SUPER A SCIENTIFIC

FORCE AND MOTION

www.super-a-scientific.com sales@super-a-scientific.com

Table of Contents

Acceleration and Trajectories

Carts and Car

Dynamics Cars
605
Plastic Body, 2carts/set
For demonstrating Newton's Laws of conservation and momentum. The set contains two high impact plastic cars with snap in wheels and two spring steel bumpers with rubber stopper assemblies. Each car is designed with large recession for holding additional weight.
Car measures 127mm x 50mm.

Dynamic Cars
606
Metal Body, 2carts/set
Each car is made from an enamel coated metal channel for strength and durability. Plastic bearing wheels reduce friction. Kit also includes four small bumper springs, one big spring, two rubber bumpers.
Dimension is 10cm x 25cm x 4.5cm.

Simple Hall's Carriage
793
Both the body and wheels are made from high impact plastic. The recession in the car allows for additional weight. The hole in the front of the molded plastic body allows you to attach a cord, which is useful with an incline plane.
(5-1/4" x 2" x 1-1/2"; .01lb).

Impact Car
798
The impact car is equipped with a spring scale and slide that is displaced on impact against a wall or similar obstacle. This slide remains in its displaced position until reset. The student rolls the car down the ramp and measures the amount of impact. Next more mass is added inside the car and the experiment is repeated. The student can take direct readings from the scale to measure the increasing force.

Ballistics Car
1600-9
Demonstrates that the forward velocity of a ball ejected vertically is the same as the forward velocity of the vehicle from which it was ejected. Includes a vertical spring loaded barrel and a 1" diameter steel ball. The ejection mechanism has two settings which are controlled by a release pin and cord.
Size 250 x 60 x 140mm.

MS123.2

Collision Ball

Item No.	Description
MS215.1	Ball Set, 5pcs, 3/4"（lead、wood、Alum. Copper、Iron)
MS215.2	Ball Set, 5pcs, 1"（lead、wood、Alum. Copper、Iron)
MS215.1-1	Lead ball，3/4"
MS215.2-1	Lead ball，1"
MS215.1-2	Wood ball，3/4"
MS215.2-2	wood ball，1"
MS215.1-3	Aluminum ball，3/4"
MS215.2-3	Aluminum ball，1"
MS215.1-4	Copper ball，3/4"
MS215.2-4	Copper ball，1"
MS215.1-5	Iron ball，3/4"
MS215.2-5	Iron ball，1"
MS215.3-1	Small brass ball, Dia.8mm
MS215.3-2	Small brass ball with ring, Dia. 8mm,

Collision Ball Apparatus

Collision Ball Apparatus
300
This unit, made by strong steel, consists of five steel balls, demonstrate that for every action there is an equal and opposite reaction.

Collision Ball Apparatus, Wooden Frame
300-1
This unit, made by hard wood, consists of five nickel-plated steel balls, demonstrates Newton's third law of motion and the principle of conservation of momentum for every action.

Collision Ball Apparatus, Economy
300-2
This unit, consists of five steel balls, demonstrates that for every action. There is an equal and opposite reaction.

Small Collision Ball Apparatus
1379
NEW LOOK! A great apparatus for demonstrating Newton's Third Law of Motion and the principle of Conservation of Momentum. The new design provides for better results, stability and quality.

Second Law of Motion
1476
This is a cast iron spring driven projectile apparatus. It demonstrates that a horizontally projected ball and vertically dropped ball land at the same time. The spring device can propel ball to 48" from its starting point. A detachable rod for clamping to a table or stand.

Collision in One Direction Apparatus

Item #	Specifications
MS117-1	Length 28cm, clip 5cm (aluminum)
MS117-2	Length 28cm, clip 5cm (black aluminum)
MS117-3	Length 28cm, clip 5cm (Plastic + aluminum

Collision in 2 D Apparatus

Collision in 2 Dimension Apparatus
This inexpensive apparatus is a rich source of data for studying conservation of momentum and conservation of kinetic energy in collisions.
It is also used to compare elastic and inelastic collisions. A curved metal track and an adjustable target support form the core of the unit. It is supplied with two steel balls, a glass ball, and a plumb bob. It requires a C-clamp for mounting on a table.

Free Fall Apparatus

Second Law of Motion
1476
This is a cast iron spring driven projectile apparatus. It demonstrates that a horizontally projected ball and vertically dropped ball land at the same time. The spring device can propel ball to 48" from its starting point. A detachable rod for clamping to a table or stand.

