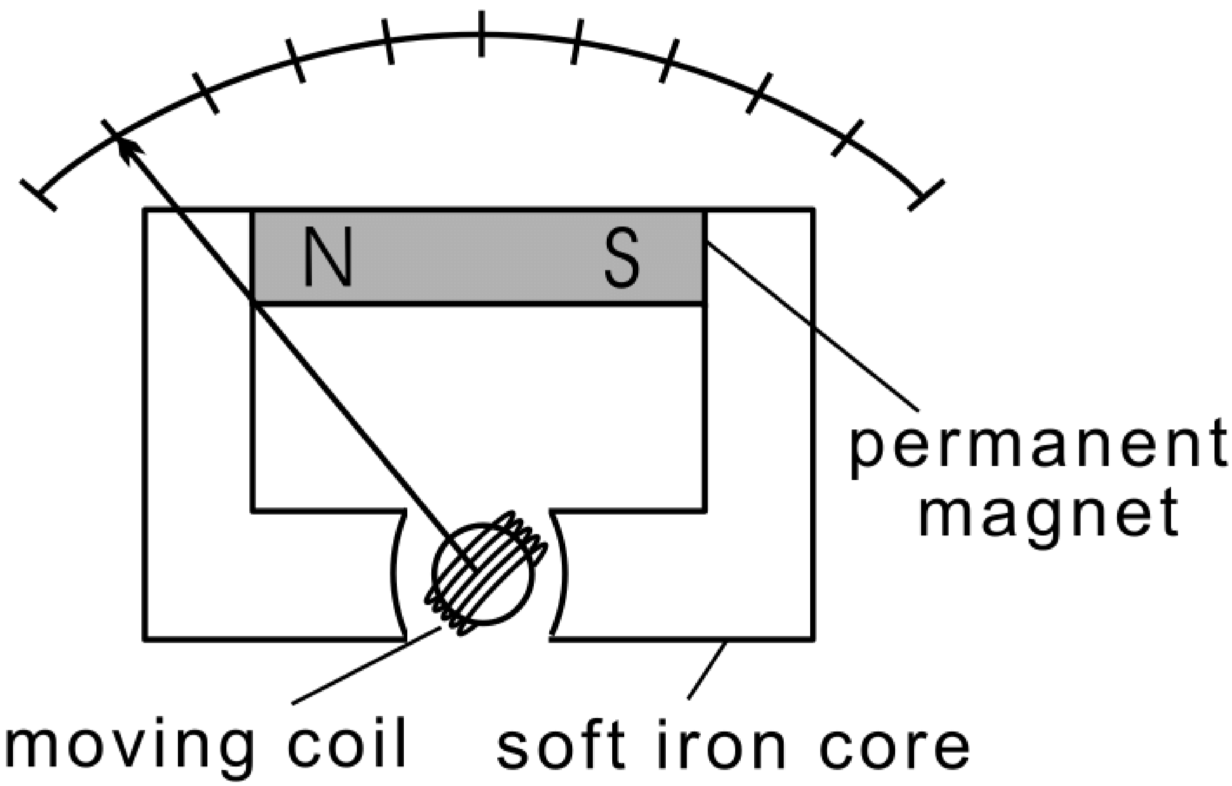
Ammeter



Moving coil ammeter

It uses magnetic deflection, where current passing through a **coil** placed in the magnetic field of a permanent magnet causes the **coil** to **move**. A **moving coil** meter indicates the average (mean) of a varying current through it, which is zero for AC.

Soft iron core

A soft iron core is used in a moving coil galvanometer. The soft iron core attracts the magnetic lines of force and hence the strength of the magnetic field increases if we use soft iron core. Thus the sensitivity of galvanometer increases. Also the use of soft iron core makes the magnetic field radial (i.e the plane of the coil will be always parallel to the direction of magnetic field).

Permanent Magnet

The D'Arsonval galvanometer is a moving coil **ammeter**. It **uses magnetic** deflection, where current passing through a coil placed in the **magnetic** field of a **permanent magnet** causes the coil to move. Because the **magnetic** field is polarised, the meter needle acts in opposite directions for each direction of current.

Ammeter

An **ammeter** (from **Am**pere **Meter**) is a measuring instrument used to measure the current in a circuit. Electric currents are measured in amperes (A), hence the name. Instruments used to measure smaller currents, in the milliampere or microampere range, are designated as *milliammeters* or *microammeters*. Early ammeters were laboratory instruments which relied on the Earth's magnetic field for operation. By the late 19th century, improved instruments were designed which could be mounted in any position and allowed accurate measurements in electric power systems. It is generally represented by letter 'A' in a circle. Ammeters have very low resistance and are always connected in series in any circuit.

Alligator Clip

Black

Red

clip – any of various small fasteners used to hold loose articles together

clip lead - a short piece of wire with alligator clips on both ends

jaw - holding device consisting of one or both of the opposing parts of a tool that close to hold an object.

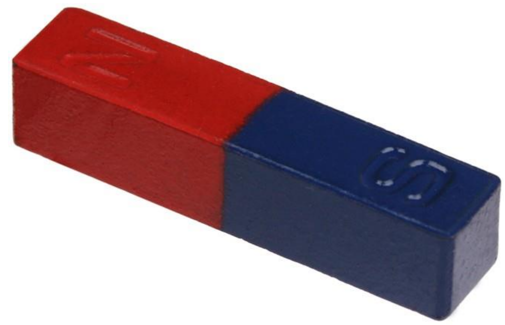
Alligator Clip Black

A **crocodile clip** (also **alligator clip**) is a sprung metal clip with long, serrated jaws which is used for creating a temporary electrical connection. This simple mechanical device gets its name from the resemblance of its jaws to that of an alligator's or crocodile's. It is used to connect an electrical cable to a battery or some other component. Functioning much like a spring-loaded clothespin, the clip's tapered, serrated jaws are forced together by a spring to grip an object. When manufactured for electronics testing and evaluation, one jaw of the clip is typically permanently crimped or soldered to a wire, or is bent to form the inner tubular contact of a ~4 mm female banana jack, enabling quick non-permanent connection between a circuit under test and laboratory equipment or to another electrical circuit. The clip is typically covered by a plastic shroud or "boot" to prevent accidental short-circuits.

Aluminum Cube

Leslie's cube is a device used in the measurement or demonstration of the variations in thermal radiation emitted from different surfaces at the same temperature. It was devised in 1804 by John Leslie (1766–1832), a Scottish mathematician and physicist.[1] In the version of the experiment described by John Tyndall in the late 1800s,[2] one of the cube's vertical sides is coated with a layer of gold, another with a layer of silver, a third with a layer of copper, while the fourth side is coated with a varnish of isinglass. The cube is made from a solid block of metal with a central cavity. In use, the cavity was filled with hot water; the entire cube has essentially the same temperature as the water. The thermal detector (on the far right in the figure) showed much greater emission from the side with varnish than from any of the other three sides.

Bar Magnet



Big **Small**

The **North Magnetic Pole** is the wandering point on the surface of Earth's Northern Hemisphere at which the planet's magnetic field points vertically downwards (in other words, if a magnetic compass needle is allowed to rotate about a horizontal axis, it will point straight down). There is only one location where this occurs, near (but distinct from) the Geographic North Pole and the Geomagnetic North Pole.

The North Magnetic Pole moves over time due to magnetic changes in the Earth's core. In 2001, it was determined by the Geological Survey of Canada to lie west of Ellesmere Island in northern Canada at 81.3°N 110.8°W. It was situated at 83.1°N 117.8°W in 2005. In 2009, while still situated within the Canadian Arctic territorial claim at 84.9°N 131.0°W, it was moving toward Russia at between 55 and 60 kilometers (34 and 37 mi) per year. As of 2017, the pole is projected to have moved beyond the Canadian Arctic territorial claim to 86.5°N 172.6°W.

Its southern hemisphere counterpart is the South Magnetic Pole. Since the Earth's magnetic field is not exactly symmetrical, the North and South Magnetic Poles are not antipodal, meaning that a straight line drawn from one to the other does not pass through the geometric center of the Earth. The Earth's North and South Magnetic Poles are also known as **Magnetic Dip Poles**, with reference to the vertical "dip" of the magnetic field lines at those points.

