



SCIENCE EDUCATION
visit us at 3bscientific.com

Anatomy
Biology
Botany

Chemistry
Health Education
Earth Science

Lab Equipment
Medical Education
Physics

Teltron® Tubes
Zoology
STEM

Changing the face of the world through EDUCATION

Albert Einstein once said, *"It is the supreme art of the teacher to awaken joy in creative expression and knowledge."* Here at 3B Scientific we believe that teachers who can accomplish this can shape the face of the earth, and thus we strive to empower them with the tools necessary to do so.

We believe that teachers with interactive models and experiments will not only enable students to retain knowledge but inspire them and invoke a sense of curiosity.

A student may hear about the process of osmosis, but seeing it and interacting with it produces curiosity that drives them to expound upon it. It is in this advanced process that our world has gone from the light bulb to space exploration, from shamanism to modern medicine, from the earth being a flat surface to a globe tilting on an axis.

3B Scientific consists of a team of trained professionals who believe in the process of learning by demonstration and practice. We develop products of the highest fidelity to ensure that students understand science at its most fundamental level. We back these products with a knowledgeable service team here to answer all your questions and assist in any way possible. At 3B Scientific we strive to go one step further so that science can too.



Zach Montgomery
Managing Director



Danny Mashburn
Physics Product Manager





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 You can find more products covering the topics introduced here on our web site.

FULL SIZE SKELETONS

Stan the 3B Scientific® Classic Skeleton

This classic model has been the standard of quality in hospitals, schools, universities, and laboratories for over 50 years. Ideal for active use in teaching and demonstrations, this is the most affordable full-size skeleton of this quality available anywhere! Don't settle for imitations which compromise quality in workmanship and materials. Stan's the man! Comes on waist mounted roller stand. 170 cm; 7.6 kg S-A10

Affordable, reliable, and genuine 3B Scientific®!



3-part skull (skull cap, skull base, mandible)



Fully articulated hands and feet



Stan the Hanging Stand

186 cm; 8.3 kg

S-A10/1



Max the Classic Muscle Skeleton

This version contains all the standard benefits of a 3B Scientific® Skeleton. In addition, it shows the structural interaction between bones and muscles. It depicts over 600 structures of medical/anatomical significance including muscle origins (red) and insertions (blue) on the left side as well as hand numbered bones, fissures and foramina on the right side. 170 cm; 8.0 kg

S-A11

Affordably priced with no sacrifice in quality!



3-part numbered skull (skull cap, skull base, mandible)



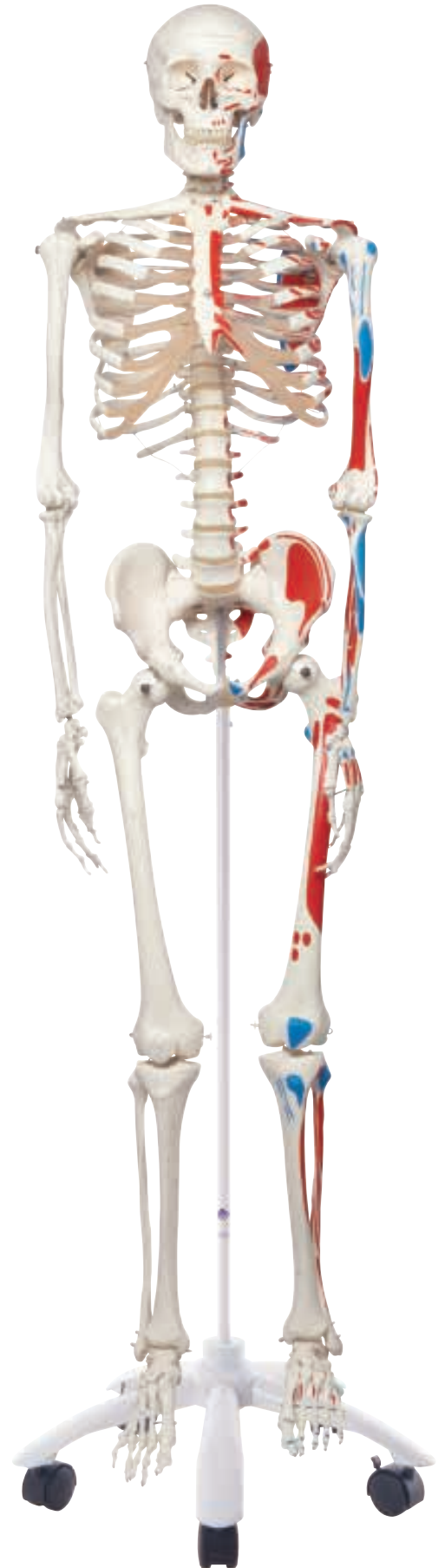
Max on Hanging Stand

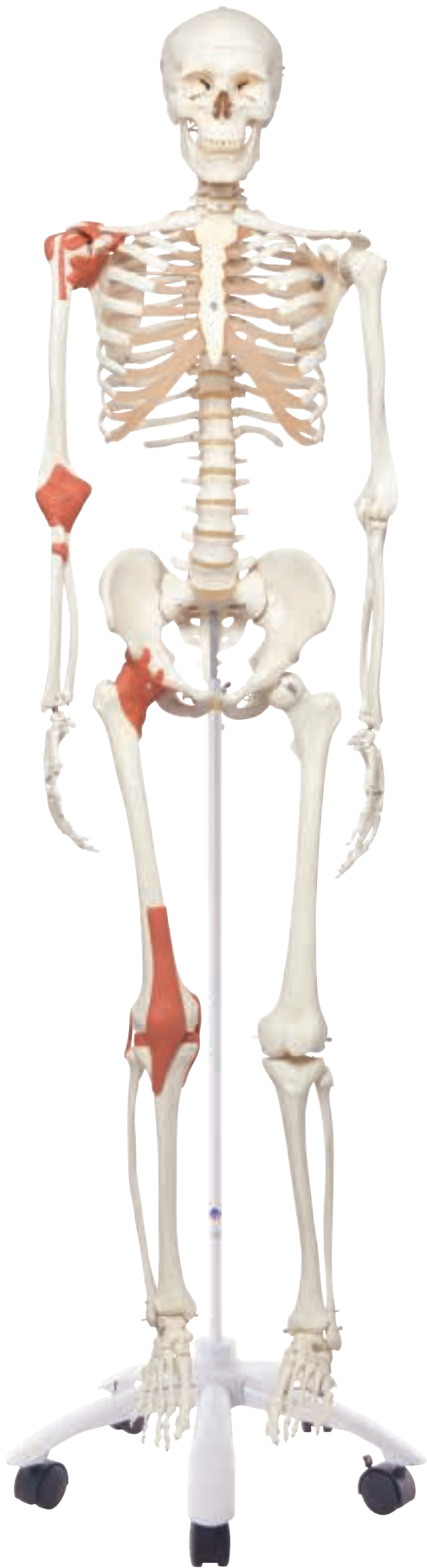
186 cm; 8.3 kg

S-A11



Movable joints

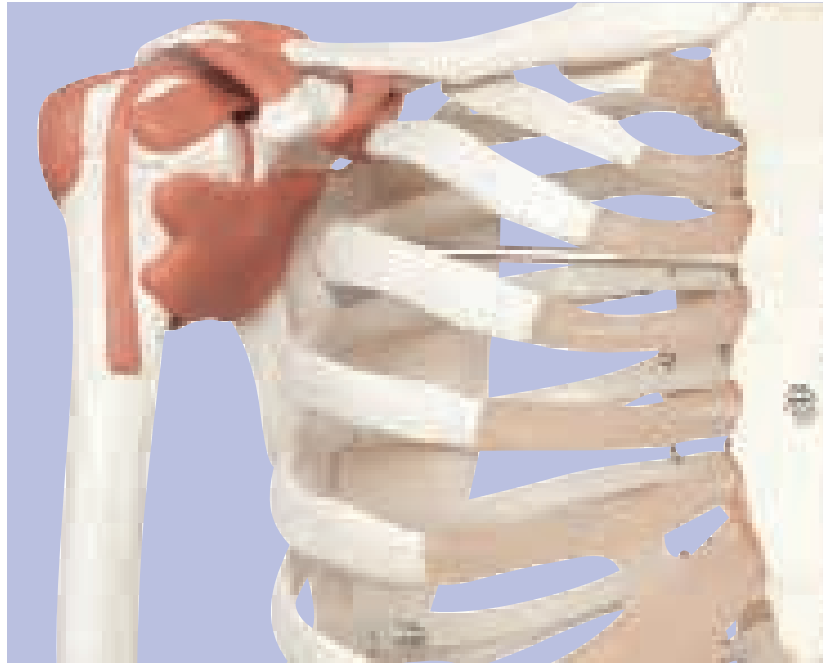




Leo the Classic Ligament Skeleton,

In addition to the standard advantages of a 3B Scientific® Skeleton, Leo provides representations of the structural interaction between bones and ligaments. His elastic ligaments on the major appendicular joints (shoulder, elbow, hip, and knee) are mounted on the right side. Now available on a stable metal stand with 5 casters and dust cover! 170 cm; 8.2 kg S-A12

Elastic, movable joints!



Elastic knee ligaments



Heavy Duty Protective Cover

Protect your investment with our heavy-duty protective cover. Suitable for all full-size skeletons and stand versions. Black.

S-W40103

Sam the Super Skeleton Does it All!

Sam's fully flexible vertebral column allows you to demonstrate all natural postures, including the movements of the skull and head joints. The unique combination of a flexible vertebral column, muscle origins and insertions, numbered bones, flexible joint ligaments, and a disc prolapsed between the 3rd and 4th lumbar vertebrae allow you to display over 600 structures of medical/ anatomical interest with this top of the line model. 170 cm; 8.4 kg

S-A13

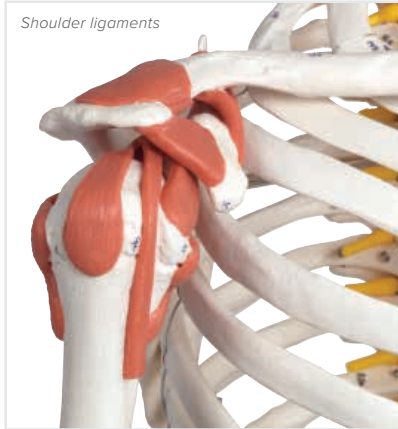
Flexible vertebral column!



Sam on Hanging Stand

75.8 in; 22 lb

S-A13/1



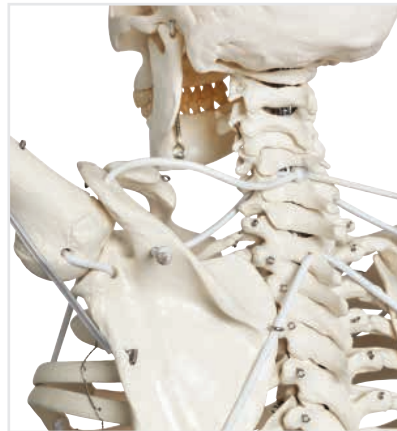


Frank The Functional Skeleton

This unique functional skeleton comes on a hanging stand and features a flexible assembly of all joints, allowing you to perform the individual movements in a nearly realistic way. You can even demonstrate the complex motions of the upper extremity. The shoulder blades rotate along when the arms are raised. Graphically demonstrate the position of the radial and ulnar bones during inward and outward rotation of the lower arm. The flexible spine allows for natural movement (lateral inclination, flexion and extension, rotation). Even the restricted mobility of the iliosacral joint and the sacrococcygeal joint can be demonstrated. 186 cm; 8.5 kg

S-A15/3S

You've never seen a skeleton move like this before!



Flexible mounted hand



Radial & Ulnar rotation



Realistic patella movement

Physiological Phil Skeleton

This skeleton is unique in its near lifelike realization of the joint mechanisms. It allows you to demonstrate the inward and outward rotation of the arms and legs and the extension and flexion of the knee and elbow joints. The flexible spine allows for natural movement (lateral inclination, movement and extension, rotation). The bones of the hands are wire mounted to demonstrate their natural positions. The foot bones are mounted flexibly to enable movability. The shoulder blades rotate along when the arms are raised. Even the restricted mobility of the iliosacral joint and the sacrococcygeal joint can be demonstrated. 186 cm; 8.5 kg

S-A15/3

Demonstrate any movement with Phil the Skeleton!



First class natural cast



Fred the Flexible Skeleton

Fred's spine can bend to mimic any natural human movement. Once flexed, it remains fixed in position to demonstrate correct and incorrect posture or various pathological conditions. In addition, all skull movements can be demonstrated. Spinal nerve exits and vertebral arteries are shown as well as a dorso-lateral disc prolapse between the 3rd and 4th lumbar vertebrae. Fred has all the standard benefits of a 3B Scientific® Skeleton. 69.5 in; 21 lb

S-A15

Extremely flexible!



INDIVIDUAL BONE MODELS

Disassembled Skeleton Models



Disarticulated Full Skeleton, numbered with muscle origins and insertions

This disarticulated 3B Scientific® Skeleton is hand-painted and numbered to show muscle origins in red and muscle insertions in blue on the left side. The disarticulated skeleton's bones and bony structures such as fissures, foramina and processes are hand-numbered on the right side. The skull is detachable into 3 parts for detailed anatomical study. Consists of 53 pieces.

- One hand and foot on wire
- One set of arms and leg loosely
- Vertebral column strung on thin, nylon wire
- Multilingual product manual to identify over 600 numbered anatomical structures
- Supplied in a sturdy partitioned cardboard storage box

This high quality skeleton replica is great for any in depth study of the human skeleton and scientific anatomy studies.

S-A05/2

600 numbered
anatomical structures



Disarticulated Full Skeleton, wire mounted hand/foot (not shown)

One hand and foot on wire, one loosely articulated. Supplied in a sturdy partitioned storage box.

48.5 x 27 x 42.5 cm; 4.8 kg

S-A05/1

Disarticulated Half Skeleton, with loose hand/foot (not shown)

Complete with 3-part skull, sternum, hyoid and spinal column.

48.5 x 27 x 42.5 cm; 4 kg

S-A04/1

Disarticulated Half Skeleton, with wire mounted hand/foot (not shown)

Complete with 3-part skull, sternum, hyoid and spinal column.

49 x 43 x 26.5 cm; 4 kg

S-A04

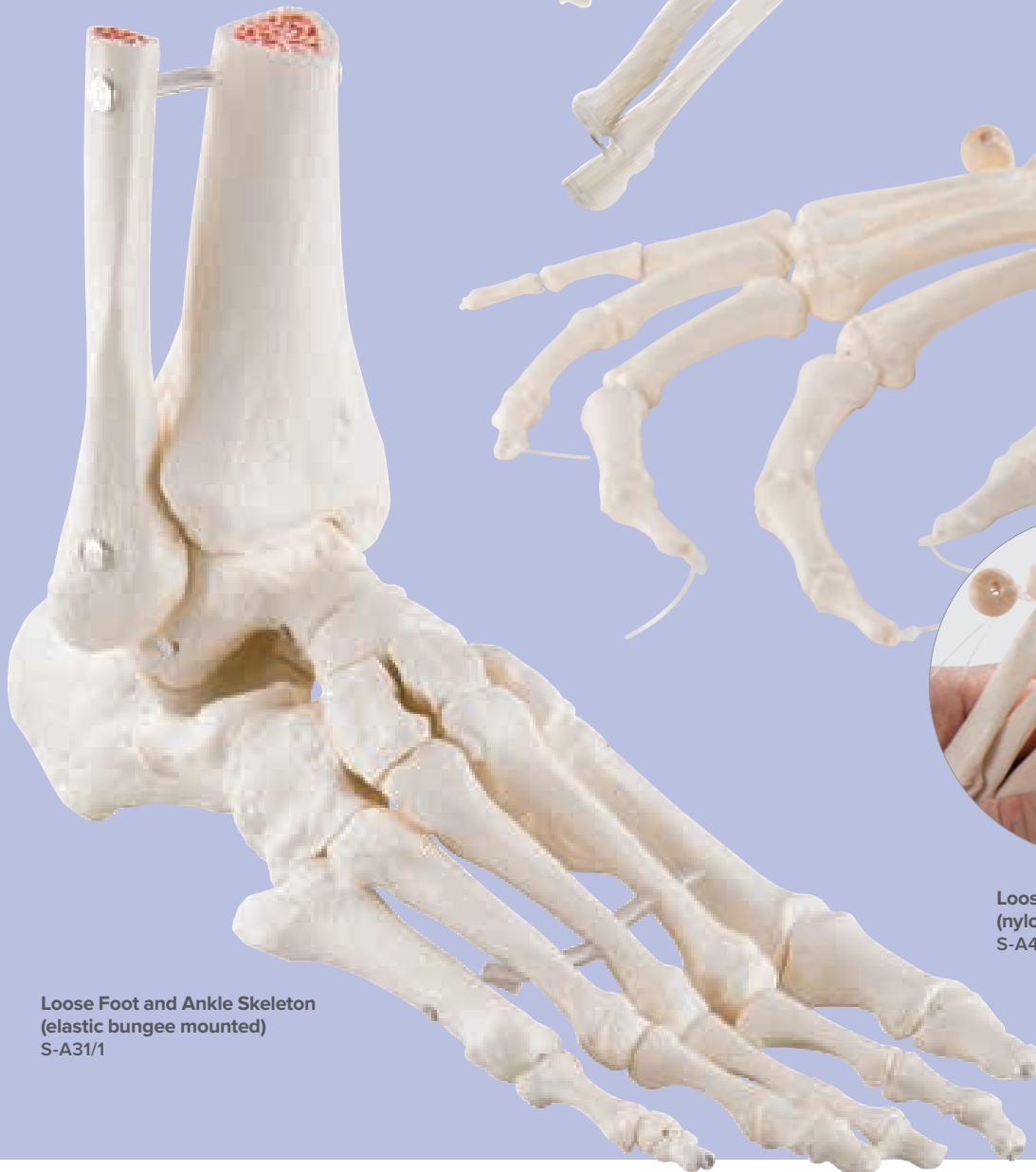
Loosely mounted on nylon for more flexibility!



**Loose Foot Skeleton
(nylon mounted)**
S-A30/2



**Loose Hand Skeleton
with Ulna and Radius**
Loosely mounted on bungee string,
Ulna and radius wire mounted.
S-A40/3



**Loose Foot and Ankle Skeleton
(elastic bungee mounted)**
S-A31/1

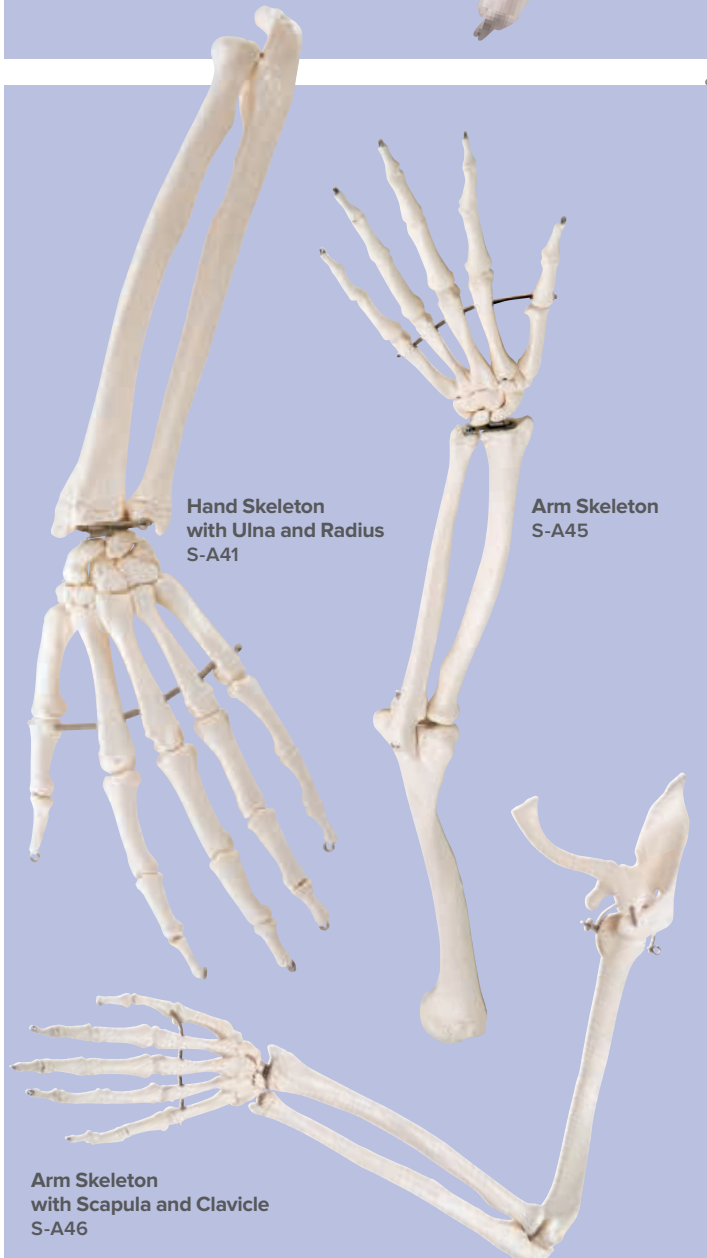


**Loose Hand Skeleton
(nylon mounted)**
S-A40/2



Wire mounted for more stability!

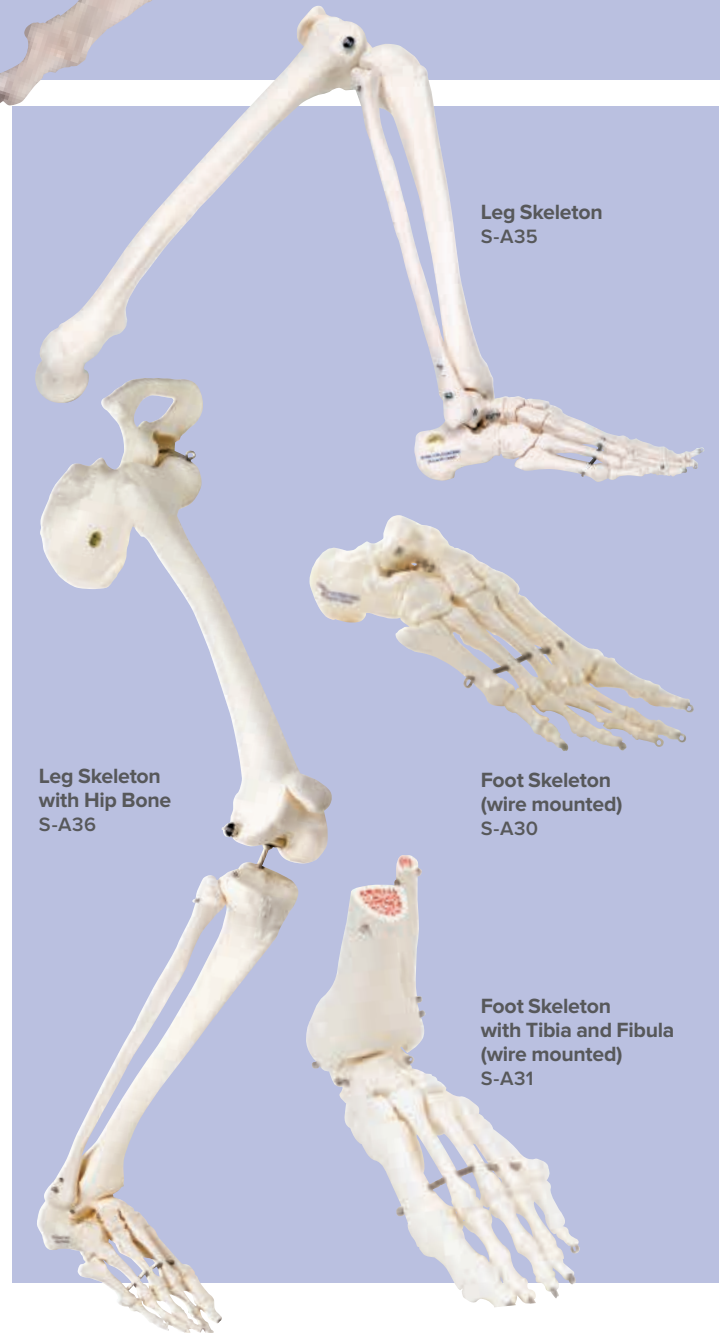
Hand Skeleton (wire mounted)
S-A40



Hand Skeleton
with Ulna and Radius
S-A41

Arm Skeleton
S-A45

Arm Skeleton
with Scapula and Clavicle
S-A46



Leg Skeleton
S-A35

Leg Skeleton
with Hip Bone
S-A36

Foot Skeleton
(wire mounted)
S-A30

Foot Skeleton
with Tibia and Fibula
(wire mounted)
S-A31

- A. Ulna**
S-A45/2
- B. Radius**
S-A45/3
- C. Humerus**
S-A45/1
- D. Fibula**
S-A35/4
- E. Femur**
S-A35/1
- F. Tibia**
S-A35/3
- G. Hip Bone**
S-A35/5
- H. Patella**
S-A35/2
- I. Atlas and Axis, wire mounted**
S-A71



Individual bone models



J. Atlas and Axis, with occipital plate
Wire mounted together on removable stand.
S-A71/5

K. Hyoid Bone Mounted on stand.
S-A71/9

L. Sternum with Rib Cartilage
Replica human sternum with rib cartilage.
S-A69

M. Clavicle
S-A45/5

N. Scapula
S-A45/4

O. Ribs
12 individual ribs of one side, unmounted.
S-A69/2

P. Sacrum and Coccyx
Assembled
S-A70/6

MINI SKELETONS

Incredible detail & fully articulating joints!



Shorty the Mini Skeleton

3B Scientific engineers have optimized the process of reproducing miniatures keeping all anatomical details and structures, even at a portion of natural size (80 cm). The skull can be removed and disassembled into 3-parts. Made from durable, unbreakable plastic, hand assembled. 94 cm; 1.7 kg

S-A18/1



Shorty with Pelvic Mount, on removable base

The skull can be removed and disassembled into 3-parts. Made from durable, unbreakable plastic, hand assembled. 88 cm; 1.5 kg

S-A18



Shorty with Painted Muscles

Like A18/1, but with painted muscle insertions (blue) and origins (red). The stand can be either placed on the floor or be attached to a wall. 94 cm; 1.7 kg

S-A18/6



Shorty with Painted Muscles, pelvic mounted

Like A18, but with numbered muscles, muscle origins (red), and insertions (blue) painted on the left half and a pelvic mounted stand. 94 cm; 1.7 kg

S-A18/5

More than measures up to the competition!

Mini Vertebral Column, flexible, on stand

Model with occipital plate of the skull, sacrum, coccyx, and intervertebral discs. The vertebral column is flexibly mounted to demonstrate natural movements and pathological changes. On a detachable stand. 44 cm; 0.25 kg

- Scaled down replicas are big on details
- Lightweight for easy transport
- Compact when space is a concern

S-A18/21



Mini Skull, 3-part

Our mini skull precisely depicts all anatomical structures down to the last detail. Use it for education or as an office decoration. Can be disassembled into skullcap, base of skull, and mandible. 10 x 8 x 8 cm; 0.10 kg

S-A18/15



Multifunctional Spinal Column Stand, 3-part (skeleton not included)

Dual purpose stand serves double duty; place it on a desk, the floor, or hang on a wall. Your choice!

S-A59/8

JOINT MODELS

Study the four major joints!

Deluxe Functional Joint Models

These high-quality functional models of naturally-sized right joints with ligaments show the anatomy and possible physiological movements (e.g. abduction, anteversion, retroversion, internal and external rotation) in exceptional detail. The color of the natural-cast bones is extremely realistic. The cartilage on the joint surfaces is marked blue.

A. Functional Shoulder

22 cm; 0.41 kg
S-A80/1

C. Functional Knee

32 cm; 0.55 kg
S-A82/1

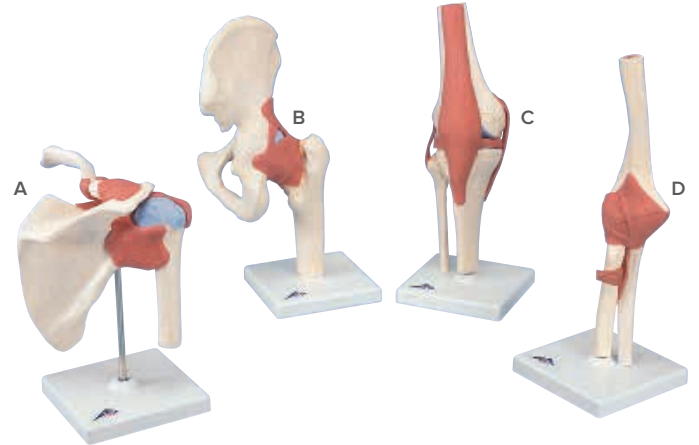
\$139 ea.

B. Functional Hip

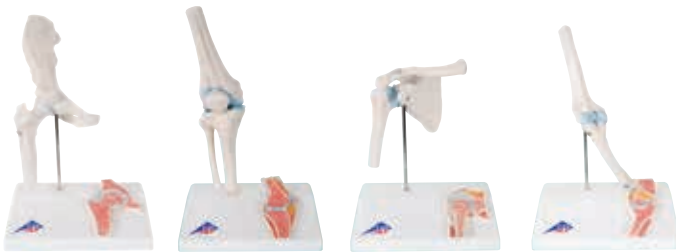
32 cm; 0.56 kg
S-A81/1

D. Functional Elbow

33 cm; 0.28 kg
S-A83/1



\$51 ea.



3B Scientific® Mini Joint Series with CrossSection

These mini-joints have been reduced to half their natural size but have kept all of their functionality. In addition to the external anatomical structures, using the superb joint crosssections mounted on the base, educators now have the ability to explain what is happening from "within".

E. Mini Hip

16 x 12 x 20 cm
S-A84/1

F. Mini Elbow

16 x 12 x 20 cm
S-A87/1

G. Mini Knee

10 x 14 x 24 cm
S-A85/1

H. Mini Shoulder

12 x 14 x 16 cm
S-A86/1



\$98 ea.



Classic Flexible Joint Models

Our classic joint models feature the same look and size as the deluxe models but without the natural bone coloring process and the blue paint representing cartilage.

I. Flexible Shoulder

16 x 12 x 20 cm
S-A80

J. Flexible Hip

17 x 12 x 33 cm
S-A81

K. Flexible Knee

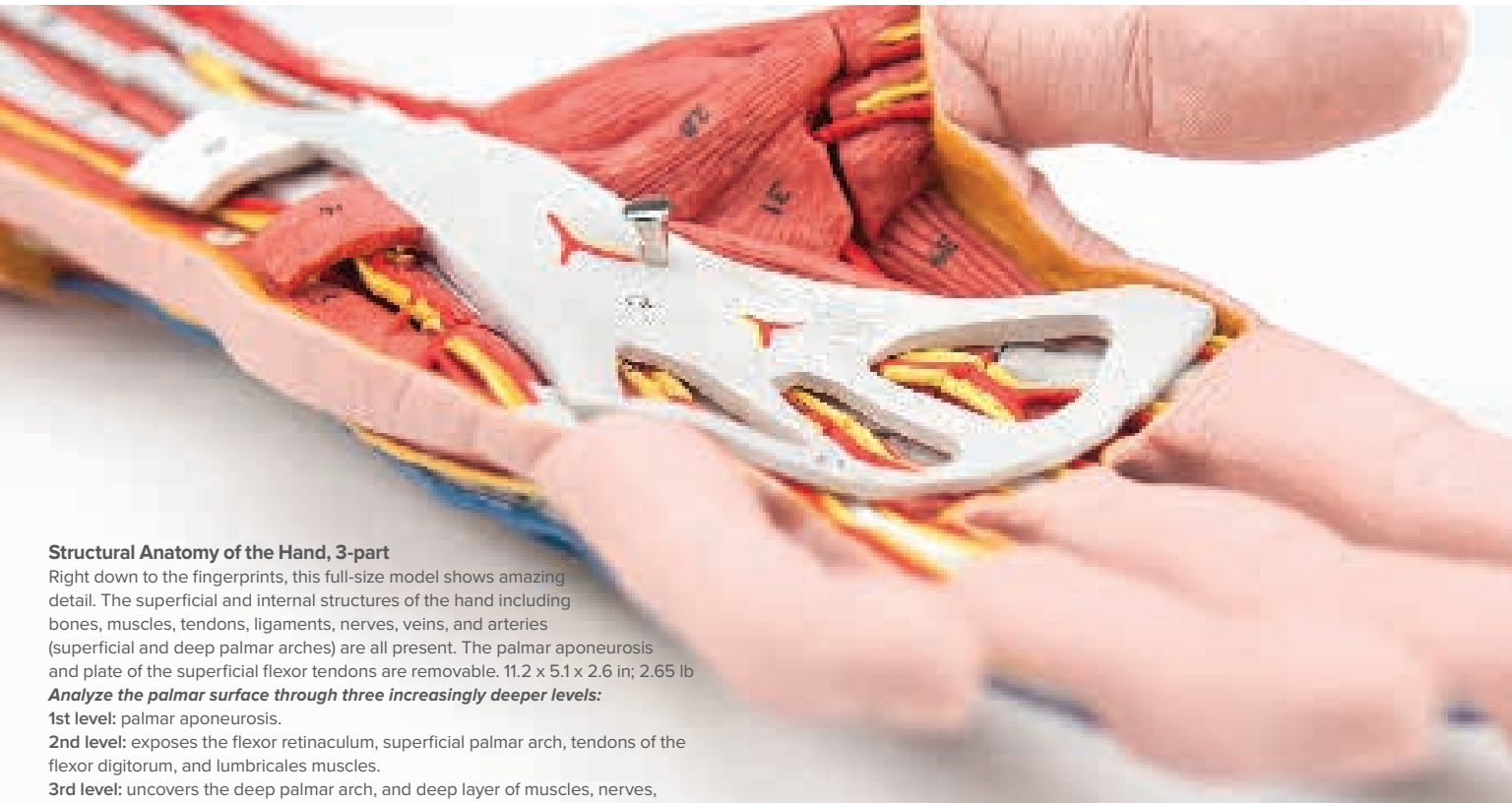
12 x 12 x 34 cm
S-A82

L. Flexible Elbow

12 x 12 x 39 cm
S-A83



INTERNAL STRUCTURES



Structural Anatomy of the Hand, 3-part

Right down to the fingerprints, this full-size model shows amazing detail. The superficial and internal structures of the hand including bones, muscles, tendons, ligaments, nerves, veins, and arteries (superficial and deep palmar arches) are all present. The palmar aponeurosis and plate of the superficial flexor tendons are removable. 11.2 x 5.1 x 2.6 in; 2.65 lb

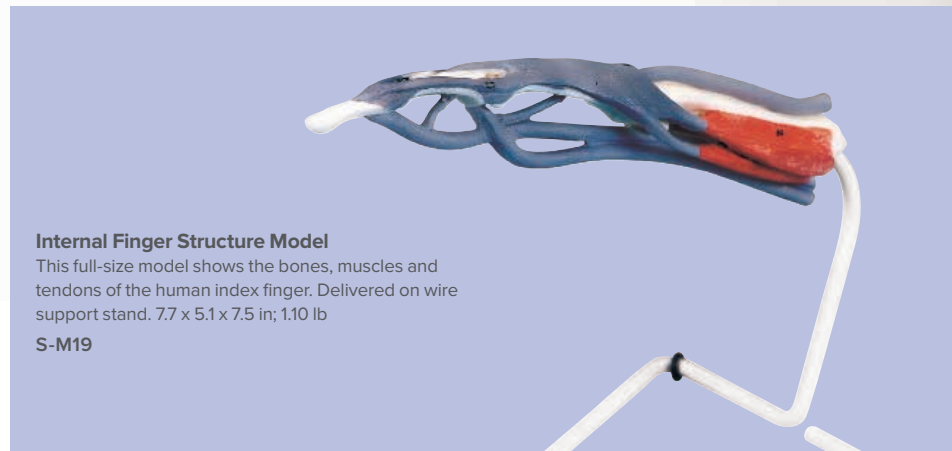
Analyze the palmar surface through three increasingly deeper levels:

1st level: palmar aponeurosis.

2nd level: exposes the flexor retinaculum, superficial palmar arch, tendons of the flexor digitorum, and lumbricales muscles.

3rd level: uncovers the deep palmar arch, and deep layer of muscles, nerves, tendons, and ligaments.

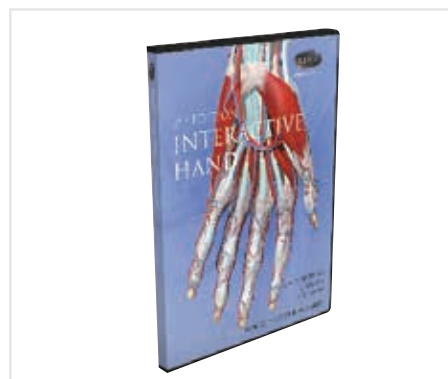
S-M18



Internal Finger Structure Model

This full-size model shows the bones, muscles and tendons of the human index finger. Delivered on wire support stand. 7.7 x 5.1 x 7.5 in; 1.10 lb

S-M19

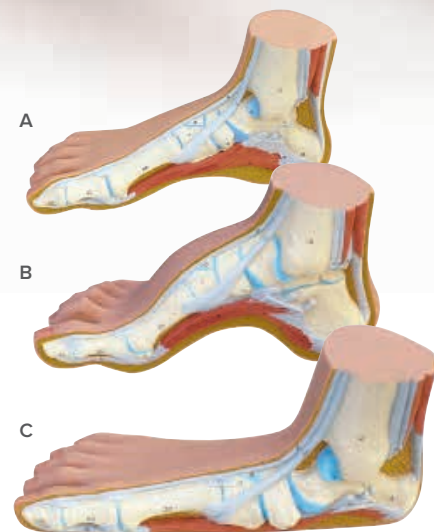


Interactive Hand 2nd Edition - DVD

3D models of all individual anatomical structures allow you to peel away layers of anatomy from skin to bone and to rotate the model at any stage. All structures have accompanying text, links to images and video clips including labeled dissections, annotated illustrations and clinical slides.

S-W46659

Use your priority code to receive **FREE** shipping.*



A. Normal Foot (Pes Cavus)

5.1 x 9.4 x 3.5 in; 0.88 lb

S-M30

B. Hollow Foot (Pes Cavus)

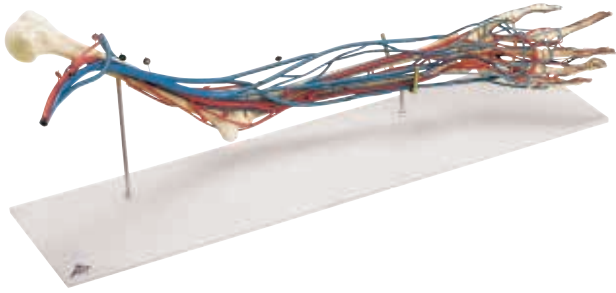
5.1 x 9.1 x 3.9 in; 1 lb

S-M32

C. Flat Foot (Pes Planus)

4.7 x 9.4 x 3.9 in; 0.88 lb

S-M31

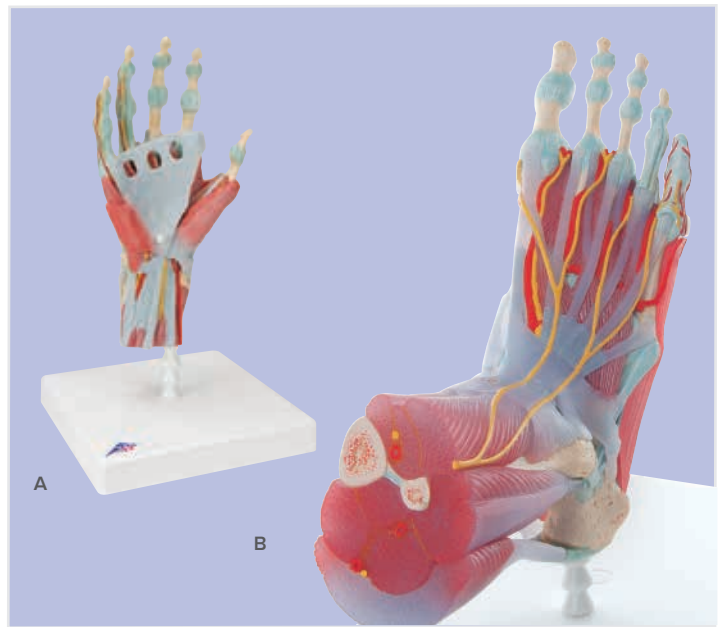


Vascular Arm

Life-size model of the left arm and hand in a semi-flexed position with the brachial, radial and ulnar arteries and accompanying veins with their radicals in situ. The complete blood circulatory system of the hand is shown on both palmar and dorsal surfaces. Comparative sizes of the various blood vessels are clearly indicated and facilitate the study of the blood circulation in the arm. Mounted on stand.

66 x 18 x 28 cm; 2.0 kg

S-W19019



A. Hand Skeleton with Ligaments and Muscles

The dorsal side of the hand shows the extensor muscles as well as portions of the tendons at the wrist as they pass under the extensor retinaculum. The palmar face of the hand is represented in three layers, the first two are removable to allow for detailed study. 13.0 x 4.7 x 4.7 in; 0.88 lb

S-M33/1

B. Foot Skeleton with Ligaments and Muscles, 6-part

The frontal view features the extensor muscles of the lower leg. The tendons can be followed as they pass under the transverse and cruciate crural ligaments all the way to their insertion points. In addition, all tendon sheaths are visible. On the dorsal portion of the model the gastrocnemius muscle is removable to reveal deeper anatomical elements. The sole of the foot is represented in three layers; displaying the flexor digitorum brevis, quadratus plantae, the flexor hallucis muscle, and even deeper anatomical details. 9.1 x 10.2 x 7.5 in; 2.43 lb

S-M34/1



Hand and Wrist Anatomy Chart

50 x 67 cm

S-VR1171L



Foot and Joints of Foot Chart

50 x 67 cm

S-VR1176L



Hand Skeleton with Ligaments and Carpal Tunnel

This 3-part hand model shows the anatomical detail of the ligaments and tendons found on the hand, wrist, and lower forearm. The flexor retinaculum is removable and in addition there is a removable portion that can be fitted on the back of the model. 11.8 x 5.5 x 3.9 in; 0.66 lb

S-M33



Foot Skeleton with Ligaments

This detailed model displays numerous important ligaments and tendons including the Achilles and peroneus longus tendons of the ankle.

9.1 x 7.1 x 11.8 in; 1.32 lb

S-M34



Hand with Ligaments

This single-part model shows the anatomy of the ligaments in the hand in detail. It is ideally suited both as a teaching aid as well as for anatomy classes, such as for medical students, physiotherapists and occupational therapists.

S-M36



Sports Shoulder with Rotator Cuff, 5-part

This model comprises the upper half of the humerus, the clavicle and the shoulder blade. The muscles of the rotator cuff (subscapularis muscle, supraspinatus muscle, infraspinatus muscle, teres minor muscle) are displayed and the sites of origin and insertion of the shoulder muscles are highlighted in color (origin = red; insertion = blue). By removing the four individual muscles, all movements of the shoulder joint can be performed. 7.1 x 7.1 x 9.4 in; 1.87 lb

- Abduction
- Adduction
- Inward rotation
- Outward rotation
- Anteversion
- Retroversion
- Elevation
- Circumduction

S-A880



Muscle Knee Joint, 12-part

Shows different removable muscles and muscle portions of the knee area. Color coded and raised areas indicate the muscle origin and insertion points on the femur, tibia, and fibula. In addition parts of the fibular and tibial collateral ligaments are represented. All the muscles of the leg are easily removable to permit study of the deeper anatomical layers. 13.0 x 6.7 x 6.7 in; 1.98 lb

S-A882



Femoral Fracture and Hip Osteoarthritis

At half natural-size, this model shows the right hip joint of an elderly person. Shown are the femoral fractures that occur most commonly as well as typical wear and tear of the hip joint. Also, a frontal section through the femoral neck is shown in relief on the base. On stand. 5.5 x 3.9 x 8.7 in; 0.66 lb

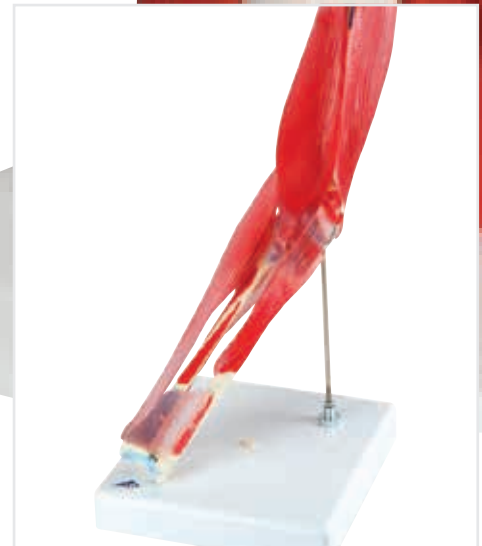
S-A888



Hip Joint with Removable Muscles, 7-part

Right hip joint of an adult male with the individual muscles as well as the muscle origins and insertions on the femur and the hip bone. For educational purposes, the origin (red) and insertion areas of the muscles (blue) have been raised and presented in color. The hip muscles have been mounted on their corresponding regions of origin and insertion and are thus removable. 7.1 x 12.6 x 7.1 in

S-A881



Elbow Joint with Removable Muscles, 8-part

The right elbow of a male with individual muscles plus muscular origins and insertions on the humerus, radius, and ulna. For didactic reasons, the areas of the muscular origins (red) and insertions (blue) are raised and color-coded. The muscles can be attached to and removed from the corresponding areas of origin and insertion. 9.8 x 16.1 x 9.8 in

S-A883

SPINE / VERTEBRAE MODELS



What is BONElike™?

3B Scientific® BONElike™ material looks and feels like real bone. Each bone is a unique original cast of natural human bone with realistic weight, feel and appearance. The finest anatomic structures are presented in extreme detail with realistic texture, color, and the porous characteristics of real human bone. They make excellent substitutes for real bone, which can be hard to obtain for ethical reasons. Great for use in medical teaching settings and in patient consultation.

3B Scientific® BONElike™ Youth Vertebral Column

This true-to-life anatomical replica of the vertebral column of a child of about 5 years old is especially interesting for those working in the areas of anatomy, pediatrics, orthopaedics and pediatric radiology. The unique material of the spine model makes it almost visually indistinguishable from a real vertebral column.

The flexible vertebral column including occipital plate, pelvis and sacroccyx is mounted on a stand. Within the spinal canal, the spinal cord with cauda equina and exiting nerve roots are represented in flexible material. See online for full description. 14 x 9 x 51 cm; 0.5 kg

S-A52



BONElike™ Flexible Vertebral Column

This true-to-life model of the human vertebral column is an excellent example of BONElike™ quality. This original, natural reproduction shows all anatomical details and has the realistic weight and feel of natural bone. Consists of the male pelvis and occipital plate. Occipital plate and atlas can be detached individually. Without stand. 85 cm; 1.5 kg

S-A794



Complete BONElike™ Vertebrae Set of 24

A complete set of 24 unmounted vertebrae delivered in a padded, easy-carry storage and travel case. 41 x 40 x 12 cm; 2.4 kg

S-A793



Vertebrae Sets

Nowhere else in the world can you find these realistic, high quality casts of original bones. They show even the finest anatomical structures in great detail. Supplied on a base. 30 x 21 x 6 cm; 0.3 kg

A. BONElike™ Cervical Vertebrae Set of Seven
S-A790

B. BONElike™ Lumbar Vertebrae Set of Five
S-A792

Flexible Spines



Classic Flexible Spine

Our most popular spine for education is also our most affordable. Fully flexible and designed for handon demonstrations. Stand is not included, please see A59/8. 29 in; 4 lb

Contains these features:

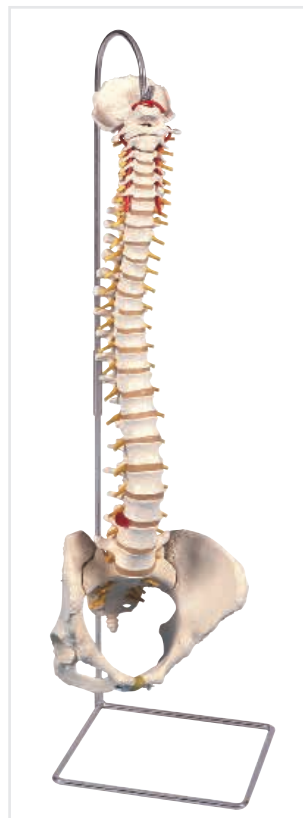
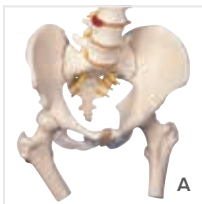
- Full pelvis and occipital plate
- Fully flexible mounting
- L3-L4 disc prolapsed
- Spinal nerve exits
- Cervical vertebral artery
- Male pelvis

S-A58/1

A. Classic Flexible Spine with Femur Heads

Same features as A58/1, additionally with femur heads. 83 cm; 2.1 kg

S-A58/2



Classic Flexible Spine with Female Pelvis

All other features as A58/1. 29 in; 4 lb

T-A58/4 \$175.00



Classic Flexible Spine with Femur Heads and Painted Muscles

Painted spines add a dimension to demonstrations. Muscle origins (red) and insertions (blue) are painted on left innominate, femur and vertebrae. Same features as A58/1. Stand is not included, please see A59/8. 32.7 in; 4.63 lb

S-A58/3



Classic Flexible Spine with Ribs and Femur Heads

All other features as A56. 83 cm; 3.0 kg

S-A56/2



Flexible Spine with Soft Intervertebral Discs

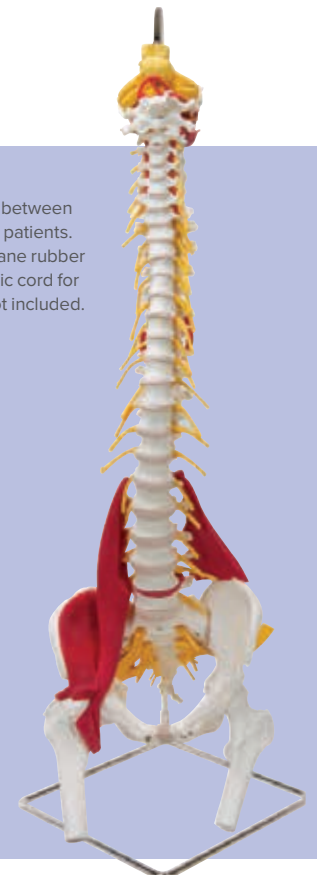
This unique spine shows how the discs deform during normal and abnormal positioning. Use it to demonstrate any number of pathological conditions such as scoliosis, lordosis, kyphosis, or subluxations. Herniation can be demonstrated with compression. Includes spinal cord and spinal nerves. Comes with its own removable stand. 10.2 x 9.8 x 35.4 in; 6.61 lb

S-VB84

Musced Spine

Easily demonstrate the relationship between bones and muscles to students and patients. Muscles are made of soft polyurethane rubber and are attached with a sturdy elastic cord for precise demonstrations. Stand is not included.

S-W99120





Deluxe Flexible Spine

In addition to all features of the Classic Spine Series our Deluxe Spine has a sacral opening and exposed brainstem for advanced studies. Stand is not included, please see A59/8. 74 cm; 1.8 kg

Other features are:

- Full pelvis and occipital plate
- Fully flexible mounting
- L3-L4 disc prolapsed
- Spinal nerve exits
- Cervical vertebral artery
- Male pelvis
- Cauda equine

S-A58/5

Deluxe Flexible Spine with Femur Heads (not shown)

Same features as A58/5, additionally with femur heads.

83 cm; 2.1 kg

S-A58/6



Deluxe Flexible Spine with Femur Heads and Painted Muscles

Painted spines add a dimension to demonstrations. Muscle origins (red) and insertions (blue) are hand-painted on left innominate, femur and vertebrae. For further information see A58/5. Stand is not included. Please see A59/8. 83 cm; 2.1 kg

S-A58/7



Highly Flexible Spine

With male pelvis, occipital plate, vertebral artery, spinal nerve exits and a dorsal lateral disc prolapse between the 3rd and 4th lumbar vertebrae. Specially mounted on a flexible, durable hose providing extra stability. Stand is not included, please see A59/8. 29 in; 3.1 lb

S-A59/1

Highly Flexible Spine with Femur Heads (not shown)

All other features as A59/1. 32.7 in; 5 lb

S-A59/2



Didactic Flexible Spine with Femur Heads

Use this spinal column for simplified patient education or for lessons in a classroom environment in which the didactic coloring helps reinforce the explanation, even from a distance. Stand is not included, please see A59/8. 32.7 in; 4.63 lb

Differentiated by color are the 5 different sections of the spinal column:

- 7 Cervical vertebrae
- 12 Thoracic vertebrae
- 5 Lumbar vertebrae
- Sacrum
- Coccyx

S-A58/9

Didactic Flexible Spine (not shown)

All the features of the A58/9.

S-A58/8



Multifunctional Stand, 3-part

- Great for spines & hanging skeleton models
- Can be placed on the floor
- Can be mounted on a wall
- Made of nickel-plated steel

T-A59/8 \$62.00

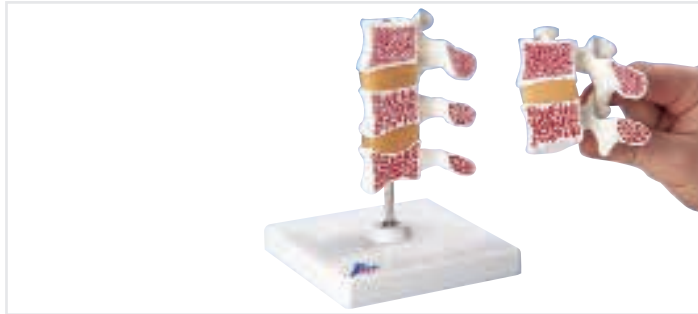
VERTEBRAE MODELS



5-Stages of Vertebral Degeneration

The model illustrates degenerative changes to the vertebral bodies and intervertebral discs of the lumbar spine in various degrees. Based on the original cast of a human lumbar spine, even the finest bone structures are accurately depicted. The model can be disassembled into vertebrae and intervertebral discs. Visit 3BScientific.com for representational conditions. Supplied on base. 22 cm; 0.5 kg

S-A795

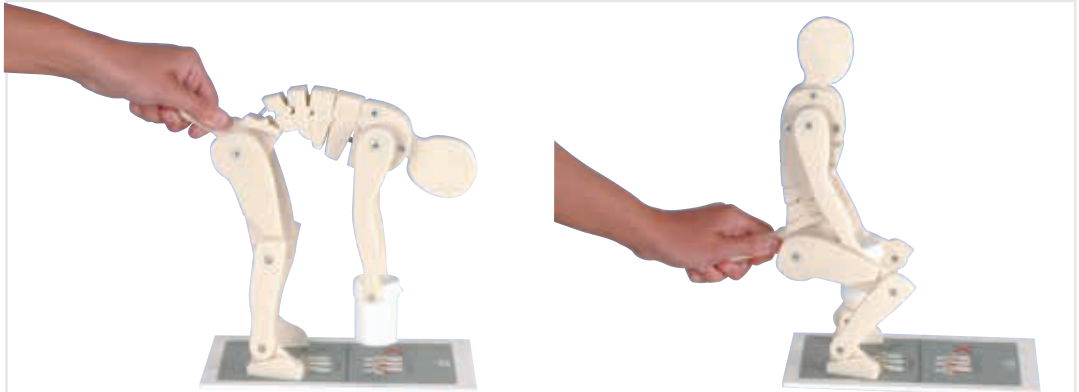


Deluxe Osteoporosis Model

Consists of three medially divided lumbar vertebrae with intervertebral discs. The upper section shows healthy bone structure, the middle section osteoporotic bone structure, and the lower section advanced osteoporotic bone structure with flattened plates, deformation and decreased mass. For detailed study the vertebrae can be removed from the stand.

16 cm; 0.25 kg

S-A78



Anatomical Lifting Manikin

Clever engineering and assembly has produced a functional figure to provide a graphic demonstration of how the human spinal column reacts when heavy objects are lifted correctly and incorrectly. The manikin will lift a weight from either of two positions marked on the base. If the correct posture is used, the spine is undistorted. Incorrect posture exhibits obvious stress and distortion to the lumbar spine. Anatomical illustrations of the spine are featured on the base. Includes booklet with background information.

14 x 22.8 cm base; 42 cm tall when standing. 1.4 kg

S-W19007

Sectional Spinal Columns



Cervical Section

Consisting of occipital plate, the 7 vertebrae with discs, cervical nerves, vertebral arteries and spinal cord. On stand. 19 cm; 0.3 kg

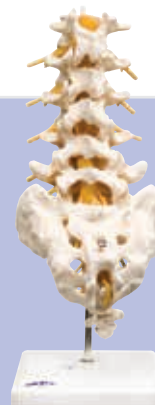
S-A72



Thoracic Section

Consisting of the 12 thoracic vertebrae with discs, thoracic nerves and spinal cord. Flexibly mounted on stand. 32 cm; 0.5 kg

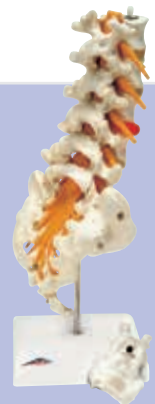
S-A73



Lumbar Section

Consisting of the 5 lumbar vertebrae with discs, sacrum with flap, coccyx, spinal nerves and spinal cord. On stand. 34 cm; 0.6 kg

S-A74



Lumbar Spinal Column with Dorso-Lateral Prolapsed Intervertebral Disc

The lumbar model includes a prolapsed inter-vertebral disc between the 3rd and 4th lumbar vertebrae. 34 cm; 0.6 kg

S-A76/5

5 times life-size!



MICROanatomy™ Bone Structure Model, enlarged 80 times

This model depicts a section of lamellar bone, showing the typical structure of tubular bone. Planes are shown in cross and longitudinal section through all levels of the bone and bone marrow. Typical elements are easily identified and help in understanding the structure and function of the Haversian systems. This representation graphically illustrates the individual bone components including spongy and compact substance, endosteum, cortical substance, osteocytes, Volkmann and Haversian canals. 10.2 x 7.5 x 5.7 in; 1.76 lb

S-A79

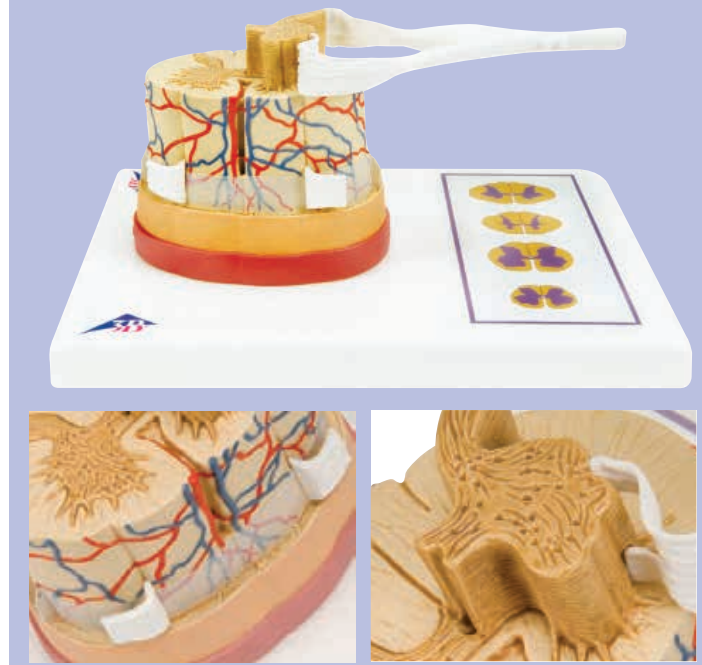
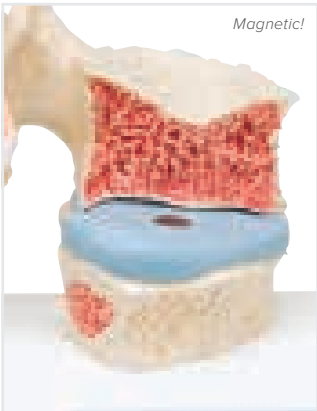


Magnetic!

Osteoporosis Model

Impressive didactic model for comparing osteoporotic and normal thoracic vertebrae. Ideal for medical studies and patient consultation. Reproductions of osteoporotic thoracic vertebrae with narrower intervertebral disc are located on the left of the stand. Two corresponding healthy vertebrae with intervertebral disc are provided on the right side. The upper vertebra is divided in the middle. The magnetically attached vertebral half can be removed easily to show the cut surfaces. A detailed illustration on the base depicts two 3D micro CT images obtained from bone biopsies.

S-A95



Spinal Cord with Nerve Endings

The construction of the spinal cord is shown through accurate representations of grey and white matter, fissures, nerve roots, the spinal ganglia, the spinal nerve with its four branches, and the three layers of the spinal column. The model is mounted on a base which has illustrations comparing cross sections from the cervical, thoracic, lumbar and sacral regions of the spinal column. The regions illustrated on the pedestal are color coded, numbered and explained in an accompanying product manual. 10.2 x 7.5 x 5.1 in; 0.88 lb

S-C41



Lumbar Spinal Column with Prolapsed Intervertebral Disc

Natural casts of L4 and L5 lumbar vertebrae with paired spinal nerves, spinal cord and two interchangeable intervertebral discs. The discs illustrate either central or dorso-lateral prolapse. Dissects into 5 parts. On stand, removable. 5.1 in; 0.6 lb

S-A76

A. Three Lumbar Vertebrae, flexibly mounted

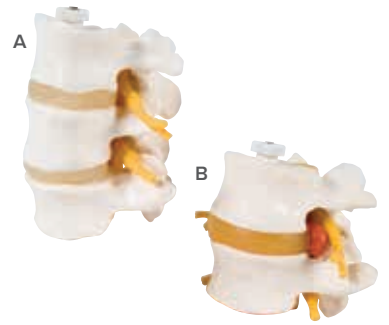
Anatomically correct to the last detail. Flexibly mounted with spinal nerves and spinal cord. 4.3 in; 0.33 lb

S-A76/8

B. Two Lumbar Vertebrae with Prolapsed Disc

Flexibly mounted with spinal nerves and spinal cord. 3.5 x 4.3 x 3.5 in; 0.33 lb

S-A76/9



SKULLS



New Skull Model with Facial Muscles

Skull with Facial Muscles

The face and mastication muscles are illustrated on the right half of this skull model. The face musculature can easily and precisely be differentiated from the mastication musculature by using two colours. On the left half the muscle origins and insertions are marked with colours (origin: red, insertion: blue). The jaw is movable and due to the flexible musculature the rudimentary chewing motion can be demonstrated. Cranium and m. masseter are detachable.

S-A300



Classic TMJ Skull with Masticatory Muscles, 2-part

Ideally suited for patient education, allied health instruction, anatomy studies, and as a medical-legal visual aid. This version of our Classic Skull has the masticatory muscles (masseter, temporal, medial and lateral pterygoid muscles) represented as elastic bands. Demonstrate the function of the masticatory muscles with jaw occlusion, the initial stage of jaw opening and the movements of the mandible to the side and front. The skullcap is removable. 20 x 13.5 x 15.5 cm; 0.9 kg

S-A24

3B Scientific® classic skulls combine quality and value with detail.

- Designed with exceptional integrity
- Affordably priced
- Top quality natural cast specimen
- Hand-made in durable, unbreakable plastic
- Highly accurate depictions of fissures, foramina, processes, sutures, and more.



Classic Skull, Painted, 3-part

The muscle origins (red) and insertions (blue) are shown in color on the left side of the skull. Cranial bones and structures are numbered on the right side. The skull identifies over 140 anatomical elements. 20 x 13.5 x 15.5 cm; 0.7 kg

S-A23

Classic Skull with Opened Lower Jaw, 3-part

In this highly detailed skull, the mandible is opened to show the dental roots with vessels and nerves. The cranial bones, bone components, fissures, foramina and other structures are numbered. The cranial sutures are shown in color, as are the meningeal vessels and venous sinuses. Over 100 features are identified in the accompanying product manual. 20 x 13.5 x 15.5 cm; 0.7 kg

S-A22

Classic Skull, Numbered, 3-part

Hand-detailed version of our Classic Skull. Hand-numbered bones and features plus highlighted suture lines of the bony plates for ease in identifying all important anatomical structures. Includes product manual with key to numbered structures. 20 x 13.5 x 15.5 cm; 0.7 kg

S-A21

Classic Skull, 3-part

The 3-part standard version A20 is a first choice for basic anatomical studies or an attractive medical gift. Alternatively, choose one of the more advanced versions with enhanced anatomical structures such as muscle origins/insertions, hand-numbered bones and structures, or a supplementary complete 5-part brain for more complex studies. 20 x 13.5 x 15.5 cm; 0.7 kg

S-A20

Life-like Detail!



Classic Skull with soft 5-part Brain

All the features of Classic Skull A20 with a supplementary 5-part brain. This skull can be disassembled into skull cap, base of skull, and mandible. 20 x 13.5 x 15.5 cm; 1.5 kg

The components of its left half are:

- Frontal lobe and parietal lobe
- Temporal lobe and occipital lobe
- Ancephalic trunk
- Cerebellum

S-A20/9



Classic Skull, Painted, with Opened Lower jaw, 3-part

Same features as A23, with exposed jaw. 20 x 13.5 x 15.5 cm; 0.7 kg

S-A22/1



Human Skull Chart

50 x 67 cm

S-VR1131L



Break-Away Adult Human Skull Kit, 22-part

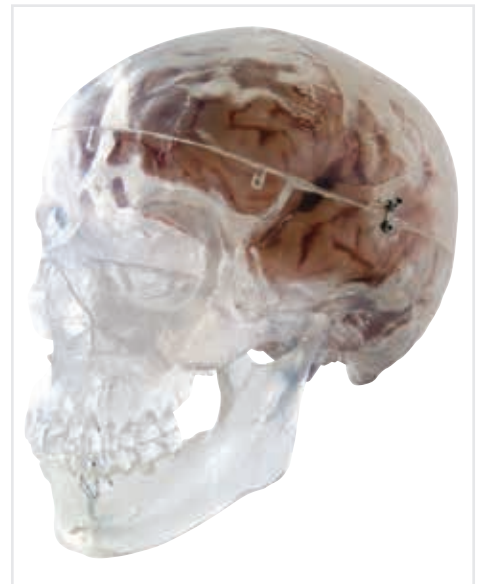
The human skull consists of many individual bones that gradually grow together as the development proceeds. The best selling 3B Scientific® Human Skull Kit is a natural cast and makes the complex anatomical structure of the skull easy to understand, since it can be disassembled into its 22 individual bones. The individual bones can be reassembled by means of inconspicuous, stable connectors attached at the slightly simplified skull sutures. The 22 bones are depicted in 9 different didactic colors so that the individual skull bones are easy to distinguish. Each pair of bone plates has the same color. The individual bones included are listed online. 21 x 13 x 15 cm; 0.7 kg

S-A291

Break-Away Adult Human Skull Kit, 22-part

The same as A291, but in natural bone color.

S-A290



Transparent Classic Skull, 3-part

Use this unique skull to study internal structures that otherwise are visible only through x-ray images.

20 x 13.5 x 15.5 cm; 0.7 kg

S-A20/T



Combined Transparent/Bone Skull, 8-part

A unique way to study the internal and external anatomy of the skull. One half is transparent and the other is bony. It offers a topographic comparison of structures that are not visible in other skull models. The teeth can be taken out and the outer masticatory muscles are represented on the bony skull half. The skull can be disassembled into two halves. 16 x 14 x 21 cm; 0.54 kg

S-A282



Human Bony Skull, 6-part

An outstanding skull for studies of the bony structure and complex anatomy of the human skull. This version shows a complete skull in median-sagittal section. It can be disassembled into two halves consisting of: 1) the calvarium and the base of the skull, and 2) the nasal septum and complete mandible. For a demonstration of masticatory motion, the mandible is mounted flexibly. 16 x 14 x 21 cm; 0.5 kg

S-A281



Deluxe Didactic Skull, 7-part

On the transparent half, the paranasal sinuses are marked in different colors as are the cranial sinuses and the neck and face arteries. One skull half visualizes the brain position and the course of the sinuses. The periodontal pockets can be viewed through the transparent jaw. The lower jaw demonstrates masticatory movements. The skull can be disassembled into both halves of the skullcap, the left half of the base of skull, the nasal septum, the complete mandible and a brain half. 35 x 18 x 18 cm; 1.0 kg

S-A283



Fetal Skull

Natural cast of a fetal head in the 30th week of pregnancy showing the characteristics of prenatal development. The fontanelles, which become bone over time, are clearly visible on the skull. Sutures will form along the bony plates helping fuse the skull as the individual ages. 14 x 9 x 9 cm; 0.2 kg

S-A25



Microcephalic Skull

This one-part microcephalic skull has an alveolar abscess of the right maxilla with the canine tooth suspended in the abscess. The molars exhibit severe attrition. 27 teeth. Natural cast. 23 x 16.5 x 17 cm; 0.8 kg

S-A29/1



Hydrocephalic Skull

The enlarged cerebral cranium is typical of this severe malformation. The skullcap of the one-part skull is partially covered by periosteum. The lower right canine and the right molar are decayed. Natural cast. 28 x 23 x 19.5 cm; 0.8 kg

S-A29/2



Skull with Cleft Jaw and Palate

Severe malformation of the left skull half. The one-part skull has 29 teeth. Natural cast. 28 x 23 x 19.5 cm; 0.8 kg

S-A29/3



Deluxe Demonstration Skull, 10-part

This replica of the human skull has exceptional quality. The skullcap is removable and the base of the skull is midsagittally divided. The frontal sinus, perpendicular lamina and vomer are fitted with flaps which can be opened to view the lateral nose wall and sphenoidal sinus. On the left half, the temporal bone can be removed and folded up in the area of the tympanic membrane. The maxilla and mandible are opened to reveal the alveolar nerves. On the right side the temporal bone is opened to reveal the sigmoid sinus, the facial nerve canal and the semicircular ducts. Additional flaps are located at the maxillary sinus and the right half of the mandible, so that the dental roots of the premolars and molars of the lower jaw can also be viewed. The natural occlusion and the individual removal and replacement of each tooth also make this skull especially interesting for dentists. 28 x 22.5 x 18.5 cm; 1.5 kg

S-A27

Exceptional teaching tool!

Neurovascular Skull

A life-size adult skull with seven cervical vertebrae mounted upon a stand. The arteries are shown on one side and nerves on the other. Removing the skull cap exposes the main nerves and arteries on the floor of the cranium. The 12 cranial nerves and the distribution of their branches is also shown. 29 x 21 x 18.5 cm; 1.3 kg

S-W19018



Didactic Skull on Cervical Spine, 4-part

Especially useful to demonstrate the specialized role of the atlas and axis; this model uses 19 didactic colors to demonstrate the shapes and relationships of the various bone plates of the skull. Flexibly mounted on the cervical spine (C1, C2 and C7 are colored), this model also exhibits the hindbrain, spinal cord, spinal nerves of the cervical spine, vertebral arteries, basilar artery and rear cerebral arteries. Mounted on a stand.

20 x 13.5 x 15 cm; 1.4 kg

S-A20/2



Skull on Cervical Spine, 4-part

This unpainted version also shows the role of the atlas and axis; is also flexibly mounted and comes with a stand and includes the entire cervical spine. In addition to the skull with movable jaw and seven cervical vertebrae, are representations of the hindbrain, spinal cord, cervical nerves, vertebral arteries, basilar artery and rear cerebral arteries.

20 x 13.5 x 15.5 cm; 1.4 kg

S-A20/1





ORTHO**bones**

Premium Class Workshop Bones

3B Scientific® ORTHObones:

Throughout the world, surgeons and medical engineers are taking advantage of the ly developed 3B Scientific® ORTHObones.

3B Scientific® ORTHObones have been cast from real specimen and are anatomically correct. The shape and physical qualities are like those of a genuine human bone.

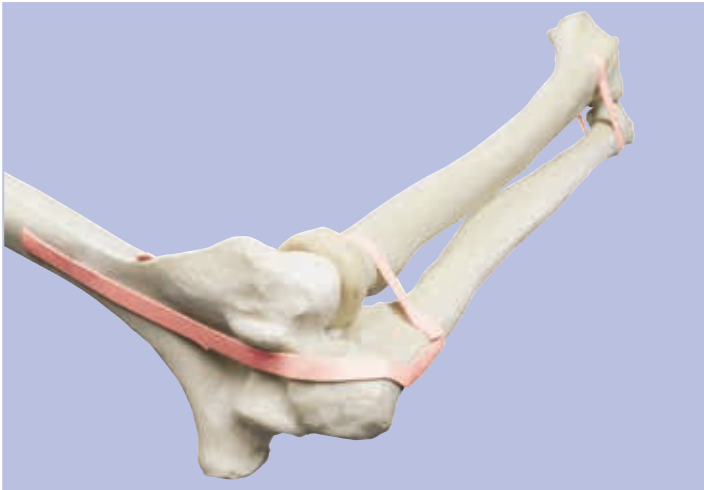
The excellent mechanical characteristics and the exact anatomical details are the most amazing features of 3B Scientific® ORTHObones. The key to the impressive similarity to real bones lies in the multi-layered construction of cortical and cancellous bone and the innovative production process.

3B Scientific® ORTHObones are made from a special mixture of plastics

that enable the use of imaging procedures, such as x-rays, without any pre-processing of the material.

3B Scientific® ORTHObones are suitable for practicing a very wide range of osteosynthetic procedures and deepening knowledge of them. Screws can be secured to the rigid cortical bone, and implants and plates can be used on it.

- High quality product
- Anatomically correct
- High contrast x-rays possible
- Better training results thanks to the realistic mechanical features
- Dual component composition: cortical and cancellous bone
- Suitable for large workshops: excellent value for money



Elbow with Latex Band
S-W19141



Knee
Left Knee S-W19146
Right Knee S-W19147



Wrist
Left Wrist S-W19143



Femur
Right Femur S-W19121
Left Femur S-W19128



Humerus
Right Humerus S-W19125
Left Humerus S-W19130



Specifically designed for surgery workshops and medical engineers
Visit 3bscientific.com for full product descriptions and additional information.

Tibia:

Right Tibia S-W19122
Left Tibia S-W19129

Ulna:

Right Ulna S-W19127
Left Ulna W19132

Radius:

Right Radius S-W19126
Left Radius S-W19131

Pelvis with Femur:

Left Pelvis S-W19149
Right Pelvis S-W19150

Half Pelvis:

Right Pelvis S-W19123
Left Pelvis S-W19133

Thoracic Vertebra:

S-W19140

Lumbar Vertebra:

S-W19134

Mandible with Teeth:

S-W19120

Sacrum Bone:

S-W19124

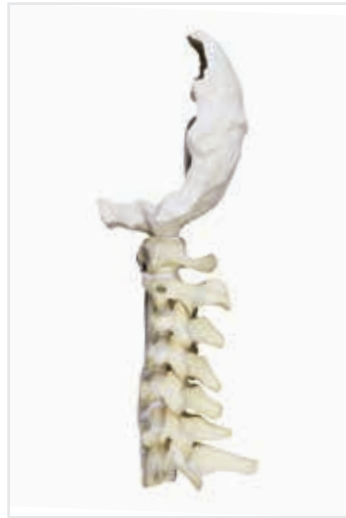
ORTHO**bones**



Full Spine
S-W19137



Cervical Vertebra
S-W19138



Cervical Vertebra with Occipital Bone
S-W19139



Full Pelvis with Femurs
S-W19148



Knee Joint with Ligaments
W19144 41



Hand
S-W19142



Foot with Hamertoes, Bunions & Heel
S-W19145



Full Male Pelvis
S-W19152

MUSCULATURE



1/3 Life-Size Muscle Figure, 2-part

The mini muscle model's (57 cm) strength is in its value. In this desktop size version all the superficial musculature of the human form is accurately reproduced and detailed in life like colors. The chest plate is removable to reveal the internal organs and the right side contains a female mammary gland. Over 125 hand-numbered and identified structures. Delivered on base. 57 x 25 x 18 cm; 2.1 kg

S-B59



Superb detail!

Mini Torso, 12-part

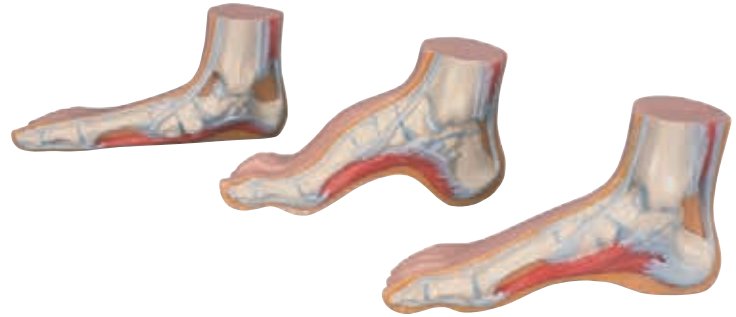
This mini masterpiece is half life-size so even small hands can quickly disassemble the torso. All parts are numbered and identified on the included product manual.

54 x 24 x 18 cm; 2.0 kg

Removable parts include:

- 2 Head halves
- Brain half
- 2 Lungs
- 2-part Heart
- Liver with gall bladder
- Stomach
- 2-part Intestinal tract

S-B22

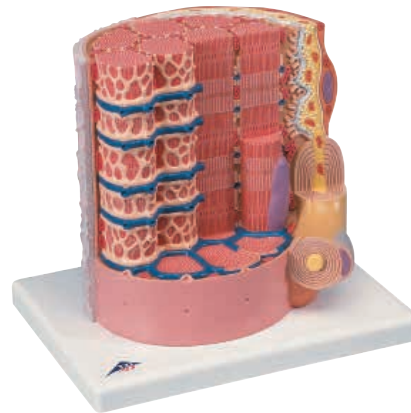


MEDart™ Foot Series Normal Foot, Flatfoot, Pes Cavus

Simply irresistible, these miniatures show the superficial structures and, at the interior side, the bones, muscles and tendons in their correct anatomical position.

6 x 12 x 4.5 cm; 0.3 kg

Set of 3 S-MAM33

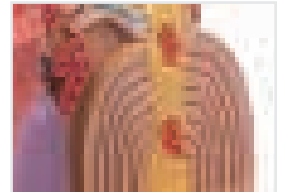


MICROanatomy™ Muscle Fiber

Magnified approximately 10,000 times, this model illustrates a section of a skeletal muscle fiber and its neuromuscular end plate. The muscle fiber is the basic element of the diagonally striped skeletal muscle.

23.5 x 26 x 18.5 cm; 11 kg

S-B60



Great for the desktop and personalized instruction!

MEDart™ Pregnancy Pelvis, 2-part

This equally sophisticated and fine median section allows a view into the physiological world of a female pelvis in the 40th week of pregnancy. The removable fetus illustrates the position of the child in the womb shortly before the birth.

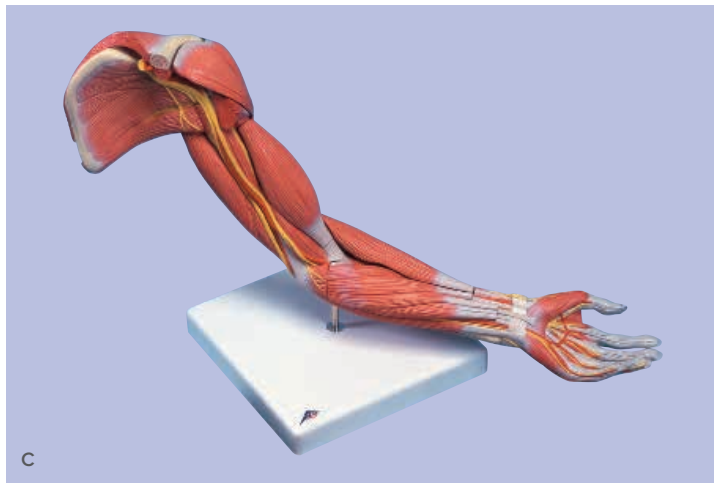
18.5 x 18.5 x 9 cm; 1.3 kg

S-MAL20



Muscle Arm, 6-part

This model illustrates both the superficial and deeper muscles, five of which are removable. Tendons, blood vessels, nerves and bone components of the left arm and shoulder are shown in great detail. Parts numbered. Delivered on removable stand. 60 x 18 x 18 cm; 1.9 kg
S-M10



C

C. Deluxe Muscle Arm, 6-part

The following muscles can be detached in this life-size model:

- Deltoid muscles
 - Biceps muscle of arm
 - Triceps muscle of arm
 - Long palmar muscle with radial flexor muscle of wrist
 - Brachioradial muscle with radial extensor muscle of wrist
 - Supplied on base.
- 41 x 48 x 48 cm; 3.0 kg

S-M11

D. Muscle Leg, 7-part

This life-size model can be disassembled into upper and lower leg. Supplied on base. 130 x 33 x 41 cm; 7.0 kg

The following muscles can be detached:

- Long head of biceps femoris with semitendinosus muscle
- Sartorius muscle
- Gluteus maximus muscle
- Rectus femoris muscle
- Gastrocnemius muscle

S-M21



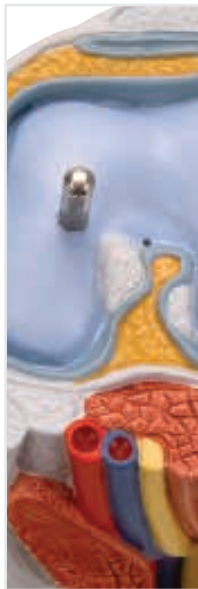
D



Lower Muscle Leg with Knee, 3-part

A unique feature of this life-size removable leg is a cross section through the knee for viewing this amazing joint. The gastrocnemius muscle can be detached. Supplied on a detachable base. 60 x 26 x 27 cm; 2.6 kg

S-M22



A



B

3B Scientific® Human Musculature Oversized Wall Charts

Printed on tear-resistant, waterproof paper with wooden rods so they are ready to hang. Accurately rendered scientific content. 33 x 78.75 in

A. Front Side V2003M

B. Back Side V2005M

\$61.00 ea.

Each leg and arm muscle is supplied with removable stand!

Muscle Leg, 9-part

Illustrating both the superficial and deeper muscles, eight of which are removable. Tendons, vessels, nerves and bone components of the left leg and foot are shown in great detail. Parts numbered. Delivered on removable stand.

77 x 26 x 26 cm; 4.0 kg

S-M20





Genuine 3B Scientific® Product!

Life-Size Male Muscle Figure, 37-part

This sophisticated model shows the deep and superficial musculature in great detail. Extraordinary accuracy makes this masterpiece a unique tool for instruction even in large lecture halls. Extra shipping charges may apply. 180 x 110 x 50 cm; 53 kg

The following parts can be removed for study:

- Skull cap
- 6-part brain
- Eyeball
- Breast/abdominal wall
- Both arms
- 2-part larynx
- 2-part lung
- 2-part heart
- Diaphragm
- 2-part stomach
- Kidney
- Liver with gall bladder
- Bladder half
- Whole intestine system
- 2-part penis
- 10 muscles

S-VA01

3/4 Life-Size Dual-Sex Muscle Figure, 45-part

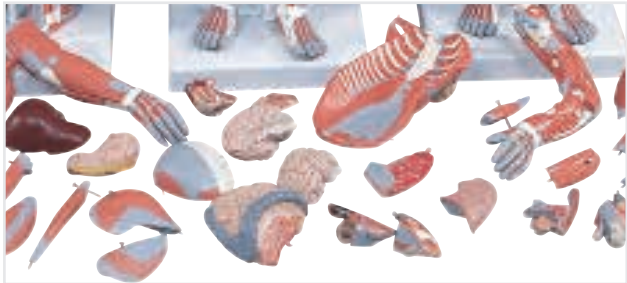
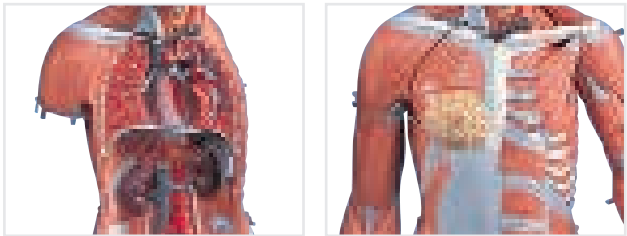
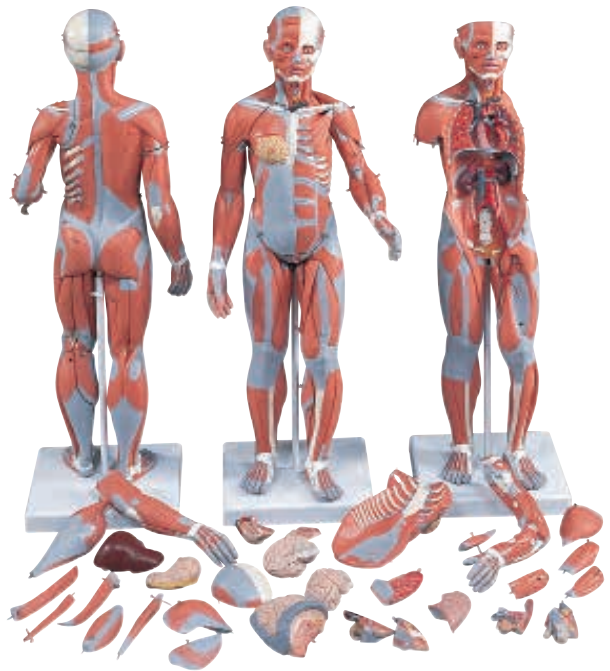
The finest teaching tool available! Standing over 4 1/2 feet tall, this 3/4 life-size human replica depicts deep and superficial musculature in addition to the body's major nerves, vessels, tissues and organs in exquisite detail. The internal organs are removable (45 pieces in all) to reveal the fundamental interrelationships of human morphology. Remove and view the details of 13 different muscles of the arms and legs and over 600 hand-numbered structures. This dual sex muscle figure version has interchangeable genital inserts and a female mammary gland. Hand-painted and mounted on a convenient roller base. Visit 3bscientific.com for all removable parts and product manual. Extra shipping charges may apply. 138 x 50 x 32 cm; 12.4 kg

S-B50

3/4 Life-Size Female Muscle Figure, 23-part (please see 3bscientific.com for images)

This Female Muscle Figure provides the same quality characteristics as the model B50 above but is delivered **without internal organs**, brain, and male genitalia providing for unobstructed study of the human musculature. Extra shipping charges may apply. 138 x 45 x 32 cm; 11.2 kg

S-B51

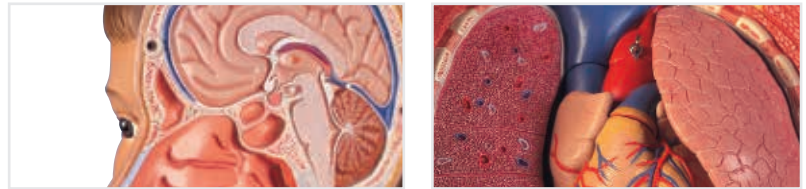
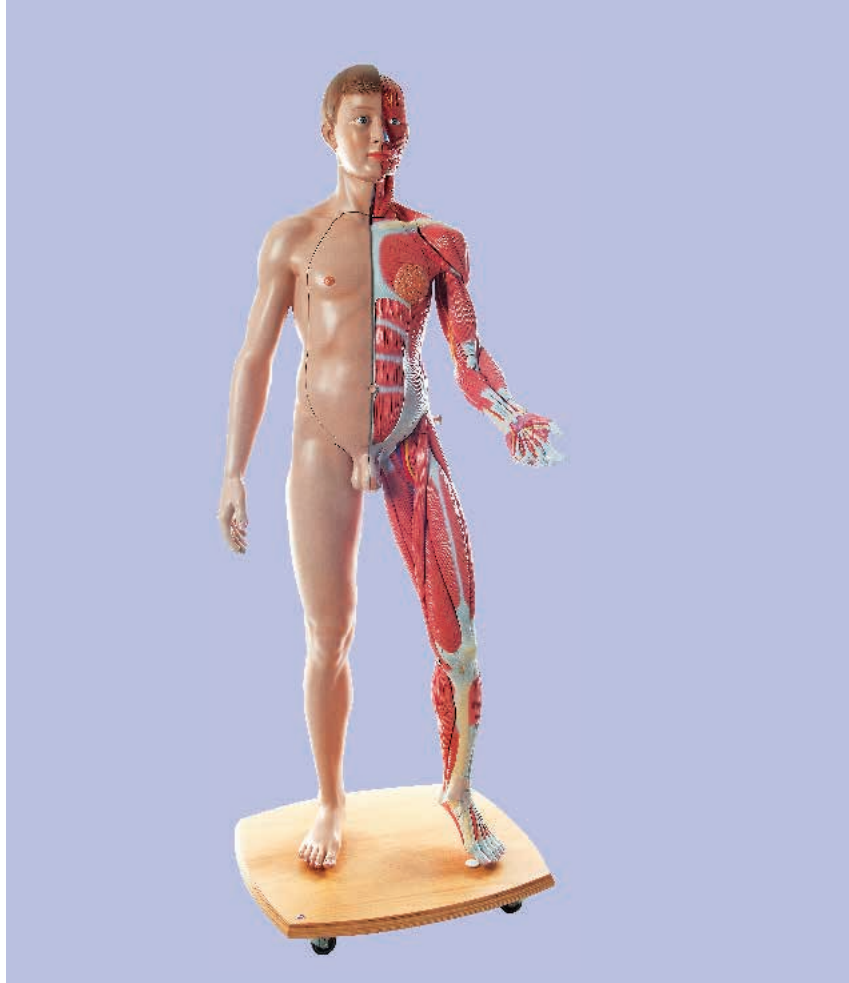


1/2 Life-Size Complete Dual-Sex Muscle Figure, 33-part

The complete human anatomy in a convenient size. This 84 cm high version of our deluxe muscle figure is a perfect choice for thorough demonstrations of human musculature and internal organs where space is a concern. Exquisitely hand-detailed and complete with 33 removable parts, this human muscular figure represents fine quality at a more affordable price. Painted by hand in realistic colors, this human anatomy model comes complete with stand and detailed multilingual product manual. Please see online for all removable parts. Extra shipping charges may apply. 84 x 30 x 30 cm; 4.95 kg
S-B55

1/2 Life-Size Complete Female Muscle Figure, 21-part

Offering the same exceptional value as our model B55, this version is delivered without internal organs, brain and male genitalia. Extra shipping charges may apply. 84 x 30 x 30 cm; 4.1 kg
S-B56



39 amazingly detailed components!

Life-Size Dual-Sex 39-Part Human Figure

This life-size male/female model facilitates an understanding of human anatomy like no other model in the world! The dissectible human features a torso which has the skin removed from one half showing the underlying musculature of the chest, back, abdomen, head, and neck. The front wall of the torso detaches to reveal the inner structures and organs in tremendous detail. In all, 39 component parts can be dissected from the model. Comes with wooden roller base. Extra shipping charges may apply. 174 cm; 40.7 kg

All removable parts:

- 2-part head
- 2 removable lungs
- 2-part removable heart
- Removable liver
- 2-part removable stomach
- Removable kidney half
- 4-part removable intestines
- 3-part female genital w/ embryo
- 4-part male genital
- M. Satorius
- M. Gluteus maximus
- M. Rectus femoris
- M. Gastrocnemius
- M. Biceps femoris cap.
- L. with M. Semitendinosus
- M. Sternocleidomastoideus
- M. Deltoideus
- M. Biceps brachii
- M. Triceps brachii
- M. Palmaris longus with M. Flexor carpi radialis
- M. Brachioradialis with M. Extensor carpi radialis
- Skin of the left arm
- Muscled leg, upper part
- Muscled leg, lower part
- Skin of the left leg
- Abdominal cover

S-B53

Free software included with this figure!

TORSO



Authentic 3B Scientific® Torsos Quality and value at great low prices!

3B Scientific® is the place for quality and value in human torso models. Our torsos are developed and modeled by skilled craftsmen in high-quality plastics then each torso is hand-painted to show a high level of detail.

3B Scientific® Torsos come in many of configurations to meet your needs and budget, from 12 parts to over 30 removable parts, choose the level of detail you want to reveal. To find the combination of removable parts and features and make an informed torso purchase, shop now at 3bscientific.com!

Life-Size Muscle Torso, 27-part

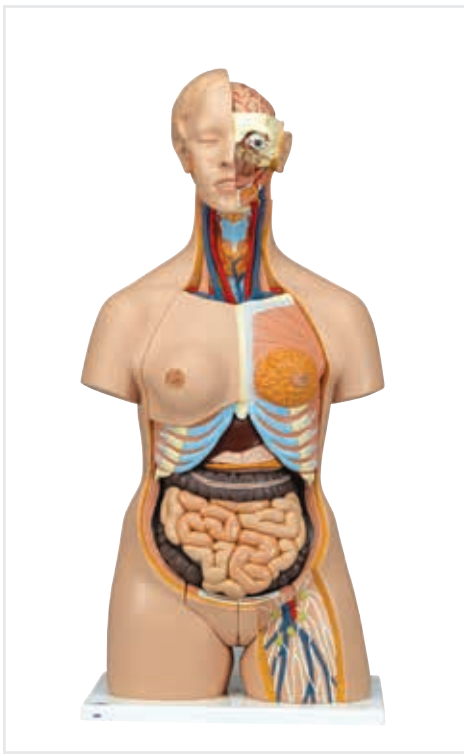
This muscle torso is designed to meet your high expectations by showing the deep and superficial muscles in great anatomical detail. With the muscle torsos extraordinary accuracy and life-size presence, this muscular masterpiece is a distinctive aid for anatomic demonstrations even in large lecture halls. Please see online for all removable parts. 95 x 60 x 35 cm; 21.2 kg

The following parts can be removed from the muscle torso for detailed studies of the human anatomy and muscular system:

- Skull cap
- 6-part brain
- Eyeball with optic nerve
- Chest/abdominal wall
- 2-part larynx
- 2 lungs
- 2-part heart
- Diaphragm
- 2-part stomach
- Liver with gall bladder
- Complete intestinal tract with appendix
- Front half of kidney
- Half urinary bladder
- 4 muscles
- Complete intestinal tract with appendix

S-VA16





Signature Dual-Sex Torso, 24-part

Need even more features? Comes with the 3B Scientific® Guide to the Human Torso. 34.3 x 15.0 x 9.8 in; 16.5 lb

This advanced version features all removable parts found in our popular torso B32 plus the following upgrades:

- 3-part Head
- 2-part Stomach
- 4-part Intestine system

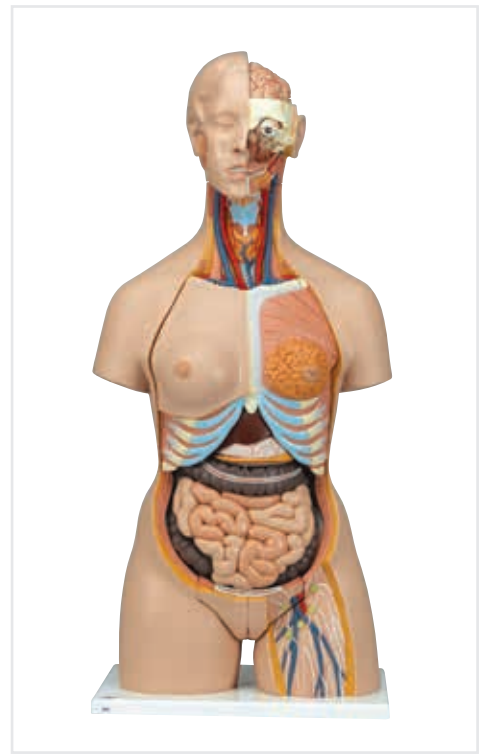
S-B30



Signature Dual-Sex Muscle Torso, 31-part

This unique torso depicts both the superficial and deep muscles. The two main muscles, the deltoid and gluteus maximus can even be removed for closer studies. You can also study the vertebrae, the spinal cord, spinal nerves and vertebral arteries, exchange the male and female genital inserts, discover the internal structures of the brain and much more. Supplied with the 3B Scientific® Guide to the Human Torso. 34.3 x 15.0 x 9.8 in; 18.74 lb

S-B40



Signature Dual-Sex Torso with Opened Back, 28-part

This torso has it all! Removable male and female genital inserts, opened neck and back section to study vertebrae, intervertebral discs, spinal cord, spinal nerves, vertebral arteries etc., a deluxe head with 4-part brain and much more! A detailed torso for advanced demonstrations. See 3bscientific.com for all removable parts. 34.3 x 15.0 x 9.8 in; 16.75 lb

S-B35

Deluxe Dual-Sex Torso, 20-part

The quality of this Dual-Sex Torso is impressive and so is the price! Comes with the 3B Scientific® Guide to the Human Torso. 34.3 x 15.0 x 9.8 in; 16 lb

Use this Torso to answer all questions about the inside story of our bodies by removing and dissecting the following parts:

- 2-part Head
- Female breast covering
- 2 Lungs
- 2-part Heart
- Stomach
- Liver with gall bladder
- 2-part Intestinal system
- Front kidney half
- 4-part Male genital insert
- 3-part Female genital insert with fetus

S-B32



View 15 axia sections from any angle!

MRI Torso

This extraordinary design presents a view of the human body developed using modern imaging techniques such as ultrasound, CT scans, and MRI tomography. The 15 full-color axial sections through the human body each accurately depict the features of a particular section. The individual slices are mounted on pivoting spokes and permit viewing and inspection from any angle, they can even be removed. The results are a brand understanding of human anatomy that is both interesting and engaging for students. 51.2 x 15.7 x 13.8 in; 42 lb

S-VA20





Life-Size Dual-Sex Torso with Muscle Arm, 33-part

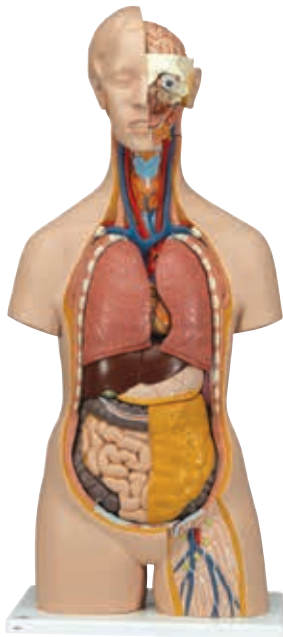
A worldwide unique feature of this life-size torso is the removable 6-part muscle arm. This first-rate model fully represents the anatomy of the complete human upper body. Its great detail makes it especially suitable for the high standards of medical school. The right half shows the skin, the left half the superficial and deeper muscles with nerves, vessels and bony structures. The versatility of this aesthetically designed model is rounded off by the exact representation of the internal organs. See online for all removable parts.

90 cm; 22.8 kg

S-B42



Quality and value at great low prices!



Classic Unisex Torso, 14-part

This popular school torso is supplied with the following removable parts:

- 3-part Head
- 2 Lungs
- 2-part Heart
- Stomach
- Liver with gall bladder
- 2-part Intestinal tract
- Front half of kidney
- Front half of urinary bladder

87 x 38 x 25 cm; 5.9 kg

S-B13



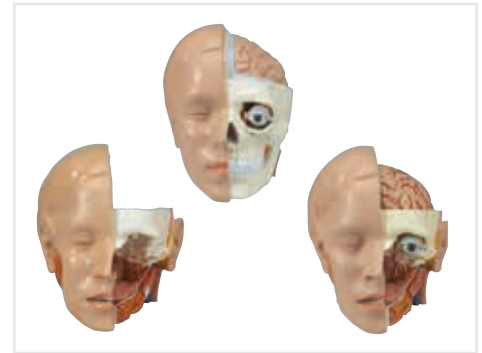
Classic Unisex Torso, 12-part

The following components of this torso are removable:

- 2-part Head
- 2-part Removable heart
- 2 lungs
- Stomach
- Liver with gall bladder
- 2-part Intestinal tract
- Front half of kidney

87 x 38 x 25 cm; 4.6 kg

S-B09



Head Specifications

2-part Head

The skull is exposed in the region of the cerebrum to show the brain.

- Removable eyeball with optic nerve
- Not sold separately

3-part Head

The nose and mouth cavities are exposed to the pharynx for detailed studies. The skull cap is exposed to show the inner structures of the skull.

- Removable brain half with arteries
- Removable eyeball with muscles, ligaments and the optic nerve
- Not sold separately

6-part Head

On this head, the occiput and the skull cap are exposed to show the inner structures of the skull.