Free Fall Apparatus, 110V, 1.2M
1888
This item is used to study the rate of an item in free fall specifically a small steel ball. This ball is held by an electromagnet and when released, the rate of fall is measured by a photo-gate and timer (photo-gate and timer is not included).

Economy Free Fall Tube
1888-120
This economical device demonstrates how aerodynamic forces, which dictate that lighter objects experience a lesser acceleration than heavier objects, are virtually eliminated when in a vacuum environment. This unit features a durable, clear plastic tube, 120cm long. The hose cock is connected to any standard vacuum pump (not included) to remove that air from tube.

Student Free Fall Apparatus
1888-S
This device was designed for student labs for the high school through college levels. Easy to set up, use, and store. Comes complete with spark timer and recording tapes. Each tape can record up to three free falls. 30"x 6"x 7", 3.8lbs.

Photo-gate and Timer
2009
The solid state apparatus is a must for any physics class and is perfect for our air track and free fall apparatus. Two photo-gates are included, each with it's own shielded connecting cord and mounting screws. The timer has functions for timing, mechanical periods of oscillation, acceleration, collision velocities, counting and more.

Hall's Carriage and Inclined Planes

Simple Hall's Carriage
793
Both the body and wheels are made from high impact plastic. The recession in the car allows for additional weight. The hole in the front of the molded plastic body allows you to attach a cord, which is useful with an incline plane.
(5-1/4" x 2" x 1-1/2"; .1lb).

Hall's Carriage
799
This unit is designed to be used with all types of inclined planes. Overall length is 14cm.

Friction on an Incline Plane
811
This is a simple device for studying friction and the varying degrees of friction in relation to an incline. The unit is made of smooth wood with a metal pulley attached to the incline and a large protractor for accurately recording the angle of incline. Three different sized boards with eye hooks are also included for study of how displacement, surface contact and weight affect frictional forces.

Incline Plane, Metal
811-M
For determining vertical and horizontal force components, friction losses, etc. Consists of a heavy base and 3" x 22" incline, supported by a cast aluminum protractor graduated to 45 degree. The adjustable pulley, with hardened steel bearings, responds to a minimum of 20g. Cart weight pan not included.

Friction Apparatus
812
This set includes a friction block and a friction board, both made of high quality, smoothly finished pine wood. The friction block has a hook for a spring scale and three compartments for additional weights. It can be placed face-up or sideways. Students can vary the weight or area of contact to see their impact on the friction force. Comes with 3 — 50g weights and a 100g spring scale. Board is 20" x 2" and the block is 4" x 1.5" x 1".

"V" Type Track
MS132
This unit is a simple way to science students to perform the principle of friction on "V" type track.

Double Cone and Incline
MS135-1
This unit is used to defy the law of gravity. When the track is widened, the center of mass of the cone is lowered. So it appears to violate the law of gravity by uphill.

Single Cone and Incline
MS135-2
This unit is used to defy the law of gravity. When the track is widened, the center of mass of the cone is lowered. So it appears to violate the law of gravity by uphill.

Inertia Apparatus

Loop-the-Loop Track
1204
The apparatus is used to demonstrate the transformation of potential energy into kinetic energy in a fun and interesting way. Challenge your students to calculate the minimum height that the steel ball can be rolled down the track and still have it complete the loop without breaking contact with the track. The unit measures 420mm x 100mm x 430mm.

Loop-the-Loop Track
MS116-3
A riveting demonstration of conservation of energy, conservation of momentum, and projectile motion, the Loop the Loop looks like the track of a rollercoaster. The curved metal track allows you to drop a steel ball from the top and watch the results. Depending on the height at which it is dropped the ball will roll completely around the interior of the track or will drop to the ground. A circular scale is attached to the device for measuring the angle at which the ball drops. Includes two steel balls and instructions.
Size: 110 cm in length

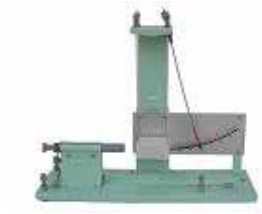
Mass Force Demonstration
1369
NEW LOOK! - Rest the plastic ball on top of the plexi glass square that is set on the vertical post. Release the spring and the square shoots out. The ball falls into the concave recession in the post, remaining at rest on top of the post as if nothing happened.

Maxwell's Wheel
1886
Used for demonstrating momentum, conservation of energy and torque. This unit which is basically a large flywheel is suspended by two strong cords. These cords are wound around the shaft of the wheel and then released. The wheel will unwind as it falls but will wind itself back up as the momentum carries the wheel upward in the opposite direction. This oscillation process will continue for several moments as the wheel slowly lose momentums and travels less each time.

