

**KELVINSIDE ACADEMY 2<sup>ND</sup> YEAR PHYSICS COURSE EXAM SUMMARY****ARCHIMEDES (287- 212 BC)**Principle of Buoyancy

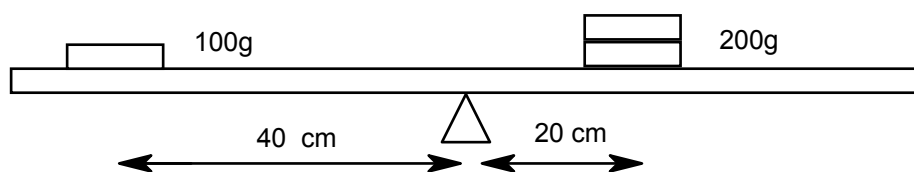
This principle is stated as follows:- "When a body is weighed in air, and then in water, it appears to lose weight. The loss in weight is equal to the weight of water displaced".

Units of mass = kg or g, Units of Weight = N, Units of Volume = ml, cm<sup>3</sup> or m<sup>3</sup>

N.B. 1ml of water = 1g, 1000 g = 1 Kg, 1 Kg weighs 10 N

Principle of Levers

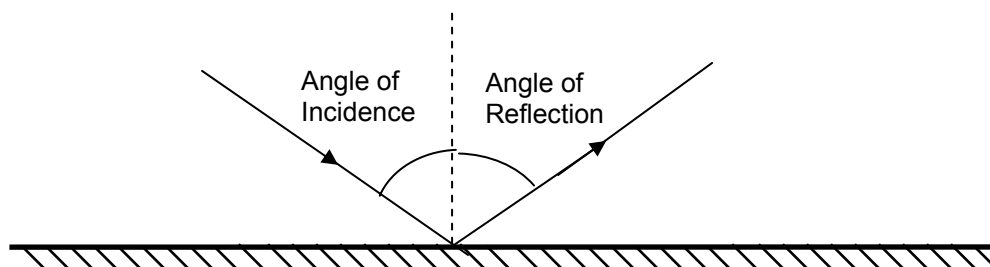
The weight (or mass) multiplied by the distance is the same for each side of the lever, so that the system shown below will be balanced. This is, of course, provided that the meter rule itself is placed on the fulcrum (pivot) at the 50 cm mark so that its own weight is balanced on each side.



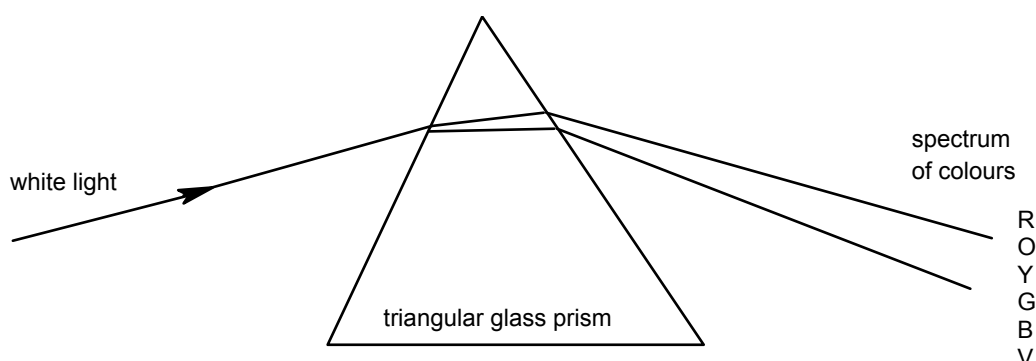
This can be written down mathematically as  $M_1 \times d_1 = M_2 \times d_2$ . If only one of the four values is unknown then it can be calculated.

**CHRISTIAAN HUYGENS (1629 – 1695)**

Both the 'wave' theory and the 'corpuscular' theory suggest the same results in the reflection of light where the light ray will always reflect off a surface at the same angle that it hits the surface. But note that the angles which are generally measured in Physics are not those between the ray and the mirror, but between the rays and the 'normal' which is a small imaginary line between the rays at right angles to the surface of the mirror.