The **South Magnetic Pole** is the wandering point on the Earth's Southern Hemisphere where the field lines are directed vertically upwards. It should not be confused with the **South Geomagnetic Pole** described later.

For historical reasons, the "end" of a freely hanging magnet that points (roughly) north is itself called the "north pole" of the magnet, and the other end, pointing south, is called the magnet's "south pole". Because opposite poles attract, the Earth's South Magnetic Pole is physically actually a magnetic **north** pole (see also North Magnetic Pole § Polarity).

The South Magnetic Pole is constantly shifting due to changes in the Earth's magnetic field. As of 2005 it was calculated to lie at 64°31′48″S 137°51′36″E, placing it off the coast of Antarctica, between Adélie Land and Wilkes Land. In 2015, it lay at 64.28°S 136.59°E (est). That point lies outside the Antarctic Circle. Due to polar drift, the pole is moving northwest by about 10 to 15 kilometres (6 to 9 mi) per year. Its current distance from the actual Geographic South Poleis approximately 2,860 km (1,780 mi). The nearest permanent science station is Dumont d'Urville Station. Wilkes Land contains a large gravitational mass concentration.

Bar Magnet

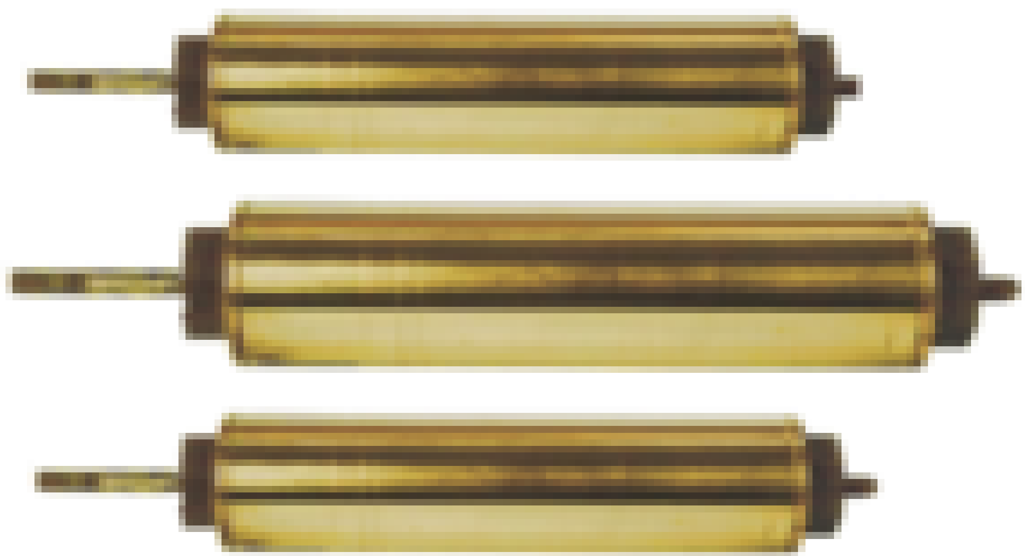
The main function of bar magnets is to pick up small metallic objects like metal shavings or nails and screws, as magnetic stirring rods in laboratory applications, and as magnets on refrigerators. Their most common application is the needle used in compasses.

Brass Ball

Brass balls exhibit good corrosion resistance in environments where fuel oil, gasoline, kerosene, and alcohol are present. Brass is a non-ferrous material. Brass balls provide excellent resistance to corrosion by water. Brass also exhibits excellent electrical conductivity. Abbott manufactures Brass balls for the automotive and electronic industries. Abbott brass balls are also widely used in the security and appliance industries for dip and tilt switches. Brass balls are available in a range of sizes, tolerances and grades of brass.

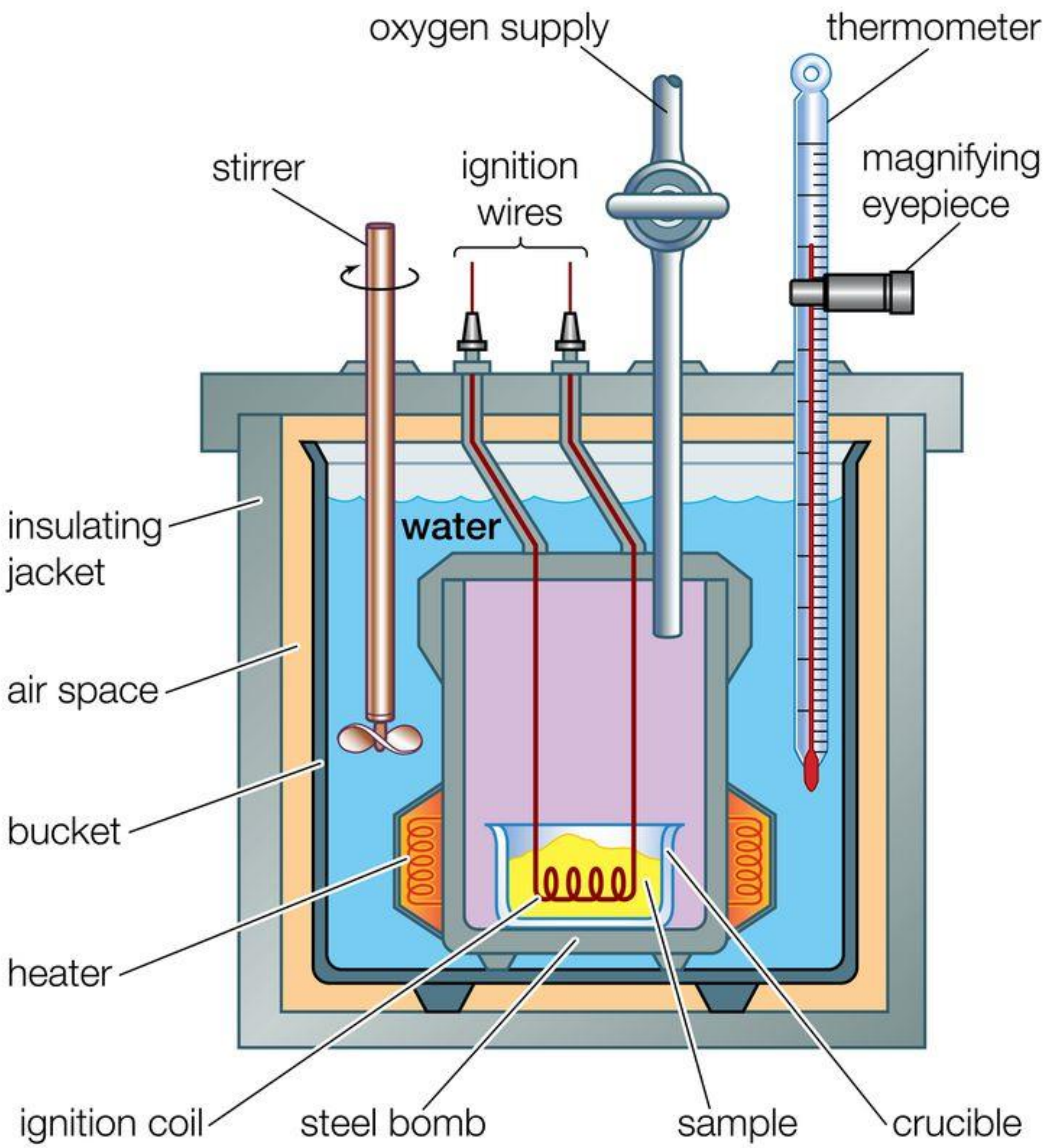
A pair of metallic spheres, each approximately 2 inches in diameter, connected by a string or chain and meant to represent the male testes.

Brass Cylinder



Brass is a metal composed primarily of copper and zinc. Copper is the main component, and brass is usually classified as a copper alloy. The color of brass varies from a dark reddish brown to a light silvery yellow depending on the amount of zinc present; the more zinc, the lighter the color. Brass is stronger and harder than copper, but not as strong or hard as steel. It is easy to form into various shapes, a good conductor of heat, and generally resistant to corrosion from salt water. Because of these properties, brass is used to make pipes and tubes, weather-stripping and other architectural trim pieces, screws, radiator, musical, instruments, and cartridge casing for firearms.