Horizontal Cast and Collision Tester
1889
Here is a unique way to study horizontal and vertical motion, conservation of energy, and momentum. A track mounted to a vertical board directs one or two carts, casting them into a free fall. A brush projecting from the back side of the carts, marks the path of the cart as it falls. Weights can be added to the carts to study the effects of increased mass on momentum.

"V" Type Track
MS132
This unit is a simple way to science students to perform the principle of friction on "V" type track.

Pendulum



Ballistic Pendulum Apparatus
1600-4
Unit uses a nylon pendulum with a tapered rubber insert. Both pendulum and base have leveling screws. The spring loaded gun has a self locking trigger and a rubber bumper to prevent damage on impact. The scale is marked in degrees and is registered by a counter weighted needle that remains in place at the height of the arc.

Pendulum Clamp
1600-7
This clamp is used on support rods to hang weights and pendulums. Each unit has three screw clamps for holding one to three strings with weights 2" apart.

Foucault's Pendulum
1600-8
Measure the Earth's rotation in a smaller scale with this innovative instrument. A unique energy compensation mechanism enables continuous operation of the pendulum; glass windows shield the unit from drafts for uninterrupted, precision measurements; and a special 360°scale enables exact recording of directions. Designed for in depth analysis and advanced studies, this Foucault's Pendulum features amplitude adjustment and built-in illumination.
Size: 40.6 x 40.6 x 144.8 cm; Weight: 110 lbs.

Rotation and Center of Gravity

Centrifuge Machine, Hand Powered
306
This centrifuge machine is equipped with a clamp for mounting to a table 1 to 4 cm thick. Made from enamel coated cast metal. Holds centrifuge tubes up to 15ml in capacity. The unit is approximately 30cm tall.

792 Precision Gyroscope
A high-quality, low-cost gyro which runs 3 minutes when string started,5 minutes with mechanical starter. The 6cm brass rotor is dynamically balanced and rotates in adjustable teflon bearings. Accessories include a plastic gimbals, rocker and weights set.

1600-5 Cavendish Balance
This classic instrument is used to measure the value of G (gravitational constant) the same way Sir Henry Cavendish did in 1789. Consists of a pair of small lead balls mounted on a "T" member suspended with a thin wire and a pair of large lead balls. Oil damping is provided for faster results. Requires a laser (not included)

Coriolis Effect Kit
3226
As the steel spheres track a pattern on the kit's turntable, students simulate the effect of the earth's rotation on winds, ocean, currents, and material objects. Each kit includes one 14" diameter base with erasable tracing surface mounted on a turntable, removable launch structure, two 5/8" diameter steel spheres.

MS 118-2

Double Cone and Plane, Wooden
MS135-1
A fascinating demonstration of center-of-gravity principles. When placed on the diverging bars of the inclined plane, the cone appears to roll up the plane. Upon careful examination, however, students determine that the axis of the cone is actually moving down the slope of the bars. The entire device is made of stained hardwood.

Double Cone and Plane
MS135-2
A fascinating demonstration of center-of-gravity principles. When placed on the diverging bars of the inclined plane, the cone appears to roll up the plane. Upon careful examination, however, students determine that the axis of the cone is actually moving down the slope of the bars. The entire device is made of stained hardwood, but with plastic wheel.

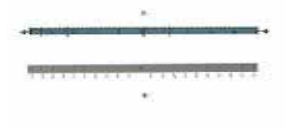
Demonstration Balance

Demonstration Balance Support and Knife-Edge Lever Clamp
150-1
This unit is designed to support lever and torque experiments. And knife-edge lever used to study balanced torque. Clamps securely onto a meter stick with a thumbscrew.

Newton Balance Set

Knife-edge Clamp
911
Clamps firmly to meter rule for balance demonstration. Fulcrum levels are sharp and cut in opposite directions. Clamp fastens to meter ruler by set-screw. Each clamp provided with metal wire stirrup which serves as a mass hanger when inserted. Openings on each side expose graduations on meter rule so that clamp may be set exactly**.**

Lever Balance
MS101-11
For demonstrating the principle of balance and showing the relationship between mass and distance from the fulcrum. Use this with plastic plate weights.



Scale of Balance
MS130

Force, Equilibrium, Vibration

Air Track and Table

Projection Air Table
101
Use this miniature air table with any suitable air source to demonstrate the random movement of molecules. Made of clear acrylic this unit can be set on an overhead projector and projected so everyone in the room can observe the movement. The molecules are colored disks with mounted magnets in each. These magnets cause each disk to repel it's neighbor and thus create an almost continuous motion.