- Removable 4-part brain half with arteries; frontal with parietal lobe; temporal with occipital lobe; half of brain stem and half of cerebellum
- Removable eyeball with muscles, ligaments and the optic nerve
- Not sold separately



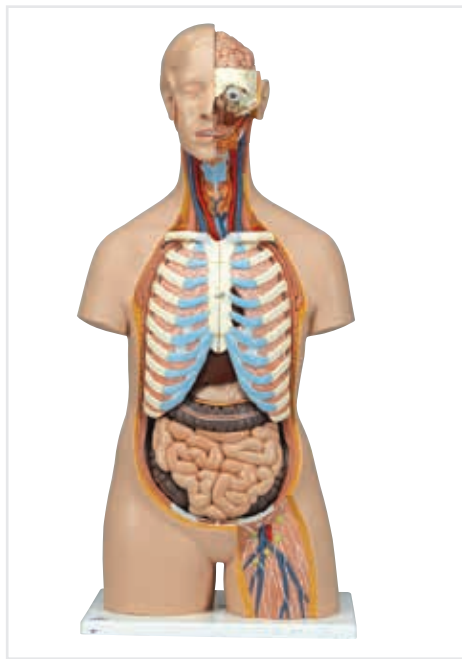
Classic Unisex Torso with Opened Neck and Back, 18-part

Based on our B13 torso, this model is characterized by its open neck and back section reaching from the cerebellum to the coccyx. Vertebrae, intervertebral discs, spinal cord, spinal nerves, vertebral arteries, and many other features are represented in detail and can be studied closely. 87 x 38 x 25 cm; 5,8 kg

This version contains the following features in addition to B13:

- 7th Thoracic vertebra removable
- 6-part Head

S-B19



Classic Unisex Torso with Open Back, 21-part

This torso is based on the B11 version for students and is equipped with an open neck and back section going from the cerebellum to the coccyx. Vertebrae, intervertebral discs, spinal cord, spinal nerves, vertebral arteries, and many other features are represented in detail. 87 x 38 x 25 cm; 6,5 kg

This version contains the following features in addition to B11:

- 7th Thoracic vertebra removable
- 6-part Head
- 2-part Stomach

S-B17



Our most comprehensive and affordable classic torso!

Classic Unisex Torso, 16-part

This torso is especially popular among students. It shows the human anatomy in great detail and contains the following removable parts:

- 3-part head
 - 2 Lungs with sternum and rib attachments
 - 2-part heart
 - Stomach
 - Liver with gall bladder
 - 4-part Intestinal tract
 - Front half of kidney
 - Front half of urinary bladder
- 87 x 38 x 25 cm; 6,8 kg

S-B11



Guide to the Human Torso

Get "inside" the human torso and open a whole world of kinesthetic learning. Detailed coverage of individual systems and organs of the human body in a user-friendly format. This is a resource for students as well as teachers of anatomy and physiology. Teaching or learning another language? The Guide has you covered in English, Latin, Spanish, German, French, Portuguese and even Japanese.

More Great Features:

- Brilliant colored pictures of each part of the torso
- Detailed explanations of even the smallest anatomical structures
- Valuable teaching tips to create more interesting lessons
- Includes all content on a CD-ROM in PDF format to assist in creating tests, or preparing lessons, and studying
- Sturdy 3-ring style binder for storage and organization

S-B01

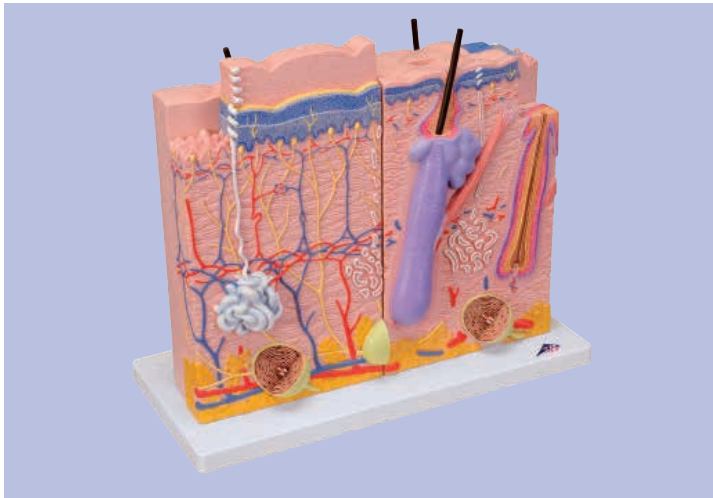


Heavy Duty Protective Cover for Torsos

Protect your investment with this heavy duty protective cover for your torso models. Suitable for all full-size torsos. Zippered with reinforced easy-carry handle. Black.

S-W40104

SKIN MODELS



3 Models in 1!

Skin Model, 3-part

All three models are located on a common base, can be removed individually, and can be attached together via magnets to show the interrelationships. Distinctions within the skin are illustrated with regard to the positions on the human body such as the palm of the hand, back of the hand and scalp. See online for full description. 13.4 x 15.4 x 6.1 in; 4.52 lb

S-J16



Skin Section, 70 Times Full-Size

This relief model shows a section through the three layers of the hair-covered skin of the head. 10.2 x 13.0 x 2.0 in; 2.2 lb

Delivered on base it shows:

- Sweat glands
- Vessels
- Receptors
- Nerves
- Representation of hair follicles with sebaceous glands

S-J10



Skin, Hair, and Nail Microscopic Structures

This model shows the microscopic structure of the skin in great detail. Both hairless and hairy skin structure are shown as well as the different cell layers of the skin, embedded sweat glands, touch receptors, blood vessels, nerves, erector pili muscle, and a hair follicle. In addition to these details, a section of nail is shown on the base depicting the nail plate, bed, and root. Completing the skin model is a representation of a hair root with all of its cellular layers. 3.9 x 4.9 x 5.5 in; 0.77 lb

S-J14



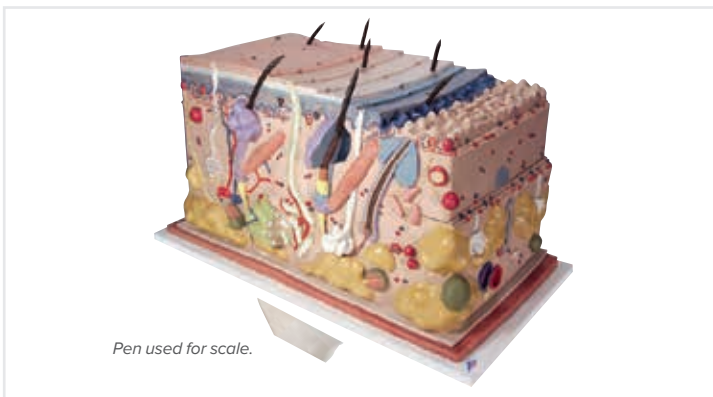
Skin Cancer Model

This 3B Scientific® Skin Pathology model shows healthy skin and 5 different stages of malignant melanoma on the front and back, enlarged 8 times:

- Healthy
- Malignant cells are found at the surface, within the epidermis
- Malignant cells fill the epidermis, a few invade the papillary layer
- Malignant cells fill the papillary layer
- Malignant cells invade the reticular layer
- Malignant cells have reached the subcutaneous fatty tissue, satellite cells approach a vein

5.5 x 3.9 x 4.5 in; 0.44 lb

S-J15

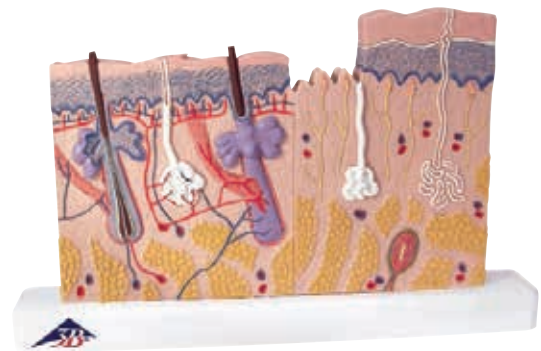


Pen used for scale.

Skin Block Model, 70 Times Full-Size

This distinctive model shows a section of human skin in three dimensional form. Individual skin layers are differentiated and important structures such as hair, sebaceous and sweat glands, receptors, nerves, erector pili muscles and vessels are shown in great detail. Mounted on baseboard. 17.3 x 9.4 x 9.1 in; 8 lb

S-J13



Skin Section, 40 Times Life-Size

The two halves of this relief model show the three layers of hairy and hairless skin in order to make the differences clear. Detailed with hair follicles, sebaceous glands, sweat glands, receptor, nerves, erector pili muscles and vessels. Delivered on base. 9.4 x 5.9 x 1.4 in; 0.44 lb

S-J11



Deluxe Head with Neck, 4-part

The left half of this life-size midsagittal section shows the muscles with nerves, vessels, and bony structures. It also contains a removable brain half. The head is mounted on a detachable neck, which is sectioned both horizontally and diagonally. Supplied on baseboard. 28 x 19 x 23 cm; 2.2 kg

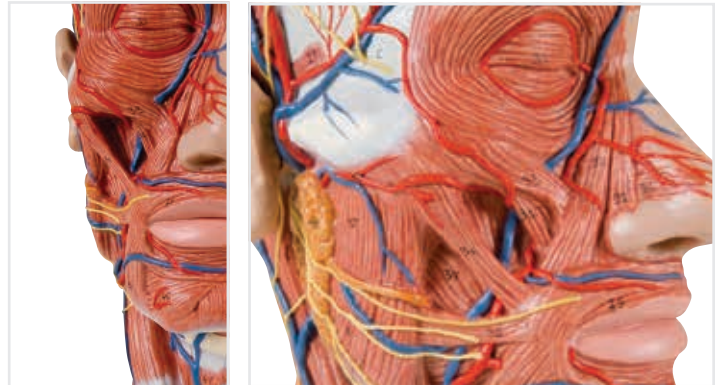
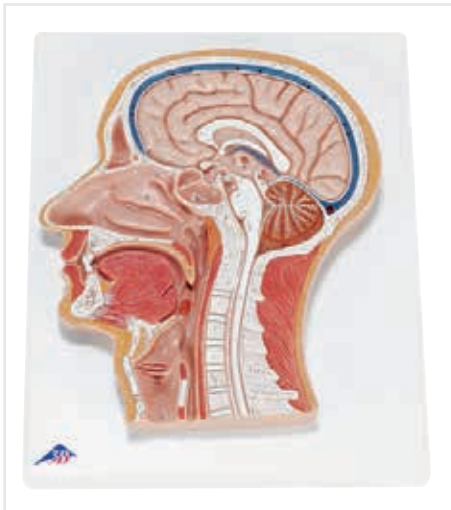
S-C07



Median Section of the Head

This relief model shows all relevant structures of the human head in great detail and is also delivered on a baseboard. 26 x 33 x 5 cm; 1.0 kg

S-C12



Half Head with Musculature

Representation of the outer, superficial, and internal (median section) structures of head and neck. Delivered on removable stand. 22 x 18 x 46 cm; 1.1 kg

S-C14

Head and Neck Musculature, 5-part

The model represents the superficial musculature and deep muscles of the head. The nerves and vessels of the head are also depicted. The head is dissectible into skull cap and 3-part brain. Delivered on a removable baseboard. 36 x 18 x 18 cm; 1.8 kg

S-C05



Head Musculature

Representation of the superficial musculature of head and neck showing:

- Parotid gland
- Submandibular gland
- Deep musculature
- Lower jaw partially exposed

24 x 18 x 24 cm; 1.2 kg.

S-VB127

Head Musculature with Blood Vessels

All the features of VB127, plus a display of the blood vessels.

24 x 18 x 24 cm; 1.2 kg

S-VB128

Head Musculature with Nerves

All the features of VB127, with an additional display of nerves.

24 x 18 x 24 cm; 1.2 kg

S-VB129

BRAIN MODELS

This brain model fits all 3B scientific® classic skulls so you can upgrade whenever you like!



Classic Brain, 5-part

This midsagittally sectioned model is an original anatomic cast of a real human brain. Now with magnetic closures! 13 x 14 x 17.5 cm; 0.49 kg

The components of its left half are:

- Frontal and parietal lobe
- Temporal and occipital lobe
- Encephalic trunk
- Cerebellum

S-C18



Deluxe Brain, 8-part

A very detailed medially divided model of the human brain. On a removable base.

Both halves can be disassembled into:

- Frontal with parietal lobes
- Temporal with occipital lobes
- Half of brain stem
- Half of cerebellum

14 x 16 x 14 cm; 0.85 kg

S-C17



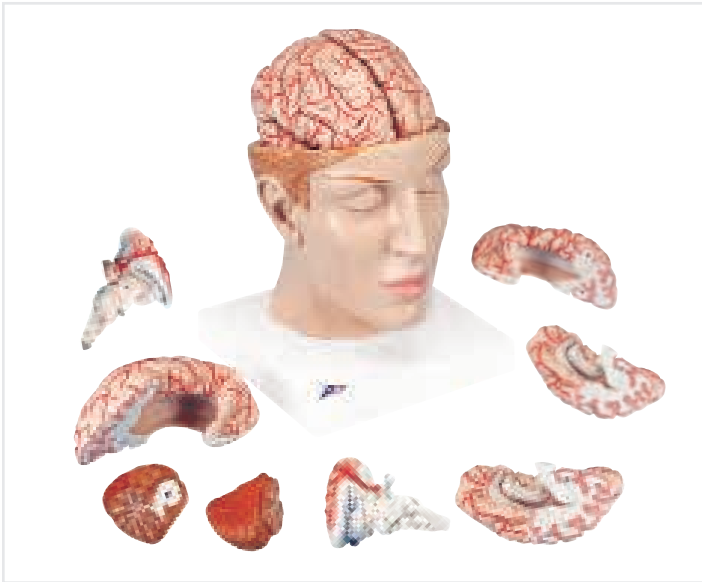
Brain, 4-part

This brain is medially divided. All structures are hand-painted, numbered, and identified in an accompanying product manual. On removable base. 14 x 14 x 17.5 cm; 0.9 kg

The right half can be disassembled into:

- Frontal with parietal lobes
- Brain stem with temporal and occipital lobes
- Half of cerebellum

S-C16



Deluxe Brain with Arteries, 10-part

This deluxe brain comes with an opened head to allow detailed study of the brain's position in the skull. The head is horizontally divided above the skull base. The brain is divided medially, with a removable basilar artery. Both halves can be divided into frontal parietal lobes, temporal with occipital lobes, and half of cerebellum. On base. 5.9 x 5.9 x 9.1 in; 3.53 lb

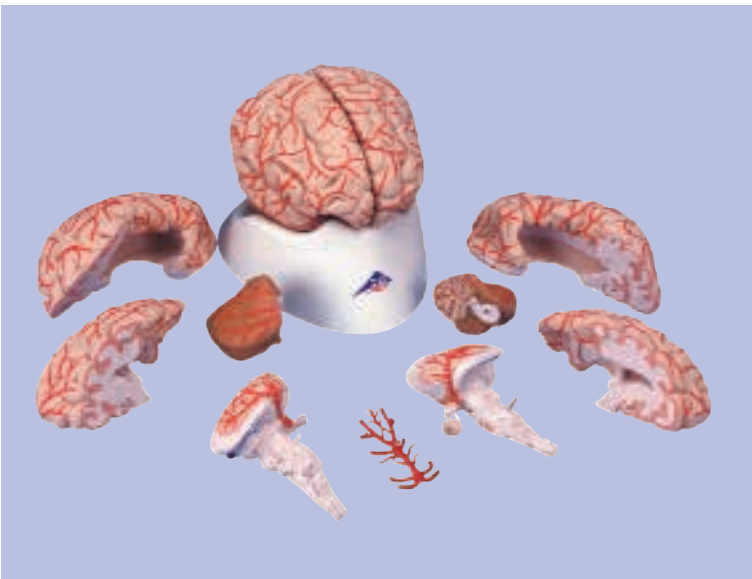
S-C25



Deluxe Head Model, 6-part

Our most detailed head model! This life-size 6-part head is mounted on a base and features a removable 4-part brain half with arteries. The eyeball with optic nerve are also removable. One side exposes the nose, mouth cavity, pharynx, occiput, and skull base. 7.5 x 9.1 x 8.7 in; 2.2 lb

S-C09/1



Deluxe Brain with Arteries, 9-part

This medially divided deluxe brain model shows the brain arteries as well as the detachable basilar artery. On a removable base. 5.9 x 5.5 x 6.3 in; 2 lb

Both halves can be disassembled into:

- Frontal with parietal lobes
- Half of brain stem
- Temporal with occipital lobes
- Half of cerebellum

S-C20

Did you know that 3B Scientific is Represented in More Than 100 Countries Worldwide. Learn More About Us at 3bscientific.com!



Brain Ventricle

This life-size model shows both lateral ventricles, the 3rd and 4th ventricle, and the aquaeductus cerebri (sylvius). On stand. 5.5 x 4.3 x 5.5 in; 1.32 lb

S-VH410



Human Brain Chart

Laminated. 20 x 26 in

S-VR1615L



Neuro-Anatomical Brain, 8-part

This deluxe brain is medially divided. On the right half you will find a colored, systematic grouping and representation of the cerebral lobe. Delivered on removable base. 5.5 x 5.5 x 6.9 in; 2 lb

The left half shows:

- Pre- and post-central region
- Broca and Wernicke areas
- Heschl's gyrus
- Brain nerves
- Ventricles

Both halves can be disassembled into:

- Frontal with parietal lobes
- Temporal with occipital lobes
- Half of brain stem
- Half of cerebellum

S-C22

Double-sided brain sections!



Brain Section

An enlarged and very detailed section through the right half of the brain, including a portion of the skull. The pia mater has been removed. This model is double sided and finely colored. One surface is on the median line, including a section of the falx cerebri. A sagittal cut on the reverse side exposes the lateral ventricle. There are 49 references on the model, identified in English on an accompanying product manual. Mounted on a stand.

S-W19026



This massive brain is truly memorable!

Giant Brain, 2.5 Times Life-Size, 14-part

At 2.5 times life-size this comprehensive brain model is a very useful teaching aid, especially for large groups of students. All structures of the brain and the ventricles are visible through median, frontal, and horizontal divisions. Delivered with a removable base. 13.4 x 11.8 x 14.6 in; 12.35 lb

- Unbreakable – Natural cast made from durable vinyl
- Fourteen removable segments secured with pins
- Ideal for 3D study of brain structures
- Includes removable base and detailed product manual

S-VH409



Rat Brain Comparative Anatomy

Enlarged roughly six times, and medially sectioned, the rat brain model can be disassembled into two halves. The right half of the color-coded model shows the structures of the cerebrum, cerebellum, and brain stem. The left half is largely transparent with a view of the left lateral ventricle and hippocampus in the median section. For comparison, a natural cast of a rat brain and a didactic, small-scale illustration of a human brain in median section are shown on the base. Each has the same color coding used for the various regions. 5.5 x 3.9 x 6.3 in; 0.53 lb

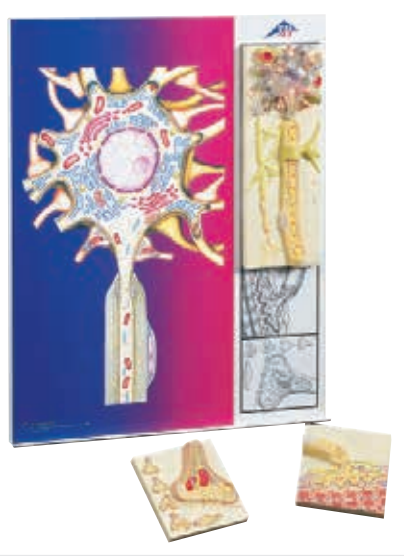
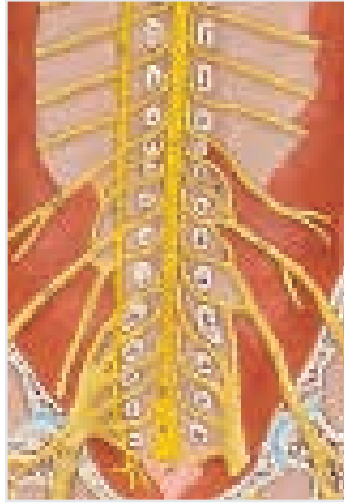
S-C29



Nervous System

An excellent model to study the structure of the human nervous system. 3-D relief model shows schematic representation of the central and peripheral nervous system. 80 x 33 x 6 cm; 3.5 kg

S-C30



Physiology of Nerves

This five model series from 3B Scientific® is unique in the world. Interchangeable sections can be assembled to illustrate the features of typical neurons found in vertebrates. All sections depict the neural components in vivid colors and attach magnetically to the illustrated base.

68 x 51 x 10 cm; 4.2 kg

The set contains the following sections, which are also available individually:

- Neuron Cell Body
- Myelin Sheaths of the CNS
- Schwann Cells of the PNS
- Motor End Plate
- Synapse

S-C40



Motor Neuron Diorama

Magnified over 2,500 times. This color-coded, three-dimensional reproduction shows a motor nerve cell situated within a milieu of interacting neurons and a skeletal muscle fiber. The membranous envelope is cut away from the neuron to expose the cytological ultrastructure, organelles, and inclusions within the cell body. A section of the axon lifts off to let you view the tightly wound layers of the enveloping myelin sheath and neurolemma, as well as the Schwann cell which formed them. Via a cutaway view, you can observe synaptic vesicles, carrying neurotransmitters, about to stimulate the muscle fiber to action. Mounted on a wooden base. 43 x 20 x 28 cm; 3 kg

S-W42537



Giant Functional Center Brain, 4-part

This popular brain model reproduces the brain of a right-handed person. It employs contrasting colors and hand-lettered captions to identify motor and sensory functional centers. In addition to focusing on the intellectual role of the dominant left brain, and the creative role of the right, the model highlights the emotional, sexual, memory, and learning functions of the limbic system. Sensory regions and centers receptive to 20 specific body regions are distinguished, as are the motor centers controlling 19 body regions. More than 120 hand-numbered features are identified in the corresponding key. On base. 20 x 20 x 25 cm; 2.4 kg

S-W42565

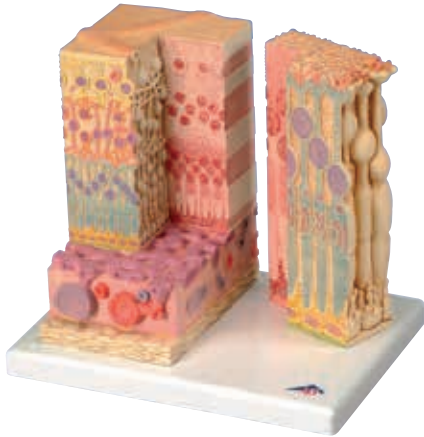


Median and Frontal Section of the Head

The perfect model to learn structure location. Two relief models on baseboard showing all relevant structures of the human head in great detail. 41 x 31 x 5 cm; 1.1 kg

S-C13

EYE MODELS



MICROanatomy™ Eye

The model illustrates the microscopic structure of the retina with choroid and sclera. The left, block-like, layered side of the model shows the complete structure of the retina including the supplying vascular layer and parts of the sclera from a lighted microscopic view. The right part of the model, a sectional enlargement, shows the microscopic structure of the photoreceptors and the cells of the pigmented layer. 9.8 x 9.1 x 7.3 in; 2.65 lb

S-F16



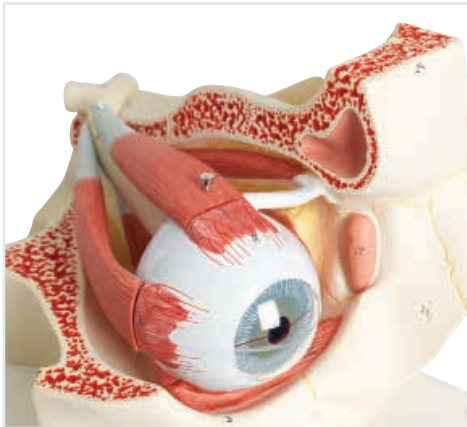
Classic Eye, 3 times Full-Size, 6-part

3.5 x 3.5 x 5.9 in; 0.22 lb

This model dissects into the following parts:

- Both halves of sclera with cornea and eye muscle attachments
- Both halves of choroid with iris and retina
- Lens
- Vitreous humour

S-F15



Classic Eye in Orbit, 3 times Full-Size, 7-part

Similar to item M-F15, this model additionally shows the optic nerve in its natural position in the bony orbit of the eye (floor and medial wall). On square base. 7.1 x 10.2 x 7.5 in; 2.43 lb

S-F13



Giant Eye, 5 Times Full-Size, 6-part

An excellent model for teaching due to its enhanced size. The same removable parts as the F15. On square base. 5.1 x 5.5 x 8.3 in; 1.32 lb

S-F10

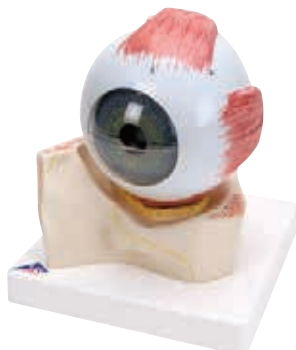


Giant Eye with Eyelid and Lachrymal System, 5 Times Full-Size, 8-part

All of the features of F15 plus the eyelid, lachrymal system, on a bony orbit. On square base.

7.9 x 7.1 x 8.3 in; 2.65 lb

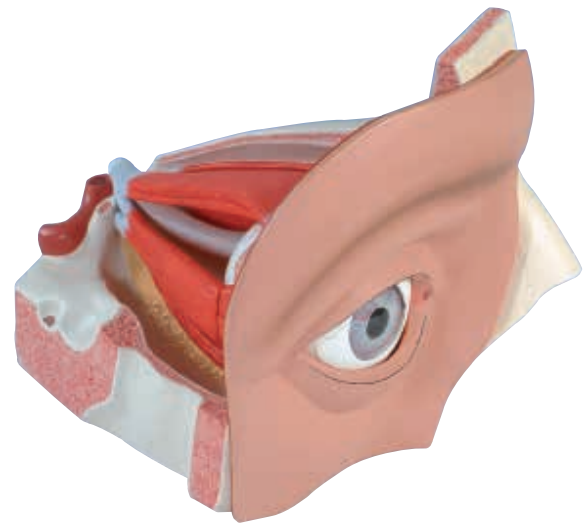
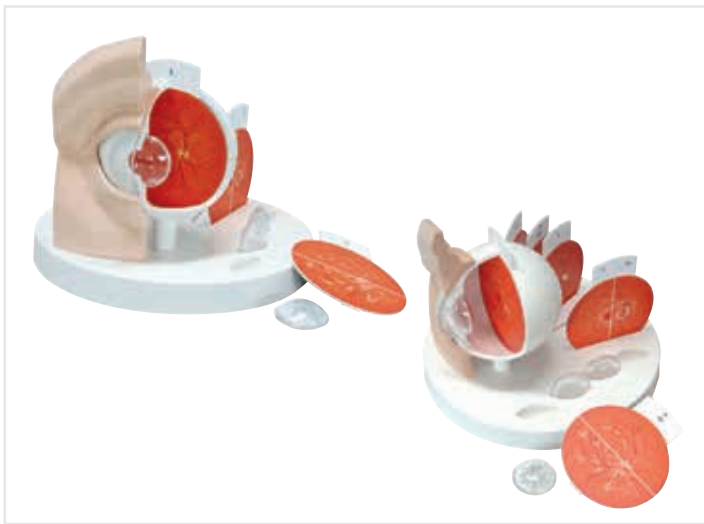
S-F12



Giant Eye in Base of Bony Orbit, 5 Times Full-Size, 7-part

With the same features as F15 and delivered on a square base of bony orbit. 7.1 x 7.1 x 7.9 in; 2.2 lb

S-F11



Pathological Eye - Enlarged 5 Times

This eye model is ideal for patient education. The easy to use switchable and didactically simplified representations of the retina and lens, make it possible to clearly explain the typical changes that occur in a healthy eye due to the following diseases:

- Subcapsular cortical and nuclear cataract
- Diabetic and Hypertensive retinopathy
- Papillary changes of glaucoma
- Age-related macular degeneration
- Papilloedema
- Central retinal arterial occlusion and venous occlusion
- Rhegmatogenous retinal detachment

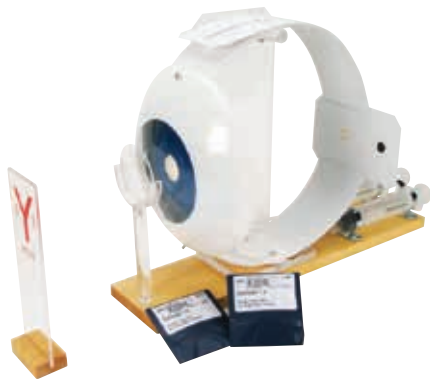
S-F17

Eye, 5 times Full-Size, 12-part

13.0 x 11.8 x 15.0 in; 10.8 lb

- Both halves of the sclera
- Optic nerve
- M. rectus superior
- M. rectus lateralis
- Cornea half
- Lens
- Lachrymal system
- Vitreous humour
- Tear gland associated structures

S-VJ500A



Functional Eye

With this functional eye model the functions of the human eye can be taught very effectively. By moving the retina, the shape of the eye can be changed. The lens and ciliary body are made of silicone to allow the change of form and thickness of the lens. 17.7 x 11.8 in; 4.41 lb

S-W16002



Budget Functional Eye

With this budget functional eye model the functions of the human eye can be taught very effectively. By moving the retina, the shape of the eye can be changed. The lens and ciliary body are made of silicone to allow the change of form and thickness of the lens. 12.6 x 7.1 in; 1.1 lb

S-W16003



Physical Eye Model

Use to demonstrate the optical functions of the eye, e.g. representation of an object on the retina, accommodation, short-sightedness and far-sightedness. 19.3 x 2.2 x 7.1 in; 4.41 lb

- Half eyeball with adjustable iris diaphragm, lens holder and 2 convex lenses ($f = 65$ mm and 80 mm), on a rod
- Half eyeball with retina (transparent screen), on a rod
- Lens holder with one concave and one convex corrective lens, on a rod
- Candle holder with 2 candles, on a rod
- Aluminium rail, 50 cm long, with 4 clamp slides
- Includes case

S-W11851

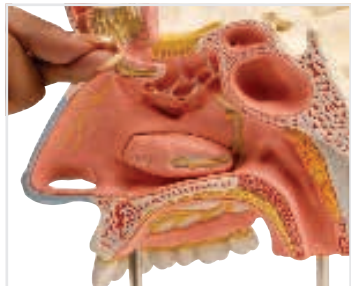


Colored Eye Chart

This innovative eye chart simultaneously screens for color blindness as well as testing visual acuity. The Colored Eye Chart has proven effective in screening the two most common types of red-green color blindness: protanopia/protanomalopia and deuteranopia/deuteranomalopia, as well as the extremely rare, total color blindness. Printed on heavy, fully laminated stock, each chart is fitted with a metal eyelet for hanging. 11 x 23 in

M-S-W58500

NOSE / EAR MODELS MODELS



Nose with Paranasal Sinuses, 5-part

The upper right half of the face is enlarged 1.5 times to illustrate the structure of the nose with paranasal sinuses. 26 x 19 x 24 cm; 0.8 kg

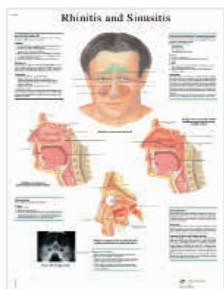
The following structures are differentiated by color and visible through the transparent removable skin:

- Outer nasal cartilages
- Nasal, maxillary, frontal, and sphenoidal sinuses
- Opened maxillary sinus when the zygomatic arch is removed

The following structures are shown in median section:

- Nasal cavity, lined with mucosa, with the (removable) nasal conchae
- Arteries of the mucous membrane
- Olfactory nerves
- Innervation of the lateral wall of the nasal cavity, the nasal conchae and the palate.

S-E20



Rhinitis and Sinusitis Chart

50 x 67 cm (20 X 26")

S-VR1251L



Allergies Chart

50 x 67 cm (20 X 26")

S-VR1660L



World's largest ear!

The World's Largest Ear, 15 Times Full-Size, 3-part

At 15 times life-size, this 3-part ear is suitable for museums and special collections as well as large lecture halls and conferences. Representation of outer, middle and inner ear. The auditory ossicles and the labyrinth with cochlea and vestibulocochlear nerve can be removed and studied in detail. On base. 130 x 120 x 60 cm; 52 kg

S-VJ510



Life-size Auditory Ossicles

Cast from natural specimen, these human auditory ossicles are presented in their natural position and embedded in transparent acrylic. 0.05 kg

S-E13



Ossicle Model, 20 times life-size

The three smallest bones that are joined to each other in the human body are located in the middle ear and are referred to as the auditory ossicles: malleus (hammer), incus (anvil) and stapes (stirrup). In our model, you can see a cast and enlargement of original ossicles, created using micro CT.

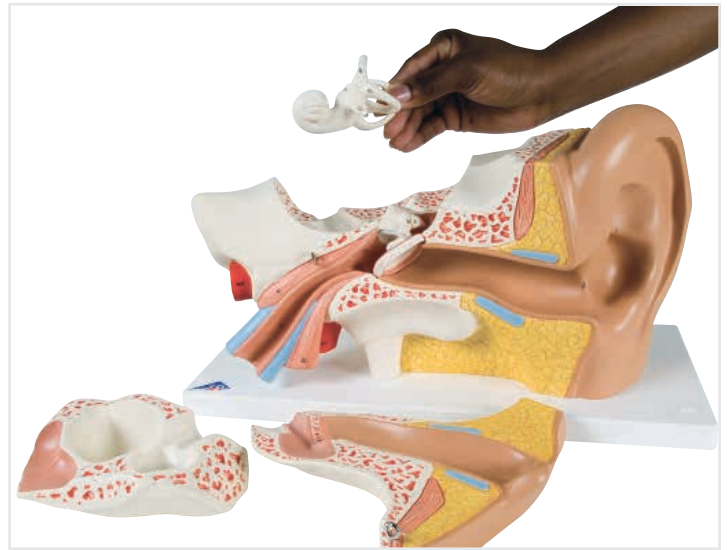
S-A101



Giant Ear, 5 Times Full-Size, 3-part

This version is a whopping 5 times life-size for easy viewing from anywhere in the classroom! Representation of outer, middle, and inner ear. Removable auditory ossicles, labyrinth with cochlea, and vestibulocochlear nerve. Delivered on base. 25 x 41 x 25 cm; 3.0 kg

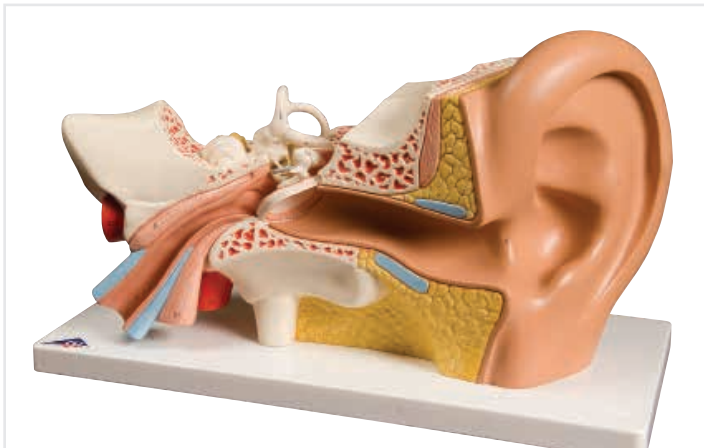
S-VJ513



Giant Ear Advanced Version, 3 Times Life-Size, 6-part

The same features as E10, with the addition of two removable bone sections to close the middle and inner ear. 34 x 16 x 19 cm; 1.55 kg

S-E11



Classic Giant Ear, 3 Times Life-Size, 4-part

At approximately 3 times life-size, the model has representations of the outer, middle, and inner ear. Removable eardrum with hammer, anvil, and stirrup, as well as 2-part labyrinth with cochlea, and auditory/ balance nerve. On base. 34 x 16 x 19 cm; 1.25 kg

S-E10



Desktop Ear Model, 1.5 Times Life-Size

Specifically designed for those on a budget, the model shows the outer, middle, and inner ear with no compromise in quality. On base. 14 x 10 x 14.7 cm; 0.35 kg

S-E12



Human Ear Chart

Size: 50 x 67 cm (20 x 26")

S-VR1243L



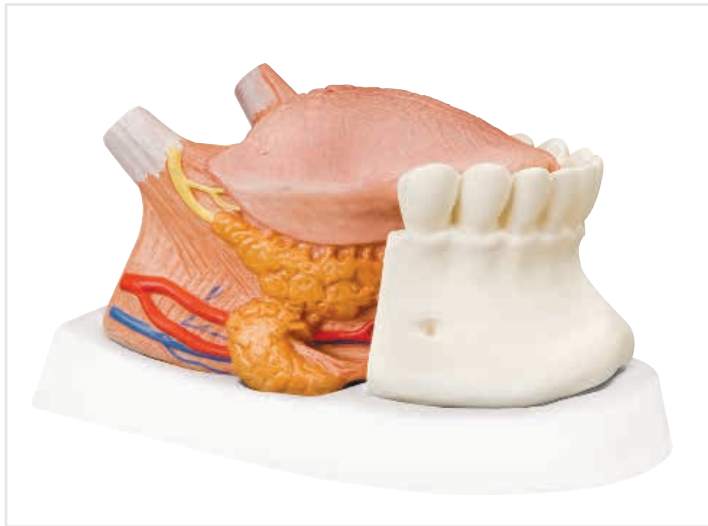
Diseases of the Middle Ear chart

Size: 50 x 67 cm (20 x 26")

S-VR1252L

More Charts Available online at 3bscientific.com or see pages 92-93.

DENTITION MODELS



Tongue Model, 2½ Times Life-Size, 4-part

This model shows the lower jaw up to the second molar, the tongue with mouth floor musculature in median section and the right sublingual and submandibular gland. On removable base. 23 x 17 x 16 cm; 0,8 kg

S-T12010



MICROanatomy™ Tongue

The 3B Scientific® MICROanatomy™ of the tongue comprises a macroscopic view of the tongue (dorsal view) and microscopic views of the various papillae of the tongue and of a taste bud. All views are mounted on a base that also features an overview of the sensory and sensitive innervations of the tongue. 14.5 x 32.5 x 20 cm; 0,8 kg

S-D17

Dentition Development

Cast from natural specimens, these four upper and lower jaw halves show four different stages of development:

- born
- Approx. 5-year old child
- Approx. 9-year old child
- Young adult

13,0 x 3,9 x 7,9 in; 1,1 lb

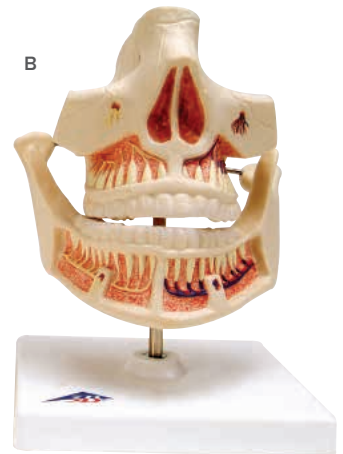
S-D20



A



B



C



D



A. Adult Dentures

Tooth roots, spongiosa, vessels, and nerves are exposed for detailed study. The lower jaw is movable. On base. 6.3 x 4.7 x 5.1 in; 2 lb

VE281 \$206

B. Milk Dentures

Upper and lower jaw are opened to show the arrangement of the remaining teeth. On base. 5.1 x 4.7 x 5.1 in; 1,32 lb

S-VE282

C. Advanced Half Lower Jaw with 8 Diseased Teeth, 19-part

These diseased teeth show various stages of cavities from a small and easy-to treat example on an incisor, through an advanced degradation of a molar, showing exposed root. 8.7 x 12.6 x 3.5 in; 2,43 lb

S-VE290

D. Half Lower Jaw, 3 times Full-Size, 6-part

One section of bone can be removed to expose the teeth roots, spongiosa, vessels, and nerves. The canine and first molar are removable and longitudinally sectioned. On stand. 13.8 x 7.1 x 14.2 in; 2,65 lb

S-D25



Skull with Teeth for Extraction, 4-part

The teeth of the upper and lower jaw can be extracted and replaced individually with their fully-formed roots. A bone flap on the right mandible can be opened to view the dental roots, spongiosa, nerve canal, and an impacted wisdom tooth. 22 x 13.5 x 17 cm; 0.8 kg

S-W10532



Giant Molar with Dental Cavities, 15 Times Life-Size, 6-part

This model depicts an upper triple-root molar and features a longitudinal section through the crown, two roots, and the pulp cavity. Contains removable pulp and three teeth inserts with different stages of advanced cavities. On stand. 24 cm high, 1.5 kg

S-D15



Quality products!

- Features individual teeth with roots
- Practice extraction time and again
- Naturally articulation jaw



Dental Morphology Series

At ten times life-size, this dental morphology series has removable lateral incisor, canine, first premolar, bridge made of artificial first molar with gold colored crown, and second molar. All relevant dental morphology structures are labeled. Dental morphology on transparent, jaw-shaped stand. Key card included. 70 x 25.5 x 15 cm; 2.1 kg

S-W42517



Includes large 14" toothbrush!

Giant Dental Care Model

At 3-time life-size, this model is large enough to be seen from the back of a classroom. It shows the upper and lower half of an adult's dentition. Teach proper cleaning techniques using the giant 14" toothbrush included with this model. 18 x 23 x 12 cm; 1.5 kg

D16 \$128

Replacement Parts

Giant 14" Toothbrush

S-XD002

Dental Disease, 21-part

Based on a lower jaw with soft gums and 16 removable teeth. One half of the model shows eight healthy teeth and healthy gums. One part of the front bone section can be removed from the dental disease model to view the roots, vessels and nerves. Two molars are sectioned along the length to show the inside of the tooth. Delivered on a base.

25.5 x 18.5 x 18 cm; 0.6 kg

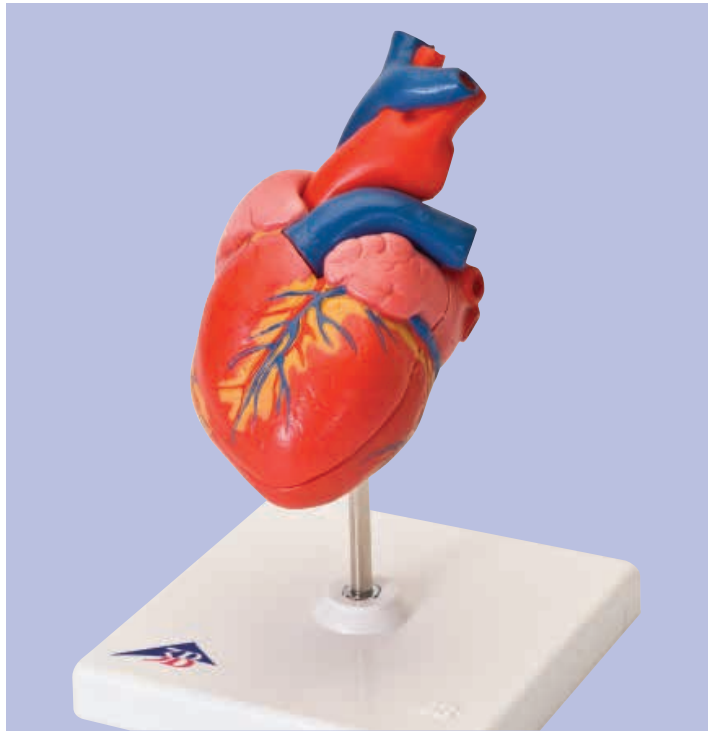
The other half shows the following dental diseases:

- Dental plaque
- Dental calculus (tartar)
- Periodontitis
- Inflammation of the root
- Fissure, approximal and smooth surface caries

S-D26



HEART MODELS



Classic Heart, 2-part

Our Classic Heart is highly detailed and at a price you will love. Just slightly smaller than life-size with exquisite detail throughout including ventricles, atria, valves, veins, and the aorta. The front heart wall is detachable to reveal the chambers and valves inside. On stand. 19 x 12 x 12 cm; 0.3 kg

S-G08



Hand detailed & finished!

Giant Heart with Esophagus 2 Times Life-Size, 5-part

At 2 times life-size this version is similar to our G12 model but additionally depicts the upper section of the esophagus, the upper bronchus, and the ascending aorta. 32 x 18 x 18 cm; 1.3 kg

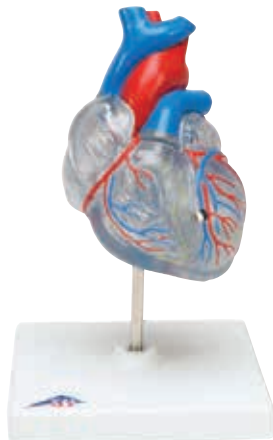
S-G13

Durable & virtually unbreakable!

Classic Heart with Conducting System, 2-part

This unique transparent model shows the anatomy of the heart complete with its conducting system represented in color. The front heart wall is removable and the entire heart can be removed from the stand. 19 x 12 x 12 cm; 0.2 kg

S-G08/3



Choose from these great features:

- Models rotate or lift off for closer inspection
- Full-size, over-size and reduced in size
- From two to ten removable parts



Heart with Bypass, 2 Times Life-Size, 4-part

This 2 times life-size heart is great for large lecture halls or classrooms. The front heart wall can be removed to view the inner chambers. In addition, this model shows a venous bypass to the ramus postero-lateralis of the right coronary artery, to the ramus interventricularis ant. of the left coronary artery with branching to the ramus diagonalis as well as a bypass to the ramus circumflexus of the left coronary artery. On removable stand. 32 x 18 x 18 cm; 1.1 kg

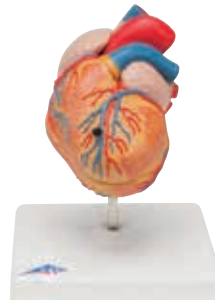
S-G06



Classic Heart with Bypass, 2-part

With all the features of the G08, but also includes venal bypasses to the right coronary artery, to the ramus interventricularis anterior, and also to the ramus circumflexus of the left coronary artery, which are shown in color. This model is a great aid in explaining coronary heart disease. On removable stand. 19 x 12 x 12 cm; 0.35 kg

S-G05



Classic Heart with Left Ventricular Hypertrophy (LVH), 2-part

In addition to all the features of item G08 this unique model shows the long-term effects of increased heart activity due to high blood pressure. The muscular wall of the left heart ventricle is considerably thickened and the tip of the heart is visibly rounded off. On removable stand. 20 x 15 x 16 cm; 0.45 kg

S-G04

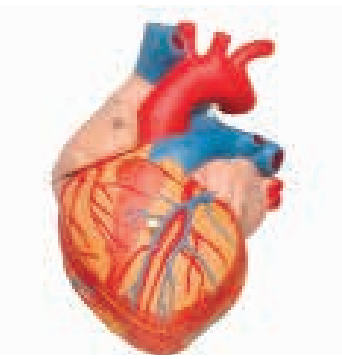


Fits together with magnet connections!

Heart Model, Natural Size

Now, in one detailed model, the study of diastole and systole is finally made straightforward and convenient. This unique dissection makes the viewing of the cardiac valves during diastole with closed pulmonary aortic valves and opened mitral tricuspid valves easier than ever before. In addition to this the closed mitral tricuspid valves and opened pulmonary aortic valves during systole are represented in a second model located on the base. Please see online for full description. 25 x 21 x 13 cm; 1.52 kg

S-G01



Giant Heart 2 Times Life-Size, 4-part

Our 2 times life-size Giant Heart allows very easy identification of all structures and is a perfect aid for lessons in big classrooms or lecture halls. The anatomy of the human heart is shown in great detail with ventricles, atria, valves, veins, and the aorta. The front heart wall can be removed to reveal the chambers and valves inside. Comes with a removable base and a multilingual product manual. 32 x 18 x 18 cm; 1.3 kg

S-G12



Classic Heart with Thymus, 3-part

Same features as G08 with addition of thymus. 20 x 12 x 12 cm; 0.3 kg

S-G08/1

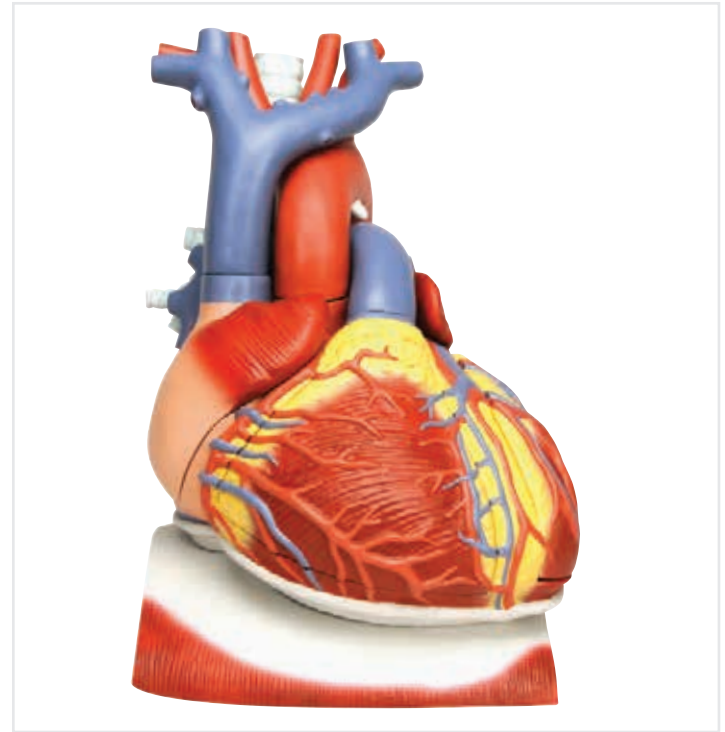
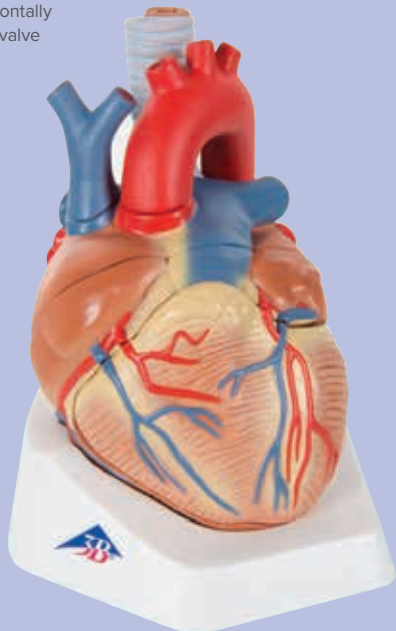
Adult Heart, 7-part

This model shows the anatomy of the human heart and is horizontally sectioned at the level of the valve plane. Delivered on a base. 20 x 15 x 17 cm; 1.1 kg

The following parts can be removed:

- Esophagus
- Trachea
- Superior vena cava
- Aorta
- Front heart wall
- Upper half of the heart

S-VD253



Authentic 3B Scientific® heart models are natural cast replicas!

Heart on Diaphragm, 3 Times Life-Size, 10-part

This unique heart model depicts the structures of the heart while detailing how the heart relates to the thoracic diaphragm. Easily show how the diaphragm separates the thoracic cavity from the abdominal cavity. *Non-removable base. 41 x 33 x 28 cm; 3.6 kg

In addition, the following parts of the heart can be removed:

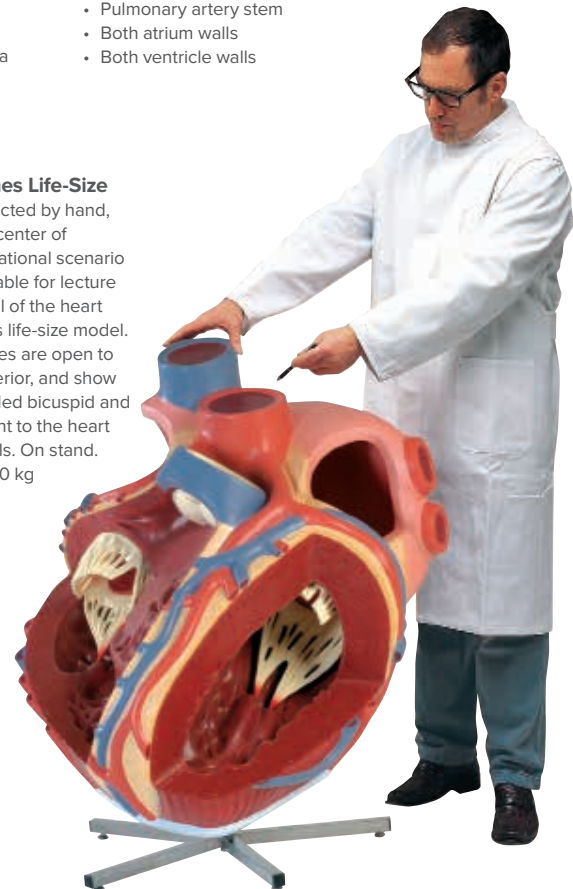
- Esophagus
- Trachea
- Superior vena cava
- Aorta
- Pulmonary artery stem
- Both atrium walls
- Both ventricle walls

S-VD251

Giant Heart, 8 Times Life-Size

Painstakingly constructed by hand, this heart will be the center of attention in any educational scenario and is especially suitable for lecture halls. See every detail of the heart with this giant 8 times life-size model. The atria and ventricles are open to give a view of the interior, and show the accurately modelled bicuspid and major vessels adjacent to the heart coronary heart vessels. On stand. 100 x 90 x 70 cm; 35.0 kg

S-VD250



HEART / LUNG MODELS



Segmented Lung

This high quality Segment Lung Model shows the lungs with representation of the bronchial tree close to the heart, trachea, oesophagus and aorta. The Lung is detachable into two lobes and single segments. The segments are colour coded and their position can be easily identified in the bronchial tree. The bronchial tree contains the lobar bronchi and segmental bronchi. All segments are connected by magnets which allow a safe and easy handling of this very high quality didactic model.

S-G70

Human Circulatory System

Half life-size schematic representation of arteries, veins, capillaries, heart, lung, liver, spleen, and kidneys. 80 x 30 x 6 cm; 13.6 kg

S-G30

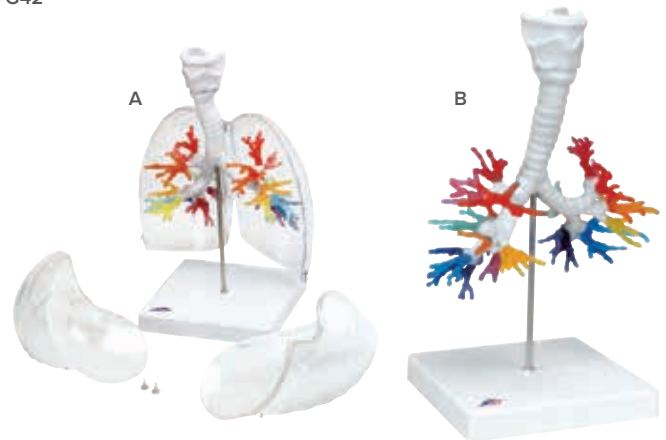


MICROanatomy™ Artery and Vein

The model, enlarged 14 times, shows a medium sized muscular artery with two adjacent veins from the antebrachial area with adjoining fat tissue and muscle. The model illustrates the reciprocal anatomical relationship of artery and vein and the basic functional techniques of the venous valves ("valve function" and "muscle pump").

The left vein and the middle artery are fenestrated in the upper anterior segment, revealing the various layers of the wall structure in a cross and longitudinal section and in top view. The right vein is opened throughout in the anterior segment, revealing the orifice of a feeder vein and two venous valves, i.e. "flap valves" formed by a duplication of the tunica intima. On the back of the model, a relief of two veins illustrates the functional aspect of the venous valves. Supplied on base. 26 x 19 x 18.5 cm; 0.9 kg

S-G42



A. CT Bronchial Tree with Larynx and Transparent Lungs

This unique model was created on the basis of computer tomography data of a human male. The larynx, with hyoid bone and epiglottis, and the trachea, with primary and lobar bronchi, are depicted in one color. The larynx is detachable at the level of the second tracheal cartilage and divisible in the median plane. The epiglottis is mounted flexibly. The various segmental bronchi are made of elastic material and depicted in various transparent colors so that they are easier to distinguish visually. The transparent lungs are detachable. 19 x 18 x 37 cm; 1.3kg

S-G23/1

B. CT Bronchial Tree without Lungs

22 x 18 x 37 cm; .43 kg

S-G23

LUNG / LARYNX MODELS



Functional Larynx

Epiglottis, vocal cords, and arytenoid cartilage are movable. Can be rotated on base. 32 x 13 x 15 cm; 0.8 kg

S-VC219



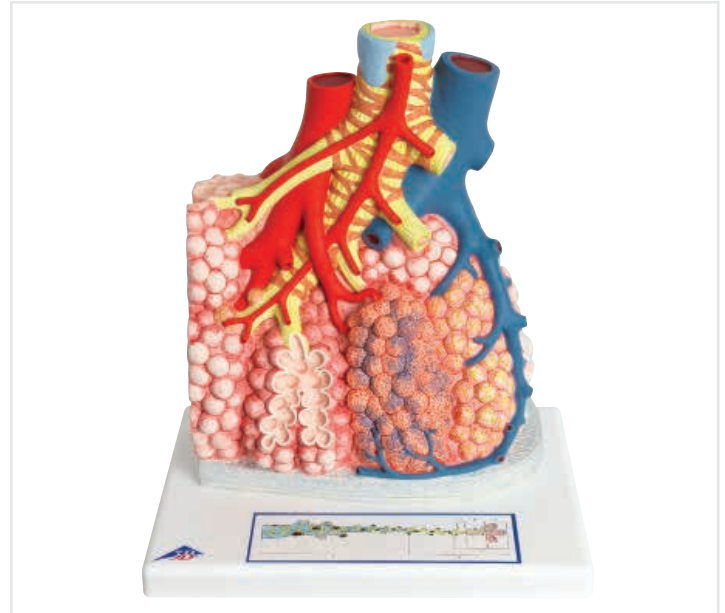
Functional Larynx, 2.5 Times Full-Size

The epiglottis, vocal cords, and arytenoid cartilage are movable. 14 x 14 x 28 cm; 0.8 kg

Additionally representing the following structures:

- Hyoid bone
- Cricoid cartilage
- Thyroid cartilage
- Thyroid
- Parathyroid glands

S-G20



Pulmonary Lobule with Surrounding Blood Vessels

The model shows the terminal branch of the bronchial tree with its further bifurcations, the associated pulmonary alveoli, as well as the surrounding blood vessels and their capillary networks in 130 times magnification. On the right side of the model, the pulmonary lobule is cut in order to facilitate view of the pulmonary tissue structure. The left side of the model shows a section of connective tissue located between adjacent pulmonary lobules. To better understand the gas exchange, a single opened pulmonary alveolus with the surrounding capillary network is shown at the back of the model in approx. 1,000-fold magnification. A graphic presentation on the base of the model shows the structure of the air passages located in the lung up to the pulmonary alveoli.

26 x 13 x 19 cm; 1.4 kg

S-G60



Larynx, 2 Times Full-Size, 7-part

This medially sectioned model shows: larynx, hyoid bone, windpipe, ligaments, muscles, vessels, nerves and thyroid gland. The Thyroid cartilage, 2 muscles and 2 thyroid gland halves are removable. On stand. 12 x 12 x 23 cm; 0.8 kg

S-G21



Larynx, 2 Times Full-Size, 2-part

This model partially shows the same features as G21. However, it is only dividable into two halves.

9 x 9 x 14 cm; 0.15 kg

S-G22

Life-size Lung Model with Larynx, 5-part

Delivered on baseboard.

28 x 37 x 12 cm; 1.25 kg

Showing the following features:

- Larynx
- Trachea with bronchial tree
- 2-part Heart
- Vena cava
- Aorta
- Pulmonary artery
- Esophagus
- 2-part Lung

S-VC243



Life-size Lung Model with Larynx, 7-part

Lung model with larynx 31 x 41 x 12 cm; 2.2 kg

Contains the following removable parts:

- 2-part Larynx
- Trachea with bronchial tree
- 2-part Heart
- Subclavian artery and vein
- Vena cava
- Aorta
- Pulmonary artery
- Esophagus
- 2-part Lung
- Diaphragm

S-G15

DIGESTIVE SYSTEM



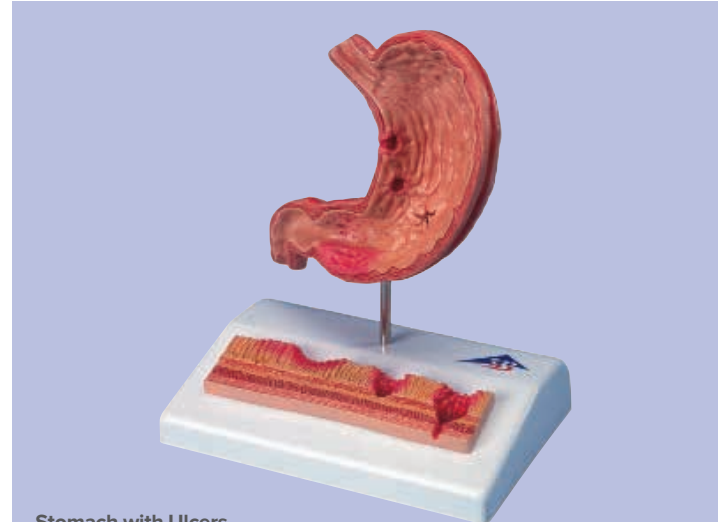
Digestive System, 3-part

This life-size model demonstrates the path food takes through the body during digestion. The duodenum, cecum, and rectum are opened. The liver, stomach, and transverse colon are removable. Mounted on baseboard. 81 x 33 x 10 cm; 4.4 kg

The entire digestive system is illustrated in graphic relief featuring:

- Nose
- Esophagus
- Pancreas
- Spleen
- Mouth Cavity and Pharynx
- GI Tract
- Liver with Gall Bladder

S-K21



Stomach with Ulcers

This 3B Scientific® pathology model demonstrates various stages of gastritis, from a light gastric ulcer to a perforation. Mounted on base. 14 x 10 x 17 cm; 0.3 kg

The stomach section, with esophagus and duodenum attachment in half life-size, shows the following pathological changes:

- Erythematous gastritis
- Erosive gastritis
- Hemorrhagic gastritis
- Healing stage with scar formation
- Atrophic gastritis
- Bleeding ulcer
- Perforated ulcer

An additional relief model of the enlarged stomach wall shows:

- Healthy mucous membrane
- Acute gastritis in the antral area
- Erosive gastritis with mucous membrane defects
- Bleeding ulcer (eroded muscularis mucosae)
- Perforated ulcer (all stomach layers eroded)

S-K17



Stomach, 3-part

Shows the layers of the stomach wall from cardia to pylorus. The front stomach half and the opened duodenum with pancreas are removable. Delivered on removable stand. 25 x 22 x 12 cm; 0.8 kg

Depicted are:

- Layers of stomach wall
- The lower esophagus
- Duodenum
- Pancreas
- Vessels
- Nerves

S-K16

Diseases of the Esophagus

Reaching from the lower part of the esophagus to the upper part of the stomach, this vivid, life-size frontal section shows many common conditions. See online for conditions shown. 14 x 10 x 19 cm; 0.19 kg

S-K18



MICROanatomy™ Digestive System

The model illustrates the structure of the fine tissues of four characteristic sections of the digestive system: The Esophagus, Stomach, Small intestine and Large intestine. The front of the model, from top to bottom, shows a magnified view, in histological section, of the individual sections of the digestive system and their fine tissue structures. The back of the model has highly magnified views of didactically interesting areas of each section shown on the front.

26 x 29.5 x 18.5 cm; 1.5 kg

S-K23



Intestinal Villi, 100 Times Life-Size

Consisting of one entire villus, one longitudinally sectioned villus showing the arterioles and venules and one sectioned villus to show the lymphatic vessels. Also includes a longitudinal section of the crypt of Lieberkühn's. On base. 43 x 28 x 10 cm; 2.5 kg

S-W42507

DIGESTIVE / RENAL SYSTEM



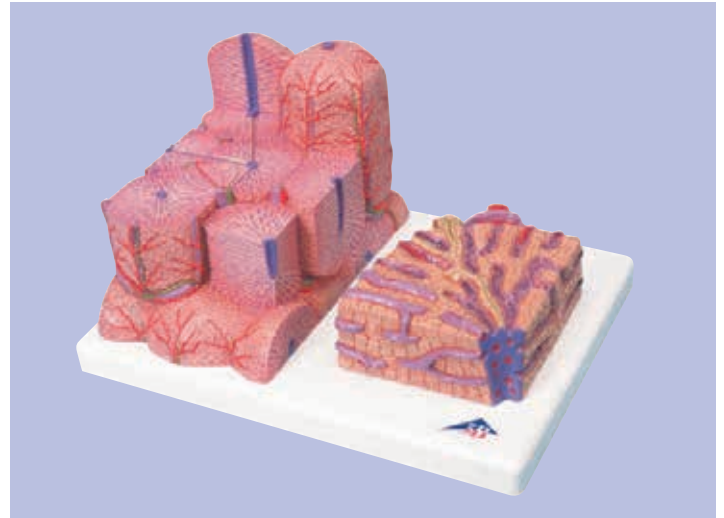
Liver with Gall Bladder

Removable stand. 18 x 18 x 12 cm; 0.5 kg

This realistic liver with gall bladder shows:

- 4 Lobes with gall bladder
- Extrahepatic ducts
- Hilus vessels.

S-K25



MICROanatomy™ Liver

This 2-part model shows a highly magnified view of a section of the liver. It illustrates the functional and structural components with two different enlargements. The left part shows a section of the liver that comprises several liver lobules. The right part of the model is a highly magnified view of the sectioned liver lobule on the left.

26 x 15 x 18.5 cm; 0.7 kg

S-K24

Gallstone Model

The anatomy of the biliary system and its surroundings are shown at half natural size in this graphic model for education. Both acute inflammation and the tissue changes caused by chronic inflammation can be identified in the gallbladder wall. Mounted on base.

14 x 10 x 19 cm; 0.28 kg

S-K26



Liver with Gall Bladder, Pancreas and Duodenum

4 x 20 x 18 cm; 0.8 kg

This highly-detailed relief model provides a detailed look at the liver with:

- Ducts
- Gall bladder
- Pancreas
- Duodenum
- Vessels
- Extrahepatic ducts with gall bladder
- Main pancreatic duct and their orifices

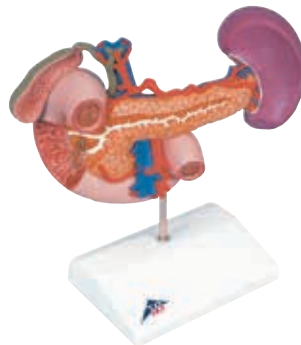
S-VE315



Kidneys with Vessels, 2-part

Life-size model presenting the kidneys with suprarenal glands, the outgoing ureters, the renal vessels, and the large vessels situated close to the kidneys. The front half of the right kidney can be removed to reveal the renal pelvis, the renal calices, the renal cortex, and the renal medulla. Comes on stand. 21 x 18 x 28 cm; 1.0 kg

S-K22/1



Rear Organs of Upper Abdomen

Representing the duodenum, which is partially opened, along with opened gall bladder and bile ducts. The model also includes the pancreas, revealing large ducts, the spleen, and the surrounding vessels, all in natural size. Comes on stand. 23 x 12 x 20 cm; 0.55 kg

S-K22/2



Kidneys with Rear Organs of Upper Abdomen, Combo Model

A combination of models K22/1 and K22/2. The 3-part model includes upper abdominal organs which are attached in their natural positions and are removable from the kidneys. Comes on stand. 24 x 18 x 29 cm; 1.4 kg

S-K22/3



MICROanatomy™ Kidney

This extremely detailed model shows the functional units of the kidney greatly magnified. Mounted on a base. 9.3 x 10.0 x 7.5 in; 2.87 lb

Six model zones illustrate the following fine-tissue structures:

- Longitudinal section of a kidney
- Section of renal cortex and renal medulla of the kidney
- Wedge-shaped section of a kidney lobe with three nephrons with Henle's loops of different lengths and diagrammatic depiction of the vascular supply
- Nephron with a short Henle's loop and didactic illustration of the vascular supply
- Opened renal corpuscle with nephron and light-microscopic transverse sections of the proximal, attenuated and distal segments of a renal tubule

S-K13



Inguinal Hernia Model

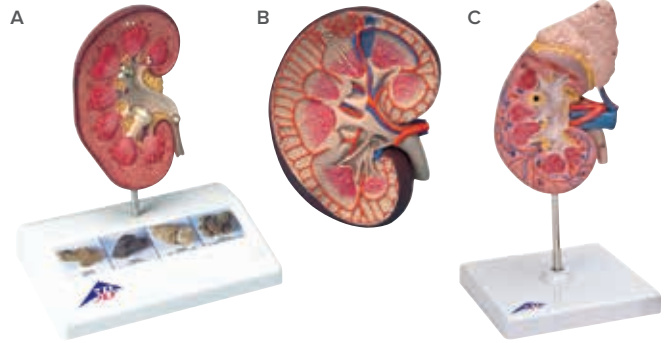
A useful model to help inform patients before undergoing surgical interventions. This natural-sized, graphic model shows the anatomical structures of a male groin with an indirect inguinal hernia, opened in layers. Two illustrations on the base allow for a comparison of direct and indirect hernias. Mounted on base. 5.5 x 3.9 x 7.1 in; 0.62 lb

S-H13

Hemorrhoid Model

The model is a life-size frontal section of the rectum as well as a smaller relief on a pedestal. In addition to the anatomical structures of the rectum (sphincter, mucous membrane, venous plexus), the model shows internal hemorrhoids during stage I and II as well as external hemorrhoids. The relief exhibit shows hemorrhoids during stage III and IV. Mounted on base. 5.5 x 3.9 x 5.5 in; 0.44 lb

S-K27



A. Kidney Stone Model

A great tool to inform patients about kidney stones and urinary stones. It shows an opened right kidney in natural size. 5.5 x 3.9 x 6.5 in; 0.40 lb

The renal calices, the renal pelvis, and the ureter are opened as well enabling concretions or stones to be identified in the following typical positions:

- In the area of the renal pyramids
- In the area of origin of the upper calix group
- In the renal cortex
- In the connecting tubule of the lower calix group, causing congestion of the minor calices (partially closed, partially opened) in the ureter
- 4 original color pictures on the base show various kidney stones.

S-K29

B. Kidney Section, 3 Times Full-Size

This colorful and anatomically accurate model depicts a longitudinal section of the human right kidney. All important structures of the human kidney are shown. No baseboard included. 3.3 x 7.5 x 10.2 in; 2 lb

S-K09

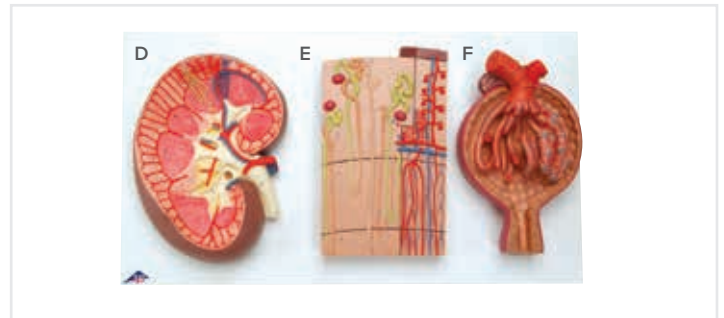
C. Kidney with Adrenal Gland, 2-part

The front half of the kidney is removable to enable demonstration of cortex medulla and vessels for teaching about the human kidney. The renal pelvis of the kidney is also displayed. 20 important structures of the human kidney are included in the anatomy key. Kidney with adrenal gland model comes on stand. 7.9 x 4.7 x 4.7 in; 0.66 lb

This high quality human kidney model shows:

- Kidney with adrenal gland
- Renal and adrenal vessels of the kidney
- Upper portion of ureter for the human kidney

S-K12



Kidney, Nephrons, Blood Vessels and Renal Corpuscle

A complete series of 3 models mounted on a baseboard allowing study of the kidney and its different structures in great detail. 700 times full-size (K10/2). 11.4 x 20.5 x 3.5 in; 6.17 lb

Together they show:

- A longitudinal section of the right kidney, 3 times life-size (K10)
- A nephron depicting a section through renal cortex and medulla. Also features the renal corpuscles with proximal and distal convoluted tubules, loops of Henle, collecting tubules, and blood vessels. 120 times life-size (K10)
- An opened Malpighian corpuscle with glomerulus and Bowman's capsule.

S-K11

Available Individually:

- | | |
|-----------------------------------|---------|
| D. Kidney | S-K10 |
| E. Nephrons and Blood Vessels | S-K10/1 |
| F. Malpighian Corpuscle of Kidney | S-K10/2 |

URINARY SYSTEM / PELVIS

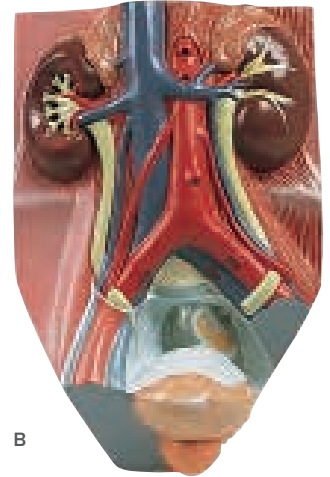
A. Dual-Sex Urinary System, Life-Size, 6-part

All in one model of the human urinary system. One front half kidney is removable; easy to change male insert (bladder and prostate, front and rear half) and female insert (bladder, womb and ovaries, 2 lateral halves). On baseboard. See online for full features.
41 x 31 x 15 cm; 2.3 kg

S-K32



A

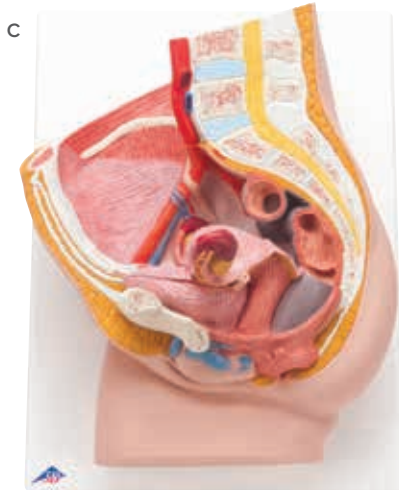


B

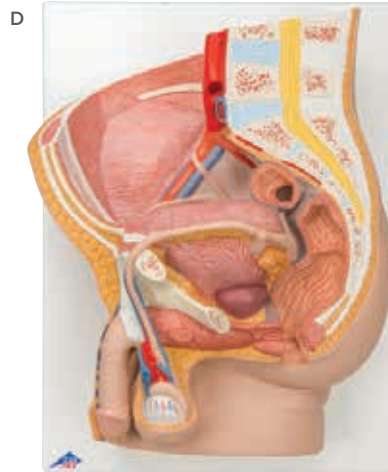
B. Male Urinary System, ¾ Full-Size

This urinary system model shows the structures of the retroperitoneal cavity in high detail. The right kidney of the male urinary system model is opened. See online for full details and list of structures represented. Urinary system model is not delivered on base.
10 x 18 x 26 cm; 1.0 kg

S-VF325



C



D

Female & Male Pelvis, 2-part

These life size models present a median section to show the normal position of organs within the adult pelvis. One half of the reproductive organs along with the bladder and rectum are removable. Each is delivered on a baseboard and can be wall-mounted if desired.

C. Female Pelvis

41 x 31 x 20 cm; 2.2 kg

S-H10

D. Male Pelvis

41 x 31 x 17 cm; 2.5 kg

S-H11



Male Pelvic Skeleton

Consisting of hip bone, sacrum with coccyx and two lumbar vertebrae. 18 x 28 x 23 cm; 0.8 kg

S-A60



Female Pelvic Skeleton

Consisting of hip bone, sacrum with coccyx, and two lumbar vertebrae; including movable symphysis. 19 x 25 x 24 cm; 0.9 kg

S-A61



Female Pelvic Skeleton w/ movable Femur Heads

This realistic pelvic skeleton model consists of hip bone, sacrum with coccyx and 2 lumbar vertebrae as well as movable symphysis.

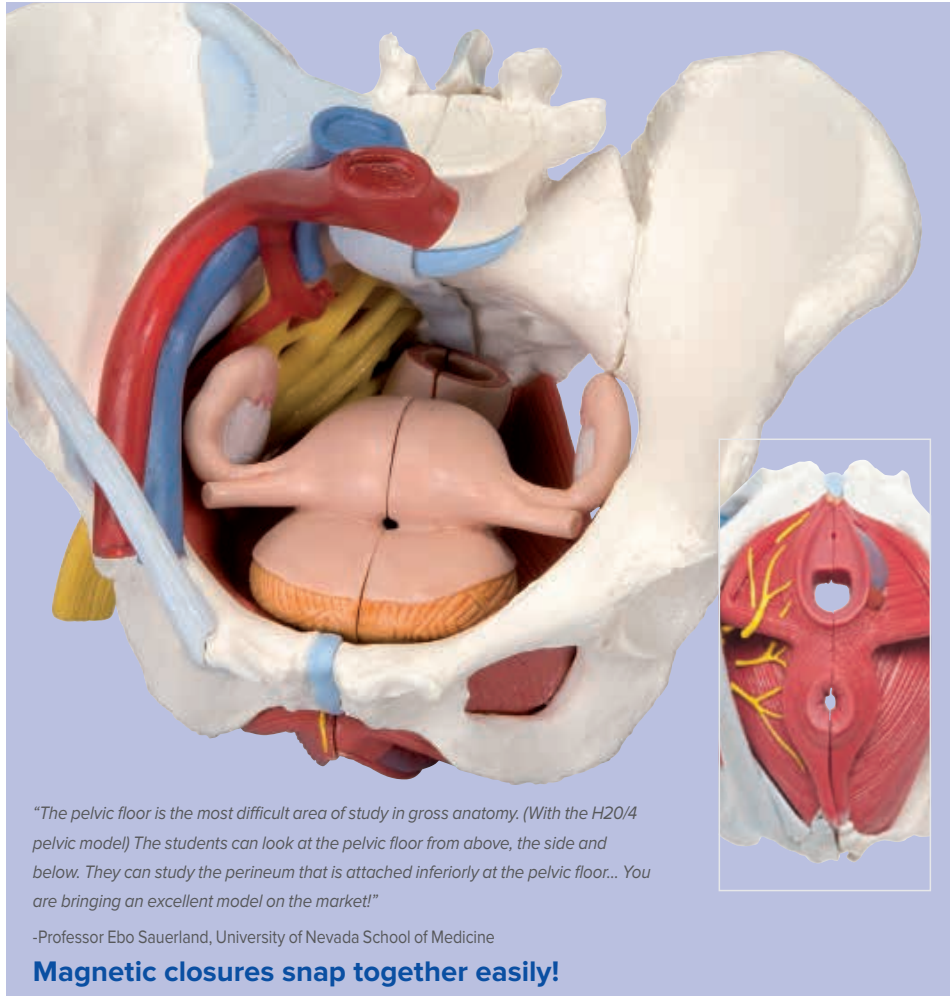
30 x 30 x 20 cm; 1.2 kg

S-A62

Pelvic skeleton features:

- Natural Cast
- Medical Quality
- Unbreakable Durable Plastic

PELVIS MODELS



"The pelvic floor is the most difficult area of study in gross anatomy. (With the H20/4 pelvic model) The students can look at the pelvic floor from above, the side and below. They can study the perineum that is attached inferiorly at the pelvic floor... You are bringing an excellent model on the market!"

-Professor Ebo Sauerland, University of Nevada School of Medicine

Magnetic closures snap together easily!

Female Pelvis with Ligaments, Vessels, Nerves, Pelvic Floor and Organs, 6-part

This original cast of a female pelvis shows bones, ligaments, vessels, nerves, pelvic muscles and organs. The whole pelvic floor is represented with partially removable midsagittally sectioned external anal sphincter, external urethral sphincter, deep and superficial transverse perineal and bulbospongiosus. Rectum, uterus with fallopian tubes and ovaries and vagina are removable and can be disassembled into halves by midsagittal section. The right pelvic half demonstrates the divisions and topographical anatomy of the common iliac artery, the external and internal artery, the common iliac vein and the external iliac vein. In addition, the right sacral plexus, right sciatic nerve and right pudendal nerve are shown. 7.5 x 10.6 x 7.5 in; 3.53 lb

S-H20/4



Female Pelvic Skeleton with Genital Organs, 3-part

This model is especially suitable for studying the position of female genital organs in the pelvis. It consists of a natural cast female pelvis with a movable symphysis, hip bone, sacrum, coccyx, 4th and 5th lumbar vertebrae, and a female genital insert with rectum. The bladder and a portion of the uterus with one fallopian tube and ovary can be removed. The soft tissues are molded from durable, soft vinyl. Delivered on base.

33 x 26 x 18 cm; 2.0 kg

S-L31



Female Pelvis with Organs, Pelvic Floor & Ligaments, 4-part

Bones, ligaments, and pelvic floor muscles with pelvic organs midsagittally sectioned to illustrate their relationship to the pelvic floor muscles.

7.5 x 10.6 x 7.5 in; 2.87 lb

S-H20/3



Female Pelvis with Ligaments, 3-part

Accurately presenting the following ligaments: Inguinal, sacrotuberous, sacrospinous, anterior sacroiliac, iliolumbar, anterior longitudinal, interosseous sacroiliac, posterior sacroiliac and obturator membrane.

7.5 x 10.6 x 7.5 in; 2.2 lb

S-H20/2



Female Pelvis, 3-part

Detailing the structures of the bony pelvis: Hip bones, pubic symphysis, sacrum, coccyx, L5 (removable) with intervertebral disc. Sacrum and the coccyx can be disassembled to show part of the cauda equina in the vertebral canal. 7.5 x 10.6 x 7.5 in; 2 lb

S-H20/1

Male Pelvis with Ligaments, Vessels, Nerves, Pelvic Floor and Organs, 7-parts

This 7-part model of the male pelvis accurately shows how the bones, ligaments and pelvic floor muscles interact. This medianly divided model is connected with magnets to allow for easy separation into two halves. The right side of the pelvis shows the external anal sphincter, rectum, bladder, prostate and penis. Layers of skin have been removed from the penis and scrotum so vessels, nerves and internal structures are visible. Over 120 structures are identified. Comes with sturdy base for display. 8.3 x 11.0 x 12.2 in; 6.88 lb

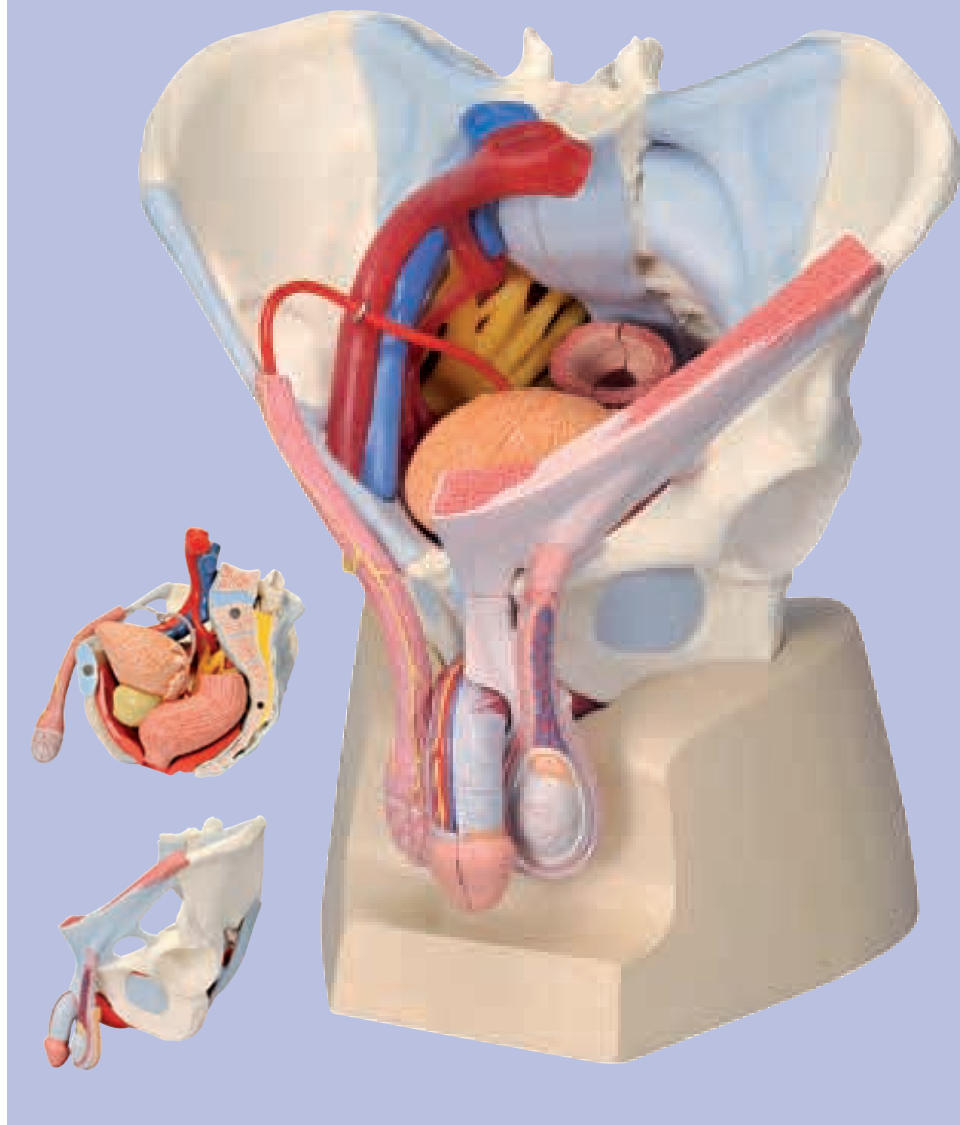
S-H21/3



Male Pelvis with Ligaments, 2-part

This 3-part model is a natural cast of a male, bone pelvis. It shows all anatomical structures in detail: both hip bones, pubic symphysis, sacrum and coccyx as well as the fifth lumbar vertebra with intervertebral disc. A median section has been placed through the fifth lumbar vertebra, the sacrum and the coccyx, so that the pelvis, which is connected by practical magnets, can be split easily into two halves. This means that part of the cauda equina is also visible in the vertebral canal. 7.5 x 11.0 x 9.6 in; 3.66 lb

S-H21/2



Male Pelvis, 3-part

This 3-part model is a natural cast of a male, bone pelvis. It shows all anatomical structures in detail: both hip bones, pubic symphysis, sacrum and coccyx as well as the fifth lumbar vertebra with intervertebral disc. A median section has been placed through the fifth lumbar vertebra, the sacrum and the coccyx, so that the pelvis, which is held together by practical magnets, can be split into two halves. This means that part of the cauda equina is also visible in the vertebral canal. The left half of the fifth lumbar vertebra is held together by magnets and can also be removed. 7.5 x 11.0 x 9.6 in; 3 lb

S-H21/1

Childbirth Demonstration Pelvis

This model demonstrates the progress of a full-term fetal head through the pelvis during birth. The simulator consists of a female pelvic skeleton with a movable symphysis, hip bone, sacrum, coccyx, and 2 lumbar vertebrae. It is articulated to accommodate passage of a fetal skull which is mounted on an omni-positioning flexible gooseneck support. Delivered on baseboard. 33 x 26 x 18 cm; 1,8 kg

S-L30



REPRODUCTIVE EDUCATION



Testicle Self Exam

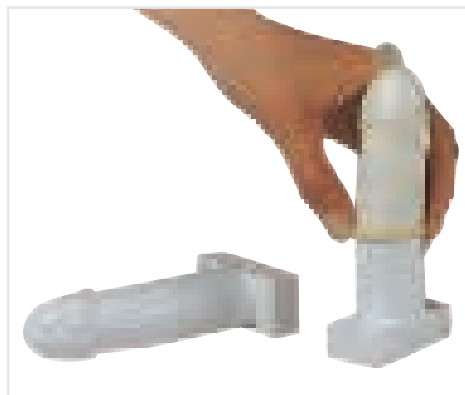
By using 3B Scientific SKINlike™ high-quality silicone, learning and practicing self-examinations of the testicles becomes even more realistic. The scrotum contains two movable testicles, the epididymi, and the spermatic cords for palpation. Two pathological findings can be felt in the left testicle. Supplied with detailed instructions for self-examination and a carrying bag. 9 x 8 x 4 cm; 0.19 kg
S-L60



Condom Training Kit

Use this model to quickly teach how to use a condom safely. The anatomical structures and its firmness are realistic, so that training to put on and remove a condom happens in a realistic way. Supplied with 12 lubricated training condoms and a carrying bag. 7.5 x 7.5 x 19.5 cm; 0.35 kg

Light Skin Tone S-L42
Dark Skin Tone S-L43



Condom Training Set

This economy set has 20 styrofoam penis models and provides a means of practicing the correct use of condoms, even in large groups. The reusable models can be fixed to the desktop with adhesive tape. Delivered without condoms. 14.5 cm

S-W19101



Testicle Self Exam Simulator

Self-examination of the testicles is just as important as self-examination of the female breasts for early detection of tumors. Providing exceptional realism, this simulator features soft, thin outer skin with delicate underlying structures and four embedded, simulated tumors. Ideal for teaching proper palpation techniques. To maintain the lifelike feeling of the skin, baby powder (included) should be applied from time to time. 23.5 x 16 x 6.5 cm; 0.475 kg
S-W44112



Teen BSE/TSE Training Set

This kit contains a teen BSE model and a TSE model to teach teens the importance of the early detection of cancer. Teen BSE model contains lumps in a variety of sizes. TSE model contains two lumps in each testicle. Each model is made of soft, durable BIOLIKE 2™ synthetic tissue and comes with slipcover and carrying case.

Beige Skin Tone S-W43104
Brown Skin Tone S-W43103



Male Pelvis Section, ½ Life-Size

A cross section of the male genital organs showing all anatomical structures in detail. 13.5 x 10 x 14 cm; 2.4 kg
S-H12



AIDS Virus

This model has been enlarged millions of times to show the outer lipid membrane with protein structures and the internal nucleus which contains the viral hereditary matter (RNA). Remove the nucleus and you'll find space to place a targeted message regarding measures to take in protecting against HIV. Mounted on base. 18 x 13 x 13 cm; 0.6 kg
S-L40

Female Condom Model

This model shows the labia and vagina up to the cervix and is designed to demonstrate and teach the insertion of a female condom. (Condoms not included).
12 cm; 0.15 kg

Dark skin tone S-L41/1
Light skin tone S-L41/2



The Consequences of HIV/AIDS 3D Display

This 3D display helps viewers to understand what HIV/AIDS can do to the body. Contained within a convenient carrying case for storage or transport. 71 x 69.75 cm opened.

S-W43090



The Consequences of STDs 3D Display

This 3D display shows how organs and body parts can be affected by sexually transmitted diseases. The durable carrying case and easy set-up make this display ideal for clinics and sex education programs. 71 x 69 cm opened.

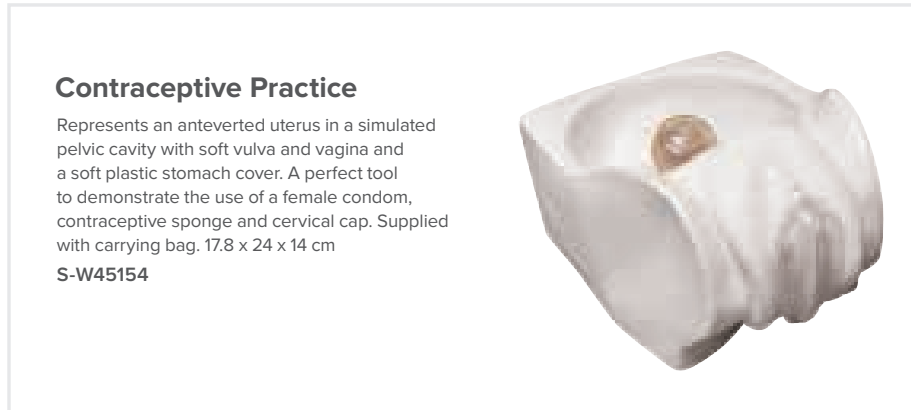
S-W43089



Female Pelvis Contraceptive Model

This model, made from soft BIOLIKE™ material, provides a cross-section of a female pelvis for demonstrating proper contraceptive insertion. The side cutout lets viewers see and understand contraceptive placement and removal. (Contraceptives not included). 15 x 8 x 9 cm

S-W43079

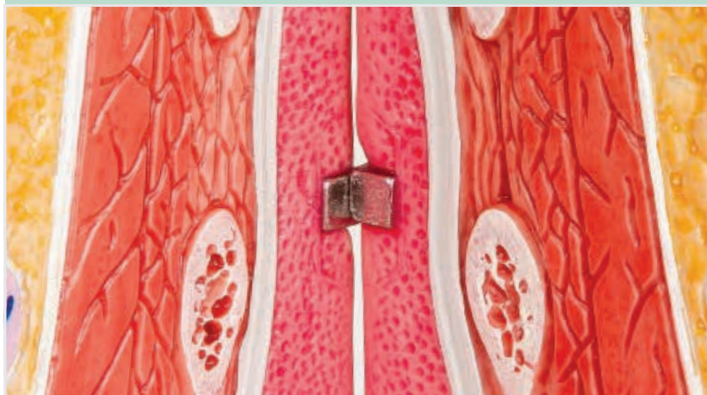


Contraceptive Practice

Represents an anteverted uterus in a simulated pelvic cavity with soft vulva and vagina and a soft plastic stomach cover. A perfect tool to demonstrate the use of a female condom, contraceptive sponge and cervical cap. Supplied with carrying bag. 17.8 x 24 x 14 cm

S-W45154

WOMEN'S HEALTH

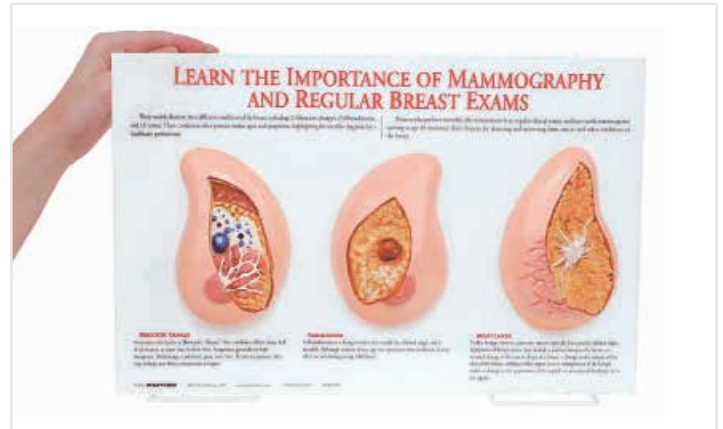


Fits together & hinges on magnetic connections

Female Breast Models

The models include an example of a lactating right breast and a non-lactating left breast. Both parts of the model have a sagittal cut showing the tissue of the breast gland as well as the deeper-lying anatomical structures such as the muscles, ribs, costal pleura, pulmonary pleura and lungs. A breast gland inflammation (mastitis) is represented on the right breast and various other diseases on the left breast including a benign tumor, two malignant tumors, and two cysts. The models are fixed together via magnets.

S-L56



The Importance of Mammography Display

These handpainted, 3D breast models feature the anatomy of three different breast diseases. Breasts with fibrocystic condition, a fibroadenoma and a malignant tumor are depicted. Comes with wire easel. 17 x 11 in

S-W43100



Wearable Breast Self Exam Model with Case

Demonstrate realistic self-examination with our natural casting of a female upper body with C cup breasts. It can easily be worn, in order to better train and practice breast self-examination. Includes: Multilingual product manual, inFemale Breast in chart (VR1556), talcum powder, harness, stand, aluminum carrying case. 56 x 44 x 24 cm; 11.5 kg

- Made of new 3B Scientific SKINlike™ high-quality silicone
- Breast examination is possible in both upright and lying positions
- Benign and malignant tumors in different stages of development sharpen self-examination skills

S-L50

S-L51 without chart and case

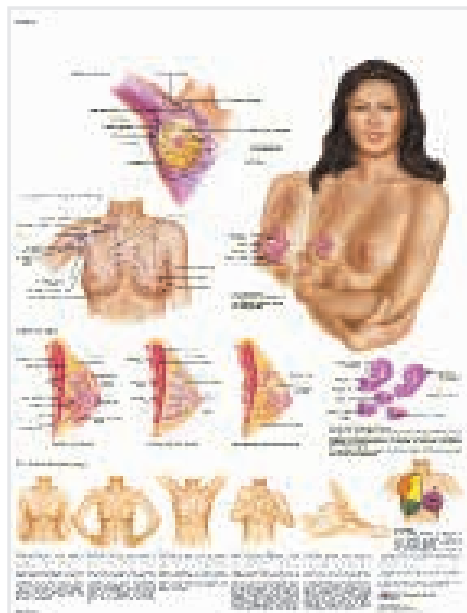


Breast Self Examination Model

Very realistic natural casting of three different female breasts in C and D cups, to train and practice breast examination. Supplied with base and talcum powder. 52 x 24.5 x 9.5 cm; 2.3 kg

- Made of new 3B SKINlike™ high-quality silicone
- Benign and malignant tumors in different stages of development are featured in two breasts
- A healthy breast is supplied for comparison

A. S-L55
 B. S-L55/1 single breast only



Female Breast Chart - Anatomy, Pathology and Self-Examination

This colorful chart covers the anatomy, pathology, and self-examination of the human female breast. The anatomy of breast pathology is shown along with useful information about different types of breast lumps that can occur. 50 x 67 cm
 S-VR1556L



How to Perform Breast Self Examination (BSE) Chart

This chart explains basic procedures for vertical/grid, circular, and wedge patterns and includes recommendations on when and where to perform BSE. Also lists possible warning signs of breast cancer. An excellent teaching resource. Laminated. 45.7 x 61 cm
 S-W43224



Why PAP Tests Can Save Your Life Easel Display

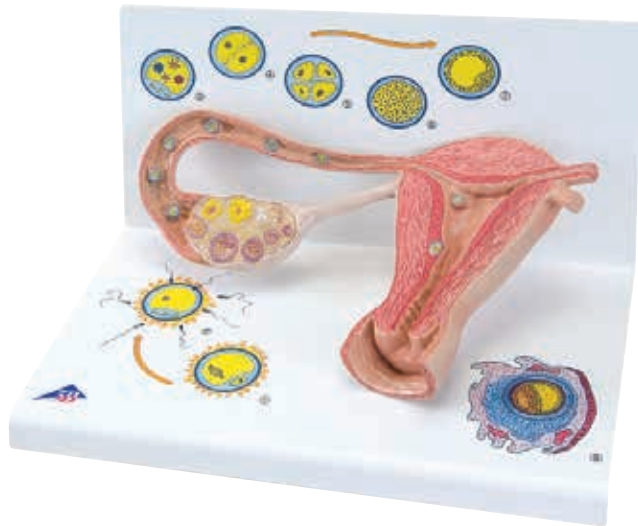
Easy-to-understand text combined with six hand-painted, realistic cervix models make teaching the importance of regular PAP tests easy. This 3D display is perfect for one-on-one presentations. Comes with a protective felt cover. 9 x 12 in
 S-W43132

Woman's Monthly Carousel Chart

Ideal visual aid for a complex process, this chart explains a 28-day menstrual cycle. Discusses function of hormones, changes in the uterine lining, the development and release of the ovum, body temperature, and more. 33 x 16 in
 S-W43222



PREGNANCY / BIRTH



Stages of Fertilization and The Development of The Embryo, 2 Times Life-Size
Schematic illustrations show how an ovum matures, how ovulation and fertilization occur, and how the fertilized ovum develops to the point of embedding itself in the womb wall to begin growth into an embryo. The various stages are shown in larger-than-life model form in an ovary, fallopian tube, and womb. An even more enlarged illustration of each is printed on the base. 35 x 21 x 20 cm; 1.2 kg

S-L01



Visual Anatomy Oversize Wall Charts

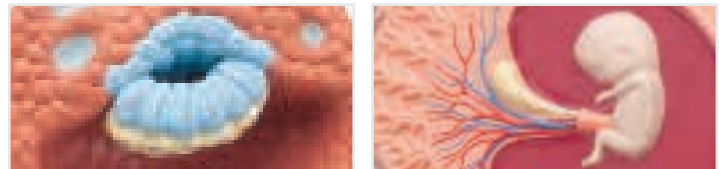
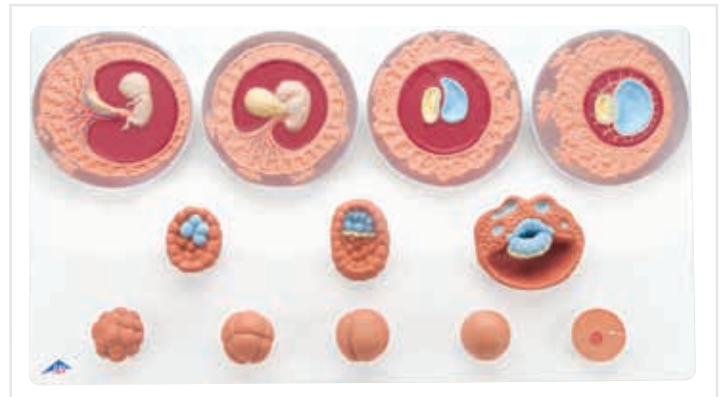
A valuable educational supplement for use in schools, universities and medical facilities. These impressive charts are supplied with a detailed, six-language product manual including scientifically correct nomenclature. Printed on waterproof, tear resistant paper each chart is available with (M) or without (U) wooden mounting rods. Please add the appropriate suffix to the product number to indicate your mounting preference.