Calorimeter



Oxygen Supply

Oxygen Bomb Calorimeters (also known as Constant Volume Calorimeters) are used for various applications in different industries to calculate the heat released from a combustion reaction (also known as a combustion calorimeter), the calorific value of the sample, be it any solid or liquid substance like coal and oil, is then measured.

Thermometer

A **thermometer** is a device that measures temperature or a temperature gradient. A thermometer has two important elements: (1) a temperature sensor (e.g. the bulb of a mercury-in-glass thermometer or the digital sensor in an infrared thermometer) in which some change occurs with a change in temperature; and (2) some means of converting this change into a numerical value (e.g. the visible scale that is marked on a mercury-in-glass thermometer or the digital readout on an infrared model). Thermometers are widely used in technology and industry to monitor processes, in meteorology, in medicine, and in scientific research.

Magnifying eyepiece

An **eyepiece**, or ocular lens, is a type of lens that is attached to a variety of optical devices such as telescopes and microscopes. The **eyepiece** is placed near the focal point of the objective to **magnify** this image. The amount of **magnification** depends on the focal length of the **eyepiece**.

Stirrer

Stirrer is used in a calorimeter to ensure proper mixing of the contents of the calorimeter. This will help in correct measurement of temperature, and thus the involved heat exchange calculated will have less error.

Ignition Wires

A small electrical spark is used to ignite the sample. The energy produced by the reaction is trapped in the steel bomb and the surrounding water. The temperature increase is measured and, along with the known heat capacity of the **calorimeter**, is used to calculate the energy produced by the reaction.

Insulating Jacket

An insulation jacket is an outer boundary layer used to serve as the primary protective layer that is adhered to a corrosion prone metal surface to prevent its direct contact with corrosion causing agents such as water or other chemicals and/or to provide thermal protection.

Bucket

A water bucket is used to carry water.

Heater

A **heater** is a piece of equipment or a machine, which is used to raise the temperature of something.

Ignition Coil

An ignition coil (also called a spark coil) is an introduction coil in an automobile's **ignition** system that transforms the battery's low voltage to the thousands of volts needed to create an electric spark in the spark plugs to ignite the fuel.

Crucible

A **crucible** is a melting pot used for extremely hot chemical reactions — the **crucible** needs to be melt-proof. Literally, a **crucible** is a vessel used for very hot processes, like fusing metals. Another **meaning** of the word is a very significant and difficult trial or test.

Sample

The measurement of heat using a simple **calorimeter**, like the coffee cup **calorimeter**, is an **example** of constant-pressure **calorimetry**, since the pressure (atmospheric pressure) remains constant during the process. Constant-pressure calorimetry is used in determining the changes in enthalpy occurring in solution.

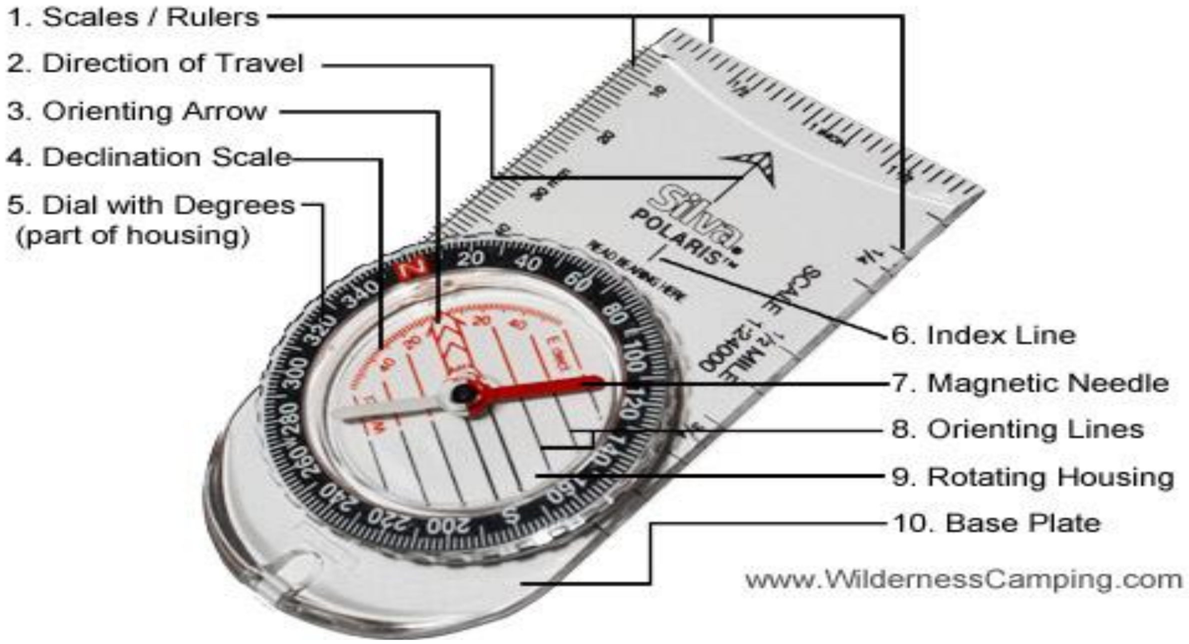
Calorimeter

A **calorimeter** is an object **used** for **calorimetry**, or the process of measuring the heat of chemical reactions or physical changes as well as heat capacity. Differential scanning **calorimeters**, isothermal micro **calorimeters**, titration **calorimeters** and accelerated rate **calorimeters** are among the most common types.

Call Bell

A **call bell** is **used** in hotels or other such facilities where people need to **call** attention to the person in charge to check them in, take their bags, of for any other reasons. It is mostly **used** in restaurants and usually attached to every table in restaurants.

Compass



1. Scales

These help measure distance on a map. If you check the common scale for the maps in your area before buying a compass and can get them to match, this can make map work a bit easier. A common scale for USGS topographic maps is 1:24,000, but this isn't always the case – so check. If your compass and map scales don't match, most orienteering compasses have centimeter and inch scales.

2. Direction of Travel

This is an arrow that is marked on the baseplate. It guides the direction of travel while following a bearing in the field.

3. Orienting Arrow

The orienting arrow is marked on the bottom of the housing and rotates with the housing. It allows the baseplate to be aligned relative to the magnetic needle. To take a basic field bearing, the housing is turned until the orienting arrow and the magnetic needle are aligned. These two elements are then kept in alignment while following the bearing.

4. Declination Scale

Declination is the difference, in angle of degree, between magnetic north and true north. The declination scale makes it easier to adjust for this difference. More advanced orienteering compasses often have an adjustable declination scale that can be set, usually by way of a tiny screw on the bottom of the compass.

5. Dial

The dial is part of the housing and is marked in two degree increments. When the dial is rotated, the orienting arrow, declination scale and orienting lines also rotate as part of the housing.

6. Index Line / bearing marker

This is where a bearing is read. A bearing is an angle relative to true north (true bearing), or magnetic north (magnetic bearing).

7. Magnetic Needle

A magnetic strip of metal that is on a pivot in the center of the housing. The north end is usually painted red, while the other end is often white or black.

8. Orienting Lines

These lines are marked on the bottom of the housing and rotate with it, the same as the orienting arrow. They are also often called meridian lines and north-south lines. When taking a bearing from a map, the orienting lines are aligned with the north-south map grid lines.

9. Housing

A liquid filled capsule that contains the magnetic needle. Orienting lines are etched on the bottom of the housing, and the dial is fixed to the top of the housing. The liquid helps dampen the needle movement, making it easier to get a more accurate reading.