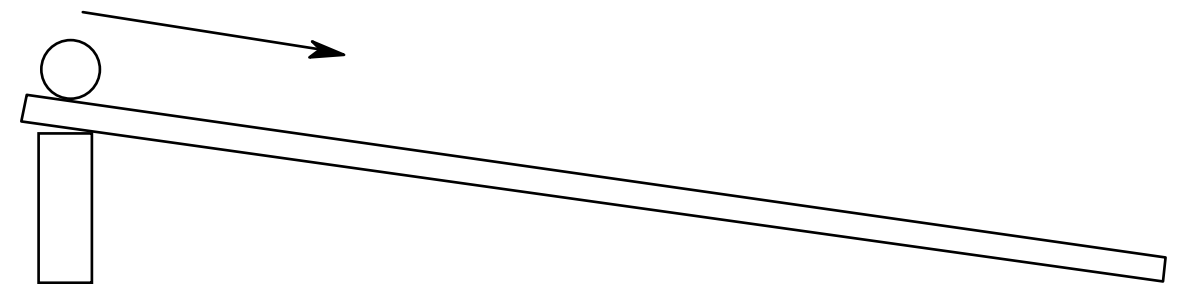


Law of Reflection is 'Angle of Incidence is equal to the angle of Reflection'

**Sir ISAAC NEWTON (1643-1727)**Principle of Dispersion of Light into its Constituent Colours

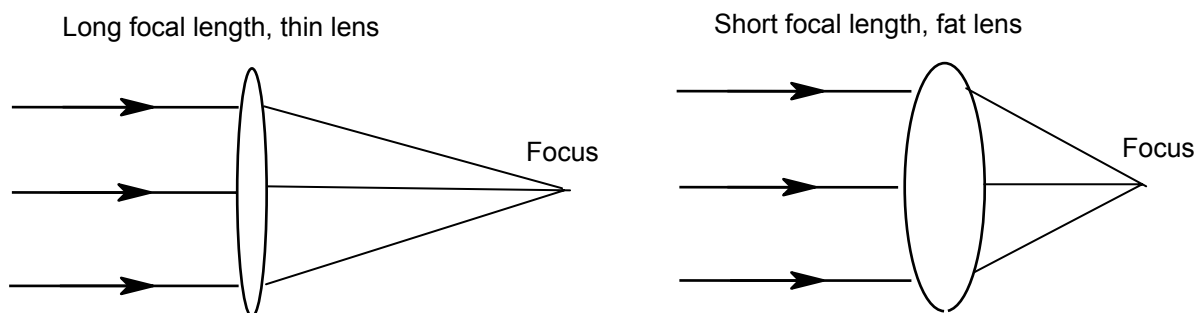
**GALILEO GALILEI (1564 - 1642)****Motion of Falling Bodies**

Galileo observed the motion of a rolling ball down an inclined plane. He found that a rolling ball will accelerate down an inclined plane so that it will cover increasing distances in each unit of time.



The speed of any moving body = distance/time. If the speed of a body is varying for any reason then the 'average' speed = Total distance/Total time

Galileo then studied the motion of bodies falling directly downwards under gravity, and also the Physics of the Pendulum. The Period of a Pendulum is the time for one complete swing backwards and forwards. The length of the pendulum is the only 'parameter' that has any noticeable effect on the 'period'.

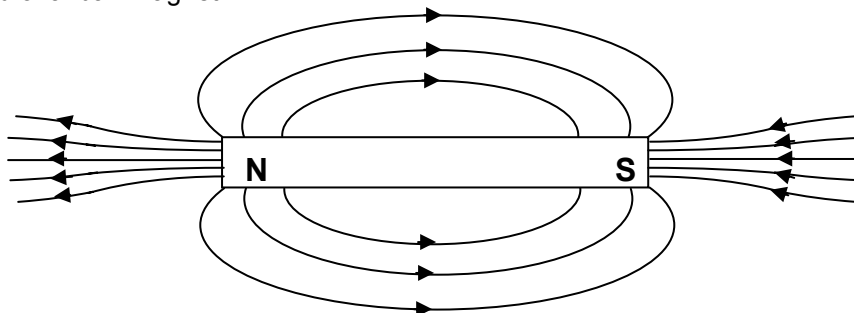
**Telescopes and Lenses**

The 'focal length' of a convex lens can be found by producing a sharp image of a window on the opposite wall of the room. The image is 'real', inverted and diminished. The focal length is the distance between the lens and the image.



**HANS OERSTED (1777-1851)**

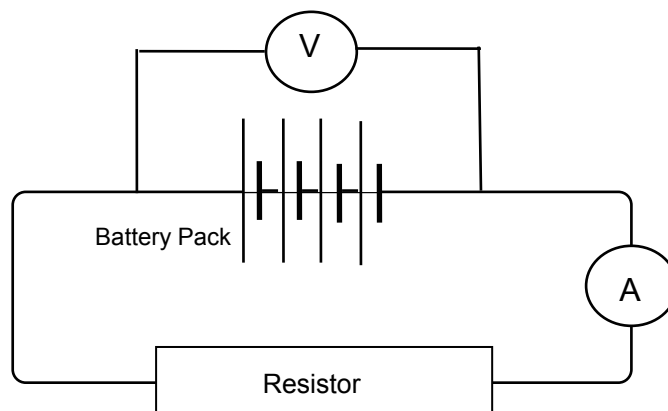
Magnetic effect of an electric current. Magnetic 'fields' of various types of magnets.  
e.g. magnetic field of a 'bar' magnet:-