Menstrual Cycle & Ovum Implantation

S-V2065U Unmounted
S-V2065M Mounted

Embryology I

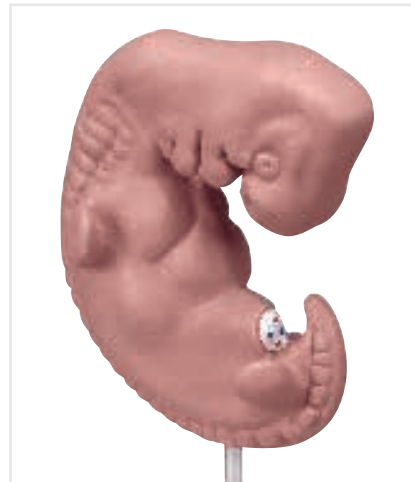
S-V2066U Unmounted
S-V2066M Mounted



Embryonic Development Model in 12 stages

The model represents the development of the human germ cells from fertilisation until the end of the 2nd month of pregnancy in 12 stages. Each stage can be removed from the common stand as an individual part and can be purposefully used for teaching and tests for the embryological specialist field. 65 x 34.5 x 6 cm; 1.55 kg

S-VG391



Human Embryo Model, 25 Times Life-Size

This human embryo model shows the anatomy of an embryo at approximately 4 weeks old. At 25 times life size this human embryo is great for studying human development. The high quality model is affordable without sacrificing any anatomical detail. 12 x 12 x 23 cm; 0.3 kg

S-L15

25 times life-size!

Embedded Placenta

This corrosion cast specimen of a human placenta is embedded in crystal-clear plastic. Detailed spatial portrayal of vessel arborization and progression as well as the placental villi is achieved by injecting different colored plastics into the placental vessels: red in the placental arteries and blue in the placental veins. The specimens vary in shape as each is unique.

21 x 17 x 4cm; 0.5 kg

S-W10604



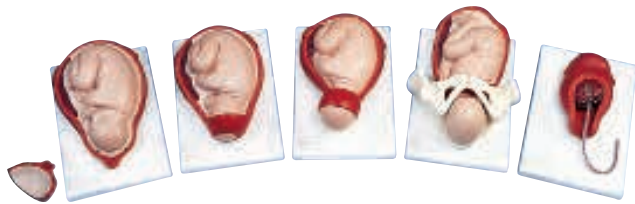


Classic 3B Scientific® Pregnancy Series

Study human development from the 4th week through the 7th month. Our most popular series includes eight models to show the complete stages of development. All embryo or fetus models are shown in different typical positions in the uterus and each is mounted separately on an individual stand. The five later stages of development allow the fetus to be removed. Ask your Sales Rep about purchasing individual models or visit 3bscientific.com for product details. 12 x 12 x 19 cm; 3.2 kg

- 1st Month Embryo
- 2nd Month Embryo
- 3rd Month Embryo
- 4th Month Fetus (Transverse Lie)
- 5th Month Fetus (Breech Position)
- 5th Month Fetus (Transverse Lie)
- 5th Month Twin Fetuses (Normal Position)
- 7th Month Fetus

S-L10



Birth Process, 5 Stages

Anatomical representation of human birth. 5 stages of the birthing process, mounted individually on bases. 17 x 28 x 46 cm; 8.6 kg

- Fetus in womb, cervix closed; 2-part
- Fetus in womb, cervix open
- Fetus in womb, start of head passage
- Fetus in womb and pelvis, finish of head passage
- Placenta in womb

S-VG392



Standard 3B Scientific® Pregnancy Series

This series consists of five models to show the most important stages of development. Stages included: 1st month, 2nd month, 3rd month, 5th month, 7th month. The 5th and 7th month stages have detachable fetuses. All models are mounted together on a base.

13 x 41 x 31 cm; 2.1 kg

S-L11/9



Model for Gynecological Patient Education

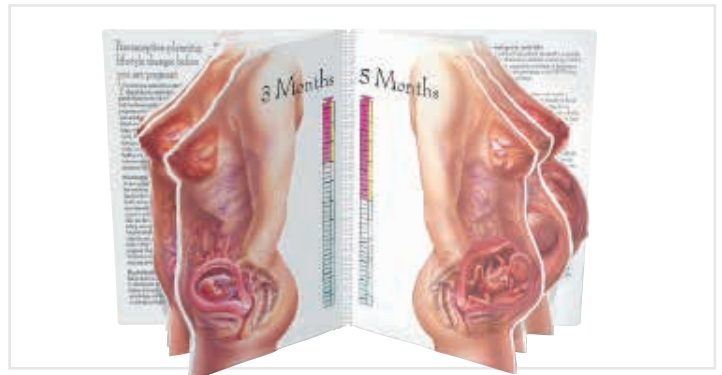
Ideal for demonstration purposes and for practicing insertion of female barrier contraceptive devices. Including the femidom, cervical cap, vaginal ring, diaphragm and IUD. It is possible to insert the various types of pessaries such as ring, bowl or cube which are used in the event of a prolapse or incontinence. 10.2 x 7.5 x 8.7 in; 3.26 lb

S-P53

Optional Kits

Contraception Kit S-XP53-001

Pessary Kit S-XP53-002



Life in the Womb: "With Child" Display

Reviewing anatomical development from conception to six weeks postpartum is made easy with the accompanying inWith Child in life-size display. 45.7 x 61 cm; 18 x 24 in

"With Child" Display S-W43076



Labor Stages Model

Same as VG392, but reduced in half. Supplied on baseboard.

40 x 31 x 13 cm; 1.4 kg

S-VG393

PARENTING EDUCATION



Ready or Not Tots®

The original manikin that simulates a baby's varying needs! Take the glamour out of teen pregnancy and demonstrate the realities of the real world to your students.

You never have to worry if students neglected the manikin. Ready-or-Not Tot® uses set programs so the teacher always knows when the manikin required care. Student response to the manikin's needs are easily checked using the template provided.

Comes complete with one set of student keys, one set of teacher keys, reproducible parental consent form/permission slip, reproducible student response sheet, teacher correction template, diaper, 9V battery, and instructions. Visit 3bscientific.com for product detail and characteristics.

White Male	S-W44214
White Female	S-W44215
Black Male	S-W44218
Black Female	S-W44219

\$305^{ea.}



A. Childhood Immunizations Folding Display

This informative and award winning folding display includes basic information about vaccines and explains why people should get them. Also provides information about 15 diseases that can be prevented by vaccinations. 58 x 22.5 in opened.

S-W43143

B. Shaken Baby Syndrome Folding Display

Describing symptoms of and ways to prevent shaken baby syndrome, this folding display is an ideal educational tool for parents and infant caregivers. Includes information about dealing with a baby who won't stop crying. 58 x 22.5 in opened.

S-W43140



Shaken Baby Demonstration Model

An infant's vulnerability to shaken baby syndrome (SBS) is powerfully demonstrated with this model. The model's translucent head allows viewers to see how a baby's brain can be harmed. Also emphasizes the importance of supporting an infant's neck. Helps teach prevention of SBS, which can have devastating consequences including permanent brain damage, blindness, and death. SBS tear pad also available. 19 in long.

S-W43117



Empathy Belly

This unique pregnancy simulation allows both female and male wearers to experience over 20 symptoms and effects of being pregnant. Through the use of a rib belt and the strategic positioning of various weighted components, the Empathy Belly simulates many of the physical and emotional effects of being pregnant. This handon garment is a wonderful teaching and learning tool. For teenagers, the Empathy Belly provides a tangible example of what it means to be pregnant.

Medium S-W99996

Large S-W99997



Sippy Cup of Sugar Display

Too much added sugar in a child's diet can cause health problems including tooth decay and obesity. The sweet and sticky goo in this display helps teach parents and caregivers that drinks are the largest source of added sugar in many children's diets. Informative tent card lists the health problems caused by too much sugar, provides facts about the scope of the problem, and includes tips for limiting added sugar consumption.

S-W43144



Breastfeeding Chart

S-VR1557L



Mini Model Set: Pocket Uterus, Baby, and Pelvis (6 Pieces)

Fit childbirth education in your pocket! An exceptional teaching tool, this set helps to explain what happens during labor and birth. The 5.5 in long baby has a detachable placenta/cord with amniotic sac. Pelvis and knitted uterus are proportioned to fit the baby. Includes receiving blanket and tote bag. 48 cm; 1.0 kg

S-W43092



Empathy Lungs

The Empathy Lungs are unique in that they simulate first-hand the symptoms of shortness of breath and breathlessness common to COPD, Asthma, and Lung Cancer. When used correctly and for short periods of time (15-30 minutes) the simulator causes the wearer to physically experience strenuous, labored, and shallow breathing along with the accompanying fatigue, irritability, and emotional distress that comes with the feeling of not being able to get enough air. The Empathy Lungs measurably reduce the wearer's total lung capacity which can be seen by measuring their Peak Expiratory Flow rates with the included Peak Flow Meter. Visit 3bscientific.com for more details.

S-W99998



Smoked Lung™

This realistic, 3D lung model lets viewers see just what cigarette smoking does to their lungs. When the top is opened a grayish-white fibroufeeling cancer is revealed. Made from BIOLIKE™ synthetic tissue, this model of a right lung with emphysema and cancer is excellent for individual and group education. 5 x 9 x 4 in

S-W43106



The Consequences of Smoking 3D Display

Show the consequences of smoking on various organs of the body with life-sized, handpainted models. Each model is permanently mounted in a carrying-case display, and the accompanying text clearly communicates its health message in simple terms. Ideal for health fairs, schools, hospitals, smoking cessation programs, or the workplace. 28 x 27 in opened.

S-W43047



A Year's Worth of Tar

This graphic, sealed exhibit, containing a pack of cigarettes and cigarette butts submerged in goopy tar, represents the amount of carcinogenic liquid a one-pack-a-day smoker puts into his/her lungs over the course of year.

13 x 14 x 7 cm

S-W43043



Death of a Lung Easel Display

When a patient or student views realistic models of lung tissue affected by smoking, the impact is stranger than any words or photographs. These three handpainted models represent a normal lung, a lung with emphysema, and a lung with cancer. This unique, 3D display illustrates the dangers of smoking in a way viewers will never forget. Comes with protective felt cover. 9 x 12 in

S-W43111



Mr. Dip Lip™

This one-of-a-kind product makes anyone question what dipping is really about. The mouth opens and closes from the rear, and flesh-like lips may be retracted to show the effects dipping can have on the inner lip, gums, and teeth.

15 x 13 x 15 cm; 0.2 kg

S-W43048



Mr. Gross Mouth

This hinged model of the teeth, flexible tongue and oral cavity shows the effects of smokeless tobacco. Mounted on base, supplied with a bottle of simulated tobacco juice.

15 x 20.3 x 10 cm

S-W43013



Lou-Wheeze

Students get a shockingly accurate picture of smoking-related lung damage with this interactive display. Lou-Wheeze has two flexible latex lung models. One representing a healthy lung, the other showing the damage done by emphysema and cancer. Comes with bellows pump and instructions. 17 x 23 in

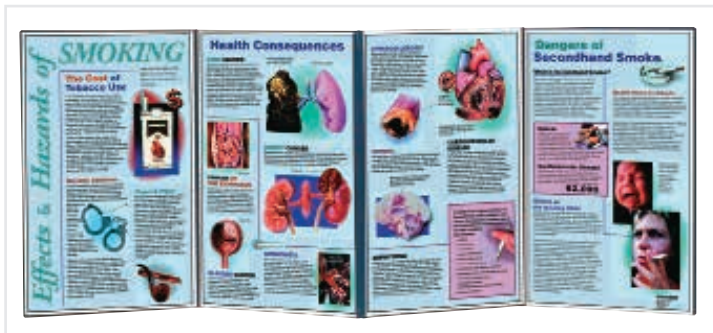
S-W43062



The Consequences of Smokeless Tobacco Use 3D Display

This 3D display graphically shows that using smokeless tobacco is harmful and deadly. Detailed, handpainted models illustrate health conditions caused by smokeless tobacco use, and the informative, easy-to-understand text is complemented by line drawings. Display is contained within its own durable carrying case. 28 x 27 in opened.

S-W43110



Effects & Hazards of Smoking Display

This folding display helps viewers understand the initial and long-term effects of nicotine and smoke by-products on the human body. Comes with 25 reorderable minitexts. 58 x 22 in opened.

S-W43064



Effects & Hazards of Secondhand Smoke Display

This folding display points out that second-hand smoke puts nonsmokers at risk for developing a number of serious conditions and diseases. Comes with 25 reorderable minitexts. 58 x 22 in opened.

S-W43069



Smokeless Tobacco: Spit It Out Display

Smokeless tobacco is often first used by young males; this folding display targets teenagers specifically, using direct language and gripping images to expose the truth about in spit in tobacco. Eye-catching and made to last.

S-W43066

Carrying Case for Displays

Fits all folding displays, holds up to 12 displays.

S-W43059





Smoker's Foul Mouth Display

Graphically displaying what cigarette smoking can do to the mouth, this model details a variety of harmful effects, including gum disease, tooth decay, lip cancer, and more. This unique, hinged model includes two removable tongues. One tongue depicts a healthy tongue in, and the other portrays leukoplakia and tongue cancer. Mouth is mounted on a handpainted model of the lit end of a cigarette. Comes with simulated cigarette that can be used as a pointer. 26.5 x 13 x 5.25 in

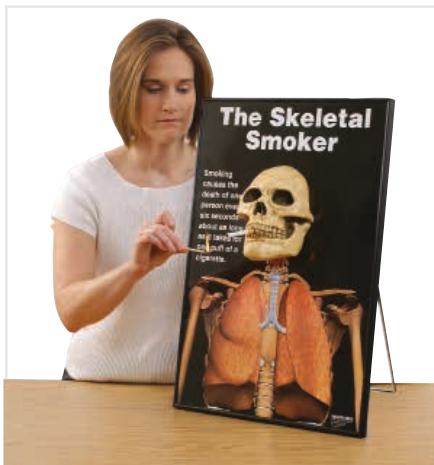
S-W43234



A Pack of Toxic Tar Display

Many people give little thought to the amount of dangerous tar found in cigarettes. This realistic display contains two removable cigarettes filled with goopy tar. In the tar in these two cigarettes represents the amount of toxic tar that a smoker receives from smoking one pack of cigarettes.

S-W43237



The Skeletal Smoker™ Display

This display sets up anywhere and draws a big crowd. Perfect size for classroom or exhibit. Tar may be collected directly on The Skeletal Smoker's washable surface or caught on disposable Mini-Lung™ sheets. Includes metal easel stand. Comes with 100 Mini-Lung sheets. Carrying case available separately. 17 x 25 in

S-W43175



Teeth in Tobacco Juice

Sealed in a plastic jar of simulated tobacco juice containing tobacco flakes, this model of damaged and decayed teeth and gums sends a clear message about the effects of smokeless tobacco use. 3.75 x 6 in

S-W43102



Clem's Phlegm™

Graphically demonstrating one of the nasty consequences of smoking, this attention-getting sealed jar contains about 2 weeks of the phlegm that would be coughed up by a smoker with COPD. Great discussion starter for any anti-smoking lesson or program. 3.75 x 6 in

S-W43171



Tainted Blood: Smokers' Blood Revealed™ Display

Designed to look like a cigarette on one side and an artery on the other, this colorful display graphically explains the damage smoking causes in a smoker's bloodstream. The artery in the model shows how smoking causes carbon monoxide to inchoke in out oxygen in the bloodstream and contains models reflecting the poisons that flow through the bloodstream of a smoker. Plaque buildup caused by smoking is depicted on the sides of the model. Display includes a tent card that explains each of the aspects of the model and provides further information about the consequences of smoking. Model is 10 x 3 x 2.5 in. Tent card is two-sided and 8.5 x 11 in.

S-W43177



Effects of Smoking Activity Model

Give your students a firsthand view of how tar and other pollutants accumulate in the lungs during smoking. Simply place a lit cigarette that you provide in the mouth of the inSmoking Man in and draw smoke into his lungs in using the syringe pump included. The results will amaze you as you watch his lungs start to darken after only a few short puffs! Includes detailed teacher and student guides that provide extensive background information on the dangers of smoking.

13 x 10 x 23 cm

S-W55723



A. Smokey Sue Smokes For Two

As Smokey Sue smokes a cigarette, tar collects around the lifelike model of a 7-month-old fetus, graphically showing the pollutants that can reach a developing baby. Jar and fetus are easy to clean. 12.7 x 35.5 x 12.7 cm

S-W43011

B. Smokey Sue – The Dangers of Smoking

Smokey Sue dramatically demonstrates the quantity of tar collected in the lungs when one single cigarette is smoked. The tar, normally inhaled directly into the lung, is collected in a transparent tube, and thus shows the quantity of tar which reaches the lung with each cigarette very clearly. Delivered with stand, 3 collection tubes, and carrying bag. 15 x 35.5 x 16.5 cm; 1.15 kg

S-W43010



Smoker Model

This small hand-held model actually smokes a cigarette and collects its tars and nicotine on a photo of a real chest X-ray of a lung cancer victim. Stained prints fit into plastic bags, keeping stains intact when they are passed around for closer inspection. 13 x 29 x 5.5 cm

S-W43042

Great teaching aid for teachers and students!

Ready or Not Tots® - Drug Affected Training Babies

The FIRST manikin to simulate a baby's varying needs is even better! This manikin is both a drug prevention baby and a general teen pregnancy prevention baby with four programs! Comes complete with one set of student keys, one set of teacher keys, reproducible parental consent form/permission slip, reproducible student response sheet, teacher correction template, diaper, 9V battery, and instructions. See online for additional features.

Features include:

- Differentiate between Shaken Baby Syndrome and other types of abuse
- Offers three different tending programs typical of most babies
- Fourth tending program simulates the more annoying cry of a drug- or alcohol-affected baby
- Alerts teacher to a student's abuse, panic, or tampering with the control box
- Newborn-size doll represents a baby of a teen mom – 2.5 kg, 50.8 cm long
- Includes a indemo in option

White Male S-W44222

White Female S-W44223

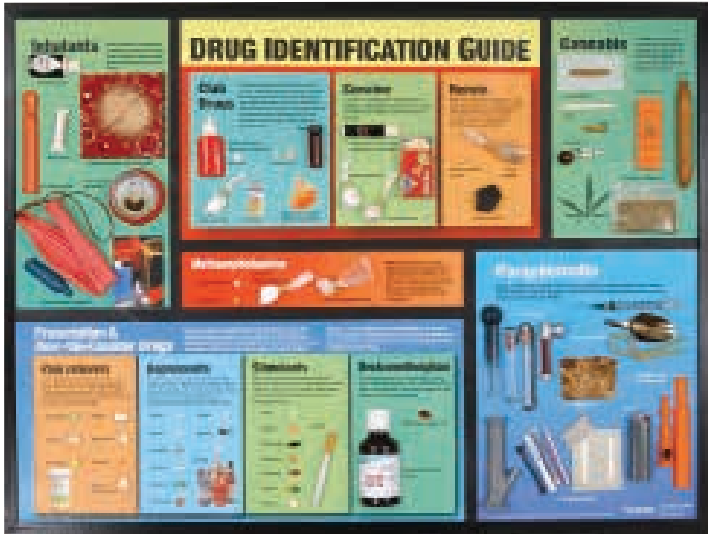
Black Male S-W44224

Black Female S-W44225

ea.



SUBSTANCE ABUSE



Drug Identification Guide

This large display uses realistic facsimiles to show today's most commonly abused drugs. Handpainted, 3D models are enclosed behind Plexiglas. Stands on a tabletop for easy display. Comes with an informative, reproducible handout. 32 x 24 in Identification Guide S-W43097



A. Substance Abuse ID Guide Flip Chart

One of the biggest problems in dealing with drugs and alcohol is being able to recognize signs of abuse. This material can be used to teach employees, families, and students about different types of drugs and the symptoms of their use. Covers alcohol, inhalants, narcotics, depressants, stimulants, cocaine, hallucinogens, and marijuana. Flip chart features presenter's notes on reverse panels. 6 panels. 12 x 17 in S-W43179



B. Marijuana Flip Chart

This flip chart describes marijuana, reveals its harmful effects, and lists possible signs of marijuana use. Perfect for teaching that marijuana is not a harmless drug. Flip chart features presenter's notes on reverse panels. 6 panels. 12 x 17 in S-W43180



Graphic, accurate information in a 3D display case

The Consequences of Drug Abuse 3D Display

This detailed display shows what actually happens to the body when drugs are abused. Life-size, hand-painted models of the body's organs are graphic and accurate. Brief descriptions make this educational tool ideal for health fairs and schools. 28 x 27 in opened. S-W43054



Our **Chart Section** is Unmatched in Detail!
See page 87 for Our Chart Selection
or Visit Us at 3bscientific.com!



Meth Mouth: An Inside Look

Graphically depicting the grisly effects of methamphetamine abuse on the mouth, this display is ideal for organizations looking to give compelling reasons to stay away from meth. The 3D handpainted model shows consequences of meth use such as missing teeth, severely decayed teeth, broken teeth, receding gums, and more. Also includes a tongue model with an ulcer. Informative text explains how meth harms both the mouth and the body and drives home the message that meth is a dangerous drug. 10 x 10 x 16 in S-W43099



Alcohol Dependence

Detailed anatomy illustrations show the effects of alcohol on the organs of the human body. This thickly laminated anatomical chart is printed on premium glossy (200 g) UV resistant paper to ensure the chart does not get a faded yellow color over time. The poster comes with 2 sided lamination (125 micron, 5.0 Mil) and metal eyelets to make the chart easy to display. 50 x 67 cm (20x26") S-VR1792L



Drug Education Guide

Ideal for educating parents and youth, this 3D, plexiglacovered display identifies basic drug groups and gives the medical and slang names, medical uses, and possible effects of use for many common drugs. Features accurate, handpainted drug facsimiles. Comes with informative, reproducible handout. 24 x 24 in S-W43243

Wheel of Misfortune Game

An excellent tool for starting discussions on drug abuse, this game includes questions about the identification and effects of various substances. Multiple-choice questions that call for value judgements are also included. A reproducible teacher's text contains questions designed for use with grades 1-5 and grades 6-12. 20.5 x 28 in S-W43242

Drug Awareness Guide Display

This colorful display shows eight categories of abused substances and various examples of each type. Sixty-six substances and their paraphernalia are pictured and crossreferenced with their street names, uses, and effects. This invaluable drug-education tool is framed. Comes with its own built-in easel and informative, reproducible handout. S-W43244



Great teaching aid!

Drunk Busters Goggles

These unique goggles simulate the effects that alcohol consumption has on the body including: visual distortion, alteration of depth and distance perception, reduction of peripheral vision and double vision.

Available in four different versions. All goggles include a cloth carrying bag and an Instructor's Guide. Each and every goggle is backed by a 3-year warranty.

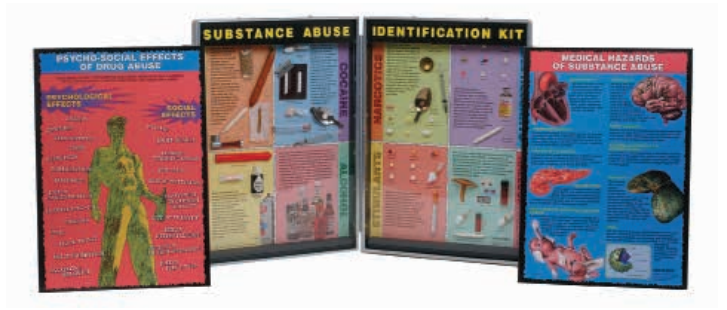
- BAC 0.08 - 0.15 S-W43305BK
- BAC 0.06 - 0.08 S-W43305BL
- BAC 0.04 - 0.06 S-W43305G
- BAC 0.15 - 0.25 S-W43305R



Drunk & Dangerous Glasses with Case

These glasses will give any alcohol education program an added dimension, allowing the instructor to deliver a powerful message quickly and clearly. Drinking and driving can be a deadly combination. Because the glasses' simulation of drunkenness is so real and intense, wearers can't help but be struck by the reality that alcohol really does make driving dangerous. Supplied with case.

S-W43041



Substance Abuse Identification Kit

Informative and eye-catching, this 3D display identifies several dangerous drugs and lists short- and long-term effects of drug abuse. Features handpainted models and a durable Plexiglas cover. Includes two stand-alone panels and an informative, reproducible handout. Case is 29 in x 20 in opened. Stand-alone panels are 12 x 17.5 in each.

S-W43182



Effects and Hazards of Substance Abuse Folding Display

Outlining both the physical and social consequences of substance abuse, this folding display offers an excellent overview of a number of dangerous substances, including narcotics, inhalants, club drugs, and more. Also includes information on getting help for a substance abuse problem. 58 x 22.5 in S-W43181

S-W43181



Rolls of Fat

One in four Americans is obese, and more than half of all Americans are overweight. Use these models as a dynamic presentation about obesity and the distribution of fat. These models have the look, feel, weight and approximate volume of fat. Students can wrap these rolls around their waistlines for a demonstration of how fat accumulates. Use in conjunction with the Body Muscle Replicas (W44657 and W44658) to compare the size of fat versus the size of muscle. 1 lb roll: 11.75 x 3 x 1 in / 5 lb roll: 29 x 5.5 x 1 in

1 lb. S-W43109O
5 5lb./1 lb. set S-W43109FO



Body Muscle Replicas

Designed to show the muscle configuration developed through exercise. Motivate your students to exercise regularly. Made of long-lasting vinyl plastic. All replicas represent accurate weight and volume.

5 lbs. S-W44658
1 lb. S-W44657



Body Fat Replicas

A shocking but highly motivating attention getter. Made of soft, pliable, long-lasting vinyl plastic, the replicas have a profound, memorable effect when passed around among the audience. All replicas represent accurate weight and volume.

5 lbs. S-W44656
1 lb. S-W44655

Have questions about our products? Contact us at **1.866.448.5846** or visit **3bscientific.com!**



Fat Vests

The effects of additional weight on a person's body are dramatically demonstrated with this useful teaching tool, which simulates the inlook in and infeel in of excess body fat. By inserting weights in varying increments into the vest's interior pocket, the wearer can experience the additional weight and limited range of motion that are associated with obesity. Two versions are available.

Adult Fat Vest

Includes a total of 20 lbs. in weight (three 5 lb. weights and two 2.5 lb. weights), features a colorful and informative front panel that describes the effects of excess weight on several body organs.

S-W43055

Youth Fat Vest

An excellent way to start group discussion about healthy eating habits the Youth Vest includes a total of 15 lbs. in weight (one 5 lb. weight and four 2.5 lb. weights). The kid-friendly front panel is a visual reminder that foods with too much sugar and fat can lead to overweight and obesity.

S-W43056

Vat of Fat

Explaining how calorie intake translates into weight gain is simplified with this graphic and informative display. The plastic jar contains approx. 1 lb. of gooey simulated fat, which represents the amount of weight a person could gain in one week by consuming an extra 500 calories each day. Information on the back of the jar shows how much weight a person could gain in one year as a result of excess calories. 5 x 6.5 in

S-W43217

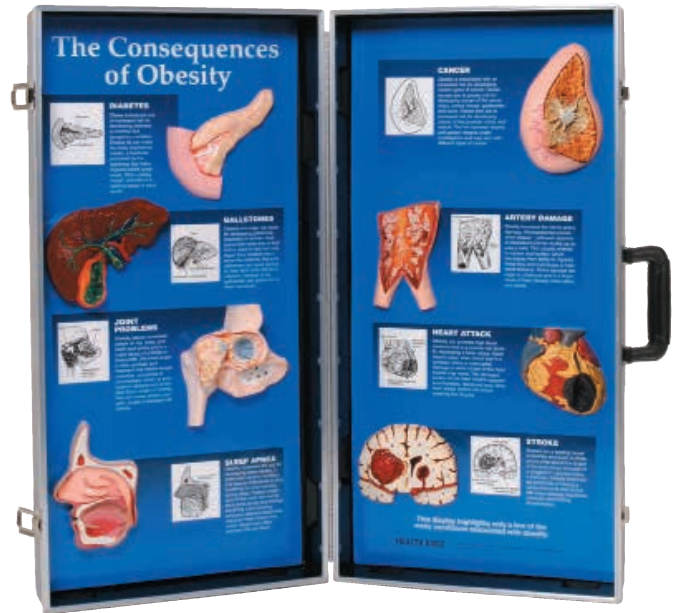




Benefits of Physical Activity 3D Display

The real benefits of physical activity are easy to see with this interactive 3D display. Its four swiveling panels show rewards of an active lifestyle on one side (strong muscles, health arteries, healthy joints, and reduced body fat) contrasted with consequences of a sedentary lifestyle on the other side (muscle loss, diseased arteries, osteoarthritis, and increased body fat). Can be used as a tabletop display or mounted on a wall. 26.5 x 13 x 5.25 in

S-W43148



The Consequences of Obesity 3D Display

This display uses life-size, hand-painted models to explain the dangers of obesity. Models are permanently mounted in a sturdy wooden case and are accompanied by text that clearly describes each condition. Ideal for health fairs, schools, or any nutrition education event. 28 x 27 in opened.

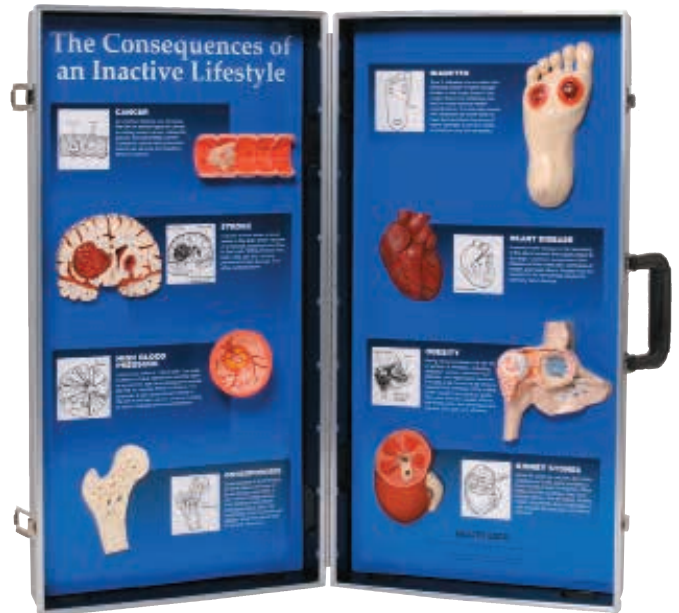
S-W43057



Heart Disease Risk Factors Display

Learning about the risk factors for heart disease is made easy with this fun, interactive display. Participants slide the arrow up the scale to add up their risk for each factor listed on the display. Both controllable and non-controllable risk factors are included. 20 1/2" x 28".

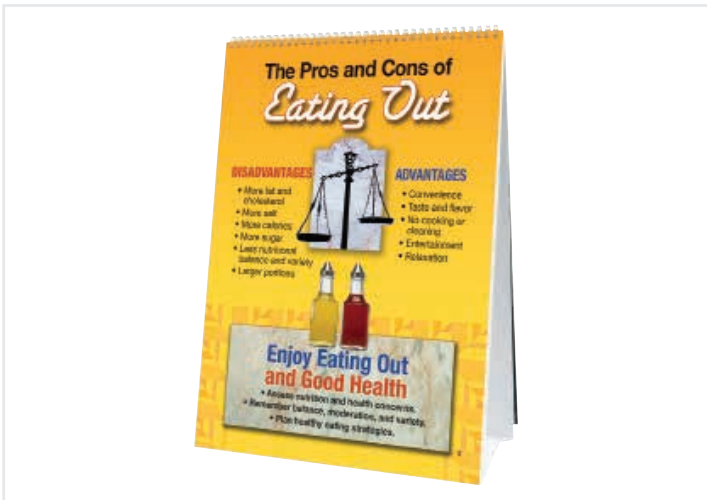
S-W43209



Consequences of An Inactive Lifestyle 3D Display

This 3D display graphically shows many of the negative health consequences of an inactive lifestyle. Each permanently mounted, handpainted model has a brief description of the consequences it represents. Display is contained within its own sturdy carrying case. 28 x 27 in opened.

S-W43147



Healthy Eating Out Flip Chart

By outlining ways to make healthy choices from restaurant menus, this flip chart helps to solve the 'ineating-out' dilemma. In Each explains how different food preparation methods affect nutritional value. Flip chart features presenter's notes on reverse panels. Flip chart is 6 panels. 12 x 17 in

S-W43218



Arteriosclerosis Model, with Cross Section of Artery

Changes in the blood vessels due to arteriosclerosis can be quickly and easily explained with this model. A horizontally dissected artery fork is depicted with arteriosclerotic changes in four different stages, from slightly sedimented to a completely clogged vessel. Mounted on base. 15 cm; 0.2 kg

S-G40



Cholesterol Flip Chart

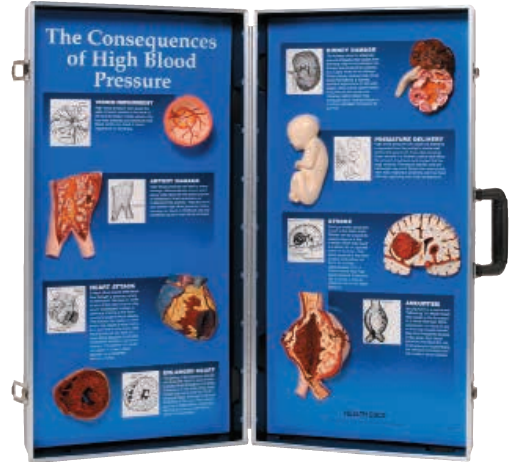
Many people do not know what steps they can take to maintain healthy cholesterol levels. This flip chart explains the facts about ingood in and inbad in cholesterol and the health risks associated with high cholesterol levels. Features presenter's notes on reverse panels. Flip chart is 6 panels. 12 x 17 in

S-W43208

Occluded Artery Model

The potentially deadly effects of high cholesterol are demonstrated with this persuasive model. The tube represents an artery constricted by plaque, which forms on artery walls when there is excess cholesterol in the blood. When the model is turned over, the blood in the artery slows or stops completely. An excellent tool for explaining the importance of keeping cholesterol under control. 2.75 x 6 .875 in

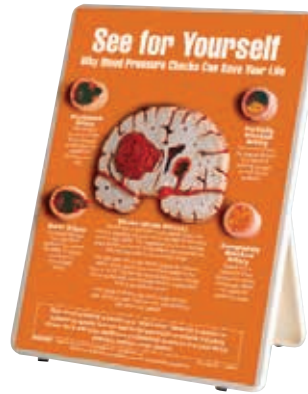
S-W43206



Consequences of High Blood Pressure

Life-size, three-dimensional, hand-painted models illustrate the various organs that can be affected by high blood pressure. Great for health fairs and health-education promotions. Contained in a convenient, sturdy wooden carrying case. 28 x 27 in opened.

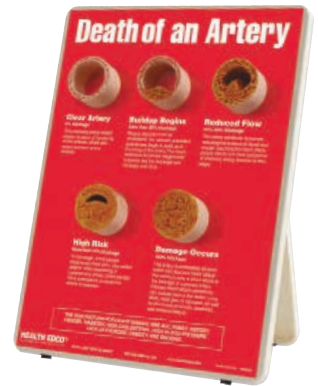
S-W43081



Why Blood Pressure Checks Can Save Your Life

Patients and students learn the importance of blood pressure checks when they see these handpainted, 3D models of arteries and this cross section of the brain. Demonstrates the way high blood pressure can silently lead to heart attacks or strokes. Comes with protective felt cover. 9 x 12 in

S-W43119



Death of An Artery Easel Display

These handpainted, crosssectional, 3D models of arteries show patients and students the various stages of plaque build up. The interior size of each vessel diminishes, making it easy to explain a process that can eventually result in death. Comes with protective felt cover. 9 x 12 in

S-W43121

Blood Cholesterol & Triglycerides Packet

The need for a healthy diet is emphasized by the four blood viscosity samples in this pack. The samples show the exaggerated differences seen when analyzing blood serum for lipid and glucose concentrations.

S-W44722

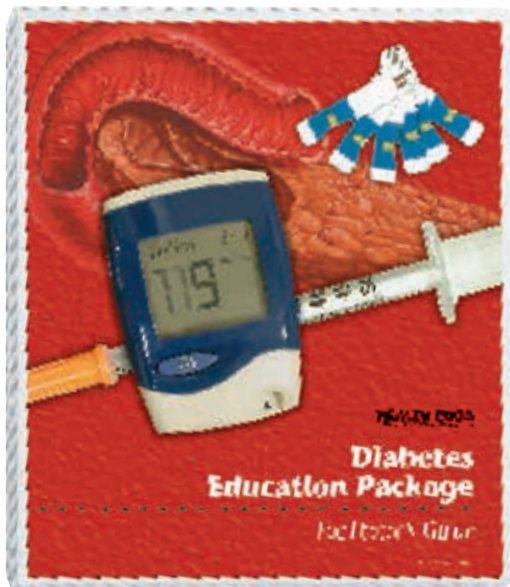
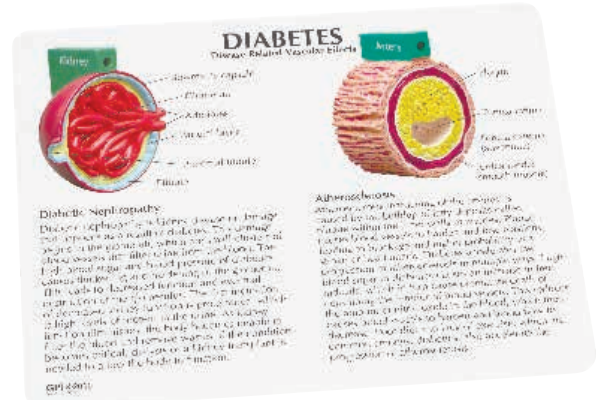


DIABETES



Four Piece Diabetes Model

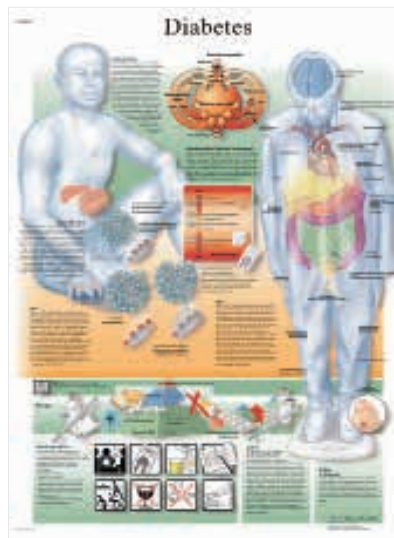
Four piece model indicating structures and organs with vascular effects due to diabetes. Includes sectioned model of Bowman's capsule (kidney), artery, nerve, and eye (posterior section). Full model size without handle: 3.5 x 2 x 2 in Handle size: 5 x 2 in S-W33387



Diabetes Education Package

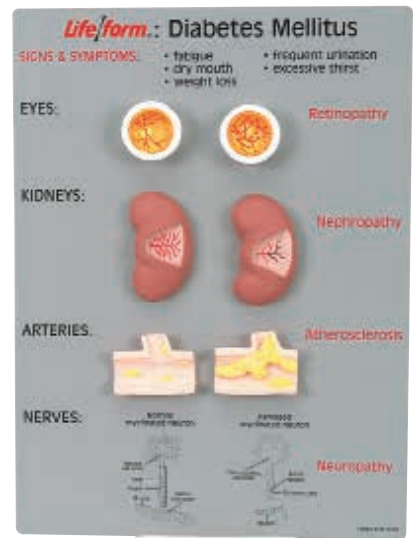
This package lays everything out in an organized logical format, making use of our best diabetic education products: What You Need to Know About Diabetes chart gives a quick insnapshot in of how diabetes affects the body. Diabetes booklet (50 included) helps students review important points later. Diabetic Foot Model emphasizes the importance of good self-care. A facilitator's guide ties the package together which contains a presentation script, worksheets, quizzes, and enrichment activities. The program can be tailored to fit a variety of time formats and different age groups (high school to adult). 28 in x 27 in opened.

S-W43285



Diabetes Mellitus Chart

This anatomical chart details the disease diabetes, its causes and effects as well as treatments for disease. A great diabetes teaching tool for a classroom or doctors office. Laminated and printed on premium glossy (200g) paper. 20 x 26 in S-VR1441L



Life/form® Diabetes Mellitus Teaching Kit

Explain the signs, symptoms, and health problems associated with diabetes using this 3D display. Also included in the kit is a 4-page booklet. Subjects include diagnosis, treatment, complications, eyes, kidneys, arteries, and nerves. The model is mounted on a sturdy, 9 x 12 in plaque with wire stand for easy desk or tabletop display. Hand painted.

S-W44766



Diabetic Injection Practice Kit

Made from realistic BIOLIKE™ material, these teaching models facilitate technique practice on both an injection skin and a finger stick apparatus. The skin model may be strapped to the user's arm or leg to simulate a needle injection site, and the finger stick model may be held by the attached grip for lancet practice. Both can be punctured repeatedly. Replacement skin for the skin model and replacement finger are available. Comes with powder and carrying case. Skin model is 6 x 4.5 x 1.5 in, and finger stick model is 1 x 4.5 x 1 in.

Beige S-W43123BE
Brown W43123BR \$46.00



A. Diabetic Foot Model

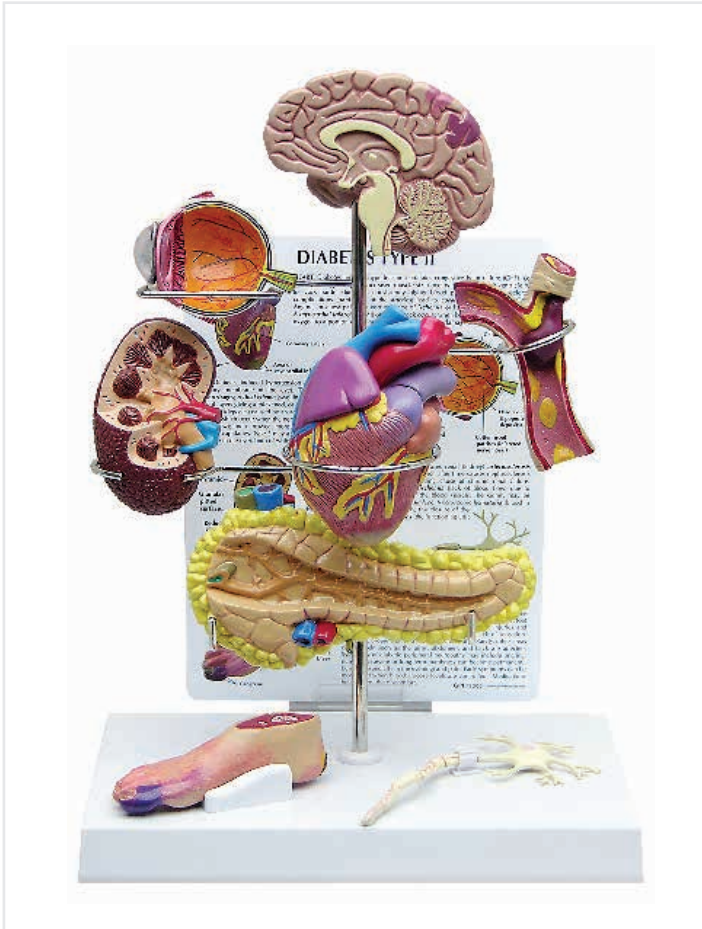
This life-size diabetic foot model can be used for both patient education and student training. Made from lifelike BIOLIKE™ material, the model contains three ulcers in various stages of development as well as the features commonly associated with diabetes. A graphic reminder of the importance of proper foot care. Comes with carrying case and instruction card. 3.5 x 9.5 x 4 in

S-W43107

B. Severe Diabetic Foot Model

This life-size, BIOLIKE™ replica complements the original Diabetic Foot Model by showing additional, more severe consequences of diabetes, including an amputated toe, Charcot foot deformity, and severe infection and gangrene. Comes with a carrying case and instruction card. 3.75 x 9 x 4.5 in

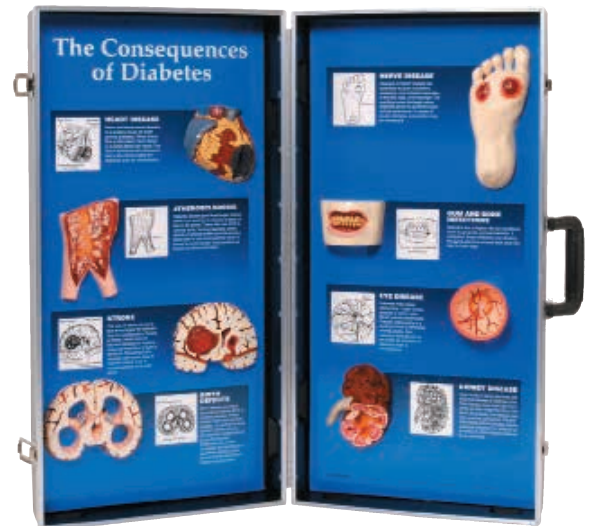
S-W43107A



Type II Diabetes Set

Model displays miniature brain, eye, heart, kidney, artery, pancreas, neuron, and foot models. Education card illustrates effects associated with Type II Diabetes: stroke, ocular pathology, hypertensive heart disease, hardening of the kidney, hardening of the arteries, insulin resistance, neuropathy, and foot ulcerations. Model display stands 10 in tall. Models are reduced size.

S-W33386



Graphic, accurate information in a display case!

Consequences of Diabetes Display

Many diabetics don't understand the often-horrific consequences of failing to properly manage their condition. Arresting models depicting a heart attack, a stroke, and infected gums motivate viewers to take charge of their health. Display is contained within its own carrying case. 28 in x 27 in opened.

S-W43081D

CPR TRAINERS



CPRLilly™

CPRLilly™ is a CPR training manikin developed to operate economically for a long time thanks to the use of disposable airbags and a separate air chamber system. This CPR simulator is also extremely hygienic: the face masks can be cleaned and exchanged easily. Replacements are available in both skin tones. All material used throughout the production process complies with the highest standards in terms of quality and durability, and is nonhazardous. 78 x 40 x 26 cm; 9 kg

Light Skin S-P70
Dark Skin S-P70/1



3B Scientific® CPR Kits

Save up to \$1000 when you buy one of our Kits for your classroom!



BASICBilly™ Packages



Intro Package

BASICBilly™ Adult and Child P72 or P72/1

- 1 - BASICBilly™, light or dark skin
- 1 - Lung bags, adult
- 1 - Lung bags, child
- 5 - Perform Disinfectant 40Gr
- 1 - Resucitator for Mask Ventilation
- 5 - Ventilation masks
- 1 - Basic support chart

Light Skin S-3009010
Dark Skin S-3009011

Deluxe Package

BASICBilly™ Adult and Child P72 or P72/1

- 10 - BASICBilly™, light or dark skin
- 10 - Lung bags, adult
- 10 - Lung bags, child
- 20 - Perform Disinfectant 40Gr
- 5 - Resucitator for Mask Ventilation
- 10 - Ventilation masks
- 1 - Basic support chart

Light Skin S-3009016
Dark Skin S-3009017

CPRLilly™ Packages



Intro Package

CPRLilly™ P70 or P70/1

- 1 - CPRLilly™, light or dark skin
- 1 - Resucitator for Mask Ventilation
- 5 - Ventilation masks
- 50 - Throat bags
- 1 - Perform Disinfectant
- 1 - Basic support chart

Light Skin S-3009012
Dark Skin S-3009013

Intro Pro Package

CPRLillyPRO™ P71 or P71/1

- 1 - CPRLillyPRO™, light or dark skin
- 1 - Resucitator for Mask Ventilation
- 5 - Ventilation masks
- 50 - Throat bags
- 1 - Perform Disinfectant
- 1 - Basic support chart

Light Skin S-3009014
Dark Skin S-3009015

Give us a call to customize your own CPR kit!

CPRLillyPRO™

With Tablet

CPRLillyPRO™ including the training tablet is the best choice for your professional CPR training courses. Using the software, you can guide the exercises and control the simulator, creating highly realistic training scenarios. All the relevant parameters can be monitored comfortably and easily via the tablet provided, and stored away for subsequent analysis. Trainers and trainees will very quickly attain the chosen training target via the direct feedback feature. 78 x 40 x 26 cm; 9kg

Light Skin S-P71
Dark Skin S-P71/1



BASICBilly™

Basic life support simulator

BASICBilly™ CPR Manikin focuses on the depth and force of compression during CPR. Basic Billy fulfills the latest CPR guidelines from the AHA (American Heart Association) and ERC (European Resuscitation Council). BASICBilly™ is both anatomically correct and hygienic to use. The head is easy to tilt in order to open the airways for mouth-to-mouth and mouth-to-nose resuscitation. Additionally, the thorax raises as the lungs are ventilated. Low priced disposable airways and a carrying bag to ensure hygienic and easy care of the manikin. 60.5 x 35.5 x 19 cm; 2.36 kg

Light Skin S-P72
Dark Skin S-P72/1



CPRLilly™ & BASICBilly™ Packages



Intro & Advanced Package

CPRLilly™ & BASICBilly™

- 1 - CPRLilly™, light or dark skin
- 5 - BASICBilly™, light or dark skin
- 10 - Ventilation masks
- 5 - Resucitator for Mask Ventilation
- 50 - Throat bags
- 4 - Perform Desinfectant
- 1 - Basic support chart

Light Skin S-3009018
Dark Skin S-3009019

Intro & Advanced Pro Package

CPRLillyPro™ & BASICBilly™

- 1 - CPRLillyPRO™, light or dark skin
- 5 - BASICBilly™, light or dark skin
- 10 - Ventilation masks
- 5 - Resucitator for Mask Ventilation
- 50 - Throat bags
- 4 - Perform Desinfectant
- 1 - Basic support chart

Light Skin S-3009020
Dark Skin S-3009021

Deluxe Classroom Package

CPRLilly™ & BasicBilly™

- 2 - CPRLilly™, light or dark skin
- 5 - BasicBilly™, light or dark skin
- 10 - Ventilation masks
- 5 - Resucitator for Mask Ventilation
- 50 - Throat bags
- 4 - Perform Desinfectant
- 1 - Basic support chart

Light Skin S-3009022
Dark Skin S-3009023

Deluxe Classroom Pro Package

CPRLillyPRO™ & BasicBilly™

- 2 - CPRLillyPRO™, light or dark skin
- 5 - BasicBilly™, light or dark skin
- 10 - Ventilation masks
- 5 - Resucitator for Mask Ventilation
- 1 - Throat bags 50x
- 4 - Perform Desinfectant
- 1 - Basic support chart

Light Skin S-3009024
Dark Skin S-3009025



Jaw Thrust Brad

Jaw Thrust Brad utilizes simple moving-parts technology for the instruction of the jaw thrust maneuver. Unique to the industry is the function of ventilating the patient when the proper maneuver is done without tilting the head. Includes kneeling pads and carry bag. 3 year warranty. 28 x 18 x 10 in

Features:

- Moveable jaw
- Individual mouth piece
- Sanitary one-way bag allows multiple users while requiring a single replacement at end of day
- Removable chest plate for adolescent and adult CPR
- Rugged vinyl skin & long-lasting foam filling

S-W44036

Replacement Parts

- 24 Adult Airway Systems **S-W44559**
 10 Adult Mouth/Nose Pieces **S-W44560**

See Page 76 & 77 for customizable
3B Scientific® CPR Kits!



Basic life support simulator BasicBilly™

BasicBilly™ CPR Manikin focuses on the depth and force of compression during CPR. Basic Billy fulfills the latest CPR guidelines from the AHA (American Heart Association) and ERC (European Resuscitation Council).

BasicBilly™ is both anatomically correct and hygienic. The head is easy to tilt in order to open the airways for mouth-to-mouth and mouth-to-nose resuscitation. The thorax raises as the lungs are ventilated. Mask ventilation is also possible.

Even better, BasicBilly™ can be used as either an adult or a child. Just use the easy and interchangeable springs located in the back of the trainer to give the realistic depth feedback of either the adult or child. 23.8 x 14 x 7.5 in; 5.2 lb

Includes:

- 1 BLS simulator (torso) with spring for cardiac massage of adults and 1 additional spring for cardiac massage of children (approximate age of 12)
- 25 lung bags, adult
- 25 lung bags, child
- 2 additional face masks and inner heads for hygienic artificial respiration
- Disinfectant solution

S-P72



Basic Buddy™ Single CPR Manikins

Offers a realistic and affordable way to provide each student with their own CPR manikin. The one-piece, disposable lung/mouth protection system makes this manikin completely sanitary – there is no risk of cross contamination and no need to sanitize the manikins after use! Rugged carrying bags make transporting the lightweight Basic Buddy™ 5 and 10-Pack convenient (manikins fit into bags fully assembled).

Features:

- Totally sanitary, one-piece lung/mouth protection system
- Realistic chest rise
- Unique airway system opens & closes with proper technique
- Rebreathing airway
- Anatomically correct w/palpable landmarks
- Adult and child capabilities

Basic Buddy™

1 manikin, size: 20 x 14 x 7 in, 10 lung/mouth protection bags, one insertion tool, and an instruction manual.

S-W44108

Replacement Parts

100 ct Lung/Mouth Protection
 S-W44109

Basic Buddy™ 5-Pack

5 manikins, 50 lung/mouth protection bags, 5 lung insertion tools, 1 carrying bag, and an instruction manual.

S-W44107

Basic Buddy™ 10-Pack

10 manikins, 100 lung/mouth protection bags, two carrying bags, ten lung insertion tools, and two instruction manuals.

S-W44106

Accessories

5 Torso Carrying Bag
 S-W44110



Brad™ Compact CPR Training Torso

This economical CPR manikin is constructed of soft, realistic vinyl plastic over polyurethane foam for a human in feel. Includes three mouth/nose pieces, three disposable lung/airway systems, nylon carry bag and kneeling pads. 65 x 38 x 22 cm; 4.8kg

Features include:

- Longer torso for realistic abdominal thrusts
- Realistic head tilt and chin lift for opening airway
- Easy to manipulate and realistically simulate airway obstruction or choking situations
- User-friendly lung/airway design eliminates cleaning.

S-W44597

EMS simulators!



Family & Friends CPR Anytime

Now anyone can learn the life saving skill of CPR, in a convenient and budget friendly manner. The self-directed learning program comes complete with a mini Anne CPR Training Manikin, CPR Skills Practice DVD, 2 Pocket Reminder Cards (One Choking and Child CPR Pocket Reminder Card and One Adult CPR and AED with hands Only Pocket Reminder Card), Mini Anne Spare Lung, Manikin Wipes (2), and Directions for Use printed inside the box.

Light Skin S-W47075
Dark Skin S-W47075D



Infant CPR Anytime

Parents can now learn the life saving skill of Infant CPR and relief of choking in less than 22 minutes. With this new self-directed learning program, parents, grandparents and others who are responsible for the care and safety of an infant can learn these lifesaving skills and be prepared to respond during the first few minutes of a life threatening emergency. Perfect for hospital maternity wards, churches, and local community centers for hosting training sessions.

Light Skin S-W47076
Dark Skin S-W47076D



Act+Fast Rescue Choking Vest

The Act+Fast Rescue Choking Vest is an invaluable tool for CPR Instructors to easily and effectively teach students the correct way to perform the Abdominal Thrust Maneuver (Heimlich) without using a manikin. When performed correctly, a foam plug shoots into the air, making teaching easy and learning fun. The trainer can be used standing, sitting, on the ground or even for choking self-rescue by using a counter or chair. 10 foam plugs included. Additionally, the red trainer features a Back Blow Pad for practicing ARC and ERC protocols.

Act+Fast Blue S-W43300B
Act+Fast Red S-W43300R



Cardiac Emergency

In a cardiac emergency it is important to quickly implement lifesaving steps to help the victim. This poster reinforces the basic steps to follow in a cardiac emergency.

Size: 18 x 23 in
S-W59503



Basic Life Support Chart

Size: 50 x 67 cm (20 x 26")
S-VR1770L



ADSAFE™ Face Shield

The user friendly design protects the rescuer and helps eliminate hesitation when performing CPR. Semi-transparent face shield allows visualization of patient's lips, mouth, and nose while protecting rescuer. See online for full details.

S-W51583BK

INJECTION / VENIPUNCTURE

Epidural and Spinal Injection Trainer

Train the localisation of the epidural space without ultrasound to administer epidural and spinal injections. You can easily adjust the trainer to simulate different pathologies. The training with realistic haptic feedback and correct anatomical landmarks is the basis for a successful preparation for real-life cases.

Extremely realistic haptic feedback



Sturdy construction that is easy to adjust manually

Training features:

- Realistic anatomical landmarks for assessing the correct insertion point
- Loss of resistance (LOR) syringe technique through realistic haptic feedback
- Hanging drop method: the negative pressure in the fluid filled spinal canal can easily be adjusted
- An epidural catheter can be inserted into the epidural space
- Spinal anesthesia training with realistic resistance of the dura and arachnoid mater with or without a cannula

About the trainer:

- Developed and manufactured in Germany in close co-operation with epidural anesthesia specialists
- Intuitive to handle, continuously adjustable fluid pressure
- Easy to clean: filled with water (closed system) to simulate spinal fluid
- Sturdy construction, all parts are integrated and latched
- Can also be used in lateral position, suction cups ensure steady positioning on the table

Delivered fully assembled. All usual materials can be used, including disinfectant, plasters and wound dressing. Includes 1 LOR kit and 1 skin pad.

17.7 x 13.8 x 9.4 in, 6.61 lb
S-P61

Low operating costs:

With the use of high-quality, hard-wearing materials, only few parts need to be replaced periodically:

Consumables	Item No.	Price
Replacement LOR kit	S-XP61-002	
Replacement skin	S-XP61-001	
Carry bag (not included)	S-1018079	



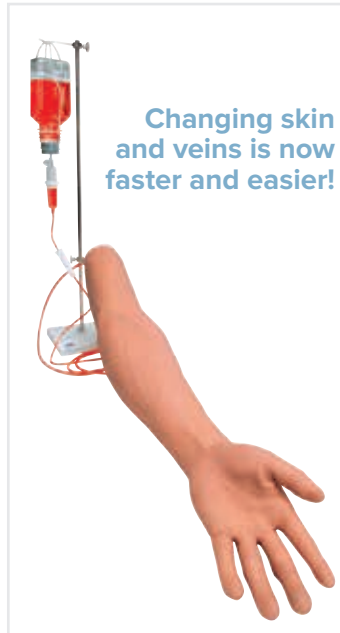
The perfect volunteer to train your healthcare students to administer intramuscular injections.

Intramuscular Injection Simulators

These simulators are the ideal way to teach proper intramuscular injection techniques. Strap it onto the upper leg, upper right arm or the buttocks to locate all necessary intramuscular injection sites. Operates on AA batteries.

- Truly Unique!
- Both Audio and Visual Feedback
- Use for Training and Performance Evaluation

- A. Upper Right Arm Simulator S-P55/1
 B. Buttock Simulator S-P57
 C. Upper Leg Simulator S-P56



Incredibly realistic with extreme attention to detail!

I.V. Injection Hand

An incredibly realistic hand with extreme attention to detail, right down to the fingerprints. Students have the opportunity to not only practice injection but to develop important manipulation skills provided by the flexion of the wrist. Under normal use hundreds of injections can be performed before skin or veins need replacement. Supplied in storage box.

- Includes injectable metacarpal, digital and thumb veins on dorsal surface
- Soft, flexible fingers are separately molded
- Flexible wrist
- Skin rolls when veins are palpated
- Perform hundreds of injections before replacing vein & skins

- Light Hand S-W44117
 Dark Hand S-W44117B

- Replacement Parts
 Veins S-W44152
 Skin S-W44154

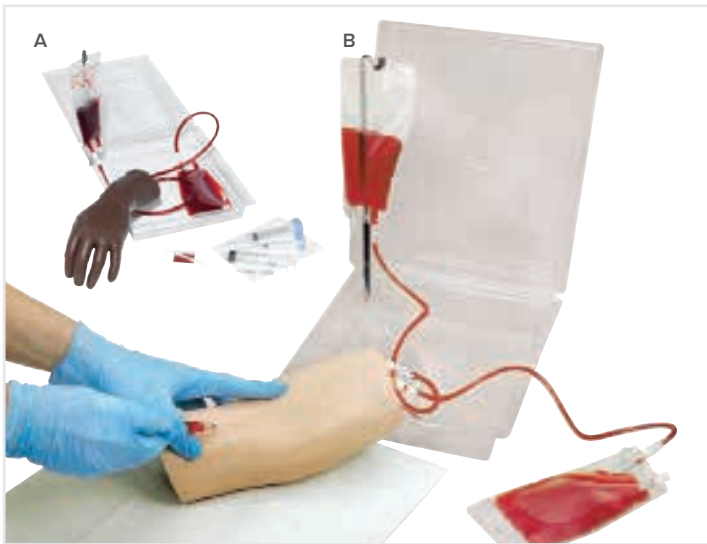
I.V. Injection Arm

This injection arm, made of 3B Scientific® SKINlike™ silicone, is unique in quality and design and allows realistic, hands-on training to develop competence in medical staff. It is also highly suitable for group instruction because of its high quality, stain resistance and easy-to-clean soft material. 74 x 19 x 14 cm; 2.8 kg

Ideal for practicing:

- Intravenous injections
- Correct puncture of peripheral veins for blood sampling. The following veins can be punctured: basilic vein, cephalic vein, median cubital vein, dorsal venous rete of hand
- Positioning of a venous catheter Delivered with stand, artificial blood, 2 replacement tubing systems, plastic bottle and syringe

S-R02

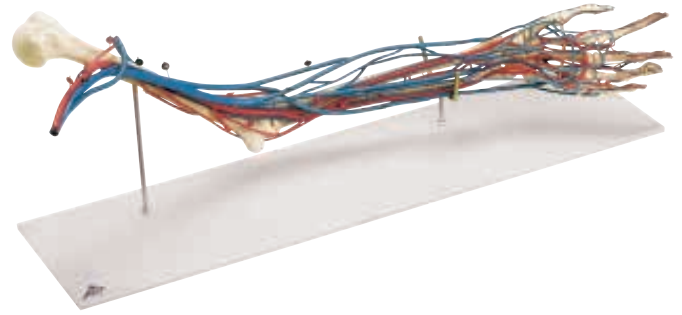


Life/form® Portable IV Arm and Hand Trainers

The economical Life/form® Portable IV Training Arm and Hand combine realism, fine detail, and lightweight convenience in a single trainer. These self-contained trainers are packaged in a plastic case that can be converted into a work station. Trainers include everything you will need to begin training and practicing IV skills. Constructed of soft material with life-like veins in the skin surface that are visible and palpable, making it possible to practice venipuncture at any of the common sites. The characteristic inpop in can be felt as the needle penetrates the vein and a realistic flashback will be observed when the needle has been accurately inserted. These trainers are the ideal way to teach venipuncture techniques including starting IVs and introducing Over the Needle IV catheters. Hundreds of injections may be performed. The skins and veins cannot be changed and trainers will eventually need to be replaced. Included with each of the trainers are two IV bags, packet of blood powder and spoon, fluid supply stand, two pinch clamps, 3 cc syringe, 12 cc syringe, 12 gauge needle, a winged infusion set, and a plastic clamshell case to store and transport the trainers and components. 2.25 lb

A. IV Hand
 White S-W44797W
 Black S-W44797B

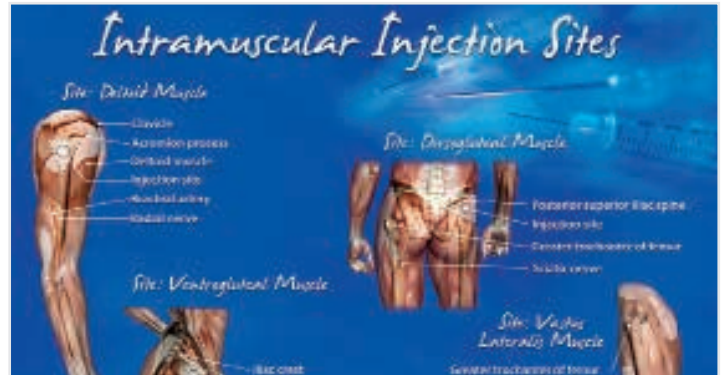
B. IV Arm
 White S-W44798W
 Black S-W44798B



Vascular Arm

This life-size model provides a complete understanding of the circulatory system of the arm and hand. An excellent teaching aid for venipuncture training. Modeled in a semiflexed position with the brachial, radial, and ulnar arteries and accompanying veins with their radicals shown. The complete circulatory system of the hand is shown on both palmar and dorsal surfaces. Comparative sizes of the various blood vessels are clearly indicated and facilitate the study of the blood circulation in the arm. Mounted on a stand with key card. 4.5 lbs.

S-W19019



Intramuscular Injection Sites Poster

This visual aid was developed specifically for teaching, demonstrating, training, and studying of intramuscular injection site locations. The poster illustrates site landmarks and muscles in the deltoid, dorsogluteal, and vastus lateralis regions. Laminated and perfect for mounting in a classroom or skills lab. This teaching aid will enhance intramuscular injection skills teaching and training. 18 X 24 in

S-W44783



Safe, economical injection simulators!

Intra-muscular Injection Pad

A simple trainer that simulates muscle tissue for handon training.

- Injection made to a depth of 50 mm
- Lifelike skin allows multiple punctures
- Will absorb fluid

S-W19375

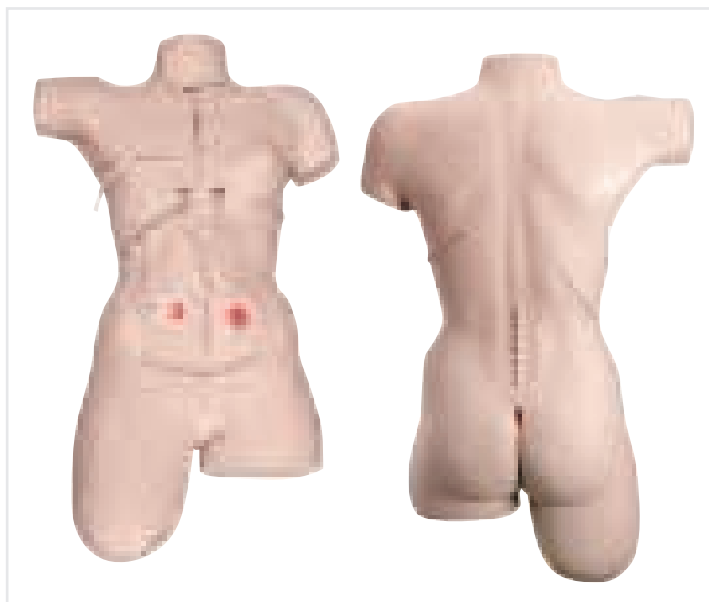


Clinically Important Blood Vessels and Nerve Pathways

This poster highlights blood vessels and nerve pathways in the neck, groin, arm, hand, and gluteals. Printed on premium glossy paper with ultra-thin lamination for wipe clean care. Mounted with metal rods on top to enable easy display. 50 x 67 cm (20 x 26 in)

S-VR1359L

BANDAGING / SUTURING



Suture and Stapling Practice Trainers

Made with a soft vinyl skin over a core of stitchable foam to provide a Lifelike suturing experience for students or a realistic suturing demonstration by an instructor. Soft and pliable for easy sewing, the skin is tough enough that sutures will not pull out when tightened. The unit is provided with three incisions. In these can be sutured repeatedly until the skin around them is finally worn out; then, new can be cut. Conservatively, more than one hundred cuts can be made on the trainer and each of these cuts can be sutured several times.

- Realistic skin texture with wrinkles, pores, and visible finger prints
- Disposable limbs provide hundreds of suturing experiences before wearing out
- Trainer comes complete with a starter package of sutures, instruction booklet

A. Practice Leg S-W44230

B. Practice Arm S-W44003



Life/form® Interactive Suture Trainer

The Life/form® Interactive Suture Trainer offers students a true-to-life clinical simulation experience. The trainer attaches easily to a person's or manikin's arm, leg, or hip, allowing practice of suturing techniques in addition to essential communication and patient interaction skills. This convenient, cost-effective kit offers practice at all skill levels, including tying knots, placement of staples, and suturing both superficial and deep wounds. By making their own incisions, the instructor or student is able to determine the depth of suturing and the proper technique to be used. Wounds automatically open when cut. Includes suture pad, attachable pad base with straps, needle holder, suture scissors, tissue forceps, scalpel, soft carrying case, nylon suture, instrument case and instruction manual. Pad in base measure 7 x 3 x 4 in.

S-W44782W



Life/form® Suture Kit

An inexpensive kit that offers practicing sutures at all levels. The instructor or student will have the ability to make incisions and determine the depth of suturing and the technique to be used. Practice and demonstrate tying knots, stapling and placement of staples, use of surgical glue, suturing deep tissue, and suturing subcutaneous tissue.

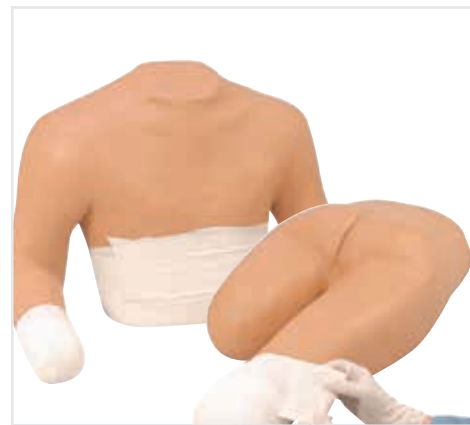
Features epidermis, dermis, fascia, fat, and muscle layers. The skin will allow placement and closure of superficial sutures. Includes suture pad, tray to hold pad, durable carrying case, needle holder, suture scissors, tissue forceps, scalpel, nylon suture and small case to hold the instruments. Pad measure 6 x 4 x 1.5 in.

S-W44423

Surgical Sally Bandaging Simulator

A readily available patient with 14 surgical wounds. The skin has been reformulated so it is drier, allowing the bandages to adhere better. Special vinyl formulations have been used to create the most lifelike look and feel possible. The flexible, flesh-colored skin realistically responds to adhesives and all types of bandaging procedures. Wound closures feature surgical staples for the Mid-Sternal Split, Thoracotomy, Nephrectomy, Laparotomy, Abdominal Hysterectomy, and Amputation Stump. Staples and sutures cannot be removed. 3 year warranty. See full description online! 84 x 30.5 x 63.5 cm; 12.0 kg

S-W44008

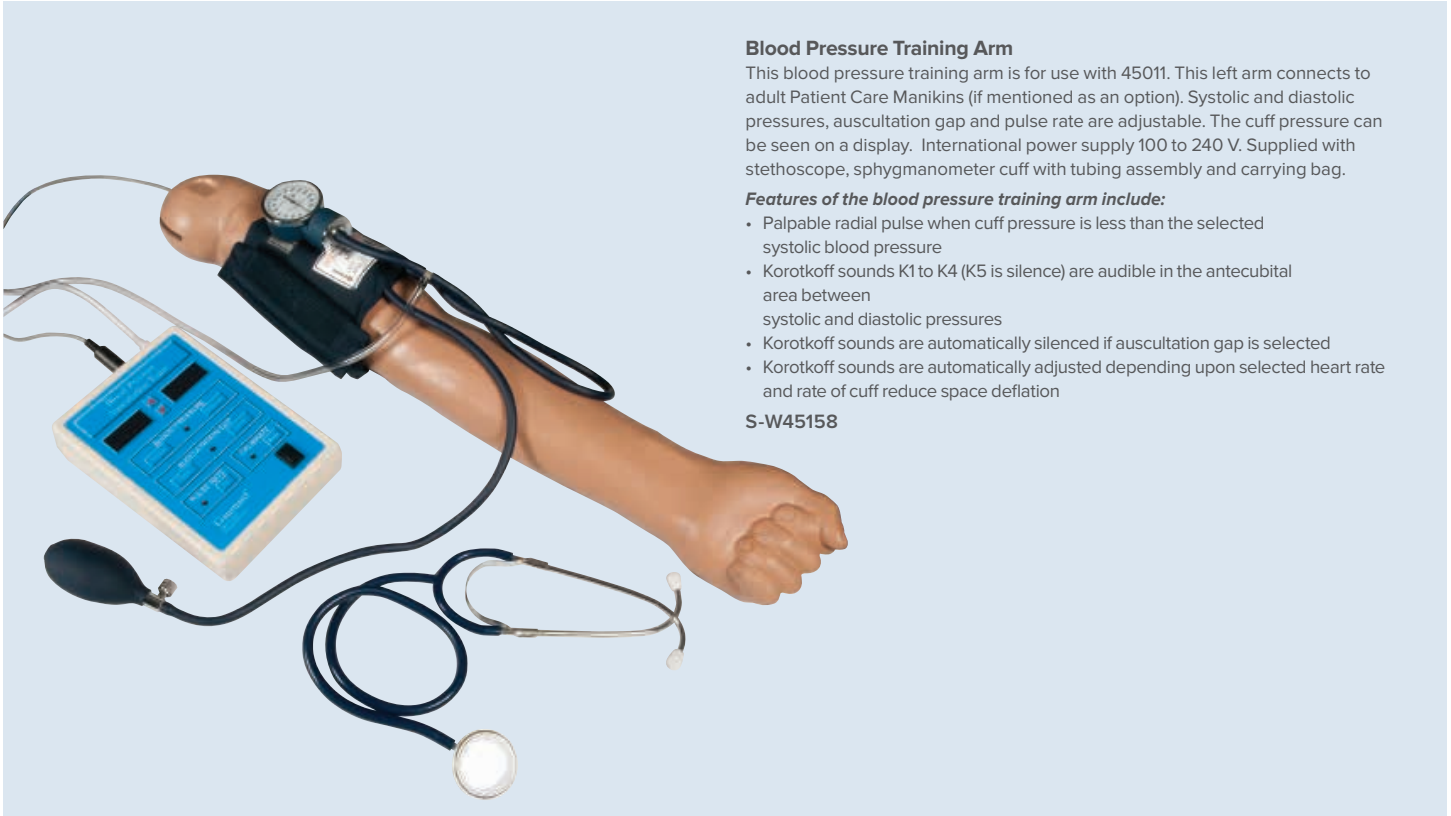


Set of 2 Stump Bandaging Simulators

Includes: lower torso, upper torso, instruction booklet. Individually boxed.

S-W44228

BLOOD PRESSURE TRAINING



Blood Pressure Training Arm

This blood pressure training arm is for use with 45011. This left arm connects to adult Patient Care Manikins (if mentioned as an option). Systolic and diastolic pressures, auscultation gap and pulse rate are adjustable. The cuff pressure can be seen on a display. International power supply 100 to 240 V. Supplied with stethoscope, sphygmomanometer cuff with tubing assembly and carrying bag.

Features of the blood pressure training arm include:

- Palpable radial pulse when cuff pressure is less than the selected systolic blood pressure
- Korotkoff sounds K1 to K4 (K5 is silence) are audible in the antecubital area between systolic and diastolic pressures
- Korotkoff sounds are automatically silenced if auscultation gap is selected
- Korotkoff sounds are automatically adjusted depending upon selected heart rate and rate of cuff reduce space deflation

S-W45158



Blood Pressure Training Arm

Includes blood pressure trainer, cuff, 9-volt battery and carry case.

- Palpable antecubital pulse
- Blood Pressure Trainer with LCD guided operation
- Systolic, diastolic, heart rate and auscultatory gap are programmable
- Representation of both systolic and diastolic pressures
- Indication of gauge reading as pressure is increased or decreased
- Volume adjustable
- May articulate to adult manikins

Control Unit Allows Instructor to:

- Select systolic and diastolic settings
- Adjust pulse rate and volume
- Turn auscultatory gap on or off
- Easily calibrate unit for use with any sphygmomanometer

Improved features include:

- Redesigned and durable control unit
- Simple calibration procedure
- Palpable radial pulse
- Optional external speakers

S-W19520



Proscope™ Teaching Scope, Dual Head

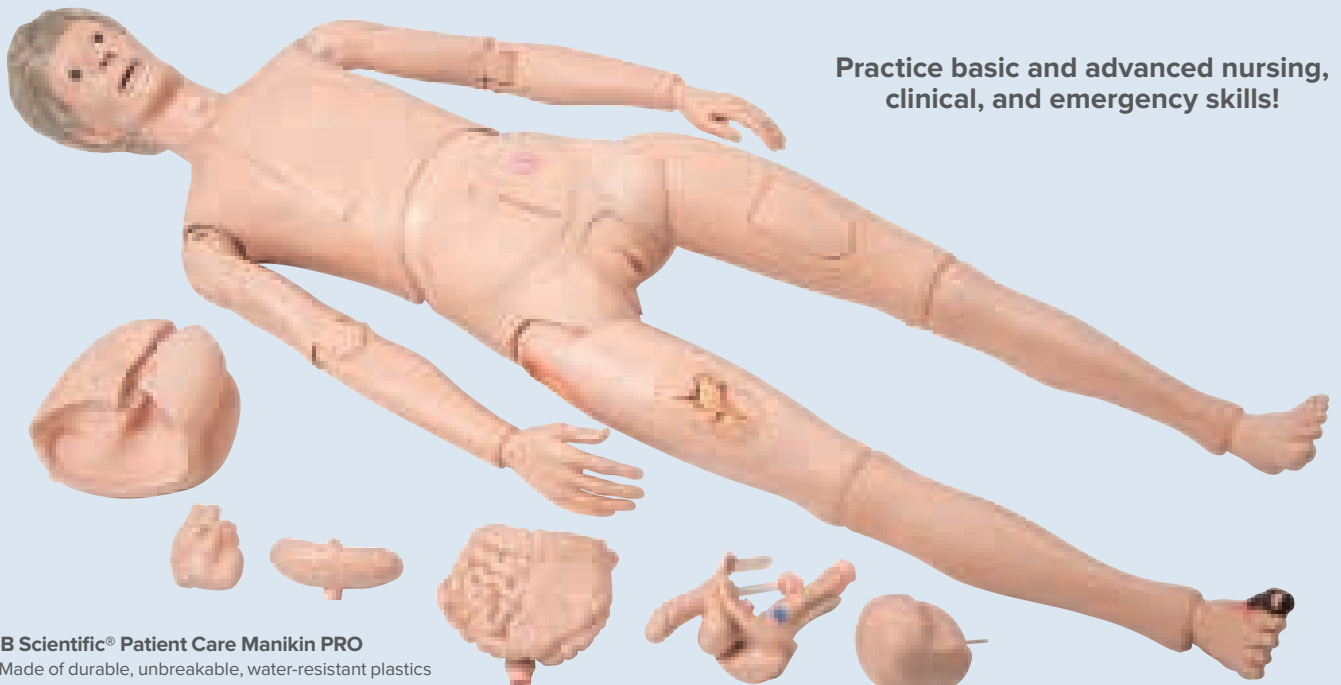
A training aid that allows student and instructor to listen simultaneously.

Feature & benefits:

- Two sets of flexible chrome-plated brass binaurals
- Two spare pairs of eartips included
- Weighs 6.5 oz., overall length 44.5 in
- 1 year warranty

S-W51523

Practice basic and advanced nursing, clinical, and emergency skills!



3B Scientific® Patient Care Manikin PRO

- Made of durable, unbreakable, water-resistant plastics
- Flexible, allowing natural movement of the arms, legs, joints and waist
- Lungs, heart, stomach, bladder and intestinal section are removable and fitted with drainage seals for easy cleaning
- Bladder and intestinal section are absolutely watertight and connected to the external genitalia to allow catheterisation

All standard injection sites have special injection pads (6 in all) which allow repeated injections and years of use. Also included is an amputation stump to practise dressing techniques, as well as an intestine tube, catheter, duodenal probe, talcum powder, vaseline and lubricant, and inserts with wound depictions (upper arm and thigh). Meets OBRA requirements.

Training Features:

- Personal hygiene, cleaning (removable partial prosthesis)
- Lifting, mobilisation
- Bandaging and wound dressing (including stump dressing)
- Irrigations (eye, ear, nose, stomach, intestine, bladder)
- Injections (intramuscular and subcutaneous)
- Naso-gastric lavage and gavage
- Oxygen treatment, artificial respiration
- Tracheotomy care
- Catheterisation (male and female)
- Ostomy care (colostomy)
- Enema administration

5.7 feet tall, delivered with assembly tools.
S-P10/1



3B Scientific® Patient Care Manikin Basic

The 3B Scientific® Patient Care Manikin is also available in a basic version, offering a variety of training possibilities for geriatric and basic nursing care.

This basic version allows you to practice:

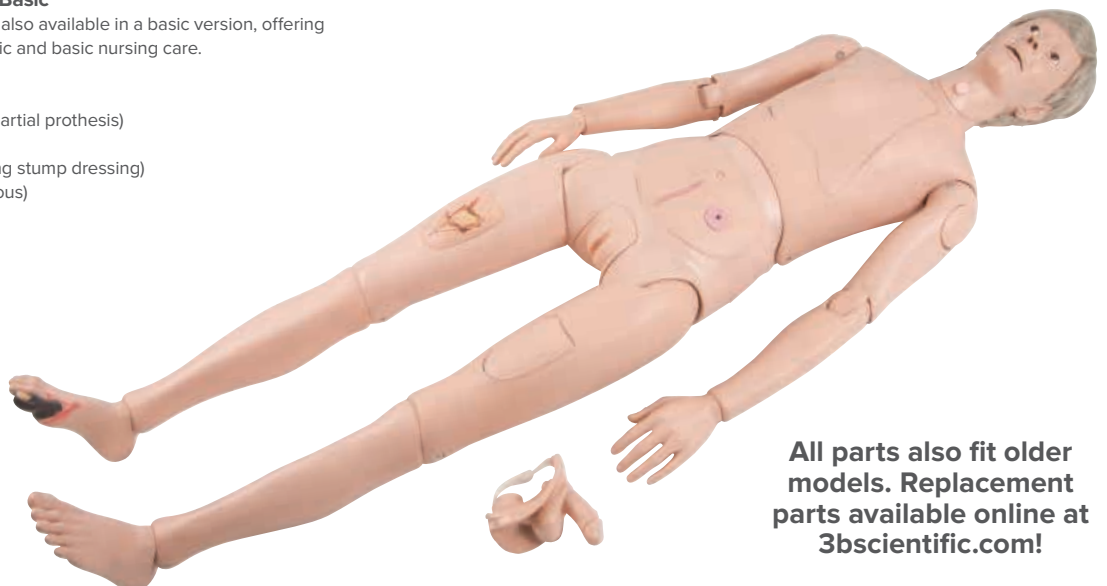
- Personal hygiene, cleaning (removable partial prosthesis)
- Lifting, mobilisation
- Bandaging and wound dressing (including stump dressing)
- Injections (intramuscular and subcutaneous)
- Oxygen treatment, artificial respiration
- Tracheotomy care

68.5 in; 31.75 lb
S-P11/1

Upgrade Kit for P11

You can easily upgrade the Basic Patient Care Manikin to the PRO version using this kit. It includes the inner organs and allows for training of catheterization.

S-P19



All parts also fit older models. Replacement parts available online at [3bscientific.com!](http://3bscientific.com)

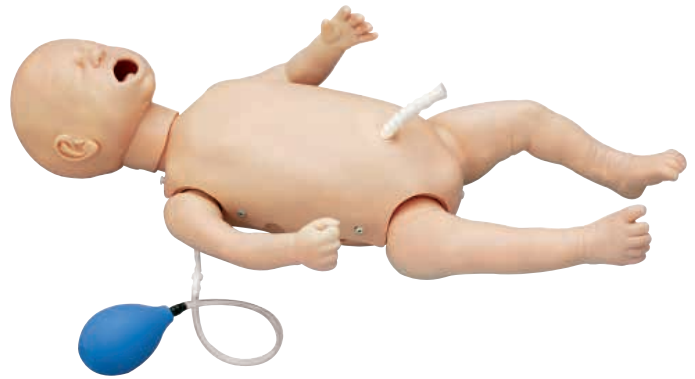
ALS MANIKINS



Advanced Infant Intubation Head with Board

This station trainer incorporates new skin technology. This new material eliminates tearing of the airway, caused by beginning student intubation attempts. Translucent property allows for life-like illumination of the airway and neck as the skill is attempted. Vocal cords are highlighted for easy viewing, the tongue swells, and all the anatomical landmarks are present. 3-year warranty. 15 x 10 x 8 in; 9 lb

S-W19519



Basic Life/form® Crisis Baby

This full-body infant manikin was created to offer realistic training and practice of infant airway management and CPR education. Anatomically correct in both size and detail. Anatomical landmarks provide key features necessary to learn proper infant handling in emergency situations. Also allows practice of intubation, and suction techniques can be performed and evaluated. Designed for use with an uncuffed endotracheal tube measuring up to 1/8 in (4 mm) inside diameter. Manikin can be upgraded by adding the Manikin Modular Component upgrades available. Includes artificial blood, IV bag, umbilical cord replacements, carry case, spray pump lubricant, and instruction manual. 3-year warranty. See 3bscientific.com for more details.

S-W44717

Life/form® Deluxe Infant Crisis™ Manikin with Interactive ECG Simulators

Features the same quality components as the W44143 with the addition of the hand-held Interactive ECG Simulator.

S-W44090



Nurse Training Baby, New Born

Accessories include syringe, suction catheter, feeding tube, urinary catheter, urine collection bag, catheter lubricant and carrying bag. 52 cm; 2.3 kg

This advanced and incredibly realistic model with male and female features includes:

- Internal organs (heart, lung, intestine system, stomach, and bladder)
- Removable belly covering, head, arms, and legs
- Interchangeable genital organs
- Soft ears

It allows trainees to practice both basic and medical infant care such as:

- Tracheotomy care
- Male and female catheterization
- Insertion of a tube into mouth or nose
- Enema insertion
- Femoral, gluteal intramuscular and subcutaneous injections
- Palpitation of fontanel

S-P30

Upgrade as your skills increase!

Start with Life/form® Crisis Baby - W44717



1. Add an IV Arm - S-W44799



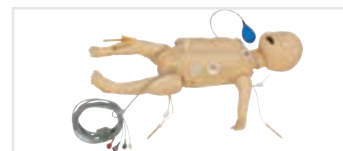
2. Add an IV Leg - S-W44777



3. Add the Single Intraosseous Infusion Leg - S-W44771



4. Add the ECG/Umbilical Cannulation Skin - S-W44800



5. Add the Airway Management Head - S-W44801

CHARTS & POSTERS

3B Scientific® Charts & Posters The finest anatomy illustrations available!

Anatomical wall charts and posters from 3B Scientific® are ideal for teaching human anatomy, patient education and medical studies! All anatomy charts are available in 19.7 x 26.6 in unless otherwise stated. An excellent addition to anatomical models in the classroom or doctors office.

Available in 3 versions, unlined paper (**UU**), laminated (**L**) and many also come as STICKYcharts. Posters are available in English, French, German, Spanish, Portuguese, Italian and several other languages.



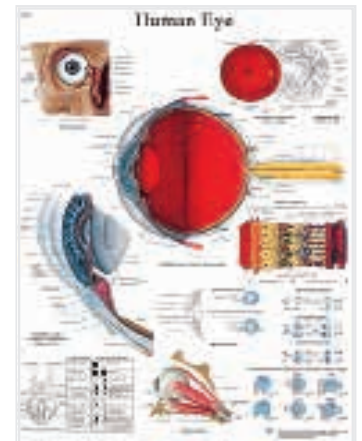
The Human Skull Chart
S-VR1131 \$14.00



Blood Vessels & Nerve Chart
S-VR1359 \$14.00



The Knee Joint Chart
S-VR1174 \$14.00



Human Eye Chart
S-VR1226 \$14.00

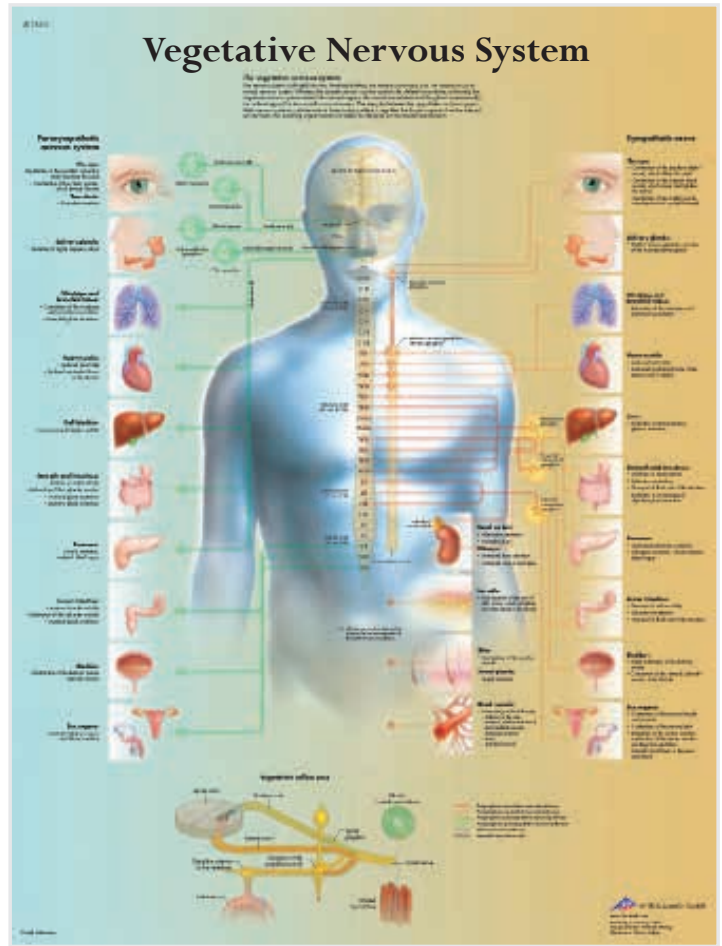
NOTE: When ordering please add suffix at the end of the item number to specify (**L**) laminated or (**UU**) unlined option, for example VR1334L.

Anatomical wall charts and posters by 3B Scientific®

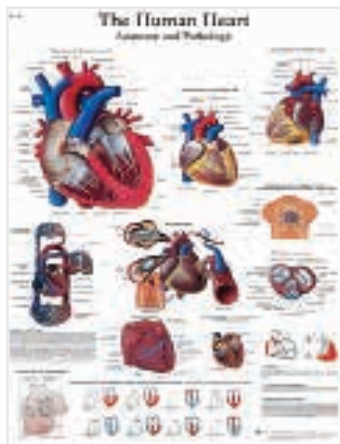
Get 5 laminated charts for **\$90** or get one (L) laminated chart for **\$21** or one (UU) unlaminated for **\$14!**



Human Ear Chart
S-VR1243 \$14.00



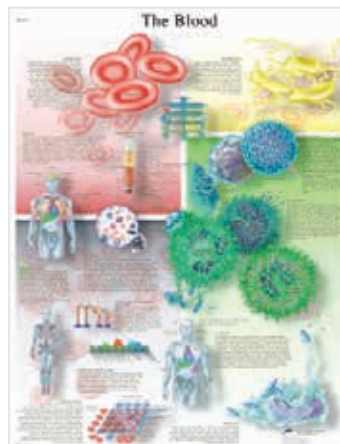
The Vegetative Nervous System Chart
S-VR1610 \$14.00



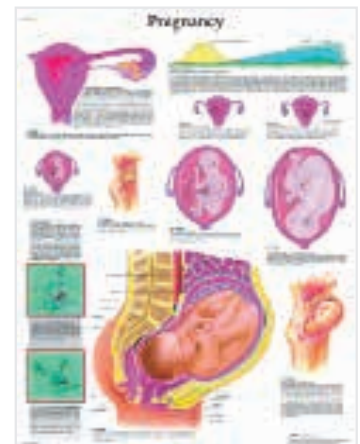
The Human Heart Chart
S-VR1334 \$14.00



Alcohol Dependence Chart
S-VR1792 \$14.00



The Blood Chart
S-VR1379 \$14.00



Pregnancy Chart
S-VR1554 \$14.00

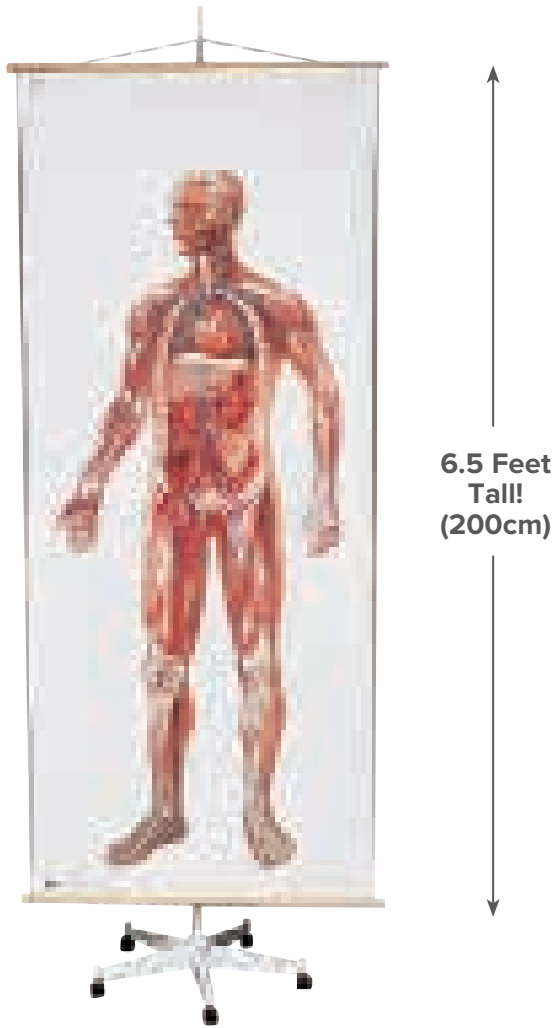
**3B Scientific® commissions
the finest anatomy illustrations available!**

Our oversized wall charts make a dramatic impact in an educational or medical setting. The same commitment to quality and detail found in our popular poster-size anatomical charts; only much, much bigger. Printed on tear-resistant, waterproof paper mounted with wooden rods so they are ready to hang. They are also available without wooden rods. Add suffix to product number to indicate **Mounted (M)** or **Unmounted (U)**. Accurately rendered scientific content. Size: 82 x 200 cm (33 x 78.75 in).
\$60.00 mounted, \$45.00 unmounted

Special Mobile Stand

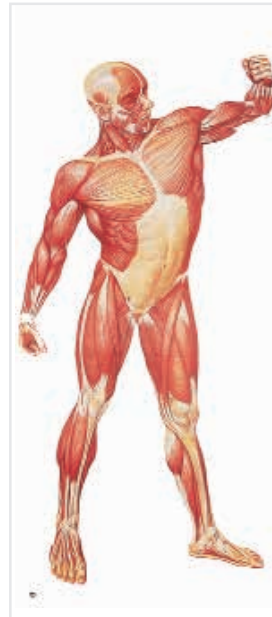
We recommend this helpful stand for displaying the anatomical wall charts.
S-Q99

Perfect fit for classroom & exam room doors!

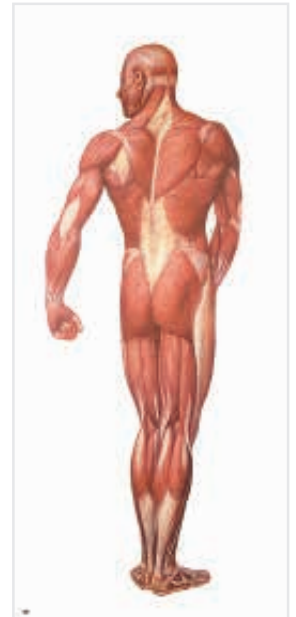


**6.5 Feet
Tall!
(200cm)**

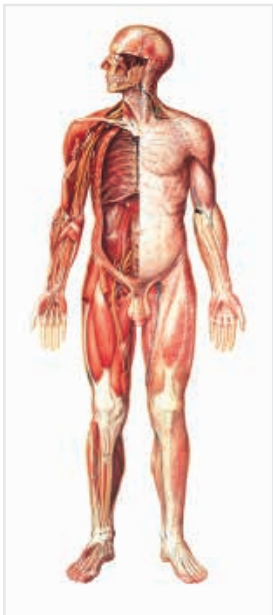
The Vascular System
S-V2004



Human Musculature Front Side
S-V2003



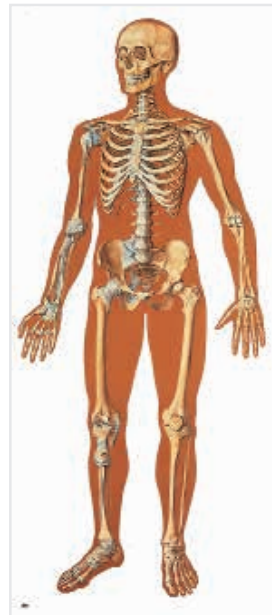
Human Musculature Back Side
S-V2005



The Nervous System Front Side
S-V2037



The Nervous System Back Side
S-V2038



Human Skeleton with Ligaments
Front Side
S-V2001



Human Skeleton with Ligaments
Back Side
S-V2002

ANTHROPOLOGICAL SKULLS



Anthropological Skull – KNER 406, Omo L. 7a-125

This model is a high-quality casting of a reconstruction of the Kalvarium skull (KMN-ER 406) with a partial mandible (Omo L. 7a-125). The Kalvarium skull is approximately 1.7 million years old and was discovered at Lake Rudolph (now called Lake Turkana) in 1970. The partial mandible comes from a different dig but is clearly from the same species. The classification of the species has not yet been indisputably clarified. Discussions continue as to whether the specimen is an *Australopithecus boisei* or a *Paranthropus boisei*.

Example of a pre-human hominid.

Discovered at: Lake Turkana, formerly

Lake Rudolph

Discovery: 1970

Age: about 1.7 million years

18 x 18 x 22.5 cm; 0.8 kg

S-VP755/1



Anthropological Skull – Sinanthropus

This skull is an accurate casting of a Sinanthropus skull reconstructed by Weinert and modelled from drawings by Black and Weidenreich after all the original bone specimens had been lost. Sinanthropus belongs to the genus *Homo erectus pekinensis* (Sinanthropus pekinensis) and can be seen as a typical example of early man.

Discovered at: Zhoukoudian

40 km south west of Peking

Discovery: 1929-1936

Age: 400,000 years

21 x 14.5 x 21.5 cm; 0.9 kg

S-VP750/1



Anthropological Skull – Steinheim

This Steinheim model is a detailed casting from Berkhemer's reconstruction (1936, skull with no jawbone). The original of this skull from a predecessor of Neanderthal man was a *Homo (sapiens) steinheimensis* aged between about 25 and 35 and was discovered in a gravel in Steinheim, southern Germany, in 1933.

Discovered at: a gravel pit near Steinheim

an der Mur, Germany

Discovery: 1933

Age: approximately 250,000 years

19 x 12.5 x 21.5 cm; 0.7 kg

S-VP753/1 \$241.00



Biface

Accurate reproduction of a biface made from quartzite. The original finding was probably used by an ancestor of the Neanderthals as a multi-purpose tool.

Material: Liquid wood

Age: 0.3 - 0.4 Mya

Place found: Neandertal

Height: 19 cm

Width: 9 cm

Depth: 5 cm

S-U75030



Osteological Reproductions

Each hominid was carefully researched and re-created based on casts made from the original fossils, the latest literature and full color, life-size photographs, or some combination thereof. Every effort has been made to accurately re-create anatomical details of color, size, shape, reconstructed areas, and bone/fossil texture, however, they are not intended for research purposes. The hominids offered in this series are high-quality recreations that can be advantageously used by educators as important visual aids in the classroom, and appreciated by the general public.



A. Chimpanzee (Pan Troglodytes) Female Skull

This Chimpanzee Skull model was cast from an original specimen from the collection of the Johann Wolfgang Goethe University of Frankfurt am Main, Institute of Anthropology and Human Genetics for Biologists. The chimpanzee (*Pan troglodytes*) skull is a great visual teaching tool for the anatomy of mammals. This animal skull is perfect for mammalogy and comparative anatomy studies. Its as close the genuine thing as you can get, for detailed anatomical study!

S-VP760/1

Specimens featured in the museum collection at the Institute of Anthropology and Human Genetics for Biologists.



Anthropological Skull - La Chapelle-aux-Saints

Cast from a reconstruction of the La Chapelle-aux-Saints skull, the model skull is an accurate copy of one belonging to a 50-55 year old male Neanderthal from ancient Europe of the species Homo (sapiens) neanderthalensis. Early man.

Discovered at: southern France
 Discovery: 1908
 Age: Approximately 35,000 to 45,000 years
 22 x 16 x 22.5 cm; 0.9 kg
 S-VP751/1



B. Orangutan (Pongo Pygmaeus) Male Skull

The male orangutan (Pongo pygmaeus) replica is a skull cast of the highest quality, with accurate anatomical detail. This animal skull is a great addition to mammalogy studies as well as comparative anatomy and other anatomical lessons.

S-VP761/1



Anthropological Skull – Crô-Magnon

This wonderful casting is a reconstruction of an early hominid called Crô-Magnon man. The age of the original is dated to be 20,000 to 30,000 years old. The skull itself belonged to an early modern man of the species Homo sapiens from the ice age of the neo-Palaeolithic era. Early man (neo-Palaeolithic).