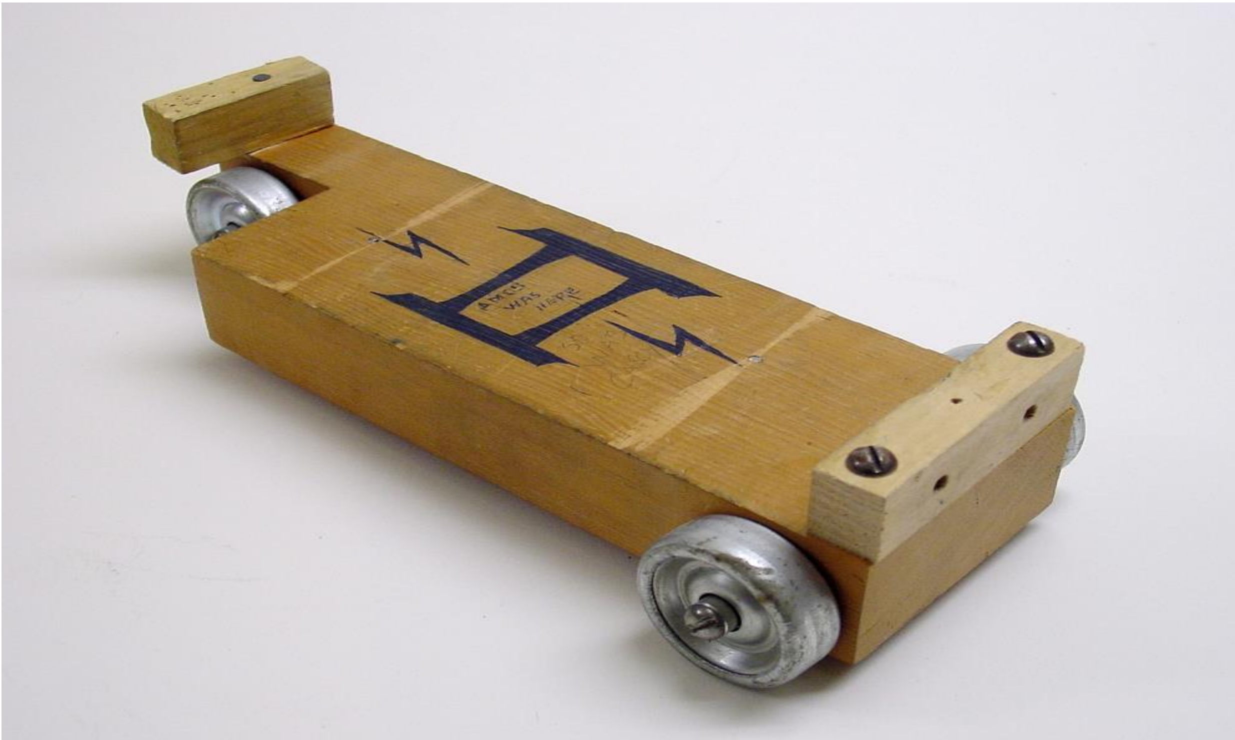
10. Base Plate

The base plate is used to taking bearing on a map. The edge is placed between two points and the orienting lines and dial act as a protractor to give the bearing. The base plate is marked with scales, direction of travel arrow and index line.

Compass

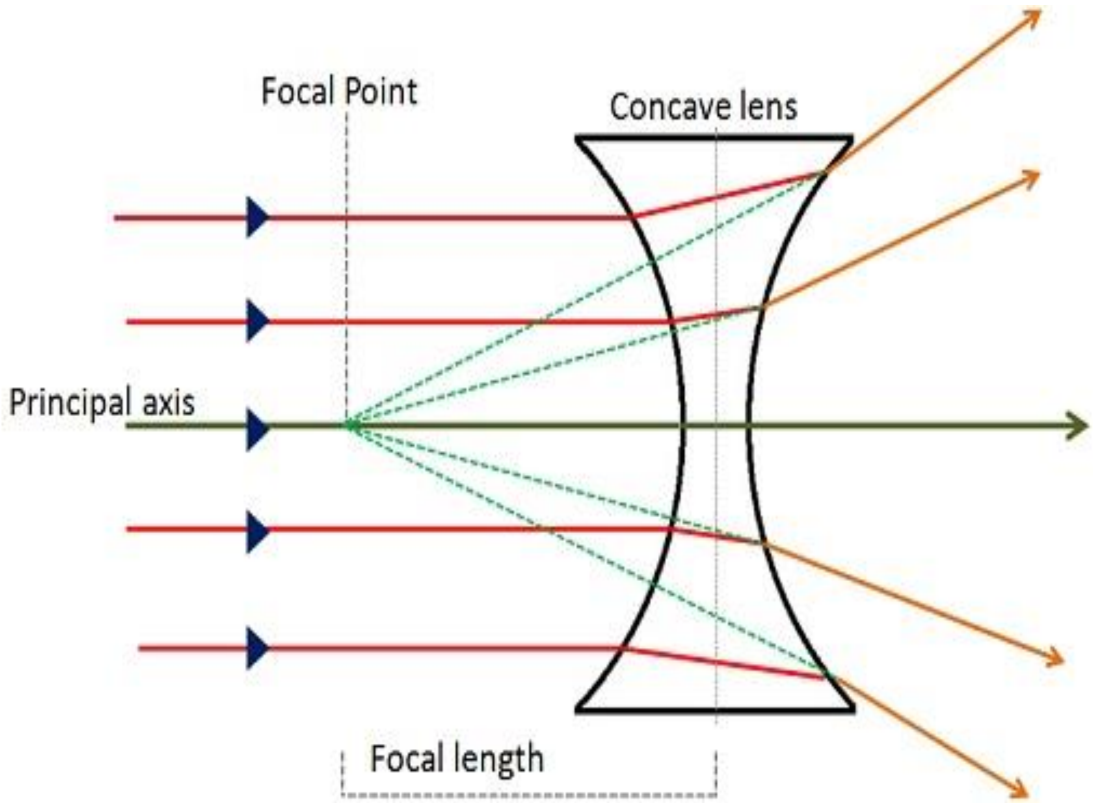
A compass is an instrument used for navigation and orientation that shows direction relative to the geographic cardinal directions. Usually, a diagram called a compass rose shows the directions north, south, east, and west on the compass face as abbreviated initials.

Cart Dynamic



Dynamics carts are used in studies of many different principles of physics including energy, forces, speed, velocity, acceleration, momentum, inertia and Newton’s Laws of motion.

Concave Lens



Concave Lens

Concave lenses represent the type of lenses which are slender at the center than at the borders. The shape of a concave lens is round inward that bends the beams outward, causing divergence of the rays of light falling on it, so it is known as a diverging lens. This also makes the object look smaller and farther than they really are and the image formed is virtual, diminished and upright.