Quiet Air Source
794
This piece of equipment can be used on any apparatus requiring an air source such as air tables or air tracks. Very quit in operation and comes complete with a 1-1/8" diameter hose. Operates on 110 volt AC.

Harmonic Motion Air Track
796
Used to study harmonic motion and relationship between vibration and mass. It can also be used to demonstrate the conversion between kinetic and potential energy and the effects of air friction or oscillation. A fish tank pump can be used as an air source. A bright and clear precision meter scale is added to each unit.

Air Track and Accessories, 110V,1.5M
797
This is one of the most useful pieces of apparatus that a physics class could have. This air track allows one to four carts to ride along on a cushion of air, practically eliminating friction. Highly precision pulleys are included to mount to the ends for performing free falling and incline experiments. Spring bumpers can be attached to record impact forces and weights can be attached to each cart for studying momentum and many other phenomena's involving forces. Air source is not included. Unit can be used with our photo gates and digital timer and our quiet air source.

Digital Timer and Photogate
2009
The solid state apparatus is a must for any physics class and is perfect for our air track and free fall apparatus. Two photo-gates are included, each with it's own shielded connecting cord and mounting screws. The timer has functions for timing, mechanical periods of oscillation, acceleration, collision velocities, counting and more.

Hook's Law Apparatus

Hook's Law Apparatus
808
This apparatus shows that the extension of a coiled spring is proportional to the weight of masses loaded on its hanger. This apparatus has a 12 cm adjustable scale and is marked in millimeters and mounted on a sturdy 30 cm support rod and base. A hook supporting a coiled spring with a mass hanger and indicator is attached to the rod.

Hook Collars - for 1/2" & 3/4" Rods
35022, 35023
Useful for attaching pulleys, cords, trusses, pendulums, and other apparatus to support rods. Nickel-plated collar with thumbscrew and hook.

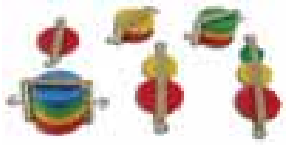
Springs for Hook's Law
MS106.2
A set of 5 springs with different spring constant (k)- they stretch by 2cm with a load of 0.5N, 1N, 2N, 3N and 5N respectively. Pre-stress has been removed for accurate results. With a hook to support weight hanger and a red arrow to indicate positions.

Pulley and Gear

Pulley
All pulley's are sturdily constructed with an aluminum housing and plastic wheel.
1606-1 plastic pulley, single
1606-2 plastic pulley, double
1606-3 plastic pulley, triple
1606-4 plastic pulley, quadruple
1606-5 plastic pulley, double tandem
1606-6 plastic pulley, triple tandem

1606-8 Pulley on Rod
Pulley with extension arm, arm 50MM aluminum
rod-mounted. Essential for teaching about simple machines and force! An aluminum 50mm pulley mounted on an aluminum support with handle. The rod mounted pulley can be used to build your own incline plane, and can be mounted to a support rod using a right-angle clamp.
Rod-Mounted Pulley (10" x 2-1/2" x 3-3/4" .7lb).
1606-8P Same as above, only mounted with plastic pulley.

Pulley with Table Clamp - Cast Aluminum
1606-20
The cast aluminum clamp mounts to the edge of any table up to 2-3/8" thick. The 2 " diameter metal pulley is mounted to an 8" rod that can be fixed to any position up to 10-1/2" above the table.



Pulley
All pulley's are sturdily constructed with an aluminum housing and plastic colored wheel. 50mm Diameter.
1607-1 plastic pulley, single
1607-2 plastic pulley, double
1607-3 plastic pulley, triple
1607-4 plastic pulley, quadruple
1607-5 plastic pulley, double tandem
1607-6 plastic pulley, triple tandem

Pulley
All pulley's are constructed with aluminum housing and aluminum wheel. Specifications are as above.
1608-1 aluminum pulley, single
1608-2 aluminum pulley, double
1608-3 aluminum pulley, triple
1608-4 aluminum pulley, quadruple
1608-5 aluminum pulley, double tandem
1608-6 aluminum pulley, triple tandem

Wheel and Axle
2302
This unit is designed to demonstrate mechanical advantage and conservation of energy. It is fitted with four coaxial pulleys of 35, 50, 65, and 105mm diameter. The wheel is fitted with a ball bearing which turns on a single steel rod.

MS102.2

MS102.5

MS102.6

MS129-2

MS140