Discovered at: a cave in Vézère/southern France
 Discovery: 1868
 Age: 20,000 to 30,000 years
 21.5 x 15 x 24.5 cm; 0.9 kg
 S-VP752/1



Anthropological Skull –Broken Hill or Kabwe

An accurate casting of a skull reconstructed from an original that was discovered in an iron ore working at Broken Hill, in northwest Rhodesia (modern-day Kabwe in Zambia). It is an example of the early man, Homo sapiens rhodesiensis or a Homo erectus rhodesiensis, and indications exist to point to both these classifications. For this reason, there is also a wide range in the estimates of the specimen's age based on differing scientific assumptions. An early example of an ancient Homo sapiens (as classified by Henke and Rothe 1994) or a Homo erectus rhodesiensis.

Discovered at: a cave in an ore working at Broken Hill, modern-day Kabwe in Zambia
 Discovery: 1921
 Age: probably 150,000 to 300,000 years old. Previous estimates were of 40,000 to 60,000 years
 21 x 15.5 x 23.5 cm; 0.8 kg
 S-VP754/1



C. Gorilla Skull (Gorilla Gorilla) Male Skull

This replica is a skull cast of high quality with anatomical detail true to nature. The gorilla skull is made of unbreakable plastic and has an anatomically correct movable lower jaw for easy demonstration of natural gorilla movement. This gorilla skull is great for mammalogy and comparative anatomy studies. Its a great tool for any biology classroom!

S-VP762/1



PLATE TECTONICS / VOLCANIC ACTIVITY



Mid-Atlantic Spine

This model shows the shaped course in 3D of the volcanic mountain range produced by tectonic shifts in the Atlantic Ocean.

Size at the equator: 1:320.000.000

Material: PVC

Dimensions: 64 x 48 x 8 cm

Weight: 6.5 kg

S-U70020

Stratovolcano

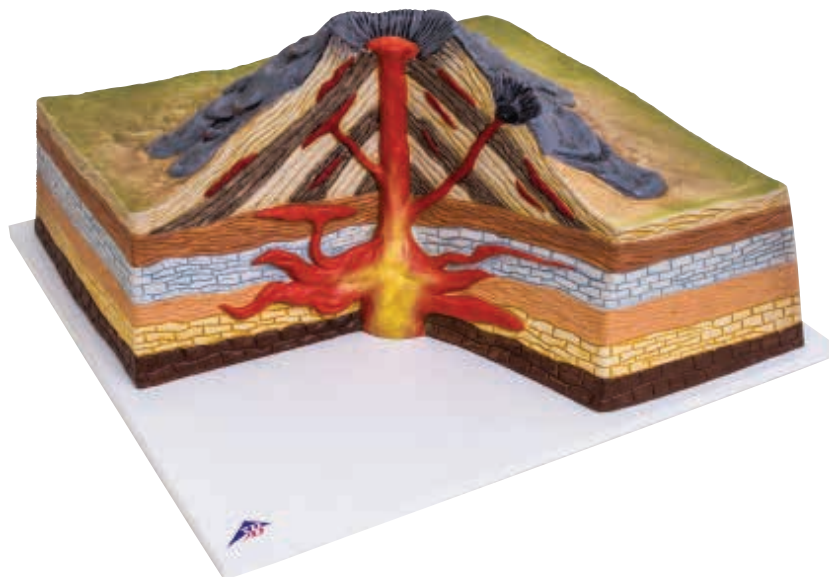
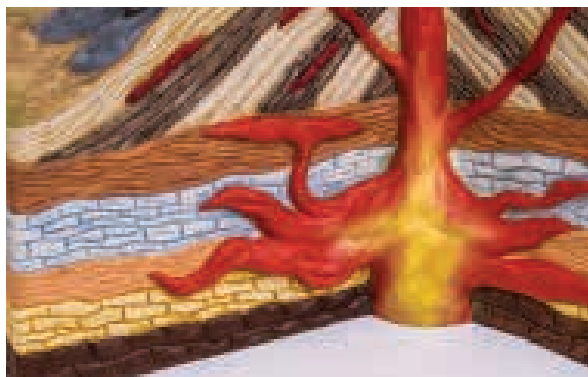
This hand-painted model shows the inside of a stratovolcano with the path of liquid magma to earth's surface.

Material: PVC

Dimensions: 47 x 35 x 19 cm

Weight: 2.4 kg

S-U70030



Set of three volcanic rocks

Set of three vulcanite rocks consisting of three little bags, each containing ten pieces of either lava rock, obsidian or pumice stone.

S-U72035





S-U72015 - Collection of 24 rocks

Minerals and rock collections

The collections contain 24 frequently occurring examples of various stone and mineral groups. The examples are approx. 3 x 3 x 3 cm to 5 x 5 x 5 cm in size, and come in a robust box that includes numbering, labels and an information booklet.



Collection of 24 volcanic rocks and minerals

The collection contains volcanic rocks and minerals.

The collection contains:

1. Volcanic rocks: basalt, phonolite, pitchstone, rhyolite
2. Lava: Lava from Vesuvius, basaltic lava and rhyolitic lava
3. Pyroclasts: lapilli, volcanic ash, pumice stone
4. Minerals: anorthite, anorthoclase, augite, cristobalite, hauyne, leucite, natrolite, nepheline, pickeringite, sanidine, sulphur, thaumasite, tridymite, obsidian.

S-U72010



Collection of 24 rocks

The collection contains frequently occurring examples of metamorphic, sedimentary and magmatic rocks as well as important examples of industrial rocks.

The collection contains:

1. Magmatic rocks, plutonites: foyaite, gabbro, granite, granodiorite, larvikite and monzonite
2. Magmatic rocks, vulcanites: basalt, pumice stone, phonolite, rhyolite
3. Sedimentary rocks: breccia, dolomite, gypsum, limestone, chalk, quartzite and sandstone
4. Metamorphic rocks: amphibolite, eclogite, mica schist, gneiss, marble, phyllite and serpentinite.

S-U72015



Collection of 24 minerals

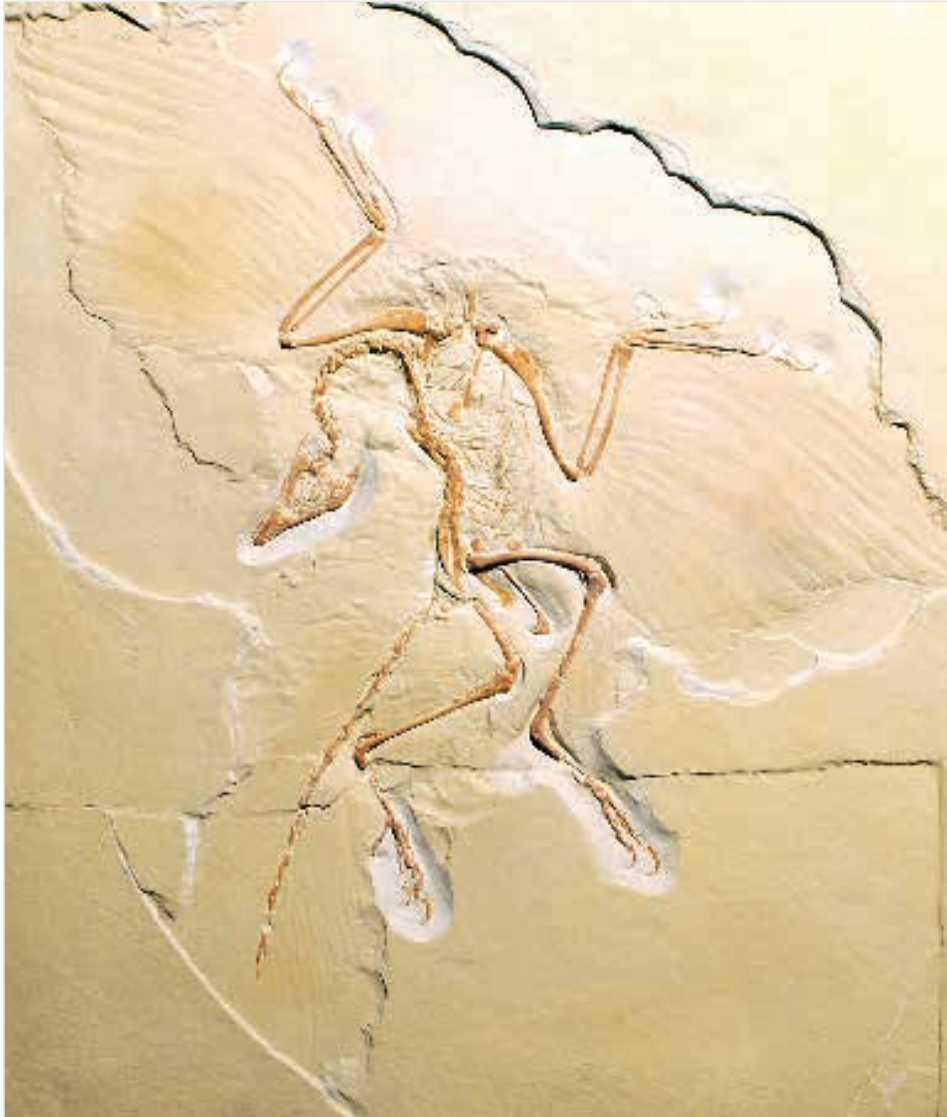
The collection contains examples of ten classes of minerals: elements, sulphides, halogenides, oxides, carbonates, borates, sulphates, silicates, phosphates and organic compounds.

The collection contains:

1. Elements: graphite and sulphur
2. Sulphides: bourmonite, galenite and pyrite
3. Halogenides: fluorite and halite
4. Oxides: hematite, quartz and rutile
5. Carbonates: calcite and dolomite
6. Borates: ludwigite
7. Sulphates: barite, coelestine and gypsum
8. Phosphates, arsenates and vanadates: apatite and vanadite
9. Silicates and germanates: actinolite, amazonite, muscovite, sodalite and talk
10. Organic compound: copal

S-U72020

FOSSILS



Archaeopteryx lithographica

Liquid wood mold of the well-known archaeopteryx lithographica fossil from Bavaria. The clear avian characteristics, flight feathers and furcula, as well as reptilian characteristics, the bony tail and front claws, are recognisable. It is therefore considered a transitional form of both species. The fossil is considered one of the few complete findings of the archaeopteryx lithographica, which lived around 150-200 million years ago.

Weight: 1.8 kg
Height: 47.5 cm
Width: 40 cm
Length: 1.5 cm

S-U75005



Ammonite, model

An exact and scientifically-based reproduction of what an ammonite may have looked like. The model shows all the important organs on the head such as the eyes, the tentacles, the funnel and the jaw that resembles the beak of a parrot.

Length: 15 cm
Width: 9 cm
Height: 8 cm
Weight: 121 g
S-W12400



Ammonite, polished

Polished shell of a fossilised ammonite from Madagascar.

Size: 5 - 9 cm
Period: Cretaceous (~ 90 Mya)

S-U75015



Ammonite, 2 polished halves

Polished shell divided into two halves of a fossilised ammonite from Madagascar.

Size: 8 - 12 cm
Period: Cretaceous (~ 90 Mya)

S-U75010



Stratigraphic collections

These collections contain carefully selected animal and plant fossils from all the important groups that are representative of certain geological time periods. These examples, placed in chronological order, give an overview of the development of life from the Precambrian to the Triassic period. Each item is stored individually in boxes placed in chronological order, with a label, the date and details of where the item was found. The fossils come in a wooden box with a detailed accompanying booklet in English, German and French. The collections were created especially to give an introduction to palaeontology. The items delivered may vary depending on availability. We will ensure that we provide at least one example from each period.

Stratigraphic collection 20 fossils S-U75020

Stratigraphic collection 40 fossils S-U75025

Examples from the collection

Name: Hexacorallia: *Pattalophyllia sinuosa*
 Age: Tertiary, Eocene: 56-38 Mya
 Place found: Pyrenees, Spain



Name: Trilobite: *Diacalymene ouzrequi*
 Age: Ordovician: Middle Ordovician
 485.4 – 443.4 Mya
 Place found: Alnif, Morocco



Name: Ammonite: *Divisosphinctes (Perisphinctes) besairiei*
 Age: Jurassic, Late Jurassic, Oxfordium:
 163.5 - 157.3 Mya
 Place found: Sakaraha, Madagascar





Horse Skull *Equus Caballus*
This animal skull is perfect for mammal and comparative anatomy studies.
S-T30017



Cow Skull *Bos Taurus*
This animal skull is perfect for mammal and comparative anatomy studies.
S-T30015



Sheep Skull *Ovis Aries*
The sheep skull is flexibly mounted allowing for demonstration of natural movement.
S-T30018

Natural Bone: Movable Lower Jaw



Pig Skull *Sus Scrofa*
Flexibly mounted.
S-T30016



Rabbit Skull *Lepus Europaeus*
Flexibly mounted.
S-T30019



Cat Skull *Felis Catus*
Flexibly mounted.
S-T30020



Dog Skull *Canis Domesticus*
Flexibly mounted.
S-T30021



Rat Skull *Rattus Rattus*
Perfect for mammal and comparative anatomy studies.
S-T30027

Reproductions



Chimpanzee Skull Model *Pan Troglodytes, Female*
S-VP760/1



Orangutang Skull Model *Pongo pygmaeus, Male*
S-VP761/1



Gorilla Skull Model *Gorilla Gorilla, Male*
S-VP762/1

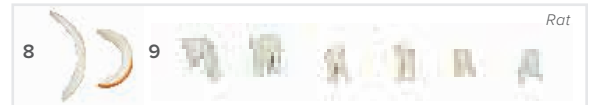
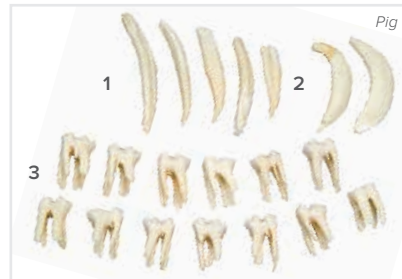
Over 80 individual teeth in this unique set!

Animal Teeth Specimen Set

This series shows the different types of teeth of cows (ruminant), pigs, dogs, cats (terrestrial carnivores), rabbits, rats (rodents). Each is a natural specimen.

S-T30029

- | | | |
|----------------------|-----------------------|-----------------------|
| 1. Pig: Incisors | 6. Hare: Incisors | 11. Cat: Incisors |
| 2. Pig: Canine teeth | 7. Hare: Molars | 12. Cat: Molars |
| 3. Pig: Molars | 8. Rat: Incisors | 13. Dog: Canine teeth |
| 4. Cow: Incisors | 9. Rat: Molars | 14. Dog: Incisors |
| 5. Cow: Molars | 10. Cat: Canine teeth | 15. Dog: Molars |



The delicate masterpieces of land and air!

All animal skeletons are constructed from natural bones. The individual bones are securely mounted and durable. Some animal skeletons have flexibly mounted joints so that natural postures can be seen and demonstrated. All skeletons have been obtained legally and may occasionally require longer delivery times due to supply and demand.

NOTE: These are natural specimens and your product may vary from examples shown here.



Rat Skeleton *Rattus rattus*

In showcase.

S-T30011



Rabbit Skeleton *Lepus europaeus*

In showcase.

S-T30008



Mouse Skeleton and Stuffed Mouse *Mus musculus*

In showcase.

S-T31001



Real bone for definitive study!

**Chicken Skeleton
*Gallus gallus***

In showcase.

S-T30002

**Duck Skeleton
*Anas platyrhynchos***

In showcase

S-T30035

**Domestic Goose
*Anser anser***

Flexibly mounted,
on wooden base.

S-T30045



Carp Skeleton (*Cyprinus carpio*)

In showcase.

S-T30001



**Dove Skeleton and Stuffed Dove
*Columba palumbus***

In showcase.

S-T31005



Dove Skeleton *Columba palumbus*

In showcase. 32.5 x 31.5 x 32.5 cm; 2 kg

S-T30007



African Catfish Skeleton *Clarias lazera*

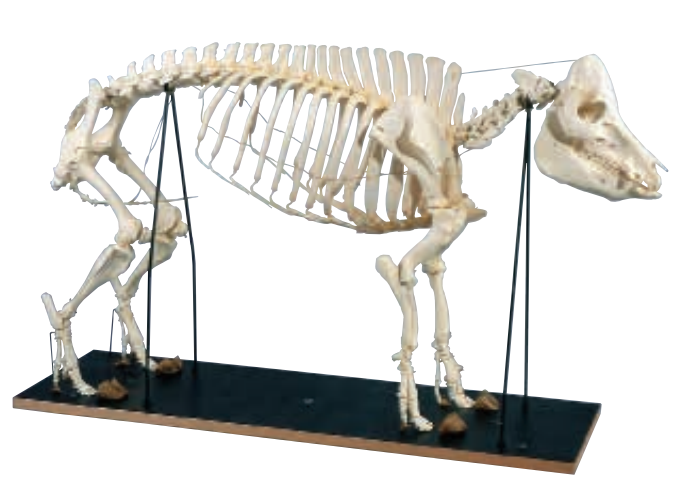
On wooden base.

S-T30046



Cat Skeleton *Felis catus*
On wooden base.
S-T30028

Cat Skeleton *Felis catus*
Flexibly mounted, in showcase.
S-T30039



Pig Skeleton *Sus scrofa*
On wooden base.
S-T30013

Cow Skeleton *Bos taurus*
On wooden base.
S-T30012



Dog Skeleton *Canis domesticus*
On wooden base.
S-T30009

Dog Skeleton *Canis domesticus*
Flexibly mounted, on wooden base.
S-T30040



Sheep Skeleton *Ovis aries*
On wooden base.
S-T30036



Horse Skeleton *Equus caballus*
On wooden base.
S-T30014



1 Horse Foot *Equus caballus*
S-T30023



1 Cow Foot *Bos taurus*
S-T30031



1 Dog Leg *Canis domesticus*
S-T30032

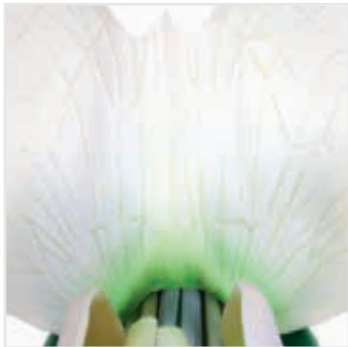


1 Pig Foot *Sus scrofa*
S-T30022



Mammalian Foot Series

Study Evolutionary Biology hands on with a tour through the adaptive selection. By isolating a single feature, discuss how size, weight, and speed all influenced the form of the nail and foot structures. Consisting of foot skeletons of: Horse or cow, pig and sheep with separately mounted hooves. Also included are leg skeletons with shoulder blade of: cat, hare or dog. Mounted on a wooden base. Extra shipping charges may apply. 72 x 44 x 60 cm; 7 kg
S-T30024



Sweet Pea *Pisum Sativum*, Enlarged 7 Times Life-Size, 12-part
Family: *Papilionaceae/Leguminosae*

There are over 17,000 members of the Papilionaceae family, named for its butterfly-like zygomorphic symmetry of the corolla. The corolla consists of petals, 2 wings, and the keel that comes from two petals which have grown together.

This model has 11 parts and is mounted on a base. Use this model to teach the principals of genetics that Gregor Mendel discovered using Sweet Peas. Easily examine the Parent and F1 generations and discuss sexual and asexual reproduction. 10 x 7 x 10.5 in; 0.3 kg
S-T21026



Study Heliotropism!

Tissue Structure of a Sunflower Stem, *Helianthus Annuus*

Detailed longitudinal and lateral view, 200 times magnified. On Baseboard. 17.5 x 9.5 x 4 in; 2.2 kg
S-W19207



Meadow Clary *Salvia Pratensis*, Enlarged 15 Times Life-Size, 4-part
Family: *Labiatae*

At 15 times magnification, the model shows the detailed structure of a single flower with its pollination mechanism. For further illustration, the model separates into four components and the typical barrier mechanism is flexibly mounted.

The four-sided stalks and the lip-shaped flowers are characteristic of labiates species. Labiates often are spice, perfume, or medicinal flowers. 18 x 28 x 30 cm; 0.6 kg
S-T21024



Celandine or Pilewort *Ficaria Verna*, Enlarged 10 Times Life-Size, 1-part
Family: *Ranunculaceae*

The family of Ranunculaceae depicts an ancient flower structure. Also known as both the buttercup or crowfoot family the number of the flower parts are indefinite, especially the male and female parts. In this case, the flower has 8 petals encased in 3 slim sepals. There are a number of stamens and pistils and the carpels are unfused. Looking down into the model, you can see the pattern of Fibonacci's sequence in the spiraling pistils. 39 cm; 0.4 kg
S-T21017

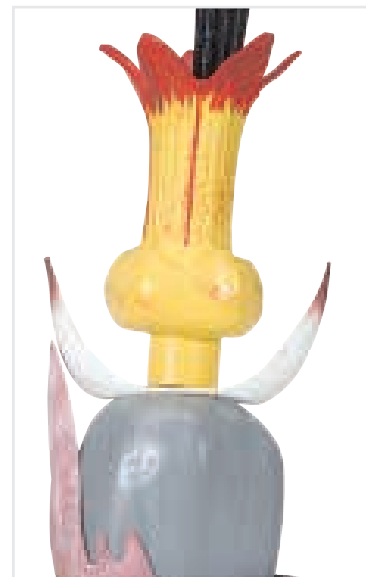


Dandelion *Taraxacum officinale*, Enlarged 10 - 20 Times Life-Size, 3 individual Models

Family: *Asteraceae*

Dandelion belongs to the Asteraceae family of composite flowers. The Dandelion model contains three separate models, each on their own base. The inflorescence is enlarged 10 times life-size. It contains up to 200 florets in its tight bracts. The florets has five lobes and are magnified to 20 times life-size. Through an intricate process of fertilization, the seed begins to mature. Shown at 20 times life-size the seed ripens and the beak grows to three or four times its length. When it opens, the Dandelion's characteristic puff ball allows dissemination of its seeds by wind. Flower: 8 x 10 x 13.5 in enlarged 10x, Floret: 5 x 5 x 13 in enlarged 20x, Seed: 5 x 5 x 13 in enlarged 20x.

S-T21022



Genuine Chamomile *Matricaria chamomilla*, Enlarged 10 Times Life-Size, 2-part

Family: *Asteraceae*

Asteraceae or composite flowers are characterized by the torus, a series of florets arranged in dense heads, that resemble a single flower.

The white ray florets are furnished with a ligule, while the disc florets are yellow. The composite flower head is shown enlarged 10x and halved to allow outer and inner views. A single tubular fertile flower is shown enlarged 70x for detailed examination of its inner structures. Chamomile is the perfect flower to teach the natural application of the Fibonacci sequence. The tubular florets mature in sequence from the outside in a spiral configuration to the center. The model shows the maturation process from immature inner flower out to mature stamen. 12 x 9 x 11.5 in; 0.7 kg

S-T21023

Study Heliotropism!

Sunflower *Helianthus annuus*

The model shows the inner tubular corolla magnified 10 times and the outer ray flower magnified 3 times. The tubular corolla can be dissected into 2 halves. 24 cm; 0.5 kg

S-T21013



Wheat *Triticum Aestivum*, Enlarged 15 Times Life-Size, 5-part

Family: *Gamineae*

The narrow, sharp and parallel-running leaves are typical of monocotyledonous grasses. Flowers of most grasses are adapted for wind pollination. The spike is made of 2 or 3 flowered ears. The ears are covered by two glumellata, while the flowers are covered by stiff protective hairs called awns. In some species like barley, the awns can contribute significantly to photosynthesis. There are three stamina and a pistil with a large surface area. As the flower matures the stamina protrude from the center glumella and prostrate. The individual ears can be separated for a detailed view of the immature stamen and pistil. 6 x 8 x 21 in, 1 kg

S-T21009



Tulip *Tulipa Gesneriana*, Enlarged 3 Times Life-Size, 2-part

Family: *Liliaceae*

Monocotyledonous Lily grasses are characterized by underground stems called bulbs that vegetatively reproduce. Likewise their large funnel-shaped flowers are two sets of three tepals in radially symmetrical whorles. The inner circle is produced by two sets of three detachable stamina. The inner chasm is painted a delightful gradient starting in red shifting to yellow finally to finish in a deep black. This colorful, large flower is adapted to insect pollination. Onion (*Allium cepa*) and the White lily (*Lilium candidum*) have similar flower shapes. 23 x 24 x 52 cm; 0.83 kg

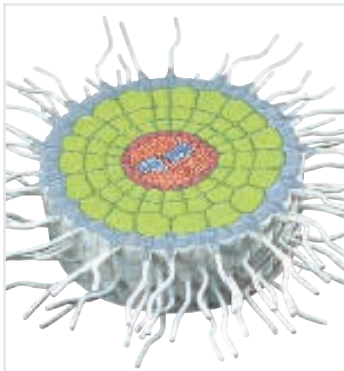
S-T21010



Block Model of Leaf Structure

This model shows the histological structure of a Christmas rose (*Helleborus niger*). Examine individual cells and their role in the larger vascular system. Identify the stomata and guard cells to discuss the intricacies of transpiration. Magnified 1500 times. 35 x 37 x 11 cm; 2.0 kg

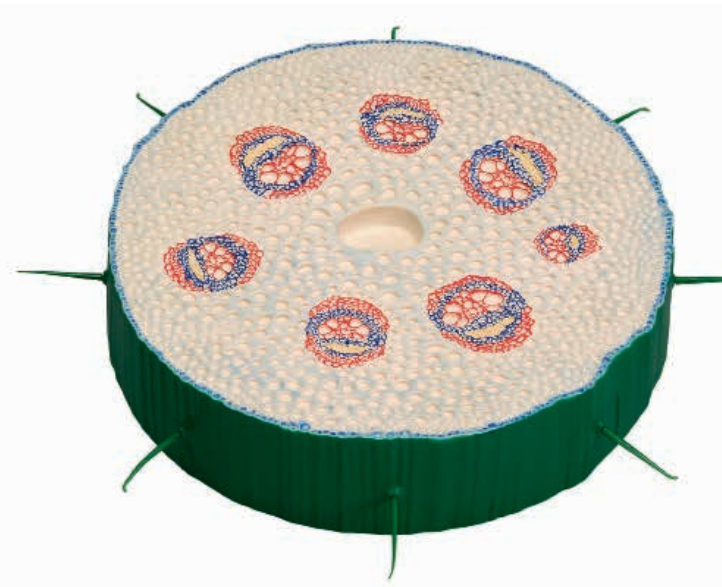
S-T21001



Absorption Zone of the Root

This relief model shows the absorption zone of a dicotyledonous plant, White Mustard (*Sinapis alba*). Identify the root hairs and vascular bundles that contain the xylem and phloem. Discuss primary versus advantageous root structures and how that influences osmosis and transportation of raw materials. 43 x 43 x 20 cm; 1.5 kg

S-T21002



Dicotyledons - Stem Cross Section

Cross section of a Creeping Buttercup stem with collateral open vascular bundles. The model shows the typical stem structure of a dicotyledon enlarged by a factor of 250.

S-T21003



Rapaseed or Canola Seed *Brassica Napus ssp. Oleifera*, Enlarged 12 Times Life-Size, 3-part

Family: *Brassicaceae*

Brassicaceae, formerly known as Cruciferae, is named for its cross-like (Cruciferous) flower. Unique in the plant world for having 4 petals, Rapaseed does not follow Fibonacci's sequence.

Rapaseed lends itself to teaching the formidable inTriangle of U in concept. One petal is removable for detailed study of the sepal and stamen. A ripe pod, magnified 3x life-size is depicted in cross section, removable from base. 11 x 9.5 x 14 in

S-T21020



Cherry Blossom with Fruit *Prunus Avium*, Enlarged 7 Times Life-Size, 3-part

Family: *Rosaceae*

This model shows the blossom of the sweet cherry (3-parts) enlarged 7 times as well as a cherry fruit enlarged 3 times. The cherry blossom can be split into two halves to reveal the removable ovary with style and stigma. 32.5 cm; 0.6 kg

S-T21019



Apple Blossom *Malus Pumila*, Enlarged 5 Times Life-Size

Family: *Rosaceae*

An apple flower is the perfect model of 5's in Fibonacci's sequence. The flower is radial, five-whorled and five-part. Five sepals form the inner whorl, next to them are 5 petals. There are typically 5 inflorescence on a branch. The stamens are bunched in five's, this model has 4 sets of stamens. While individual flowers vary in numbers of sets they are always in multiples of five. Hawthorn (*Crataegus monogyna*) and Cherry (*Cerasus vulgaris*) have similar flowers. A spectacularly beautiful model, the rounded white leaves are barely tinted with pink. The powder-coat paint on the stem and anthers give this model a realistic look & feel.

10 x 9 x 16.5 in; 0.91kg

S-T210161



Potato Flower *Solanum Tuberosum*, Enlarged 8 Times Life-Size, 2-part

Family: *Solanaceae*

In nature, the potato flower branches usually divide into two stalks, each with multiple flowers. The gamopetalous corolla's 5 points are radially symmetrical, marked by yellow lines that equally transverse & divide. The 5 stamens sets are fused to form a conical stamens. The corolla and stamens detach to reveal the superior pistil. The powder coated paint on the stamens and stem give life-like texture that provides realism to the model. 5 petals, 5 sepals, 5 sets of stamens all fall into Fibonacci's sequence. Similar flower structures to the Potato flower are Peppers (*Capsicum annuum*) and Tomatoes (*Lycopersicon esculentum*). 7 x 7 x 15 in; 0.5 kg

S-T21014

Wild Rapa *Sinapis Arvensis*, Enlarged 12 Times Life-Size, 3-part

Family: *Brassicaceae*

The sepals and petals standing in two whorled circles form a crossshape, leading to the former Cruciferous family name. The stamens are in two whorles. The two stamens in the outer circle are shorter than the four stamens in the inner circle. The ovary is divided by a wall and the ovules are linked to the edge of this wall. The carpel can be removed from the silique and disassembled into two pieces. 13 x 13 x 14 in ; 0.75 kg

S-T210121



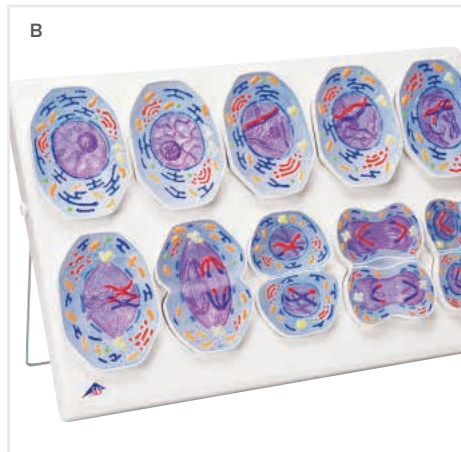
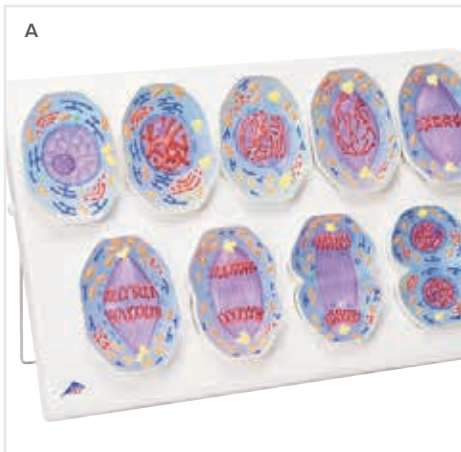
Worlddidac gold award winner!

Human Cell, in Glass at 40,000 Times Life-Size

This one of a kind model represents an undifferentiated human cell at an enlargement of 40,000 times. It shows the structure of the smallest unit of any living creature capable of independent life, as seen through an electron microscope. The high-quality human cell model shows the essential function-bearing cell organelles with stunning beauty and their arrangement in the model provides a momentary snapshot of the dynamic balance of a cell.

The cell nucleus, a few mitochondria and the lysosomes are shown in section, so that their internal structure is visible. The glass cell is an eye-catcher in many exhibitions and has received several distinctions as in Worlddidac gold award in. Whether you are looking for a model for a display case, museum mount or to make a statement in a lobby – this glass cell model is of the finest quality and sure to please. 60 x 46 x 46 cm; 13 kg

S-VL650



3B Scientific® Magnetic Model Series

These three-dimensional relief models are painted according to the usual coloring methods of microscopy, making the process of mitosis and meiosis easy to understand. The models are equipped with magnets at the back so they can be easily arranged on a magnetic board in the classroom. Each series is supplied in a storage system which can be fastened to the wall. A detailed description and handouts for your lessons are included. Comes with metal stand.

A. Mitosis Model

This 3B Scientific® Model Series shows the 9 phases of mitosis on the basis of a typical mammal cell at an enlargement of approx. 10,000 times: 60 x 40 x 6 cm; 1.5 kg
S-R01/1

B. Meiosis Model

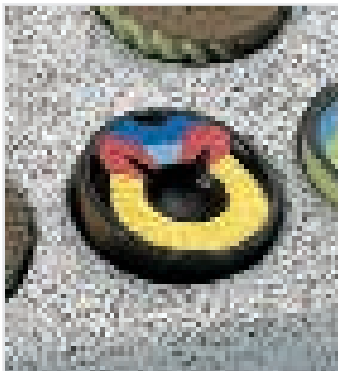
Our Meiosis models show the 10 stages of meiosis on the basis of a typical mammal cell at an enlargement of approx. 10,000 times: 60 x 40 x 6 cm; 1.7 kg

S-R02/1

Embryonic Development of a Frog, 12 stages

Rana temporaria, the common frog, provides an excellent backdrop for the study of fertilization and embryonic development. Track the blastula as it divides and forms more specialized cells. 30x life-size

S-T12009



The Plant Cell

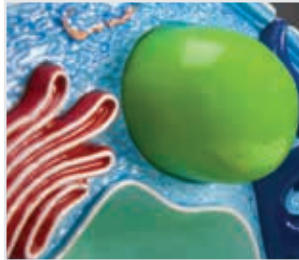
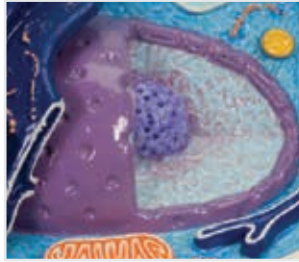
The two-piece model presents the structure of a typical plant cell with cytoplasm and cell organelles, as viewed from an electron microscope. For purposes of better illustration, all important organelles are raised and displayed in color. 20 x 14 x 32 cm; 0.8 kg

S-R05

The Plant Cell STICKYchart™

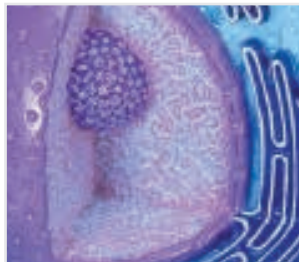
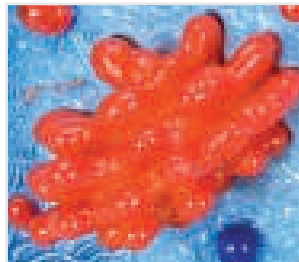
The Plant Cell STICKYchart™ presents the structure of a typical plant cell with cytoplasm and cell organelles, as viewed from an electron microscope. For purposes of better illustration, all important organelles are displayed in color. 18 x 24 in

S-V1R05S



3B Scientific STICKYcharts™

Printed in full color on durable vinyl with a 3M™ adhesive backing. The non-destructive adhesive affixes to walls, doors, windows, whiteboards, metal, cabinets and most any clean surface. Can be removed and re-affixed to surfaces many times.



The Animal Cell

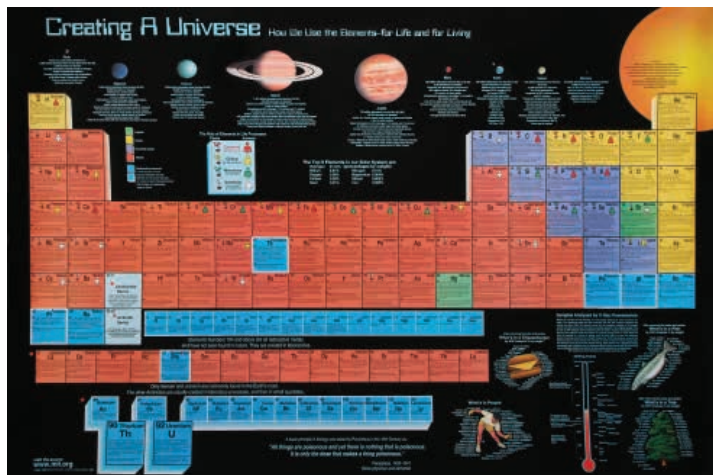
This two-piece model shows the form and structure of a typical animal cell as viewed from an electron microscope. For the purpose of better illustration, all important organelles are raised and displayed in color. On removable base. 21 x 11 x 31 cm; 0.8kg

The Animal Cell STICKYchart™

The highly detailed Animal Cell STICKYchart™ shows the form and structure of a typical animal cell as viewed from an electron microscope. For the purpose of better illustration, all important organelles are displayed in vibrant color. 18 x 24 in

S-V1R04S





Two charts in one!

The Blue Marble Vinyl Periodic Chart

It's vinyl, it's huge! Go ahead, just try and tear it, almost as indestructible as the elements themselves. PLUS it's two posters in one. We took our most popular poster (The Ultimate Periodic Chart) and printed another Periodic Chart on the back side with 103 gorgeous color photos of the minerals that provide the elements we use. 36 x 54".

S-W55762D



Interactive Atomic Model According to Bohr - Student Edition

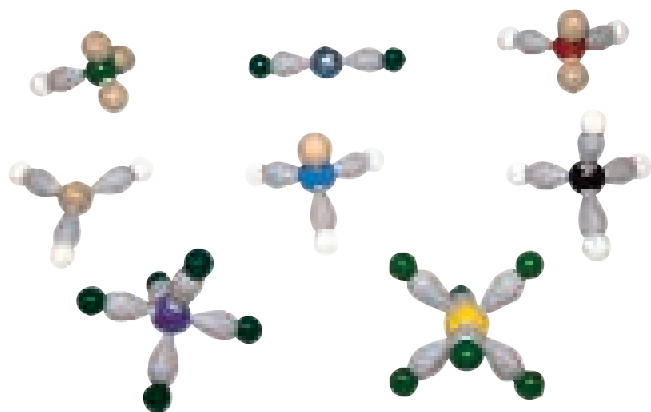
This student model applies tactile learning to chemistry, physics and biology! This excellent model greatly simplifies the understanding of Bohr's model of the atom. The base and lid double as the nucleus of an atom surrounded by its' electron orbits. Visualize the protons, neutrons and electrons which provides a greater understanding of the overall charge of an atom. When you're finished conveniently store the protons, neutrons and electrons inside the model at the end of studying. All the components needed to create atoms, isotopes, ions, noble gas configurations, covalent bonds, and more are provided.

S-W19902

Interactive Atomic Model According to Bohr - Teacher Edition

Interactive atomic model class set with 8 student training models and 2 magnetic demonstration atoms functions and structures for your physics, chemistry and biology classes. With this completely magnetic demonstration atom you will be able to clearly and quite easily explain Bohr's atomic model to your students on the blackboard. Using the training atom your students will be able to construct their own atoms, isotopes, and even ions.

S-W19901



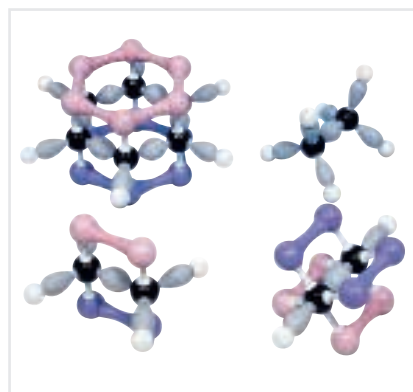
Molyorbital™ 8 Model Collection Set - Electron Repulsion Theory

This 8 model collection set contains sufficient parts to make the eight atomic models shown. The different shapes are examples of the orientations of the bonds and cover coordination numbers 1 to 6. Lone pairs are represented by brown spheres or brown pear shaped parts. The two extra pear shaped parts are included in the set to enable protonated models to be made, e.g. Acid/Base theory, the formation of H₃O as a result of the migration of H⁺ from hydrogen chloride.

Contents:

- 13 Hydrogen (white)
- 7 Chlorine (green)
- 9 Fluorine (light green)
- 1 Metal (Beryllium) (grey)
- 1 Boron (beige)
- 1 Chlorine (light green)
- 1 Oxygen (red)
- 1 Nitrogen (blue)
- 1 Carbon (black)
- 1 Phosphorus (purple)
- 1 Sulphur (yellow)
- 26 Sigma bonds (grey)
- 6 Lone pair orbital (beige)
- 6 Protonated lone pair orbital (beige)
- 6 Short Link (white)

S-W19758



The Molymod molecular orbital system uses standard shiny colored atom parts to represent the central atom cores. Average scale is 3.5 cm per Angstrom. The atomic and molecular orbital parts are represented by pastel/matte colored pieces and are color-coded according to their use.

The pink and purple pear-shaped lobes and concave π links represent the +ve and -ve signs of the wave functions ψ of the lobes of atomic and molecular orbitals.

The gray pieces represent hybridized sigma bonds. The light brown spheres are used to indicate lone electron pair orbitals. Where the electrons are involved in hydrogen bonding, a light brown pear-shaped lobe is used.

Molyorbital™ Organic Structures

This 4 model collection set contains sufficient parts to make benzene, ethane, ethene, and ethyne. Shows sigma and pi bonding orbitals, and concepts of hybridization and delocalization. Top row: Benzene, Ethane; bottom row: Ethene, Ethyne.

Contents:

- 12 Carbon
- 18 Hydrogen
- 9 Carbon-carbon (oval shaped)
- 18 Carbon-hydrogen (pear shaped) sigma bonds
- 9 pi-bonds (21 pink and 21 purple pieces)

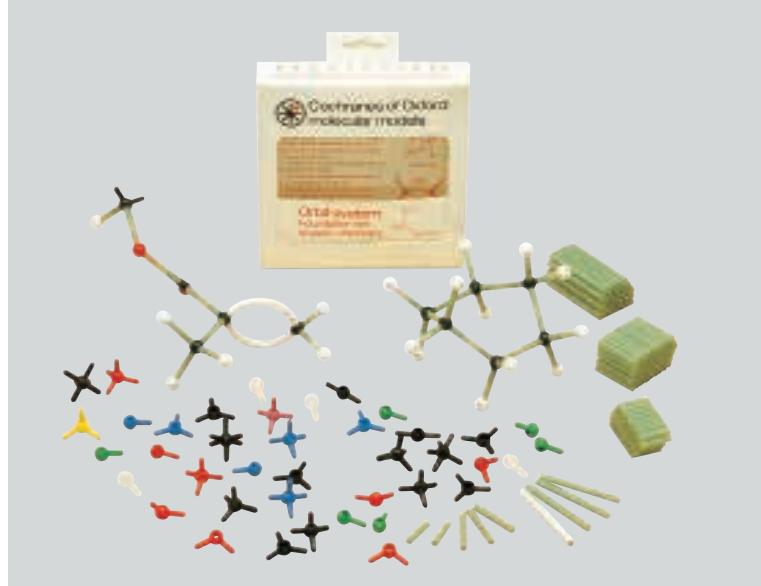
S-W19756



Biochemistry ClasSet

This set comprises 390 atom centers, scale 3 cm = 100 pm. The centers are color coded according to the element and the bond angles are marked. Bonds between atoms are made from plastic straws, which can be cut to any required length. The items consist of: Amino acids, monosaccharides, glycerol, fatty acids, steroids, purines and pyrimidines, peptides, disaccharides, lipids, nucleosides, nucleotides, proteins, polysaccharides, nucleic acids. 30 x 20 x 3 cm; 0.3 kg

S-W19802



Great for organic & biochemistry

The Orbit Molecular System Foundation Set

This Molecular System is a set of 65 atom centers, scale 3 cm = 100 pm. Capable of building simple organic models, including sugar. The colors of the centers represent the elements. The centers are joined by bonds which fit over the prongs. For simple model building, bonds of 2 or 3 lengths are sufficient. 15 x 15 x 2 cm; 0.1 kg

S-W19807

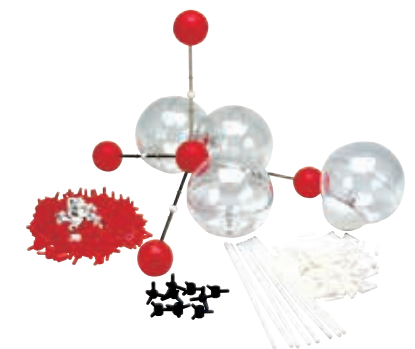


Carbon-Carbon Bond

Orbital molecule models representing the sigma and pi bonds found in carbon-carbon pairs: -ethane -ethylene -acetylene -benzene.

51 x 34.5 x 14 cm; 3.0 kg

S-T22008



Hydrogen Bridge Bond

Hydrogen bonds represent some of the most common and important secondary bonds. 100 x 26 x 36 cm; .5 kg

Use this model to illustrate the hydrogen bonding found in:

- Ice
- Water
- Acetic acid
- HF₂

S-T22012



A. Inorganic/Organic Chemistry ClasSet

This set comprises 500 atom centers, scale 3 cm = 100 pm. The atoms consist of plastic centers having prongs set at the correct bond angles. The centers are color coded according to the element, and the bond angles are engraved on the centers and marked by bars. The items consist of: Molecular shape, methane, butane and alkanes, isomerism, carbon compounds with multiple bonds, ring structures, molecules with nitrogen, phosphorous and sulphur, benzene, optical isomerism, sugars, carbohydrates, polymers and complex ions. 20 x 30 x 3 cm; 0.4 kg

S-W19805

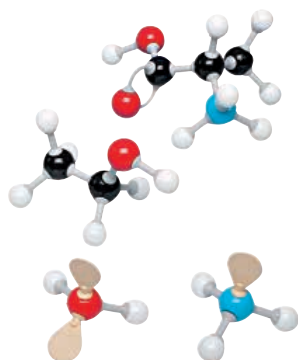
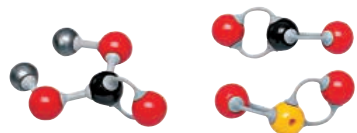
B. Inorganic/Organic Chemistry Student-Set

This set comprises 240 atom centers, scale 3 cm = 100 pm. The atoms consist of plastic centers having prongs set at the correct bond angles. The centers are color coded according to the element, and the bond angles are engraved on the centers and marked by bars. The items consist of: Molecular shape, methane, butane and alkanes, isomerism, carbon compounds with multiple bonds, ring structures, molecules with nitrogen, phosphorous and sulphur, benzene, optical isomerism, sugars, carbohydrates, polymers and complex ions. 15 x 20 x 2 cm; 0.2 kg

S-W19806

Have a question about our chemistry sets?

Call us at **1.866.448.5846!**



Inorganic/Organic Student Set

Simple inorganic molecules or empirical formulae representations are possible in addition to many organic structures. Examples: Carbon dioxide, ammonia, sulphuric acid, calcium hydroxide, metal salts, copper sulphate, alkanes, alcohols, glucose and benzene. The three brown atoms can be used to represent any element having one sp^3 , one dsp^3 , and one d^2sp^3 in addition to existing element hybridizations. Each set is packed in a four-compartmented box. Designed for school, college or self study chemistry courses. Sufficient links are provided to make single, double, and triple bonds for OPEN and short links for CLOSED models. The models can easily be assembled and reassembled to make hundreds of possible structures.

S-W19722



Inorganic/Organic Teacher Set

Each Teacher Set comes with a set of instructions and is packed in a plastic box containing eight trays in two layers for convenient storage of the individual components. A wide variety and quantity of atom-parts enables a vast number of possible organic or inorganic models to be assembled and reassembled. 23.6 x 17.3 x 5.8 cm; 0.82kg

S-W19717

For a complete list of kit parts visit
3bscientific.com or call **1.866.448.5846!**



Biochemistry

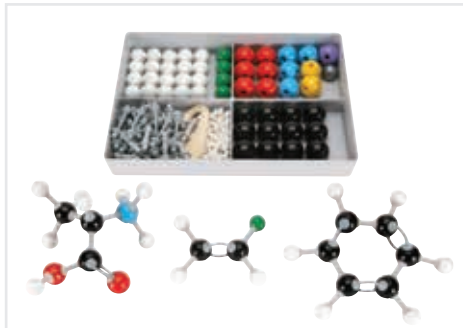
A set for making compact models having a very wide range of biochemical structures. The mushroom style atom links are used to give a compact appearance.

Examples of structures include, amino-acids, monosaccharides, fatty acids, glycerol, steroids, purines and pyrimidines, peptides, disaccharides, nucleosides, nucleotides, coenzymes, proteins, polysaccharides, and nucleic acids. Supplied in two large boxes. Supplied in two large boxes.

257 atom-parts

- 42 Carbon, 4-holes Tetra.
- 26 Carbon, 2 Lin. 24 trig. black
- 34 Nitrogen, 12 Tetra 12 trigl. 10
- 40 Oxygen, 20 Ang. 10 lin. 10
- 100 Hydrogen, Atom link white
- 2 Hydrogen, 2-hole Linear white
- 2 Sulphur, 2-holes Ang. yellow
- 6 Phosphorus, 4-holes Purple
- 2 Metal, 1 Tetra. 1 octa. grey
- 150 NV Links colorless
- 100 Linkshort white
- 10 V-links Grey
- 1 Link remover tool

S-W19720



Organic Chemistry Student Set

Each Student Set comes with an instruction leaflet and is packed in a four-compartmented box. The Student Sets are designed for school, college, or self study chemistry courses. Sufficient links are provided to make single, double, and triple bonds for OPEN and short links for CLOSED models. The models can easily be assembled and reassembled to make hundreds of possible structures.

50 atom-parts

- 12 Carbon, 4-holes Tetra. black
- 6 Oxygen, 2-holes Ang. red
- 20 Hydrogen, 1-hole White
- 4 Nitrogen, 4-holes Tetra. blue
- 1 Sulphur, 4-holes Tetra. yellow
- 1 Sulphur, 6-holes Octa. yellow
- 1 Phosphorus, 4-holes Purple
- 4 Halogen, 1-hole Green 17 mm
- 1 Metal hole grey
- 26 Links grey medium ML-12
- 12 Links grey flexible long ML-13
- 26 Links white short ML-10
- 1 Link remover tool

S-W19721



Organic Chemistry Teacher Set

Demonstrate the key areas of organic chemistry, including all functional groups, alkanes, alkene, alkynes, alkyhalides, alcohols, ethers, aldehydes, ketones, carboxylic acids, nitriles, amines, esters, aromatic and heterocyclics. Each set comes packed in a plastic box for convenient storage. A wide variety and quantity of atom-parts enables a vast number of possible organic or inorganic models to be assembled and reassembled.

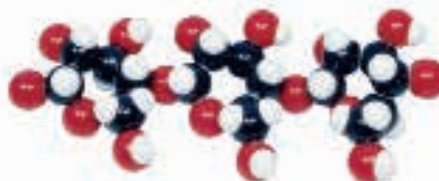
111 atom-parts

- 24 Carbon, 4-holes Tetra. black
- 14 Carbon, 6 Tribipyr. 2 lin. 6 trig.
- 12 Oxygen, 2-holes Ang. red
- 40 Hydrogen, 1-hole White
- 4 Nitrogen, 4-holes Tetra. blue
- 1 Sulphur, 4-holes Tetra. yellow
- 1 Sulphur, 6-holes Octa. yellow
- 4 Phosphorus, 4-holes Purple
- 8 Halogen, 1-hole Green 17 mm
- 3 Metal, 2 1-hole 17 mm 1 Ang.
- 55 Links grey medium ML-12
- 25 Links grey flexible long ML-13
- 60 Links white short ML-10
- 1 Link remover tool

S-W19716

Ideal for classroom demonstrations or permanent display!

These simple yet elegant model sets are the perfect companion for any classroom and a great way to demonstrate chemical compounds in three dimensions. The sets also allow students a hands-on approach to molecular geometry, making it easier to visualize the more complex arrangements. The Molymod® system is the original, unique, dual-scale system of high quality low-cost molecular models. These enormously popular sets are ideal for students at school and university, and are also used by scientists all over the world. Each kit is contained within a sturdy plastic storage container with instruction manual.



Starch or Cellulose
Self-assembly, three glucose units, 63 Atom-parts, 66 NV links, 1 Tool.
S-W19747



Glucose
Self-assembly, two molecules, 48 Atom-parts, 46 NV links, 1 Tool.
S-W19745



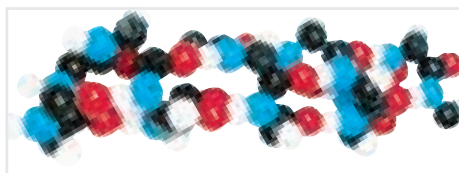
Sucrose
Self-assembly, one molecule, 45 Atom-parts, 46 NV links, 1 Tool.
S-W19746



Fat (glyceryl tristearate)
Self-assembly, one molecule, 173 Atom-parts, 65 NV links, 1 Tool.
S-W19748



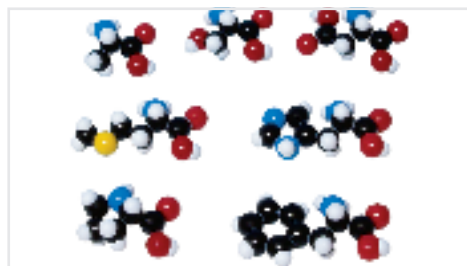
Polypeptide
Self-assembly, five peptide units, 30 Atom-parts, 12 NV links, 1 Tool.
S-W19751



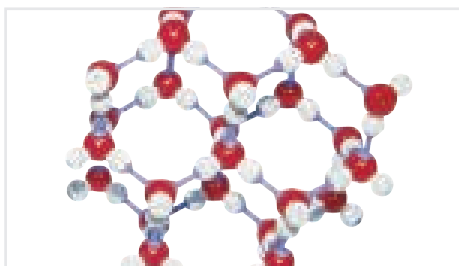
Alpha-Helix
Self-assembly, 15 Peptide units, 105 Atom-parts, 75 NV links, 1 Tool, 1 Small stand.
S-W19753



Soap
Self-assembly, one molecule, 56 Atom-parts, 24 NV links, 1 Tool.
S-W19743



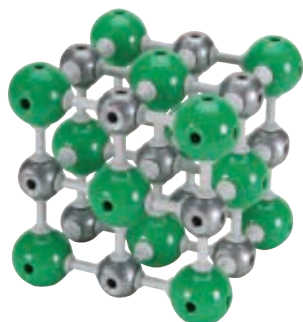
7 Model Amino Acid Collection Set
This kit can be utilized to demonstrate 7 models of L-configuration amino-acids. Includes 125 atom parts and 180+ NV links.
S-W19749



Ice Molecular Kit
78 Atoms, 26 Oxygen (red), 52 Hydrogen (white), 52 NV links, 45 Medium purple ML-11, 97 Links.
S-W19736



Protein-Beta Pleated sheet
Self-assembly, 105 Atom-parts, 60 NV links, 1 Tool.
S-W19752



Sodium Chloride Molecular Kit
27 Atoms, 13 Metal (grey octa.), 14 Halogen (green octa.), 54 Links (grey medium).
S-W19731



Diamond Molecular Kit
30 Carbon, tetra (black), 40 Links (medium grey).
S-W19732



Graphite Molecular Kit
45 Carbon, tribipyr (black), 51 Links (medium grey), 16 Links long flexible purple.
S-W19733



Buckminsterfullerene Kit
60 Carbon, tribipyr (black), 90 Links (medium grey).
S-W19734



Unlock the secrets of the genetic code!

These beautiful models are made of specially shaped, brilliantly colored plastic pieces for easy self-assembly. Display these stunning models on their stand or "unzip" them by removing the central support rod and pulling the helix apart along the hydrogen bonds. Possibly the best models you have ever seen!

DNA Double Helix

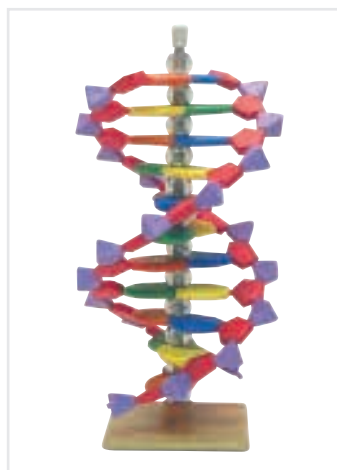
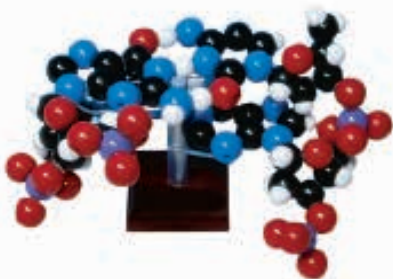
Three coils of the DNA double helix, consisting of nucleic acids, are represented to demonstrate base pairing. At the top end one RNA cord is attached to show the basis of transcription. On base. 31 x 9 x 9 cm; 0.2 kg

S-W19205

Two Layer Model

A compact model version to make two base pairs, thymine-adenine and cytosine-guanine with ribose-phosphate side chains. Self-assembly. Layers are supported on a small stand and models can be easily dismantled to keep as units in a storage box supplied. 128 atom-parts, 110 links, and 1 tool. On Stand.

S-W19754



miniDNA™ 12 Layer Molecular Model

10" tall when fully assembled, instructions included.

Contents:

- 6 Thymine (orange)
- 6 Adenine (blue)
- 6 Guanine (green)
- 6 Cytosine (yellow)
- 24 Deoxyribose (red)
- 24 Phosphate (purple)

S-W19759

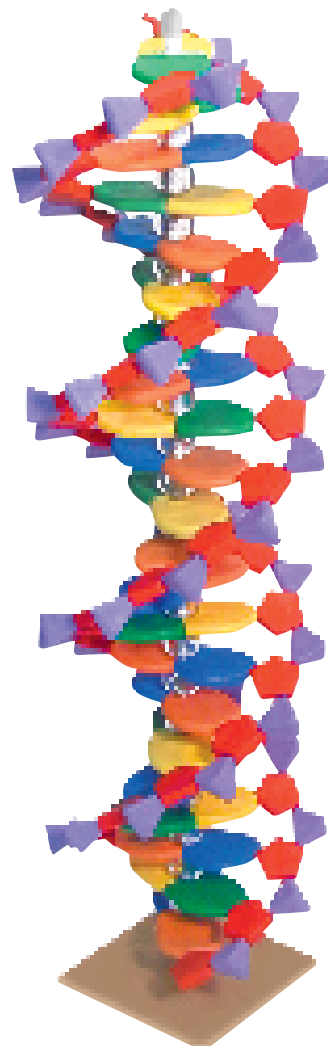
miniDNA™ 22 Layer Molecular Model

About 18" tall when fully assembled, instructions included.

Contents:

- 11 Thymine (orange)
- 11 Adenine (blue)
- 11 Guanine (green)
- 11 Cytosine (yellow)
- 44 Deoxyribose (red)
- 44 Phosphate (purple)

S-W19760



RNA 12 Base Kit

Easily assemble this single strand molecule which consists of the 4 bases, as in DNA, and Uracil. Contains enough material to make all 64 different codons and provides handon investigation into protein synthesis.

Contents:

- 3 Uracil (light blue)
- 3 Adenine (blue)
- 3 Guanine (green)
- 3 Cytosine (yellow)
- 12 Ribose (red)
- 12 Phosphate (purple)

S-W19761

3B Scientific® Microscopes

Basic, intermediate, advanced, and research microscopes. Perfect for students and teachers! More microscopes online at 3bscientific.com!



Intermediate



Advanced

Advanced Microscope

- Construction:** The coaxial focusing via metal rack & pinion with ball bearing guide provides stable and smooth movement. The focusing stop is adjustable to prevent damage to slides and objectives.
- Objectives:** Quadruple nosepiece; DIN achromatic objectives 4x, 10x, 40xR, 100xR (oil)
- Stage:** Built-in mechanical stage 125 x 130 mm with specimen clamp. Coaxial knobs for X-direction & Y-direction with range 70 x 30 mm.
- Condenser:** Abbe condenser NA1.25 with iris diaphragm. Filter holder is focusable by rack & pinion.
- Illumination:** Built-in illuminator with fluorescent bulb 5W, main power 115V

Monocular Microscope
S-W58753

Binocular Microscope
S-W58754

Intermediate Microscope

Binocular Microscope

- Head:** Siedentopf binocular head, 30° inclined and 360° rotation
- Eyepieces:** Paired 10x DIN wide-field eyepieces
- Objectives:** Triple nosepiece; DIN achromatic objectives 4x, 10x, 40xR, 100xR (oil)
- Condenser:** Abbe N.A.1.25 spiral type, iris diaphragm, filters and filter holder
- Stage:** plain stage 127 x 132 mm with spring clips
- Illumination:** built-in fluorescent bulb, 5W
- S-W58752

Monocular Microscope

- Head:** Monocular, inclined 45° with 360° rotation
- Eyepiece:** 10x DIN wide-field eyepiece
- Objectives:** Triple nosepiece; DIN achromatic objectives 4x, 10x, 40xR
- Condenser:** N.A.0.65 and iris diaphragm
- Stage:** plain stage 127 x 132 mm with spring clips
- Illumination:** built-in fluorescent bulb, 5W
- S-W58751



Basic Microscope

Supplied with dust cover. Dimensions and Weight: 175 x 135 x 370 mm; 2.9 kg.

- Construction:** All-metal stand, arm firmly connected with base, pinion knobs attached on both sides of the stand for coarse and fine focusing
- Objectives:** Triple revolving nosepiece with 3 achromatic lenses 4x, numerical aperture 0.10, 10x numerical aperture 0.25, 40xR numerical aperture 0.65, (with specimen protection)
- Stage:** 110 x 120 mm with 2 specimen clips
- Illumination:** 110V, 20 W fluorescent lamp integrated in base, with blue filter in lamp shaft, power supply 110 V
- Condenser:** Bright-field condenser N.A. 0.65, iris diaphragm and filter holder

Monocular Microscope

- Head:** Monocular, inclined 45° with 360° rotation
- Eyepieces:** 10x Wide-field eyepiece with pointer and eyepiece lock
- S-W30600-115

Research Microscope

Siedentopf binocular head is 360°rotating and the two eye-tubes are inclined at 30°. The distance between the two eyepieces is adjustable between 54-75 mm. The dioptic adjustment ± 5 is available for both eye-tubes. Includes paired 10x DIN wide-field eyepieces.

S-W58756

Focusing range:

15 mm. Fine focusing graduation: 0.002 mm

Objectives:

Quadruple nosepiece; DIN plan achromatic objectives 4x, 10x, 40xR, 100xR (oil)

Stage:

Built-in mechanical stage 132 mm x 145 mm with specimen holder offers a moving range of 50 x 76 mm.

Condenser:

Abbe NA1.25 with iris diaphragm & filter holder is focusable by rack & pinion.

Illumination:

Built-in electrical illuminator with a halogen bulb 20W/6V offers bright and even illumination over the whole field of view, and the brightness is adjustable continuously.

Monocular Microscope

S-W58755

Trinocular Microscope

S-W58757

Dual View Microscope

S-W58758

Optional Equipment for Research Microscopes

A. Condenser (Wet)

S-W58774

B. Condenser (Dry)

S-W58773



Upgrades for basic, intermediate, advanced & research microscopes

Widefield-eyepieces (not shown)

WF 10x-18 mm with pointer

S-W58761

WF 10x-18 mm with scale

S-W58762

Semi-plan Achromatic Objectives

A. 4x

S-W58763

B. 10x

S-W58764

C. 40xR

S-W58765

D. 100xR(oil)

S-W58766

Plan Achromatic Objectives

E. 4x

S-W58767

F. 10x

S-W58768

G. 20xR

S-W58769

H. 40xR

S-W58770

I. 60xR

S-W58771

J. 100xR(oil)

S-W58772

Micrometer Slide

K. Size: 76 x 26 mm,
1mm/100div./0.01 mm

S-W58775

K



A



B



A



B



C



D



E



H



More kits available at 3bscientific.com!

Bring Science to life with these hands-on kits! Perfect for students and teachers. Teacher's Manual and student study guides included.



DNA/Chromosome Staining

Prepare your own squashed stained slide and be able to identify the phases of plant mitosis and chromosomal development. With the DNA/Chromosome Staining Kit, students will be able to prepare, stain and mount slides using specifically prepared onion root tips. Kit contains enough material for 15 groups. Teacher's Manual and Student Guide copymasters are included. See online for included materials.

S-W56613



DNA Extraction

In this lab students will learn the history of the discovery of DNA and DNA structure. Understand the nature of genetic inheritance and the role of DNA and proteins in genetic expression while using biological detergents, enzymes, and ethanol to isolate DNA from plant material. You need to supply the plant material. Kit contains enough materials for 15 groups. Teacher's Manual and Student Study Guide copymasters are included. See online for included materials.

S-W56615



Diffusion and Cell Size

Why are cells microscopic? The answer relates to the needs for the cell to effectively move materials in and remove waste. In this activity, students will create simulated cells (agar blocks) of different sizes and examine how effectively a substance is able to diffuse into the cell in a set period of time. A special indicator in the cells will allow students to visualize the degree of diffusion. The results will clearly display the fact that a smaller volume creates a more favorable condition for the exchange of material across a cell membrane. Kit contains enough materials for 15 groups of students. Teacher's Manual and Student Study Guide copymasters are included. See online for included materials.

S-W56616



Osmosis and Diffusion Lab

This lab allows you to learn about two forms of passive transport: diffusion and osmosis. You will compare and contrast similarities and differences in the processes of diffusion and osmosis. Use a colorimetric test to demonstrate the movement of a solute across a semi-permeable membrane. Set up an environment likely to facilitate osmosis and gather data to determine whether or not osmosis may have occurred. Kit contains enough materials for 15 groups. Teacher's Manual and Student Study Guide copymasters are included. See online for included materials.

S-W56614



Presumptive Blood Test Kit

Test for the presence of blood on materials using phenolphthalein. The Presumptive Blood test will not distinguish between animal and human blood. Further serology tests are needed for this type of blood distinction. Included in the Presumptive Blood test are instructions, blood standard and reagents to complete 30 tests. See online for included materials.

S-W56601

More kits available online at 3bscientific.com or call us at **1.866.448.5846!**



Kidneys and Blood Filtration

Learn the role of the kidney in blood filtration and waste removal along with the many functional tasks performed by nephrons, as well as nephron structure. Students will create an artificial kidney model to filter simulated blood. This will allow them to visually determine if filtration of the simulated blood may or may not have occurred. Chemically test the resulting filtrate to detect any possible waste material that may have been removed by the kidney. Kit contains enough materials for 15 groups. Teacher's Manual and Student Study Guide copymasters are included. See online for included materials.

S-W56619



Urinalysis Using Simulated Urine

Urinalysis, one of the oldest medical diagnostic tests performed, is to this day still one of the most common. In this activity, students will use simulated urine to avoid the unpleasantness of using the real thing while still performing actual tests used on real urine samples. Students will examine the simulated urine for factors such as pH, color, clarity, as well as test for the presence or absence of proteins, glucose and calcium. The students will then examine the samples microscopically to determine if crystals may be present in any of the samples. Kit contains enough materials for 15 groups of students. Teacher's Manual and Student Guide copymasters are included. See online for included materials.

S-W56625



Gun Shot Residue Presumptive Test Kit

This is a two part test to determine whether a surface has been exposed to a discharged firearm. A rapid color change takes place to verify the presence of nitrates and lead in this gunshot residue test kit. Each kit contains instructions and enough materials for 30 tests for gunshot residue. See online for included materials.

S-W56600



Forensic Chemistry of Document Analysis

The Forensic Chemistry of Document Analysis kit sets up the following crime to solve: The school library's computers have been stolen. Left behind was a ransom note demanding money. Help solve the crime using thin-layer chromatography to separate the ink on the ransom note and ink found in markers tied to possible suspects. It may be possible to provide evidence as to whether or not the ransom note could have been written with a particular marker. Kit contains enough material for 15 groups. Teacher's Manual and Student Guide copymasters are included. See online for included materials.

S-W56602



Forensic Chemistry of Blood Types

Blood typing is a method of classifying blood based on the presence or absence of specific proteins, called antigens, on the surface of red blood cells. Blood type, an inherited characteristic, is valuable to know in that it affects medical procedures, such as surgery and transfusions, paternity testing, as well as serving as evidence in criminal investigations. Determining blood type can help provide supporting evidence or eliminate a possible suspect's involvement in a crime. This Forensic Chemistry of Blood Types activity includes a Teachers Manual and Student Guide and Analysis copy-masters. There is enough material for 15 groups of students. See online for included materials.

S-W56607



Acid Rain and the Environment: Acidity and Plant Growth

The problem of acid rain is quite often associated with its effects on aquatic systems. Unfortunately, acid rain can also have devastating effects on terrestrial environments as well. In this activity, students will examine the detrimental effects of acidic conditions on plants. Plants will be grown under normal soil conditions, mildly acidic soil conditions, and very acidic soil conditions. Through physical observation, students will determine if the acidity has any impact on the growth of the plant. Kit contains enough materials for 15 groups. See online for included materials.

S-W56642



Environmental Chemistry: Water Treatment and Filtration

Students will develop a knowledge of the processes performed at a water treatment plant and understand the reasons for each process. They will perform, on a small-scale, several of the procedures that occur in a water treatment plant on "polluted" water. They will examine the changes in the water after each treatment step is performed. They will also observe physical characteristics of water, such as clarity, color, odor, and how they are affected from the beginning of the treatment process until the end. Kit contains enough materials for 15 groups of students. Teacher's Manual and Student Study Guide copymasters are included. See online for included materials.

W56639 \$54.00



Environmental Chemistry: Acid Rain, Weathering, and Erosion

Acid rain is a term used generically to describe any type of acidic moisture, be it rain, snow, or fog. Acid rain can have devastating effects on not only aquatic ecosystems but also terrestrial areas. Acid rain not only affects naturally-occurring surfaces, such as exposed rocky surfaces of mountainous regions, but also human-made surfaces as well. Different stone and metal substances used in the construction of buildings, statues, monuments, etc. may all be affected by acid rain. The rates of erosion and weathering may increase rapidly depending on the degree of acidity in the precipitation. In this activity, students expose many rock materials and metals, both naturally-occurring and common in construction, to an acidic environment and examine the reaction of these materials in contrast to the same materials exposed to "normal" rain (tap water). Kit contains enough materials for 15 groups. Teacher's Manual and Student Study Guide copymasters are included. See online for included materials.

S-W56641



Green Chemistry: The Production of Biodiesel

In this activity, students will be performing a two-phase process to produce small batches of crude biodiesel. The crude biodiesel produced is of sufficient quality for use in the demonstration of the burning qualities of both biodiesel and vegetable oil. Included is an optional small-scale exercise where the students will use a washing procedure to experience the full process of producing biodiesel to meet quality levels necessary for use in vehicles. Kit contains enough materials for 15 groups of students. Teacher's manual and student guide copymasters are included. See online for included materials.

S-W56631



Green Chemistry: Electrochemical Remediation of Wastewater

Water pollution is one of the largest threats facing the global population. Water is a finite resource. Once polluted, it cannot be set aside in the hopes that the environment will "make" new, clean water. One procedure often employed to treat wastewater is coagulation/flocculation. While the coagulation/flocculation procedure in wastewater treatment is effective, it involves the addition of chemical components to the water being treated. Recently, a great deal of attention has been given to less traditional alternatives to the typical process of coagulation/flocculation. One such approach receiving a good deal of attention is a process called electrocoagulation. Electrocoagulation is a coagulation process carried out by an electrical charge. Kit contains enough materials for 15 groups of students. Teacher's manual and student study guide copymasters are included. See online for included materials.

S-W56632



Enzymes and The Process of Digestion

All the food in the world is of no use if the human body does not have the ability to extract necessary nutrients from it. With this activity, students will be able to expose three nutrients (carbohydrates, proteins and lipids) to different digestive enzymes. These samples will be compared to nutrients to which no enzymes are added and chemical tests will be used to determine if the enzymes were effective in digesting the compounds. Upon completion, students will not only understand the importance of the digestive system but also the vital role enzymes play in releasing nutrients from food and converting them to a form usable by the body. Kit contains enough materials for 15 groups. Teacher's manual and student guide copymasters are included.

S-W56626

Bring science to life with these experiment kits!

22 comprehensive
electricity experiments

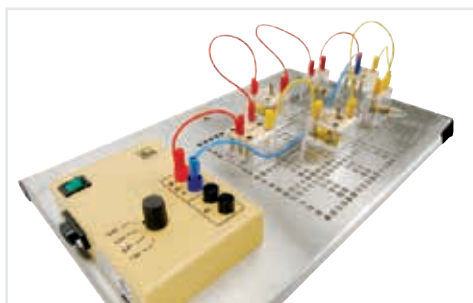
Advanced Electricity & Magnetism Kit

Nearly two dozen experiments on electricity are ready to be performed with this sturdy, easy-to-use, system. The textured plug-in surface on the universal base plate encourages ordered experiment set-ups.

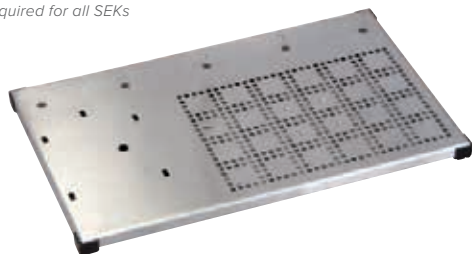
The following experiments may be performed:

- 5 Electric current experiments
- 3 Electrical voltage experiments
- 10 Electrical resistance experiments
- 2 Electric field in a capacitor experiment
- 5 Magnetic fields experiments
- 3 Electromagnetic induction experiments
- 3 AC circuits experiments
- 3 Transformers experiments

S-U8506000



Required for all SEKs



Advanced Kit Base Plate

Tilt-resistant stainless steel base with five special threads for stand rods, threads for mounting a dismantlable transformer and expansion slots for the insertion of electrical components. The base has rubber feet for a stable, steady working platform. 400 x 245 x 15mm

S-U8408035

20 experiments on the
mechanics of solid bodies



Advanced Mechanics Kit

Set of equipment for carrying out 23 student experiments in classical mechanics. Comes with comprehensive student and instructor experiment manuals and instructions. In a tough Gratnell tray containing a foam insert with cut-outs for the equipment and featuring a transparent lid. Experiments are set up and performed on the Advanced Kit Base Plate (U8408035) so that they are compact but still clear in their layout and objectives.

The following experiments may be performed:

- 10 Force experiments
- 8 Machines for the transformation of forces experiments
- 2 Oscillation experiments

S-U8501000



38 experiments in optics



Advanced Optics Kit

Individual optical components can be attached by magnets to the universal base plate in a non-slip fashion. Template masks with silhouettes show students the precise positions for the components, ensuring experimental results are reproducible and easily checked. Teachers can copy the masks, modify them and even make masks of their own. Copies of the masks, on which the optical components and the rays observed in the experiments can be drawn, serve as experiment documentation and evaluation for the students.

The following experiments may be performed:

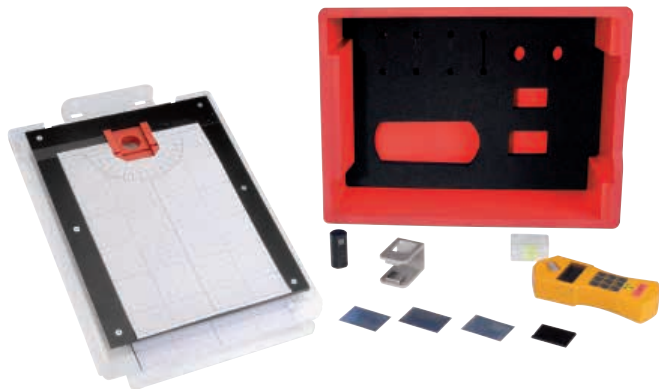
- 4 Light propagation experiments
- 5 Reflection experiments
- 7 Refraction experiments
- 9 Lenses experiments
- 3 The eye experiments
- 5 Optical equipment experiments
- 3 Colors experiments

S-U8503000-115

Additional Item Required

Base Plate **S-U8408035**

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 Visit **3bscientific.com** or call us at **1.866.448.5846!**



Advanced Radioactivity Kit

This is a set of apparatus that can be used to carry out 10 basic student experiments on radioactivity. Everything is contained in a durable plastic box with protective form-fitting foam inserts plus a transparent lid. Includes a CD with instructions for the experiments.

Includes 10 experiments on the subject of radioactivity:

- Determining background radiation
- Determining pulse rates for various radioactive preparations
- Statistical distribution of counter pulses
- Determination of equivalent dose for various radioactive preparations
- Penetrative capacity and range of radiation
- Deflection of alpha and beta radiation by a magnetic field*
- Absorption of alpha rays*
- Absorption of beta rays*
- Absorption of gamma rays*
- Inverse square law

Contents:

- 1 Base plate 340 x 250 mm
- 3 Work templates
- 1 Holder for sources and deflecting magnet
- 1 Deflecting magnet
- 1 Thorium irradiation module I (weld filler wire)
- 1 Uranium glass cube
- 2 Aluminium plates, 0.5 mm
- 1 Aluminium plate, 1 mm
- 1 Lead plate, 2 mm, in plastic cover

S-U8504000

Additional Item Required

Base Plate S-U8408035

**See all radioactive sources on page 212*



Advanced Electrostatics Kit

This set is used to carry out 15 basic student experiments on electrostatics, and includes parts like an electroscope, charge indicator, charge storage unit and Piezo charger. Everything is contained in a durable plastic box with protective form-fitting foam inserts plus a transparent lid. Includes a CD with instructions for the experiments. The experiments are designed to occupy as little space as possible in the apparatus frame, while remaining clear and easy to perform.

Includes 15 experiments on the subject of electrostatics:

- | | |
|---------------------------------------|---|
| • Electrostatic charging of hair | • Charge pendulum |
| • Forces on uncharged particles | • Spinner |
| • Charge indicator | • Charging due to induction |
| • Forces between charged bodies | • Transfer of charge using a charge spoon |
| • Build your own electroscope | • Faraday's cup |
| • Electroscope | • Faraday's cage |
| • Shock of hair | • Plate capacitor |
| • Demonstrating charge on a capacitor | |

Contents:

- | | | |
|-----------------------------|--|-------------------------|
| • 1 Stand base | • 1 Set of needles | • 1 Set of metal strips |
| • 1 Apparatus frame | • 1 Spinner | • 1 Piezo charger |
| • 2 Aluminium rods | • 1 Pendulum bob | • 1 Faraday cage |
| • 1 Aluminium rod w/ magnet | • 1 Polystyrene) | • 1 Faraday cup |
| • 1 Electroscope | • 1 Screw-on needle | • 1 Charge indicator |
| • 1 Plastic plate, angled | • 1 Set of plasticine | • 1 Charge storage unit |
| • 1 Plastic rod | • 2 Experiment leads | • 2 Capacitor plates |
| • 1 Glass rod | • 1 Set of papers with 1 plastic cloth | • 1 Dielectric |
| • 1 Conductor body | • 1 Set of balloons | |

S-U60060

Additional Item Required

Basic Student Kit S-U60011





Basic Mechanic Kit

Set of apparatuses for carrying out 25 basic student experiments on the mechanics of solids, liquids, and gases. Everything is contained in a durable plastic box with protective form-fitting foam inserts plus a transparent lid. Includes a CD with experiment instructions. The experiments are designed to occupy as little space as possible on the base plate of the Student kit set (U60011), while remaining clear and easy to perform.

Mechanics Experiments

- Effects of forces
- Action and reaction
- Deformation by forces (2 experiments)
- Masses and densities of bodies
- Friction (2 experiments)
- Second/third class levers (2 experiments)
- First class lever (2 experiments)
- Fixed pulley
- Moving pulleys
- Combinations of fixed and moving pulleys
- Inclined plane (2 experiments)
- Connected vessels
- Pressure in liquids
- Principle of the U-tube manometer
- Pressure due to weight of fluids
- Buoyancy in liquids
- Floating and sinking
- Air as a body
- Pressure and volume
- Temperature and volume
- Effects of atmospheric pressure

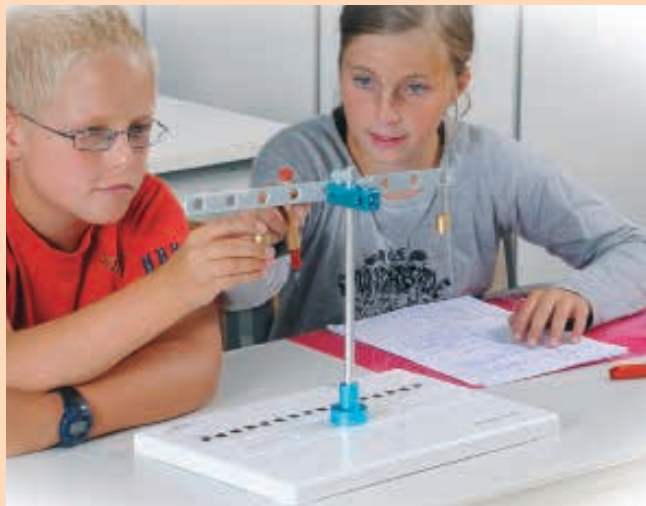
Contents:

- 1 Steel leaf spring
- 1 Lever arm
- 1 Ruler
- 1 Pulley
- 1 Pulley with hook
- 1 Weight, 100 g
- 3 Weights, 50 g
- 2 Weights, 25 g
- 1 Dynamometer, 2 N
- 1 Metal pivot
- 4 Washer rings to fit metal pivot
- 1 Pulley with cord
- 1 Trolley
- 1 Friction pad
- 1 Coil spring
- 1 Iron block
- 1 Aluminium block
- 1 Wooden block
- 1 Silicone tube,
- 1 Tubing connector
- 1 Clip, 8 mm dia.
- 1 Clip, 14 mm dia.
- 1 Syringe, 50 ml
- 1 Syringe, 30 ml
- 1 Plastic sphere
- 1 Rubber stopper (30 mm x 31/25 mm dia.)
- 1 Funnel, 40 mm dia.
- 1 U-tube manometer
- 1 Measuring cylinder
- 100g Modelling clay
- 500 mm x 3 mm dia.

Mechanics Kit S-U60020

Additional Item Required

Basic Student Kit S-U60011



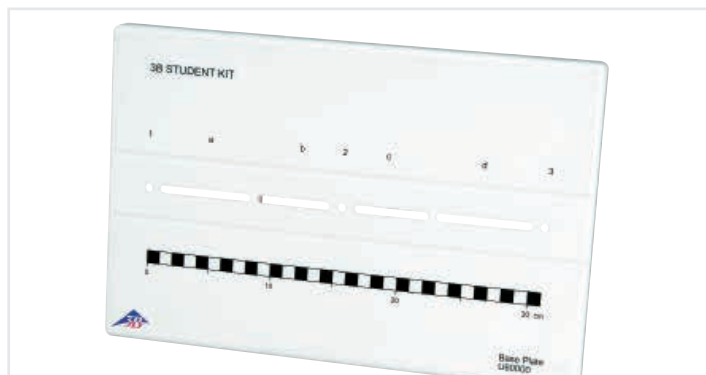
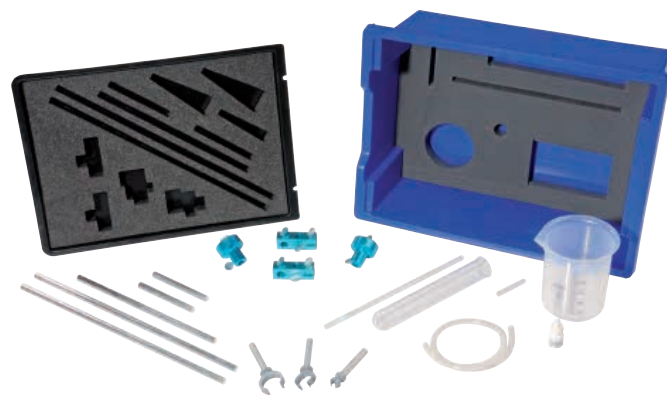
Basic Student Kit

Basic set of apparatus for use with student kits for mechanics (U60020) and heat (U60040). Consisting of a robust plastic base-plate, anodized aluminum stands, clamps and various other components used in both mechanics and heat experiments. Everything is contained in a durable plastic box with protective form-fitting foam inserts plus a transparent lid.

Contents:

- 1 Base plate
- 2 Stand bases
- 2 Stand rods, 360 mm
- 1 Stand rod, 250 mm
- 2 Stand rods, 100 mm
- 2 Double clamps
- 2 Double clamps with slot
- 1 Clip, 8 mm dia.
- 1 Clip 22 mm dia.
- 1 Clip 27 mm dia.
- 1 Beaker, 500 ml
- 1 Test tube
- 1 Glass tube, 50 mm
- 1 Glass tube, 250 mm
- 1 Silicone tube, 500 mm x 6 mm dia.

Basic Student Kit S-U60011



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Basic Optic Kits

Equipment set for carrying out 23 basic student experiments in optics. Everything is contained in a durable plastic box with protective form-fitting foam inserts plus a transparent lid. Includes a CD with experiment instructions.

Optics Experiments:

- Propagation of light
- Light and shadows
- Reflection at a plane mirror
- Concave and convex mirrors
- Refraction of light
- Refractive index
- Optical lenses (paths of rays)
- Focal point of convergent lenses
- Focal length of convergent lenses
- Magnifying glasses
- Function of the eye
- Function of spectacles
- Principle of a camera
- Principle of a slide projector
- Principle of a Galilean telescope
- Principle of an astronomical telescope
- Principle of a microscope
- Breaking down light into its components
- Mixing of colors

Content:

- 1 Screen
- 1 Optical lamp
- 1 Lens, $f = 50$ mm
- 2 Lenses, $f = 100$ mm
- 1 Lens, $f = 300$ mm
- 1 Lens, $f = -100$ mm
- 2 Slide-holders
- 1 Semi-circular shape
- 1 Lens shape, rectangular
- 1 Lens shape, concave
- 1 Lens shape, convex
- 1 Prism
- 1 Single-slit aperture
- 1 Triple-slit aperture
- 1 Aperture in the shape of an F
- 1 Mirror with magnetic holder
- 2 Small candles
- 1 Opaque object
- 1 Color slide

Optics Kit S-U60050-115



Quantity discounts for sets of 8 or more! visit 3bscientific.com or call us at **1.866.448.5846!**

Student Kit – Heat

Set of apparatus for carrying out 10 basic student experiments on heat. Everything is contained in a durable plastic box with protective form-fitting foam inserts plus a transparent lid. Includes a CD with instructions for the experiments. The experiments are designed to occupy as little space as possible on the base plate of the Student Kit basic set (U60010), while remaining straight-forward and easy to perform.

Heat Experiments:

- Principle of a thermometer
- Heating of solid bodies
- Heating of liquid bodies
- Heating of gases
- Behavior of bimetallic objects
- Conduction of heat
- Radiation of heat
- Condensation
- Distillation
- Temperature of mixtures

Contents:

- 1 Conical flask, 100 ml
- 1 Bimetallic strip
- 4g Glycerine
- 1 Concave mirror mounted on stem
- 1 Aluminium rod 200 mm
- 1 Thermometer, $-10^{\circ}\text{C} - +100^{\circ}\text{C}$
- 1 Glass tube with 90° bend
- 1 Rubber stopper, 25 mm x 24/19 mm dia.
- 1 Spirit burner
- 1 Ceramic mat

Heat Kit S-U60040

Additional Item Required

Basic Student Kit S-U60011



FRANK-HERTZ EXPERIMENT



Premium Frank-Hertz Experiment

Premium Franck-Hertz Tube with Mercury Filling and Heating Chamber

Highly evacuated electron tube containing mercury in a heating chamber for demonstrating the discrete nature (quantization) of the energy released by free electrons in collisions with mercury atoms, and for determining the excitation energy of the mercury resonance line (61S0–63P1), which is 4.9 eV. Electric heating chamber with continuous temperature control and digital temperature display showing actual and set-point temperatures.

Heater voltage:	4 – 12 V
Grid voltage:	0 – 70 V
Suppressor voltage:	1.5 V approx.
Tube dimensions:	130 mm x 26 mm diam. approx.
Heater output:	400 W
Temperature range:	160° C – 240° C
Temperature constancy:	±1°C approx.
Overall dimensions:	335 x 180 x 165 mm ³ approx.
Weight:	5.6 kg approx.
115 V, 50/60 Hz	S-U8482550-115



Premium Power Supply Unit for Franck-Hertz Experiment

Power supply unit for operating the mercury filled Franck-Hertz tube (U8482550-115), the neon filled Franck-Hertz tube (U8482230) or the critical potential tubes (U18560 and U18565). The equipment provides all the voltages needed to power the tubes and includes a sensitive built-in DC amplifier for measuring collector current.

Filament voltage U_f :	4 – 12 V, continuously adjustable
Control voltage U_G :	0 – 12 V, continuously adjustable
Accelerating voltage U_A :	0 – 80 V
Modes of operation:	manually adjusted / saw-tooth
Countervoltage U_E :	0 – ±12 V, continuously adjustable, switchable polarity

Output U_E for collector current I_E :	$I_E = U_A * 7 \text{ nA/V (0 - 12 V)}$
Output U_Y for accelerating voltage U_A :	$U_x = U_A / 10$
Outputs:	4 mm safety sockets
Input:	BNC socket
Dimensions:	160 x 132 x 210 mm ³ approx.
Weight:	3.4 kg approx.
115 V, 50/60 Hz	S-U8482530-115



Plug-in Board Experiment Kit

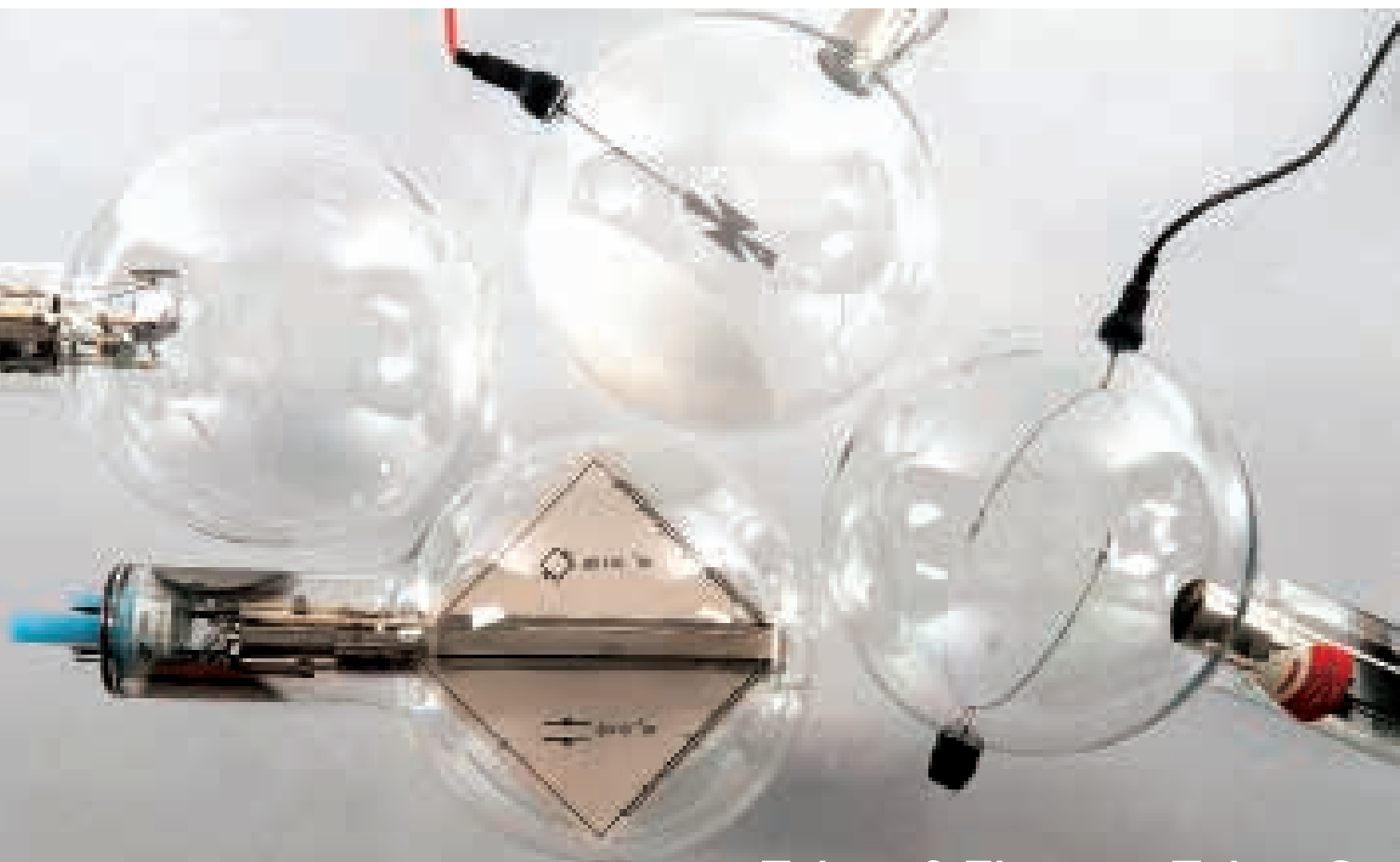
Set of apparatus for carrying out 28 fundamental student experiments on electricity. Stored in a tough Gratnells tray with foam inlay featuring recesses moulded to the shape of the apparatus and covered by a transparent lid. Circuits are assembled using components in plug-in housings plugged into a plug-in board. Power is supplied via 2 D-cell, LR20, 1.5 V batteries (batteries not included) or via an external power supply.

Includes:

- 1 Plug-in Board for Components
- 2 Battery Holders
- 1 Set of Conductors and Non-Conductors
- 1 Set of 10 E10 lamps 1.3 V, 60 mA
- 1 Set of 10 E10 lamps 3.8 V, 300 mA
- 3 E10 lamp sockets
- 2 Change-over switches
- 1 Toggle switch, single pole
- 1 Push-button (NO), single pole
- 1 Roll of chrome-nickel wire
- 1 Roll of constantan wire
- 1 Roll of iron wire
- 1 Set of 10 connecting plugs
- 6 Connecting plugs, 4 mm
- 6 Crocodile clips
- 1 Potentiometer, 220 Ω
- 1 Linear Resistor, 47 Ω, 2W
- 2 Linear Resistors, 100 Ω, 2W
- 2 Zinc plates
- 2 Copper plates
- 2 Carbon plates
- 1 Glass trough
- 1 Set of 3 experiment leads, red
- 1 Set of 3 experiment leads, blue
- 1 Roll of experiment cord
- 1 Weight, 50 g
- 1 Tea candle

S-U60070

TELTRON ELECTRON TUBES



Teltron® Electron Tubes S



Teltron® Luminescence Tube S

Used for investigating luminescence during and after electron bombardment of a phosphorous anode, as well as excitation of fluorescence and phosphorescence. Luminescence can also be observed following irradiation of the phosphorous anode with ultraviolet light.

Cathode filament voltage: $U_f = 7.5 \text{ V}$, $I_f = 1.8 \text{ A}$
 Anode voltage: $U_a = 5 \text{ kV}$
 Anode current: typically $I_a = 150 \mu\text{A}$ at $U_a = 4.0 \text{ kV}$

S-U18552



Teltron® Perrin Tube S

Used for demonstrating the negative polarity of electron beams through magnetic and electric deflection of the beams towards a laterally positioned Faraday cage connected with an electroscope (i.e. U17250). Also for investigating electron beams in two perpendicularly aligned magnetic alternating fields (operation of a cathode-ray oscilloscope, Lissajous figures) and estimating specific electron charge e/m .

Filament voltage: $U_f \leq 7.5 \text{ V}$ / approx. $I_f \leq 0.35 \text{ A}$
 Anode voltage: $U_a \leq 5 \text{ kV}$
 Anode current: typically $I_a = 150 \mu\text{A}$ at $U_a = 4 \text{ kV}$
 Beam current: typically $I_b = 0.4 \mu\text{A}$ at $U_a = 4 \text{ kV}$
 Deflection voltages: $U \leq 350 \text{ V}$

S-U18554



Teltron® Maltese Cross Tube S

Used for demonstrating the linear propagation of electron beams in field-free spaces by projecting the shadow of a Maltese cross on a fluorescent screen. Also intended for observing the focusing of electron beams by magnetic fields as an introduction to electron optics. Comparison between the Maltese cross shadows of electron beams and electromagnetic radiation (light) in a magnetic field.

Cathode filament voltage: $U_f = 7.5 \text{ V}$, $I_f = 1.8 \text{ A}$
 Anode voltage: $U_a = 5 \text{ kV}$
 Anode current: typically $I_a = 150 \mu\text{A}$ at $U_a = 4.0 \text{ kV}$

S-U18553

A. Teltron® Diode S

Used for investigating the Edison effect (thermionic effect) representing emission currents as a function of the heating power of the hot cathode. Recording the characteristics of diodes and demonstrating their application as rectifiers is possible. Also intended for determining specific charge e/m by means of the magnetron method (Helmholtz coils, U185091).

Cathode heating voltage: $U_h \leq 7.5 \text{ V}$, $I_h \leq \text{approx. } 3 \text{ A}$
 Anode voltage: $U_a \leq 300 \text{ V}$
 Anode current: typically $I_a = 6.0 \text{ mA}$ at $U_h = 7.5 \text{ V}$, $U_a = 300 \text{ V}$

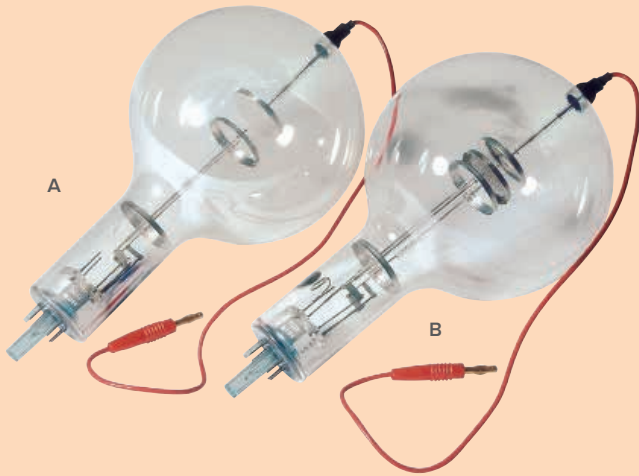
S-U185501

B. Teltron® Triode S

Used for quantitative investigations of controllable high-vacuum tubes. Recording triode characteristics, determining the negative polarity of electron charges and generating cathode rays (model of an "electron gun") is possible. Also intended for investigating technical applications of triodes as amplifiers and oscillators (with Helmholtz coils, U185091).

Cathode heating voltage: $U_h \leq 7.5 \text{ V}$ / $I_h \leq 3 \text{ A}$
 Anode voltage: $U_a \leq 300 \text{ V}$
 Anode current: typically $I_a = 1.4 \text{ mA}$ at $U_h = 7.5 \text{ V}$, $U_a = 300 \text{ V}$
 Grid voltage: $-300 \text{ V} \leq U_g \leq 300 \text{ V}$
 Grid current: typically $I_g = 0.9 \text{ mA}$ at $U_h = 7.5 \text{ V}$, $U_a = 300 \text{ V}$

S-U18551



Teltron® Thomson Tube S

Used for investigating electron beams in electric and magnetic fields and determining specific charge e/m through compensation of magnetic deflection by electrostatic deflection or ascertaining the radius of curvature of the electrons in the magnetic field. Also used for estimating the speed of electrons.

Cathode filament voltage: $U_f = 7.5 \text{ V}$, $I_f = 0.4 \text{ A}$
 Anode voltage: $U_a = 5 \text{ kV}$
 Anode current: typically $I_a = 0.2 \text{ mA}$ at $U_a = 4 \text{ kV}$
 Deflection voltage: $U = 350 \text{ V}$

S-U18555



Teltron® Electron Diffraction Tube S

Highly evacuated electron tube for determining the wavelength of electrons as a function of the anode voltage from the radii of the diffraction rings and the distance between the lattice planes of graphite (Debye-Scherrer-diffraction) and rendered visible on a fluorescent screen. Also intended for determining the wavelengths of monochromatic radiation at different anode voltages from the radii of the diffraction rings and the lattice plane spacing of graphite, as well as confirming de Broglie's hypothesis.

Filament voltage: $U_f \leq 7 \text{ V}$, $I_f \leq 0.4 \text{ A}$
 Anode voltage: $U_a \leq 5 \text{ kV}$
 Anodenstrom: approx. $I_a = 0.1 \text{ mA}$ at $U_a = 4.0 \text{ kV}$
 Lattice constant of graphite: $d_{10} = 0.213 \text{ nm}$, $d_{11} = 0.123 \text{ nm}$

S-U185711



Teltron® Gas Triode S

For quantitative investigations of the typical properties of a gaffiled triode. Allows user to record the $I_a - U_a$ characteristics of a thyratron, as well as observe independent and dependent discharge and discontinuous energy release comprising He and Ne atoms during inelastic collisions with free electrons.