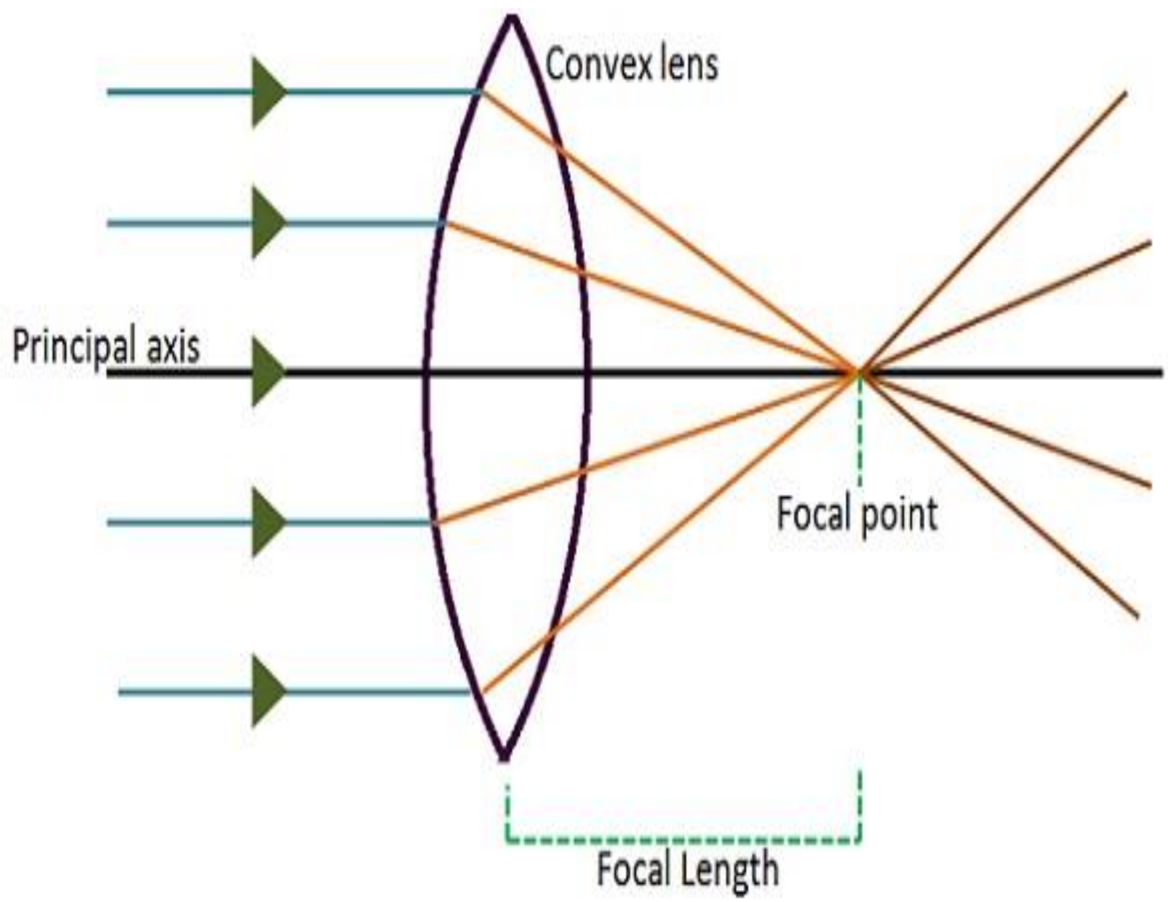
Concave lenses are used to treat a condition called nearsightedness (also called myopia). Concave lenses spread out light before it hits the part of the eye that senses light, causing images to appear much more clearly for people with this condition.

Concave Mirror

Concave Mirror

Concave Mirrors are also called as Convergence mirrors, because concave mirrors cause the incoming parallel rays together and it causes these rays to converge. Concave Mirrors form real and inverted images. The concave mirror will produce magnified image and the object will look much bigger than that of the actual size of the object.

Convex Lens



Convex Lens

Convex Lenses are the lenses that feel massive at the center than at the edges. The curve of the lens is outward, and as the light beams pass through the lens, it refracts them and brings them together, resulting in the convergence of light, due to which it is also named as a converging lens.

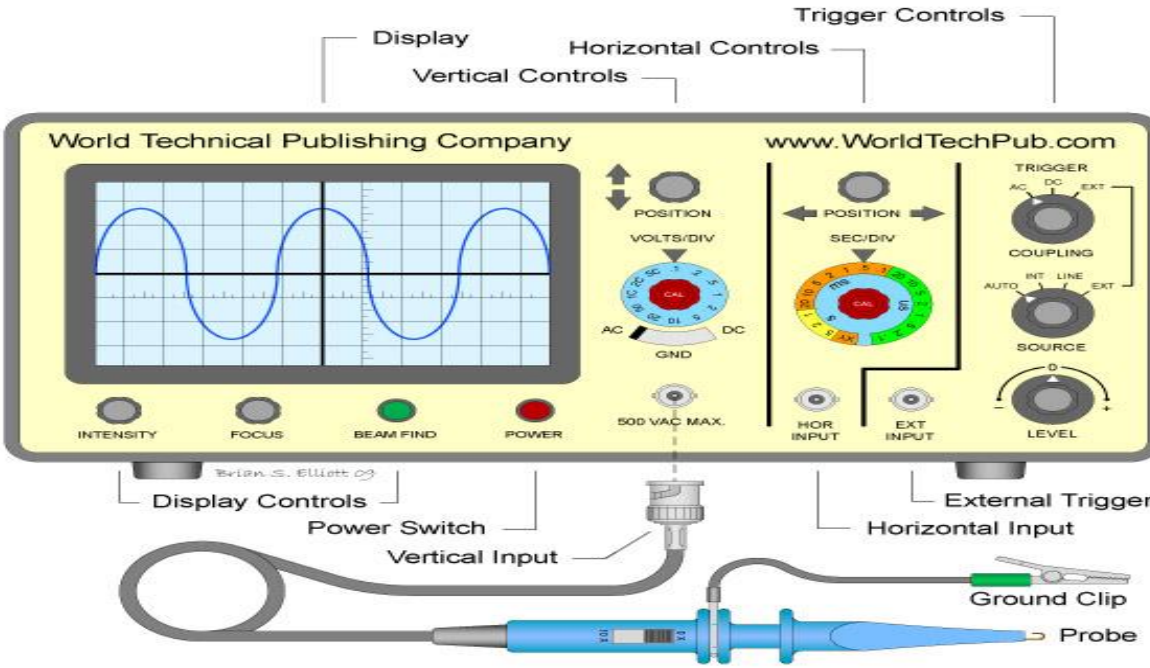
There are various uses of convex lens like in a microscope, magnifying glasses, camera, correction of hypermetropia, etc.

Convex Mirror

Convex Mirror

Convex Mirror are also called as Divergent Mirror, because convex mirror causes the rays of light parallel to its axis to diverge. The image formed by the convex mirror is virtual, erect, diminished and is formed closer to the mirror than the actual object. The object in the image formed by the convex mirror appears much smaller than the actual object.

Digital Storage Analog Oscilloscope



Display

The display is usually a CRT (historically) or LCD panel laid out with horizontal and vertical reference lines called the *graticule*. CRT displays also have controls for focus, intensity, and beam finder.

Vertical Control

The vertical section controls the amplitude of the displayed signal. This section has a volts-per-division (Volts/Div) selector knob, an AC/DC/Ground selector switch, and the vertical (primary) input for the instrument. Additionally, this section is typically equipped with the vertical beam position knob.

Horizontal Control

The horizontal section controls the time base or "sweep" of the instrument. The primary control is the Seconds-per-Division (Sec/Div) selector switch. Also included is a horizontal input for plotting dual X-Y axis signals. The horizontal beam position knob is generally located in this section.

Trigger Control

The trigger section controls the start event of the sweep. The trigger can be set to automatically restart after each sweep, or can be configured to respond to an internal or external event. The principal controls of this section are the source and coupling selector switches, and an external trigger input (EXT Input) and level adjustment.

Probe

The probe connects to any input on the instrument and typically has a resistor of ten times the oscilloscope's input impedance. This results in a .1 (-10X) attenuation factor; this helps to isolate the capacitive load presented by the probe cable from the signal being measured. Some probes have a switch allowing the operator to bypass the resistor when appropriate.

Digital Storage Analog Oscilloscope

A digital storage oscilloscope (often abbreviated DSO) is an oscilloscope which stores and analyses the signal digitally rather than using analog techniques. It is now the most common type of oscilloscope in use because of the advanced trigger, storage, display and measurement features which it typically provides.

The input analogue signal is sampled and then converted into a digital record of the amplitude of the signal at each sample time. The sampling frequency should be not less than the NY Quist rate to avoid aliasing. These digital values are then turned back into an analogue signal for display on a cathode ray tube (CRT), or transformed as needed for the various possible types of output-liquid crystal display, chart recorder, plotter or network interface.

Digital oscilloscopes usually analyze waveforms and provide numerical values as well as visual displays. These values typically include averages, maxima and minima, root mean square (RMS) and frequencies. They may be used to capture transient signals when operated in a single sweep mode, without the brightness and writing speed limitations of an analog storage oscilloscope.

Donut Shape Magnet

Ring magnets are usually used in science experiments such as a demonstration of magnetic repulsion where the magnetic rings are threaded through a wooden pole. When the same poles of the magnets face each other they won't touch.

Ring magnets are also occasionally used in medicine. For example, some studies have shown that they neutralize Implantable cardioverter-defibrillators (ICD) if they malfunction. ICDs correct the heart's rhythm with an electric shock if it becomes irregular. Sometimes the ICD malfunctions and can apply more shocks than are needed, which can be fatal for the patient unless a ring magnet is applied to the patient's chest.