**ANDRÉ AMPÉRE (1775-1836)**

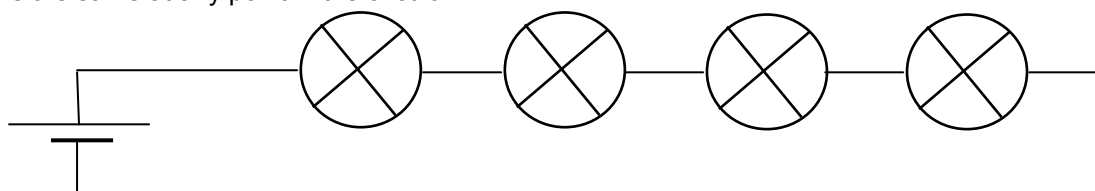
Made the first electromagnet or 'solenoid' and established the factors which affect the strength of an electromagnet. The factors which affect the strength are the current and the number of coils, as well as the material from which the 'core' is made. This later led to the development of the electric motor.

**GEORG SIMON OHM (1789-1854)**

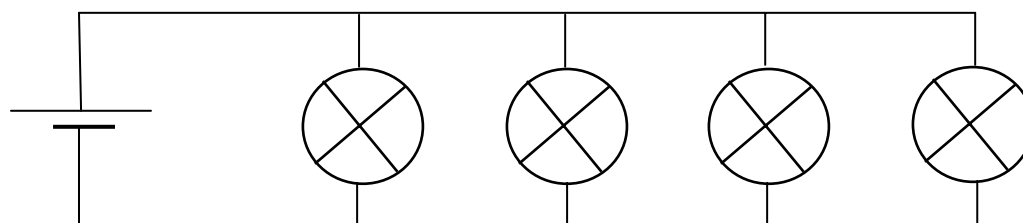
Using a circuit like the one shown here, Ohm established the law connecting current, voltage and resistance.  $V = I \times R$

**Series circuit**

Current is the same at any point in the circuit

**Parallel Circuit:-**

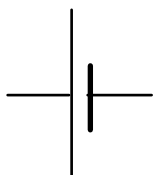
Current drawn from supply is the sum of all the currents in each component

**MICHAEL FARADAY (1791-1867)**

Faraday discovered the Laws of Electromagnetic Induction and invented the Dynamo. All the mains electricity which we use today is generated using large dynamos. He found that the voltage generated depended upon:-

The speed of movement of the magnet, The strength of the magnet, The number of coils of wire

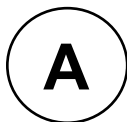
Circuit Symbols



Cell (long terminal is +)



Battery (long terminal is +)



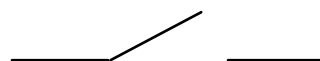
Ammeter



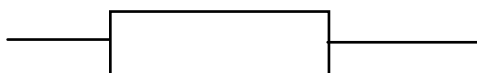
Voltmeter



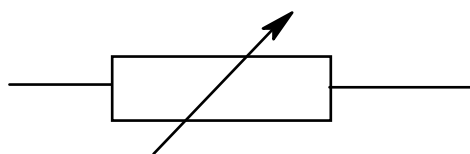
Ohm-meter



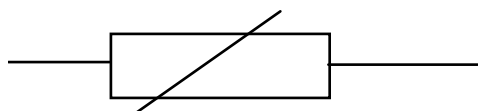
Switch



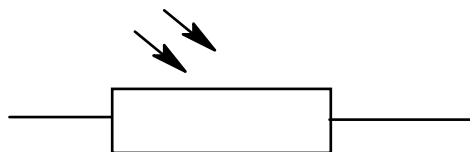
Resistor



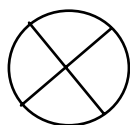
Variable resistor (or Rheostat)



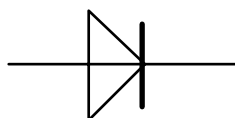
Thermistor



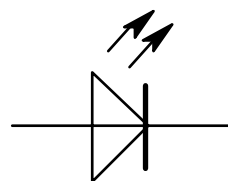
Light dependent resistor LDR



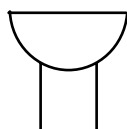
Bulb



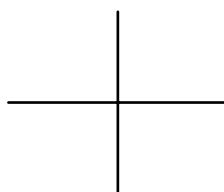
Semiconductor diode



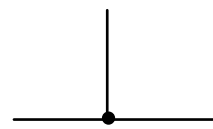
Light emitting diode LED



Buzzer



Wires crossing - not connected



Wires connected