Filament voltage: $U_f \leq 7.5 \text{ V}$ / approx. $I_f = 3 \text{ A}$
 Anode Voltage: $U_a \leq 300 \text{ V}$ (He)
 Grid Voltage: $-300 \text{ V} \leq U_g \leq 300 \text{ V}$ (He)
 $100 \text{ V} \leq U_g \leq 100 \text{ V}$ (Ne)

S-U18557

A. Helmholtz Coils S

For generating magnetic fields for electron beam deflections in the tube holder (U185001).

Number of coil turns: 320 each
 Coil diameter: 138 mm
 Load rating:
 Continuous operation: 3000 A/m (12 V DC, 1.0 A)
 Short-term operation: 4500 A/m (18 V DC, 1.5 A)
 DC resistance: $R = \text{approx. } 6 \Omega$
 Connection: via 4 mm jacks

S-U185051



B. Tube Holder S

The tube holder serves as a mounting for the entire Teltron tube line (U18552–U18571), for the student experiments and related accessories such as Helmholtz coils (U185051) and auxiliary coil (U19100).

The tube holder with its five pole socket allows easy access to almost all tube connections via 4 mm jacks. In addition, a cathode protection circuit is integrated in the tube holder to safeguard the hot cathode against overvoltage.

S-U185002



Teltron® Critical Potential Tube S

Used for quantitative investigations of inelastic collisions of electrons with inert gas atoms, determination of ionization energy and excitation energies of helium or neon, resolution of the energy states of various primary and orbital angular-momentum quantum numbers, as well as demonstrating meta-stable states. Includes shielding as well as a discharge tube and battery unit (battery included in the scope of delivery) for the collector voltage. (He) TEL 2533.02 (Ne) TEL 2533.10. See 3bscientific.com for additional items required.

Cathode filament voltage: $U_f = 3 \text{ V}$, $I_f = 1.3 \text{ A}$
 Anode voltage: $U_a = 60 \text{ V}$
 Anode current: $I_a = 10 \text{ mA}$
 Collector voltage: $U_c = 1.5 \text{ V}$
 Collector current: $I_c = 200 \text{ pA}$

Helium Filled Neon Filled
 S-U18560 S-U18565



Teltron® Dual Beam Tube S

Used for Helium-filled tube with a tangential and axial electron gun. The electron paths are rendered visible in the form of fine luminescent beams through impact excitation of the helium atoms. For determining the charge to mass ratio from the diameter of the electron beam in the case of tangential bombardment and a perpendicularly aligned magnetic field, and observing spiral paths of electrons in the case of axial bombardment and a co-axial magnetic field. See 3bscientific.com for additional items required.

Cathode filament voltage: $U_f = 7 \text{ V}$, $I_f = 0.35 \text{ A}$
 Anode voltage: $U_a = 300 \text{ V}$
 Anode current: $I_a = 30 \text{ mA}$
 Deflection voltage: $U = 60 \text{ V}$

S-U18570

Have D-Series (demonstration) Teltron® Tubes?
 Contact us for **discounts to upgrade** to the Series (student)!



Control Unit for Critical Potential Tubes

Control unit for operating the critical potential tubes; equipped with an output for sawtooth acceleration voltages; adjustable upper and lower limits of the acceleration voltage; integrated pico-ammeter amplifier for anode-current measurement. Allows recording of the acceleration voltage as a function of the anode current.

S-U186501-115



Teltron® Auxiliary Coil D

Used for generating two perpendicularly aligned magnetic fields in conjunction with the demonstration Helmholtz coils (U185091) for the purpose of deflecting electron beams in a Perrin tube.

S-U19106



Experiment Topics

- Determine the specific charge of an electron
- Demonstrate the deflection of electrons in a uniform magnetic field along a closed circular path
- Determine the Helmholtz coil current I_H in relation to the accelerating voltage U of an electron gun where the electrons are moving in a circular path of constant radius r
- Determine the charge to mass ratio of an electron, e/m , from the measurements

One complete unit with no messy wires!

Fine Beam Tube Power Supply

- Beam voltage / accelerating voltage: 15 – 400 VDC adjustable with front panel control
- Coil current: 0 – 4.5 A adjustable with front panel control
- Fine tuning of the filament voltage from 4 to 7 V
- Fine tuning of the focusing cup voltage from 0 to -50 VDC
- Meters: two 3-digit LED panel meters for the Beam voltage and the Coil current
- Low voltage measuring outputs (4 mm plugs) for Beam voltage and Coil current
- Rotatable Tube over an angle of 270°
- Coil diameter: 30 cm
- Magnetic Field: max. 3.4 mT @ 4.5 A or 0.75 mT / A
- Dimensions: 310 x 275 x 410 mm³
- Weight: 7.1 kg (without tube)

S-U8481425

Additional Item Required

e/m Fine Beam Tube S-U18575



3B Basic Fuel Cell Car Kit

This fuel cell car kit allows you to introduce 21st century technology to your students. Use battery power to separate the water into hydrogen and oxygen. Then, disconnect the battery and watch as the gases recombine in the fuel cell to power your vehicle across the floor. The car steers itself and automatically changes its course of direction when it bumps into objects. This kit includes a detailed instruction manual.

S-U40621

Have questions about our products? Contact us at **1.866.448.5846** or visit **3bscientific.com!**

3B Renewable Energy Education Set

These various modules are designed to illustrate the technological advances in the field of clean energy. Each part can be used individually: photovoltaic sensor, wind turbine, electrolyser, fuel cell, motor etc. By combining them, you can create a complete power station.

Everything you need is here:

- Electrolyzer
- Fuel cell
- Photovoltaic solar sensor
- Wind turbine on its mast
- Current detector with 2 LEDs
- Motor with propeller
- Two tanks for oxygen and hydrogen

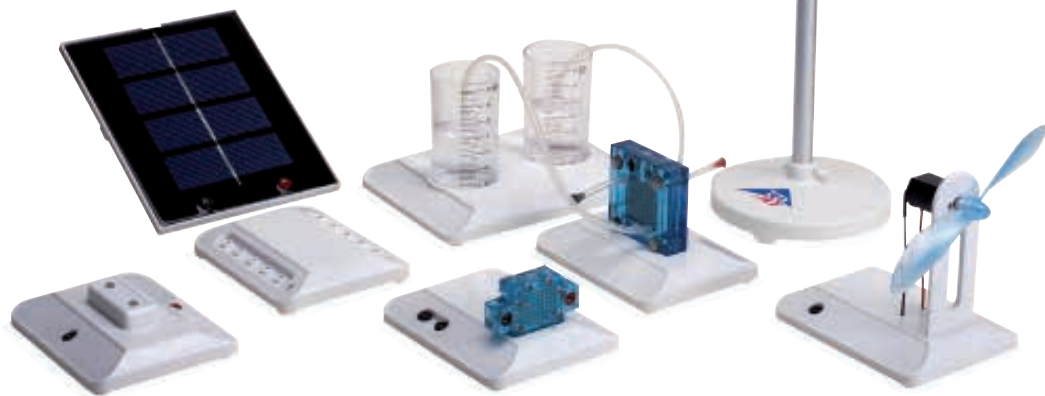
- Power backup (if there is no sunlight, the photovoltaic cell can be efficiently replaced with 2 LR06 (AA) type 1.5 V batteries, not included)
- Patch cords with 2 mm plugs
- Various assembly pipes and accessories

Some parts are delivered as a kit, to be assembled.

S-U40624

Additional Items Required

- AA Batteries
- Distilled water



You will learn to:

- Store the energy
- Use this energy
- Use and reuse the energy because it is renewable



Hoffman Water-decomposition Apparatus

With this apparatus you can perform the electrolysis of water, the quantitative determination of the gases formed and establish Faraday's laws. Consists of two scaled gas collection tubes connected by flexible plastic hose with leveling bulb for pressure compensation and hence for the exact measurement of gas volumes, on stand with retaining plate. GL threads provide secure mounting for electrodes.

Dimensions: approx. 800 x 150 mm

Includes:

- Gas collection tubes
- Pair of platinum electrodes with 4 mm-sockets
- Plastic hose with leveling bulb
- Stand ring for holding leveling bulb
- Universal bosshead
- Stand baseplate with rod :
 - Baseplate area: 250 x 160 mm
 - Rod: 750 x 12 mm Ø
 - Retaining plate: 120 x 110 mm

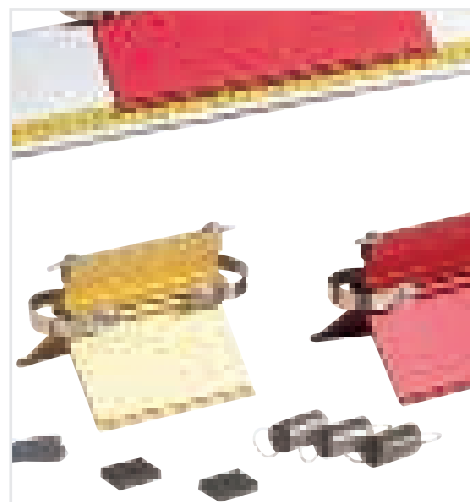
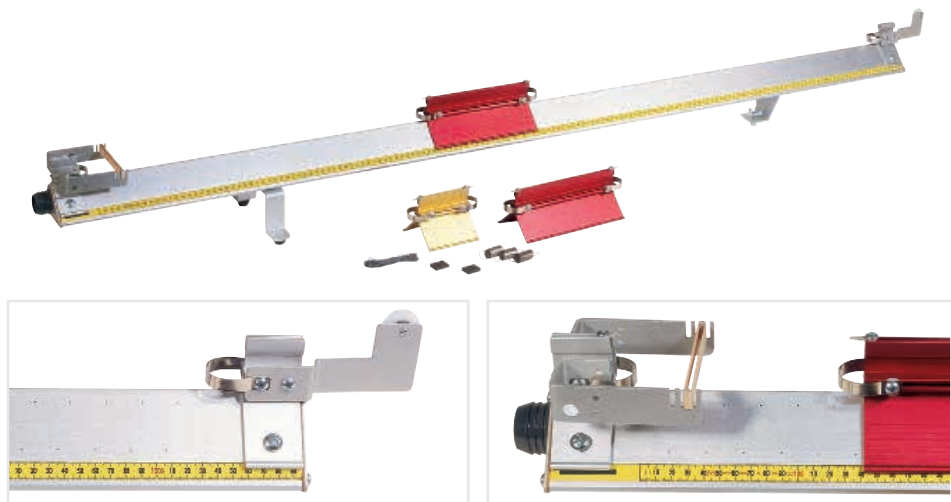
S-U14332

Additional Item Required

Power Supply S-U33020-115



MECHANICS



Basic Air Track

Basic Air Track (1.6m)

Designed specifically for introductory mechanics, the Basic Air Track is used to perform fundamental experiments such as the measurement of acceleration with a constant force, acceleration on an inclined plane, conservation of momentum, inelastic collisions, and coupled harmonic oscillations. We construct the Basic Air Track from the same high-quality extruded aluminum section as the Deluxe Air Tracks. The apparatus consists of an anodized aluminum triangular profile with a three-point base including an adjustment screw for horizontal alignment, a mm-scale along the entire length of the track as well as a guide groove for recording paper. It accepts all our Air Track accessories and is ideal for multiple student laboratory stations because of its durability and maintenance-free design.

S-U40405

Includes:

One air track on a U-profile girder:

Length:

Operating range: 1.5 m
Total length: 1.67 m

Crosssection:

Isosceles triangle
Base width: 94 mm
Side length: 66.5 mm
Wall thickness: 3 mm

Air outlet holes:

2 rows on each side
Diameter: 0.9 mm
Spacing: 24 mm

Distance measurement:

mm-scale recessed in a groove
Rubber cord launcher
Stopper with bumper spring and end pulley with ball-bearing pulley

Track limit:

Air Track Accessories



Bumper Springs

A replacement set of twenty nickel-plated spring steel bumper springs to replace bent springs.

S-U40424

Soft Bumper Springs (not shown)

A set of twenty nickel-plated spring steel glider bumper springs to replace standard bumper springs for "softer" collisions.

S-U40425



Spare Gliders

Our Gliders are ruggedly designed for extensive student use. Before shipment, gliders are tested with an added mass equal to the glider mass to ensure they will float properly in your laboratory. Threaded grooves for #10-24 screws on the top and sides of the vertical section allow addition of accessories without drilling or tapping holes. Gliders have nickel-plated steel bumpers at each end, together with fasteners for springs. We manufacture our gliders to within ± 0.1 g of their listed mass.

450 g Blue S-U40422

300 g Red S-U40421

150 g Gold S-U40420



Inelastic Collision Kit

Velcro® pads attached to bumper springs cause colliding gliders to stick together after a collision. For conservation of momentum experiments.

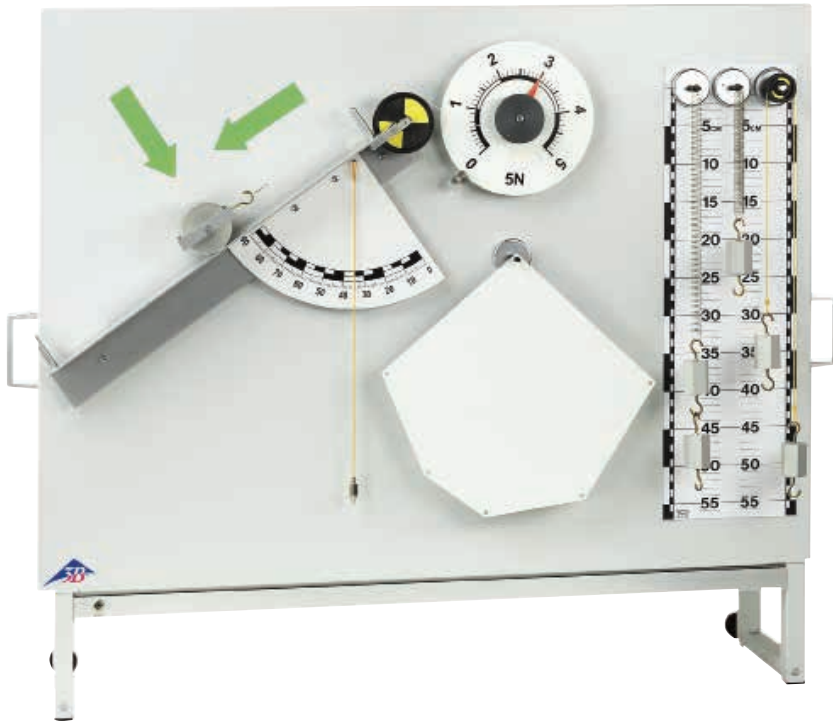
S-U40431



Riser Blocks

Create an inclined plane with an Air Track by utilizing these four 4 cm square aluminum blocks with thicknesses of 0.3, 0.6, 1.3 and 2.6 mm, respectively. These blocks can stack under an Air Track or Air Table to provide a fixed and reproducible slope for inclined plane experiments.

S-U40511



Whiteboard Mechanics

The Whiteboard Mechanics system consists of large, colorful, and easy-to-see components, made of heavy-gauge aluminum and stored in a foam-cushioned wooden storage case. Setting up a demonstration is quick and simple!

All measuring parts mount on the whiteboard surface by means of high quality magnets and are large enough to be seen clearly from the back of a classroom or lecture hall. In minutes students or instructors can set up over 30 different experiments. The dramatic demonstrations promote a clear understanding of basic concepts of mechanics. Hang the masses, attach the scales, and let your students see the results for themselves.

Units of measure, vector diagrams and explanations can be written on the board right next to your demonstration set-up. Seeing the principles of mechanics operate while you explain them adds tremendous visual impact and makes lectures more memorable and understandable.

System includes:

- Inclined plane
- Rolling mass, 500 g
- Multipurpose beam, 54.5 cm
- Index rod, 40 cm long
- Counterweight, 20 g
- Double pulley block, 70 mm, 40mm
- Two pulleys – 70 mm and 40 mm
- Two round scale dynamometers, 5N
- Three anchor posts
- Three springs, $k=6.2$ N/m
- Linear scale, 55 cm long
- Four arrows and fulcrum
- Six masses – double-hooked, 100 g each
- Friction block
- Stringnylon
- Center of gravity plate
- Plumb bob
- Fitted storage case
- Instruction manual

Experiment Topics:

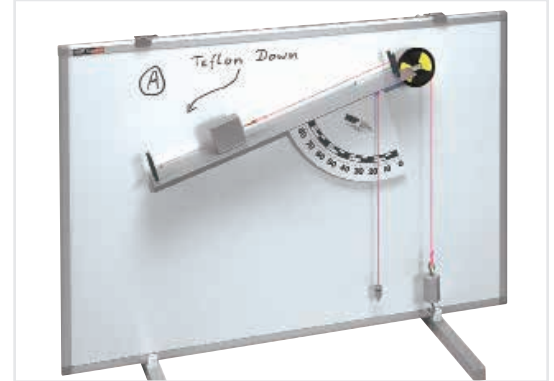
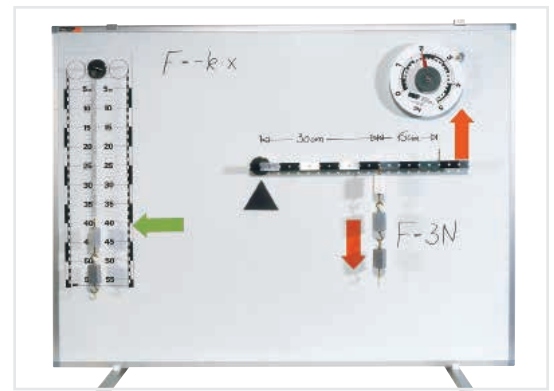
- Inclined plane
- Levers – 1st, 2nd and 3rd class
- Physical equilibrium (torques and forces)
- Forces on a crane
- Fisherman's scale
- Force vectors – addition
- Force vectors – components
- Pendulum motion
- Physical pendulum
- Pulley systems and mechanical advantage
- Hooke's Law
- Mass on a spring
- Coupled resonance
- Center of mass
- Static and sliding friction

Note: You must have a steel-backed blackboard (check with a magnet to be sure).

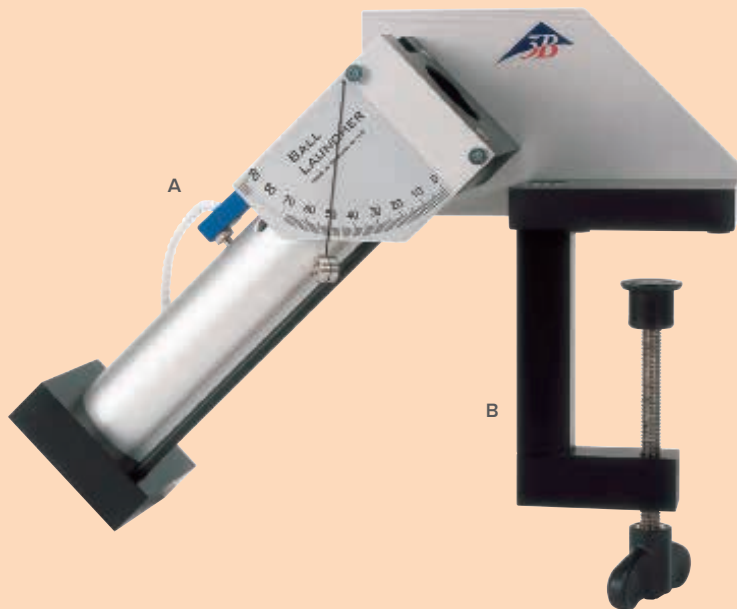
Whiteboard Mechanics
U8400040 \$996

Additional Items Required

Whiteboard 600 x 900 mm S-U10030
Whiteboard 900 x 1200 mm S-U10031



Record your demos with an HD camera!



A. Projectile Launcher

Experimental equipment for the quantitative investigation of projectile laws: vertical, horizontal and angled launch, recording of flight trajectories depending on launch angle and projectile range.

Three different reproducible launch speeds, continuously adjustable launch angles, constant height of trajectory at various angles since the launch point is coincident with pivot point of the cannon. Projectile is launched with almost no spin. With threaded holes on the bottom for attaching a photocell light barrier. The encapsulated design and the use of spherical plastic projectiles ensure that experiments are safe.

Horizontal projectile range: 1.1 m, 2.3 m and 4.5 m
 Launch angle: 0° to 90° continuously adjustable
 Reproducibility at 45°: standard deviation less than 1%
 Diameter of projectiles: 25 mm
 Mass of projectiles: 7 g

Includes:

- 1 Projectile Launcher
- 3 Spherical plastic projectiles

- 1 Ramrod
- 1 Wing nut M8x20

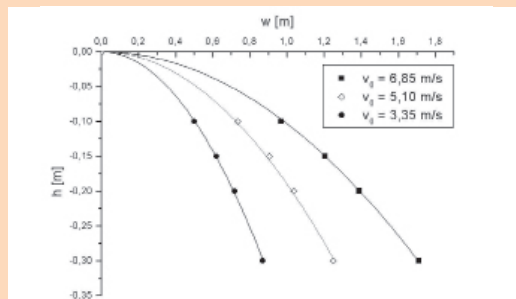
S-U10360

B. Clamp Mount

Table clamp for Projectile Launcher U10360. Made of anodized aluminum.

Span: 10 mm to 65 mm
 Dimensions: 150 x 70 x 80 mm
 Mass: 710 g

S-U10361



C. Ballistic Pendulum

This apparatus is used for experiments on elastic and inelastic collisions and for performing projectile experiments using the projectile launcher. The lightweight anodized aluminum construction of the pendulum eliminates the need to use steel balls as projectiles. The plastic projectiles can be propelled from the launcher at three different speeds. The projectile speeds calculated from the launch speed and from the trajectory agree to within about ±3%. Additional weights can be used to change the length of the pendulum swing while the projectile speed remains constant. While conducting projectile experiments the launcher is attached to the rear of the ballistic pendulum. 5 preset launch heights of 5, 10, 15, 20 and 30 cm allow trajectories to be investigated quickly and easily. The equipment is attached to a bench via a clamp.

Height of pendulum: 370 mm
 Extra weights: 17.5 g each
 Base plate: 130 x 130 mm
 Table clamp: 10 mm to 65 mm (span)

Includes:

- 1 Ballistic pendulum with table clamp
- 2 Extra weights

S-U10362

Additional Item Required

Projectile Launcher S-U10360



Have questions about our products? Contact us at **1.866.448.5846** or visit **3bscientific.com!**



Student Force Table

This student force table is a complete set with these new features:

- Dual scale that allows students to take readings either clockwise or counterclockwise
- 3 Complete weight sets with (2x) 5g, 10g, 20g, 50g brass slotted weights and a 50 g hanger
- 3 pulleys with clamps and two sets of strings that allow students to investigate the equilibrium of either three or four forces
- A lightweight durable table top and a sturdy cast iron support that allows both ease of use and accuracy.

S-U52004



Stability Apparatus

Demonstrates the stability of an object in relation to its center of gravity. The supporting beams can be tilted so that the hanging weight will shift the object's center of gravity into differing locations.

S-U15033



Center of Gravity Plate

For introducing the concept of center of gravity and determining centroids. The plastic plate has six boreholes and washable labeling.

S-U8409270



Atwood's Machine

Experiment for studying motion under constant acceleration, demonstrating Newton's second law and determining the acceleration due to gravity g . Includes an aluminium stand for affixing to a wall. A string with weights at both ends is passed over a rotating pulley. The set-up undergoes relatively slow but constant acceleration if the weights are slightly different. This motion is initiated by a tug on one string and stops when the dropping weight strikes a movable platform. To show the rotation of the pulley, it is divided into 20 segments of equal angle. It can easily be removed to measure its moment of inertia.

Axis:	Mounted on ball bearing
Diameter of pulley:	152 mm
Thickness of pulley:	10 mm
Weights:	150 g each
Slotted weights:	1x 5 g, 2x 2 g, 1x 1 g each

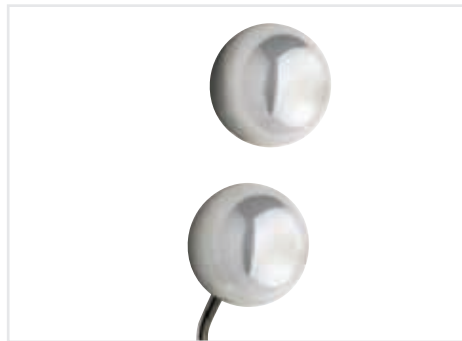
S-U40550



Springs Set for Hooke's Law

A set of 5 springs, each with pointer attached to provide a variety of spring constants. Use with hooked weights.

S-U40816



Two Pendulum Balls, 16 mm

Excellent for use as pendulum bobs or in impact and collision experiments. Comes with two steel pendulum balls, one drilled and one with a hook, and a 2 meter line.

S-U49800

Pulleys, Block and Tackle Experiment Set

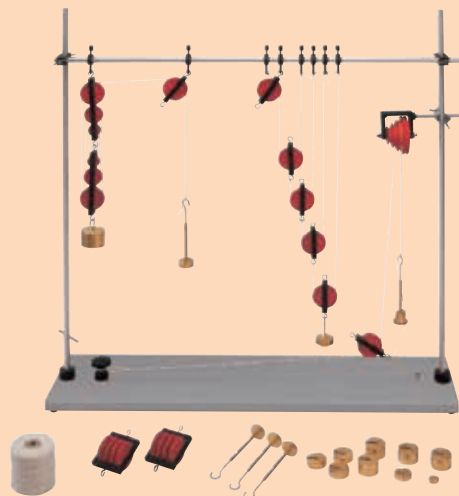
Demonstrates how forces can be altered in direction and modified in magnitude by simple machines (fixed and movable pulleys, block and tackle). Also introduces the concepts of mechanical work, power and energy. Comes in a complete set consisting of a stable base plate, retort stand rods, pulley blocks, block and tackle, a set of pulleys of various diameters on an axle, weight holders, slotted weights and a reel of cord. Experiments are simple and easy to set up. The enclosed design of the pulley blocks' plastic frames ensures that the cord cannot slip off the pulley.

Base plate: 810 x 200 mm
 Stand rods: 810 x 12.5 mm Ø
 Slotted weights: 2 x 10 g, 2 x 20 g, 2 x 50 g, 4 x 100 g, 4 x 200 g, 1 x 500 g
 Holders: 1 x 10 g, 1 x 20 g, 5 x 50 g

S-U30028

Additional Items Required

Measuring Tape S-U10073
 Digital Economy Stopwatch S-U49356
 Dynamometer S-U20034



Economy Lever

Used to study mechanical leverage and balance. A movable fulcrum can slide along and be fastened on any point of a 50 cm stick. Various weights can then be applied to balance the system and to study leverage systems. Consists of a 50 cm stick, stand, three knife edge clamps, one 50 gram hooked weight and one 100 gram hooked weight. Instructions included.

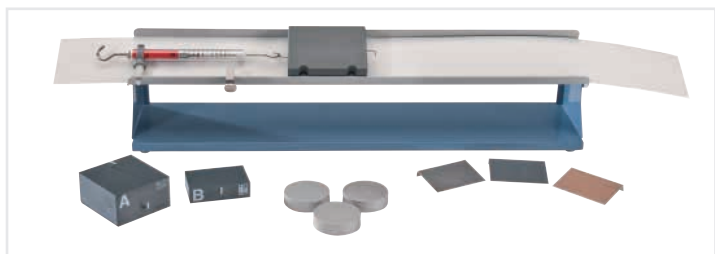
S-U49519



Bicycle Wheel Gyroscope

Spoked wheel with weighted rim for demonstrating conservation of angular momentum. Simple to use due to small wheel radius and ease of suspension.

S-U450001



Apparatus for Measuring Friction

This demonstration apparatus is used to measure static and dynamic friction between various surfaces. The plane of friction – a coated, U-profile aluminum friction track – is hinged at one end to a steel base plate. A protractor scale is used to measure the angle of inclination.

S-U8405120



Economy Spark Timer

Determine the rate of acceleration in a falling weight, calculate the speed of a moving cart or study the forces of friction. A paper strip is pulled through the device while sparks burn tiny dots on the paper at very precise time intervals. The faster the strip passes through the sparks the larger distance between dots. It is easy for the student to calculate the velocity and acceleration. Additionally everything on the spark timer is enclosed for safety. Instructions included.

S-U49524

Replacement Parts

Paper Roll S-U49525
 Carbon Disk S-U49526

Wooden Blocks for Friction Experiments

Each with a plastic coated surface. Complete with hooks for fastening a spring scale. 12 x 6 x 6 cm; 12 x 3 x 3 cm

S-U15026





Air Cushion Table

The 3B Scientific® Air Cushion Table is the ultimate teaching aid for demonstrating the structure and properties of gases, liquids, and solids; the process of electrical conduction; mechanical motions and even nuclear physics. Position the air cushion table on an overhead projector and watch colorful hovering bodies begin to move and collide. This dynamic presentation becomes a captivating visual experience sure to complement your instruction by making the complex concepts easy to comprehend and unforgettable for students. Over 48 experiments can be performed using the 100+ components. Dimensions: 350 x 350 x 75 mm
S-U15420

48 Experiment Topics

Structure and properties of gases:

- Molecule motions
- Gas compounds
- Change in temperature and pressure
- Adiabatic compression and expansion
- Diffusion
- Brownian motion

Structure and properties of liquids:

- Configuration and motion of the molecules
- Change in temperature
- Diffusion
- Evaporation
- Solidification
- Condensation of a gas through pressure

Structure and properties of solids:

- Configuration and motions of the lattice elements
- Melting
- Heat conduction

Processes of electric conduction:

- Motion of the electrons under various conditions
- Ohmic resistance
- Thermal emission
- Insulator
- P-type and n-type semiconductors

Nuclear physics:

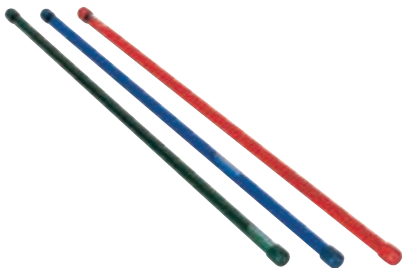
- Scattering of positively charged particles near an atomic nucleus
- Scattering of alpha particles when passing through a metal foil
- The Rutherford atomic model

Mechanical motions:

- Vertical, diagonal and horizontal projection
- Change in the direction of motion of objects through forces
- Elastic collision
- Mixing of gases
- Diffusion of gases through a porous partition
- Dependency of the pressure on the temperature



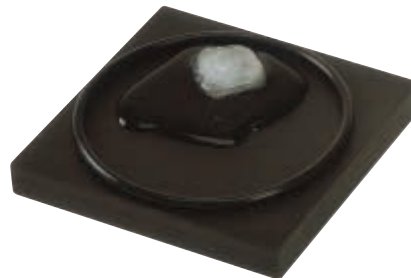
**Record your demos
with an HD camera!**



Constant Velocity Student Kit

Set of equipment for investigating the concept of velocity by means of student experiments. Consisting of three small coloured plastic tubes in which an air bubble rises at constant velocity in a viscous liquid, provided the tubes are aligned vertically. Since the viscosities differ, the velocities also differ. The position of the air bubble is plotted against time. The three different resulting straight lines lead to a definition of velocity.

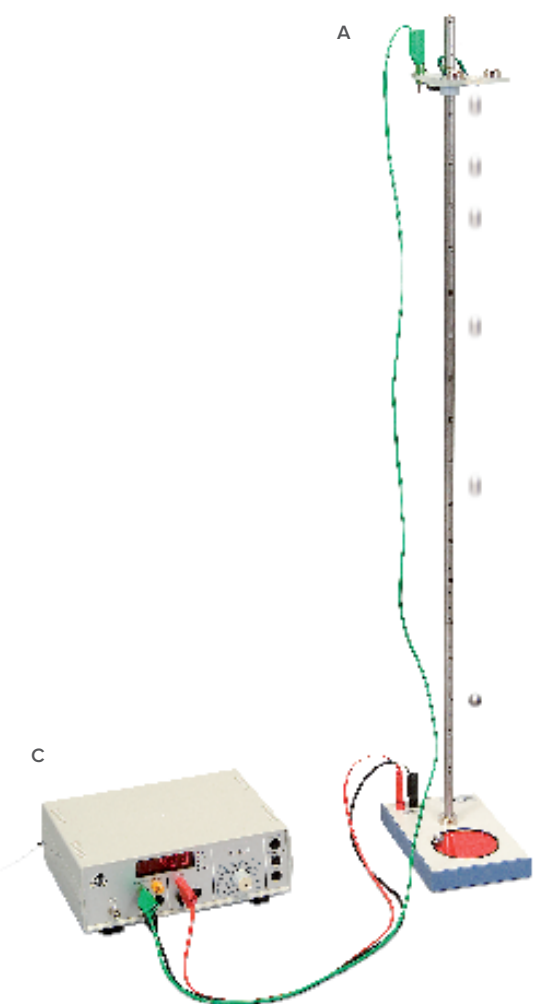
S-U45060



Thermal Conductivity Equipment Kit

Kit for the qualitative investigation of the heat conductivity of aluminum (extremely high thermal conductivity) and expanded polystyrene (very low thermal conductivity). Even at room temperature the varying material temperatures are evident to the touch.

S-U45055



A. Free Fall Apparatus

Apparatus for measuring the time it takes for a ball to fall a certain distance using a digital timer. Very easy to set up and use but nevertheless highly accurate. Includes 3 steel balls. A micro-magnet holds the ball in its start position. Three contact pins under the release mechanism ensure that the start position of the ball can be reproduced and act as the contacts of a switch that opens when the ball is released, thus triggering the beginning of the timing measurement. When the ball strikes the contact plate at the bottom, the timer is stopped. The ball is also held firmly on the plate so that it does not bounce. The height through which the ball drops can be adjusted to a fraction of a millimetre and read off a scale on the column.

Height scale: 20 – 960 mm
 Scale divisions: 10 mm
 Scale precision: 0.2 mm
 Balls: Steel, 16 mm dia.
 Dimensions: 200 x 130 x 1000 mm approx.

S-U8400830

Additional Items Required

B. Millisecond Counter S-U8533370-115
 C. Digital Counter S-U8533341-115

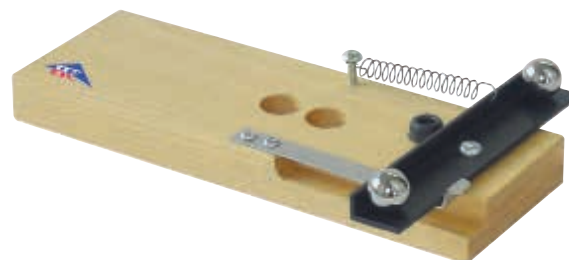


Dual Launcher S

Experimental apparatus for studying vertical and horizontal trajectories as well as trajectories starting at intermediate angles. Also demonstrates the independence of the horizontal and vertical components of motion (for projectiles). Including stand rod and bench clamp. Provides for three different launch velocities. Angle of launch can be adjusted to any arbitrary angle and read off from a protractor scale with a plumb line. The projectile ball is held in place by a magnet until the moment of launch so that the height of the trajectory is independent of the launch angle. When a projectile is launched, a second ball can be released simultaneously from the other side of the launcher that then descends in free fall. The latter should strike the floor at the same time as the projectile if the launch angle is horizontal.

Launch angle: 0° – 90°
 Maximum range: 3 m
 Projectile diameter: 16 mm
 Projectile weight: 22 g

S-U8400930



Drop and Launch Apparatus

For demonstrating superposition of motions. A launching spring rail is mounted on a wooden base and two steel balls are used as test bodies. Upon triggering the spring rail one ball starts to fall downwards and the other is simultaneously launched horizontally. Both balls hit the ground at the same time. Two holes in the base plate are provided for storing the balls. Ball diameter: 15 mm

S-U119831



Gyroscope Kit

Gyroscope for qualitative and quantitative determination of gyroscopic laws by means of practical experiments. The experiment apparatus is a shaft that can tilt vertically and rotate horizontally while attached to a rod stand. On one side of the shaft there is a disc mounted on dual ball bearings, while on the opposite side there is a movable counterweight for establishing equilibrium. Fine adjustment is performed by thumb screw at the end of the shaft. To generate external torque an additional weight is provided that can also be moved along the shaft. The shaft's angle of inclination can be read from an easily readable scale. A spirit level allows the gyroscope to be adjusted to the horizontal. The disc can be set rotating by hand or by means of a cord. The dual ball bearing system ensures that rotation is nearly frictionless and continues for lengthy periods of time. The open construction of the gyroscope allows gyroscopic phenomena to be observed easily and clearly.

Scale:	- 40° to + 40°
Scale divisions:	1°
Disc:	250 mm Ø
Mass of disc:	1500 g
Mass of counterweight:	50 g, 1400 g

Experiment topics

- Moment of inertia of a disc
- Torque
- Angular momentum
- Precession
- Nutation

S-U52006

Gyroscope Accessory Kit

Accessory kit for Gyroscope U52006 consisting of a gyroscope disc and counterweight. For demonstrating the canceling out of gyroscopic phenomena in the case of two discs rotating at the same speed in opposite directions.

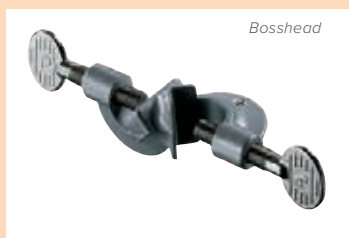
S-U52010

Additional Items Required

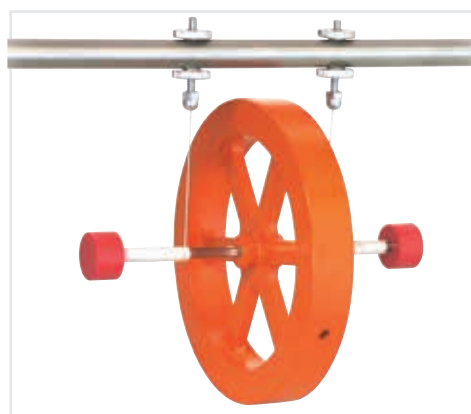
Duplex Stand Base	S-U13271
Stainless Steel Rod, 47 cm	S-U15002
Boshead	S-U13255
Mechanical Stopwatch	S-U11901



Duplex stand base



Boshead



Deluxe Maxwell's Wheel

For demonstrating conversion of kinetic energy into potential energy and vice versa. By placing the equipment set directly onto scales, it can be used to measure inertial forces during acceleration. Two panels at the ends of the axles prevent the wheel from coming off. A photocell light barrier can be used to measure speed of translation. Includes retaining rod and adjustable mount.

Moment of inertia:	10 kg cm ² approx.
Diameter of wheel:	approx. 130 mm
Mass of wheel:	approx. 470 g
Retaining rod:	370 x 12 mm Ø

S-U8408305

Additional Items Required

Duplex Stand Base	S-U13271
2 Steel Rods	S-U15000
2 Universal Clamps	S-U13255



Digital Stroboscope

Portable microprocessor-controlled device with quartz-controlled with time base for observing periodic movements and measuring frequency and rotation speed. This sturdy, easy-carry case contains a built-in Xenon flash tube and photo thread and is easily mounted on a stand. Continuous frequency adjustment in two ranges is possible using the coarse and fine setting control knobs. The 4-digit digital display permits readings of the chosen flash sequence per minute. 115 V, 50/60 Hz

Meas. ranges:	100 min ⁻¹ up to 1000 min ⁻¹ (approx. 1.5 Hz up to 18 Hz) and 1000 min ⁻¹ up to 10000 min ⁻¹ (approx. 18 Hz up to 165 Hz)
Accuracy:	± (0.05% + 1 digit)
Display:	4-digit LED
Resolution:	0.1 min ⁻¹ (< 1000 min ⁻¹) 1 min ⁻¹ (1000 min ⁻¹ up to 9999 min ⁻¹) 10 min ⁻¹ (10000 min ⁻¹)

Flash duration:	60 µs up to 100 µs
Flash energy:	4 Ws
Flash angle:	80°

S-U40160-115



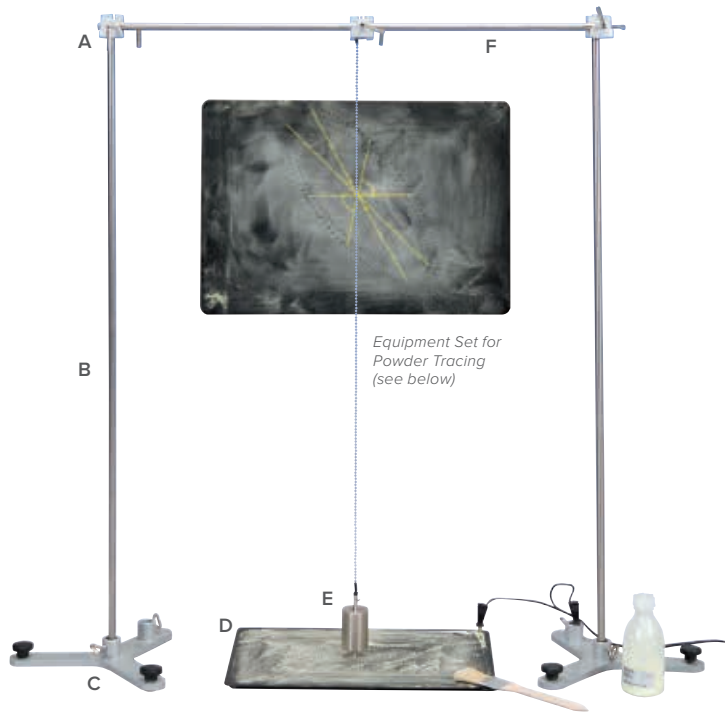
Laser Tachometer

This tachometer is an excellent tool for mechanics experiments or demonstrations as it allows non-contact RPM measurements of rotating objects. Simply apply reflecting tape on the object to be measured and point the laser for quick and easy measurements.

Features:

- Make non-contact RPM measurements of rotating objects
- Memory button holds last reading and recalls min/max readings
- Easy to read large 5 digit LCD display.
- Rugged double molded housing for better grip
- Includes 9V battery

S-U40142



Equipment Set for Powder Tracing (see below)

Kepler's Second Law Experiment

As an example of motion under the influence of a central force, the elliptical motion of a pendulum bob is recorded by the dust-marking method. This produces a trace with time-interval marks, and from the distances between these one can directly measure the velocity of the pendulum bob. Furthermore, it can be shown by a simple graphical analysis that the area swept by the radius vector of the pendulum in each time interval is constant, and is thus independent of the length of the radius vector.

- | | |
|-------------------------------------|------------|
| A. 3 Multiclamps | S-U13255 |
| B. 2 Stainless Steel Rods 100 cm | S-U15004 |
| C. 2 Tripod Stands 150 mm | S-U13270 |
| D. Equipment Set for Powder Tracing | S-U8400870 |
| E. Pendulum with Plotting Electrode | S-U8405640 |
| F. Stainless Steel Rod 75 cm | S-U15003 |

Show how the planets behave!



Rings Demonstrating Flattening of the Earth

Used For demonstrating the flattening of the earth and other planets due to rotation. Two steel bands crossed over and bent into a ring around a guide rod.

- Ring: 240 mm Ø
Guide rod: 10 mm Ø

S-U8403120

Additional Items Required

For U8403110 & U8403120

- | | |
|-------------------------------|----------|
| Experiment Motor with Gearbox | S-U10375 |
| Stand Base, Tripod, 185 mm | S-U13271 |



Pair of Elastic Balls with Plotting Electrode

Pair of balls with identical mass and sliding plotter electrode for experiments on elastic collisions. Diameter: 70 mm each, Weight: 300 g each

S-U8405630



Equipment Set for Powder Tracing

Set consisting of an insulated plate with 4-mm connector socket, a pulse generator and a transformer with two 4-mm plugs for its secondary winding, 35 g of powdered sulphur and a flat brush.

S-U8400870

G. Experiment Motor with Gearbox

Experiment motor for universal use in experiments on rotational motion, e.g. for experiments using the rings demonstrating flattening of the earth (U8403120). Can also be used as a generator in conjunction with the included hand crank. Robust clockwise and counter-clockwise rotating IDC motor with epicyclic gearbox and quick-action chuck in a tough anodized aluminum casing with removable and adjustable stainless steel stand rod. Can also be mounted on the clamp for the projectile launcher (U10361). Speed of rotation is adjusted by altering the supply voltage. Adjustable torque. Includes 3 belt pulleys of different diameters on a mounting axle.

- | | |
|---------------------|------------------------------------|
| Speed without load: | Approx. 480 rpm at 12 V |
| Speed sensitivity: | Approx. 40 rpm per V |
| Span of chuck: | 0.8 – 10 mm |
| Stand rod: | 12 mm dia. |
| Pulleys: | 10 mm dia., 20 mm dia., 40 mm dia. |
| Axle: | 10 mm dia. |
| Drive belt: | 130 mm dia. x 4 mm |
| Nominal voltage: | 12 V DC, 5A |
| Connection: | Via 4-mm safety sockets |

Contents:

- | |
|-------------------------------|
| Experiment motor |
| Stand rod with knurled screws |
| Hand crank |
| Pulleys |
| Drive belt |

S-U10375



H. Watt's Governor

Demonstrate the principle of controlling rotational speed (e.g. steam engines). A dual pendulum is placed centrally on an axle. As it rotates, the metal cylinder on the axle experiences a force opposed to the force of gravity; this regulates the speed of rotation. A spring causes the pendulum to be restored to its initial position.

- | | |
|--------------------|--------|
| Rotation diameter: | 300 mm |
| Height: | 230 mm |
| Diameter of axle: | 10 mm |

S-U8403115





Period of oscillation as a function of the inclination

Deluxe Rotation Apparatus

For determining the angular acceleration as a function of torque and for determining the moment of inertia as a function of the distance of the body from the axis and its mass. A vertical, rotating axle with agate bearing supports a crossbar for holding the weights. The force of the driving weight is transferred via a pulley and a cord wrapped around a pulley wheel on the axis.

S-U8405715

Dimensions of the base plate: 200 x 140 mm
 Length of crossbar: 600 mm
 Pulley wheel diameter: 9/18 mm
 Total weight: approx. 1.3 kg

Includes:

- Weights, 100 g, Set of 2
- Weight, 200 g
- Pulley
- Cord



Variable Gravity Pendulum

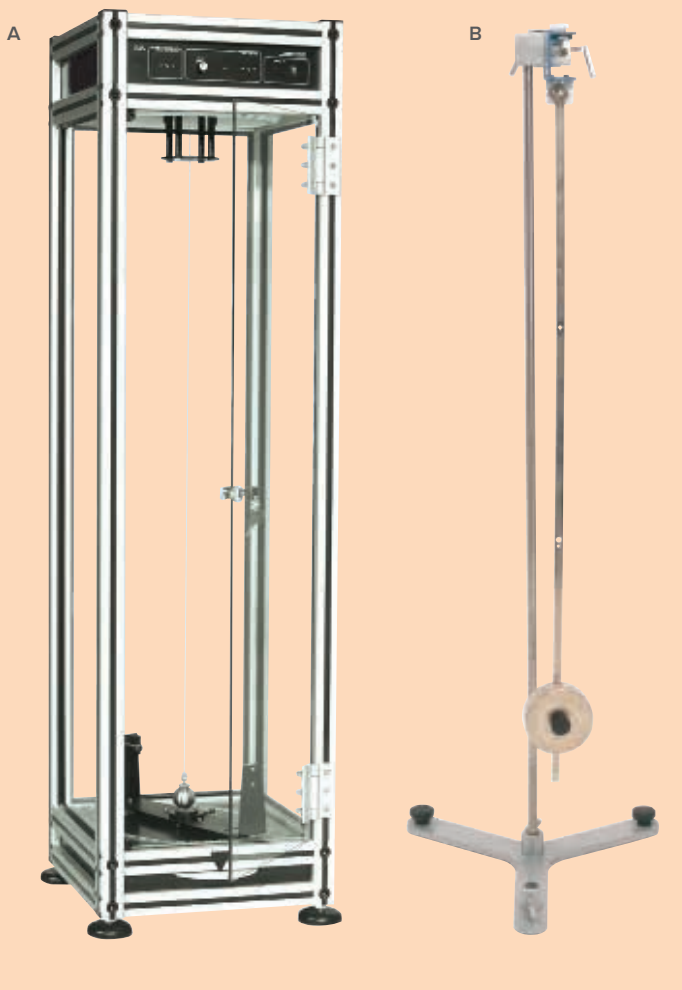
For determining the period of oscillation as a function of the pendulum length and of the acceleration due to gravity. Pendulum consisting of a virtually massless rod with sliding weight and clamp for attaching to a tripod with an infinitely variable plane of oscillation.

Max. length of pendulum: 280 mm
 Mass of pendulum: 0.5 kg
 Angle of plane of oscillation: 0° to 90°
 Dimensions: 300 x 250 x 550 mm
 Mass: Approx. 5 kg

S-U8403950

Additional Items Required

Duplex Tripod Base S-U13270
 Digital Counter S-U8533341-115
 Stainless Steel Rod S-U15002



A. Deluxe Foucault Pendulum

For the quantitative measurement and qualitative demonstration of the earth's rotation. Oscillation of the pendulum is maintained by means of electromagnetic excitation. The position of the plane of oscillation can be read off to a high degree of accuracy via an optical measuring device with laser. Quantitative values for the angular velocity can be achieved within short experimental times.

Length of pendulum:	120 cm
Mass of pendulum:	230 g
Diameter:	38 mm
Damping of elliptical motion:	Charron ring
Control:	Via photosensor
Mechanism for exerting excitation force:	Electromagnet
Excitation force:	Infinitely variable
Housing:	Metal housing, fully glazed with front door, 4 leveling feet
Measurement of plane of oscillation:	Shadow projection of pendulum cable
Angular resolution:	0.1°
Dimensions:	400 x 400 x 1400 mm
Mass:	Approx. 40 kg

S-U8403000-115

B. Pendulum Rod with Angle Sensor

Pendulum system with low-friction cone bearings and electromagnetic angle sensor. For investigating harmonic oscillations, damping due to air resistance, coupled oscillations and Lissajous figures. The angle of the pendulum is converted into a proportional electrical signal by a Hall sensor. This signal can be used to record the oscillation using an interface, an XY plotter or an oscilloscope. The pendulum bob is movable.

Length of pendulum:	1 m
Mass of pendulum:	1 kg
Output voltage:	± 5 V
Output resistance:	500 Ω
Precision:	$\pm 1\%$ for $d = 14^\circ$ ($\sin d = 0.24$)
Power supply:	12 to 16 V AC
Diameter of tube:	10 mm

S-U8404275-115

Pendulum Rod without Angle Sensor

S-U8404280

Additional Items Required

Duplex Stand Base	S-U13270
AC/DC Power Supply	S-U117601-115
Stainless Steel Rod	S-U15002
Analog Oscilloscope	S-U43563
Digital Oscilloscope	S-U43569

Rotating System on Air Bed (115 V, 50/60 Hz)

Apparatus for investigating frictionless rotation. A small rotating disc with a protractor scale supports a cross bar to which weights can be attached. The disc is supported by a bed of air in which its axis is centred. A driving weight is suspended from a hook at the end of a string that is passed over a single pulley on one side and a multiple pulley on the other. The rotation is very slow and can be measured using a stopwatch by hand. Alternatively, a digital timer may be used. This can be started by a mechanism that is supplied with the kit and halted by a signal from a laser reflection sensor when the wheel passes through angle zero.

Protractor scale:	0 – 360°
Scale divisions:	1°
Length of cross bar:	ca. 440 mm
Radii of perforations:	30 – 210 mm
Separation of perforations:	20 mm
Radii of multiple pulley:	5.0 mm/10.0 mm/15.0 mm
Moment of inertia of disc with cross bar:	0.16 gm ² approx.
Maximum moment of inertia:	7.1 gm ² approx.
Minimum driving torque:	0.05 mN m approx.
Maximum driving torque:	0.60 mN m approx.

S-U8405680-115

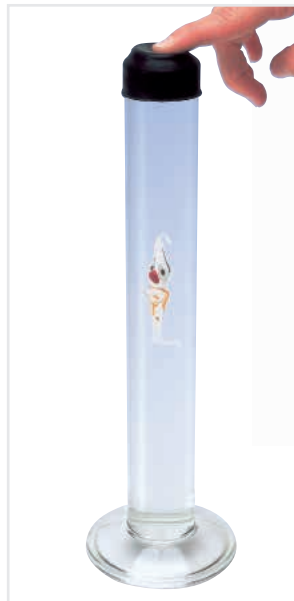
Additional Items Required

Laser Reflection Sensor	S-U8533380
Digital Counter	S-U8533341-115





Magnified 10 times



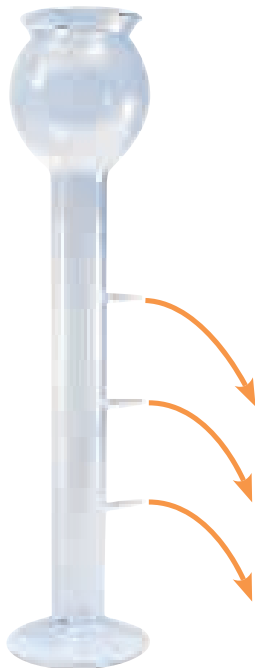
Cartesian Diver

Demonstrates a body floating, sinking or rising in water. The body is a hollow figure made of colored glass, with a narrow opening. The figure floats upright in a cylinder filled with water and can be made to float, sink or rise by applying pressure to the rubber cap. The rubber cap fits cylinder diameters of approx. 30 mm to 40 mm .

Includes:

- 1 Cartesian diver
- 1 Rubber cap

S-U14090



Outlet Vessel

For investigating the dependence of hydrostatic pressure on water depth through an observation of the outlet water jets. Consists of a glass cylinder with three outlets positioned at different heights.

S-U21601



Density Set, 12 materials

Twelve sets of test bodies made of the same material but with four different weights for deriving the concept of density in school experiments. Supplied in storage containers. Wood, polypropylene, polyamide, acrylic (2 colors), polyurethane, phenol, PVC (3 colors), Teflon and aluminum.

S-U45058



Density Set, 2 materials

Two sets of test bodies made of the same material but with four different weights for deriving the concept of density in school experiments. Supplied in storage containers.

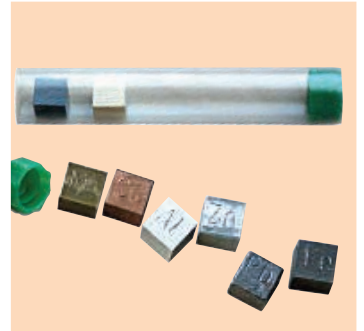
S-U45057



Set of 15 Bodies with 2 Different Densities

Set of 15 test bodies of various masses made of two identical looking materials for deriving the concept of density in experiments at school. Supplied on a storage tray.

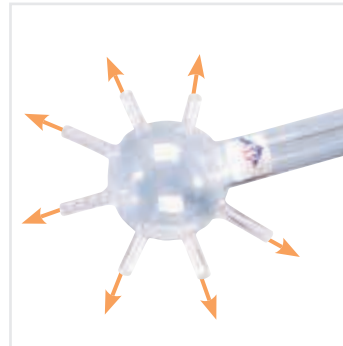
S-U45059



Set of Seven Cubes

For direct measurement of density. Material: Al, Zn, Fe, Cu, brass, hard rubber and wood. Delivered in storage container.

S-U8404509



Pascal's Pressure Sphere

Excellent for viewing and class demonstrations. A piston distributes the pressure so that water is sprayed equally far in all directions.

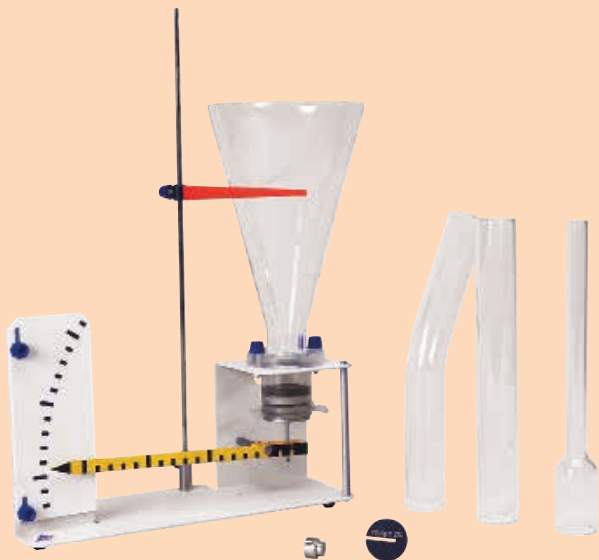
S-U14325



Sphere for Weighing Gases 1000 ml

Glass sphere with two taps and nozzles for attaching tubing for demonstrating the weight of air from the difference in weight between the sphere when filled with air and when evacuated.

S-U8422050



Pascal's Vane Apparatus

For demonstration of the hydrostatic paradox and quantitative measurements on ground pressure. This pressure is measured through the curvature of a membrane and indicated in magnified form with the help of a level multiplier. Allows compensation for comparative measurements. Includes four differently shaped vessels.

Tube diameter at the bottom: 2.6 cm
 Height of the vessels: 25 cm
 Total height: 35 cm
 Dimensions of base: 28 cm x 11 cm

S-U15070

Large Volume Archimedes' Principle Apparatus

This 100 ml version of the traditional Archimedes' Principle Apparatus has more than four times the volume of the usual metal versions. The increased water displacement results in bigger differences in the weighings in air and water, with clearer results. Both the cylinder and the transparent bucket have graduation rings of 25 ml, which allows the experiment to be carried out with four different volumes of water, showing that Archimedes' Principle is valid for all volumes.

S-U40875



Pressure Apparatus with 2 Pistons

For introducing the concept of pressure and for studying transmission of pressure in liquids and gases as well as the functioning of a hydraulic press.

Includes:

- 2 graduated glass cylinders,
- 10 ml and 50 ml, with plungers
- Transparent hose
- T-piece and connecting sleeves
- Additional weights 2 x 50 g, 1 x 100 g, 2 x 200 g
- Aluminum rail with two boreholes for accommodating the glass cylinders

S-U10355



Glass Cylinder with 3 Tubes

Glass vessel for demonstrating communicating tubes; also suitable as an overflow vessel. Consists of a glass cylinder with two openings and GL screw connections. Includes three differently shaped glass tubes.

S-U14320



Glass Cylinder with 2 Tubes

Glass vessel for demonstrating communicating tubes. Consists of a glass cylinder with two openings and GL screw connections, as well as two differently shaped glass tubes.

S-U14321



Capillary Tubes Apparatus

Four capillary tubes each with a different internal diameter are connected to a glass reservoir with filling tube. Water rises to a different level in each of the tubes demonstrating the relationship between the bore of the tube and capillary pressure.

Capillaries: 2.0 mm, 1.5 mm, 1.0 mm and 0.5 mm inner diameter
 Height: Approx. 165 mm

S-U58021



Digital Manometers

Features:

- Bright backlight
- Digital display of gauge or differential pressure
- Simple fittings for hose connection
- Data Hold & Record features
- Min/Max button
- Auto power off & low battery indicator
- Displays: psi, in H₂O, bar, mmHg, ozin², kgcm², kPa, ftH₂O, inHg, cmHg & mbar
- R232 output
- Ideal for medical applications, computer peripherals, pneumatic controls, HVAC and more
- Dual Ports
- Positive & Negative pressure
- Power Source: 19-volt battery

Includes:

- Hard Case
- Connection hose
- Battery
- Pressure range: 0 to 15 psi (to 415 in H₂O)
- Max pressure 30 psi
- Pressure range: 0 to 100 psi (to 2,768 in H₂O)
- Max Pressure 150 psi

S-U49351



Rotary-Vane Vacuum Pump, 100 L/min

High performance, compact, two-stage, oil-sealed rotary vane pump for vacuum experiments. With thermal overload protection, handle, air valve, manometer and hose nipple. Includes pump oil.

Suction capacity: 100 L/min
 Final pressure: 0.01 hPa
 Motor power: 245 W
 Manometer: 0 – 1000 hPa
 Hose nipple: 10 mm dia.

S-U34000



Vacuum Hoses

Our Vacuum hoses are made of natural rubber according to DIN 12865. Color red.

Item Number	Price	Length	Internal Dia.	Wall Thickness	Temp Range
S-U10140		1 m	8 mm	5 mm	-30C to 85C
S-U10141		1 m	10 mm	5 mm	-30C to 85C



Vacuum & Pressure Hand Pump

Simple mechanical air pump for filling and evacuating small containers; equipped with an ergonomic handle, a manometer with a pointer that rotates through a full 360°, a ventilation valve, two hoses (long and short) and six connecting adapters.

Final pressure: From -980 hPa to 4000 hPa

Tubing nozzle: 8.5 mm diam.

Hose: 850 mm x 6.5 mm internal diam.

65 mm x 4.5 mm internal diameter

Dimensions: Approx. 180 x 60 x 260 mm³

Weight: Approx. 0.3 kg

S-U205001



Piston Vacuum Pump

For performing simple vacuum experiments – for instance, evacuation of the (e.g. vacuum bell jar U21851). Solid construction which enables you to generate a low vacuum without much effort. Piston with grips, heavy base bracket, connection for suction hoses with diameters of d = 5 – 15 mm.

Final pressure: 0.3 bars

Dimensions: 160 x 235 x 560 mm (LxWxH)

Weight: approx. 1.7 kg

S-U8421210

Additional item Required

Vacuum Hose S-U10140



Crosspiece DN 16 KF

Connection: DN 16 K

Dimensions: 80 x 44 mm²

S-U14511



2-Way Ball Valve DN 16 KF

Connection: DN 16 KF

Length: 100 mm

S-U14510



Tension Ring DN 10/16 KF

Tension ring for mechanically secure connection of ISO-KF components.

S-U14517



Ventilation Valve DN 16 KF

Connection: DN 16 KF

Dimensions: 36 x 26 mm Ø

S-U14513



Adapter Flange DN 16 KF / NS 19/26

Connection: DN 16 KF

Core: 19/26 NS

Length: 40 mm

S-U14516



A. Vacuum Bell Jar

Our Vacuum Bell Jar is made of glass with a secure grip knob and polished flange. Set this jar on top of the vacuum experiment plate (U21850) to create a vacuum chamber in your classroom.

Inner diameter: 190 mm

Total height: 220 mm

S-U21851

B. Vacuum Experiment Plate

Assemble your own vacuum chamber, in conjunction with the Vacuum Bell Jar (U21851), to perform experiments in the coarse and fine vacuum range. The experiment plate is metal with sealing ring on a tripod. Includes hose connection on the pump-side, ventilation cock and vacuum-tight current feed with 4-mm safety sockets. Center bore with M12 thread for attaching experiment equipment.

Diameter: 250 mm

Height: 90 mm

Current feed-through: 2-pole with 4-mm safety sockets (red, black)

Power feed: via 2 cables (red, black) approx. 1 m long with 4-mm safety plugs

Electrical limit specs.: max. 48 V, max. 12 A

Vacuum connection: hose nozzle Ø 12 mm and 10 mm

S-U21850

Experiment Topics

- Bell in a Vacuum
- Boil water at room temperature
- Experiment with marshmallows, balloons and shaving cream
- Determining the mass of evacuated air and its density.
- Effect of air pressure on a partially inflated balloon and a miniature bellows.



Electric Doorbell

Used for demonstrating electromagnetic operation of machinery and verifying that sound waves do not propagate in a vacuum (< 1 mbar). Open acrylic housing with 4-mm safety sockets.

Power supply: 6 V AC

Dimensions: 100 x 95 x 50 mm

S-U21854



Mini Magdeburg Hemispheres

Demonstrate the effect of atmospheric air pressure with the Mini Magdeburg Hemispheres. Two plastic hemispheres can be joined vacuum tight! Air is forced from the disks after being placed face to face. The disks are then very difficult to pull apart, showing the strength of air pressure. 2.5" diameter.

S-U49807



Baroscope

Perform an undeniable demonstration illustrating the concept that the loss of weight of an object in air equals the weight of the air displaced by it. At a state of equilibrium the baroscope is placed in a vacuum bell jar under atmospheric pressure. When the air in the bell jar is then evacuated the styrofoam sphere falls because of the reduction in lift. Cleverly mounted on a balance beam base with a styrofoam sphere attached at one end and an adjustable counterweight on the other end.

Sphere: 50 mm Ø

Base: 120 x 90 mm

Height: 125 mm

S-U21853



Free Fall Tube

Used for proving that gravitational acceleration and the duration of fall in a vacuum is equal for all bodies, when air resistance and buoyancy are absent. Consists of a glass cylinder with two stoppers. One stopper has a stopcock and can be connected to a suction hose.

Falling bodies: Corks, feather, metal disc.

Connection nozzles: 10 mm

Dimensions: 800 x 36 mm (LxD)

Weight: approx. 650 g

S-U8422090

Pythagorean Cup

Pythagoras is known to most students today as the author of the Pythagorean Theorem ($a^2 + b^2 = c^2$). There was far more to Pythagoras' philosophy than this: he was a deep thinker on religion, the nature of the soul, and the harmony of the cosmos. With the "Pythagorean Cup" he illustrated to his students the virtues of moderation: when filled halfway, it retains its contents, but if it's too full, all of the liquid drains out through a hole in the bottom.

Our Pythagorean cup is made of hand-blown clear glass. The secret of the construction is a siphon, which is built in the center of the cup. Ideal for explaining to your students the principle of a siphon with an historical background.

Height: 25 cm

Cup: 8 cm diameter

S-U14350





Jet Nozzle (Flow Laminator)

For generating an almost homogenous air flow for flow experiments in connection with an air flow generator (e.g. fan U15425-115). The jet nozzle spreads the air blowing from the fan. The air thereby escapes from the tubular nozzles in the area of the plastic ring and mixes with the secondary air to form a total air current of a large diameter. The jet nozzle has no moving components, it does not produce any eddies and is very light. The jet nozzle is suited for conducting almost all experiments connected with air currents, e.g. studying convection in bodies, flow resistance, aerodynamic paradox, and jet propulsion.

Dimensions:	255 x 150 mm (LxD)
Air inlet:	33 mm
Air outlet:	120 mm
Stand holder:	10 mm
Weight: approx.	350 g

S-U8404250

Additional Item Required

Variable Air Supply **S-U15425-115**

Component Balance

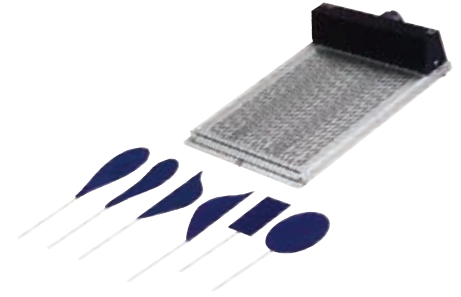
Consists of a clamping fixture for measuring air resistance and buoyancy on a wing or on resisting bodies U8404260. The component balance can be applied for measuring forces in any arbitrary direction.

Measuring range:	0 – 0.3 N
Diameter of the scale:	170 mm
Dimensions:	350 x 220 mm (LxW)
Shaft diameter:	10 mm
Weight: approx.	0.9 kg

S-U8404261

Complete Aerodynamics Kit

Variable Air Supply	U15425-115
Jet Nozzle/Flow Laminator	U8404250
Set of Aerodynamics Bodies	U8404260
Component Balance	U8404261



Air Flow Generator

For demonstrating air flow patterns around bodies of different shapes. The air flow patterns can be projected on to a wide screen using an overhead projector. Two strings are fastened on one side at equal distances between two glass plates. The strings move according to the air currents between the two glass plates. Bodies of different shapes can be introduced in the air current. The inserted bodies can be moved to various positions in the air current from outside.

Dimensions:	385 x 310 x 75 mm (LxWxH)
Weight:	approx. 3.2 kg

S-U8404300

Additional Items Required

For U8404300

Variable Air Supply **S-U15425-115**



Laminar Flow Apparatus

Used for demonstrating and investigating the laminar flow properties of water. The emergence of currents in water, the flow of current in the case of straight laminar flow and the overflow of differently shaped bodies can be studied. A constricted flow of current can also be demonstrated clearly.

A rectangular piece of velour paper is placed in the apparatus consisting of an upper and lower trough. Due to capillary forces, water from the upper trough is drawn in by the paper. The water flows down into the velour paper. The flow of water in the upper level is marked with a dye at constant intervals. The low speed of flow (approx. 2 mm/s), the development of currents can be observed with the help of the dye. After the velour paper has been dried, a lasting current pattern remains, which can be copied and evaluated.

Dimensions:	220 x 140 x 240 mm (LxWxH)
Weight:	approx. 1.3 kg

S-U8404248



Set of Aerodynamics Bodies

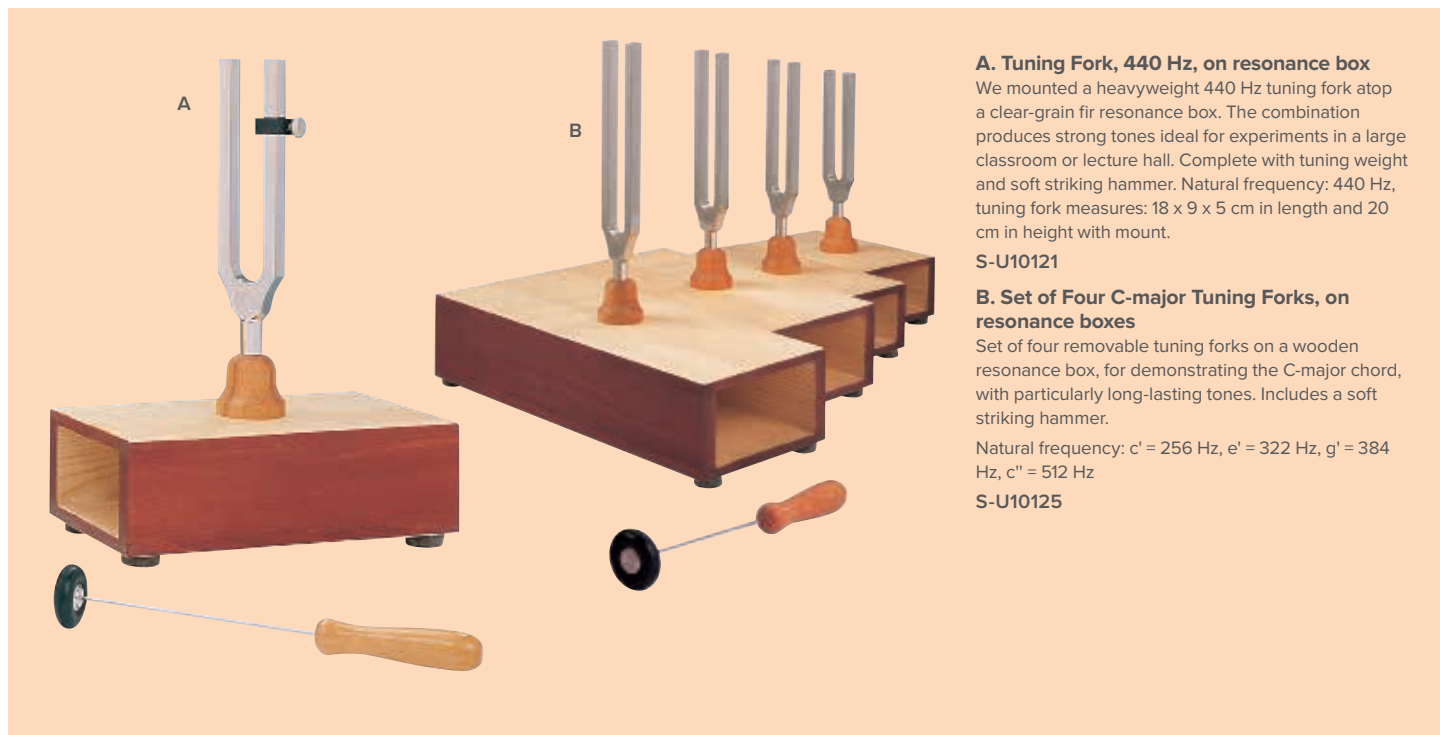
For measuring buoyancy and resistance to air flow of various bodies in an air current. Set of 7 wooden models with a shaft, in storage box.

Includes:

- 1 Streamlined body, smooth, l = 120 mm
- 1 Streamlined body, rough, l = 120 mm
- 1 Ball, d = 50 mm
- 1 Circular disc, d = 47 mm
- 1 Circular disc, d = 68 mm
- 1 Plate, 150 x 40 mm
- 1 Wing profile, l = 150 mm

S-U8404260

ACOUSTIC / WAVE THEORY



A. Tuning Fork, 440 Hz, on resonance box

We mounted a heavyweight 440 Hz tuning fork atop a clear-grain fir resonance box. The combination produces strong tones ideal for experiments in a large classroom or lecture hall. Complete with tuning weight and soft striking hammer. Natural frequency: 440 Hz, tuning fork measures: 18 x 9 x 5 cm in length and 20 cm in height with mount.

S-U10121

B. Set of Four C-major Tuning Forks, on resonance boxes

Set of four removable tuning forks on a wooden resonance box, for demonstrating the C-major chord, with particularly long-lasting tones. Includes a soft striking hammer.

Natural frequency: $c' = 256$ Hz, $e' = 322$ Hz, $g' = 384$ Hz, $c'' = 512$ Hz

S-U10125

Quality high-frequency steel forks for cleaner sound!



Pair of Resonance Tuning Forks

Complete with a striking hammer and pair of tuning weights.

S-U10120



E. Light Metal Tuning Fork, 1700 Hz

Suitable for use as an intensive source of high-frequency sound, e.g. for generating stationary waves in Kundt's Tube, after it has been tuned to resonance pitch.

Frequency: 1700 Hz
Length: approx. 10 cm

S-U10115

F. Light Metal Tuning Fork, 1000 Hz

Frequency: 1000 Hz
Length: approx. 12 cm

S-U10116



Set of 8 Tuning Forks

A tuning fork is a time-honored device for demonstrating the connection between sound and vibrations, and the transfer of energy between resonant systems. This tuning fork set is made of high-quality, nickel-plated steel, and comes with its own fitted case.

Frequencies:
 $c' = 256$ Hz $g' = 384$ Hz
 $d' = 288$ Hz $a' = 426 \frac{2}{3}$ Hz
 $e' = 320$ Hz $b' = 480$ Hz
 $f' = 341 \frac{1}{3}$ Hz $c'' = 512$ Hz

S-U10100

C. Hard Striking Hammer

Aluminum striking hammer. Particularly suitable for high-frequency tuning forks, for example, 2000 Hz.

S-U10118

D. Soft Striking Hammer

Rubber striking hammer. Particularly suitable for low-frequency tuning forks, for example, those on the resonance boxes.

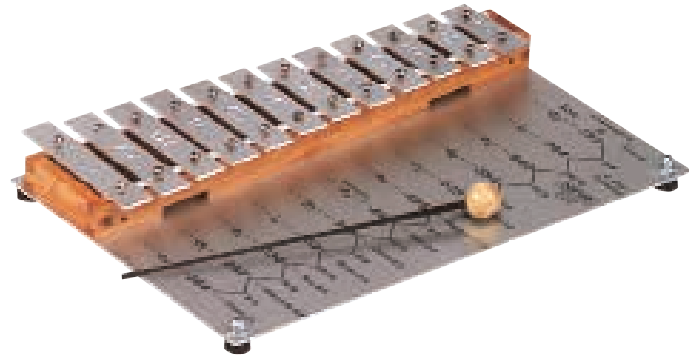
S-U10122



Pair of Tuning Weights

Use these tuning weights to change the frequency of tuning forks for experiments; intended for the 440 Hz tuning fork on the resonance box (U10121).

S-U10119



Metallophone

Mounted on a base plate. C-major scale from c^1 to g^2 . Notes, frequencies and intervals are printed on the base plate. Striking hammer included.

Dimensions: 320 x 210 mm (LxW)
Weight: approx. 510 g

S-U8430290

Demonstrate the Doppler Effect!

Digital Sound Meter

Features:

- +/- 2dB accuracy with 0.1dB resolution
- A&C weighting
- AC analog output
- Record max/min values over time
- Auto power off and Max Hold functions
- Utilizes 0.5" (12.7 mm) condenser microphone
- Tripod mountable
- 40 to 130 dB measuring range
- Fast/slow response time
- Complete with 4 AAA batteries and microphone windscreens

Dimensions: 9 x 2.2 x 1.7" (230 x 57 x 44 mm)
Weight: 5.6 oz (160g)

S-U40183

Tuning Fork, 2000 Hz

Made with a handle for demonstrating the Doppler effect, which can be exhibited very impressively by moving the fork slowly toward and away from the audience.

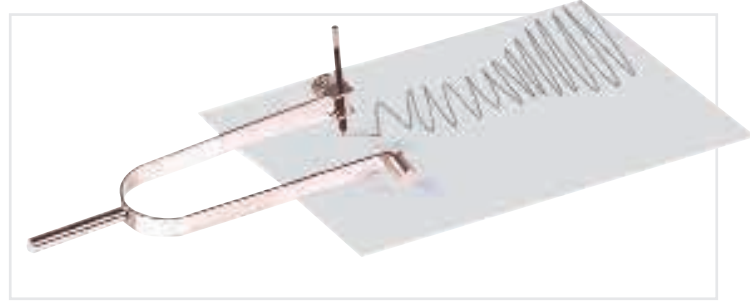
Natural frequency: 2000 Hz
Length of the tuning fork: 220 mm

S-U10117

Additional Item Required

Hard Striking Hammer

S-U10118



21 Hz Tuning Fork with Plotter Pen

Tuning fork that allows for plotting oscillations on a sheet of paper. The oscillation is triggered by pushing the prongs of the fork together. The oscillation of the tuning fork is highly visible both with the naked eye or with the aid of a stroboscope. Includes a plotter pen with holder and a counterweight.

Natural frequency: 21 Hz
Length: 245 mm
Total weight: approx. 170 g

S-U8431030



Over 2½ feet tall!

G. Demonstration Tuning Fork

Used for visualizing the vibrating legs of the fork.
Length: 75 cm

S-U55001

H. Tuning Fork with Recording Stylus

Used for demonstrating and recording the vibrations of sound. For recording the oscillations on a sooted glass plate one of the two prongs has a pointed, metal nib. Complete with glass plate.

Characteristic frequency: 128 Hz
Total length: approx. 28 cm

S-U10110

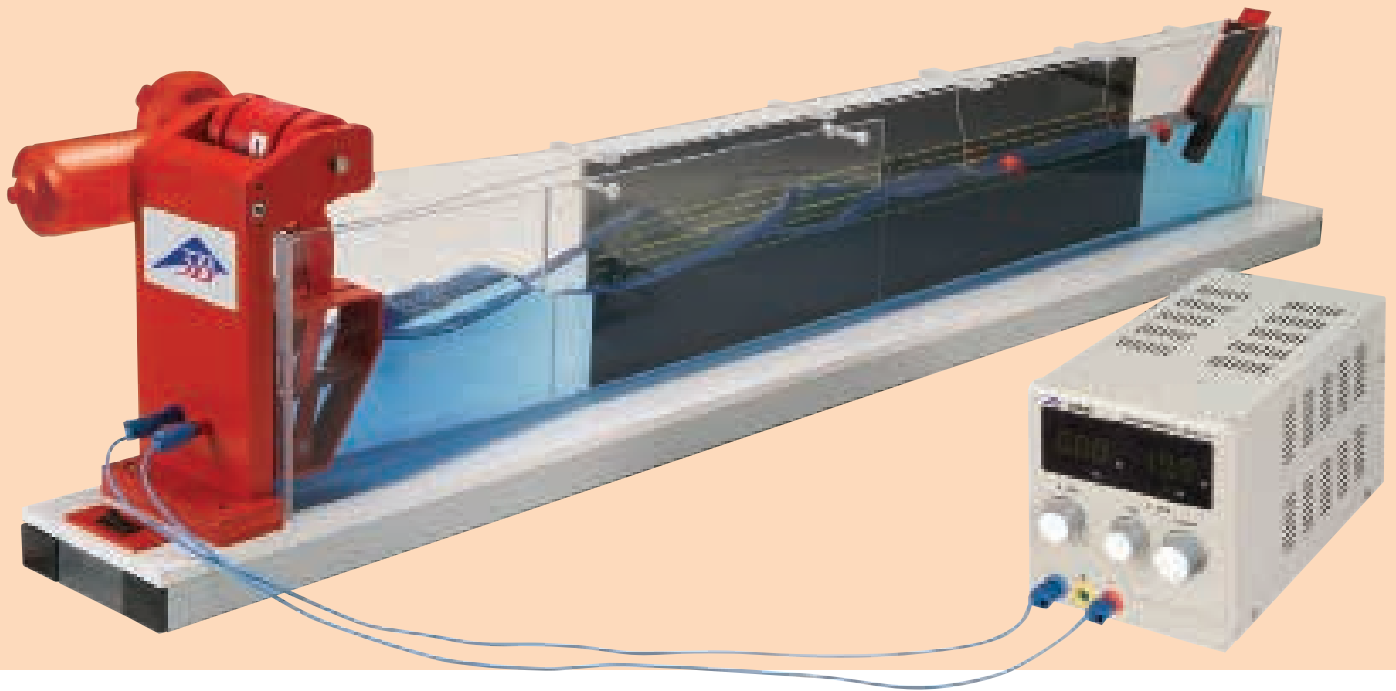


Organ Pipe with Sliding Piston

An organ pipe provides a simple but effective demonstration of a resonant cavity and the relationship between cavity length and resonant frequency. This wooden organ pipe has a sliding piston so you can vary the length of the resonant cavity to provide tones of varying pitch. The pipe will produce frequencies from approximately 400 to 800 Hz.

Frequency range: g^1 (392 Hz) to g^2 (794 Hz)
Resonance space:
Area: 24 x 24 mm
Length: approx. 180 mm
Length with piston fully extended: approx. 550 mm

S-U8430185



Wave Channel for Water

Demonstrate and investigate the wave properties of water with our new wave channel. The unit has a Y-shaped channel made of plexiglass with two wave exciters which can be used both in-phase and out-of-phase. By adjusting the frequency you can generate waves with varying wavelengths. Waves can be either absorbed or reflected by inserting or removing the absorber at the end of the channel.

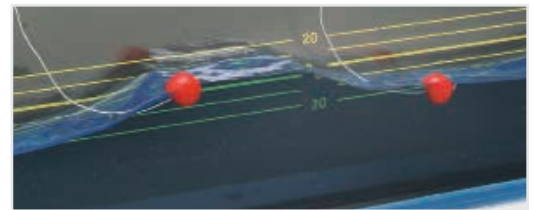
S-U8431411

Additional Item Required

DC Power Supply **S-U33020-115**

Experiment topics

- Reflection
- Dispersion
- Interference
- Frequency
- Wavelength



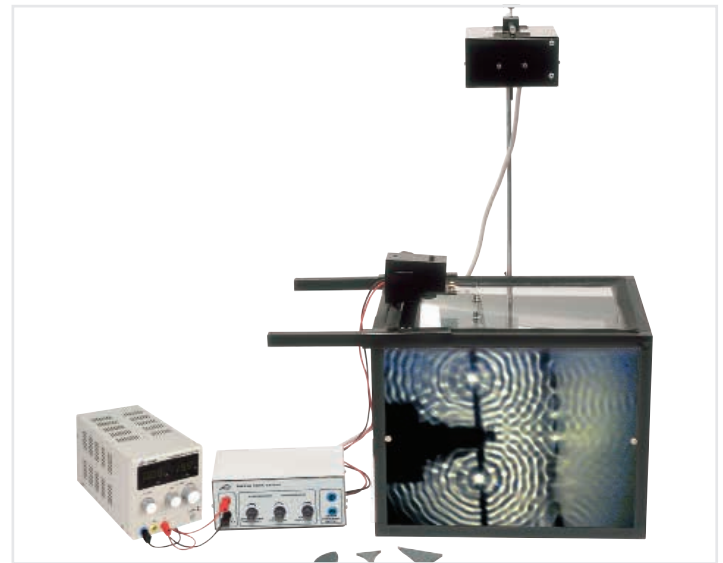
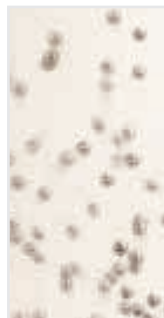
Kinetic Theory of Gas Model

For demonstration of the kinetic theory of gases and thinning of air as altitude increases. Consists of a clear cylindrical tube with a rubber diaphragm attached to the bottom of the tube and a loose-fitting, metal cap on top. Beneath the diaphragm, a piston connected to a 6 V DC motor is fixed to produce agitation. The whole assembly is mounted on a circular base with two 4-mm socket terminals for electrical connection to the motor. Includes metal balls 1/8", freely-sliding, expanded polystyrene pistons, and four cardboard discs to load the piston.

S-U49805

Additional Item Required

AC/DC Power Supply **S-U117601-115**



Ripple Tank

Equipment set for the graphic demonstration of fundamental phenomena found in wave theory based on waves made visible in water. The wave tank consists of a flat basin with a glass bottom set in an aluminum frame. The generation of waves in water is carried out by transferring the oscillations of an electromagnetic vibrator. The control unit is responsible for separately regulating both the frequency of the stroboscope as well as the frequency and amplitude of the vibrator.

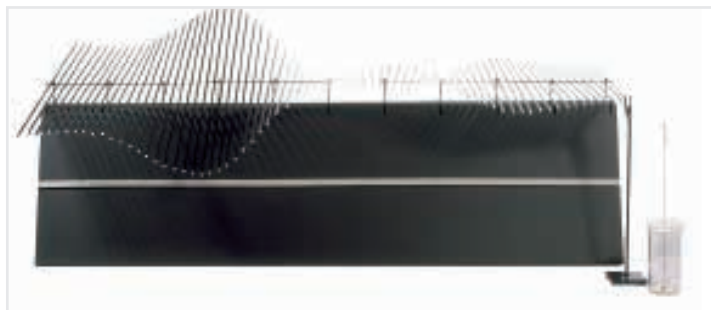
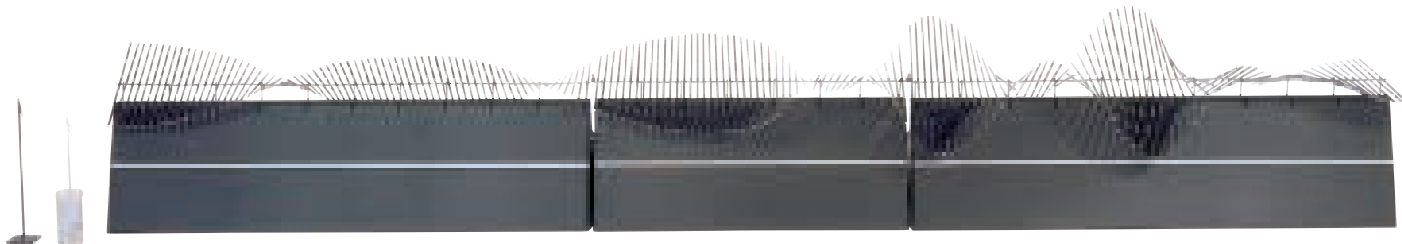
Supply voltage: 9 V - 12 V via 4-mm safety sockets

Light source: LED lamp 12 V / 100 W, GY6.35

U219101 \$1,100

Additional Item Required

DC Power Supply **S-U33020-115**



Demonstration Wave Machine, single module

The single module can be used to perform demonstrations, except for reflections at transitions and transition coupling including Module, Damping device, & Retention clip on a rod.

S-U45012

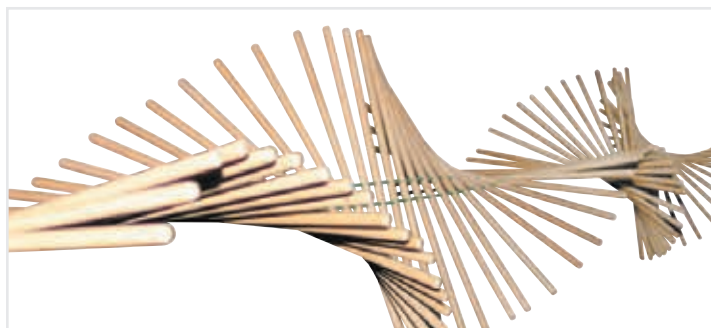
Demonstration Wave Machine, triple module

This wave machine is intended for conducting a wide range of experiments to demonstrate the behavior and properties of transverse waves. The wave machine consists of three A-shaped modules which are made of sheet steel, and can be coupled together and folded for the purpose of storage. The steel rods, representing wave motion are soldered to a steel-rod spring on this structure. The rod ends are furnished with fluorescent paint on one side and white paint on the other side. The equipment set also includes a damping device, a retention clip on a rod for demonstrating reflections (fixed ends) as well as two module couplers.

Dimensions:

Module 1:	92 cm long with 73 rods each 46 cm long
Module 2:	92 cm long with 73 rods each 23 cm long
Module 3:	60 cm long with 47 rods, 46 cm long at one end, 23 cm long at the other end
Total length:	2.44 m

S-U45011



Hand-Held Wave Machine

For demonstrating the propagation, reflection, refraction and superimposition of transverse waves. A chain of double pendulums is coupled by means of a bifilar torsion strip. Pendulum bobs for altering the moment of inertia are included in the scope of delivery. Two handles are used for manual excitation. 79 double pendulums.

S-U8431805



Kundt's Tube

Glass tube for demonstrating standing sound waves and calculating wavelengths of sound using cork powder in a method devised by Kundt. Cork powder is spread evenly throughout the tube by means of a filler chute. Then a sound source, e.g. a whistle, a 1700 Hz tuning fork (U10115) or a horn speaker (U8432680), is used to excite the powder into a regular pattern of nodes and anti nodes. The effective length of the tube can be altered by means of a piston.

Length:	600 mm
External diameter:	20 mm
Internal diameter:	17 mm

S-U8432845



Resonance Bowl

Dating from the Song Dynasty (960-1279 A.D.), this bronze basin has two prominent handles and four fish in relief, one in each quadrant. When the handles are rubbed briskly with the palms of the hands, a harmonious sound is heard and standing waves are excited in the four quadrants along the circumference, spouting water more than 30 cm into the air.

S-U30001



Great value!

Acoustic Demonstration Kit

For presenting a comprehensive overview on the field of acoustics. Delivery in a plastic tray with foam liner to enable protective storage of the individual components. The demonstration apparatus includes 34 components and devices.

Experiments:

Noise, tones, timbre, air columns, lip whistle.

Oscillations:

Chladni's acoustic figures, bell oscillations, harmonic oscillations, overtones, string oscillations, string instruments, tuning fork with writing stylus, oscillating rods, sirens.

Waves:

Propagation speed, Doppler effect, resonance, Helmholtz resonator, standing waves, waves in water, Sound analysis, Kundt's tube, Kundt's powder figures, megaphone, volume, ultra- and infrasound, scales (keys), triads, major and minor keys.

S-U8440012



Three-String Monochord

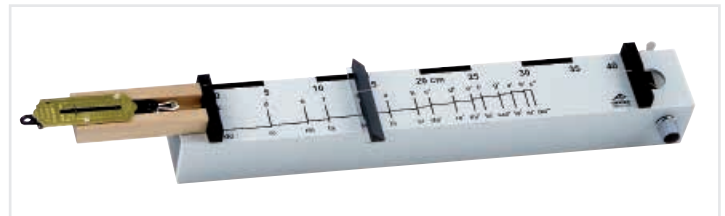
Used for experiments with vibrating strings, e.g. for investigating the dependence of pitch on the length, tension and thickness of a string. Contains three strings stretched across a resonance body. Two of the strings can have their length and tension adjusted via a bridge and thumbscrew respectively. The third string has a guide pulley and hook which can be attached to a spring scale and fitted with weights to measure the string tension.

Scale length: 60 cm
Scale division: cm and dm
Dimensions: 70 x 9 x 6.5 cm

S-U15100

Additional Items Required

Set of 3 Monochord Strings S-U15101



One-String Monochord

A wooden box, open on both sides, with clamping fixture for a string and reading device for the string tension.

Dimensions in mm: 490 x 70 x 60 (LxWxH)

Includes:

- Monochord
- Monochord Bridge
- Steel string (B)
- Perlon string (B)

S-U8431216

Additional Items Required

Set of 3 Monochord Strings S-U15101



Horn Loudspeaker

Point sound source for acoustic experiments e.g. for the excitation of Kundt's tube U8432845. The exit aperture of the loudspeaker can be used on the tube directly and is thus better suited than a larger loudspeaker. Barrel foot not included.

Frequency range: 300 Hz to 10 kHz
Power rating: 6 W (max 10 W)
Impedance: 8 Ohm
Stationary diameter: 10 mm5

S-U8432680



Helmholtz Resonator

Hollow glass bulb with a narrow tube leading out for demonstrating acoustic resonance. The fundamental oscillation is generated by blowing into the opening or tapping on the outside of the bulb. The elasticity and inertial mass of the air in the bulb cause the bulb to act as an acoustic resonator with a highly distinct resonant frequency. The frequency is dependent on the dimensions of the bulb and the tube. With a whole set of Helmholtz resonators it is possible to demonstrate how tones combine to form a tonal mixture.

Opening on the glass bulb: 14 mm dia.
Length of tube: 15 mm
Internal diameter of tube: 6 mm

70 mm dia. S-U8430310
52 mm dia. S-U8430320

40 mm dia. S-U8430330
32 mm dia. S-U8430340



Vibration Generator

Used for experiments studying oscillations and resonance. Springs, plates, rubber bands, and other accessories can be attached and made to vibrate. The generator is encased in a robust plastic housing which includes a mounting pin with 4-mm socket for accessory attachment (Chladni plates, resonance wire, rubber band etc.). Also includes a holder for a stand rod (up to 8 mm Ø) on the rear side of the apparatus to demonstrate standing waves in a coil spring. The generator is equipped with overload protection.

Connection: via 4-mm safety sockets
 Impedance: 8 Ohms
 Frequency range: 0 up to 20 kHz
 Overload protection: 1 A fuse
 Dimensions: 200 x 160 x 70 mm
 Weight: 1.4 kg

S-U56001

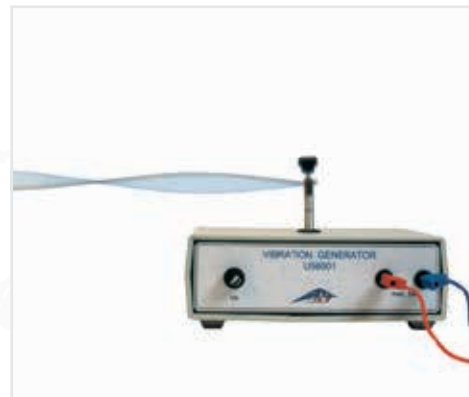


Power Function Generator

Sine and square wave generator especially well-suited for student and demonstration experiments. Illuminated, digital display for frequency and signal shape. Built-in amplifier is controlled with the volume knob.

Signal wave: Sine, square, positive square-wave
 Frequency range (1): 0.05 Hz - 3 kHz
 Resolution: 0.05 Hz
 Frequency range (2): 1 Hz - 50 kHz
 Resolution: 1 Hz
 Output voltage: 0 - ±12 V continuously adjustable, short-circuit proof max. 1 A
 Output current: max. 1 A
 Connection: via 4 mm-safety sockets
 Power consumption: max. 15 VA
 Dimensions: 45 x 195 x 115 mm
 Weight: 1.2 kg

S-U8533600-115



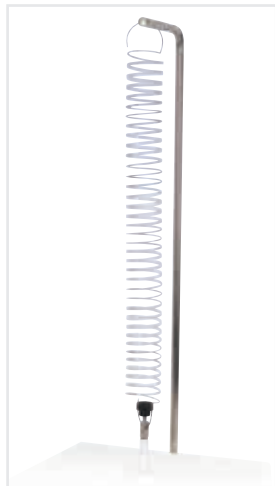
Rubber Band

Used for demonstrating stationary waves and wave propagation using the vibration generator U56001. 25 m, 2 mm Ø.

S-U56002

Have questions about our products? Contact us at **1.866.448.5846** or visit **3bscientific.com!**

Accessories for vibration generator



Accessories for Spring Oscillations

Used for the demonstration of standing waves in a coil spring used in conjunction with the vibration generator U56001. Consisting of angled stand rod, coil spring and connector pin for attachment of the spring to the vibration generator.

Rod: 470 x 8 mm Ø
 Spring constant: 3.9 N/m

S-U56003



Accessories for Rope Waves

Used for investigating standing transverse waves and their wavelengths as a function of rope tension at constant frequency. Consists of a base plate with stand rod, holder for dynamometer, pulley and rubber rope.

Base plate: 180 x 180 x 25 mm
 Stand rod: 525 mm
 Rope: 1 m

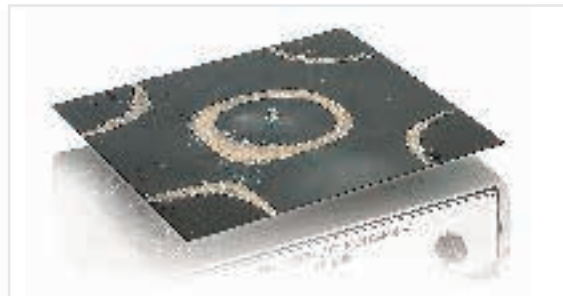
S-U85560081
 Additional Item Required
 Dynamometer S-U20033



Kinetic Gas Theory

Used for demonstrating the relationship between temperature, pressure and volume and elucidating molecular movements as a function of the state of aggregation. Differently colored balls (model gas) are put into a state of motion by a mechanical wave exciter. Includes: Plexiglass cylinder, 30 cm long; disc; and one set of colored balls.

S-U56004

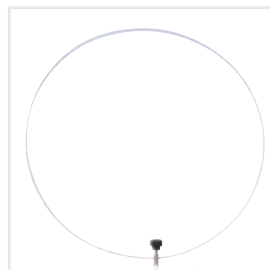


Chladni's Plates

Used for demonstrating Chladni's acoustic figures with fine, dry sand. Plates with 4 mm plugs.

Chladni Plate, square, 180 x 180 mm
 S-U56006

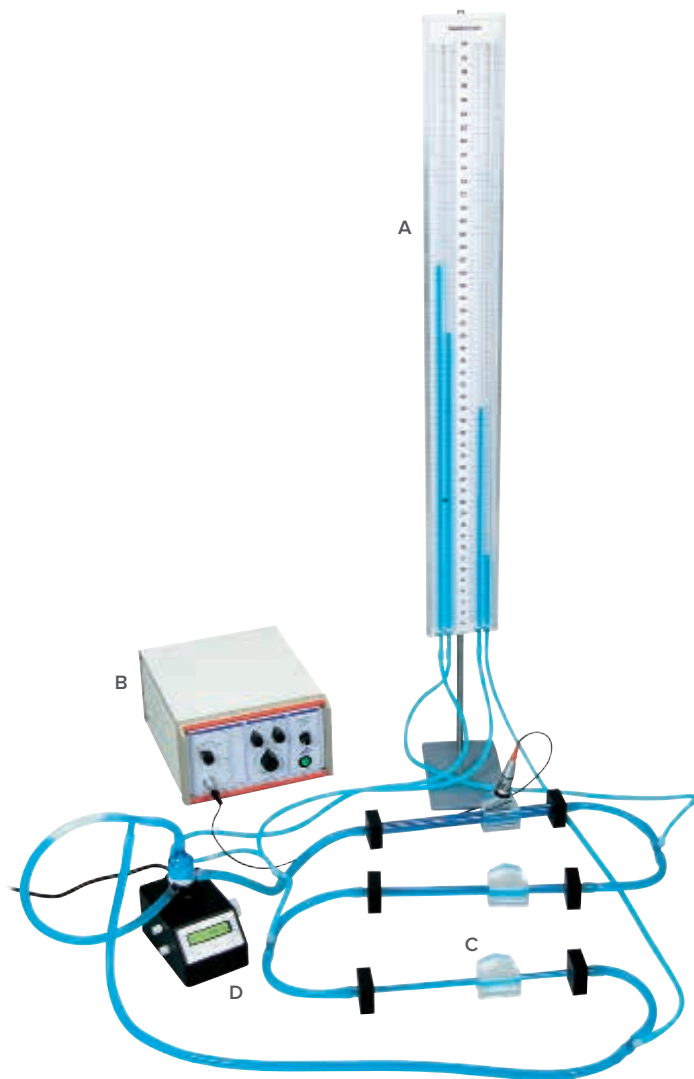
Chladni Plate, circular, 240 mm Ø
 S-U56005



Resonance Wire, Ring Shaped

Used for demonstrating fixed points in a wave and determining different frequencies. Wire ring with 4 mm plug.

Diameter: 290 mm
 S-U56007



A. Riser Tubes for Pressure Measurement

Set of four riser tubes arranged in front of a millimetre scale for measuring pressure status at up to four measuring points along the line of a flow. Includes tubing and Luer Lock connectors to make a circuit in which the fluid flows.

Length: 1000 mm
 Connectors: Luer Lock, male
 Length of tubing: 1200 mm
 Tubing connector: 3/8" female Luer Lock connector

S-U10003

B. Ultrasonic Doppler Pulse Generator

Control unit for conducting ultrasonic Doppler experiments using 2 MHz ultrasonic converter (U10016). Includes measurement and evaluation software for Windows operating system. If the radiated waves are reflected or scattered from moving particles or bubbles in fluid flow, the Doppler shift in frequency can be detected. The equipment detects the scattered waves and generates an audio signal at a volume that reflects the amplitude of the reflected signal and a frequency that reflects the speed of the scattering. At the same time, the amplitude is also displayed on an LED bar display. Sensitivity and volume can be adjusted by means of appropriate controls. The controller can also pass on data to a PC for detailed recording and evaluation. During measurement the current LF Doppler signal is displayed. Evaluation is by means of a Fourier transformation in the frequency domain and the result can be interpreted as the distribution of velocity within the flow.