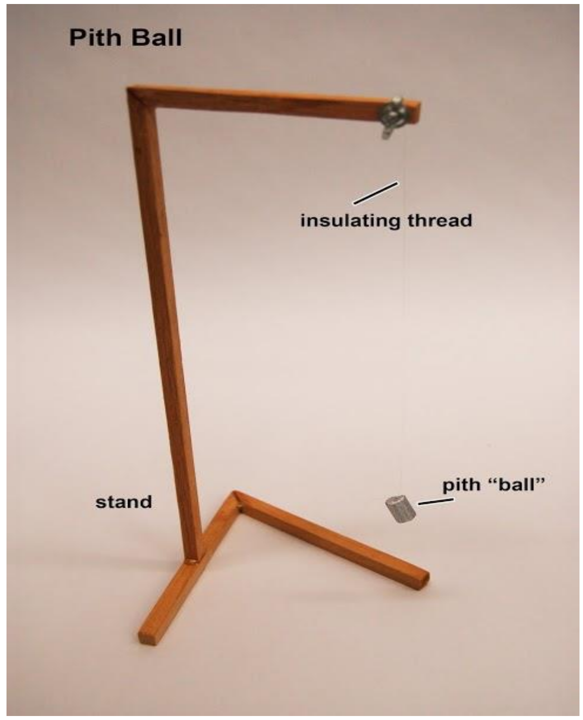
Electrical Tape

Electrical Tape

Electrical tape (or insulating tape) is a type of pressure-sensitive tape used to insulate electrical wires and other materials that conduct electricity. It can be made of many plastics, but vinyl is most popular, as it stretches well and gives an effective and long lasting insulation.

The primary tapes used in electrical applications are vinyl, rubber, mastic, and varnished cambric. Electricians generally use only black tape for insulation purposes. The other colors are used to indicate the voltage level and phase of the wire. (In fact, the colored tape is referred to as phasing tape.) This is done on large wire which is available only in black insulation. When wires are phased, a ring of tape is placed on each end near the termination so that the purpose of the wire is obvious.

Electroscope Pith-ball



Insulating Thread

An **insulating** material used in bulk to wrap electrical cables or other equipment is called **insulation**.

Stand

Have or maintain an upright position, supported by one's feet, (of an object, building, or settlement) be situated in a particular.

This pith-ball electroscope

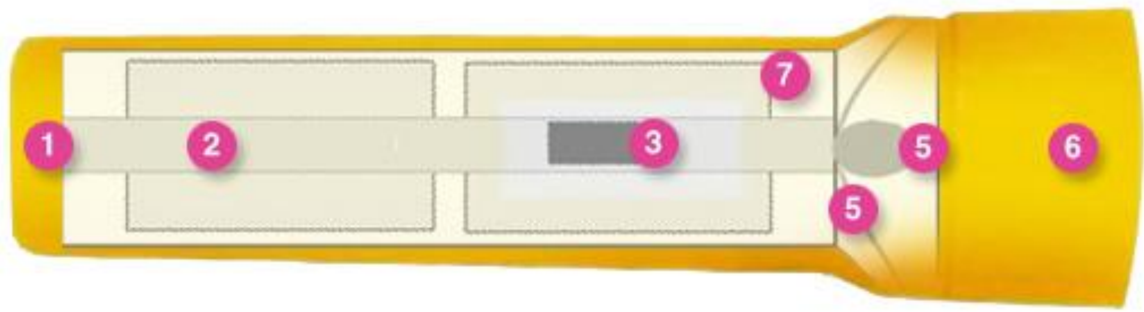
Is used to detect the presence of a static electricity charge. The two lightweight "pith" balls suspended from the strings are attracted to objects with a static electric charge. The pith balls can also be charged by touching them to an object with a static electric charge. He pith-ball electroscope, invented by British schoolmaster and physicist John Canton in 1754, consists of one or two small balls of a lightweight nonconductive substance, a spongy plant material called pith, suspended by linen threads. Modern electroscopes frequently use plastic balls and the ball is suspended by a silk thread from the hook of an insulated stand. In order to test the presence of a charge on an object, the object is brought near to the uncharged pith ball. If the object is charged, the ball will be attracted to it and move toward it.

The attraction occurs because of induced polarization of the atoms inside the pith ball. All matter consists of electrically charged particles located close together; each atom consists of a positively charged nucleus with a cloud of negatively charged electrons surrounding it. The pith is a non-conductor, so the electrons in the ball are bound to atoms of the pith and are not free to leave the atoms and move about in the ball, but they can move a little within the atoms. See diagram at right. If, for example, a positively charged object (B) is brought near the pith ball (A), the negative electrons (blue minus signs) in each atom (yellow ovals) will be attracted and move slightly toward the side of the atom nearer the object. The positively charged nuclei (red plus signs) will be repelled and will move slightly away. Since the negative charges in the pith ball are now nearer the object than the positive charges (C), their attraction is greater than the repulsion of the positive charges, resulting in a net attractive force. This separation of charge is microscopic, but since there are so many atoms, the tiny forces add up to a large enough force to move a light pith ball.

The pith ball can be charged by touching it to a charged object, so some of the charges on the surface of the charged object move to the surface of the ball. Then the ball can be used to distinguish the polarity of charge on other objects because it will be repelled by objects charged with the same polarity or sign it has, but attracted to charges of the opposite polarity.

Often the electroscope will have a pair of suspended pith balls. This allows one to tell at a glance whether the pith balls are charged. If one of the pith balls is touched to a charged object, charging it, the second one will be attracted and touch it, communicating some of the charge to the surface of the second ball. Now both balls have the same polarity charge, so they repel each other. They hang in an inverted 'V' shape with the balls spread apart. The distance between the balls will give a rough idea of the magnitude of the charge.

Flashlight



1 - Case

The tube that houses the parts of the flashlight, including the batteries and lamp (light-bulb).

2 - Contacts

A very thin spring or strip of metal (usually copper or brass) that is located throughout the flashlight, making the electrical connection between the various parts – the batteries, the lamp, and the switch. These parts conduct electricity and "hook everything up," completing the circuit.

3 - **Switch**

The flow of the electricity is activated when you push the switch into the ON position, giving you light. The flow of electricity is broken when the switch is pushed into the OFF position, thus turning off the light.

4 - Reflector

A plastic part, coated with a shiny aluminium layer that rests around the lamp (light bulb) layer and redirects the light rays from the lamp to allow a steady light beam, which is the light you see emitting from the flashlight.

5 - Lamp

The light source in a flashlight. In most flashlights, the lamp is either a tungsten filament (incandescent bulb) or a light emitting diode (solid state bulb), also known as an LED. The tungsten filament or LED glows when electricity flows through it, thus producing visible light. Tungsten is a natural element and the tungsten filament is a very thin wire. Tungsten lamps must be replacing when the tungsten filament breaks. An LED contains a very small semiconductor (diode) that is encapsulated in epoxy and this part emits light when electricity flows through it. LED's om flashlights are widely considered "unbreakable" and not replaced a lifetime lamp.

6 - Lens

The lens is the clear, plastic part you see on the front of the flashlight that protects the lamp, since the lamp is made if glass and can easily be broken.

7 - Batteries

When activated, the batteries are the power source for your flashlight.