Frequency: 2 MHz
 Gain: 10 – 40 dB
 Display: LED bar display and acoustic signal with volume control
 PC connector: Parallel, LPT, Sub D 25
 Mains voltage: 90 – 230 V, 50/60 Hz
 Dimensions: approx. 256x185x160 mm³

S-U10001

Additional Item Required

Ultrasonic Transducer 2MHz S-U10016

C. Flow Tubes and Hose Equipment Set

Equipment set including plastic tubes and hoses of various diameters and lengths for investigating flow phenomena using ultrasonic waves. Includes Doppler prisms for connecting an ultrasonic transducer to the tubes or hoses at three different angles.

S-U10002

D. Centrifugal Pump

Fluid pump for generating adjustable constant fluid velocity for investigating flow phenomena in a good approximation of laminar flow. The magnetic transmission of motor power to the pump head means the fluid is completely isolated from the drive module. To generate pulsing flows, the pump can be operated with a periodic signal.

S-U10005



Doppler Phantom Fluid

Phantom fluid with encapsulated micro-bubbles with excellent properties for scattering ultrasonic waves in the frequency range 1 – 6 MHz.

S-U10004

E. Ultrasound Transducer, 40 kHz, Equipment Kit

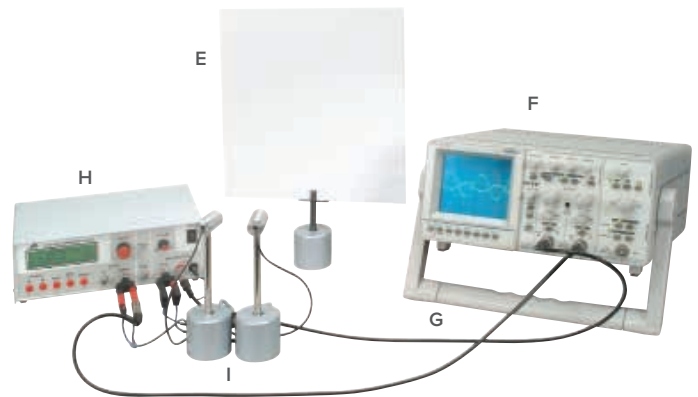
Equipment set for experiments on geometric and wave-mechanical acoustics. Based on the piezo-effect discovered by the Curie brothers, an AC voltage is applied to a piezo-electric body causing it to oscillate. Sound waves can also be used to excite the body and the oscillations can be converted into an electrical voltage signal. Converters can thus be used as both transmitters and receivers.

Resonant frequency: 40 kHz
 Band width: 6 kHz approx.
 Capacitance: 2000 pF
 Connector: Coaxial cable with two 4-mm safety plugs
 Stand rod: 145 mm x 10 mm dia.
 Dimensions: 40 mm x 25 mm dia.

Contents:

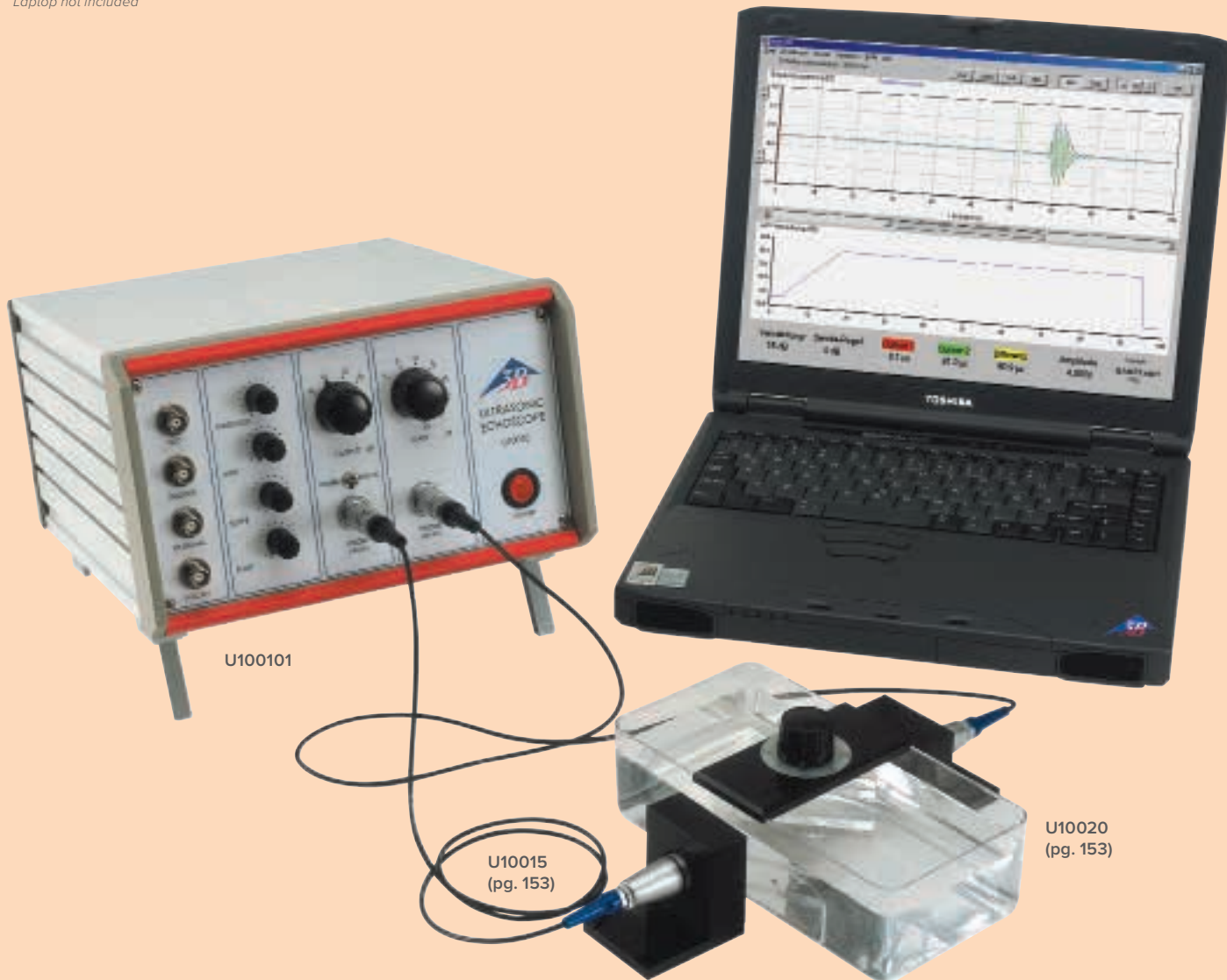
Ultrasonic Transducer, 40 kHz on stand rod

S-U8552003



Additional Items Required

F. Digital Oscilloscope S-U43569
 G. HF Cable, BNC/4-mm plug (2x) S-U11257
 H. Function Generator w/ Interface S-U11230-115
 I. Barrel Foot, 0.6kg (3x) S-U8611210



U100101

U10015
(pg. 153)

U10020
(pg. 153)

Ultrasonic Echoscope

The Ultrasonic Echoscope is an instrumental tool in preparing students for a career in Medical Physics. Ultrasonic experiments can be conducted in reflection mode, according to the pulse-echo principle, or in through-transmission mode. Experiments involving the Ultrasonic Echoscope can be performed with 1 MHz, 2 MHz or 4MHz transducers.

Frequency range:	1 MHz to 5 MHz
Transducer identification:	Automatic
Measuring mode:	Switchable between pulse-echo and through-transmission
Transmission signal:	Direct pulse ($< 1 \mu\text{s}$, 10 V to 300 V)
Transmission power:	0-30 dB, in 10 dB steps
Gain:	0-35 dB, in 5 dB steps
TGC:	Continuously adjustable threshold value, start value, rise time and gain time
	Maximum gain of 30 dB
Connections:	TGC signal, trigger, low-frequency signal, high-frequency signal via a BNC jack in each case
Scanning rate:	10 MHz per channel
Dimensions:	256 x 257 x 156 mm
Mains voltage:	115 V / 230 V, 50/60 Hz
USB Cable Connection	S-U100101

Ultrasonic Echoscope Experiment

The ultrasonic transducers are connected via robust snap-in jacks, their frequencies are identified automatically by the ultrasound scanner. Ultrasound tests can be conducted in reflection mode (pulse-echo principle) or through-transmission mode. The transmitting power and amplification can be adjusted over a wide range. Losses in the intensity of the irradiated ultrasonic pulses can be compensated by means of time-dependent amplification (time-gain-control or TGC). The threshold value, starting value, rise time and gain time are adjustable.

The most important function signals (trigger, TGC, low-frequency (amplitude) signal, high-frequency signal) are output to BNC sockets and can be displayed on an oscilloscope.

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Perfect tool to prepare students for a career in Medical Physics!



Arm Phantom Set

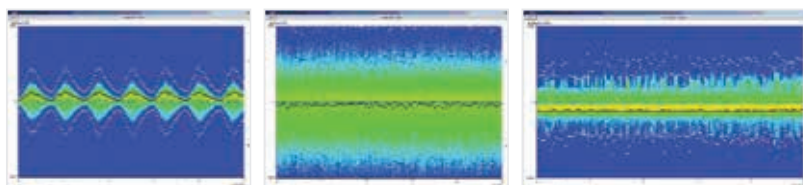
Model of a human arm for simulating Doppler sonographic examinations of blood vessels. Includes an ultrasonic Doppler probe and so-called phantom fluid for simulating blood. The model features a variety of tubing (simulating blood vessels), including one tube which simulates a blood vessel stricture or stenosis. Using the ultrasonic Doppler apparatus (U10001) and a centrifugal pump (U10005), it is possible to simulate typical examinations used in vascular diagnosis. Doppler spectra are measured for the flow through arteries and veins with both a pulsing flow (like a heart beat) and continuous flow, allowing sounds typical of Doppler sonography to be heard. One particularly interesting feature is the possibility of observing the change in the spectra and the Doppler sound due a stenosis (stricture) in the elbow. In addition, it is possible to calculate the flow index and resistance index from the curves measured with a pulsing flow.

Probe frequency: 2 MHz
 Probe dimensions: 200 mm x 15 mm diam.
 Length of lead: 1 m

Includes:

- Model arm with stenosis
- Silicone tubing
- 3/8" connectors
- Ultrasonic Doppler probe
- Phantom fluid to simulate blood, 250 ml
- Funnel
- Rubber stoppers

S-U10019



Model Eye for Ultrasonic Biometry

Model of the human eye, enlarged to a scale of 3 to 1, including the cornea, the lens and glass bodies for demonstrating the fundamentals of ultrasonic biometry. The biometric ratios in the human eye (distance between cornea and lens, thickness of lens, distance between lens and retina) are very well suited to demonstrating measurement using a pulse-echo method with ultrasound. With the help of an ultrasonic echoscope (U100101) and a 2-MHz ultrasonic probe (U10016), typical echoes and the speed of sound can be measured. This allows the geometry of individual objects in the eye to be calculated. A lesion close to the back of the eye becomes apparent due to the diffuse nature of its echo. Diameter: 80 mm

S-U10018

Additional Items Required

Ultrasonic Echoscope S-U100101
 Ultrasonic Probe 2 MHz S-U10016
 Ultrasonic Coupling Gel S-XP999

Recommended for comparison

Model of the Human Eye S-F15



Ultrasonics Set

Equipment package for demonstrating the basic properties of waves using 40-kHz ultrasonic waves as an example in a space-saving, table-top experiment. Two rod-shaped microphone probes are used to record and analyze oscillations with the help of a standard oscilloscope. An ultrasonic pen can be used to record wave fronts in the plane of the table as lines of equal phase (isophases).

Contents:

- 1 Operating unit US
- 2 Ultrasonic transmitters 40 kHz
- 2 Microphone probes
- 1 Ultrasonic pen
- 1 Concave semi-circular mirror
- 2 Ultrasonic blocks/mirrors
- 1 Set for double slit
- 1 Ultrasonic semi-silvered mirror
- 1 Ultrasonic absorber
- 2 BNC cables
- 1 Cable, BNC /4-mm safety sockets
- 1 Plug-in power supply 12 V AC, 700 mA

S-U61011-115

Additional Items Required

USB Oscilloscope S-U29104



Ultrasound in Solids Equipment Set

Use the equipment set for the investigation of the propagation of longitudinal and transversal waves, known as shear waves. The equipment set also allows for the determination of the shear modulus, elasticity modulus and Poisson's ratio in solid bodies.

Determine ultrasonic attenuation in liquids through time dependent amplitude measurement with the aluminum test block. Ultrasonic transducers are available in 1 MHz, 2 MHz and 4 MHz and are not included in the scope of delivery.

Features:

- Acoustic basin
- Polyacrylic test plate with protractor scale
- Two holders for ultrasonic transducers

Specifications

Sound trough: 20 x 10 x 6 cm
 Test plate: 10.4 x 7.5 x 5 cm
 Protractor scale: 360°, 5° divisions
 Polyacrylic block: 7 x 4.5 x 1 cm

S-U10020



Ultrasonic Transducers

Ultrasonic probe for investigations of penetration levels and depth resolution. It includes a 16-mm piezo-ceramic disc in a die-cast metal case, adapted to sound in water/acrylic glass, a 1 meter long cable with a frequency-coded snap-in plug.

Dimensions: 65 mm, 27 mm Ø

1 MHz S-U10015
 2 MHz S-U10016
 4 MHz S-U10017

Measure the speed of sound in a variety of mediums!



Polyoxymethylene Test Block

The Polyoxymethylene Test Block is an accessory for use with the Ultrasound in Solids Equipment Set to examine the spread of transverse waves in plastic. Different properties of polyoxymethylene can be determined such as the elastic constants, the shear modulus, the modulus of elasticity and the Poisson ratio.

Protractor scale: 360°, 5° divisions
 POM block: 70 x 45 x 10 mm³
 Dimensions: 104 x 75 x 50 mm

S-U10023



Aluminum Test Block

Accessory for use with the Ultrasound in Solids Equipment Set to examine the propagation of transverse waves in metals. Different properties of aluminum can be determined such as the elastic constants, the shear modulus, the modulus of elasticity and the Poisson ratio.

Features:

- High reflection coefficient in water
- Measure attenuation in liquids
- Protractor with scale

Protractor scale: 360°, 5° divisions
 Aluminum block: 70 x 45 x 10 mm³
 Dimensions: 104 x 75 x 50 mm

S-U10022



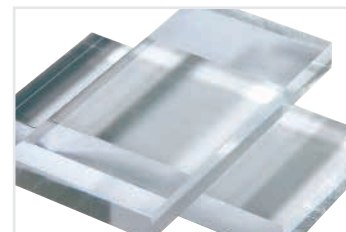
Acrylic Body with Drilled Holes

Polished polyacrylic block with bores of various diameters and varying distance from the surface. Both the 1 MHz and 4 MHz transducers are required for studying resolution. 150 x 80 x 40 mm

Experiment Topics:

- Determine the speed of sound and the attenuation of ultrasonic signals in polyacrylate
- Localize defects
- Investigate aberrations resulting from acoustic shadows and ground returns
- Analyze frequency-dependent resolving power
- Display manual B-images.

S-U10027



Pair of Reflection Blocks

Fine-tune your studies of sound by measuring attenuation as a function of frequency and multiple echoes from this polished polyacrylate block. A 4 MHz transducer (U10017) is especially suitable for such measurements. An echo pattern comprising at least 3 echoes is recorded, and the spectra of the individual echoes analyzed. The result of the analysis is a shift in the average frequency toward lower frequencies, due to a stronger attenuation of the signal's high-frequency components. 80 x 40 x 10 mm

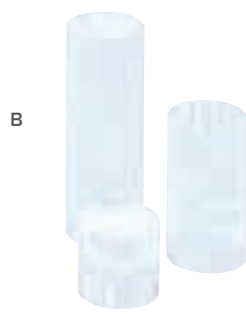
S-U100251



A. Heart Valve Model

Double-vessel with a rubber membrane and pressure regulator is used to demonstrate the operation of a heart valve. Tests conducted with the Heart Valve Model produce images similar to those of a beating heart's valve during echocardiography in medical diagnostics. 160 x 70 mm

S-U10029



B. Set of 3 Cylinders

These polished polyacrylate cylinders are used to ascertain the speed of sound and the attenuation of ultrasonic waves in transparent acrylic. Measurements can be performed in reflection mode or through-transmission mode.

Length : 40 mm, 80 mm and 120 mm
 Diameter: 40 mm

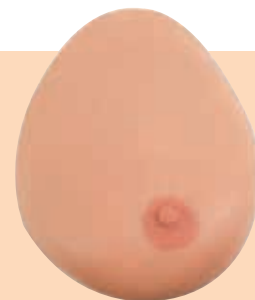
S-U10026

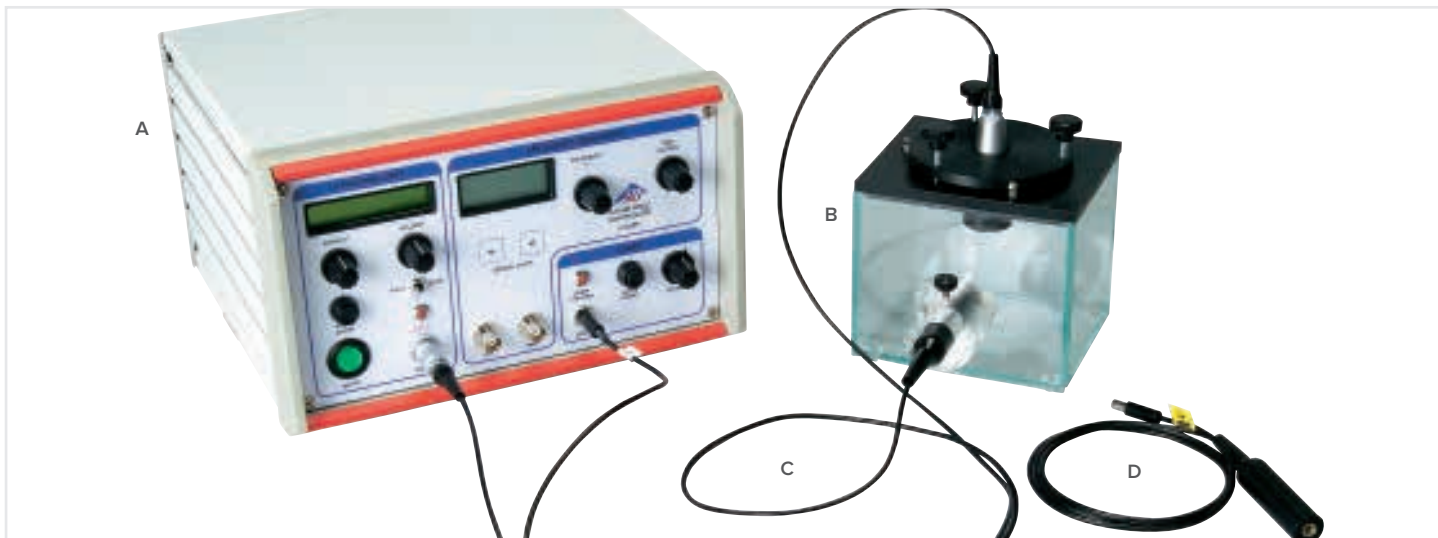
Breast Self Examination model

Realistic, natural casting of a female breast for use with the Ultrasonic Echoscope (U100101). 52 x 24.5 x 9.5 cm; 2.3 kg

- Made of SKIN/like™ high-quality silicone
 - Realistic to the touch and dermatologically tested
 - Benign and malignant tumors are featured
- Includes multilingual product manual and talcum powder.

S-L55/1





A. Ultrasonic Continuous Wave Generator

Use this apparatus to generate high-energy ultrasonic continuous waves (CW), or stationary waves. The generator's transmission power can be adjusted continuously and activated or deactivated independently via the voltage supply on the ultrasonic transducer. The integrated LCD display makes reading your measurements trouble-free. You can select from three preset transmitting frequencies (2, 4 and 8 MHz) and an auxiliary monitor output allows more precise scrutiny of the transmitted frequency when attached to an oscilloscope or digital counter. The device includes a piezo-ultrasonic transducer in a die-cast metal housing, a 1 meter connecting cable and a BNC plug.

Frequency:	2 MHz, 4MHz, 8MHz, adjustable via a selector switch
Output signal:	Sinusoidal, continuously adjustable from 5 V _{ss} to 50 V _{ss} w/ independent disconnect facility and indicator lamp
Output power:	Max. 25 watt
Connection:	BNC jack
Voltage display:	3-digit LCD
Height of digits:	10 mm
Monitor signal:	TTL to BNC socket
Laser output:	3 V DC, max. 300 mW at jack socket, with independent disconnection facility and indicator lamp
Dimensions:	256 x 86 x 156 mm
Mains voltage:	115/230 V, 50/60 Hz
Power consumption:	Approximately 30 VA
Ultrasonic transducer:	Piezo-ceramic, 16 mm Ø
Dimensions:	65 x 27 mm Ø

S-U100061

Additional Items Required

Laser Diode	S-U10007
Test Vessel	S-U10008
Projection Screen	S-U17130
Stand Base	S-U13265
Laboratory Jack (160 x 130 mm)	S-U15021

B. Laser Diode for Debye-Sears Effect

Safety Class II.	
Beam spot:	< 6 mm Ø at a distance of 3 m
Wavelength:	650 nm ±10 nm
Power:	< 1 mW
Supply voltage:	3 V DC
Current consumption:	Max. 30 mA
Connector:	Jack plug, 3.5 mm Ø
Dimensions:	80 mm x 18 Ø

S-U10007

C. Ultrasonic Test Vessel

Made of transparent acrylic, the Ultrasonic Test Vessel possesses a lid and a transducer mounting. Three adjustment screws can be used to adjust the stationary wave. A laser fixture with a lens mounting aligned vertically to the sound axis allows demonstration of the Debye-Sears effect and projection of the ultrasonic waves. The device comes with a plano-convex lens on a square mounting for projection experiments.

Test vessel:	≥100 x 100 x 120 mm
Testing volume:	Approximately 1 liter
Laser fixture:	8 mm Ø inside
Lens:	Plano-convex, f=100 mm, 16 mm Ø

S-U10008

D. Laser Diode for Debye-Sears Effect, Green

Laser diode of protection classification IIIa with 1 m connector lead and barrel connector for connecting ultrasonic cw generator (U100061).

Wavelength:	Approx. 432 nm
Power:	< 5 mW
Supply voltage:	3 V DC
Current consumption:	Max. 250 mA
Dimensions:	90 mm x 17 mm dia.

S-U10009

Microwave Set

Equipment set for conducting wave optics experiments involving wavelengths in the cm range. A transmitter with a horn antenna radiates a narrow beam of linearly polarised electromagnetic waves with a wavelength of about 3 cm. The direction of polarisation can be altered by rotating the antenna around the axis of propagation. To detect the waves, a horn antenna receiver and a microwave sensor are provided. A control unit converts the intensity of the signal received into a proportionally large output voltage that can be measured using a voltmeter. It is also possible to switch on an acoustic signal with a volume that is proportional to the intensity of the signal.

Oscillator frequency:	10.5 GHz (U8493600-115)
Power of transmitter:	10–25 mW
Internal modulator frequency:	3 kHz approx.
Acoustic signal:	Switchable
External modulation:	100 Hz –20 kHz, 1 V max.
Output voltage:	10 V max.
Receiver with horn antenna:	Silicon diode with resonator
Microwave sensor:	Silicon diode with resonator
Dimensions of basic apparatus:	Approx. 160 x 200 x 75 mm ³
10.5 GHz (115 V, 50/60 Hz)	S-U8493600-115



Additional Items Required

Analogue Multimeter, AM50	S-U17450
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Electrostatics Experiments Kit

Used for vivid demonstration of important electrostatics phenomena. The set allows one to carry out a series of interesting experiments in electrostatics, including many recreations of famous historical experiments. Most parts are equipped with a 4 mm plug to mount them and are easily interchangeable on the included insulated stand. For connections to the charge source plug leads or the included metal chains can be used.

Includes:

- Insulated stand with terminal socket
- Sphere with plug, 30 mm Ø
- Moving sphere
- Pith cylinder pendulum
- Pieces of pith in box
- Housing with sphere-shaped electrode
- Housing with point-shaped electrode
- Electric whirl
- Tissue paper umbrella
- Lighting board
- Carillon
- Friction rod PVC with 4 mm bore hole
- Pair of metal chains

S-U8491500

Additional Items Required

- Wimshurst Machine S-U15310
Van de Graaff Generator S-U15300-115



Van de Graaff Generator with Discharge Electrode

Used for the generation of DC potentials with low current for multiple experiments in electrostatics. Detachable conductor sphere, drive motor with controllable speed, including small discharge sphere on rod.

- | | |
|-------------------|-------------------------|
| Max. voltage: | Approx. 100 kV |
| Length of sparks: | Up to 5 cm |
| Conductor sphere: | 190 mm dia. |
| Sphere on rod: | 460 mm, dia. 90 mm |
| Dimensions: | Approx. 24 x 19 x 62 cm |

S-U15300-115

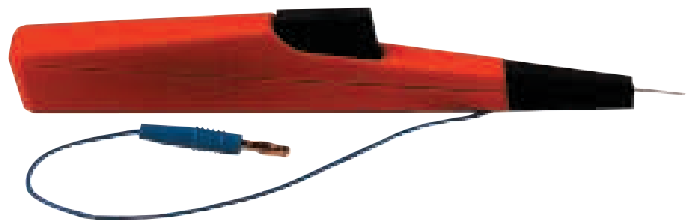


Deluxe Wimshurst Machine

A top-quality, hand-operated apparatus for performing electrostatic demonstrations. Designed to be "student-proof" in construction and materials. This unit is unique in that the current can be directed to the discharge spheres, the Leyden Jars or both simultaneously. For generating high DC voltages; complete with 2 Leyden jars as well as spark gap, hand-operated crank and V-belt drive.

- | | |
|------------------------|---------------|
| Diameter: | 31 cm |
| Max. spark length: | 12 cm |
| Short-circuit current: | Approx. 30 µA |
| Base board dimensions: | 29 x 36 cm |
| Weight: | 3.4 kg |

S-U15310



Piezoelectric Charge Source

Hand-held unit used for the simple generation of safe voltages needed in electrostatic experiments. Featuring the functional principle of a piezoelectric gas lighter. With shortened earthing sleeve and 4-mm cable plug.

- | | |
|----------------------|--------------------------|
| Charge: | Approx. 2 µC |
| Crystal capacitance: | 100 pF |
| Voltage: | Max. 12 – 15 kV |
| Dimensions: | Approx. 250 x 25 x 33 mm |
| Weight: | Approx. 130 g |

S-U8490210



Electrolytic Trough

Equipment set for recording equipotential lines of electric fields. Electrodes of different shapes can be used to measure equipotential lines for a plate capacitor, dipole, induced surface charge and a Faraday beaker.

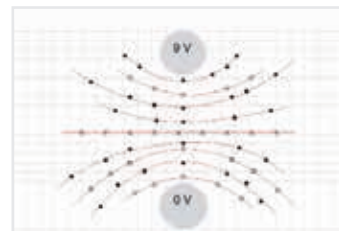
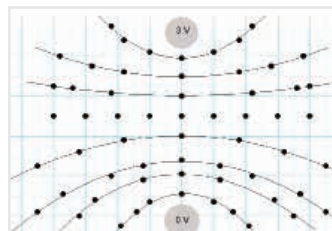
Includes:

- 1 Plastic trough
- 1 Stand with measurement electrode
- 2 Bar electrodes
- 2 Round disc electrodes
- 1 Ring electrode
- 20 Sheets of mm-grid paper

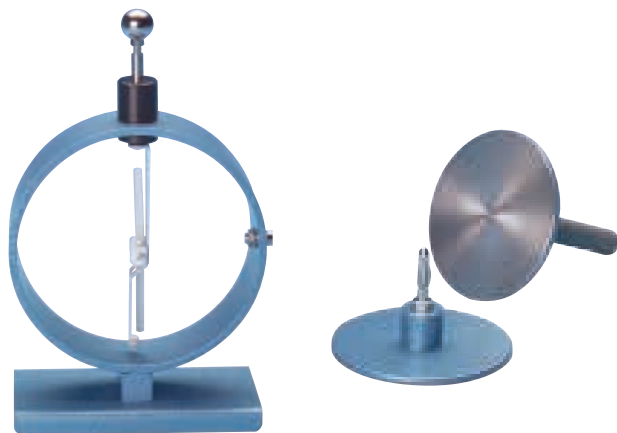
Additional Items Required

- Power Supply S-U33020-115
- Multimeter S-U40165
- Connecting Leads S-U138101

S-U51001



Equipotential Lines of Point Charges



Electroscope

Provide a classic introduction to electrostatics with our sturdy electroscope. When charged, the conductive rod rotates, indicating charge magnitude. The shield ring measures 13 cm in diameter and is constructed of powdered finish steel. The shield ring can be grounded with banana plug connectors. A Charge Sampler and a Capacitor Plate is included.

S-U17250



Kolbe's Electroscopic

This quantitative electroscopic allows you to take readings of charge magnitude. It features a glass and metal housing with 4mm sockets for grounding purposes. The pointer is mounted on a pivot bearing and is electrically insulated from the metal housing. A transparent scale allows reading of the electrical charge. For classroom demonstration experiments the electroscopic is suitable for shadow projection.

S-U8532131



Charge Spoon

Metal plate on insulating rod for charge transport and for experiments on electrostatic induction.

Description	Item No.	Price	Length	Plate	Rod Ø
Charge Spoon, SM	S-U11051		205 mm	40 x 35 mm	10 mm
Charge Spoon, LG	S-U11052		265 mm	40 x 70 mm	10 mm

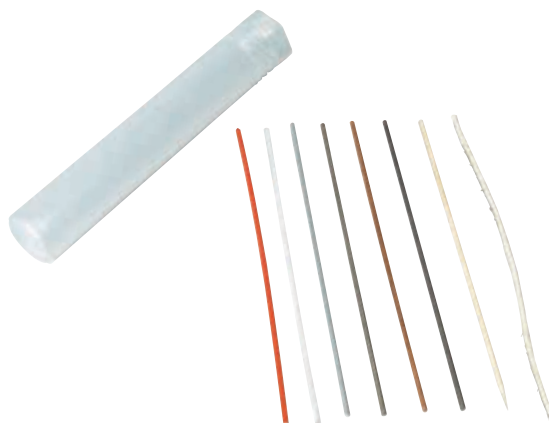


Plate Capacitor, 175 cm²

This device is used to investigate the relationship between charge, voltage and capacitance, as well as determine the dielectric and electric field constants. It consists of a fixed plate and a movable plate on a guide rail. A centimeter scale is used to read the plate spacing. The device comes with four dielectric sample plates made of acrylic, bakelite, plywood and cardboard.

Plate spacing: 0 - 150 mm
 Plate diameter: 149 mm
 Plate area: 175 cm²
 Connection: Via 4-mm safety jacks

S-U30040



Set of Conductors and Non-Conductors

Samples of eight materials for experiments to investigate the electrical conductivities of different materials. In a storage container.

Materials: Iron, aluminium, copper, steel, wood, glass, plastic, cotton
 Length: approx. 200 mm

S-U8495350



Friction Rods

Two rods for experiments on frictional electricity, made of PVC and acrylic.

Length: 250 mm
 Diameter: 10 mm.

S-U11053



Faraday cup

Aluminum cup for investigating the charge distribution in the case of a hollow metal body, with 4 mm-plug for placing on electroscopes.

Connection: 4 mm-plug
 Height: 105 mm
 Diameter: 58 mm

S-U8496460



Sphere with plug

For experiments on electrostatics, e.g. for determining the capacitance of a sphere, and for experiments on electrostatic induction. Hollow brass sphere, nickel-plated with 4 mm-plug.

Diameter: 30 mm.

S-U8532126

Have questions about our products? contact us at **1.866.448.5846** or Visit **3bscientific.com!**

Experiment Topics

- Basic operational tests
- Electrostatic tests
- Measurement of static electric field strength
- Capacitor tests
- Measurements of potential with an electrostatic meter



A. Electric Field Meters

A star-shaped modulation vane-wheel connected to earth is mounted a short distance in front of a measurement electrode, also star-shaped. Influenced by the electric field, the charges generate an alternating current proportional to the field strength. A selective amplifier measures this alternating current without the electric field experiencing any average energy loss over time. The device is protected against excess voltage.

Specifications:

Alternating output
Voltage: Max. 10 V
Measuring ranges: 100 V/cm, 300 V/cm, 1000 V/cm
Capacitor plate: 178 mm Ø with 50 mm bore

Includes:

- 1 Electric field meter
- 1 Capacitor plate
- 1 Voltage measurement plate, measuring range 1x
- 1 Voltage measurement plate, measuring range 10x
- 1 Experiment description

S-U8533015-115

Additional Items Required

B. Multimeter S-U40165
C. Holding Rod S-U11055
D. Drip cup w/Trap S-U8496410

D. Drip Cup with Trap

For experiments involving the electrostatic charging of fluids. The drip cup with trap is made of metal. Drip cup with side-mounted holder and glass cock to regulate drip rate. Trap with 4-mm connector.

S-U8496410



High Precision Resistors

High precision resistors in plastic housing with 4 mm safety plugs.

Dimensions: Approx. 122 x 70 x 30 mm³



Item Number	Price	Resistance	Tolerance	Load Rating
S-U51004		1 Ω	1%	4 W
S-U51005		10 Ω	1%	4 W
S-U51006		100 Ω	1%	4 W
S-U51007		1 kΩ	1%	4 W
S-U51008		10 kΩ	1%	4 W
S-U51009		100 kΩ	1%	1 W
S-U51013		300 kΩ	5%	3 W
S-U51010		1 MΩ	1%	1 W
S-U51011		10 MΩ	1%	1 W

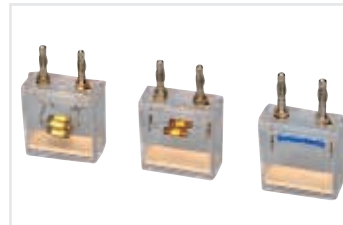


Electrometer

Impedance converter with high-resistance input for measuring extremely small charges and currents. The input signal is converted into a proportional voltage, which can then be measured with an external voltmeter. Includes a 12-V AC plug-in power supply.

Electrometer gain factor:	1.00
Input resistance:	>1,012 Ω
Output resistance:	<1 k Ω
Input current:	<10 pA
Input capacitance:	<50 pF
Max. output voltage:	± 8 V
Resistance to excess voltage:	1 kV (from low-resistance sources) 10 kV (from high-resistance sources)
Supply voltage:	12 V AC

Electrometer (115 V, 50/60 Hz) S-U8531408-115



Additional Items Required

Electrometer Accessories
DC Power Supply 450 V (115 V, 50/60 Hz)

S-U8531420
S-U8521400-115

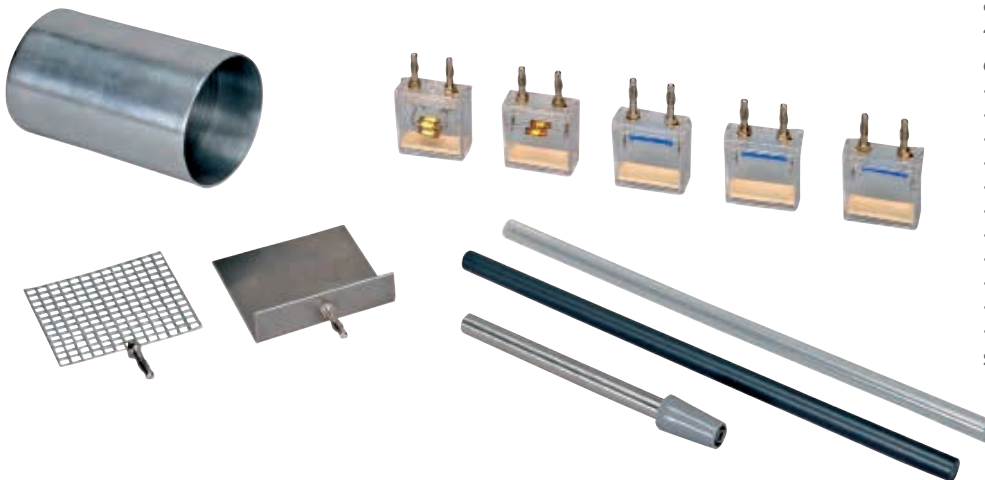
Electrometer Accessories

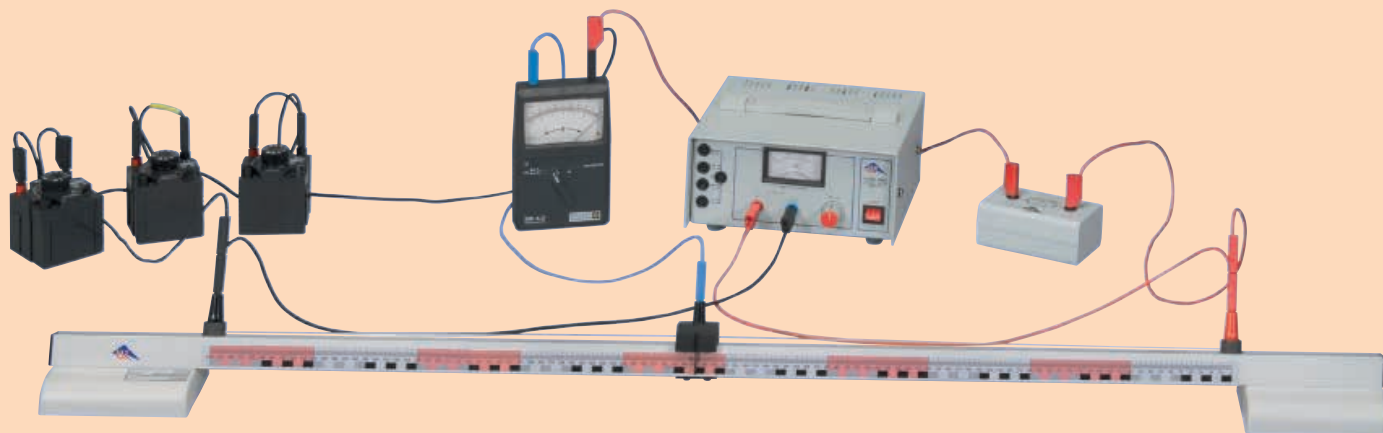
Set of accessories for carrying out basic experiments on electrostatics, electricity and the photoelectric effect in combination with an electrometer (U8531408-115) and 450-V DC power supply (U8521400-115).

Contents:

- 1 Faraday cup
- 1 Pair of friction rods
- 1 Metal rod with 4 mm drilled hole
- 1 Safety adapter socket
- 1 SK plug-in capacitor 1 nF
- 1 SK plug-in capacitor 10 nF
- 1 SK plug-in resistor 100 M Ω
- 1 SK plug-in resistor 1 G Ω
- 1 SK plug-in resistor 10 G Ω
- 1 Zinc electrode
- 1 Grid electrode

S-U8531420





Deluxe Wheatstone Bridge

This device is used to measure resistances in bridge circuits and investigate voltage drops across wires. It consists of a rail with a scale mounted at two points and a resistance wire stretched between two connecting sockets. A sliding contact on the resistance wire is used to set the resistance of the resultant two wire sections. A Wheatstone bridge circuit is configured to determine unknown resistances. The device is only suitable for low voltages.

S-U8551002

Dimensions: 1,300 x 100 x 90 mm
 Rail: 30 x 30 mm
 Scale: 0 – 1000 mm
 Scale divisions: mm
 Resistance wire: 1 m, 0.5 mm Ø
 Material: NiCr
 Resistance: 3 Ω
 Connection: 4-mm safety jacks
 Maximum permissible voltage: 8V
 Maximum permissible current: 1.5 A

Additional Items Required

DC Power Supply 0 to 20V, 5A
 Zero-point Galvanometer
 Resistance Decade
 High Precision Resistor
 High Precision Resistor 100K ohm
 Connecting Leads

S-U33020-115
S-U11170
S-U40191
S-U51004
S-U51009



Resistance Measurement Bridge

Used to investigate the dependency of electrical resistance on conductor length, conductor cross-section and material. 6 wires are laid out side by side on a block of wood and both ends connect to 4-mm sockets.

Wire lengths: 1,000 mm
 Dimensions: 1,085 x 70 x 55 mm (LxWxH)
 Weight: approx. 1.5 kg

S-U8492030

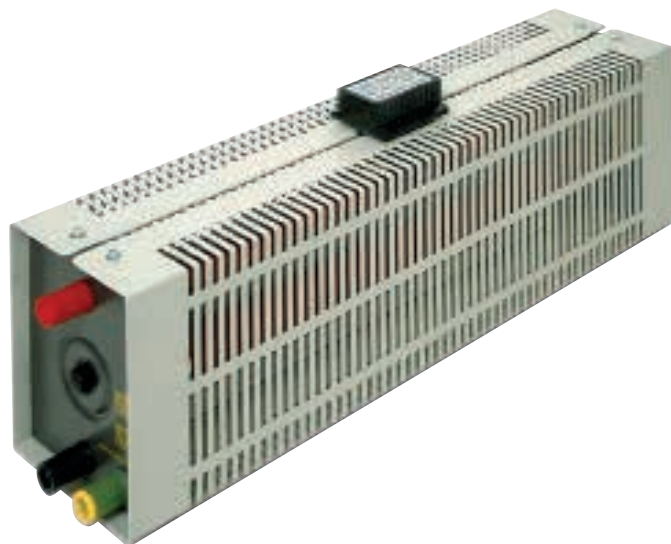
Additional Item Required

LCR Meter
S-U40162

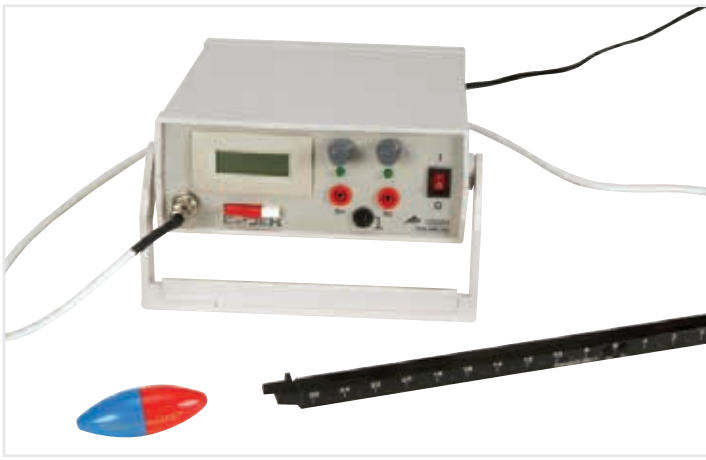
Rheostats

Used during experiments in extra-low and low voltage circuits, these heavy-duty variable resistors have shockproof housings and built-in ground sockets. Use them as a continuously variable series resistor, for setting power levels, as fixed resistor or as voltage divider.

Resistance tolerance: 10% from nominal value
 Max. permissible power: 320 W (continuous operation), 640 W (max. 15 min)
 Max. permissible voltage: 600 V
 Terminals: 4 mm safety sockets



Item Number	Price	Resistance in Ω	Current Rating in A (continuous)	Current Rating in A (continuous)
S-U17350		1	18	25
S-U17351		3.3	10	12
S-U17352		10	5.7	8
S-U17353		33	3.1	4.4
S-U17354		100	1.8	2.5
S-U17355		330	1.0	1.4
S-U17356		1000	0.57	0.8
S-U17357		3300	0.31	0.44

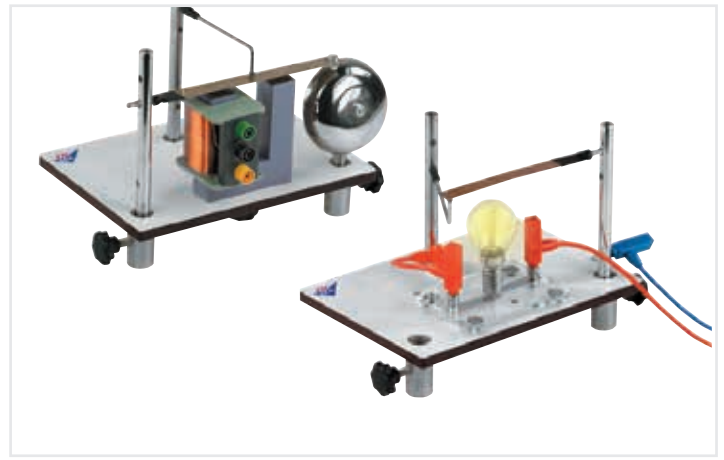


Digital Teslameter with Probe

This economical digital teslameter will allow students to incorporate quantitative measurements into their magnetism experiments. The unit includes a Hall sensor probe for measuring axial and tangential magnetic fields up to 200 mT. The probe also serves as a ruler as it includes a metric scale. There are two measuring ranges, 0-±20 mT and 0-±200 mT. The teslameter can be calibrated by the user. In addition to having a digital display, the unit outputs a voltage proportional to the magnetic field which can be measured with a data logger, XY-recorder or analogue multimeter.

Measurement ranges:	0 – ±20 mT, 0 – ±200 mT
Resolution:	0.01 mT, 0.1 mT
Digital Display:	3½ digit LCD
Height of digits:	13 mm
Input:	BNC socket
Output:	4 mm safety sockets
Dimensions of unit:	205 x 230 x 85 mm ³
Dimensions of probe:	360 x 15 x 25 mm ³

S-U33110-115



Bell, Relay and Bimetallic Switch Assembly Kit

Equipment kit comprising materials to assemble electromagnetic switches and bimetallic switches.

Base plate: 200 x 140 x 40 mm

Weight: 1.6 kg

Contents:

- 1 Stand plate with 3 clamps
- 1 Bell, 70 mm in diameter
- 2 Contact rod with three 4 mm cross holes
- 1 Leaf spring with connector
- 1 Bimetallic strips with connector
- 1 Armature with connector
- 1 Contact pin with connector
- 1 U-core, 20 mm²
- 1 Coil, 500 turns

S-U8497700

Magnetic Field Lines Device, Three-Dimensional

For the three-dimensional demonstration of the magnetic field of a round bar magnet. This Plexiglas object has a center hole and features a special highly viscous fluid and iron filings. When the magnet is inserted, the evenly distributed iron filings inside the fluid align themselves in accordance with the magnetic field lines. An enclosed air bubble ensures that a good shake of the device causes the iron shavings to be evenly distributed.

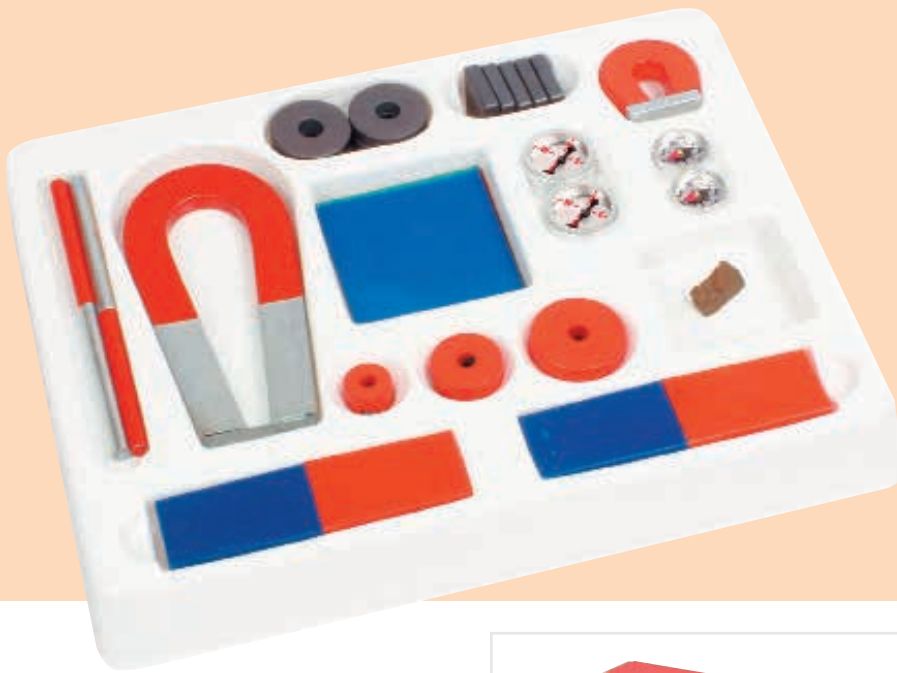
Dimensions:	115 x 115 x 120 mm
Diameter of the hole:	21 mm
Weight:	0.8 kg

S-U8491925

Additional Item Required

Round Bar Magnet (50 x 20 mm) **S-U8495210**





Magnetic Equipment Set

A selection of various magnets for introducing the subject of magnetism; complete with a specially molded storage tray.

Includes:

- 3 AlNiCo round magnets: 12 mm, 19 mm, 24 mm Ø
- 1 AlNiCo horseshoe magnet, 25 mm long
- 2 Chromium-steel bar magnets, 100 mm x 6 mm Ø
- 1 Natural magnet
- 4 Colored magnetic foils, 50x50 mm
- 2 Bar magnets in a protective plastic case, 80 mm long
- 2 Drawing compasses, 19 mm Ø
- 2 Drawing compasses, 16 mm Ø
- 5 Iron ring magnets, 25 mm Ø
- 5 Iron magnets, 19 x 19 x 5 mm
- 1 Chromium-steel horseshoe magnet, 100 mm long

S-U19555



Demonstration of Magnetic Field Lines, transparent

When used in conjunction with an overhead projector, this device demonstrates the presence of magnetic field lines. The transparent plastic vessel is filled with a liquid containing magnetic powder. Magnets and an experiment manual are included.

S-U19560



Large Horseshoe Magnet with Yoke

Poles colored red/green.

Length: 130 mm
Pole spacing: 60 mm
Pull-off force of yoke: 250 N

S-U20570



Horseshoe Magnet with Yoke

Chromium-steel U-magnet with yoke, red and silver colored poles.

Dimensions: 140 x 20 x 10 mm

S-U19553



Round Magnet, AlNiCo

Round magnet made of AlNiCo. Poles colored red/green.

Length: 200 mm
Diameter: 12 mm

S-U20550



Cylindrical Bar Magnet 50 x 20

Round bar magnet with poles marked red and green.

Dimensions: Approx. 50 x 20 mm dia.

S-U8495210



Bar Magnet, Alnico, 70 mm

Alnico bar magnet with poles marked red and green.

Dimensions: approx 70 x 20 x 8 mm³

Weight: Approx. 80 g

S-U8491820



Pair of Bar Magnets, AlNiCo

Pair of AlNiCo bar magnets, red, with north pole marked. Including two iron yokes.

Dimensions: 60 x 15 x 5 mm

S-U19551

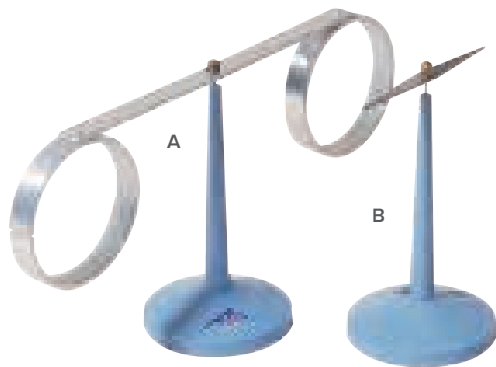


Pair of Bar Magnets, 80 mm

Pair of bar magnets in a protective plastic case; poles identified in red and blue.

Dimensions: 80 x 22 x 10 mm

S-U19550



A. Appliance for the Introduction of Lenz's Law

Used for qualitative investigation of Lenz's law. One closed and one open conductor loop, with point bearing on base.

Length: 195 mm
Height: 110 mm

S-U8556012

B. Magnetic Needle

Mounted on base with pivot point.

Length: 80 mm
Height: 110 mm

S-U216031



Magnetic Field Indicator

Bar magnet, with poles identified by color and free to turn in space, for three-dimensional mapping of magnetic fields. Pivots on agate gimbal bearings allow the small bar magnet free rotation in space. Magnet poles are color-coded. Handle and cardanic suspension made of plastic to alleviate any adverse effects on magnetic field.

Magnet: Approx. 25 x 3 x 3 mm³
Handle length: Approx. 95 mm

S-U8491900



Suspended Magnet

For demonstrating repulsion forces between magnets. Two ring magnets facing each other with identical poles are slid on a rod.

Base: 100 mm Ø
Rod: 100 mm x 30 mm Ø
Weight: 410 g

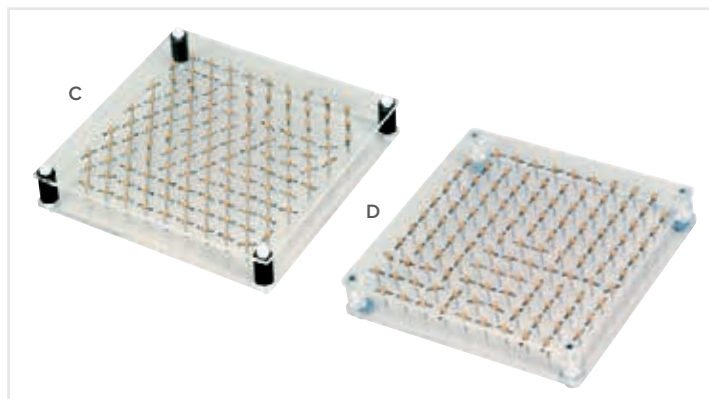
S-U8495222

Magnetic Field Incliner

Accurate and easy to use, our magnetic field inclinometer is designed for determining the direction, in horizontal and vertical increments, of the Earth's magnetic field and to demonstrate the magnetic field of a current carrying conductor. The instrument has an aluminum conductor loop with 4-mm safety sockets. A magnetic needle with a pointed axle rotates on bearings above a full circle in transparent material with an angle scale rotating about the horizontal axis and mounted on acrylic base.

Diameter of circle: 110 mm
Length of magnetic needle: 100 mm
Strap length: 150 mm
Terminal: Via 4 mm safety sockets
Base dimensions: 100 x 90 mm
Height: 185 mm

S-U21900



Magnetic Model

To demonstrate the behavior of molecular magnets in ferromagnetic materials, 117 freely rotating magnetic needles are mounted between two acrylic glass discs.

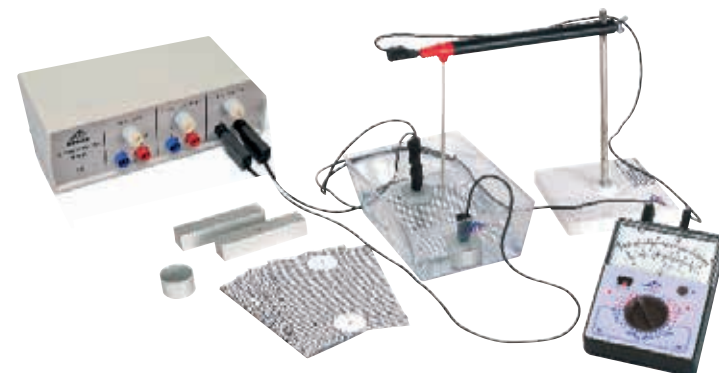
Length of the molecular magnets: Approx. 11 mm
Measurements: 1 50 X 150 mm

C. Hexagonal Magnet Model S-U15350

D. Cubic Magnet Model S-U15351

Additional Item Required

Round Magnet S-U20550



Electrolytic Trough

Equipment set for recording equipotential lines of electric fields. Electrodes of different shapes can be used to measure equipotential lines for a plate capacitor, dipole, induced surface charge and a Faraday beaker. Trough dimensions: 160x105x65 mm³ approx.

Contents:

- 1 Plastic trough
- 1 Stand with measurement electrode
- 2 Bar electrodes
- 2 Round disc electrodes
- 1 Ring electrode
- 20 Sheets of millimetre-grid paper

S-U51001

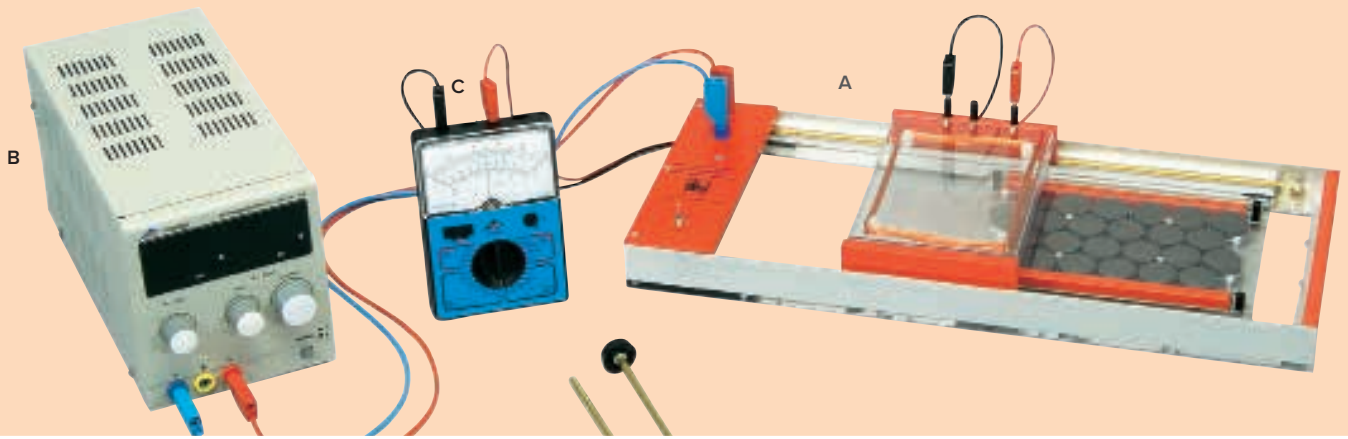


Globe with Bar Magnet

Used to demonstrate the earth's magnetic field lines. A bar magnet is located at the polar axis. A compass or magnetic field sensor is then positioned at any given location on the globe's surface so that it aligns with the magnetic field parallel to the longitudinal lines. The inclination can also be determined using the magnetic field sensor.

Diameter: 150 mm
Weight: Approx. 150 g

S-U8495245



A. Induction Apparatus

For the demonstration and investigation of an induction voltage, which is caused by a frame coil moving on a magnetic plate. By varying the speed and the frame coil's number of turns the law of induction can be verified quantitatively in an experiment. Using a conveyor cable the frame coil is moved up and down the magnetic plate at a constant speed by means of a motor. This generates a constant induction voltage. The direction of the movement can be reversed using a changeover switch and the speed can be varied by means of the voltage. Furthermore the rolling motion of a current-carrying conductor can be demonstrated inside the field of the magnetic plate. The transparent design of the magnetic plate and coils means that they can be demonstrated on the overhead projector. An unfoldable support permits inclined setup.

Operating voltage: 2 – 12 V DC
 Frame coil (LxB): 185 x 125 mm
 Total dimensions: 585 x 200 x 55 mm (LxWxH)
 Weight: 3 kg

Additional Items Required

B. DC Power Supply
S-U33020-115
 C. Multimeter
S-U40165
 Measurement Amplifier
S-U8532161

Includes:

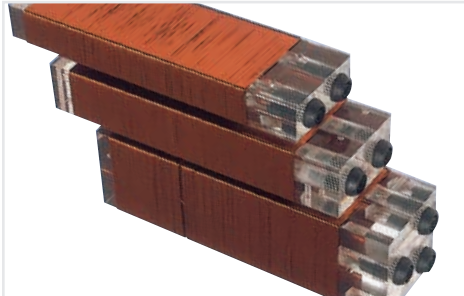
Induction apparatus with retractable magnetic plate, frame coil, rolling conductor loop (pictured above)

S-U8496270

Length	Coil 1	Coil 2	Coil 3
Number of turns	300 with two taps at the 100th and 200th turns	300	
Coil crossection	50 x 50 mm	50 x 30 mm	50 x 20 mm
Coil length	170 mm	170 mm	170 mm

Field & Induction Coils

Used for measuring the intensity of magnetic fields as a function of the current and the number of turns per unit length (with U8496175), to demonstrate that the field intensity is independent of the coil area, and for quantitative induction experiments and electric resonant circuits; only for extra-low voltages. The bobbins are made of plexiglass, thus offering a view into and through the coils.



Set of 3 Induction Coils

Connection: 4 mm sockets
S-U122501



Field Coil, 100 mm S-U12252

Number of turns:
 Coil length:
 Current:
 Connection:

Field Coil, 120 mm S-U12253

90
 49 cm
 max. 10 A, short-term 20 A
 via 4 mm sockets



Coil with Variable Number of Turns Per Unit Length

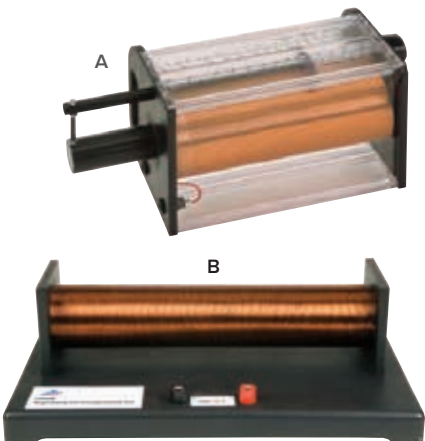
For investigating the intensity of magnetic fields as a function of the number of turns per unit length.

Number of turns: 30
 Coil diameter: 100 mm
 Coil length: 49 cm
 Current: max. 10 A, short-term 20 A
 Connection: via 4 mm sockets

S-U8496175

Stand for Coils

Made of acrylic.
 Dimensions: 155 x 120 x 75 mm
S-U8496150



A. Variable Inductance Coil

This experiment measures inductance and self-inductance of a current-carrying coil and how they change depending on the insertion of an iron core. It is also good for investigating how AC circuits work and what effect coils produce in those situations.

Number of windings: 3000
 Max. permissible voltage: 30 V AC, 60 V DC
 Max. permissible current: 2 A
 Inductance: Continuously adjustable from 0.15 to 1.4 H, for current of approximately 1 A
 Resistance: 12.5 Ω
 Connections: Via 4 mm safety plugs
 Dimensions: 265x145x130 mm
 Weight: 6.2 kg

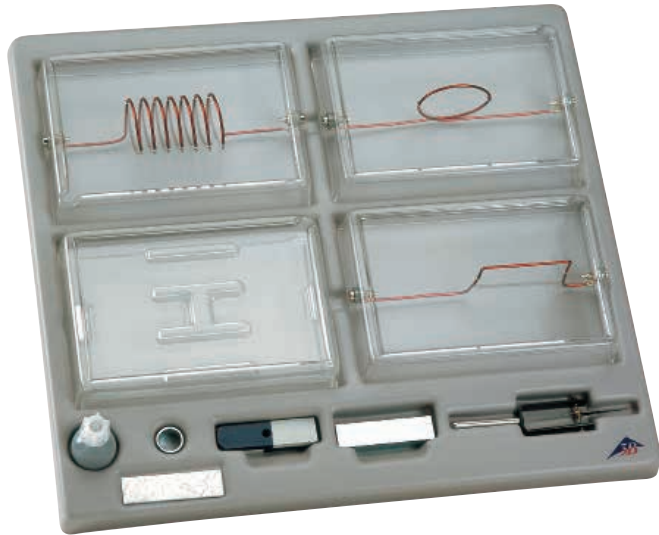
S-U21903

B. Magnetizing and Demagnetizing Coil

This solenoid allows you to magnetize and demagnetize ordinary magnets or iron bars in addition to conducting inductance experiments. The rugged unit consists of insulated copper winding mounted on a base with 4mm sockets and a switch.

Windings: 1000
 Coil length: 250 mm
 Coil radius: 35 mm internal
 Operating Voltage: Max. 12 V DC or 12 V AC
 Dimensions: 305 x 200 x 100 mm³
 Mass: 2 kg

S-U30048



Experiment Topics

- Magnetic flux lines of bar and horseshoe magnets
- Magnetic screening
- Magnetic induction
- Lines of force of electromagnetic fields of straight conductors
- Conductors that form a ring
- Cylindrical coils and electromagnets

Apparatus for Displaying Magnetic Fields

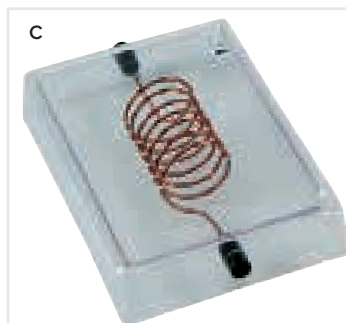
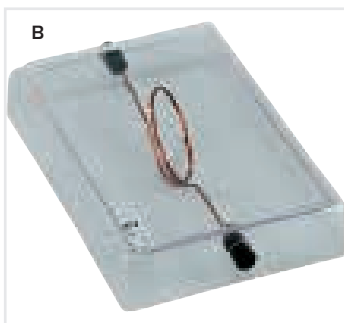
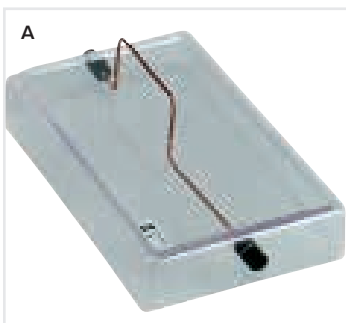
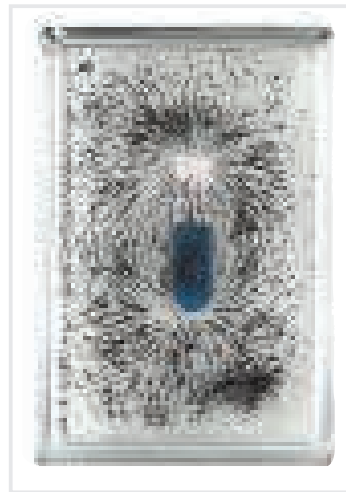
Equipment set for demonstration experiments designed to make visible the magnetic field distribution of permanent magnets and current carrying conductors. Also compatible for use with a daylight projector. The acrylic glass boxes containing iron filings are equipped with a pouring lip so that the used filings can easily be refilled into the storage bottle.

Acrylic glass boxes: Approx. 185 x 125 x 40 mm
 Storage tray: Approx. 430 x 380 x 25 mm
 Weight: Approx. 1.5 kg

S-U8491790

Additional Items Required

High Current Power Supply (below) S-U117361
 Overhead projector S-U30150-115
 HD Camera S-W499219



Conductor on Acrylic Base Plate

When combined with iron filings or iron granules, the magnetic field associated with straight or looped conductors can be displayed brilliantly on an overhead projector. Contains two 4 mm sockets for the current supply.

Base measurements: 185 x 150 x 30 mm
 Number of turns: 9
 Diameter of turns: 45 mm
 Length of turns: 75 mm
 Measurements: 185 x 150 x 30 mm

A. Straight Conductor
 S-U8491791

B. Loop Conductor
 S-U8491792

C. Coil Conductor
 S-U8491793

D. Iron Filings
 S-U11451

A



A. Pair of Helmholtz Coils

This device is used to produce a homogeneous magnetic field. It is intended for experiments on induction and beat in conjunction with the rotary frame and flat coil (S-U8481510) and for determination of e/m in conjunction with the electron-beam tube (S-U8481420). The coils can be switched in parallel or in series. A spring clip on the top crossbar is used to mount the Hall sensor during measurements of the magnetic field.

Coil diameter:	295 mm
Coil spacing:	150 mm
Number of turns per coil:	124
Enamelled copper wire thickness:	1.5 mm
DC resistance:	1.2 Ω each
Maximum coil current:	5 A
Maximum coil voltage:	6 V
Maximum flux density at 5 A:	3.7 mT
Weight:	4.1 kg approx.

S-U8481500

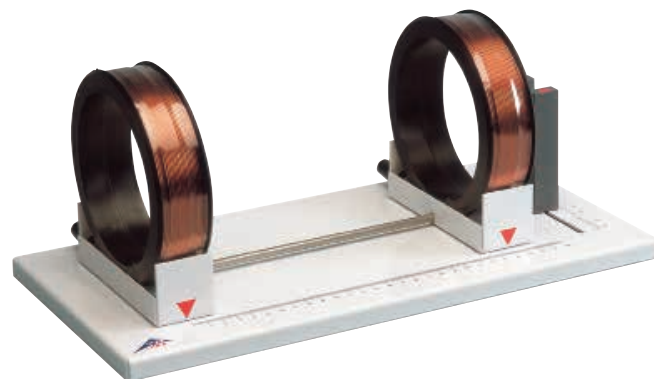
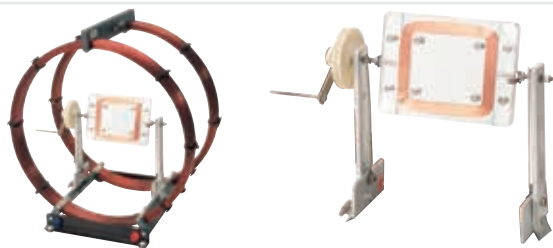
B. Rotary Frame with Flat Coil

In conjunction with the pair of Helmholtz coils (U8481500), this device is intended for experiments involving the law of induction. The flat coil is mounted on a plexiglass frame with a rotary bearing. The electrical connection to the coil is established via sliding contacts. A hand crank and pulley on the rotary frame's axle are used to drive the coil. The flat coil is mounted on the crossbars of the Helmholtz coils U8481500 such that it is located in the center of the magnetic field. Measurable voltages are induced even at low speeds of rotation (1 rpm) in the field. Rotating the flat coil in an alternating field makes it possible to produce beat curves.

Number of turns:	4000
Copper wire thickness:	0.1 mm
Effective area:	41.7 cm ²
Dimensions:	110 x 80 x 11 mm
Weight:	Approx. 360g

S-U8481510

B



Helmholtz Coils on Base Plate

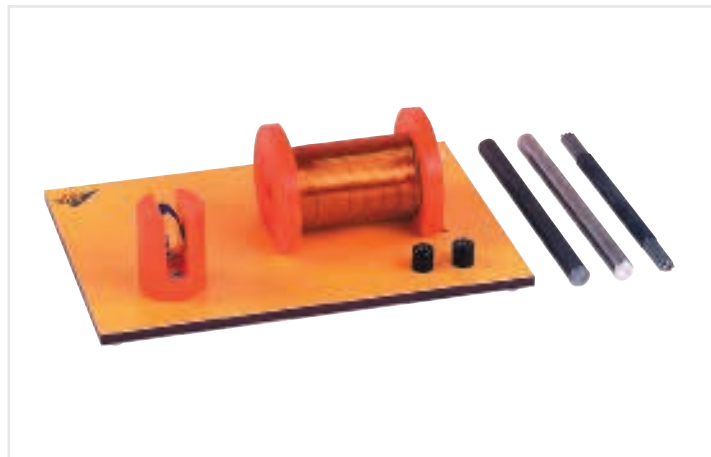
Used to generate homogenous magnetic fields and to determine the Helmholtz configuration. The apparatus comprises a pair of coils arranged parallel to each other mounted on a robust metal base plate with a holder for a magnetic field meter to measure the magnetic field. One coil and its holder are moveable. The coils can be connected in parallel or series. There are two scales printed on the base plate to allow coil separation to be read off and to determine how far the measurement probe's position deviates laterally from the coil axis.

Number of turns:	100 each
Average coil diameter:	125 mm
Coil width:	33 mm
Terminals:	via 4 mm safety sockets
Max. permissible current:	5 A
Max. coil separation:	240 mm
Scale division:	mm
Base plate:	400 x 200 mm

S-U21901

Additional Items Required

High Voltage Power Supply **S-U33010-115**



Coil for Hysteresis Curve Equipment Kit

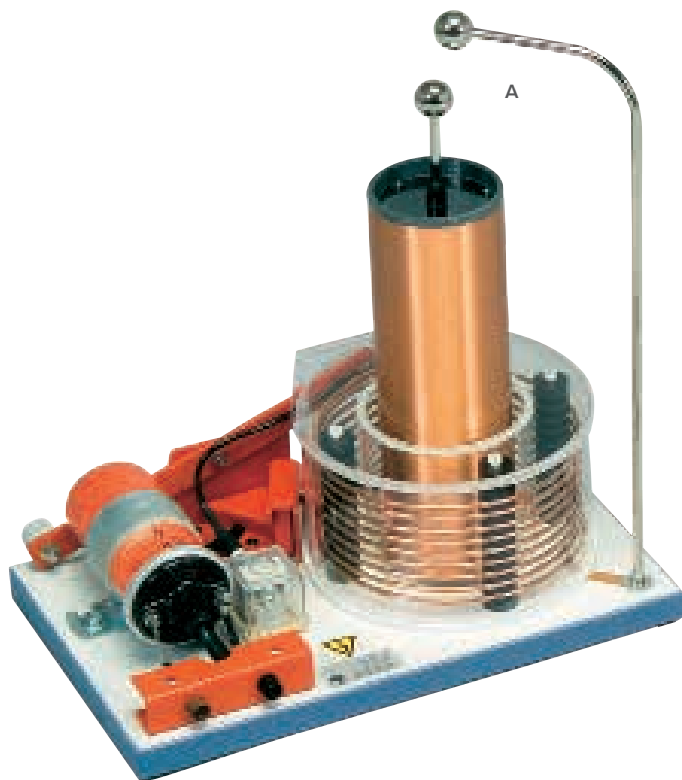
For the plotting of hysteresis curves (magnetic flux density as a function of the magnetic field strength) of various core materials.

S-U8496112

Additional Items Required

Function Generator
S-U8533600-115

Oscilloscope
S-U43563



A. Tesla Transformer

Classic Tesla transformer for the generation of a safe high frequency high voltage starting from approx. 100 kV. The well-conceived, open configuration of all components facilitates demonstration of both design and function. The apparatus is rendered shock proof on account of its extra low voltage operation.

No. of turns in the primary coil:	2 – 10
No. of turns in the secondary coils:	1150
Primary voltage:	20 V AC
Secondary voltage:	>100 kV
Transformer:	Approx. 330 x 200 x 120 mm
Secondary coils:	Approx. 240 x 75 mm dia.
Weight:	Approx. 3 kg



Contents:

- 1 Tesla transformer, basic apparatus
- 1 Hand coil
- 1 Secondary coil
- 1 Spherical electrode, short
- 1 Spherical electrode, long
- 1 Needle electrode with spray wheel
- 1 Fluorescent tube
- 1 Reflector

A. S-U8496250

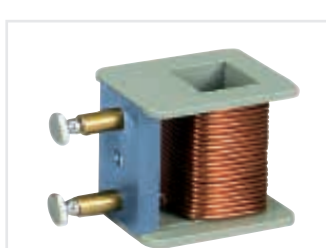
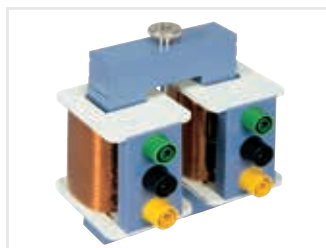
Additional Coil for Tesla Transformer
Dimensions: approx. 240 x 75 mm dia.

B. S-U8496255

Transformer Coils

Impact resistant plastic covered coils, safe to touch, for assembling a transformer in conjunction with the transformer core (U8498112).

Maximum voltage:	50 V
Terminals:	4 mm
Opening for iron cores:	20 mm ²



Transformer Core

U-core with removable yoke made of high quality transformer laminate.

Core cross section:	20 mm ² approx.
U-core:	70 mm ² approx.
Length of yoke:	70 mm approx.

S-U8498112

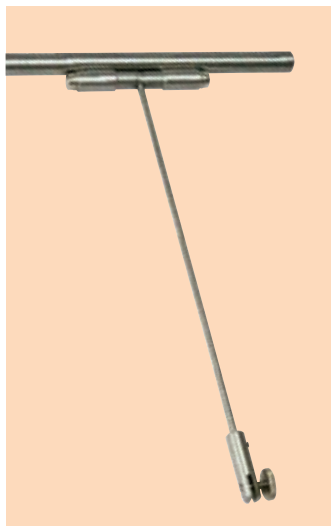
High Current Coil

Secondary coil for transformer core S (U8498112) for generating high current output.

No. of windings:	22
------------------	----

S-U8498065

Item Number	Price	Turns	Taps	Inductance
A. S-U8498070		600	200/400/600	6 mH
B. S-U8498080		800	400/800	10 mH
C. S-U8498085		1200	400/800	25 mH
D. S-U8498090		2400	800/1600/2400	100 mH



Waltenhofen's Pendulum

For the demonstration of the effects of eddy currents and braking. A pendulum object composed of a solid steel plate swings back and forth between the poles of an electromagnet with the power switched off. When the magnet is switched on, the pendulum motion of the object comes to an almost immediate halt. If the plate contains slots more time elapses before the plate stops moving, i.e. the braking effect is severely reduced. The equipment set consists of a pendulum rod and four aluminium pendulum plates with various shapes: rectangle, rectangle with slits, circular disk, ring and ring with slits.

Rectangular: 100 x 60 mm
 Ring: 30 mm Ø interior, 60 mm Ø exterior

S-U8497500

Additional Items Required

Pair of Pole Pieces	S-U8497200
Transformer Core w/Yoke	S-U8497180
(2) Coils w/1200 Turns	S-U8497440
DC-Power Supply	S-U33020-115



Tube with Six Induction Coils

Plastic tube with six identical induction coils connected in series. When the bar magnet provided is allowed to fall through the tube, a voltage is induced in each of the coils in turn. As the velocity of the magnet increases with time during its fall, the amplitudes of the voltage peaks also increase, and their width decreases. The area under each voltage peak remains constant.

Coil width: 10 mm
 Distance between coils: 190 mm
 Dimensions: 1500 mm x 20 mm dia.
 Weight: Approx. 500 g

S-U8511200

Additional Item Required

Digital Oscilloscope **S-U43565**



Pair of Pole Shoes, drilled

Defined air gap e.g. for electromagnets, Waltenhofen's pendulum as well as for investigating paramagnetic and diamagnetic samples. Each designed with a plane and a conical end.

Pole shoe: 40 mm²
 Weight: 1.7 kg

S-U8497200

Experiment Topics

- Effect of force acting on a current-carrying conductor in a magnetic field
- Measurement of the magnetic flux density
- Effect of induction acting on a single conductor in the magnetic field
- Force between two parallel linear conductors
- Definition of ampere



Transformer Core with Yoke

Heavy U-shaped core for the generation of powerful magnetic flux. Made of high-quality transformer sheet metal, laminated, with two clamps to attach the pole shoes U8497200 or the yoke.

U-core: 150 x 130 x 40 mm
 Yoke: 150 x 40 x 40 mm
 Weight: approx. 6 kg

S-U8497180

Item Number	Price	Turns	Taps	Resistance	Max. Current	Inductance
S-U8497420-115		600	N/A	3 Ω	2.2 A	15 mH
S-U8497410		72	6/30/54/66/72	0.1 Ω	12 A	0.23 mH
S-U8497406		6	N/A	3 m Ω	60 A	0.25 mH
S-U8497450		6000	2000/6000	350 Ω	0.2 A	1.5 H
S-U8497440		1200	400/1200	12 Ω	1.2 A	60 mH
S-U8497430		600	200/600	3 Ω	2.2 A	15 mH
S-U8497460		24,000	N/A	10 k Ω	0.02 A	28 H

Attention: Coils can carry both low or high voltage as secondary coils. Do not use these in student experiments.



Dismountable Transformer

Connections: via 4-mm safety sockets
Dimensions: 120 x 90 x 70 mm
Opening for iron cores: 42 mm²

Experiment topics:

- Voltage transformation
- Transformer under load
- Current transformation
- Autotransformer
- Leakage field experiments

Coils for the Dismountable Transformer

- Coils made of shock-proof plastic
- Contact-safe with safety sockets
- Technical data printed on coils: number of turns, maximum continuous current, effective resistance and inductance
- Rated continuous current may be exceeded briefly by several factors

Applications:

- Induction oven
- Point welding
- Fusing experiments



Metal Ring

For performing Thomson's ring experiments in conjunction with the mains coil U8497430-115 and the transformer core with yoke U8497180. The mains coil is arranged in the U-core in such a manner that the yoke stands upright on it. The metal ring is placed above it. When the mains coil is switched on the ring jumps into the air. Ring: 55 mm \varnothing internal

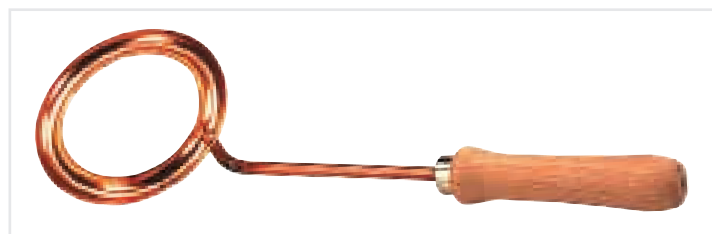
S-U8497470

Additional Items Required

Transformer Core
Mains Coil

S-U8497180

S-U8497420-115



Fusion Ring

Circular aluminum channel with insulated handle used to explain the principle of induction melting. Use as a secondary coil in conjunction with a mains coil of 600 turns as primary coil U8497420. Suitable melting material: Wood's Alloy

Internal diameter: 57 mm

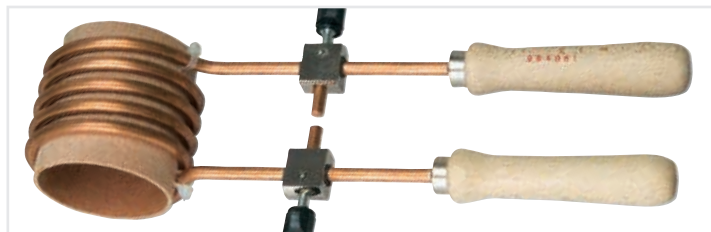
Weight: approx: 80 g

S-U8497310

Additional Items Required

Mains coil of 600 turns

S-U8497420-115



Coil with 5 Turns

Secondary coil for creating high currents for spot welding of sheet metal of up to 2 mm thickness.

Turns: 5

Internal diameter: 57 mm

Weight: approx. 650 g

S-U8497320

Jumps Up at the Flip of the Switch!



Set of Metal Strips

Five metal strips used to demonstrate spot welding techniques in conjunction with a Coil with 5 turns, U8497320.

Dimensions: 300 x 15 x 0.4 mm

S-U8497330

Experiment Topics

- Voltage measurement of galvanic elements
- Standard potentials of different pairs of metals/metal cations
- Standard potentials of different pairs of non-metals/non-metal cations
- Voltage measurement of concentration chains
- Electrochemical corrosion of iron
- Measurement of pH values of different electrolyte solutions
- Daniell cell
- Leclanché cell
- Fuel cells

A. Electrochemistry Kit

A complete equipment set for basic experiments in electrochemistry. Includes a handy measurement device with an LCD display for pH values and practically zero-current measurement of voltages, as well as a pH combined electrode with a highly flexible cable. Enclosed in a robust console housing with labeling on a resistant SKF inscription foil with a scratch-proof coating.

S-U11110

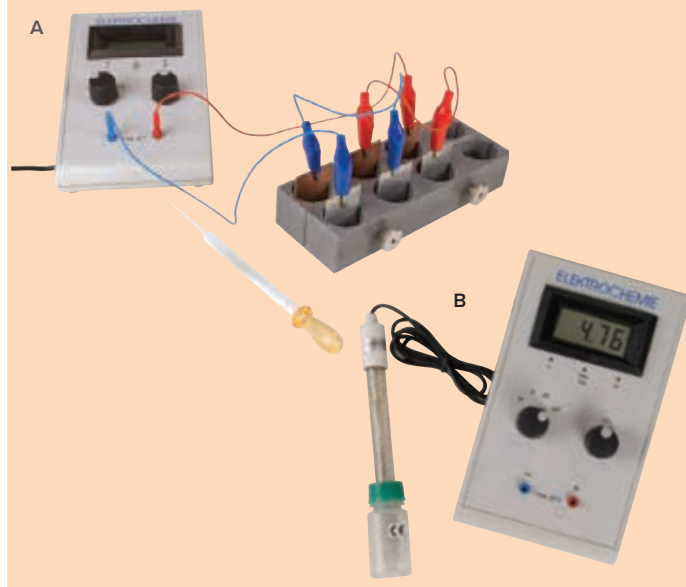
B. pH Combined Electrode

pH combined electrode with shaft made of plastic and a BNC plug.

Length of cable: 1 m

Dimensions: 120 x 12 mm Ø

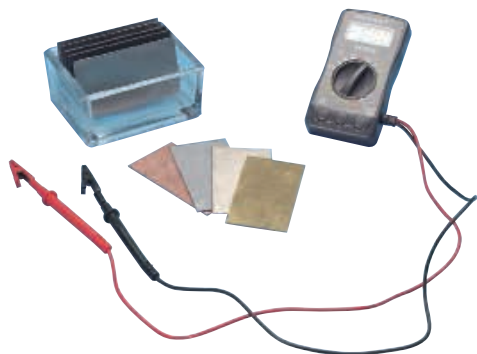
S-U11111



Description	Item No.	Price	Specifications
pH Buffer Pouches	S-U40197		6 ea. of pH4, pH7 & pH10
Blue Litmus	S-U49565		pH 4.3 – 6.8, 100/vial
Red Litmus	S-U49564		pH 6.8 – 8.1, 100/vial
Wide Range pH	S-U49566		Determines pH values 1 – 14, 100/vial
Teacher Demo Wide	S-U49567		Wide Range in 1" x 9.5", 100/vial
Acid, Base or Neutral	S-U49562		Determines graduated pH ranges, 100/vial



**Oyster Series pH/
mV/Temp meter**
Includes one pH probe
and 2 buffer solutions.
S-U40199



Electrochemistry Set

A simple but effective set to measure electrochemical potential between various metals.

Includes:

- 1 Electrolysis cell
- 1 Aluminum plate
- 1 Copper plate
- 2 Carbon plate
- 1 Zinc plate
- 1 Digital Multimeter
- 1 Iron plate
- 2 Lead wires with alligator clips
- 2 Nickel plate

S-U11100

Additional Items Recommended

Copper Plates	Set of 10	S-U11101
Zinc Plates	Set of 10	S-U11102
Iron Plates	Set of 10	S-U11103
Nickel Plates	Set of 5	S-U11104
Aluminum Plates	Set of 10	S-U11105



Leclanché Cell

This model of a dry battery was invented by the French chemist Georges Leclanché in the 1860s. It consists of a cylindrical zinc electrode, a rod shaped carbon electrode, a clay vessel and a battery glass. Filled with cell electrolyte, the Leclanché cell supplies a voltage of approximately 1.5 volts. The cell is delivered without a filling.

Connections: via 4 mm jacks
Dimensions: 105 mm high,
65 mm diameter

Suitable fillings:

Copper sulphate solution (CuSO₄) 10% and zinc sulphate solution (ZnSO₄) 10%

S-U14330



Daniell Cell

Students make a Daniell Cell to study the characteristics of voltaic cells. A copper electrode is immersed in dilute ammonium chloride solution in a porous cup. These, in turn, are immersed in copper sulfate solution containing a zinc electrode, to produce an emf of 1.08 V. The cell includes a battery jar, zinc and copper electrodes and a porous cup. The electrodes have 4-mm sockets. The element is supplied without filling.

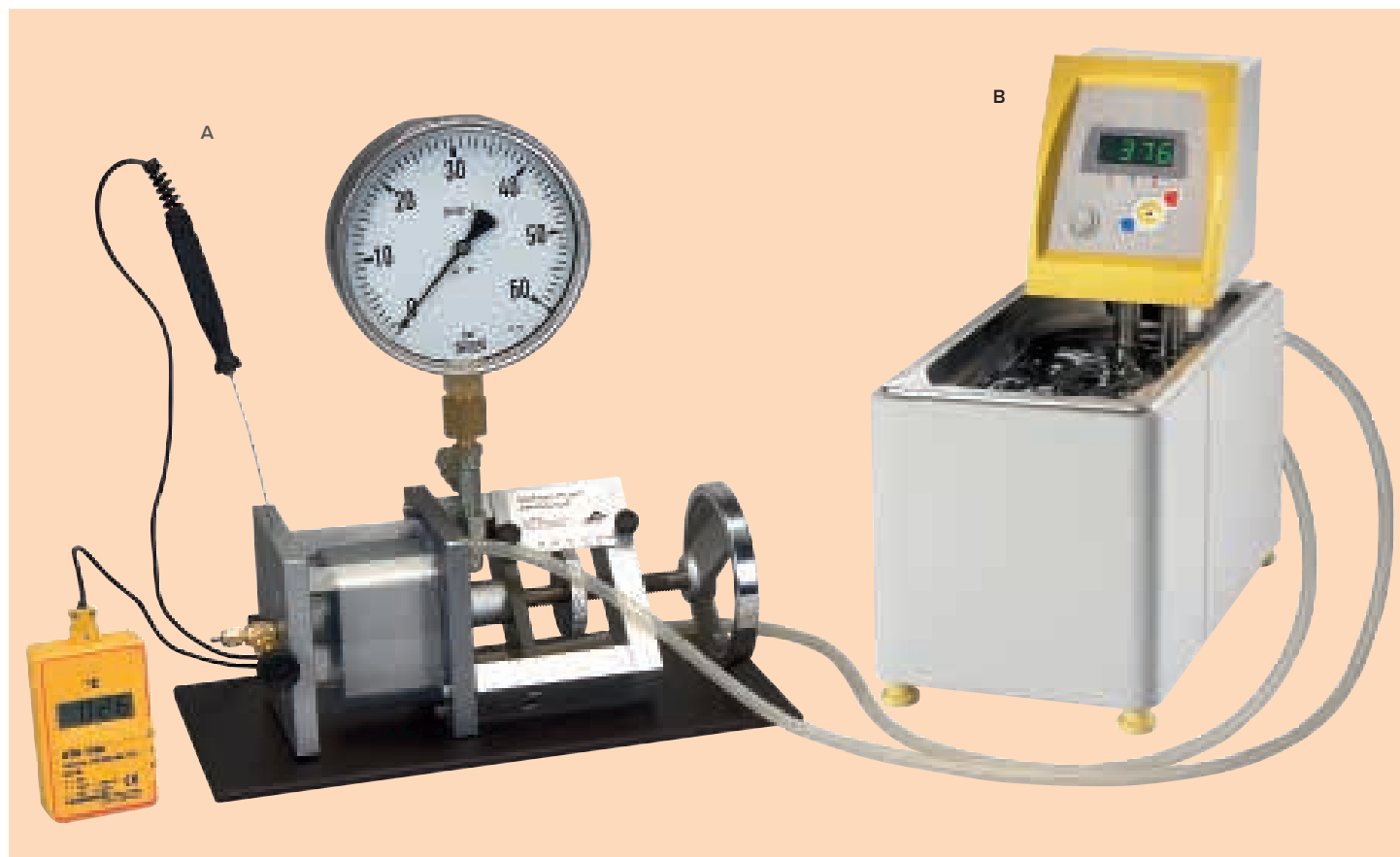
Connections: via 4mm jacks
Dimensions: 105 mm high, 65 mm diameter

Suitable fillings:

Copper sulphate solution (CuSO₄) 10% and zinc sulphate solution (ZnSO₄) 10%

S-U14331

HEAT / THERMODYNAMICS



A. Critical Point Apparatus

Precision equipment for investigating compressibility and liquefaction of a gas. Measurements allow the critical point for the gas to be determined as well as the recording of isotherms for an adiabatic p-V diagram (Clapeyron diagram). The gas used for testing is SF₆ – sulphur hexafluoride. This has a critical temperature of 319 K (46° C) and a critical pressure of 3.76 MPa (37.6 bar). It allows the experiment set-up to be simple, robust and understandable so that both qualitative investigations and precise measurements can be made. SF₆ is completely non-hazardous and can be used without reservation in lessons and labs. The pressure is applied by a hydraulic system using castor oil of medicinally authorized quality.

- No mercury needed! Traditional equipment used to examine the critical point are filled with mercury which is harmful both to nerves and kidneys.
- Using two scales (one stationary and one co-rotational) any change in volume can be read off with an accuracy of 1/1000 of the maximum volume (15.7 ml).
- Class 1.0 manometer (max. 1% deviation from the end value of the scale) with 160 mm diameter and a display gauge up to 60 bar.
- Drill hole with 6 mm diameter for commercially available thermometer or temperature sensor.
- The theoretically long-life of the measuring cell amounts to 70 bar; while the theoretical bursting pressure point is above 200 bar.
- Dimensions: Base plate 37 x 20 cm, height 39 cm. Weight: approx. 6.9 kg.

Includes:

- 1 Apparatus for measuring critical point
- 1 Cold light
- 1 Safety valve
- 1 Oil-filling attachment

S-U104001

Additional Items Required

Immersion/Circulation Thermostat	S-U144002-115
Differential thermometer	S-U40184
1L Sulfur Hexafluoride	S-U42710
Regulator for U42710	S-U42701
Castor oil	

Call for Pricing
Call for Pricing

B. Immersion/Circulation Thermostat

This immersion/circulation thermostat has a closed bath for thermostatic control of water tanks or external apparatus with non-flammable liquids at temperatures of up to 100° C. The fully electronic continuous controller and powerful circulation pump with a rotatable pump housing ensure ideal bath circulation and, therefore, a high degree of temperature constancy. The rotary knob is used for analog setting of setpoint values. Actual values are indicated by a glass thermometer. Clearly visible indicator lights for heating functions and errors increase operational safety.

Includes a connection for a continuous cooler, a cooling coil which makes use of tap water as the coolant, a thermometer with a display range of 0 - 100°C and a plug.

Operating-temperature range:	25°C to 100°C
Temperature constancy:	± 0.05°C
Heating power:	1.5 kW
Pump pressure:	max. 0.15 bar
Delivery rate:	max. 8 l/min
Bath volume:	2.5 l to 3.5 l
Bath area / depth:	135 x 105 mm / 150 mm
Mains connection:	115 V; 50/60 Hz

S-U144002-115

Additional Items Required

Silicone Tubing x2 S-U10146

Get more value from your critical point apparatus and increase its usefulness!

Extra shipping applies. Please contact us at
1.866.448.5847 for More Details.



Boyle's Law Apparatus

A sturdy and effective tool for demonstrating the relationship between pressure of gas and volume at a constant temperature (Boyle's Law). Consists of a plexiglass cylinder with graduations for volume measurement, piston, manometer and air inlet/outlet valves. By turning a knob the pressure inside the cylinder increases or decreases. A Bourdon gauge with an outlet valve is mounted at the end of the cylinder so students can easily see the gas pressure. For safety reasons, the power cylinder is enclosed in another plexiglass cylinder.

Maximum pressure: 30 N/cm
 Length of the cylinder: 300 mm
 Diameter of the cylinder: 40 mm (internal)
 Piston: 30 x 40 mm Ø with two O-rings

Manometer:

Pressure range: -10 N/cm² – 30 N/cm²
 Diameter: 100 mm

S-U17210

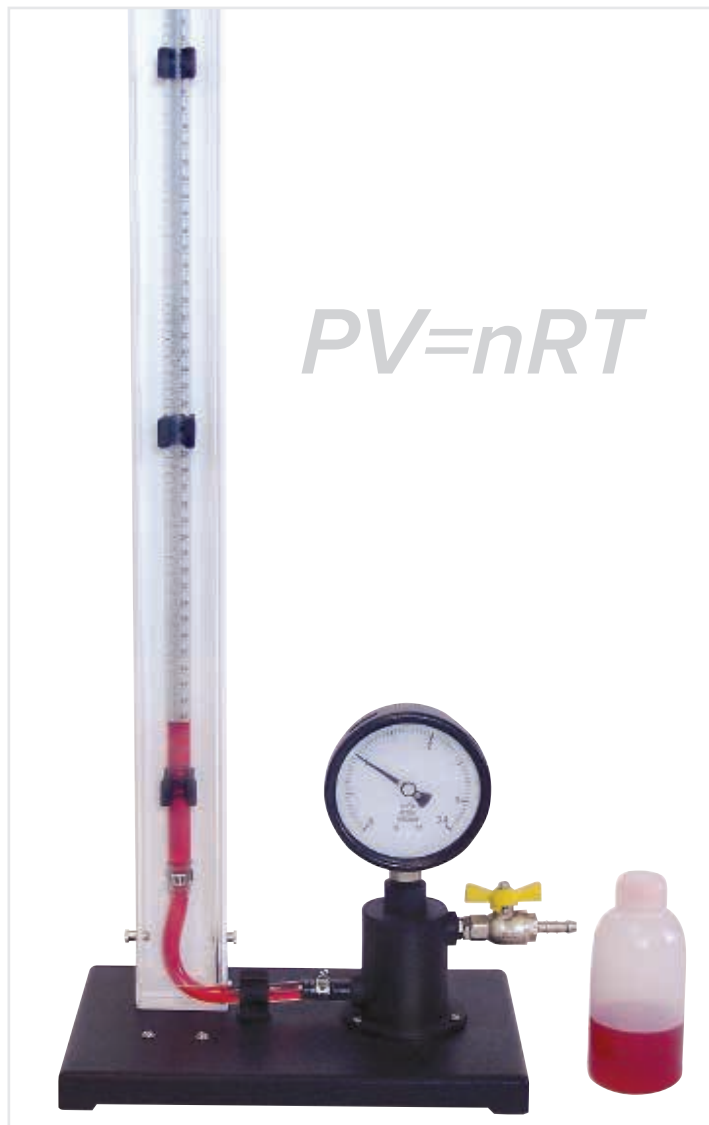
Free manuals and experiment guides available at 3bscientific.com!

Boyle-Mariotte Apparatus S

This apparatus is ideally suited to demonstrating Boyle's Law to groups of students. Colored oil is gradually pumped from a reservoir into a tube containing air. Whilst the volume of air is read from a scale clearly visible behind the tube, pressure is measured by a Bourdon gauge. The glass tube is extra strong and additionally protected by a plastic safety screen. The Bourdon gauge is fitted with a transparent plastic back to allow students to see its working parts. The apparatus is supplied complete with red oil.

Hose nipple: 10 mm dia.
 Dimensions: approx. 350 x 200 x 760 mm³

S-U30046



$$PV=nRT$$



Calorimeter with Heating Coil

Calorimeter for determining the specific heat capacity of solids and liquids and for measuring the electric heat equivalent. Two mutually insulated aluminum beakers, lid with rubber stopper with boreholes for thermometer and stirrer, with heating coil.

Capacity of insulated container: Approx. 150 ml
 Connection: 4 mm sockets
 Electric heater: 6 V / 2 A max.

S-U8441020

Additional Items Required

Tube Thermometer, -10 – +100° C **S-U8451310**

Additional Items Recommended

Aluminium Shot, 100 g **S-U8442610**
 Copper Shot, 200 g **S-U8442620**
 Glass Shot, 100 g **S-U8442640**
 DC Power Supply, 0 – 20 V, 0 – 5 A (115 V, 50/60 Hz) **S-U33020-115**



Pellets

Granules for filling calorimeters.

A. Glass Shot, 100 g **S-U8442640**
 B. Aluminium Shot, 100 g **S-U8442610**
 C. Copper Shot, 200 g **S-U8442620**

D. Graduated Cylinder, 100 ml

Duran glass, tall form with spout, hexagonal base. Scale: 100 ml. Divisions: 1 ml

S-U14205



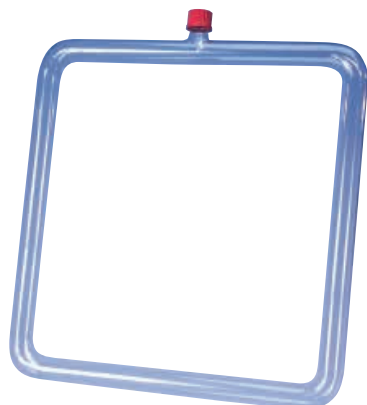
Heat-flow Device

For demonstrating heat flows resulting from uneven heating of a liquid. Consists of a right-angled glass tube with a filling neck and GL25 screw connection for pouring in liquids and coloring agents. Dimensions: approx. 470 x 420 x 30 mm Ø

S-U14340

Additional Items Required

Duplex Stand Base **S-U13270**
 Stainless Steel Rod **S-U15002**
 Clamp with Jaw Clamp **S-U13253**



Calorimeter with Heating Coil, 1,200 ml

Calorimeter for determining specific heat capacities, conversion energies of materials, mixing temperatures as well as measurement of electrical equivalents of heat.

Consists of a double-walled, heat-insulating plastic container with an insulating vessel inside made of reflecting glass, with heating coil and stirrer. Also includes a lid with an opening for a thermometer and two 4 mm plugs for connecting the power supply for the heating coil. The calorimeter is equipped with a heating filament, electrically insulated to avoid decomposition of filament and terminals due to electrolytic processes.

Max. heater voltage:

25 V

Max. heating power:

Approx. 160 W

Contents of insulated container:

Approx. 1200 ml

Dimensions:

Approx. 240 mm x 120 mm dia.

Weight:

Approx. 0.8 kg

S-U8441010

Additional Items Required

Tube Thermometer, -10 – +100° C **S-U8451310**

Additional Items Recommended

Aluminium Shot, 100 g **S-U8442610**
 Copper Shot, 200 g **S-U8442620**
 Glass Shot, 100 g **S-U8442640**
 DC Power Supply, 0 – 20 V, 0 – 5 A (115 V, 50/60 Hz) **S-U33020-115**

Calorimeter, 200 ml

For determining temperatures of mixtures, specific heat capacities, conversion energies of substances and heat of fusion of ice. Designed for simple experiments for students. Plastic container with styrofoam inlay.

Weight: 80 g

S-U8441050

Additional Items Required

Tube Thermometer, -10 – +100° C **S-U8451310**

Additional Items Recommended

Aluminium Shot, 100 g **S-U8442610**
 Copper Shot, 200 g **S-U8442620**
 Glass Shot, 100 g **S-U8442640**

$$Q = CM\Delta T$$



Equivalent of Heat Apparatus

To determine the specific heat capacity of aluminum as well as to verify conservation of energy.

- Solid construction of anodized aluminum with table clamp
- Shaft double ball-bearing mounted
- Built-in counter mechanism
- Heating of the calorimeter through friction or electricity
- Calorimeter with integrated heating element
- Temperature sensor (NTC thermistor) in aluminum sleeve
- Temperature reading via calibration table printed on apparatus
- Snap-in slot in calorimeter bodies for temperature sensor

Includes:

- 1 Basic equivalent of heat apparatus
- 1 Friction cord
- 1 Aluminum calorimeter
- 1 Bucket, 5 l
- 1 Temperature sensor
- 1 Counterweight
- 2 Adapter cables

S-U10365

Additional Item Required

DC Power Supply 16V, 5A S-U33020-115
Digital Multimeter S-U40165

Additional Item Recommended

Copper Calorimeter

Will provide diversity to your Equivalent of Heat Apparatus allowing you to test the properties of copper as well as aluminum. Intuitive installing mechanism for quick and easy experiments.

S-U10366



Ball and Ring Apparatus

An excellent device for demonstrating thermal expansion of solid bodies. Brass ball and ring with wooden handles. Length: 10"

S-U40900

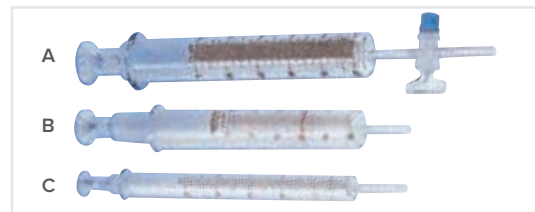


Student Thermal Expansion Apparatus

Used for measuring the thermal expansion of iron, copper and glass tubes. Consists of a base strip with a clamping spring, pointer, scale and hose nipple. Includes three sample tubes made of iron, copper and glass.

Magnification factor: 50
Tube Length: 63 mm approx.
Total dimensions: 53 x 6 x 24 cm
Weight: 0.6 kg

S-U15405



Gas Syringe

Used for storing and measuring quantities of gases and liquids. Consists of a glass cylinder with a scale having divisions of 0.5 ml or 1 ml. The ground finish of the glass cylinder ensures extreme tightness and smooth operation.

Item Number	Price	Volume	Division	Valve
A. S-U14315		100 ml	1 ml	1 way
B. S-U14316		50 ml	.05 ml	-
C. S-U14317		25 ml	.05 ml	-



Dilatometer Advanced Thermal Expansion Apparatus

Used for simultaneous measurement and comparison of the thermal expansion coefficients of rod-shaped bodies. Linear expansion of the rods is displayed on a mirror scale via three rollers with differently colored pointers. Swift and uniform heating is achieved by the application of the steam generator U8624650-115.

Rods: Brass, aluminum, glass
Dimensions (LxWxH): 830 x 80 x 70 mm
Weight: Approx. 1.2 kg
Plate diameter: 90 mm
Contents of the vessel: 250 ml
Power consumption: 550 W

S-U8442200

Additional Item Required

S-U8624650-115



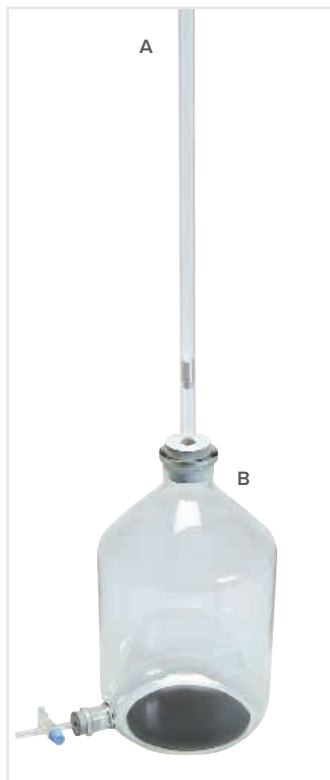
Deluxe Ball with Ring

An arrangement for demonstrating the expansion of solids on heating. After heating in a burner flame, the ball no longer fits through the bore in the bracket. Steel ball with chain and handle.

Dimensions of the bracket in mm: 40 x 50 x 40 mm
Diameter of ball: 22 mm
Length of handle with shaft: 225 mm
Weight: Approx. 175 g

S-U8442500

Did you know our oldest manufacturing plant in **Germany** has been in operation since **1819**?
Learn more about us at **3bscientific.com!**



A. Oscillation Tube

Used for determining adiabatic exponent c_P/c_V of air by Rüchardt's method, used in conjunction with Mariotte flask U14327. Precision glass tube with precisely fitting aluminum cylinder. If the glass tube is placed vertically on a glass flask of 10 L volume and the aluminum cylinder is allowed to slide into the glass tube, it can be made to undergo harmonic oscillations on the air cushion resulting from the enclosed volume of air. c_P/c_V can then be calculated from the period.

Dimensions: 600 mm x 16 mm dia. internal

Aluminum cylinder: 15.2 g

S-U14328

B. Mariotte Flask

Duran glass flask with discharge opening at base and two rubber stoppers with boreholes.

Volume: 10 L

S-U14327



C. Device for Demonstrating the Anomaly of Water

Apparatus for demonstrating the thermal anomaly of water, measuring its thermal expansion and determining its maximum density. Comprises a Duran glass vessel with an inlet tube and two GL screw connections for mounting the riser tube with a mm scale and a temperature sensor or thermometer. Includes stirring rod.

Volume: 250 ml
Riser tube: 400 mm
Capillary: 1.5 mm dia.
Hose nipple: 8 mm
Overall height: Approx. 500 mm

S-U14318

Additional Items Required

- D. Magnetic Stirrer S-U11876
 - Tube Thermometer S-U16115
 - E. Digital Thermometer S-U40166
 - K-Type NiCr-Ni Immersion Sensor, -65°C – 550°C S-U11854
- or
and

Leslie's Cube

This device allows students to measure heat radiation of various surfaces at different temperatures.

The 100mm cube is hollow with an inner water reservoir. The temperature of the heated water can be measured via a hole in the top which can accommodate a thermometer or thermocouple. The cube faces are polished, ground, white and black. Thermal radiation can be measured with our U8441301 thermopile.

Dimensions: 10 cm²

S-U8442835



Ice Bomb

Clamping set up for demonstrating volumetric expansion of water on freezing, as well as the tremendous forces which can be exerted in the process. Comprises a steel cylinder with a clamping rib and plastic lid. The set includes 10 cast-iron bolts for breaking in the course of the experiment.

Diameter for bolt hole: 10 mm
Dimensions: Approx. 40 x 30 x 75 mm

Weight: Approx. 620 g

S-U8442120

Additional Item Required

Cast Iron Bolts, set of 10 bolts S-U8442110



Pneumatic Lighter

Device for demonstrating the ignition of diesel. By swiftly pressing down the piston, the compressed air in the transparent tube is heated so strongly that a piece of paper placed at the bottom of the tube very clearly ignites. Similarly, a cotton-wool pad soaked in ether also catches fire.

Compression tube length: Approx. 150 mm

S-U8741180

Create fire from thin air!



Apparatus for Demonstrating the Greenhouse Effect

Used for demonstrating the effect of greenhouse gases on the absorption of infrared radiation. The experiments are very simple, clearly demonstrated and can be conducted very quickly. The radiation emitted (short-wave infrared and visible light from an incandescent reflector lamp [part 1] or long-wave infrared from a black metal disc [part 2]) passes through either air or greenhouse active butane gas in a metal tube. The radiation is partly absorbed and can be registered by the thermopile. Significant differences in the absorption of radiation in part 1 (corresponding to the incident solar radiation on Earth) and part 2 (corresponding to the infrared radiation emitted from Earth) can be demonstrated. The heavy absorption of long-wave infrared radiation by greenhouse-active butane gas impressively demonstrates the mounting rise in temperature of the Earth's atmosphere (greenhouse effect).

Includes:

- Base plate
- Cell
- Plain metal tube
- 2 shafts
- Storage box
- Lamp socket with incandescent reflector lamp
- Black metal disc
- Metal tube with 2 stopcocks
- Silicone hose

S-U8460500-115

Additional Items Required

- Thermopile S-U8441301
- Microvoltmeter S-U8530501-115
- Butane gas



Giant Sized Crookes Radiometer

Our radiometer is twice as tall as the competitor's, allowing for more visible and exciting demonstrations. This classical piece of equipment vividly shows the differential absorption of radiation and expansion of residual gas. The glass globe is 99% evacuated and houses a balanced set of four vanes. Each vane has one black and one white face. When illuminated with an ordinary incandescent bulb, the vanes transform the radiant energy into kinetic energy, as the black sides absorb more heat and thus expand the neighboring gas at a greater rate than the white sides.

Height: 21 cm
Flask diameter: 8 cm

S-U14300



Moll-type Thermopile

Highly sensitive device for radiation measurement: thermal radiation of a black body, reflection of the long-wave thermal radiation, intensity distribution across the spectrum, Wien's displacement law. Built into a metal casing with polished horn, including two 4-mm connection sockets, mounted on a shaft. The thermopile comprises a surface with a 15 mm diameter and with 17 thermocouples connected to it.

Sensitivity: Approx. 0.28 mV/μW
Internal resistance: Approx. 10 ohm
Setting duration: 40 s for 95 % of the measured value
Tripod: 156 mm x 10 mm Ø
Dimensions: 94 mm x 40 mm Ø
Weight: Approx. 200 g

S-U8441301



Bolometer

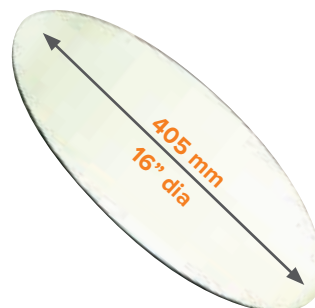
Designed to measure heat radiation from the sun, this device consists of an aluminium tube with a blackened front enclosed in a cardboard tube blackened on the inside. Includes a borehole for a thermometer.

Aluminium tube: 30 x 40 mm dia. approx.
Cardboard tube: 195 x 50 mm dia. approx.
Weight: 350 g approx.

S-U8461300

Additional Items Required

- Thermometer, +10 - +30° C S-U40911
- Universal Clamp S-U13261

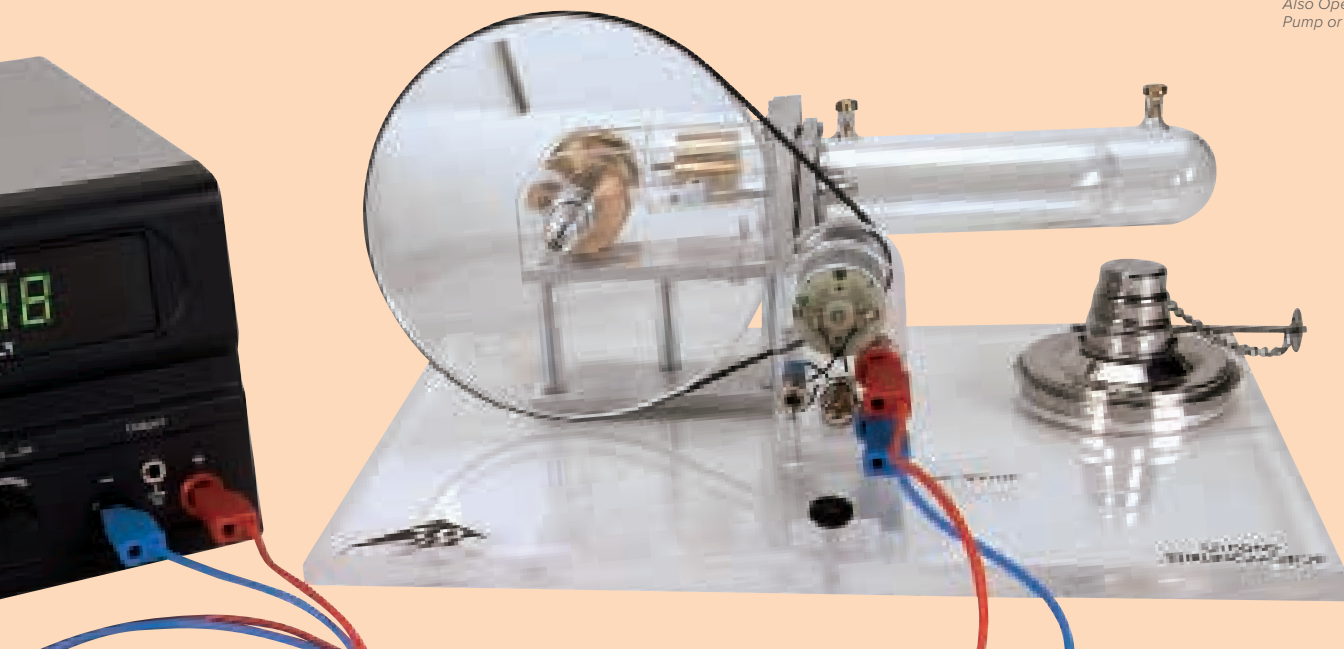


Concave Parabolic Mirror

Used for experiments with sound and thermal radiation, this aluminum, mirror-finished, concave dish is ideal. Easily used for the determination of focus.

Focus: Approx. 680 mm
Diameter: 405 mm

S-U49575



The Stirling Engine is submitted to a load by means of a light source or by a coupled generator. Rotation frequency and temperature changes of the Stirling Engine are observed. Effective mechanical energy and power, as well as effective electrical power, are assessed as a function of rotation frequency. The amount of energy converted to work per cycle can be determined and the efficiency of the Stirling Engine can be estimated.

Both the cylinder and the displacement piston are made of heat-resistant glass. The displacement piston provides two connecting pieces for temperature measurements. The power cylinder, flywheel and gearbox cover are made of acrylic glass for clear observation of the individual sequences of motion at all times. The crankshafts have ball bearings and are made of hardened steel. The connecting rods are made of wear-resistant plastic.

The large acrylic glass flywheel has an imprinted marking to allow measurement of revolutions per unit of time using a light barrier. For recording pV-diagrams it is possible to measure the pressure in the power cylinder via a hose connection. A provided string can be fastened to the power piston to measure the stroke in order to determine the volume.

The integrated engine-generator unit with a two-stage belt pulley allows a conversion of the produced mechanical energy into electrical energy. Equipped with a switchover option for operating an integrated lamp or external loads or feeding electrical energy for operation as a heat pump or refrigerating machine in accordance with the direction of rotation of the Stirling engine. Includes an alcohol burner (U10051).

Deluxe Quantitative Stirling Engine

For quantitative demonstrations and investigations of thermodynamic cycles, the reversibility of which can also be shown.

The Stirling Engine can be operated as:

- Thermal engine
- Heat pump
- Refrigerator

Motor-generator unit:	max. 12 V DC
Two-stage belt pulley:	30 mm Ø, 19 mm Ø
Power of the Stirling engine:	approx. 1 W
Volume:	32 cm ³ to 44 cm ³
Flywheel diameter:	140 mm
Dimensions:	300 x 220 x 160 mm
Weight:	1.5 kg

S-U10050

Additional Items Recommended

DC Power Supply	S-U33020-115
Datalogging Differential	S-U40184
Thermometer + IR Thermometer	

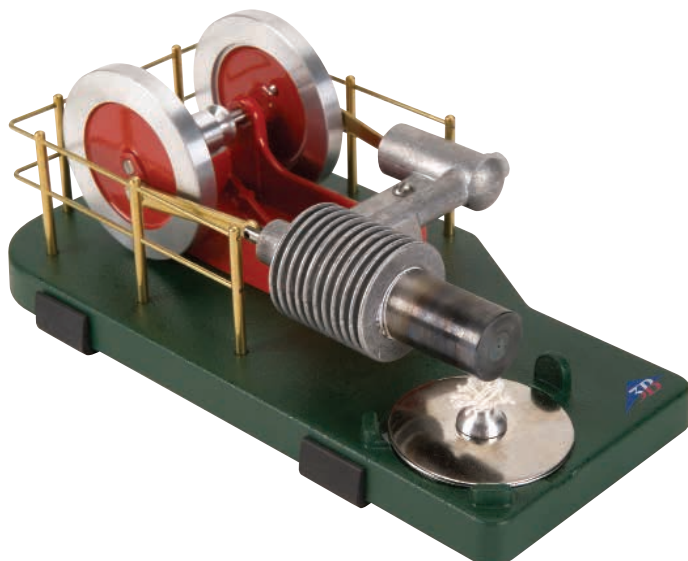
Transparent glass shows piston movement!

Simple Stirling Engine

This affordable Stirling Cycle Engine measures 7 X 4.25" and comes complete with built-in alcohol burner. Red flywheels and chassis mounted on a green base, this all-metal engine runs silently at speeds in excess of 1,000 RPM and is sure to attract your student's attention and inspire awe. This model comes completely assembled and ready to run, accompanied by our "Stirling Cycle Engines" book which explains the principles of operation. Weight: 2.6 lbs

S-U49327

An exciting classroom demonstration!





Transparent Solar Stirling Engine Kit

Currently, the most efficient source of solar energy production is the Solar Stirling Engine technology. The Solar Stirling Engine produces up to 200W of thermal power. Watch the Solar Stirling Engine run, simply from the power of the sun!

Features:

- 90° V-configuration of piston
- Balanced, quiet operation at over 1000 RPM
- All moving parts are visible!
- Displacement cylinder and piston made-of heat-resistant glass
- Power cylinder and flywheel cover made-of acrylic glass

The crankshaft is mounted with ball bearings and consists of hardened steel, and the connecting rod and crank made of a wear-resistant plastic. Due to the constitution of the item's components, its operation is very quiet and maintenance-free with a performance of ca. 1.5 mechanical Watts.

The operation of this motor/generator unit impressively demonstrates the transduction of thermal energy into mechanical energy and then into electrical energy, whereby a light bulb (E 10 socket) is illuminated via an electrical conduction box (max. 12 V).

Some assembly required.

Contains:

- Black absorbent ring
- Flywheel d = 70 mm (or 2.75")
- Parabola mirror d = 470 mm (or 18.5")
- Angle supports
- Tripod with case
- Stirling Engine on acrylic base

S-U10052



2-in-1 Stirling Engine

Steam Engine, transparent housing

Used to demonstrate how an oscillating steam engine operates. In this engine the cylinder moves around a center axis. This motion causes the inlet port and outlet port of the steam conduit to open and close. The base plate and flywheel are made of plexiglass, the boiler and working cylinder are made of heat-proof quartz glass, making all of the moveable parts and actions very clearly visible. With a ball-bearing supported crankshaft made of brass and a safety valve built into the boiler to prevent excessive pressure. Including alcohol burner.

Rotation speed:	800 rpm.
Mech. power:	1 W
Boiler volume:	50 ml
Run time per load:	20 up to 25 min.
Max. operating pressure:	0.5 bar

S-U10055

Replacement Items

Spirit Lamp

Made of metal, with a knurled screw for feeding the wick and cap for extinguishing the flame.

Contents:	60 ml
Dimensions:	55mm x 65 mm dia.
Weight:	50 g approx.

S-U8621240

Wick (not shown)

Spare wick for the U8621240 spirit lamp.

Length: 100 mm

S-U8621250





Sun Runner Stirling Engine

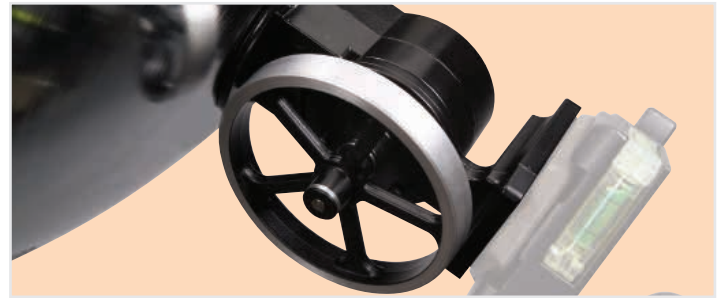
The Sun Runner, a solar-powered Stirling Engine, offers a dramatic demonstration of energy conversion. This motor and its parabolic mirror can be attached to any conventional camera tripod. When properly aimed at the sun, the polished aluminum parabolic mirror focuses incoming solar energy on the heat cap of the engine, which is converted to rotary motion. Unit comes complete with motor, parabolic mirror, and wrenches. Standard camera tripod is not supplied. This engine is completely assembled and ready to run. Each unit is test run at the factory prior to shipping. Motor runs at 2,000 RPM and up. This engine can also run as a horizontal engine with an alcohol burner. Demonstrate this exciting method of harnessing the sun's clean and renewable energy to your students. Weight: 6.00 lbs

Dimensions:

Engine: 8.25 x 3 inches (L x W)
 Flywheel: 3.25 inches
 Parabolic Mirror: 18 inch diameter

S-U49325

Attach to a tripod during strong sunlight to run at approximately 2000 RPM!



A great way to explain how gases expand and contract and how Heat engines work!

Stirling Engine D

Used to demonstrate how a Stirling motor operates and how thermal energy is transformed into mechanical energy as well as how to plot the pV diagram of the Stirling process.

All essential parts are designed in a transparent housing and thus permit excellent visibility of the interaction between displacement cylinder and working piston. The heat can be supplied by any of three different ways: with a hot plate mounted in the displacement cylinder, with a tea candle or by the illuminance and thermal radiation from a standard incandescent lamp and curved mirror slid underneath the displacement cylinder. 520 mm high without tripod and additional weights.

Dimensions of base plate: 290 x 200 mm
 Weight: 2.2 kg

S-U8440450



Experiment Topics

- Michelson Interferometer
- Fabry-Perot Interferometer
- Determination of the refraction index of glass*
- Determination of the refraction index of air*
- Twyman-Green Test for optical components (qualitative)*

* with U10351 Accessory Kit

Interferometer

This complete set of high quality components comes on a heavy duty base to allow precise and reproducible measurements. The large optical components make it possible to produce clear, sharp interference patterns and conduct the experiments during daylight. Positions for the optical elements are predetermined so set up is easy and configurations can be quickly changed. The set includes a plastic box for convenient storage of the assembled interferometer.

Baseplate

Weight:	5.5 kg
Height:	25 mm
Dimensions:	245 x 330 mm

Optical components

Beam divider:	40 mm Ø
Evenness:	Frontside 1/10 l Backside 1/4 l.

Mirror:	40 x 40 mm
Evenness:	< 1/2 l

Mirror adjustment

Eccentric-reduction:	1:1000
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(1 Micrometer-division mark corresponds to a mirror movement of 10 nm)

S-U10350

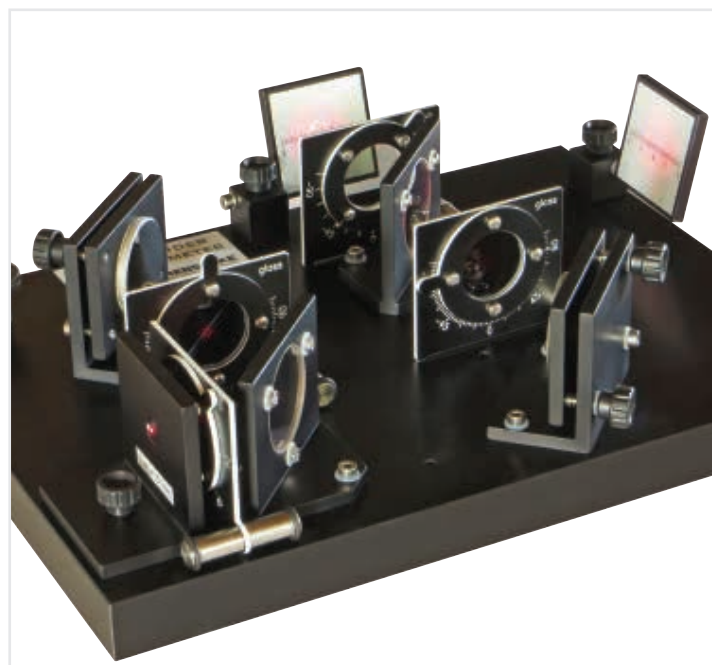
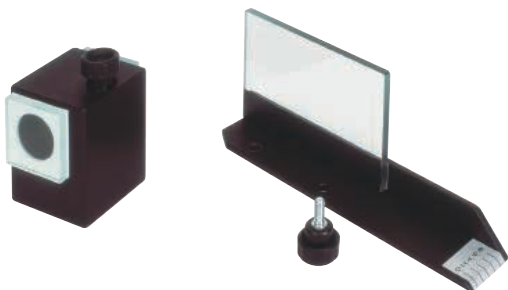
Additional Item Required

He-Ne-Laser S-U41610

Accessory Kit to Interferometer

Accessory Kit to Interferometer U10350 containing vacuum cell to measure the index of refraction of air and glass plate on rotating holder to set up a Twyman-Green-interferometer.

S-U10351



Mach-Zehnder-Interferometer

Complete equipment set consisting of two beam splitters, two surface-coated mirrors, two observation screens and four polarisation filters. The highgrade optical components mounted on a heavy, rigid base plate for precise and reproducible measurements. Behind the first beam splitter, the two beams arrive on separate paths at the second beam splitter, where they are again superimposed. Therefore, the sub-beams can be polarised differently by introducing polarisation filters.

Beam splitter

Diameter:	40 mm
Evenness:	$\lambda/10$ (front side), $\lambda/4$ (rear side)

Surface-coated mirror

Dimensions:	40x40 mm ²
Evenness:	< $\lambda/2$

Polarisation filter

Diameter:	30 mm
Adjustable range:	$\pm 105^\circ$
Material:	Glass (2x), foil (2x)
Angular graduation:	3°, 15°

Base plate

Weight:	5.5 kg
Dimensions:	245x330x25 mm ³

S-U10353

Additional Item Required

He-Ne-Laser S-U41610



Multiple Ray Projector, Magnetic

Demonstrate and experiment with geometric optics on magnetic boards. Light emitted from 1 to 5 light rays which are deflected via rotatable mirrors such that the light from the projector is parallel, divergent or convergent; for experiments on reflection, diffraction and lenses.

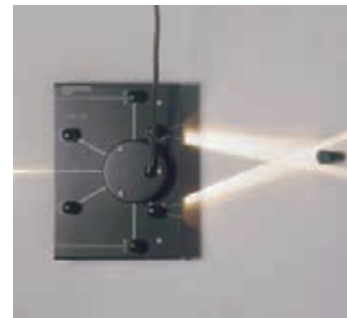
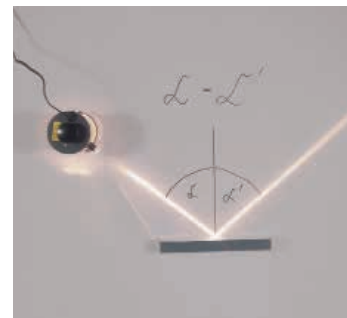
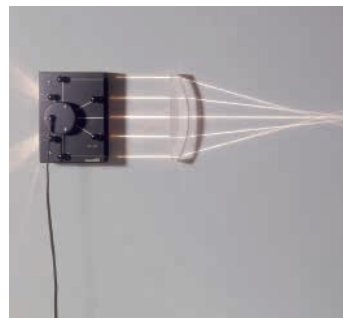
One to two divergent light rays, the overlap of which can be adjusted via mirrors, are available from the reverse side of the multiple-ray projector for experiments on shadow-casting and chromatics.

S-U40110

Spare Halogen Lamp, (not shown)

Spare halogen lamp for multiple-ray projector U40110 12 V, 55 W.

S-U40113



Experiment Topics

- Laws of reflection
- Laws of refraction
- Total reflection
- Minimum deflection angle for a prism
- Focal determination of mirrors and lenses
- Laws of lenses and image errors
- Shadow casting



A. Single-ray Projector

For experiments on geometrical optics on magnetic boards. With an adjustable slit apertures for creating light cone or thin ray for geometrical optics. In circular metal housing, rotatable on holder.

Lamp: 12V, 35W
 Connecting line: 1.5 m long with 4 mm-plug
 Dimensions: 120 x 70 mm Ø
 Weight: 0.25 kg

S-U40120

Additional Items Required

B. Magnetic Holder

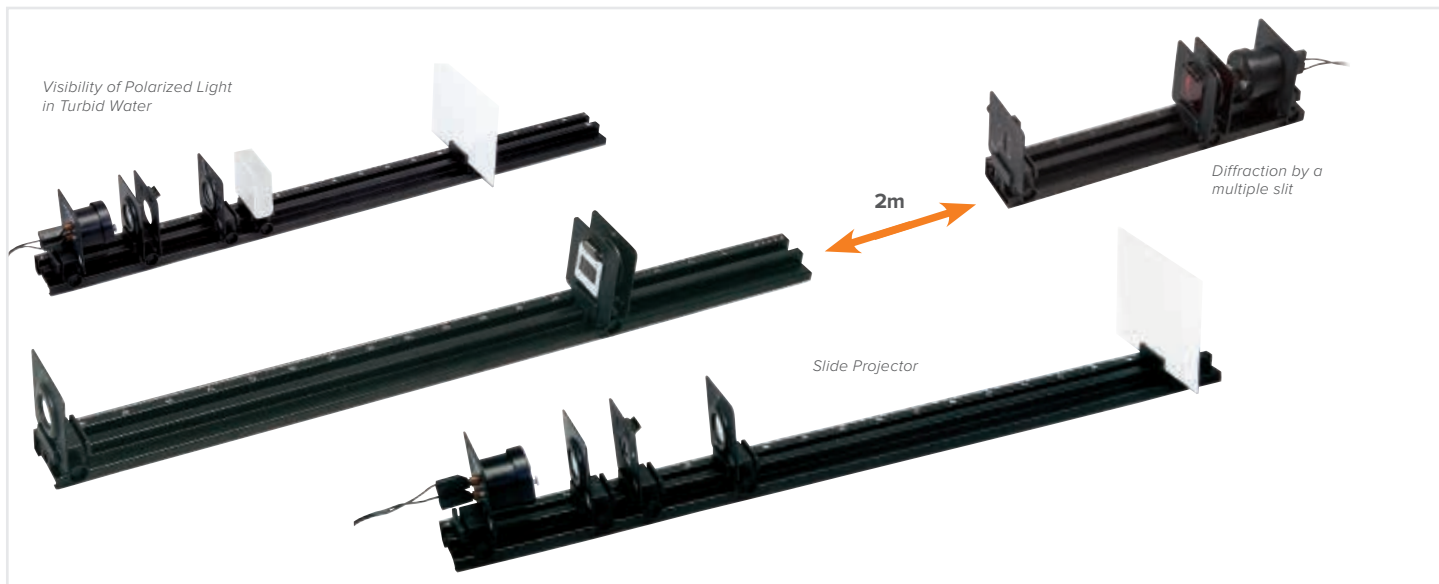
For mounting single-ray projector U40120.

S-U40121

Spare Lamp, (not shown)

Spare lamp for single-ray projector U40120.
 12 V, 35 W.

S-U40122



Kröncke Optical Systems

The Kröncke Optical System provides robust reliability that has been tried and tested for decades and offers all the precision needed for student exercises and practical courses in numerous experiments on ray and wave optics. The experiments are carried out in traditional fashion using the white light of an incandescent lamp, the filament of which can be projected through an adjustable slit to observe interference in particular.

All optical components are mounted in diaphragms with no stems and can easily be adjusted vertically and with precision into the optical light path when mounted on optical riders. Optical riders can freely move on the U-profile rail of an optical bench and can be attached with a minimum of effort.

Ray optics:

- Pinhole camera
- Imaging with converging lenses
- Image aberrations
- Images in the eye (eye model)
- Correction of vision
- Magnifying glasses
- Microscopes
- Astronomical telescopes
- Terrestrial telescopes
- Slide projectors

Required equipment for ray optics:

Basic Set for Kröncke Optical System

S-U8477120-115

Polarization:

- Polarization of transverse waves
- Polarizer and analyzer
- Visibility of polarized light in turbid water
- Double refraction
- Rotation of planes of polarization by a sugar solution

Required equipment for polarization:

Basic Set for Kröncke Optical System S-U8477120-115

Supplementary Set for Polarization S-U8477140

Includes teacher's manual!

Interferences:

- Fresnel mirror
- Diffraction by small openings and plates
- Diffraction by an air gap
- Diffraction by the wire
- Diffraction by multiple slits
- Diffraction by the grating
- Optical resolution
- Determining the wavelength of light

Required equipment for interference:

Basic Set for Kröncke Optical System S-U8477120-115

Supplementary Set for Interference S-U8477130



Basic Set for Kröncke Optical System

The experiments are carried out in traditional fashion using the white light of a halogen lamp, the filament of which can be projected through an adjustable slit to observe interference in particular. All optical components are mounted in diaphragms with no stems and can easily be adjusted vertically and with precision into the optical light path when mounted on optical riders. Optical riders can freely move on the U-profile rail of an optical bench and can be attached with a minimum of force.

S-U8477120-115



Supplementary Set for Polarization

Supplementary set to the Basic Set for Kröncke Optical System (U8477120-115) for carrying out student experiments on the polarization of light waves.

Contents:

- 1 Pair of polarizing filters
- 1 Pinhole aperture, 10 mm
- 1 Rectangular cuvette

S-U8477140

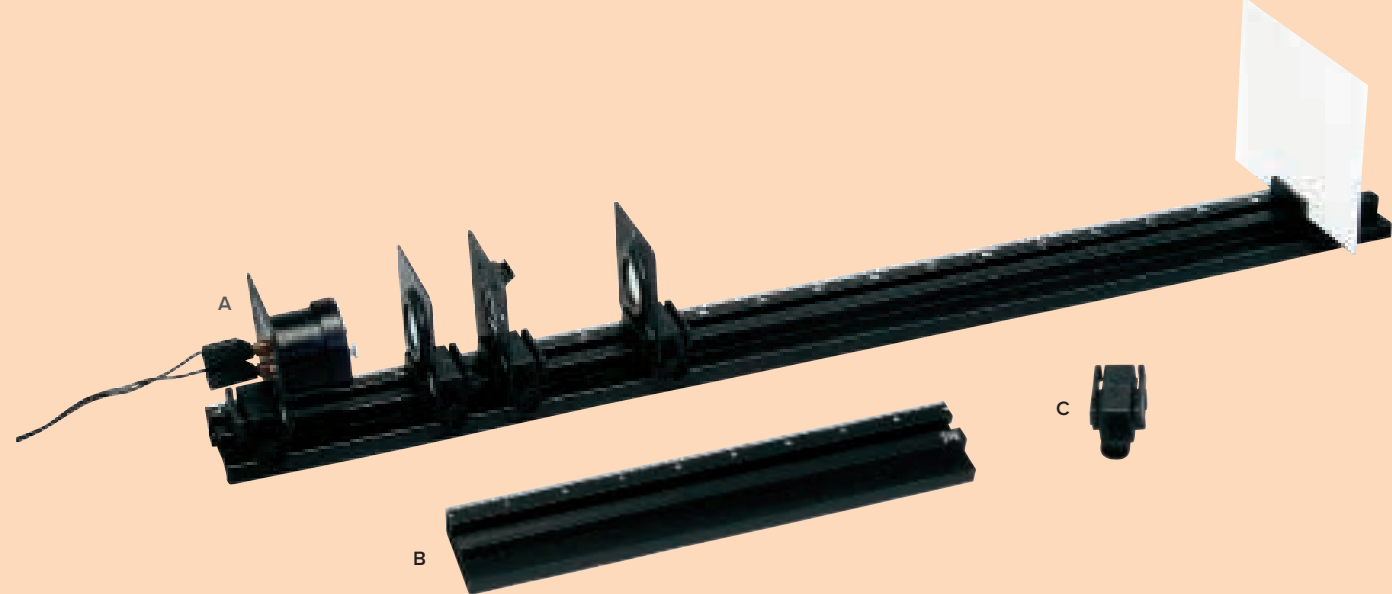


Supplementary Set for Interference

Supplementary set to the Kröncke Optical System basic set (U8477120-115) for carrying out student experiments on the interference of light waves.

S-U8477130

Full Content Information Available
Online at [3bscientific.com!](http://3bscientific.com)



A & B. Optical Bench K

Optical bench comprising an aluminium U-shaped profile with a printed millimeter scale. Available in 2 sizes.
 Crosssection: 72 x 30 mm approx.

- A. 1000 mm 1.2 kg S-U8475240
- B. 450 mm .06 kg S-U8475230

C. Optical Rider K

Optical rider for K-model optical benches (U8475337 and U8475336). With two clamps for diaphragms from the Kröncke Optical System or for plates up to 2 mm thick.
 Dimensions: Approx. 40 x 50 x 35 mm
 Weight: Approx. 70 g

S-U8475350

Projection Screens K (not shown)

Plastic projection screens for mounting on K-model optical riders (U8475350).

Dimensions: 200 x 150 mm

- Transparent Projection Screen K S-U8476310
- White Projection Screen K S-U8476320

Customize your own kit!



Iris Diaphragm K

Continuously adjustable iris on diaphragm screen 100 mm².

Aperture: 2 – 18 mm
 Dimensions: 100 mm²

S-U8472345



Optical Lamp K

Halogen lamp in cylindrical housing attached to diaphragm screen (100 mm²) for mounting on K-model optical riders (U8475350). The filament can be aligned horizontally or vertically.

Halogen lamp: 12 V, 20 W
 Terminals: 4 mm safety sockets
 Dimensions: Approx. 60 x 100 x 100 mm
 Weight: Approx. 130 g

S-U8475400

Additional Item Required

Transformer 12 V, 25 VA
 S-U8475470-115



Pair of Polarization Filters K

Two polarizing filters on a diaphragm screen (100 mm²) for producing and analyzing polarized light. In a rotating frame with a pointer and protractor scale.

Scale: 0 – 180°
 Scale division: 5°
 Dimensions: approx. 100 mm²
 Filter diameter: 35 mm

S-U8476526



Concave Mirror K

Concave mirror on diaphragm 100 mm².

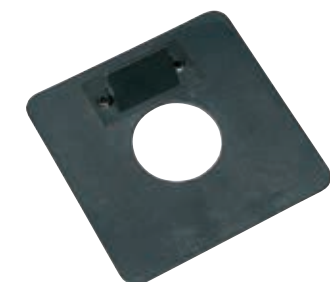
Focal length: 180 mm
 Mirror diameter: 50 mm
 Dimensions: 100 mm²

S-U8475200

Halogen Lamp 12 V/20 W (not shown)

Special substitute lamp for the optical lamp K (U8475400).

S-U8475410



Clamp K

Clamp for diaphragms, filters, diffraction objects and other objects in a slide frame. On diaphragm screen (100 mm²).

Clamping range: 0, 2 – 10 mm
 Dimensions: approx. 100 mm²
 Round opening: 38 mm dia.

S-U84755401



Adjustable Slit K

Continuously adjustable slit on diaphragm screen (100 mm²). The slit width can be adjusted by means of a micrometer screw.

Slit width: 0 – 4 mm
 Slit height: 20 mm
 Dimensions: approx. 100 mm²
 Weight: approx. 190 g

S-U8476675



Optical Lenses K

Lenses made of high-grade optical glass. Shock-proof and crack-proof installation in optical diaphragm (100 mm²). With focal length specification.

Dimensions: 100 mm²

Lens diameter: 50 mm

Item Number	Price	Shape	Focal Length
S-U8475901		Convex Lens	50 mm
S-U8475911		Convex Lens	100 mm
S-U8475921		Convex Lens	150 mm
S-U8475931		Convex Lens	300 mm
S-U8475941		Convex Lens	500 mm
S-U8475951		Concave Lens	-100 mm
S-U8475961		Concave Lens	-500 mm



Fresnel Mirror K

Fresnel mirror for use on K-model optical benches (U8475337 and U8475336). Two mutually inclined surface-coated mirrors are bonded to a common metal plate. A knurled screw at the rear can be used to adjust the angle between the mirrors. The wave nature of light can be demonstrated by interference following reflection at both mirrors.

Dimensions: 50 x 160 x 83 mm

Weight: 240 g

S-U8476515



Prism Table K

Prism table with clip for clamping prisms. Holder fits K-model optical riders (U8475350).

S-U8476110



Plane Mirror K

Simple plane mirror, glass.

Dimensions: 100 mm²

Weight: Approx. 70 g

S-U8475180



Micrometer Screw K

Micrometer screw with fine tip for measuring diffraction and interference lines. Holder fits the optical rider K (U8475350).

Dimensions: Approx. 80 x 30 x 60 mm

Weight: Approx. 120 g

S-U8476630



Storage Box

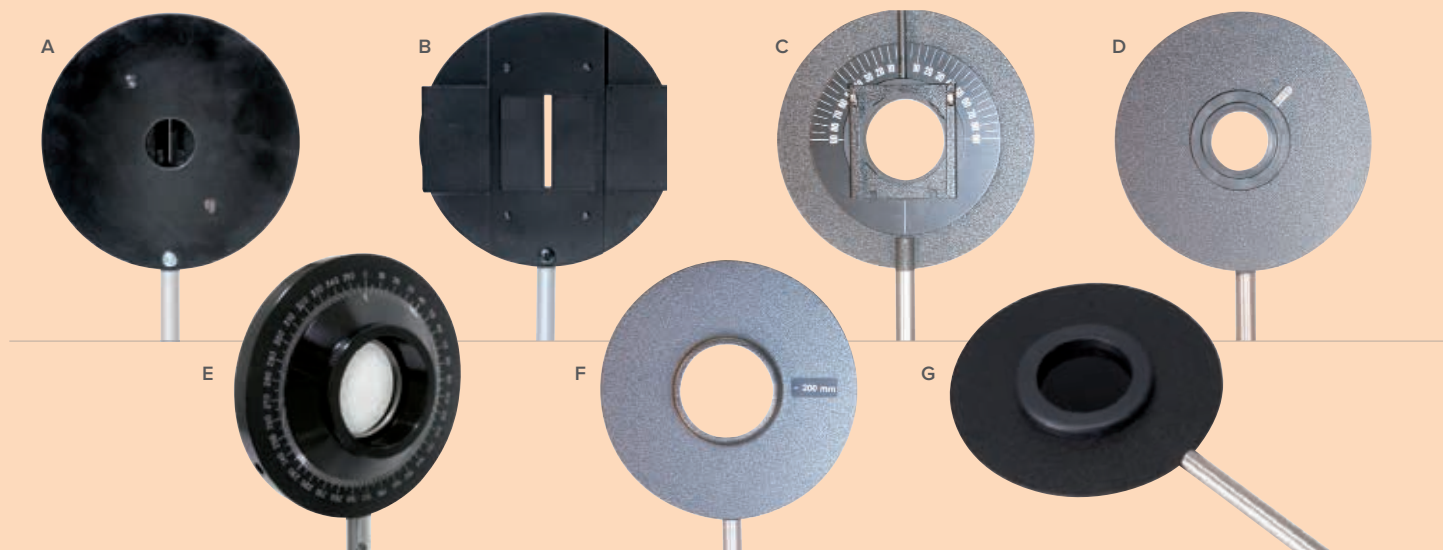
Box made from smoked beech, varnished, with 20 compartments for lenses and optical elements of width 100 mm.

Dimensions: 400 x 130 x 90 mm³

Weight: Approx. 1,000 g

S-U8776140

A truly unique and extraordinary lens!



A. Adjustable Slit on Stem

Slit with symmetric aperture, in black metal frame on stem. With micrometer screw.

Holder diameter: 130 mm
 Slit width: 0 – 3 mm
 Slit height: 25 mm
 Shaft diameter: 10 mm

S-U8474015

B. Object Holder

Holder with plug-in socket for flat, optical elements such as diaphragms, slits, gratings, filters and slides in black metal frame.

Diameter of metal frame: 130 mm
 Plug-in socket: 50 x 50 mm
 Shaft diameter: 10 mm

S-U8474000

C. Rotating Object Holder

Same as U8474015 but rotating plug-in socket and angular scale.

Angular division: $\pm 90^\circ$
 Divisions: 5°
 Diameter of the disc: 130 mm
 Rod: 10 mm

S-U17001

D. Iris Diaphragm

In black metal frame, shaft-mounted. Continuously adjustable aperture.

Iris diameter: 3 to 29 mm
 Diameter of metal frame: 130 mm
 Shaft diameter: 10 mm

S-U17010

E. Polarization Filter on Stem

Precision glass polarization filter, which is in a mounting on a steel rod and can be rotated on a ball-bearing. With angular scale marked in 1° intervals.

Aperture diameter: 38 mm
 Extinction coefficient: $>99.9\%$ at = 450 – 750 nm
 Height of optical axis: 150 mm
 Mounting diameter: 100 mm
 Stem diameter: 10 mm

S-U22017

F. Shaft-Mounted Lenses

All lenses are mounted in a 130 mm black metal frame with a 10 mm rod to be placed in the rider on the optical bench. The lens has a rim around it to protect it from damage.

Item Number	Price	Shape	Focal Length	Lens Dia.
S-U17101		Convex Lens	+50 mm	50 mm
S-U17102		Convex Lens	+100 mm	
S-U17103		Convex Lens	+150 mm	
S-U17104		Convex Lens	+200 mm	
S-U17105		Convex Lens	+300 mm	50 mm
S-U17106		Convex Lens	-100 mm	
S-U17107		Convex Lens	-200 mm	
S-U17108		Convex Lens	+150 mm	

G. Mounted Mirrors

All mirrors are mounted in a 130 mm black metal frame with a 10 mm rod to be placed in the rider on the optical bench. The lens has a rim around it to protect it from damage.

Diameter of frame: 130 mm
 Shaft diameter: 10 mm
 Lens diameter: 50 mm

50 mm concave S-U17110
 50 mm convex S-U17111
 50 mm plane S-U17112



Storage Base for Lenses

With ten holes for storing lenses and other instruments with a rod of 10 mm.

S-U17120

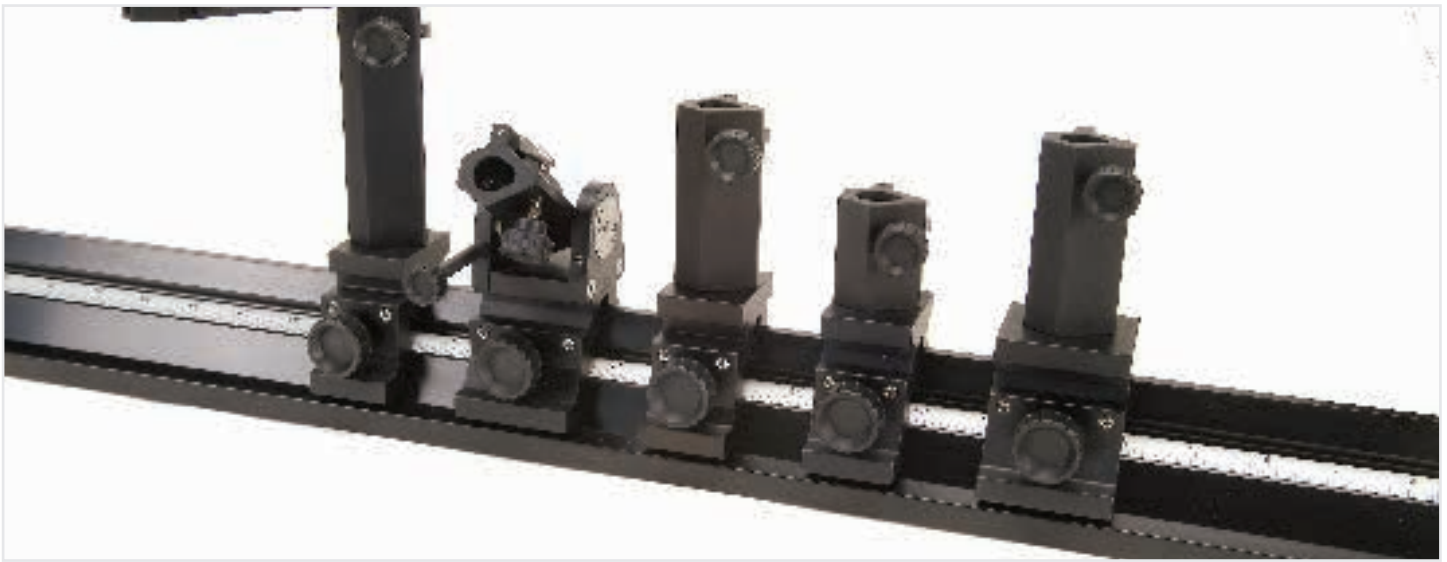


Multi-component Holder

Two-piece holder, shaft-mounted, for mounting diffraction objects such as slits, double-slit, gratings, polarization foils, color filters, diaphragms, lenses etc. Optical components are secured by means of a metal ring equipped with two adjusting screws.

Diameter of holder: 80 mm
 Diameter of aperture: 36 mm
 Component diameter: 37 to 61 mm max
 Shaft: 150 x 10 mm \varnothing

S-U22010



Optical Riders

These riders accept rods from 10 mm to 14 mm in diameter. Two interior mounting springs allow optical components to be fixed to the optical axis even when the rider is not fixed to the optical bench. Our optical riders are manufactured with extremely high precision so that they can be attached to the optical bench in either direction and your optical components will remain aligned in the optical axis. Side mounting on optical riders allow you to place the riders as close together as possible.

Engineered with high precision and detail

Item Number	Price	Height	Base Width
S-U103111		90 mm	50 mm
S-U103151		60 mm	36 mm
S-U103161		90 mm	36 mm
S-U103301		60 mm	50 mm
U103171	\$188	120 mm	36 mm
S-U103121		120 mm	50 mm



Tilting Rider

For tilting optical elements out of the optical axis.

Tilting range: 90°
 Sleeve height: 90 mm
 Base width: 50 mm
 Clamping width for rods: 10 to 14 mm

S-U103301



Cantilever Arm 100mm

Clamps to riders for positioning devices next to the optical axis. Optical rider sold separately.

Extension arm: 100 mm
 Clamping width for rods: 10 to 14mm

S-U10331



Sliding Rider

For sliding of optical elements perpendicular to optical bench.

Sliding range: ± 50 mm
 Height from optical bench: 90 mm
 Width of base: 50 mm
 Clamping width for rods: 10 to 14 mm

S-U103202



Support for Optical Bench

Made of black anodized aluminum for adjusting the optical bench. Consisting of two feet and a single-point support with adjusting screws.

Length of supports: 270 mm.

S-U103041



Optical Bench

Our new bench is 100% compatible with the traditional design which has been the standard for over 80 years in college and university laboratories. This means that all existing optical components such as riders will fit on these sleek and durable new benches. Machined with highest accuracy out of black anodized aluminum with an equilateral triangle cross section, these benches are sure to meet the most demanding requirements.

- Bore holes on front end for inserting elements or further rails
- V shaped standardized cross section
- Graduation: mm/cm and inches (opposite sides)

0.5 m, approx. 1.75 kg S-U10302
 1 m, approx 3.5 kg S-U10300
 2 m, approx. 7 kg S-U10301



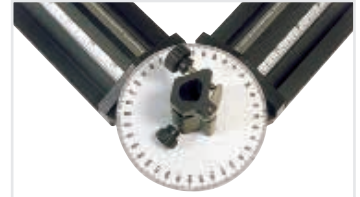
Projection Screen

Translucent screen, shaft-mounted for all projection purposes on optical bench.

Dimensions: 250 mm²
 Shaft diameter: 10 mm

S-U17130

Quality and accuracy that fits most traditional designs!



Swivel Joint

For experiments where light is deflected and where the highest precision requirements prevail. Black anodized aluminum with adjustable protractor scale ±180° in 1° divisions.

Protractor scale: ± 90°
 Sleeve height: 60 mm
 Clamping width for rods : 10 to 14 mm

S-U10305



Equipment Set for Wave Optics with Laser

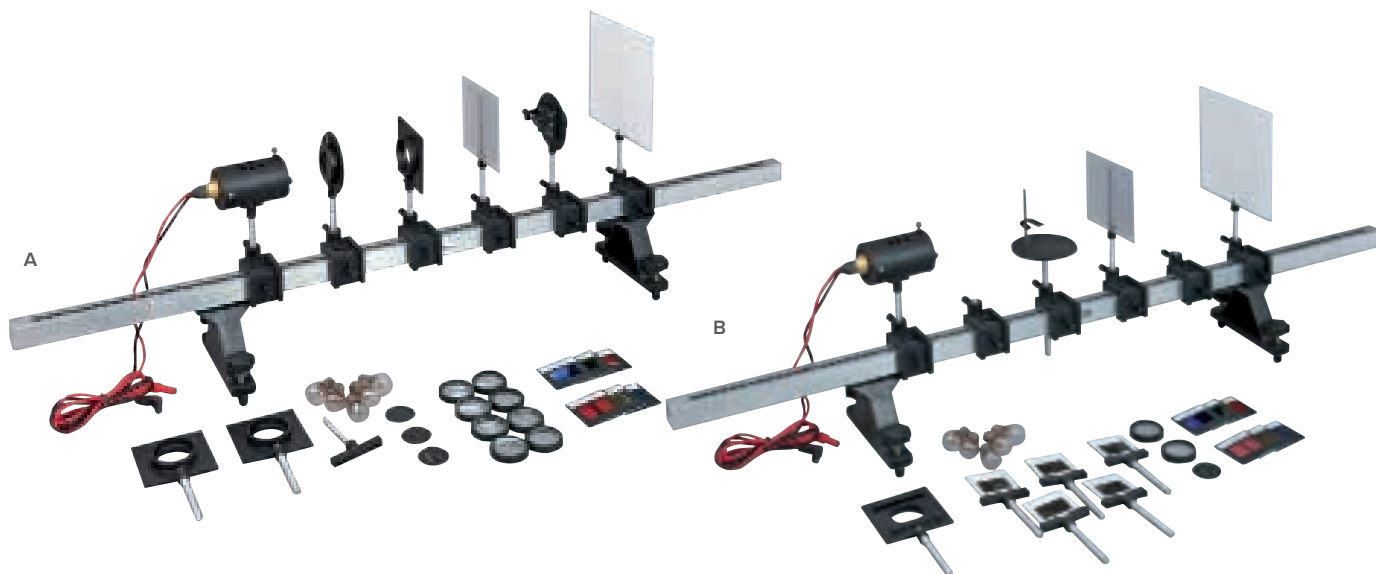
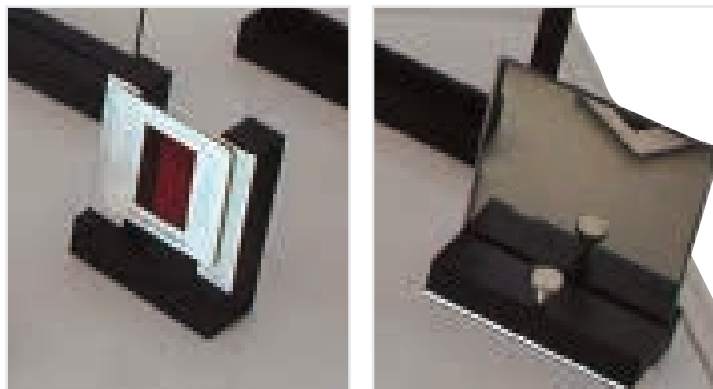
Equipment set for demonstrating fundamental phenomena in wave optics by means of practical experiments.

The light source is provided by a partially polarised diode laser with adjustable mount. Power is supplied from a plug-in power supply (included) or from batteries. The components are magnetic and can be placed horizontally or vertically on the included metal board, according to the set-up required for the various experiments. All components are stored in a case with shaped foam inlay.

Diode laser: max. 1 mW, laser safety class II
 Wavelength: 635 nm
 Plug-in power supply: primary 100 V AC – 240 V AC secondary 3 V DC, 300 mA
 Battery holder: for 2 x 1.5 V AA batteries (batteries not included)

- Contents:**
- 1 Diode laser with adjustable mounting
 - 1 Plug-in power supply
 - 1 Battery holder (without batteries)
 - 2 Mirrors with adjustable mounting
 - 1 Half-silvered mirror
 - 1 Screen, white
 - 1 Screen, frosted glass
 - 1 Convex lens
 - 1 Polarization filter
 - 1 Holder for lens and filter
 - 3 Color filters in slide frames (red, green, blue)
 - 2 Apertured diaphragms in slide frames
 - 2 Square diaphragms in slide frames
 - 3 Gratings with slits in slide frames
 - 1 Cross grating in slide frame
 - 1 Glass plate in slide frame
 - 1 Holder for slide frames
 - 1 Hologram
 - 1 Metal board (60 x 45 cm²) with removable strut
 - 4 Rubber feet for metal board
 - 1 Storage case
 - 1 Experiment guide

S-U17303



Optical Bench 160 cm or 100 cm

Made with an aluminium profile for maximum accuracy, fitted with 2 legs to adjust the bench and place it horizontally. 160 cm scales. Supplied with the instructions for use and experiment protocols.

Contents:

- A light source with 12 V, 21 W lamp, fitted with a condenser for adjustment, a diaphragm holder to place an asymmetrical object in front of the light source; connection using 4 mm dia. leads. Supplied with 5 spare lamps
- 6 optical riders with indices compatible with all the optic components on a rod with 8 mm diameter on which the bench is fitted
- Asymmetrical object "d"
- 1 filter holder
- 1100 x 100 mm chequered translucent screen on a rod
- 1150 x 150 mm white screen

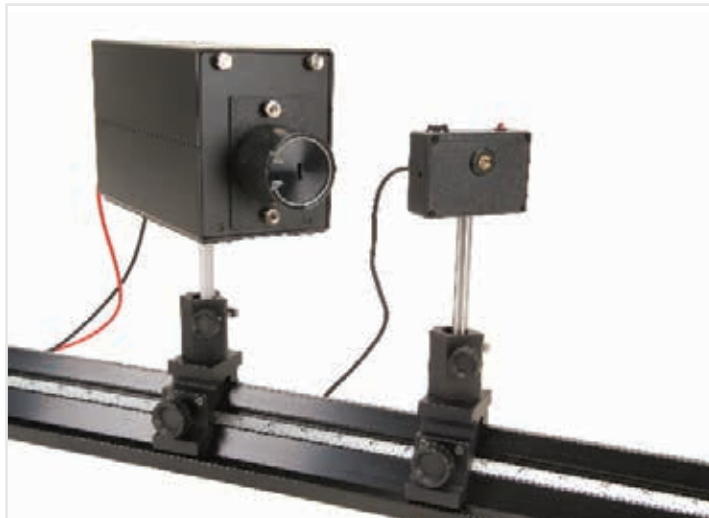
- 8 glass lenses with 40 mm diameter, protected by plastic bushes: +100 mm, +200 mm, +300 mm, +500 mm, -100 mm, -200 mm, -300 mm, -500 mm
- Three holders for lenses with 40 mm diameter
- Single-slit diaphragm for light source
- Single-slit diaphragm with adjustable width of 0 to 2 mm on a rod
- Iris diaphragm with adjustable diameter of 1 to 30 mm on a rod
- Three-slit diaphragm: each 2 mm wide and spaced at 1 cm for light source
- Set of 3 primary color filters (red, green and blue) with dimensions 50 x 50 mm,
- Set of 3 secondary color filters (magenta, cyan and yellow) with dimensions 50 x 50 mm

A. 160 cm S-U29304

B. 100 cm S-U29301

Additional Item Required

Transformer 12 V, 60 VA (115 V, 50/60 Hz) S-U139001-115



A. Compact Laser Diode

A new, extremely compact light source for use in optics, e.g. geometric optics and wave optics. Its small size allows use with many optical components on a shorter optical bench, thus providing an economical classroom solution.

A laser with all security characteristics for the training and practical course application:

- Classified under laser class II, equipped with key switch
- Well visible LED display for lasers in operation
- Potentiometer for the regulation of power output on the max. output of 1 mW
- Power supply provided by plug-in contained in scope of delivery

Specifications:

Power output:	0.5 mW up to < 1mW Adjustable with potentiometer
Wavelength:	650 nm \pm 3 nm
Beam diameter:	2.5 mm of \pm 10%
Stability of power output:	\pm 5% in 24 h
Beam divergence:	< 2 mrad
Polarization:	random
Plug-in power supply:	12V
Dimensions:	50 x 72 x 54 mm
Rod staff:	130 x 10 mm dia.

Includes:

Diode laser with key switch, operating instructions, safety notes and plug power supply unit.

S-U16040-115

B. Optical Halogen Lamp, 12 V, 50 W

This extremely bright, universal light source is intended for use during experiments on the optical bench and for projection purposes. It consists of a metal housing with a condenser, a movable element for axial light adjustment, a holding stem with a screw mounting and an integrated fan.

Halogen lamp:	12 V, 50 W
Connection:	Via 4-mm safety jacks
Condenser focal length:	75 mm
Condenser diameter:	45 mm
Stem:	120 x 10 mm \varnothing
Housing:	190 x 125 x 110 mm

S-U21881



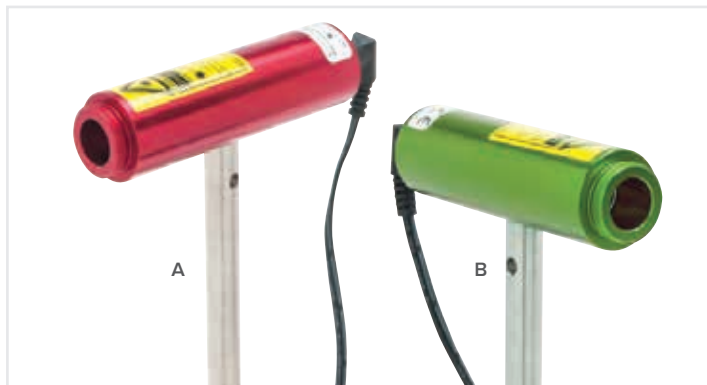
Experimental Lamp, Halogen 12 V, 50 W

Light source with small extension for optical experiments. Black-lacquered metal housing with mechanism for vertical and horizontal use. Includes halogen lamp 12 V, 50 W.

Light aperture:	40 mm \varnothing
Connection:	via 4 mm-sockets
Dimensions:	80 x 80 x 105 mm
Shaft:	10 mm \varnothing

S-U17140

Additional Item Required
Transformer
S-U139001-115



Laser Diode, Red

Red light source giving a beam with minimal divergence, housed in a compact and sturdy aluminium body. It is based on a 650 nm class II industrial laser module with a glass collimating lens. Fitted with a 10 mm stainless steel rod. A 100-230V AC/DC converter is included.

Laser protection class:	II
Output power:	0.6 – 1mW
Wavelength	650 nm \pm 5 nm
Spot size at 5 m distance:	<8 mm dia.
Divergence	<1 mrad
Operating voltage:	6 – 12 V DC

S-U22000

Laser Diode, Green

High performance 532 nm green laser (doubled NdYag). The laser (safety classification II) produces green light ideally suitable for optical demonstrations, as the wavelength is in the range where the human eye has maximum sensitivity. The visibility is as good as that for red laser light from a 5 mW source. Fitted with a 10 mm stainless steel stem. The apparatus supplied includes a plug-in mainadapter power supply.

Laser protection class:	II
Output power:	0.4 – 1 mW
Wavelength:	532 nm \pm 0.1 nm
Spot size at 5 m distance:	< 9 mm dia.
Divergence:	< 2 mrad
Operating voltage:	3 V DC

S-U22001



Modulated Helium-Neon Laser

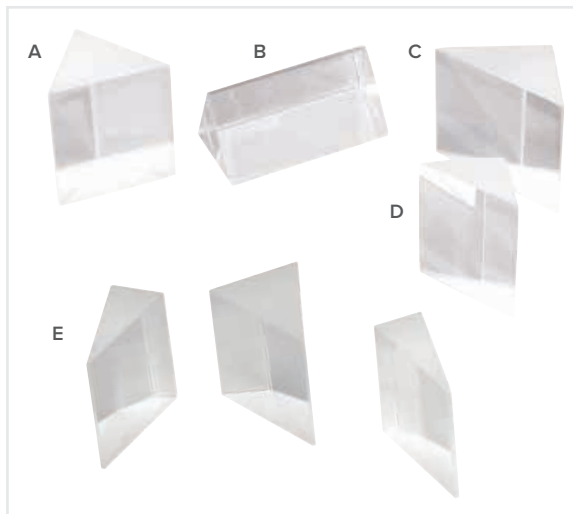
Laser light can be modulated by varying its intensity. This laser is capable of up to 15% intensity variations at rates up to 1 MHz. The increased brightness can also help students make better holograms. Small movement or vibrations are less likely to blur the picture with a shorter exposure time.

Features:

- Beam can modulate from 85% to 100% of full power
- Accepts modulation signals ranging from 50Hz to 1MHz
- Effective signal transmission up to several hundred feet. With collimator and detector transmission range increases to thousands of feet
- Miniature phone jack accepts audio input signals at 100mV peak-to-peak level and 8K Ω impedance
- Two-year limited warranty

Power (mW):	1.0 min./2 typ./2.9 max.
Beam diameter:	0.49 mm
Beam divergence:	1.65 mRad
Power Requirements:	105-125 Vac, 50-60 Hz, Class IIIA U.S. CDRH

S-U41610



Item Number	Price	Material	Shape	Size (L x W x H)	Glass Index
A. S-U14005		Crown Glass	Equilateral	45 x 45 x 50 mm	1.515
B. S-U140001		Crown Glass	Equilateral	27 x 27 x 50 mm	1.515
C. S-U14015		Crown Glass	Rectangular	45 x 45 x 50 mm	1.515
D. S-U14010		Crown Glass	Rectangular	30 x 30 x 50 mm	1.515
S-U14051		Crown Glass	Equilateral	30 x 30 x 30 mm	1.515
S-U14052		Flint Glass	Equilateral	30 x 30 x 30 mm	1.608
Set of 3 Prisms Used for demonstrating the layout of an achromatic prism and direct-vision prism.					
E. S-U14050		Crown glass	–	40 x 18 x 40 mm	1.515
		Crown glass	–	40 x 30 x 40 mm	1.515
		Flint glass	–	40 x 15 x 40 mm	1.608

Take your experiments to the highest level! 3B Scientific® quality prisms for precise results!

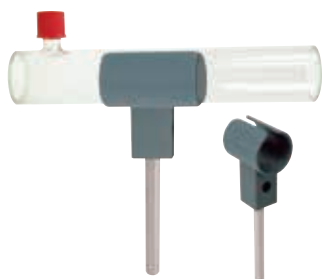


Round Cells

Duran glass cells with bonded optical discs and GL threads. For experiments on the determination of the angle of rotation of optically active substances on the optical bench.

Diameter: 35 mm
Thread: GL-14

100 mm long S-U14313
200 mm long S-U14314



Cell Holder on a Stem

Plastic holder for round cells U14313 and U14314.

Holder: 36 mm Ø
Stem: 90 mm x 10 mm Ø

S-U11112



Prism with Stand

Equilateral prism made of K9 glass. Comes with stand molded to fit the prism for ease-of-use.

Dimensions: 24 mm³
Height with Stand: 13 cm

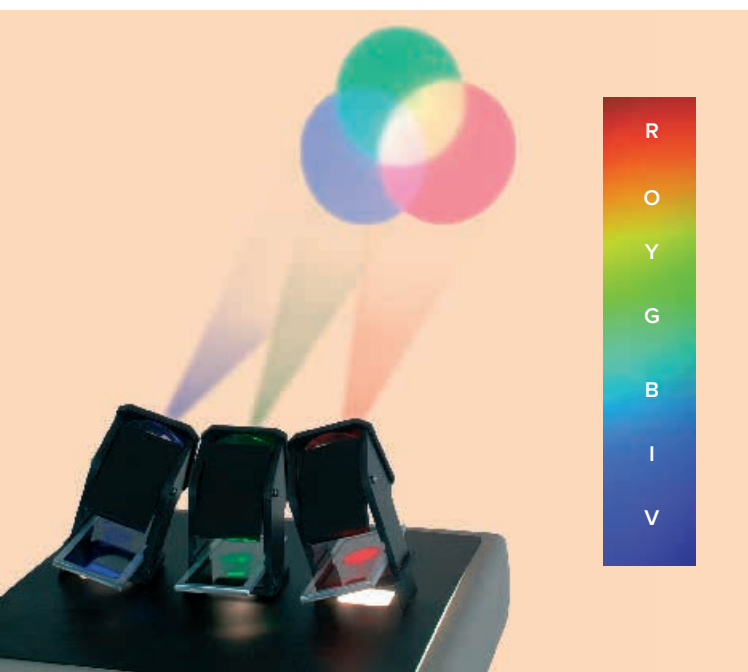
S-U49810



Prism Table

Round prism table with adjusting clip, diameter 60 mm with a 10 mm rod. For mounting prisms and curves on the optical bench. Rider and prism sold separately.

S-U17020



Equipment Set for Color Mixing

Equipment set for demonstrating how colors combine (with the aid of an overhead projector). This equipment set is designed to permit quick setting up and safe, simple operation. The clear configuration facilitates understanding of the experiments and allows direct viewing of results.

The projection plate, along with its three holders for mirrors and lenses, is placed onto the projection surface of the overhead projector. Depending on the projection distance, three large circles with diameters of 30 to 80 cm appear on the projection screen. By turning the holders and mirrors, it is possible to project colors so that they are separated or so that they partially overlap. Such adjustments can be performed easily and precisely. The large color filters can be simply inserted into the lens holders, or placed directly on the overhead projector.

Contents:

- 1 Projection plate with three mirror and lens holders
- 2 Color filters; red, green, blue (120 x 50 mm²)
- 3 Color filters; cyan, yellow, magenta (120 x 50 mm²)

S-U21883

Additional Item Required

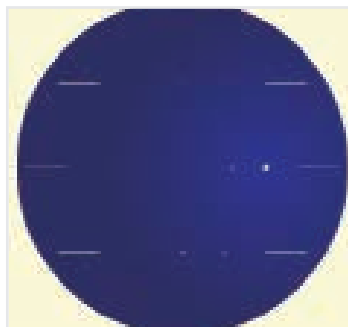
Overhead Projector S-U30150-115



Funhouse Mirror

The Funhouse Mirror is a high grade polyester sheet with vacuum deposited silver metal surface. The mirror is 8 mm thick; it will not tear but can be cut with normal scissors. Keep out of sunlight as it can focus light and heat to start fires. Comes rolled into 1.5" tube, will unroll flat. This is a great way to teach concave and convex mirrors and real and virtual images. Many applications, use your imagination!

Jumbo 54 x 84" S-U40275
Large 24 x 52" S-U40276



Diffraction Apertures on Glass Plate

Glass plates with 12 different single and double diffraction apertures for quantitative diffraction experiments.

Diameter of support: 40 mm
 Aperture irregularities: < 1 μm

Single Apertures

Diameters: 20, 30, 50, 100, 200 & 500 μm

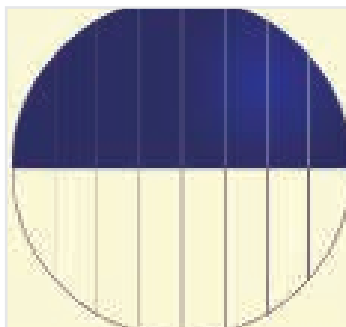
Double Apertures

Separations: 100, 200 and 400 μm
 Diameter: 50 μm Rectangular apertures

Rectangular Apertures

Diameters: 70 x 70 μm², 200 x 200 μm²
 and 70 x 200 μm²

S-U22011



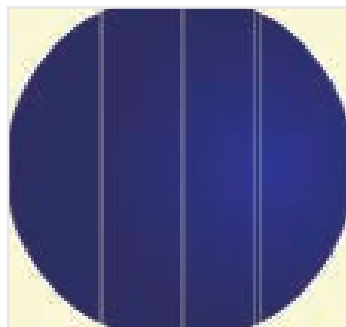
Slits and Bars on Glass Plate

Glass plates with 7 sets of slits and bars of different widths for quantitative diffraction experiments.

Diameter of support: 40 mm
 Irregularities: < 1 μm

Slit widths: 30, 40, 60, 80, 100, 150 & 200 μm
 Bar widths: 30, 40, 60, 80, 100, 150 & 200 μm

S-U22012



Double Slits on Glass Plate

Glass plates with three double slits of different separations for quantitative diffraction experiments.

Diameter of support: 40 mm
 Irregularities: < 1 μm

Slit width: 70 μm
 Separations: 200, 300 and 500 μm

S-U22014



G. Multiple Slits on Glass Plate

Glass plates with four different numbers of multiple slits for quantitative diffraction experiments.

Diameter of support: 40 mm
 Irregularities: < 1 μm

Slit width: 40 μm
 Slit separation: 100 μm
 Number of slits: 3, 4, 6 and 14

S-U22015

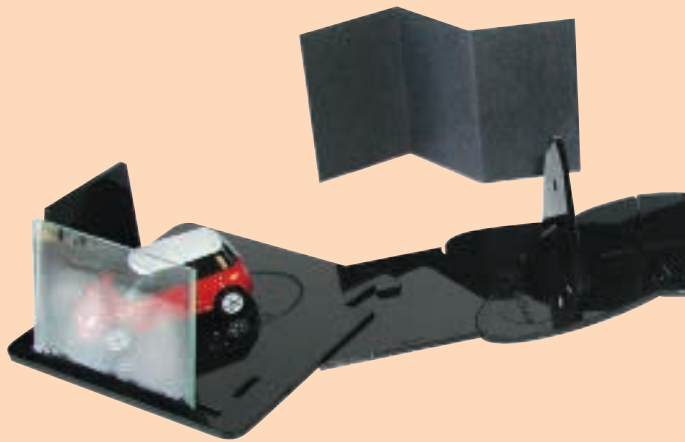
Additional Items Required

Holder for Four Optical Components

S-U22016

Component Holder

S-U22010



Hologram Kit

Are your students looking for excitement? With this kit they could be making holograms in no time. These transmission holograms are easy to make because of relatively lower sensitivity to vibrations. Set it up on a solid desk, turn off the lights and then hold your breath for 5 minutes while the special "Instant Hologram" film is exposed to laser light. Your hologram will then be visible under dim monochrome lighting. Follow the enclosed instructions carefully for satisfactory results.

Includes:

- SafetyLight Laser Diode (with heat sink)
- LED Darkroom Light (For seeing in the dark without exposing the film)
- "Instant Hologram" Film Plates (20 – 2 x 3")
- Laser-cut Holographic Plate Holder
- Laser-cut Laser Diode Mount
- Beam Spreading Lens
- Battery Pack and Batteries
- Object for Hologram
- Step-by-Step Instructions

S-U46100



Reflection and Refraction Set

Includes:

- Stable 300 x 200 mm base plate
- Light source with condenser and slit-holder to obtain several types of light beams, with a 12 V 21 W lamp; connection via cable and 4 mm safety plugs. Supplied with two spare lamps.
- The light source can be adjusted, for accurate adjustment of the rays with respect to the optical elements.
- Scaled disc of diameter 240 mm with double scales in degrees: 90°-0-90° with a system to position the optical elements.
- Plane mirror with a fixing device on the disc.
- Plexiglas half-cylinder with 200 mm diameter which can be easily placed on the disc.
- Transparent half-cylinder tank with diameter 200 mm; height 2 cm; scaled in degrees 90°-0-90° on its cylindrical surface, with positioning on the built-in disc
- 2 Diaphragms: a single-slit and a triple-slit.

S-U29305



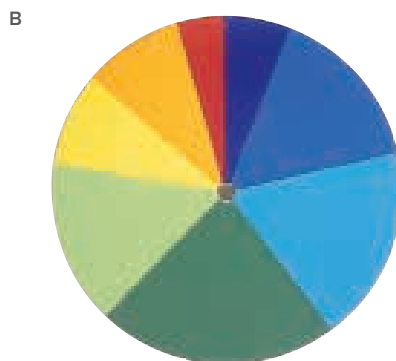
A. Optical Disc with Accessories

This equipment set introduces the fundamentals of geometric optics. It consists of a base plate with an angular scale possessing 1° divisions, a block scale and two bores for mounting clamps for optical components (lenses, prisms, mirrors). An adjustable holder and tripod permit horizontal as well as vertical installation.

Includes:

- 1 Optical disc w/ a holding stem and 2 clamps, 240 mm Ø
- 1 Bi-concave lens, 90 mm
- 1 Bi-convex lens, 90 mm
- 1 Semi-circular element, 90 mm
- 1 Trapezoid element, 45° and 60°
- 1 Prism, rectangular, leg length 50 mm
- 1 Combined mirror (planar, convex, concave)
- 1 Storage case

S-U17128



B. Color Disc

To demonstrate additive color mixing in conjunction with the motor with drive control (U11040). Plastic round disc with segments in the colors red, orange, yellow, bright green, dark green, light blue, dark blue and violet. The colors are mixed into the color white when the disc rotates.
Diameter: 170 mm

S-U15500

C. Motor with Drive Control

To operate the color disc (U15500). With disc holder and clamp for attachment to a stand rod. Including plug-in power supply.

Control range: 0 up to 25 rev/s
Rotation direction: reversible
Dimensions: 110 x 70 x 45 mm
Weight: 0.2 kg

S-U11040



Optics on magnetic boards!

With this demonstration equipment system experiments on light propagation and wave optics can be optimally performed. The optical components like lenses, mirrors, prisms and light sources can be attached in a matter of seconds directly to the magnetic whiteboards (U10030 or U10031) and experiments as well as measurements can be performed without having to darken the room. The size of the components guarantee that the experiments can be performed in larger lecture halls.



Have questions about our products? contact us at **1.866.448.5846** or visit **3bscientific.com!**



Includes:

- 1 Light box
- 2 Bi-convex lenses (transparent acrylic)
- 1 Bi-concave lens (transparent acrylic)
- 1 Plane-parallel block (transparent acrylic)
- 1 Semicircular body (transparent acrylic)
- 1 Equilateral prism (transparent acrylic)
- 2 Right-angled prisms (transparent acrylic)
- 1 Plane mirror (glass)
- 2 Concave mirrors (metallic)
- 2 Slit gratings (4 different slit combinations)
- 8 Color filters (in slide frames)
- 8 Colored cards
- 1 Connecting lead with 4-mm plugs

A. Optics on Magnetic Boards, basic kit

Basic kit for demonstration experiments on geometrical optics performed on magnetic boards, e.g. shadow-casting, laws of reflection, laws of refraction, total reflection, angle of least deflection in a prism, focal determination of mirrors and lenses, laws of lenses and image errors.

Voltage supply, 12 V, 10 A

includes:

- 2 Plane mirrors, magnetic
- 1 Plano-concave lens, magnetic
- 1 Plano-convex lens, magnetic
- 1 Plane-parallel plate, magnetic
- 1 Semi-circular body, magnetic
- 1 Right-angled prism, magnetic
- 1 Mirror model, convex-concave, magnetic
- 1 Set of 3 shadow-casting bodies, magnetic

S-U14600

Additional Items Required

- 2 Single-ray Projector **S-U40120**
- 2 Magnetic Holder for Single-ray Project **S-U40121**
- 1 Multiple-ray Projector **S-U40110**

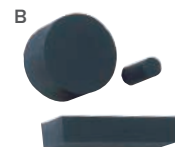
or

B. Set of 3 Shadow-casting Objects, magnetic

For experiments on shadow casting on magnetic boards.

- Cube: 100 x 20 x 35 mm
- Cylinder: 60 Ø x 35 mm
- Cylinder: 15 Ø x 35 mm

S-U15525



Acrylic Glass Bodies, Magnetic

Height: 35 mm each. L = Length, W = Width, S = Side length, T = Thickness

Item Number	Price	Description	Focal Length	Dimensions
S-U15515		Plano-concave lens	- 400 mm	L = 200 mm, T = 40 mm
S-U15516		Plano-convex lens	+ 400 mm	L = 200 mm, T = 40 mm
S-U15517		Plane-parallel	---	L = 200 mm, W = 100 mm
S-U15518		Semi-circular lens	+ 200 mm	200 mm Ø
S-U15520		Right-angled prism	---	S = 200 mm, 200 mm, 283 mm

Magnetic Mirror

Item Number	Price	Description	Surface
S-U15510		Plane mirror, magnetic	200 x 35 mm
S-U15511		Mirror model, convex - concave, magnetic	200 x 35 mm

Light Box Equipment Set

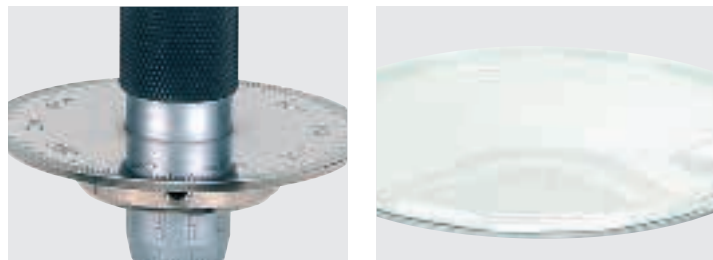
Introduce the fundamentals of geometric optics and the combination of color with our versatile, affordable Light Box Equipment Set. Intended for tabletop use, the light box has a robust plastic housing. A movable convex lens mounted in front of the light source can be used to produce parallel, convergent and divergent light beams. Four apertures for light to emerge are located at the ends and the sides for use in experiments. Both lateral apertures are equipped with two hinged mirrors for experiments on color mixing and shadow casting. All apertures possess fixtures for optical components mounted in 50 x 50 mm slide frames. The light box and all its accessories are delivered in a container for storage and transportation.

- Lamp: 12 V, 36 W
- Connections: via 4-mm plugs
- Light box: 175 x 55 mm
- Storage case: 250 x 240 x 100 mm

S-U30011

Additional Item Required

- Power Supply **S-U33020-115**



High Precision Spherometer

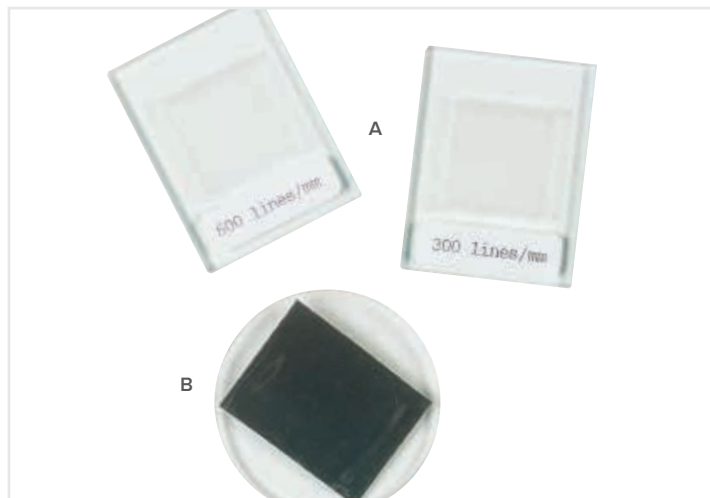
For measuring plate thicknesses, depressions and radii of curvature of spherical surfaces, e.g. lenses. The device consists of a tripod with three steel tips as feet, which form an equilateral triangle and a centered micrometer screw with a measuring tip. Attached to the micrometer screw is a disc with circular divisions from 0 to 500 and a vertical scale with millimeter divisions from 10 to 15 mm at the tripod.

Measuring ranges: 0 to 25 mm and 10 mm to 15 mm
 Screw pitch: 0.5 mm
 Measuring accuracy: 0.001 mm
 Support spacing: 50 mm

S-U15030

Additional Items Required

Set of 10 Watch Glass Dishes – 80 mm **S-U14200**
 Set of 10 Watch Glass Dishes – 125 mm **S-U14201**



A. High Quality Gratings

Transmission grating for spectroscopic examinations and for experiments on diffraction and interference. Suitable to resolve the Na-D lines. Mounted on glass carrier.

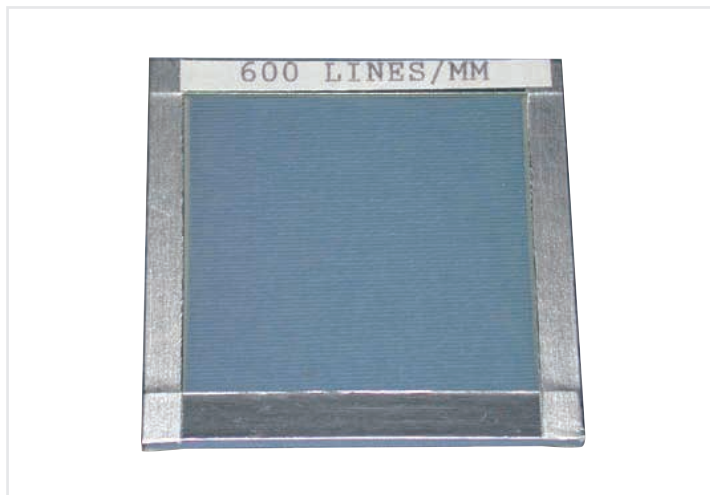
600 lines/mm S-U19511
300 lines/mm S-U19512

B. Concave Reflection Grating

Reflection grating mounted on round, concave glass carrier for demonstrating visible spectra and UV-spectra of 1st and 2nd order and, when inclined, up to the 5th order.

Glass carrier: 50 mm Ø
 Curvature radius: 500 mm
 Grating: 530 lines/mm
 Grating dimensions: 40 x 30 mm

S-U19525



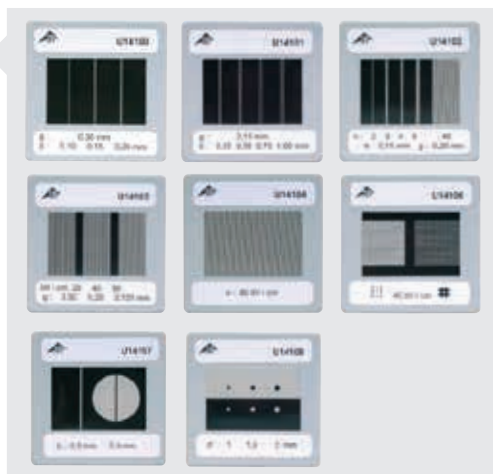
Copy of a Rowland Grating

This copy of a Rowland grating is supplied on a collodion foil between two glass plates in a metal frame for the purpose of projecting diffraction spectra, measuring wavelengths and observing spectra with spectrum lamps.

Lines: 600 mm
 Grating constant: 1.7 µm
 Dimensions: 50 mm²

S-U14424

Item No.	Price	Description	Line Count	Lattice	Slit/line	Slit Spacing mm
S-U14100		3 double slits of different widths	–	–	0.10	0.30
S-U14101		4 double slits of different spacings	0 pt	–	0.15	0.25
			–	–	–	0.50
			–	–	–	0.75
			–	–	–	1.00
S-U14102		2-, 3-, 4-, 5-fold slits and grating	–	–	0.15	0.25
S-U14103		3 gratings	20	0.50	–	–
			40	0.25	–	–
			80	0.125	–	–
S-U14104		Grooved grating	80	0.125	–	–
S-U14106		2 cross gratings	40	0.25	–	–
S-U14107		Single slit and line	–	–	0.5 each	–
S-U14108		3 hole and disc pairs of various diameters	–	–	1.00	–
			–	–	1.50	–
			–	–	2.00	–



Diffraction Objects

Photographically prepared and mounted in slide frames.



Gratings

Examine the angle of diffraction and interference using these wire mesh gratings in slide frames.

Dimensions: 50 mm²

- 140 Lines S-U21871
- 530 Lines S-U21872
- 600 Lines S-U21873
- 1000 Lines S-U21874



Set of Five Diaphragms

Consisting of:

- 1 slit: Slit width 1 mm
- 3 slits: Slit width 1 mm
Slit spacing 5 mm
- 5 slits: Slit width 1 mm
Slit spacing 5 mm

"F" diaphragms: Aperture of 8 mm

S-U17040

Set of Four Diffraction Gratings (not shown)

These individual 35 mm slides contain 4 different diffraction gratings: 80, 100, 300 and 600 lines/mm. They are perfect for qualitative studies of the relationship between line spacing, wavelength and diffraction angle.

S-U19515



Color Filters, Primary Colors

Set of 3 color filters in slide frames: Red, Green, Blue. Dimensions: 50 mm²

S-U21878

Color Filters, Secondary Colors

Set of 3 secondary color filters in slide frames: Cyan, Yellow, Magenta. Dimensions: 50 mm²

S-U21879



Hologram

Transmission hologram in slide holder.

Dimensions: 50 mm²

S-U21870



Digital Spectrophotometer

This digital spectrophotometer is used for quantitative investigations of emission and absorption spectra and transmission curves, and for measurements related to calorimetry and chemical kinetics. Based on the Czerny-Turner principle, this device permits simultaneous, real-time recording and analysis of the entire visible range from 380 nm – 830 nm in conjunction with the user-friendly measurement and evaluation software. Light recorded by means of an optical fiber and projected on a CCD detector via two mirrors and a reflection grating. Includes an absorption module with cell and slide holders for disposable cells and color filters, a software program and various connecting cables.

Spectral range:	380 – 830 nm
Wavelength accuracy:	0.25 nm
Resolution:	1 nm
Transmission:	0 – 100%
Resolution:	0.1%
Absorption:	0 – 100%
Resolution:	0.1%
Optical configuration:	Czerny Turner
CCD detector:	2048 pixels
Absorption module:	
Quartz halogen lamp:	12 V/20 W
Optical connection:	via optical fiber
Mains voltage:	115 V/230 V, 50/60 Hz
Dimensions:	approx. 315 x 175 x 322 mm ³
Weight:	approx. 6.6 kg

Software:

- Real-time recording of emission and absorption spectra as well as transmission curves
- Simultaneous recording of spectra over the entire wavelength range (recording time per spectrum less than 2 ms)
- Export of measured data to standard text and bitmap formats, as well as Regressi and Excel formats
- Recording of spectra as a function of time (chemical kinetics)
- 3D display; functional relationship between absorption, time and wavelength
- Display of spectra in authentic colors
- Display of several spectra in one diagram
- Manual calibration option
- Wavelength measurements
- Recording and evaluation of concentration measurements (Beer-Lambert law)
- Zoom and cursor function
- Storage of recorded spectra
- Color printout of spectra

S-U21830

System requirements:

Operating system:	WINDOWS
PC:	Pentium 133 or higher, 32 MB RAM, CD-ROM drive
Free disk space:	at least 15 MB
Screen resolution:	at least 800 x 600 pixels (16 bit)
Computer connection :	USB interface

Includes:

- 1 Spectrophotometer
- 1 Absorption module
- 1 CD with software
- 1 Optical fiber, 1 m
- 1 PC connection cable (USB)
- 1 DIN cable for connecting the absorption module
- 1 Mains connection cable
- 1 Operating manual
- 100 Disposable cells

Record the intensity of the light spectra!



Spectroscope with Adjustable Slit

With adjustable slit at one end and eye-piece mounted on a draw-tube at the other end. A composite, three-element, trapezoidal prism is used for dispersion. Draw-tube can be adjusted to give a sharp spectrum. A bright and clear spectrum of light approximately 16 mm wide is visible. Comes with polished, wooden case.

S-U49806



Advanced Spectrometer-Goniometer

Used as a spectroscope for the observation and measurement of emission and absorption spectra. When used with a prism, students can observe visible light as it is dispersed by wavelength. When used with a diffraction grating (such as U14424) and a gas discharge tube, students can observe the emission spectrum of various gases. The Advanced Spectrometer-Goniometer illustrates the concepts behind discovering the properties of astronomical objects such as chemical composition or velocity.

The prism table is removable and features three point bearing leveling screws. The prism and holder are included as well as the diffraction grating holder.

S-U14416

Spectral telescope	Continuously adjustable Eyepiece crowsires
Objective	18 / 160 mm
Slit tube	Symmetrical precision slit. Hardened steel
Eyepiece	18 mm aperture, 160 mm focal length
Prism	
Flint Glass	(60°)
Dispersion	C-F 2°
Length of Base	33 mm
Height	22mm
Angular Scale	0° up to 360° Division 0.5°
Vernier Reading Accuracy	1 angular minute
Weight	7.9 kg



system Spectrometer-Goniometer

Spectrometer with rotatable prism or grating and directionally-adjustable objective tube for observing and measuring emission and absorption spectra. Can also be used for precise determination of the optical parameters of prisms or gratings. Includes prism with holder and transmission grating with holder.

S-U22050

Objective	Adjustable slit width and object distance; f = 175 mm, 32 mm dia
Eyepiece	Continuous focusing and viewing angle adjustment, eyepiece with crosswire, f = 175 mm, 32 mm dia.
Prism	
Flint Glass	(60°)
Dispersion	(nF – nC): 0.017
Length of base	40 mm
Height	40 mm
Transmission Grating	300 lines/mm
Angular Scale	0° to 360° Division 0.5°
Vernier Reading Accuracy	0.5 angular minute
Weight	12 kg



Basic Spectrometer

Designed after Kirchhoff and Bunsen. For the observation and measurement of emission and absorption spectra. With adjustable aperture, condensor and flint glass prism. Ideal for schools and universities.

S-U14415

Observation Tube	Moveable, with locking screw slideable eyepiece
Objective	18 / 160 mm
Slit tube	Stationary, with symmetrical slit Objective: 18 / 160 mm
Scale Tube	Stationary, 200-division scale
Eyepiece	18 mm aperture, 90 mm focal length
Scale	Can be calibrated in wavelengths
Prism	
Flint Glass	(60°)
Dispersion	C-F 2°
Length of Base	20 mm
Height	30 mm
Weight	4.8 kg



Includes:

- CCD linear camera
- Neutral-grey filter
- Manual with experiment descriptions
- Software for data recording and evaluation
- USB Cable
- Transport case

S-U218002

Additional Item Required

Polarization Filter (2x) S-U21821

Additional Items Recommended

- Diode Laser (115 V, 50/60 Hz) S-U16040-115
- Component Holder on stem S-U22010
- Diffraction Apertures on Glass Plate S-U22011
- Slits and Bars on Glass Plate S-U22012
- Double Slits on Glass Plate S-U22014
- Multiple Slits on Glass Plate S-U22015

Computer Connection Via a USB Cable	
Refresh Rate	20 fps
System Requirements	
Operating System	Windows 98 or Higher
Computer	2mb of Free Hard-disk Space
Screen Resolution	At least 640 x 480 Pixels with 256 Colors

Note: Laptop, Laser Diode, Optical Rider and Optical Bench not included

CCD Linear Camera

Intended for investigating all optical phenomena in real time, this precision CCD linear camera consists of a measuring head with a CCD linear array, as well as data acquisition accessories. The control unit can be connected directly to a PC. The scope of supply includes user-friendly software, neutral grey filters, patch cords and a storage case.

Measurement head with a CCD linear array:

- Resolution: 2048 pixels (14 x 200µm)
- Sensitive length: 30 mm
- Neutral-grey filter: Density factor 3.0: black/white
- Rod: 170 x 10 mm Ø
- Integration time (remote or direct control): 5 to 42.5 ms – step 2.5 ms

- Real-time displays for observing time-dependent phenomena, for example, during experiment adjustments
- Adjustable sensitivity of the measuring head in accordance with the intensity of the light source
- Representation of the intensity distribution of interference spectra in diagrams and grey stages, as well as colored display of measured emission and absorption spectra
- Measurement functions such as adjustable axis scaling, grids, vertical and horizontal cursor with corresponding displays, peak-search routine with display of intensity and position, zoom
- Signal processing functions such as smoothing, averaging and inversion of spectra, Fast-Fourier Transformation
- Simulations for comparing theoretically calculated interference and diffraction intensity distributions with experimental data
- Storage, printing, online help and export of data and graphics (in the form of word processing, spreadsheet and bitmap files)

Spectrometer (Investigations of)

- Emission and absorption spectra
- Transmission curves of filters
- Spectral resolution of white light

Wave optics

Display and measurement of diffraction and interference spectra, for example, diffraction at a slit, pinhole, grating, Newton's rings, Fresnel mirrors; comparison of measured spectra with theoretical calculations.

Geometric optics

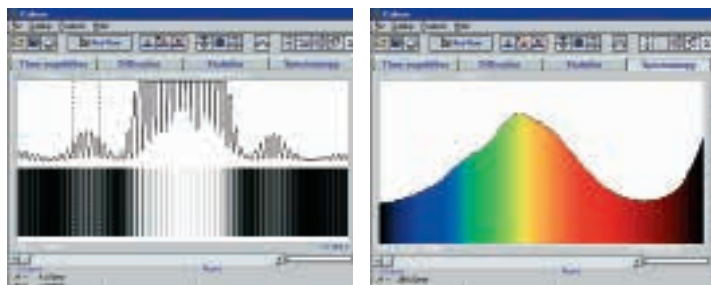
For example, measurement of focal lengths, enlargements and divergence of a light beam.

Time-dependent data acquisition

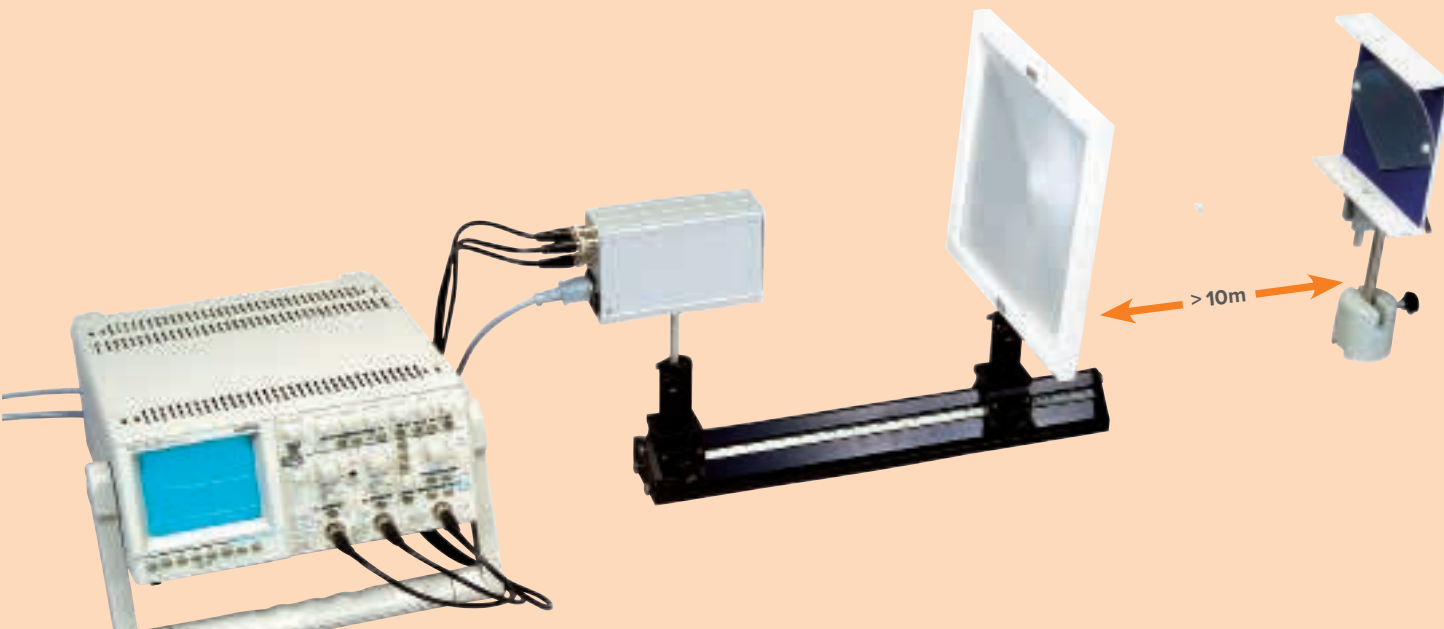
For measuring light modulation on a pixel, for instance, oscillations of monochromatic light sources, measurement of doublets in emission and absorption spectra (e.g. sodium, mercury).

Fast Fourier transformation allows wavelengths to be determined.

The multi-lingual software offers a wide range of functions!



Have questions about our products? contact us at **1.866.448.5846** or visit **3bscientific.com!**



Light Speed Meter

The oscillator for the LED light pulse, the photoreceptor and the calibrated quartz crystal oscillator generator accurately timed square-wave pulses are integrated into one compact housing. The transmitted signal is reflected via an internal and external reflector and superimposed onto the original signal. Due to this, the external main reflector, thanks to its numerous, small triple-prism reflectors, can be set up without difficulty simply judging by eye. The evaluation is carried out with a dual-channel oscilloscope capable of recording at least 70 MHz (e.g. U43569). On the basis of the determined differential delay, the speed of light can thus be calculated.