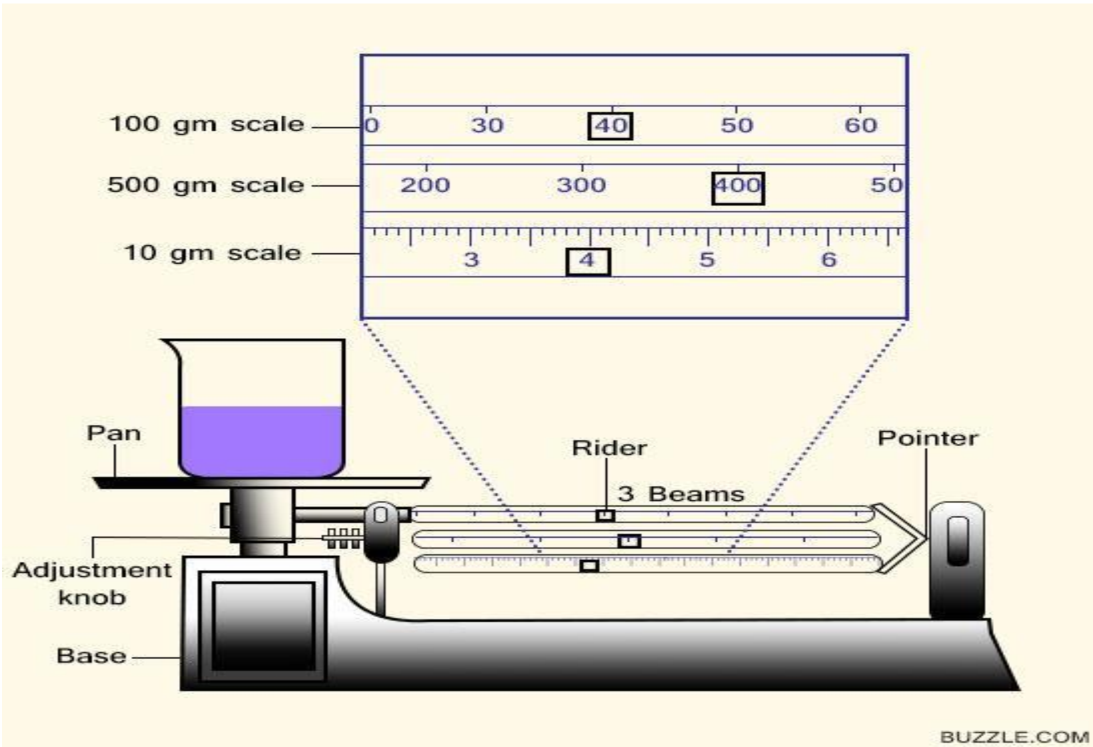
Flashlight

A flashlight (more often called a torch outside North America) is a portable hand-held electric light. The source of the light is usually an incandescent light bulb (lamp) or light-emitting diode (LED). A typical flashlight consists of the light source mounted in a reflector, a transparent cover (sometimes combined with a lens) to protect the light source and reflector, a battery, and a switch. These are supported and protected by a case.

The invention of the dry cell and miniature incandescent electric lamps made the first battery-powered flashlights possible around 1899. Today, flashlights use mostly incandescent lamps or light-emitting diodes and run on disposable or rechargeable batteries. Some are powered by the user turning a crank or shaking the lamp, and some have solar panels to recharge a battery.

In addition to the general-purpose hand-held flashlight, many forms have been adapted for special uses. Head or helmet-mounted flashlights designed for miners and campers leave the hands free. Some flashlights can be used underwater or in flammable atmospheres. Flashlights are used as a light source when in a place with no power or during power outages.

Platform Beam Balance



Base and Pan

The solid metal platform which supports the rest of the parts of the triple beam balance is known as the base. It provides stability to the apparatus while the measurements are being taken. The pan is located on one side of the apparatus and rests on top of the base. It is where the object to be weighed is placed.

Adjustment Knob and Pointer

The adjustment knob is present on the left hand side of the apparatus, beneath the pan. It can be turned to attain greater accuracy while measuring the weight of an object using the triple beam balance. The pointer is present on the right hand side of the triple beam balance. By default, it points to zero on a labelled scale. Together the pointer and the scale are used to ascertain when the beams are at their resting position and when the correct mass of an object has been found.

Triple Beams and Riders

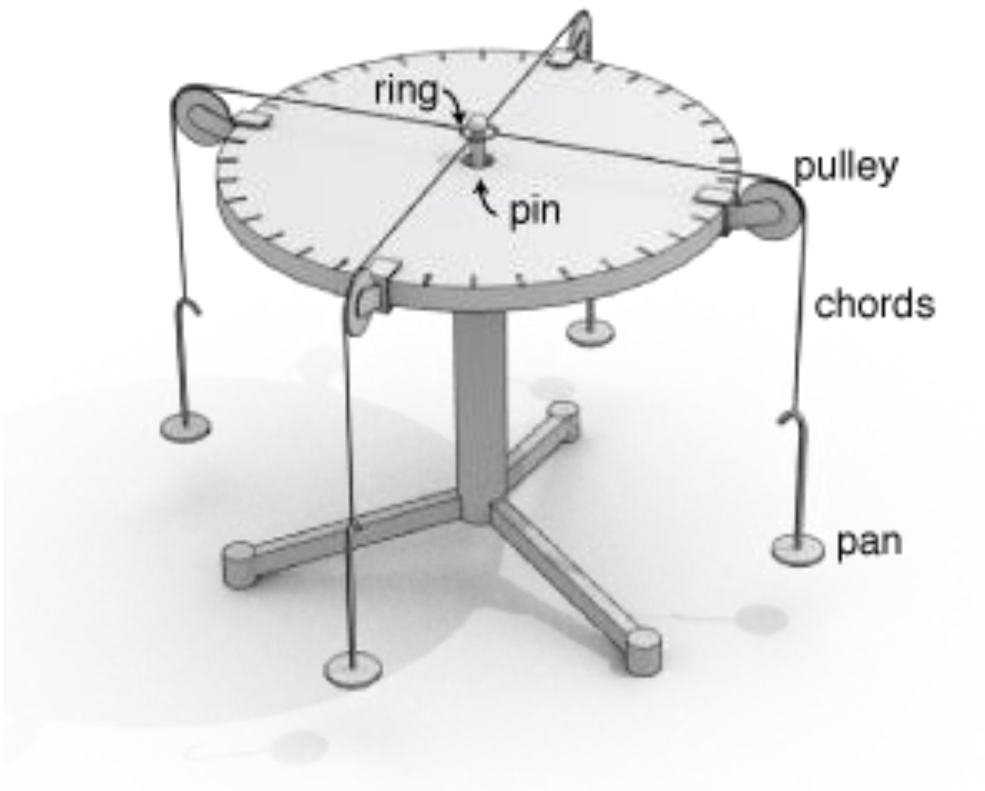
As the name of this apparatus implies, the triple beam balance comprises three beams which are individually used to determine the mass of an object. Each of these three beams has a weighted rider on it, which the user can slide along the length of the beam to determine the object's mass. When positioned such that the pan is on the left hand side and the scale and pointer to the right, the beam which is located on the front has a 10 gm. scale and a 0.1 gm. rider on it.

Platform Beam Balance

This platform balance is a triple beam poise carriage balance. This type of balance was patented in 1932. To determine the weight of the object placed in the weighing pan, the weights, known as poise, must be moved along the beams for hundreds, tens and units (grams). The beams are horizontal arms to which the pan is fixed. On the opposite side, they are joined together and end in a single arrow. The pan and the arrow oscillate from top to bottom until they stabilize, indicating that the beams are perfectly horizontal. At this moment, the position of the poise indicates the weight of the object placed on the pan. This balance can weigh objects up to 610 grams.

The **triple beam balance** is an instrument used to measure mass very precisely. The device has reading error of +/- 0.05 gram. The name refers to the three beams including the middle beam which is the largest size, the front beam which is the medium size, and the far beam which is the smallest size. The difference in size of the beams indicate the difference in weights and reading scale that each beam carry. The reading scale can be enumerated that the middle beam reads in 100 gram increments, the front beam can read from 0 to 10 grams, and the far beam can read in 10 gram increments. The triple beam balance can be used to measure mass directly from the objects, find mass by difference for liquid, and measure out a substance.

Force table metal



The **force table** is an apparatus that allows the experimental determination of the resultant of force vectors. The rim of the circular table is calibrated in degrees. Forces are applied to a ring around a metal peg at the center of the table by means of strings.

Galvanometer

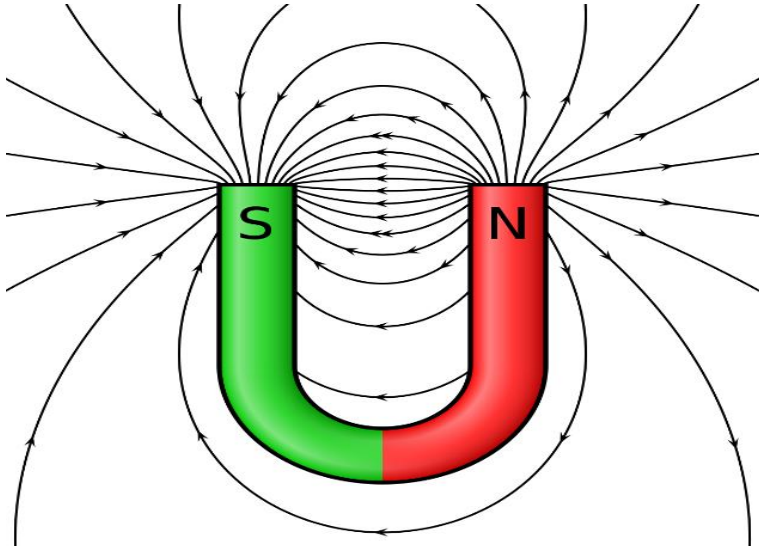
A **galvanometer** is an electromechanical instrument used for detecting and indicating an electric current. A galvanometer works as an actuator, by producing a rotary deflection (of a "pointer"), in response to electric current flowing through a coil in a constant magnetic field. Early galvanometers were not calibrated, but their later developments were used as measuring instruments, called ammeters, to measure the current flowing through an electric circuit.

Hanging Pulley

A **pulley** is a wheel on an axle or shaft that is designed to support movement and change of direction of a taut cable or belt, or transfer of power between the shaft and cable or belt. In the case of a pulley supported by a frame or shell that does not transfer power to a shaft, but is used to guide the cable or exert a force, the supporting shell is called a block, and the pulley may be called a sheave.

A pulley may have a groove or grooves between flanges around its circumference to locate the cable or belt. The drive element of a pulley system can be a rope, cable, belt, or chain.

Horse Shoe Magnet



Horse Shoe Magnet

A horseshoe magnet is a magnet made in the shape of a horseshoe. The magnet has two magnetic poles close together. This shape creates a strong magnetic field between the poles.

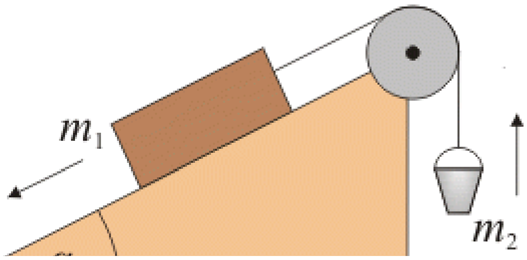
It is one type of permanent magnet, meaning that it stays magnetized, as opposed to an electromagnet, the magnetic field of which can be started and stopped.

The purpose of a horseshoe magnet's shape is to place the poles as close together as possible. The total magnetic flux is the same, but the field is greater, as it is spread over a smaller volume. A horseshoe is used, rather than a simpler C-shaped magnet, which is also used, because this places the maximum amount of magnetized material into the magnet, for given dimensions around the poles. A particularly large horseshoe magnet is U-shaped with long parallel sides, rather than the classical horseshoe.

Electromagnets are also constructed as horseshoes. They may have either one or two coils wound on them. As most coils are wound by machine, the coil formers are straight. They are thus usually placed as two coils, one on each side of a U-shaped horseshoe.

A horseshoe magnet can be created by bending a bar magnet into a horseshoe shape.

Inclined Plane with Pulley



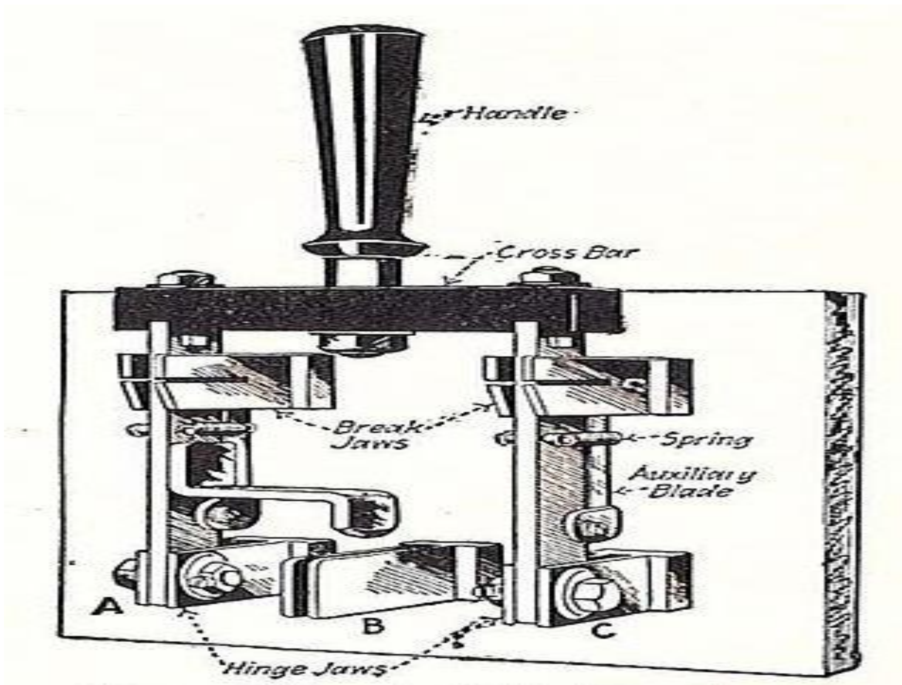
An **inclined plane**, also known as a **ramp**, is a flat supporting surface tilted at an angle, with one end higher than the other, used as an aid for raising or lowering a load. The inclined plane is one of the six classical simple machines defined by Renaissance scientists. Inclined planes are widely used to move heavy loads over vertical obstacles; examples vary from a ramp used to load goods into a truck, to a person walking up a pedestrian ramp, to an automobile or railroad train climbing a grade.

Moving an object up an inclined plane requires less force than lifting it straight up, at a cost of an increase in the distance moved. The mechanical advantage of an inclined plane, the factor by which the force is reduced, is equal to the ratio of the length of the sloped surface to the height it spans. Due to conservation of energy, the same amount of mechanical energy (work) is required to lift a given object by a given vertical distance, disregarding losses from friction, but the inclined plane allows the same work to be done with a smaller force exerted over a greater distance.

The angle of friction, also sometimes called the angle of repose, is the maximum angle at which a load can rest motionless on an inclined plane due to friction, without sliding down. This angle is equal to the arctangent of the coefficient of static friction μ_s between the surfaces.

Two other simple machines are often considered to be derived from the inclined plane. The wedge can be considered a moving inclined plane or two inclined planes connected at the base. The screw consists of a narrow inclined plane wrapped around a cylinder.

Knife Switch



Knife Switch

A knife switch is a type of switch used to control the flow of electricity in a circuit. It is composed of a hinge which allows a metal lever, or knife, to be lifted from or inserted into a slot or jaw. The hinge and jaw are both fixed to an insulated base, and the knife has an insulated handle to grip at one end. Current flows through the switch when the knife is pushed into the jaw. Knife switches can take several forms, including single throw, in which the "knife" engages with only a single slot, and double throw, in which the knife hinge is placed between two slots and can engage with either one. Also, multiple knives may be attached to a single handle and can be used to activate more than one circuit simultaneously.

Though used commonly in the past, knife switches are now rare, finding use largely in science experiments where the position of the switch may be plainly seen in demonstration. The knife switch is extremely simple in construction and use, but its exposed metal parts present a great risk of electric shock, and the switch is subject to arcing when opened at higher voltages, which poses a further risk of shock or burns to the operator and can cause fires or explosions under certain conditions.

Open knife switches were supplanted by safety switches with current carrying contacts inside a metal enclosure which can only be opened by switching off the power. In modern applications, automatic switches (such as contactors or relays), and manual switches such as circuit breakers are used. These devices use a snap action mechanism which opens the switch contacts rapidly, and feature an arc chute where the arc caused by opening the switch is quenched. These devices also prevent injury due to accidental contact, as all of the current carrying metal parts of the switch are hidden within or surrounded by insulating guards.