Scope of delivery:

- Basic unit including the oscillator, receiver and built-in mains supply
- Fresnel lens, shaft-mounted
- Triple-prism reflector, shaft-mounted

Contents:

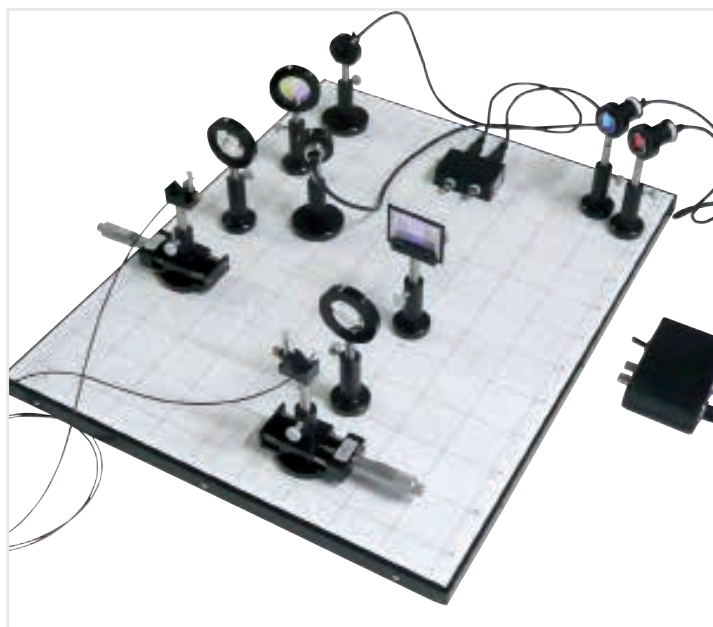
- 1 Control unit with a transmitter, receiver and integrated power supply unit
- 1 Fresnel lens on shaft
- 1 Triple-prism reflector on shaft
- 3 HF cables, 1 m

S-U8476460-115

Additional Items Required

Stand Base (3 required)	S-U8611200
Digital Oscilloscope	S-U43569
Optical Bench, 0.5m	S-U10302
Optical Rider, 60mm	S-U103101
Optical Rider, 90mm	S-U103111

Measure the speed of light!



Spectrometry Supplementary Set (not shown)

Supplement to the Optical telecommunications equipment set for investigating spectrometry of transmitted signals and measurement of absorption losses.

Contents:

- 1 Spectrometer with SMA connectors
- 1 Fiber optic cable with SMA plugs, 10 m
- 1 Reference light source with SMA connectors
- 5 SMA/SMA connectors
- 5 Fiber optic cables with SMA plugs, 2 m

Optical Telecommunications Equipment Set

Complete experiment system for quantitative investigation of transmission of signals via optical media, plus the processes of optical multiplexing and demultiplexing.

To build a two-dimensional optical system of high precision, a magnetic bench with a printed grid is provided, upon which it is possible to write.

Optical bench:

Available surface:	600 x 480 mm
Grid radials:	0°, 45°, 90°, 135°
Grid subdivisions:	5 cm, 1 cm
Weight:	6 kg approx.

Contents:

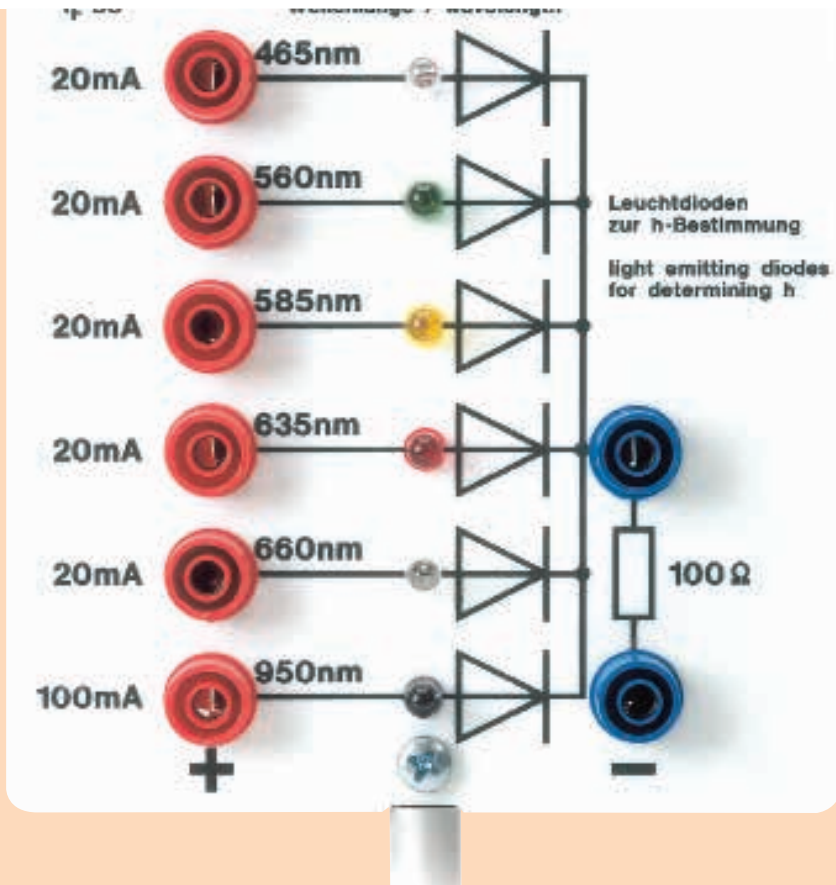
- 1 Optical bench, 600x480 mm, for attachment of magnetic components
- 8 Optical riders with magnetic base
- 2 Movable riders, l = 25 mm, with magnetic base
- 1 LED with collimating lens, in frame on stem, red
- 1 LED with collimating lens, in frame on stem, blue
- 1 Electronic signal transmitter, including power supply
- 1 Electronic signal receiver, including power supply
- 2 Phototransistors in housing on stem
- 1 Fiber-optic cable with SMA plugs, 1 m
- 1 Diffraction grating, 600 lines/mm
- 1 Dichroitic filter in housing on stem, blue
- 1 Dichroitic filter in housing on stem, yellow
- 2 Converging lenses in housing on stem, f = 50 mm, 40 mm dia.
- 1 Slide holder for gratings, on stem
- Component holders and spring clips

S-U22055

Additional Items Required

Spectrometry Supplementary Set	S-U22056
Two-Channel Function Generator, 20 MHz	S-U22065
Digital Oscilloscope, 4-Channel, 60 MHz	S-U22060

ATOMIC / NUCLEAR PHYSICS



Use for the determination of Planck's Constant!

Light-Emitting Diodes (LEDs)

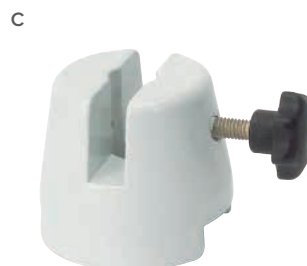
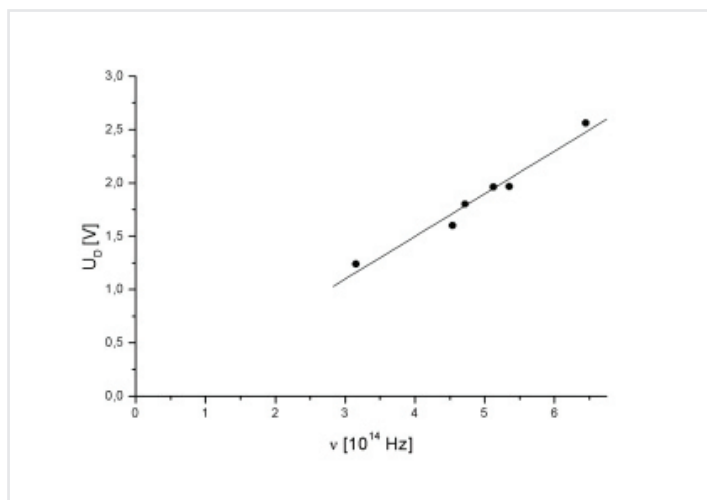
Used for determining Planck's constant h by measuring the diffusion potential of differently colored LEDs as a function of the wavelength or frequency. Six colored LEDs of different emission wavelengths with integrated series resistor mounted on carrier plate with shaft.

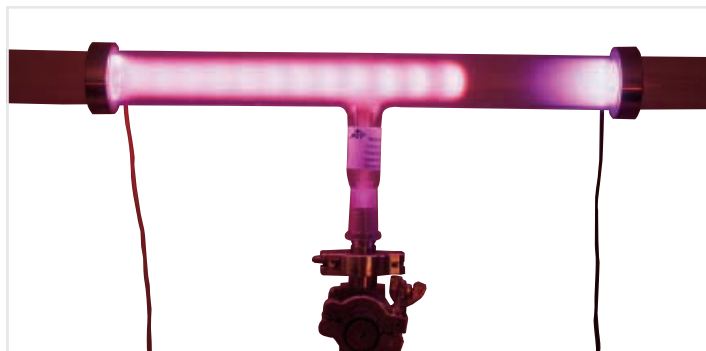
Wavelengths:	480 nm, blue	560 nm, green
	590 nm, yellow	635 nm, orange
	655 nm, red	950 nm, IR
Series resistor:	100 Ohm, 1%	
Voltage:	max. 6 V	
Dimensions:	115 mm ²	
Weight:	approx. 120 g	

S-U8482460

Additional Items Required

A. Power Supply	S-U33020-115
B. Multimeter	S-U40165
C. Stand Base	S-U8611210
D. Patch Cords	S-U13800





Gadischarge Tube, Large

For observing luminescence during electric discharge in gases at reduced pressure, and investigating cathode rays and canal rays occurring at low pressures outside the discharge path. Glass tube with graded seal, disc-shaped, perforated electrodes and 4 mm-jacks for connecting the voltage supply. Gas not included. Experiment set up is shown with vacuum pump and power supply which are not included.

Material: Glass
 Dimensions: 700 x 4 mm Ø
 Vacuum connection: Graded seal NS 19/26

S-U14380



Observation Spectroscopes with Graduated Scales

These spectroscopes have been specially developed to allow users to observe the spectrum of light traversing through a slit refracted by a grating of 530 lines / mm. The superposition of the obtained spectrum on the graduated scale of the spectroscope permits the measurement of the main wavelengths of light from spectral lamps.

Budget Hand-held Spectroscope

An uncomplicated yet still fully functional spectroscope for observing spectra and spectral lines. This model is made of cardboard and plastic with built-in grid. 145 x 28 mm

S-U21875

Spectroscope in Cardboard Box

Hand spectroscope in a flat cardboard box with built-in wavelength scale for direct reading of coarse wavelengths for spectral lines and spectra. 180 x 115 x 25 mm

S-U21876

Planck's Constant Apparatus

Simple, safe and quick-to-operate, compact apparatus with integrated photocell as well as a voltmeter and nano-ammeter for determining Planck's constant and the work done in emitting an electron using the stopping potential method. Five light emitting diodes (LEDs) of known mean wavelengths act as light sources of differing frequencies. The intensity of the light emitted by them can be varied from 0 to 100%.

Wavelengths: 472 nm, 505 nm, 525 nm, 588 nm, 611nm
 Dimensions: 280 x 150 x 130 mm3
 Weight: 1.3 kg approx.

Contents:

- 1 Basic apparatus with photocell, voltmeter, nano-ammeter and power supply for light sources
- 5 LEDs in casings with connector leads
- 1 Plug-in power supply 12 V AC

S-U10700-115

No dry ice required!

View alpha particles, lower energy beta particles, and electrons!



Diffusion Cloud Chamber

The Model 500 Diffusion Cloud Chamber is used to view high energy alpha particles, lower energy beta particles, and electrons. Sources such as radioactive material, cosmic rays and other forms of naturally occurring radiation can be studied with this device.

The bottom of the chamber is cooled by circulating ice water through the base and further cooling it to -35°C with a Peltier device. Alcohol placed in the chamber wicks up the inside chamber lining where it evaporates in the warmer region of the chamber and diffuses downward. The alcohol vapor is then cooled near the chamber bottom and becomes super-saturated. As energetic alpha and beta particles from a radioactive source pass through the alcohol vapor, the vapor condenses, forming droplets which appear as tracks in the strong chamber crosslighting.

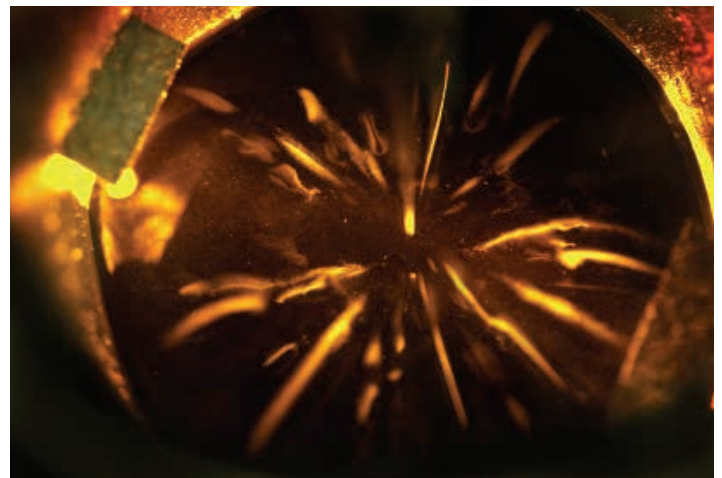
Unlike most cloud chambers on the market, this unit does not use dry ice! Simply connect the unit to a source of cold running water, or use the included pump and a container of ice water and your experiments will run for hours!

With visible tracks showing in as little as 15 minutes, the Model 500 Diffusion Cloud Chamber is a wonderful demonstration tool that can be easily set up and operated just about anywhere!

S-U45014

Features:

- Uses ice water instead of dry ice
- Water circulation pump
- Built-in high voltage ($\sim 800\text{V}$) power supply for clearing the chamber of unwanted ions
- Powered by 12V DC power adapter
- Built-in LED Lamps for illuminating the particle trails



Includes:

- Cloud Chamber (5" diameter)
- 12 VDC Power Adapter (6 A)
- Water Circulation Pump
- 2 Rubber Hoses
- Extraction Pipette and Funnel
- Internal Clearing Field Generator
- Radioactive source

What you can learn about

- Alpha, Beta, Gamma-particles
- Beta deflection
- Ionising particles
- Mesons
- Cosmic radiation
- Radioactive decay
- Decay series
- Particle velocity
- Lorentz force



ESR/NMR Basic Set

This basic equipment set is intended for investigating the electron spin resonance (ESR) of an unpaired electron of a DPPH sample as well as the nuclear magnetic resonance (NMR) of glycerine, teflon and polystyrene. Resonances are observed via transitions induced through high frequencies resulting from changes in the external magnetic field. Resonance absorption curves can be represented with a simple dual-channel oscilloscope.

Contents:

- 1 Basic unit
- 1 Pair of coils
- 1 Control panel
- 1 Plug-in power supply, 12 V AC (115 V, 50/60 Hz)

The basic unit is a mechanical base for test samples as well as ESR (from U188501) or NMR probes (from U189021), a coil pair and a permanent magnet (from U189021).

Dimensions: 165 x 105 x 135 mm³ approx.

Weight: 1.25 kg approx.

The coil pair is used to generate the variable magnetic field for electron spin resonance and – in conjunction with the permanent magnet (from U189021) – nuclear spin resonance.

Magnetic flux density: 0 – 3.7 mT

Connection: Barrel connector

Dimensions: 20 mm x 74 mm dia. approx. each

Weight: 0.2 kg approx. each



The control console provides the voltage for control and supply of power to probes and the coil pair. It also processes the signal for display on an oscilloscope and indicates the frequency of the high-frequency signal.

Probe connection: Four-pin lemo socket

Coil pair connection: Saw-tooth current source, 0 – 250 mA, 50 ms, pair of barrel sockets

Field output: Proportional to coil current, 0 to 1V, BNC socket

Signal output: Resonance signal, 0 to 1 V, BNC socket

Frequency range: 45 to 75 MHz approx. (ESR)

10 to 15 MHz approx. (NMR)

Dimensions: 170x105x45 mm³ approx.

Weight: 0.5 kg approx.

S-U188031-115

Additional Items Required

ESR Supplementary Set S-U188501

NMR Supplementary Set S-U189021

Analogue Oscilloscope, 2x30 MHz S-U43563

Electron spin resonance and nuclear magnetic resonance in a simple kit for your lab!



NMR Supplementary Set

Supplementary set for ESR/NMR basic set (U188031) for experiments on nuclear magnetic resonance using three different samples. Consists of an NMR probe-head with radio frequency coil, a permanent magnet giving a highly uniform field, a sample of glycerine, a sample of polystyrene, a sample of Teflon, an empty sample tube for comparison and two mounting discs.

Connection to the probe-head: Four-pin lemo plug

Magnetic flux density of permanent magnet: 300 mT approx.

S-U189021

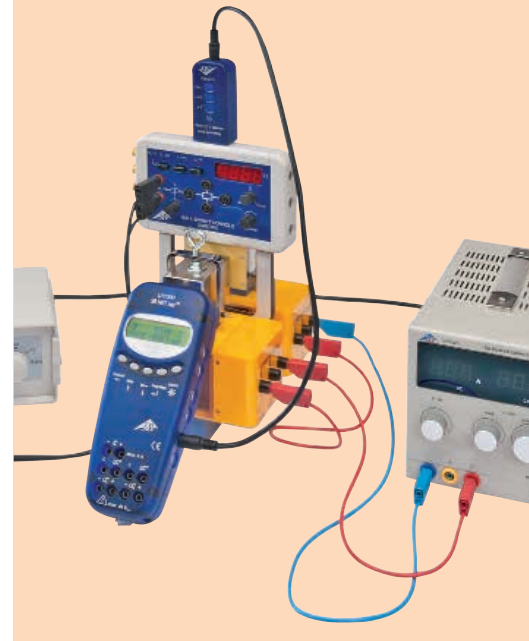


ESR Supplementary Set

Supplementary set for ESR/NMR basic set (U188031) for experiments on electron spin resonance using DPPH. Consists of an ESR probe-head with radio frequency coil, a sample of DPPH (diphenyl picryl hydrazyl), an empty sample tube for comparison, two mounting rings, and two mounting cylinders.

Connection to the probe-head: Four-pin lemo plug

S-U188501



Experiment Topics

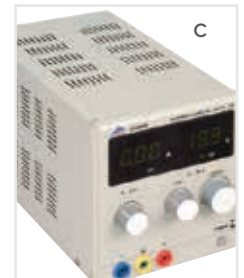
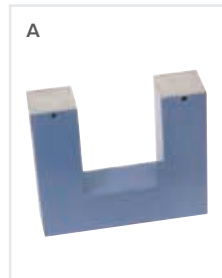
- Extrinsic conductivity
- Intrinsic conductivity
- Mobility of electrons and holes
- Drift velocity of charge carriers
- Carrier concentration
- Band separation

Basic Hall Effect Basic Apparatus

Basic apparatus for attaching contacts and supplying voltages to germanium crystals on printed circuit boards (U13111 – U13113) for experiments on the measurement of Hall potentials and conductivities at different temperatures. With stem for setting up the apparatus between the pole-shoes of the transformer assembly kit. Built with integrated adjust-able constant-current source, amplifier for temperature measurement, automatic heater cut out to protect the crystal, and compensation circuit with matching and cut out functions for offset voltages.

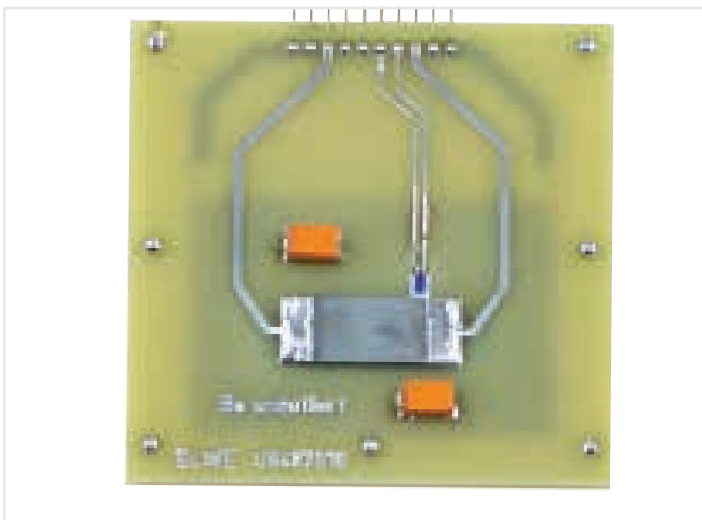
Heater voltage: 15 V DC, 2 – 4 A
 Constant-current source: 12 V DC, 40 mA
 Output signals: Hall potential, temperature, voltage drop across crystal
 Connections: 4 mm safety sockets
 Dimensions: 150 x 250 x 50 mm approx.
 Weight: 0.5 kg approx.

S-U8487000



Additional Items Required

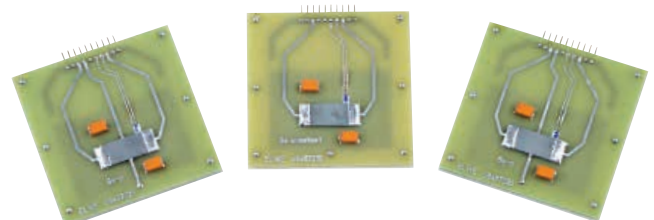
- A. U-core with Yoke **S-U8497215**
- B. Pair of Clamps **S-U8497181**
- Coil with 600 Turns (2x) **S-U8497430**
- DC Power Supply 0 – 20 V, 0 – 5 A (115 V, 50/60 Hz) (2x) **S-U33020-115**
- DC Power Supply 1.5 – 15 V, 1.5 A (115 V, 50/60 Hz) **S-U8521131-115**



Germanium on Printed Circuit Board Interchangeable board with a germanium crystal for investigating the conductivity of germanium as a function of temperature. With contacts for transverse current, integrated resistive heating element with temperature sensor directly under the crystal, and multi pin plug for connecting the circuit board to the basic Hall effect apparatus (U13114).

Crystal dimensions: 20 x 10 x 1 mm approx.
 Overall dimensions: 100 x 100 x 10 mm approx.
 Weight: 200 g approx.

- Undoped Germanium **S-U8487010**
- P-Doped Germanium **S-U8487020**
- N-Doped Germanium **S-U8487030**





Photocell

Photocell for demonstrating the photoelectric effect which shows that the emission of electrons increases with increasing light intensity. Mounted ready for use on a base plate with electrical wiring and clamping bar. Available gas filled or in a vacuum.

Vacuum Photocell S-U8482415

Gas Photocell S-U8482445

Photocells	S-U8482415	S-U8482445
Cathode	Caesium on oxidized Silver	
Cathode Area	2.4 cm ²	
Wavelength for Maximum Sensitivity	850 nm	
Operating Voltage	50 V, max. 250 V	
Working Resistance	1 M	
Dark Current	<0.05 μA	<0.01 μA
Sensitivity	20 μA/lumen	125 μA/lumen
Photoelectric Current Density	max 3.0 μA/cm ²	max 0.7 μA/cm ²



Heating Chamber

Electric heating chamber with thermostat. In lacquered metal housing with two viewing windows, opening with spring-clip for thermometer and thermally insulated carrying handle.

front opening: 230 x 160 mm approx.
 Heating power: 400 W
 Temperature range: 160 – 240°C
 Temperature constancy: ±5°C
 Dimensions: 160 x 150 x 240 mm
 Weight: 3.5 kg approx.

S-U8482590-115

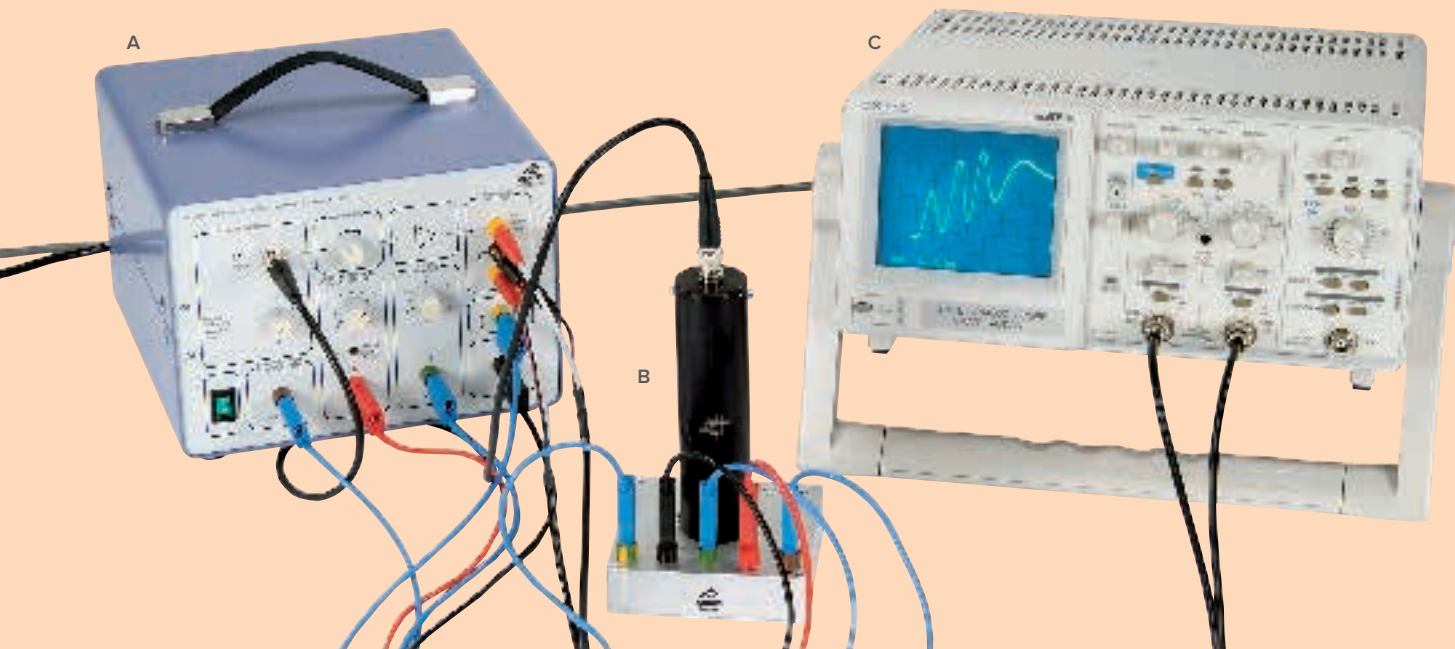


Sodium Fluorescence Tube on Furnace Wall

Highly evacuated glass tube containing several times distilled sodium for demonstrating the resonance fluorescence of sodium vapour. Filled with argon, the entire tube emits yellow light at the wavelength of the sodium D line when it is brought to the heated state and illuminated with sodium spectral light. If it is instead illuminated with white incandescent filament light, the transmitted light exhibits a dark absorption line at the position of the sodium D line.

S-U8482260

Additional Items Required
 Heating Chamber (50/60Hz) **S-U8482590-115**
 Digital Thermometer **S-U40184**
 Immersible Temperature Sensor **S-U11854**
 Hand Held Spectroscope **S-U21877**



A. Premium Franck-Hertz Experiment Power Supply

Power supply unit for operating the mercury-filled Franck-Hertz tube U8482150 and the neon-filled Franck-Hertz tube U8482220. The equipment provides all the voltages needed to power the tubes and includes a sensitive built-in DC amplifier for measuring collector current. The accelerating voltage can be provided manually or by means of a saw-tooth output voltage from the power supply unit. Additional measuring inputs are also available for the anode current and accelerating voltage.

Filament voltage:	4 to 12 V continuously adjustable
Control voltage:	9 V, 10 mA
Accelerating voltage:	0 to 80 V
Operating modes:	manual, continually adjustable saw tooth (approx. 60 Hz)
Countervoltage:	1.2 to 10 V continually adjustable

Analog outputs:

Signal output:	0 to 12 V, 7 nA/V
Accelerating voltage:	UA/10 for oscilloscope
Connections:	via 4-mm safety sockets
Dimensions:	160 x 132 x 210 mm
Weight:	2.4 kg

S-U8482530-115

Additional Items Required

C. 20 MHz Oscilloscope (shown above)	S-U43563
Patch Cords	S-U13800
Patch Cord	S-U11255
Patch Cord, BNC/4mm Plug (need 2)	S-U11257

Bundle & Save

- Franck-Hertz Tube with Neon U8482230
- Power Supply Unit U8482130-115
- 20 MHz Oscilloscope U43563
- Patch Cords

Complete Kit S-UE502040

For more information, please contact us at 1.866.448.5846

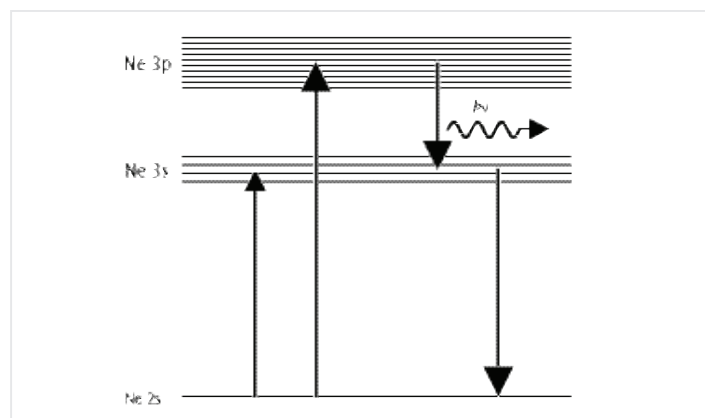
B. Franck-Hertz Tube with Neon Filling Mounted on Base

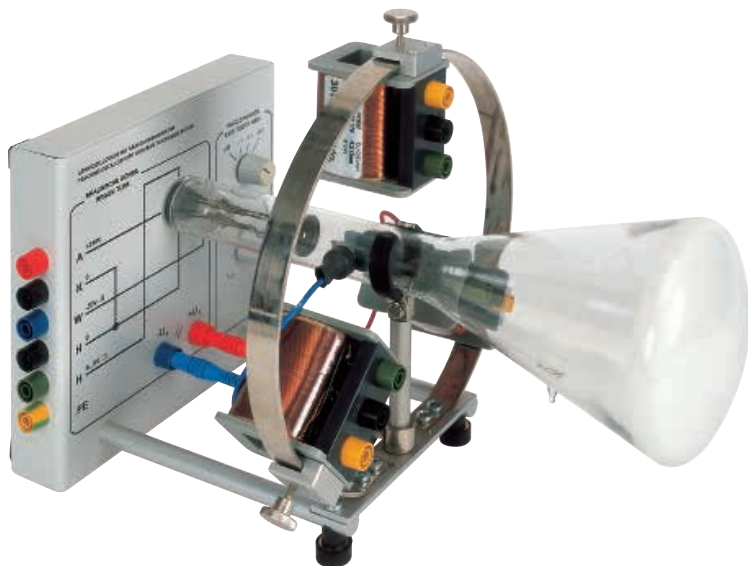
Used for demonstrating that free electrons colliding with neon atoms emit energy in quantized packets and for determining the excitation energy of the $3p^0$ or $3s^1$ states at about 19 eV. When excited, these states emit visible light due to the energy drop from intermediate levels to a ground state at an excitation energy of about 16.7 eV. The light emitted is in the red-yellow region of the spectrum. Bands of light develop between the control grid and the accelerating grid. The plane-parallel geometry of the grids means that these bands can be viewed through a window. Unlike the mercury-filled Franck-Hertz tube, the neon-filled version can be operated at room temperature. Tetrode with indirectly heated cathode, mesh control grid, mesh accelerating grid and collector (counter) electrode. Mounted on a base with color-coded connection sockets.

Filament voltage:	4 to 8 V AC/DC
Control potential:	9 V
Accelerating voltage:	max. 80 V
Countervoltage:	1.2 to 10 V DC
Tube:	approx. 130 mm x 26 mm \varnothing
Base with connector sockets:	190 x 115 x 115 mm
Weight:	Approx. 450 g

S-U8482230

Perform the Nobel Prize winning Franck-Hertz Experiment!





Training Oscilloscope

Used for investigating the design and operation of a cathode-ray tube. The electron beam can be deflected by an electric field produced by the deflection plates integrated into the tube, and by a magnetic field from three external coils mounted on a ring. A Wehnelt cylinder is used to focus the beam. A gas filling and fluorescent screen make it possible to observe the beam in the tube. A continuously adjustable saw-tooth generator can be used to analyze and visualize time-dependent processes. The device comes with a socket and printed wiring scheme.

S-U8481350

Anode voltage: 250 to 400 V DC
 Anode current: 1 mA
 Filament voltage: 6 to 8 V DC or AC
 Filament current: 0.3 A
 Wehnelt voltage: 0 to 50 V DC
 Deflection plate dimensions: 12x20 mm
 Plate spacing: 12 mm
 Electric deflection sensitivity: 0.2 mm/V
 Screen diameter: 100 mm
 Tube length: 260 mm
 Residual gas: Neon
 Sweep frequency: 10 Hz to 200 Hz,
 continuously adjustable
 3 deflection coils: 600 turns each, with a center pickup

Weight: 1.6 kg

Additional Items Required
 Power Supply Unit, 500 V DC
 Function Generator
 AC/DC Power Supply
 Patch Cords

S-U33000-115
 S-U8533600-115
 S-U117601-115
 S-U138021

Replacement Item
 Spare Tube

S-U8481320



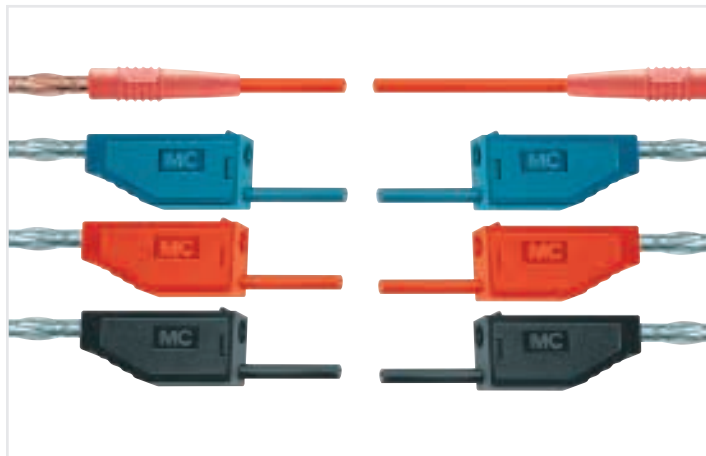
Telron® Discharge Tube S

Used for observing the phenomena occurring during electrical discharges in a gas in accordance with its pressure and type, cathode glow, positive column and canal rays. Either end of the discharge tube is equipped with a fluorescent screen. Demountable design, installation in tube holder (U185001). Includes a needle ventilation valve and vacuum hoses.

Length: 280 mm
 Polarization voltage: $U \leq 5$ kV
 Discharge current: typically $I = 1.2$ mA
 Connections: Via 4 mm-contact pins

S-U18580

Additional Items Required
 Tube holder U18502 \$566
 High-voltage power supply S-U33010-115
 Vacuum Pump S-U34000



Set of Patch Cords for Tube Experiments

Seventeen maximum-quality patch cords with 4 mm-connectors for all cabling between tubes, power supplies, display units and coils.

Wire crosssection: 1 mm²
 Continuous current: Max. 19 A
 Plug and jack: 4 mm (nickel-plated)

S-U138101

Quantity	Length	Color	Connection
2	75 cm	Red	Jack/Plug
4	75 cm	Blue	Plug/Plug
2	75 cm	Black	Plug/Plug
2	75 cm	Blue	Plug/Plug
5	75 cm	Black	Plug/Plug
2	75 cm	Red	Plug/Plug



Advanced Lab Spectroscopy System

Designed for conducting a wide selection of spectroscopy experiments, the Advanced Lab features the UC30 Universal Computer Spectrometer for IBM compatible computers. This external multi-channel analyzer connects through a USB port and includes a computer controlled amplifier, high voltage, 2048 channel MCA, upper and lower level discriminators and multi-channel scaling for half-life and decay studies.

The complete system includes a Na(Tl) scintillation detector with lead shield and multi-position sample stand, a set of 8 gamma emitting radioisotope sources including an "unknown", MCA software with ISOMATCH peak identification and a lab manual of experiments in gamma spectroscopy. (Requires PC with minimum 512K memory, EGA/VGA/SVGA graphics, DOS or WINDOWS.)

System Components:

- Universal Computer Spectrometer with Software
- Complete scintillation probe with SD 38 detector, stand, base and cables
- Set of 8 gamma sources including "unknown"
- Experimental Gamma Ray Spectroscopy manual

For PC Compatibles only S-U41450

Gamma ray spectroscopy and half-life studies

Isotope Generator

This C137/Ba-137 m Isotope Generator is used to demonstrate the properties of radioactive decay. Based on the original Union Carbide patented design, it offers exceptional performance, ease-of-use and safe operation.

Each generator contains 10 μCi of C137, which represents one Exempt Quantity, making it free from specific State and Federal licensing. The generator can produce up to 1000 small aliquotes of the short lived Ba-137m isotope with a half-life of 2.6 minutes.

Each generator is supplied with 250 mL of eluting solution (0.9% NaCl). The parent isotope C137 with a half-life of 30.1 years beta decays (94.6%) to the metastable state of Ba-137m. This further decays by gamma emission (662 keV) with a half-life of 2.6 min. to the stable Ba-137 element. During elution, the Ba-137m is selectively "milked" from the generator, leaving behind the C137 parent. Regeneration of the Ba-137m occurs as the C137 continues to decay, re-establishing equilibrium in less than 1 hour.

Approximately 30 minutes after elution, the residual activity of the Ba-137m sample has decayed to less than one thousandth of its initial activity, making it safe for disposal. When used with the eluting solution supplied, bleed through of the parent C137 is less than 50 Bq/mL, affording a long working life. Each kit is supplied with the generator, syringe, tube, 250 mL of solution and a storage case.

S-U41500

Additional Items Required

- | | |
|------------------------------|----------|
| 10mCi Extra Eluting Solution | S-U41501 |
| 250ml Bag of 100 planchets | S-U41502 |



Did you know that 3B stands for **Best Quality, Best Value** and **Best Service**? It is our commitment!
Learn more about us at 3bscientific.com!



Intermediate Nuclear Lab Station

Our Intermediate Nuclear Lab System brings new dimensions to the study of Nuclear Science and radiation monitoring. By using a specialized microcontroller, many of the features previously found only in multiple products are now combined in a single inexpensive instrument. The classical nuclear scaler function has been extended to include a timer, preset counter, digital ratemeter with alarm, computer interface and optional battery power for field applications. The addition of preset count mode can be extremely useful when constant counting statistics are required, and the digital ratemeter is ideal for contamination survey work. The alarm level may be set to any pre-selected value and if the count rate exceeds this level, an audible alarm is sounded to warn of a high activity condition.

Valuable Components

Also included is a set of 5 radioactive sources (U41512) containing 1 each of C137, Co-60, Sr-90, Tl-204 and Po-210, emitting a range of alpha, beta and gamma radiations. This set is ideal for demonstration and introductory nuclear labs covering basic characteristics of radiation. In addition, a set of 20 calibrated radiation absorbers (four lead, ten aluminum sheets, two polyethylene, two plastic, and two aluminum foil absorbers) covers the range from 4.5 to 7400 mg/cm² and consisting of aluminum plastic and lead plates is included. These absorbers are suitable for absorption studies with Alpha, Beta and Gamma radiation.

System Components:

- Radiation Counter with LABLINK software
 - GM 35 probe with stand and cable
 - USB cable for PC or Mac
 - Set of five sources, Alpha, Beta, Gamma
 - Set of 20 calibrated absorbers
 - Student Lab manual
 - Instructors manual
- GM Tube: 25mm. diameter, 800V plateau, 2 mg/cm²
 - Window alpha sensitive
 - Sample Holder: Ten position, 1 cm spacing
 - Display: 6-decade. 2.5 cm LED, display counts, preset counts, time, preset time. CPM, CPS, alarm level, high voltage
 - Modes: Preset time, preset count, CPM, CPS
 - High Voltage: 0 to 1200V, digitally selected 25V increments
 - Power: 9V DC from charger supplied
 - Absorbers: 20 piece set
 - Sources: Alpha as Po-210, Beta Sr-90, Tl-2M, gamma CO-60, & C137
 - Software: Mac/PC

PC or Mac S-U41400



Nuclear physics made easy!

Basic Nuclear Lab Stations

Designed for high school and junior college level nuclear science instruction, this system provides a complete solution for performing many basic nuclear demonstrations and experiments. The single convenient package includes a GM detector with multi-position sample stand, a 6-decade scaler with preset timer, a built-in 11-piece absorber set and a computer interface for optional connection to a PC computer.

The internal thin windowed 15mm Geiger Mueller counter allows detection of alpha, beta and gamma radiation. Perform experiments such as:

- Range of Alpha Particles
- Absorption of Beta Particles
- Inverse Square Law
- Half-Life decay
- Detection Efficiency
- Counting Statistics
- Nuclear physics plus many additional laboratory exercises for both introductory and intermediate instruction.

Powerful Software

By connecting the Basic Nuclear Lab Station to an PC, students can run experiments from a laboratory work station and display data directly on the computer screen. The software package supplied with the system stores each measurement in a data file which can be saved to disk for transferring into a spreadsheet for graphing and presentation.

System components:

- Nuclear Lab Station with NUCLAB software & set of 11 absorbers
- Serial cable for PC
- Set of three sources, Alpha Beta Gamma
- Student Lab Manual
- Instructors Manual

GM counter: 15mm diameter, 1.5-2 mg/cm² window, 500V operating, 150V plateau

Sample holder: 5-position, 1 cm spacing

Display: 6-decade, 999999, 1.25 in. LED

Preset Time: 0-900000 sec decade selection

High Voltage: 0-800V, digital steps of 20V

Indicators: Run, Set HV, Set Time

Serial Ports: DB-9M for PC

Power: 9V DC from unit (supplied)

Absorbers: 11-piece set, 6-7400 mg/cm²

Sources: Po-210, Sr-90, Co-60

PC compatible only S-U41300



Set of Three Sources

Contains 1 each Po-210, Sr-90 and Co-60 emitting a range of alpha, beta and gamma radiations. This set is ideal for demonstration and introductory nuclear labs covering basic characteristics of radiation.

S-U41511

Isotope	1/2 Life	Activity	Emissions
Po-210	138 days	0.1μCi	Alpha
Sr-90	28.5 years	0.1μCi	Beta
Co-60	5.27 years	1μCi	Gamma, Beta

Individual Radioactive Sources

A variety of individual solid sources come in 1" or 1.75" diameter.

Item Number	Price	Isotope	1/2 Life	Activity	Emissions
S-U41526		Ba-133S	10.7 years	1 mCi	Gamma
S-U41536		C-14S	5730 years	10 mCi	Beta
S-U41527		Cd-109S	453 days	1 mCi	Gamma
S-U41525		Co-57	270 days	1μCi	Beta
S-U41523		Co-60	5.27 years	1μCi	Gamma, Beta
S-U41531		Cs/ZnS	Mixed	1 mCi	Mixture of C137 and Zn-65 ("unknown")
S-U41524		C137	30.1 years	1μCi	Gamma, Beta
S-U41528		C137S.2	30.1 years	0.2 mCi	Beta and Gamma
S-U41529		C137S.5	30.1 years	0.5 mCi	Beta and Gamma
S-U41530		C137S5	30.1 years	5 mCi	Beta and Gamma
S-U41532		Eu-152	13.5 years	1 mCi	Gamma
S-U41537		Fe-55S	2.73 years	100 mCi	Beta, X-ray
S-U41533		Mn-54S	312 days	1 mCi	Gamma
S-U41534		Na-22S	2.6 years	1 mCi	Gamma
S-U41520		Po-210	138 days	0.1μCi	Alpha
S-U41521		Sr-90	28.5 years	0.1μCi	Beta
S-U41522		Tl-204	3.78 years	1μCi	Beta
S-U41535		Zn-65S	244 days	1 mCi	Gamma

Set of Five Sources

Containing 1 each C137, Co-60, Sr-90, Tl-204 and Po-210, this set provides a wide range of alpha, beta and gamma emissions making it a popular choice for nuclear science instruction. The set contains two beta emitters, two beta/gamma emitters and one alpha source for in-depth studies of radiation.

S-U41512

Isotope	1/2 Life	Activity	Emissions
C137	30.1 years	1μCi	Gamma, Beta
Co-60	5.27 years	1μCi	Gamma, Beta
Sr-90	28.5 years	0.1μCi	Beta
Tl-204	3.78 years	1μCi	Beta
Po-210	138 days	0.1μCi	Alpha



GM Resolving Time Set

This set is used for determining the resolving time of GM Counters. It consists of three half discs, two of which contain 5 microcuries of Tl-204 plus a third half disc with no activity. The count-rate of each half disc plus the blank (to maintain constant geometry) is measured and then both active half discs are combined for a measurement with high count-rate. The counting loss may now be calculated by adding the rates from each half disc and comparing the result to the count-rate with both halves combined.

S-U41510



Set of Eight Sources

Designed for gamma spectroscopy, with eight different gamma emitting isotopes covering the entire energy range from 32 to 1333 keV. Also included in the set is a mixed source of C137 and Zn-65 which students may use to identify an "unknown" isotope. The set consists of Ba-133, Cd-109, Co-57, Co-60, C137, Mn-54, Na-22 and Cs/Zn.

S-U41513

Isotope	1/2 Life	Activity	Emissions
Ba-133	10.7 years	1μCi	Gamma
Cd-109	453 days	1μCi	Gamma
Co-57	270 days	1μCi	Gamma
Co-60	5.27 years	1μCi	Gamma, Beta
C137	30.1 years	1μCi	Gamma, Beta
Mn-54	312 days	1μCi	Gamma
Na-22	2.6 years	1μCi	Gamma
Cs/Zn	Mixed	1μCi	Unknown



Warning Notice: "Radioactive"

Warning notice on white plastic. Dimensions: 210 x 300 mm² approx. Weight: 80 g approx. S-U8483218



Steel Safe for Radioactive Materials

Steel safe for theft proof storage of radioactive materials in accordance with radiation protection requirements. S-U8483219



DC Power Supply 0 – 500 V

Low voltage power supply with four outputs primarily intended to supply power for electron tubes, including Helmholtz coils, with four independently adjustable DC voltages and analog dials for each of them. The DC voltages are stabilised and regulated, floating and galvanically isolated from one another, short circuit proof and secure from external voltages.

500 V output:	Voltage:	0 – 500 V DC, max. 50 mA
	Stability at full load:	$\leq 0.01\% \pm 100 \text{ mV}$
	Residual ripple:	$\leq 20 \text{ mV}$
50 V output:	Voltage:	0 – 50 V DC, max. 50 mA
	Stability at full load:	$\leq 0.1\% \pm 30 \text{ mV}$
	Residual ripple:	$\leq 5 \text{ mV}$
8 V output:	Voltage:	0 – 8 V DC, max. 3 A
	Residual ripple:	$\leq 0.1\% \pm 30 \text{ mV}$
	Overload protection:	Thermal cut-out
12 V output:	Voltage:	0 – 12 V DC, max. 4 A
	Residual ripple:	$\leq 0.1\% \pm 30 \text{ mV}$
	Overload protection:	Thermal cut-out
Displays:	Analog, class 2	
Connections:	4 mm safety sockets	
Power consumption:	50 VA	
Dimensions:	85 x 325 x 190 mm approx.	
Weight:	4 kg approx.	

S-U33000-115



High Voltage Power Supply 5 kV

Universally applicable, floating, high-voltage source for operation of electron tubes. With built in high voltage resistant transformer to supply the heater voltage for electron tubes. Continuously adjustable high voltage, safe to touch, with passive current limitation and digital voltage display.

High voltage output:	0 – 5000 V DC, max. 2 mA
Heater voltage output:	6.3 V AC, max. 3 A, high voltage resistant up to 6 kV
Connections:	4 mm safety sockets
High-voltage display:	3 digit LED

S-U33010-115

Affordable and Reliable Power Supplies



DC Power Supply 0 – 20 V, 0 – 5 A

Universal power supply with digital current and voltage display. Output voltage and output current are continuously adjustable. The device can be used as a constant voltage source with current limiting or as a constant current source with voltage limiting.

DC output:	0 – 20 V, 0 – 5 A
Output power:	100 W
Stability under full load	$\leq 0.01\% + 5 \text{ mV}, \leq 0.2\% + 5 \text{ mA}$
Residual ripple	$\leq 1 \text{ mV}, 3 \text{ mA}$
Display:	2 x 3 digit LED
Terminals:	4 mm safety sockets
Dimensions:	approx. 130 x 150 x 300 mm
Weight:	approx. 4.7 kg

S-U33020-115



High Current DC Power Supply Unit, 16 V / 20 A

DC high-current power supply with digital display of voltage and current. The voltage and current are continuously adjustable by means of coarse and fine controllers. The device can be used as a constant-voltage source with current limiting, or a constant-current source with voltage limiting. The selected operating mode is indicated by an LED on the front panel. High reliability even under extremely adverse conditions is ensured by automatic transformer switchover, MOSFET power amplifiers and temperature-controlled fan speed with monitoring function. This equipment is also provided with a preset function for protecting against excess current and voltage. An interface socket is located on the front panel with inputs and outputs for external programming and monitoring by a PC. A USB-analogue interface adapter is available on request. The design of the device omits any air vents at the top or bottom and does not require an external heat sink. The output is protected against sustained short-circuits. Two or more such units can be operated in series or in parallel.

Mains voltage: 115 V / 230 V, 50/60 Hz
 Output voltage: 0 – 16 V
 Fine-adjustment range: 800 mV
 Stability at 0 – 100% load: < 12 mV
 Residual ripple: < 1 mV
 Output current: 0 – 20 A
 Fine adjustment range: 2 A

Connections: via 4 mm jacks
 Dimensions: 240 x 120 x 300 mm
 Weight: 10 kg

S-U117361



AC/DC Power Supply, 0 – 12V

Adjustable voltage power supply with illuminated analog display meter for stabilized and regulated DC output voltage, permanent electronic short-circuit protection and protection against interference voltages; additionally equipped with four electrically isolated AC voltage outputs. Overload protection via four overcurrent circuit breakers for increased lab safety.

DC output: 0 – 12 V, continuously adjustable
 Load capacity: 3 A, short-circuit proof
 Stability at full load: ≤ 20 mV
 Residual ripple at full load: ≤ 2 mV_{eff}
 AC outputs: 3, 6, 9, 12 V
 Display: analog, class 2.5
 Fuse: T 1.4, primary, 4 overcurrent circuit breaker, secondary
 Connection voltage: 115 V, 50/60 Hz
 Connections: via 4 mm safety jacks
 Dimensions: 23 x 11.5 x 19 cm
 Weight: 3.5 kg

S-U117601-115



Analog and Digital Triple Output DC Power Supply

- Adjustable to 30V/3A with fixed 5V and 12V outputs
- Adjustable Voltage and Current output
- Easy snap terminals for fixed 5V/0.5A and 12V/1A outputs
- Constant Voltage or Current
- Current limiting indicator
- Overload and short circuit protection
- Binding post terminals for variable supply

Item Number	A. S-U40180-115	B. S-U40181-115
Price		
Voltage Output	DC 0-30V	
Current Output, DC	0 – 3 Amps	
Current Limiting Indicator	Status LED	
Accuracy	± 7% Full Scale	± 1% Full Scale + 2 digits
Ripple and Noise	< 5mV	
Line Regulation	< 0.05% + 10mV	
Fixed Output Voltage	5V / 0.5A (continuous); 1A (max.)	
	12V / 0.5A (continuous); 1A (max.)	
Power	110/220VAC 50/60Hz (switchable)	
Dimensions	6 x 5.6 x 9.5" (152 x 142 x 242 mm) (W x H x D)	
Weight	10 lbs. (4.5 kgs)	



DC Power Supplies

- Light and compact design
- 0.01% high regulation
- Constant voltage and constant current operation
- Series or parallel operation function
- Remote control for external programmable
- Internal select for continuous or dynamic load
- Low ripple and noise
- Overload and reverse polarity protection

0-18V & 0-5A S-U43575
0-30V & 0-3A S-U43576

Meter	Digital	3 digits 0.5" LED display Accuracy (0.5% of rdg + 2 digits)
Insulation	Chassis and Terminal Chassis and AC Cord	20M or above (DC 500V) 30M or above (DC 500V)
Power Source		AC 100V/120V/220V/240V± 10%, 50/60Hz
Accessories		Test lead x 1 Instruction manual x 1 Power cord x 1
Dimensions		128 x 145 x 285 mm (W x H x L)



Budget Power Supplies

- Constant voltage or current
- Dual backlit LCD displays for voltage and current
- Short circuit protection
- Current limiting
- High load/line regulation
- Low noise/ripple
- Banana plug output terminals
- Complete with power cord

Item Number	S-U40140-115	S-U40141-115
Price		
Display	Dual LCD, 3 Digits	
Display Accuracy	±1.5%range V; ±2% range A	
Voltage Output, DC	0-30V	0-18V
Current Output, DC	0-1A	0-3A
Power	110V/60Hz	
Warranty	1 year	
Dimensions	240 x 108 x 155 mm (W x H x D)	
Weight	2 kg	3 kg



Digital and Programmable Power Supply

- Single output dual range max. 200W
- High resolution: 1mV/1mA
- Stable & clear power: 0.01% load/line regulation, 350uV_{rms} ripple
- Auto Step running with timer setting and 100 sets memory
- Safety design: OVP, OCP & OTP ; output ON/OFF control
- Self-test and software calibration
- High visible vacuum-fluorescent display
- Front and rear output terminal
- LabView Driver
- Interface: R232 and GPIB (IEEE 488.2)

Item Number		S-U43572	S-U43573	S-U43574
Price				
DC Output	Low	0 ~ 8V/20A	0 ~ 15V/7A	0 ~ 30V/6A
	High	0 ~ 20V/10A	0 ~ 30V/4A	0 ~ 60V/3.3A
Transient Response		< 50 sec. (for output to recover to within 15mV following a change in output current from full load to half load.		
Commant Porcessing Time		100 ms		
Stability (% Of Output + Offset)	Voltage Current	0.02% + 1mV 0.1% + 1mA		
Memory		Store/Recall points		
Power Source		AC 100V/120V/220V 10%, 230V : - 6% ~ + 10%, 50/60Hz		
Interface	Standard	R232C, GPIB		
Accessories		Instruction manual x 1, Power cord x 1, Test Lead x 1		
Dimension & Weight		230 x 140 x 380 mm (W x H x L); Approx. 10kg		



AC/DC Power Supply 0 – 20 V, 0 – 5 A

Power supply with adjustable and stabilised DC voltage and analogue voltage and current display for DC voltage. The DC voltage component features an automatically alternating voltage and current control and is protected against continuous short circuits. The AC voltage can be selected in eight steps, the output is protected by an overcurrent circuit breaker. The AC and DC voltage outputs are DC isolated. A temperature regulated fan protects the unit from overheating.

DC output: 0 – 20 V, 0 – 5 A
 AC output: 2, 4, 6, 8, 10, 12, 15, 20 V, max. 5 A
 Ripple U: <10 mV
 Dimensions: approx. 235 x 175 x 245 mm³
 Weight: approx. 8 kg

S-U8521131-115



Compact size is great for student use!

Power Function Generator

Sine and square wave generator especially well-suited for student and demonstration experiments. Illuminated, digital display for frequency and signal shape. Built-in amplifier is controlled with the volume knob. The output is short-circuit proof and protected against induction voltages and spark discharges; e.g. in the case of connected coils and accidental disconnection of the experiment cables when operated under load. Includes plug-in power supply.

Signal wave:	Sine, square, positive square-wave
Frequency range (1):	0.05 Hz - 3 kHz
Resolution:	0.05 Hz
Frequency range (2):	1 Hz - 50 kHz
Resolution:	1 Hz
Output voltage:	0 - ±12 V continuously adjustable, short-circuit proof
Output current:	max. 1 A
Connection:	via 4 mm-safety sockets
Power consumption:	max. 15 VA
Dimensions:	45 x 195 x 115 mm
Weight:	1.2 kg

S-U8533600-115



Function Generator and Frequency Meter 0.02 Hz to 2 MHz

This multifunctional generator combines four different functions in a single device: function generator, sweep generator, pulse generator and 50 MHz frequency meter.

Frequency meter:

Frequency range: 200 mHz - 50 MHz
Max. input voltage: 250 VPP

General data:

Display: 6-digit LED
Dimensions: 280 x 240 x 90 mm
Weight: 2 kg

Frequency range:	0.02 Hz - 2 MHz in 7 ranges
Accuracy:	± 5%
Waveform:	Sine, square, triangle, pulse, saw-tooth, ramp

Signal outputs:	
Output voltage:	0 to ± 5 VPP
Output impedance:	50 Ω ± 5%
Attenuator:	0 to 20 dB continuously adjustable and 20 dB fixed
Sweep generator:	Internal or external, linear
Sweep frequencies:	0.02 Hz to 2 MHz (7 ranges)
Sweep time:	20 ms to 2 s

S-U11230-115



Color Digital Storage Oscilloscopes

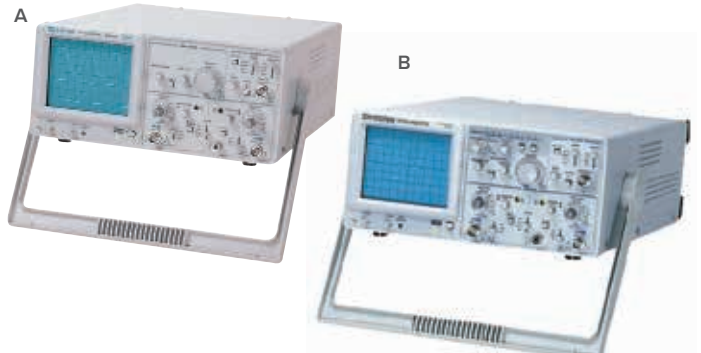
Dimensions: 254 x 142 x 310 mm

Weight: approx. 4.3 kg

Features:

- 200/100/60 MHz Bandwidth
- 2 or 4 Input channels
- 1GSa/s Real-time and 25GSa/s equivalent time sampling
- 25k Points record length maximum
- Large 5.6-in TFT color display
- USB Host/Device: Support USB printer and USB flash drive
- Color printout

2CH 60MHz	S-U43565
4CH 60MHz	S-U43566
2CH 100MHz	S-U43567
4CH 100MHz	S-U43568
2CH 200MHz	S-U43569
4CH 200MHz	S-U43570



Complete your lab with easy-to-use oscilloscopes from 3B Scientific!

A. 20MHz Analog Oscilloscope Function Generator

The general purpose analog oscilloscope with a 20MHz bandwidth. Aside from the basic functions, such as 1mV/div~5V vertical sensitivity, 0.2uS/div~0.5S/div horizontal sweep time, and practical Auto/Norm/TV-V/TV-H trigger modes, the GO620FG offers extra function generating features required for most class experiments and electrical production lines. The affordably priced GO620FG is capable of generating Sine/Square/Triangle waveforms in the frequency ranges from 0.1Hz~1MHz (7 range) with sine wave distortion as low as 2%.

S-U43582

B. 20MHz Analog Oscilloscope

Features:

- 20 MHz, dual channel
- High sensitivity 1mV/Div
- TV synchronization
- A axis input
- ALT triggering function
- Hold off function
- CH1 output

S-U43563

CRT	6-inch rectangular type with internal graticule 8x10 DIV
Power Source	AC 100V/120V/220V/230V ± 10%, 50/60Hz
Accessories	Power cord, instruction manual, Probes (10:1/1:1)
Dimensions	310 x 150 x 455 mm
Weight	approx. 8.2 kg



Microvoltmeter

Used for the measurement and amplification of extremely small DC and AC voltages e.g. induction, thermo- and photovoltages. Indication using LED display, in addition a voltage signal proportional to the measurement variable can be tapped at the analog output and supplied to a demonstration measuring instrument, a recorder or an interface. The measurement signal is fed into the device via a BNC socket or a 4-mm safety socket. An additional DIN socket allows for the connection of Hall sensors. A filter can be connected to the measurement input for signal smoothing or for upper limitation of the measurement frequency.

Measurement ranges (199.9 μ V; 1.999 mV; 19.99 mV; 199.9 mV; AC/DC)
 Frequency range for AC: 10 Hz up to 1 kHz
 Input impedance: DC range: 100 k Ω ; AC range: 900 k Ω
 Upper cutoff frequency: 1 Hz; 10 Hz; 100 Hz; 1 kHz (switchable) also usable for DC-signal smoothing
 Display: 3fdigit LED, 20 mm high
 Measurement accuracy: 5%
 Measurement rate: 3 measurements/s
 Output voltage: 0 up to \pm 2 V
 Output current: Max. 1 mA
 Dimensions: 235 x 250 x 180 mm
 Weight: Approximately 3.3 kg

S-U8530501-115



Measurement Amplifier

Used for the measurement of extremely small currents, voltages and charges in electrostatics and atomic physics. A voltage signal proportional to the measurement is available and can be supplied to a voltmeter as a display instrument. Overvoltage protection up to 300 V provided by a high-voltage-proof input. Includes a built-in fixed voltage output for external circuit connections (e.g. measurement bridges).

Measurement ranges (with respect to 1V output voltage):
 Voltage: 0.1 mV up to 100 V (7 ranges)
 Current: 10-11 A up to 10-5 A (7 ranges)
 Charge: 10-11 As up to 10-7 As (5 ranges)
 Input impedance: 10 M Ω
 0 Ω , voltage-proof up to 300 V
 Measurement accuracy: 3 %
 Analog output: 0 up to 10 V, adjustable zero point, reversible polarity
 Fixed voltage output: + 15 V, max. 50 mA
 Dimensions: 235 x 230 x 180 mm
 Weight: ca. 2.8 kg

S-U8531401-115



Benchtop Digital Multimeter

This benchtop digital multimeter provides a wide range of capabilities at a value price. Feature rich and high performance, it is the ideal solution for your testing stations. Measure AC/DC voltage and current, resistance, capacitance and test diodes (max 2.5 mA/ 3.2 V). Includes a continuity beeper if the conductance is less than 30 Ω as well as a 0.5" LCD display. Comes with instruction manual, power cord and test lead. 245 x 95 x 280 mm; 2 kg

S-U43577

DC Voltage:	Range: 200mV, 2V, 20V, 200V, 1000V 5 ranges, Accuracy: \pm (0.5% rdg + 1 digit), Input Impedance: 10M Ω
AC Voltage:	Range: 200mV, 2V, 20V, 200V, 750V 5 ranges, Accuracy: 40Hz~500Hz \pm (0.5% rdg + 1 digit), Input Impedance: 10M Ω
DC Current:	Range: 200 μ A, 2mA, 20mA, 200mA, 2A, 20A 6 ranges, Accuracy: 200 μ A ~ 2mA \pm (0.5% rdg + 1 digit) 2A ~ 20A \pm (0.5% rdg + 3 digits)
AC Current:	Range: 200 μ A, 2mA, 20mA, 200mA, 2A, 20A 6 ranges Accuracy: 40Hz ~ 500Hz on all ranges, 200 μ A ~ 2mA \pm (1.0% rdg + 3 digits), 2A ~ 20A \pm (1.5% rdg + 2 digits)
Resistance:	Range: 200 Ω , 2k Ω , 20k Ω , 200k Ω , 2M Ω , 20M Ω 6 ranges Accuracy: 20M Ω \pm (1.5% rdg + 5 digits)
Capacitance:	Range: 2nF, 20nF, 200nF, 2 μ F, 20 μ F 5 ranges Accuracy: \pm (1.5% rdg + 5 digits) Test Frequency: 300Hz \pm 5%



Student Measurement Amplifier

Used for the measurement of extremely small DC and AC voltages and currents. A voltage signal proportional to the measurement is available at the analog output and can be supplied to a voltmeter to be used for display. The measurement amplifier is equipped with an operational amplifier and a special pre-amplifier, which provides for a high gain factor, a low offset voltage and long-term stabilisation.

Measurement ranges (with respect to 1 V output voltage):
 Voltage: 1 mV up to 1 V
 Current: 100 nA up to 100 μ A
 Frequency range: 0 up to 20 kHz at $v = 1$
 0 up to 500 Hz at $v = 1000$
 Input impedance: 10 k Ω
 Input voltage: max. 10 V
 Output voltage: max. 10 V
 Measurement accuracy: 2 %
 Voltage supply: 12 V AC
 Dimensions: 175 x 85 x 65 mm
 Weight: Approximately 250 g

S-U8532161

Additional Item Required

Plug-in Power Supply 12 V S-U33020-115

These multimeters pay you back with reliable high performance every day. Don't settle for inferior quality!

Three new Multimeters include all the features you need and want.

Item U40165 measures AC/DC voltage, AC/DC current, resistance, diode test, and continuity plus thermocouple temperature. The U40166 adds capacitance, frequency, and duty cycle to the range of measurements possible. For true versatility choose the U41067, all the above measurements plus thermocouple and non-contact IR temperature. Each unit comes with an operations manual detailing features and measurement settings.

Item Number	A. S-U40165	B. S-U40166	C. S-U40167
Price			
Display Counter	2000 Counts Backlit	4000 Counts Backlit	
True RMS	–	Yes	
Basic Accuracy	±0.5% (VDC)	±0.3% (VDC)	
DC/AC Voltage	0.1mV to 600V (DC) / 1mV to 600V (AC)	0.1mV to 600V (DC/AC)	
DC/AC Current	0.1µA to 20A		
Resistance	0.1Ω to 20MΩ	0.1Ω to 40MΩ	
Capacitance	–	0.01nF to 100µF	
Frequency	–	0.001Hz to 10MHz	
Temperature (Type K)	-4 to 1382° F (-20 to 750°C)		
Temperature (Infrared with Laser)	–	–	-4 to 518°F (-20 to 270°C)
Duty Cycle	–	0.1 to 99.9%	0.1 to 99.9%
Diode/Continuity	Yes		
CE/UL Category Rating	CE/UL CAT III	CE/UL CAT III-600V	
Dimensions	7.4 x 3.2 x 2" (187 x 81 x 50mm)		
Weight	0.75lbs (342g)		
Warranty	1 year	3 year	



Digital Mini MultiMeters

Compact and versatile multimeters include thermocouple and are available in manual ranging or autoranging.

Includes:
protective rubber holster, battery, test leads and Type K thermocouple probe

- Large easy to read digital display
- Measure AC and DC voltages to 600V
- Measure DC current to 10A
- Thermocouple temperature measurements to 1400°F (750°C)
- Resistance tests with Continuity and Diode functions
- Manual ranging model includes 9V and 1.5V battery test
- Autoranging models capable of AC Current, Capacitance, and Frequency measurements
- Convenient mini size with protective rubber holster and tilt stand
- Data Hold locks reading into the display

Item Number	S-U40146 Manual Ranging			S-U40147 Autoranging			
	Price	Functions	Price	Functions	Price	Functions	
		Range	Max. Resolution	Basic Accuracy	Range	Max. Resolution	Basic Accuracy
DC Voltage		200mV, 2V, 20V, 200V, 600V	0.1mV	±0.5%	400mV, 4V, 40V, 400V, 600V	0.1mV	±0.5%
AC Voltage		200V, 600V	0.1V	±1.2%	4V, 40V, 400V, 600V	0.1V	±1.2%
DC Current		200mA, 10A	0.1mA	±1.5%	400µA, 4000µA, 40mA, 200mA, 10A	0.1µA	±1.2%
AC Current		—	—	—	400µA, 4000µA, 40mA, 200mA, 10A	0.1µA	±1.5%
Resistance		200Ω, 2kΩ, 200kΩ, 20MΩ	0.1µΩ	±0.8%	400Ω, 4kΩ, 40kΩ, 400kΩ, 4MΩ, 40MΩ	0.1Ω	±1.2%
Capacitance		—	—	—	4nF, 40nF, 400nF, 40µF, 100µF	0.001nF	±3.0%
Frequency		—	—	—	10Hz, 100Hz, 1kHz, 100kHz, 1MHz, 5MHz	0.01Hz	±1.0%
Temperature		-4 to 1400°F (-20 to 750°C)	1°	±(1%+4°)	-4 to 1400°F (-20 to 750°C)	1°	±(1%+4°)
Battery Test		9V and 1.5V Batteries			—		
Power		One 9V Battery			2 x AAA Batteries		
Dimensions		138 x 72 x 38 mm					

NiCr-Ni Temperature Sensor

Thermocouple for temperature measurement in conjunction with the, Demonstration Multimeter (U21100-115) and is equipped with a 2-pole, standard flat connector. Measurement range: -40°C to 500°C.

S-U21036





LCR Meter

Measures inductance, capacitance, and resistance

This meter will accurately measure capacitors, inductors and resistors using the test frequencies of 120Hz and 1kHz. The dual display will simultaneously display the associated quality factor, dissipation or resistance value using a series or parallel equivalent circuit.

Features:

- Simultaneous 20,000/10,000 count display of the primary parameter (L, C, or R) with the secondary parameter of Q (quality), D (dissipation) or R (resistance)
- Set Hi/Lo limits using absolute values or percentage
- Parallel or series equivalent circuit
- 4-1/2 digit backlight LCD display
- Max/Min/ Avg recording, Auto power off
- Automatic blown fuse indication
- Built-in test fixture or use external test leads

- Open and short Zero removes unwanted stray impedances from the measurement
- Relative mode with zero reference or user supplied reference
- CE approved, one year warranty
- Complete with test leads, alligator clips, 9V battery, and protective holster

S-U40162



1000A 3-Phase Power Analyzer and Datalogger

The logger has four clamps for power measurements on single phase, 3-phase/3-wire, or 3-phase/4-wire systems. Features a large backlit LCD display that shows 10 parameters simultaneously: kW, kVAR, kVA, PF plus the voltage and current of the three phases. Uses clamp-on True RMS power measurements with included software for Harmonics analysis. Can sustain current measurements to 1000A and Voltage measurements to 600V. Also automatically logs up to 20,000 sets of measurements.

S-U40163



Inductance Decade

Housing made of shock-resistant ABS plastic. This series incorporates mechanically stable components, a slide switch for setting measurement ranges and colored, 4 mm sockets with clips for connecting wires.

S-U11820



Resistance Decade

Easy slide switch design allows quick adding and subtracting of resistor values. Unit also offers any resistor value between 1Ω and 11MΩ. Equipped with insulated plug sockets for safe operation.

S-U40191



Capacitance Decade

Intuitive system of switches makes creating capacitance values between 100pF and 11MF almost too easy. Protected 4 mm plugs always promotes safe laboratory experiments.

S-U40192



Analog Ammeter

Range: 0-50 mA, 0-500 mA, 0-5 A

U49808 \$9.00



Analog Voltmeter

Range: 0-3 V, 0-15 V, 0-30 V

S-U49809



Resistance Decade, 1 Ω up to 10 kΩ

Four resistance decades in a single housing, can be used individually or in combination, e.g. for setting up a Wheatstone bridge. Can be set using control knob, with decade scale.

S-U11185

Zero-Point Galvanometer CA 403

Reasonably priced, sturdy and easy-to-use analog measuring instrument with moving coil instrument and rectifier, particularly well-suited for student and practical experiments, may be used as a DC micro-ammeter and DC millivoltmeter. This device has only one control knob, includes safety sockets and quick-break fuses, is electrically protected and double-insulated.

Specifications:

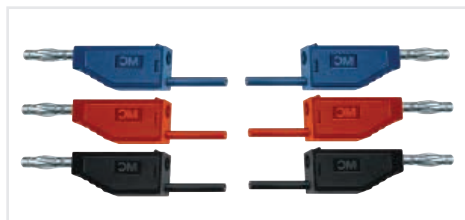
- Meas. ranges: 100 mV DC, 30 μA DC, 3 mA DC
- Int. resistance: 3333 Ω, 460 Ω, 500 Ω
- Accuracy: ± 1.5%
- Zero point: center
- Mirrored scale: yes
- Connection: 4 mm-security sockets
- Fuse: 0.315 A HBC 380 V 50 kA
- Dimensions: 165 x 105 x 50 mm
- Weight: 450 g

S-U11170



Patch Cords

All Patch Cords are equipped at either end with a laminated plug and a fully-insulated axial jack for connecting additional patch cords.

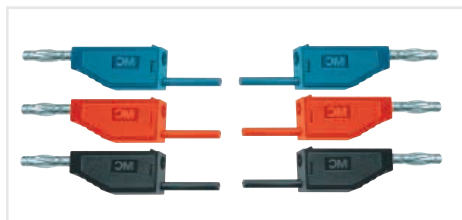


Set of 15 Low Volt Patch Cords, 75 cm

Used for low-voltage electrical circuits; copper wire encased in highly flexible PVC.

Wire cross-section: 1 mm²
 Continuous current: max. 19 A
 Plug and jack: 4 mm Δ (nickel-plated)

S-U13800

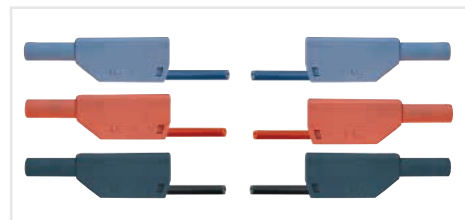


Set of 15 Patch Cords, 75 cm

Used for electrical circuits with low voltages and high currents; copper wire encased in highly flexible PVC.

Wire cross-section: 2.5 mm²
 Continuous current: max. 32 A
 Plug and jack: 4 mm Δ (nickel-plated)

S-U13801

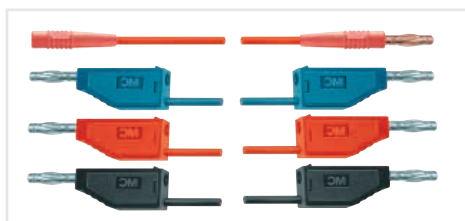


Set of 15 Safety Patch Cords, 75 cm

Used for electrical circuits with low voltages and high currents; copper wire encased in highly flexible PVC; equipped at either end with a laminated safety plug and a fully-insulated axial jack for connecting additional patch cords.

Wire cross-section: 2.5 mm²
 Continuous current: max. 32 A
 Plug and jack: 4 mm Δ (nickel-plated)

S-U138021

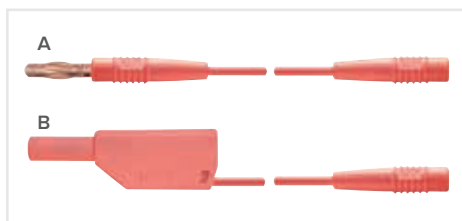


Set of 17 Patch Cords

Seventeen maximum-quality patch cords with 4 mm-connectors for all cabling between tubes, power supplies, display units and coils. (see page 213 for quantities)

Wire cross-section: 1 mm²
 Continuous current: max. 19 A
 Plug and jack: 4 mm (nickel-plated)

S-U138101



Safety Patch Cords

Patch cord with Multilam plug / jack

Length: 75 cm
 Wire cross-section: 1 mm²
 Continuous current: max. 19 A
 Color: red
 Plug and jack: 4 mm

A. Gold Plated S-U13760
 B. Nickel Plated S-U13761



High-frequency Patch Cords

Shielded patch cords for low-loss, low-capacitance transmission of high-frequency signals; equipped at either end with a BNC plug. Impedance: 50 W

S-U11255

High-frequency Patch Cord (not shown)

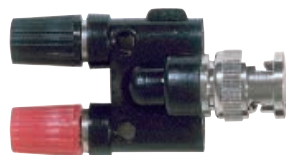
BNC / 4-mm plug. Shielded patch cord equipped with a BNC plug at one end and a 4-mm plug at the other end. S-U11257



BNC Patch Cord Connector

Equipped at either end with a BNC jack for connecting high-frequency patch cords with BNC plugs.

S-U11258



Adapter

BNC jack / 4 mm-jacks. Adapter for crossover from a BNC plug to 4 mm-jacks.

S-U11259



Adapter

BNC jack / 4 mm-plugs. Adapter for crossover from a BNC jack to 4 mm-plugs with 19 mm spacing.

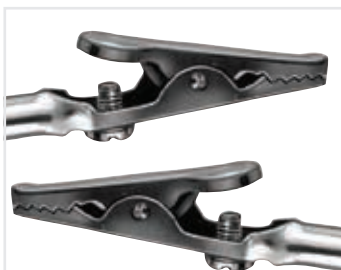
S-U11260



T-piece, BNC

For connecting two high-frequency patch cords to one BNC jack.

S-U11261



Crocodile Clip 4 mm, Pack of 15

Non-insulated test clip with 4-mm sockets for accepting 4 mm-test leads or any other 4 mm-Multilam plug. Connection also possible with screw clamp or soldering.

S-U13805PK



Safety Crocodile Clip 4 mm

Fully insulated safety crocodile clip with 4 mm-safety socket for accepting 4 mm-safety test leads or any other 4 mm-Multilam plug.

S-U13806



Precision Mass Set, 12 pieces

Extreme accuracy makes this an excellent choice for precision calibration and weighing. Weights: 1-500 g, 2-200 g, 1-100 g, 1-50 g, 2-20 g, 1-10 g, 1-5 g, 2-2 g, 1-1 g.

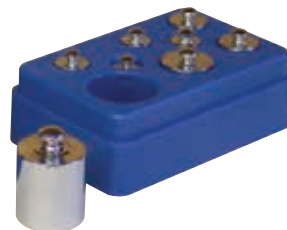
S-U40882



Slotted Weight Set with Hanger

1-50 g (hanger), 9-20 g, 1-10 g, 2-5 g

S-U49515



Precision Mass Set, 8 pieces

Housed in plastic casing. 1-50 g, 1-20 g, 2-10 g, 1-5 g, 2-2 g, 1-1 g

S-U49516



Set of Weights 1 g to 500 g

12-piece set of brass weights on convenient storage rack. 1-1 g, 2-2 g, 1-5 g, 1-10 g, 2-20 g, 1-50g, 1-100 g, 2-200 g, 1-500 g

S-U30013



Set of Weights 10 g to 1000 g

9-piece set of brass weights in storage box, each with hooks on both sides. 1-10 g, 2-20 g, 1-50 g, 1-100 g, 2-200 g, 1-500 g, 1-1000 g

S-U30016



Set of Weights, 1 g to 1000 g

13-piece set of brass weights in storage block. 1-1 g, 2-2 g, 1-5 g, 1-10 g, 2-20 g, 1-50 g, 1-100 g, 2-200 g, 1-500 g, 1-1000 g

S-U30014



Weight Holder, 50 g

Weight holder for weight set U30013.

S-U30017



Set of 10 Weights

Brass weights with hooks on both sides so that they can be suspended from one another.

10 g S-U8404710

20 g S-U8404700



Precision Dynamometer, transparent

Color-coded precision dynamometer in a transparent plastic casing with easy-to-read scale, protection against over-extension of the spring and zero-point calibration capability.

Precision: < 1% of maximum measurement

Dimensions: 280 x 16 mm Ø

Buy 20 and get 25% OFF!



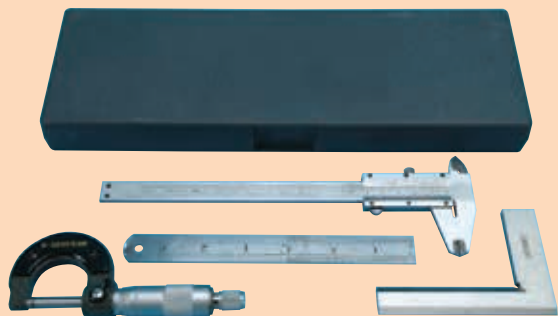
Dynamometer, Color Coded

Color coded dynamometer for measuring weights or masses as well as forces. Scaled in newtons or grams and kilograms with zero-point calibration.

Buy 10 and SAVE more than 35%!

Item Number	Price	Color	Range	Scale division
S-U20030		Silver	0.1 N	0.001 N
S-U20031		Beige	0.2 N	0.002 N
S-U20032		Yellow	1 N	0.01 N
S-U20033		Red	2 N	0.02 N
S-U20034		Blue	5 N	0.05 N
S-U20035		Green	10 N	0.1 N
S-U20036		Violet	20 N	0.2 N

Item Number	Price	Color	Range	Scale division
S-U40810		Blue	250 g / 2.5 N	5 g / 0.05 N
S-U40811		Green	500 g / 5 N	10 g / 0.1 N
S-U40812		Brown	1000 g / 10 N	20 g / 0.2 N
S-U40813		Red	2000 g / 20 N	50 g / 0.5 N
S-U40814		White	3000 g / 30 N	50 g / 0.5 N
S-U40815		Yellow	5000 g / 50 N	100 g / 1 N



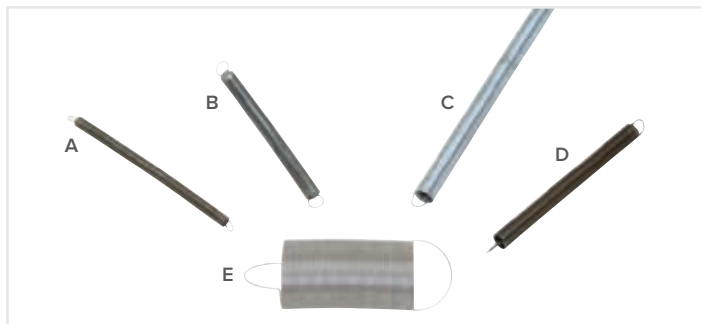
Precision Measurement Set, 4 pieces

All the basics for taking precise length measurements.

Includes:

- 1-Micrometer 25 x 0.1 mm
- 1-Vernier Caliper 150 x .05 mm (6 x .001 in)
- 1-Knife edge square 90 degree
- 1-Ruler Steel 150mm (6 in) housed in a sturdy case.

S-U49514



Item Number	Price	Constant N/m	Max Load	Length
A. S-U11027		20	6.5	110 mm
B. S-U15028		30	13.5	115 mm
C. S-U11026		6	2.5	115 mm
D. S-U11025		3	1.5	80 mm
E. S-U15027		20	8.0	180 mm



Plumb Line

Brass body on a line.

- Height: 100 mm
 Diameter: 20 mm
 Weight: 220 g
 Line length: 1600 mm

S-U15015



Demonstration Model of Vernier Scale

Demonstrate Vernier reading on numerous length and angle measuring instruments. With retrograde and direct Vernier graduation.

- Length: 60 cm
 Length of Nonius: 26 cm
 Height: 19 cm

S-U15035



Digital Fractional Calipers

The high-contrast digital display easily switches between inches, millimeters and fractions, with guaranteed accuracy to 0.001. In addition, the rugged stainless steel design delivers accurate readings of inside, outside, step and depth measurements. The Fraction+ comes with a foam padded plastic case for safe storage when not in use.

Resolution: 0.0005", 0.01 mm, 1/64"

Power Source: 1SR44 battery (included)

S-U49361



Universal Spirit Level, 250 mm

Spirit level made of shock-resistant plastic for measuring angles to horizontal, vertical and inclined planes. The rotating gauge can be turned and fixed in place when measuring inclined planes. Gauges are designed to prevent leakage and breaking. Scale markings: 45°, 60° and 120°; mm scale on measuring surface; protractor scale for rotating gauge.

- Scales: 250 mm/1 mm, -90° to +90°/2°
 Dimensions: 250 x 54 x 15 mm

S-U10074



10-piece Mini-Screwdriver Set

The 10 Piece Mini Screwdriver Set features three popular blade styles – Slotted, Phillips and Torx – with compact handle designs.

S-U49367



Callipers, 150 mm

Precision callipers for measuring internal and external dimensions and depth. Tempered stainless steel, precision polished measuring surfaces, gauge with matte-chrome finish. In imitation leather pouch.

- Measuring range: 150 mm / 6 inch
 Graduation: 1/20 mm / 1/128 inch

S-U10071



Mechanical Cumulative Stopwatch

Cumulative stopwatch with start, stop and reset buttons in shock-resistant plastic casing. Dual dial for minutes and seconds; pendant cord. Measuring range: 15 min; accurate to within 1/10 sec. Unit diameter: 55 mm.

S-U11901



Digital Stopwatch

Stopwatch with start/stop and split/reset buttons for starting and stopping, cumulative, lap-time and dual-time measurement. Measuring range: 9 h, 59 min, 59 sec, 99/100 sec. Accurate to within 1/100 sec. 65 x 65 x 18 mm.

S-U11902



Digital Stopwatch

Displays lap time, hours, minutes, seconds, month, day and date. Additional features include a daily alarm and hourly chime; 12 or 24 hour clock; accurate to 1/100 seconds over 24 hours. Powered by one CR2016 battery. Available in black only. 2.25 x .25"

S-U49356



Timer

Counts up or down, acoustic tick, with magnetic grip for fixing to metal surfaces and with fold-out support leg.

S-U16100



Set of Riders for Rulers

The set of riders consists of two red plastic pointers to match rulers U8401550 and U8401560 that can be used as movable cursors. 120 x 40 x 20 mm

S-U8401570



Infrared Temperature and Humidity Gauge

Digital measuring device for contact-free temperature measurement from large distances of hot or moving objects, or inaccessible points of measurement, and for simultaneous humidity display. The thermometer contains a backlit display and a laser diode is integrated to aid in detection.

Measuring range: (0.1° accuracy),
 Temperature: -50° C – +500° C; -58° F – +932° F
 Dimensions: 90 x 170 x 45 mm"
 Mass: 360 g

S-U11819



Hygro-thermometer Clock

- Humidity: 10 to 85% RH
- Temp: 14 to 140°F or -10 to 60°C
- Accuracy: ±6%RH; ±1.8°F, ±1°C
- Clock displays: 12/24 hour time

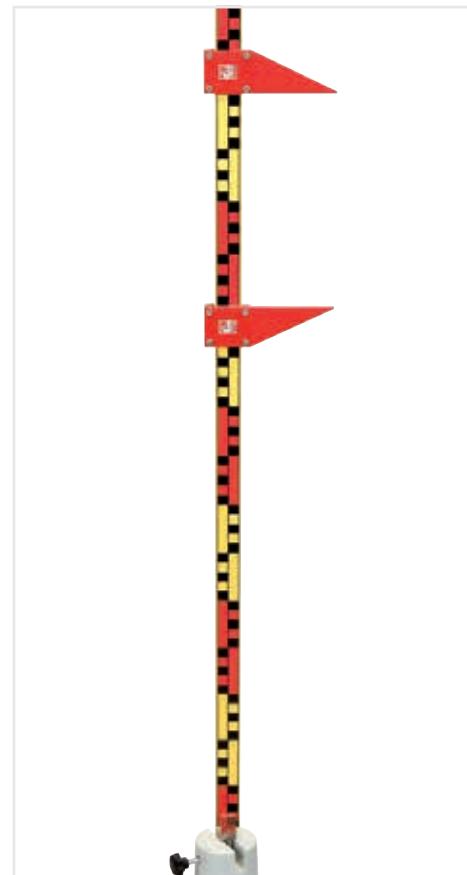
S-U40188



Ruler, 1 m

Wooden ruler with mm scale on one side and two-colored cm scale on the reverse. Cross section: 25 x 8 mm

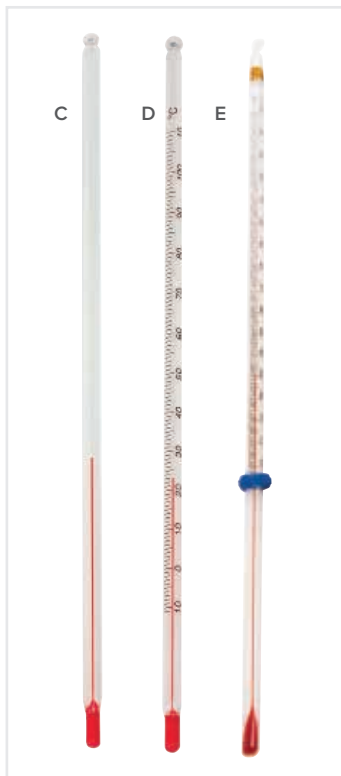
S-U8401550



Vertical Ruler, 1 m

Ruler with fastening pin (d = 12 mm) so that it can be set up vertically in a stand base. Scale as per S-U8401550.

S-U8401560



Insertion Thermometer

Used for measuring the temperature in air, liquids and soft materials. Temperature sensor made of stainless steel with protective case, switchable between °C and °F, On/Off switch and automatic switch-off.

Measuring range: -50°C to 150°C / -58°F to 302°F
 Division: 0.1°C/F
 Accuracy: ± 1°C / ± 2°F
 Temperature sensor: 130 x 4 mm Ø
 Mass: 29 g

S-U40170

Surface Thermometer

Used for measuring the temperature of surfaces. Temperature sensor made of stainless steel and with measurement contact area in the form of a disc, switchable between °C and °F, On/Off switch and automatic switch-off.

Measuring range: -50°C to 300°C / -58°F to 572°F
 Division: 0.1°C/F
 Accuracy: ± 1°C / ± 1.8°F
 Temperature sensor: 130 x 4 mm Ø
 Measurement disc: 18 mm Ø
 Mass: 30 g

S-U40171

Item Number	Price	Features	Scale	Measure Range	Dimensions
A. S-U16115		Stable tube-type thermometer with biodegradable special blue filling, scale on yellow background, with eyelet.	0.2° C	-1° C to 101° C	460 x 7mm Ø
B. S-U16120		Extra-large tube-type thermometer with biodegradable special blue filling, easy-to-read scale on yellow background.	1° C	-10° C to 110° C	650 x 30mm Ø
C. S-U14296		For demonstrating function and mode of operation of thermometers, like U14295 but without scale.	--	--	260 x 6mm Ø
D. S-U14295		Tube-type with anti-roll design, white coated capillary, red alcohol filling, packed in a plastic tube.	1° C	-10° C to 110° C	295 x 6.3mm Ø
E. S-U40911 S-U40913 S-U40915 S-U40916	-20° to 110° C				
	-20° to 150° C				
	-20° to 110° C / 0° to 230° F				
	-20° to 150° C / 0° to 300° F				



K-Type NiCr-Ni Immersion Sensor, -65° C to 550° C

Temperature measurement sensor with stainless steel (V4A)-tube, spring-mounted (rigid) and silicone cable.

Measuring range: -65°C to 550°C
 Response time: approx. 3 sec
 Tube: 130 mm x 1.5 mm Ø

S-U11854

K-Type NiCr-Ni Immersion Sensor, -200° C to 1150° C

Sheath thermocouple with stainless steel (Inconel) tube, flexible and silicone cable.

Measuring range: -200°C to 1150°C
 Response time: approx. 3 sec
 Tube: 150 mm x 1.5 mm Ø

S-U11855



Digital Pocket Thermometer

Stainless steel temperature sensor with a protective case is watertight, switchable between °C and °F, Min/Max/Hold functions with automatic switch-off.

Device measures 150 x 20 x 18 mm, 20 g.
 Measuring range: -40°C to 200°C / -40°F to 392°F
 Division: 0.1°C/F

Accuracy: ± 1°C / ± 2°F

S-U40173



Micro IR Thermometer

Economical contactless temperature measurement for basic needs.

- Wide Temperature range from -34 to 446°F
- Micro size designed for convenience
- Max and Min Hold
- Complete with CR2032 3V Battery

S-U40148



Pocket IR Thermometer

Handy troubleshooting thermometer with laser pointer that measures to 518°F (270°C).

Features:

- Economical small pocket size design for convenience
- Built-in laser pointer identifies target area
- Data Hold and Max Hold
- Fixed emissivity covers 90% of surface applications
- Auto power off
- Complete with two AAA batteries

S-U40195



Datalogging Differential Thermometer + IR Thermometer

Take differential temperature readings with dual Type K thermocouple probes plus non-contact surface temperature measurement using IR Thermometer Probe (included).

Features:

- Datalogs up to 18,000 readings
- Heavy Duty rugged housing
- MAX/MIN/AVG and Data Hold
- Use IR Thermometer probe to measure non-contact surface Temperature up to 1,022°F (550°C); 8:1 distance to spot ratio and Laser pointer
- Includes two Type K bead wire temperature probes (-4 to 482°F/-20 to 250°C), IR Thermometer probe, Windows® compatible software with USB cable, hard carrying case, and 9V battery

S-U40184



High Temperature IR Thermometer

- Widest temperature range from -58° to 1400°F (-50 to 760°C)
- Built-in laser pointer identifies target area
- High 16 to 1 distance to target ratio measures smaller surface areas at greater distances
- Backlighting illuminates display for taking measurements at night or in areas with low background light levels
- Automatic Data Hold
- Automatic shut off after 6 seconds

Measuring range: -58°F to +1400°F, -50°F to +760°C

Divisions: 0.1°C/F
 Accuracy: ±(2%+2) at <932°F (500°C)
 ±(2.5%+5) at >932°F (500°C)
 Emissivity: 0.95 fixed value
 Laser power: Less than 1mW
 LCD Display: 3 digit backlit LCD with function indicators
 Power supply: 9 V battery
 Dimensions: 100 x 56 x 230 mm
 Mass: 290 g

S-U40194



Infrared Thermometer

Surface thermometer for contactless temperature measurement from a safe distance, e.g. in inaccessible places, hot or moving objects. With laser diode for laser sighting, illuminated LCD display, range overflow display, measured value storage function, selection between Celsius and Fahrenheit, automatic switch off. Includes bag and battery.

S-U118152

Digital Hygro-thermometer

Used for displaying exterior and interior temperature and humidity. With min/max function and acoustic signal if exterior temperature drops to or below zero, switchable between °C and °F, on/off button, eyelet for hanging up and fold-out stand.

Measuring range:
 Temperature (interior): 0° C - 50°C / 32°F - 122°F
 Temperature (exterior): -50° C - 70°C / -58°F - 158°F
 Humidity: 20% - 99%
 Divisions: 0.1°C/F, 1%
 Accuracy (temp.): ±1°C / ±2°F
 Accuracy (humidity): ±3%
 Exterior temperature sensor: Cable length 3 m

S-U16102



Mini IR Thermometer

- Built-in laser pointer identifies target area
- Backlighting illuminates display for taking measurements at night or in areas with low background light levels
- Automatic Data Hold when trigger released
- Fixed 0.95 emissivity covers 90% of surface applications
- Auto power off after 6 seconds

Measuring range / resolution: -4°F to +500°F; -20°C to +260°C / 1°C/F
 Accuracy: ±3% of reading ±3°C / 6°F whichever is greater
 Emissivity: 0.95 fixed value
 Laser power: Less than 1mW
 LCD dual-function display: 2,000 count LCD, backlighting and function indicators
 Power supply: 9 V battery
 Dimensions: 170 x 44 x 40 mm
 Mass: 140 g

S-U40193



Humidity Temperature Chart Recorder

Features:

- Simultaneous numerical and graphical display of humidity and temperature readings, plus Time/Date
- Measures humidity (10 to 95% RH) and temperature (-20.0°F to 140.0°F) plus calculates dew point
- Large dual graphical LCD displays with adjustable vertical and horizontal TAC resolution
- Internal memory records up to 49,000 data points and can be transferred to a PC via R232 serial port for further data analysis
- LCD indicates percentage of memory remaining
- Replaceable probe does not require recalibration
- Detachable probe extends up to 1 meter for measurements in closed environments
- Audible and visual alarm with Hi/Low setpoints
- Download, analyze, and store data using Windows® 95/98/2000/NT/ME/XP Compatible Software (included)
- Output socket used with optional external alarm module
- Scroll the cursor to display selected data recorded
- Desk or wall mount
- Complete with built-in stand, detachable probe with 3 ft (1 m) cable, RS232 cable, software, 110VAC adaptor and 3 AA batteries

Applications:

- Monitor and record Laboratory or clean room temperature and humidity history
- Record process conditions
- Generate warning when conditions are outside required limits
- Monitor controlled environment areas such as freezers, storage areas and other critical areas
- Store humidity and temperature historical data for report generation

S-U40143

Paperless chart recorder that is easy to set up and operate.

Analog Barometer

This wall mountable barometer will allow you to predict tomorrow's weather or check the ambient pressure before starting your experiment. A brass housing and classic design make the barometer usable in a lab or at home.

Range: 27.5 to 31.5 (940 to 1060 mbar) in HG
 Dimensions: 4.5" dial diameter, 5" overall
 Weight: 10 oz.

S-U49354



Precision Hair Hygrometer

For measuring the relative air humidity, consisting of a round plastic housing with a human hair as the measuring element. The specially treated hair exhibits an almost inertia-free response to changes in humidity. Wall-mountable.

Measuring range: 0% - 100% relative humidity
 Temperature range: -35°C - +65°C
 Reading accuracy: ± 5%
 Diameter: 100 mm

S-U14293



Mini Thermo-Anemometer + Humidity

Waterproof pocket size with air velocity, temperature, %RH, dew point and windchill. Display air velocity and either relative humidity, dew point, temperature or windchill. Selectable averaging function of 5, 10, or 13 second intervals. Fold up protective housing extends to 9" (229 mm) for better reach, tripod mount. Data hold with auto power off. Water resistant housing floats.

S-U40185



Heat Stopwatch

- Selectable Heat Index alarm
- Stopwatch/chronograph modewith 1/100 second resolution
- Fastest/Slowest/Average Lap recall
- 99 lap counter with 30 lap/split memory
- 10 hour countdown timer with audible beeper warning
- Programmable alarm
- Calendar mode displays day, month and date
- Battery included (CR2032)

Dimensions: 3.1 x 2.6 x 0.8"

Weight: 3 oz. with battery

S-U40189



Suspension Hook Clamp

Powder coated 93 g
S-U13252

Bosshead Clamp

Powder coated, 110 g
S-U13250

Cross Bosshead Clamp

Powder coated, 160 g
S-U13256

Clamp with Jaw Clamp

Clamping width: 20 up to 40 mm
S-U13253

Universal Clamp

Clamping width: 0 up to 80 mm
S-U13261



Universal Bosshead Clamp

Angular screws, 135 g
S-U13255

Table Clamp

Powder coated , 350 g
S-U13260

Base, 1 kg

Heavy base for holding rods
S-U13265

Tripod Stand with Base

Base 6" legs, rod 1/2 x 36"
S-U13271

Barrel Feet

1 kg S-U8611200
0.6 kg S-U8611210

Resistance Wires

Metal wires on bobbins, e.g. for experiments to investigate how resistance depends on the material, crosssectional area and length of the wire.

Item Number	Price	Material	Length	Diameter
S-U8495420		Copper	100 m	0.3 mm
S-U8495460		Iron	100 m	0.3 mm
S-U8495550		Brass	50 m	0.3 mm
S-U8495490		Nickel	50 m	0.3 mm
S-U8495505		Chrome-Nickel	100 m	0.3 mm
S-U8495515		Chrome-Nickel	50 m	0.5 mm
S-U8495527		Constantan	100 m	0.2 mm
S-U8495532		Constantan	100 m	0.3 mm
S-U8495537		Constantan	50 m	0.4 mm
S-U8495540		Constantan	50 m	0.5 mm



Item Number	Price	Length	Diameter
S-U15000		10 cm	dia. 12 mm
S-U15001		25 cm	dia. 12 mm
S-U15002		47 cm	dia. 12 mm
S-U15003		75 cm	dia. 12 mm
S-U15004		100 cm	dia. 12 mm
S-U15005		150 cm	dia. 12 mm



Laboratory Jacks

Height-adjustable stand for elevated positioning of demonstration devices and continuous height adjustment of individual devices forming part of an experiment set-up.

Item Number	Price	Usable Area (cm)	Max Load	Height (mm)	Weight
S-U15020		20 x 20	40 kg	70 - 260	2.3 kg
S-U15021		16 x 13	50 kg	65 - 250	1.2 kg
S-U15022		32 x 22	30 kg	65 - 250 mm	2.6 kg



A



B

A. Support Stand with Triangular Base, Large
base 6" legs, rod 1/2 x 36"
S-U49604

B. Stamped Steel Stand Bases
4 x 6", rod 5/16 x 18"
S-U49599
5 x 8", rod 3/8 x 20"
S-U49600
6 x 9", rod 1/2 x 24"
S-U49601
6 x 11", rod 1/2 x 36"
S-U49602



Maximum-minimum Thermometer

Reading of maximum, minimum and instantaneous temperature. In plastic housing with reset button and hanging strap. Mercury filling.

Measuring range: -38°C to 50°C
Divisions: 1°C
Dimensions: 230 x 85 mm
S-U14294

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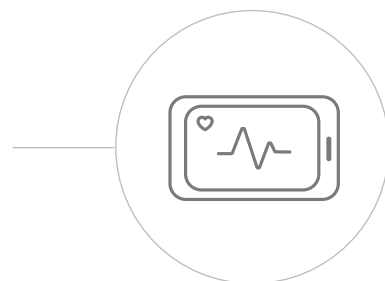


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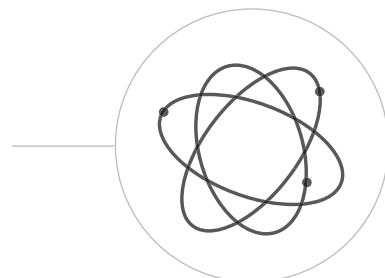


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ANIMAL AND PLANT CELLS



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Cells in 10,000:1 scale, approx. 20 cm high.

See with the naked eye what you would normally need an electron microscope to observe.

This 2-part model of an animal cell and a plant cell shows the typical features of their form and structure as would be seen using an electron microscope.