

Learning Objectives for CE Physics: 2018 + (Final Version)

Year 7:

You should know and understand:

Working Scientifically			
How to plan an experiment to investigate a Hypothesis			
What the aim of an experiment is			
That a variable is a factor that may affect the results on an experiment			
The variable you have chosen to investigate how it affects the results of an experiment is called the independent variable . This is what you are changing .			
The variable that will be affected by changing the independent/input variable is called the dependent variable . This is what you measure & record			
A Fair Test is when you keep all variables the same/fixed (except the independent variable that you are deliberately changing). The variables you keep the same are called the control variables . If you change more than one variable at a time it is not a fair test.			
Results are more reliable if you repeat the experiment and average the results. Repeating does not make results more precise, it can make them more accurate			

Units & Density			
units and abbreviations for mass time length area and volume			
the measurement of the mass and volume of regularly-shaped solids			
Finding the volume of liquids using a measuring cylinder			
Finding the volume of irregularly shaped solids (using the displacement of water to find a volume)			
the relationship between density, mass and volume; how to use this for simple quantitative work			
that the unit of density is kg/m^3 or g/cm^3			

Energy			
the significance of the Law of Conservation of Energy			
that although energy is always conserved, it may be dissipated, reducing its availability as a resource			
that energy can exist in many different forms			
the form in which energy is stored in a particular situation			
how to describe the energy transformation taking place in simple situations			
that energy can be measured and that the unit of energy is the joule			
Thermal Energy			
Particle theory and energy changes in the 3 states of matter			
Conduction – how some materials are conductors and others are insulators.			
Convection – what convection is and real world examples			
Radiation – what black body radiation is. Real world examples			
Insulation – how insulation works			
How houses are insulated.			
Energy Resources			
that electricity is generated using a variety of energy resources			

about the variety of energy resources			
the distinction between renewable and non-renewable resources			
that a renewable resource is one which can be replenished within a lifetime;			
some of the advantages and disadvantages of renewable and non-renewable resources			
the role of the Sun as the ultimate source of the energy			
that a variety of processes is used to generate electricity			

Space			
that the weight of an object on Earth is the result of the gravitational attraction between its mass and that of the Earth			
that there is a gravitational force of attraction between any two masses; that this force causes bodies to fall towards the centre of the Earth; that the weight of a body is the pull of gravity on it			
how the movement of the Earth causes the apparent daily and annual movement of the Sun and other stars			
the relative positions of the Earth, Sun and planets in the solar system			
that the Earth is one of several planets which orbit the Sun,;			
the reasons for the changes causing night and day			
seasons			
and eclipses of the Sun and Moon			
the concept of a moon as a satellite, as shown by our Moon and the moons of other planets			
that the solar system is part of the Milky Way galaxy, and that the Universe contains many such groups of stars or galaxies			
about the scale of astronomical distances			
about the movements of planets around the Sun and to relate these to gravitational forces			
that it is gravitational forces which keep the Moon in orbit round the Earth and planets in orbit round the Sun			
that the Sun and other stars are light sources and that the planets and other bodies are seen by reflected light			
why the planets and our Moon are visible even though they are not light sources			
about the use of artificial satellites and probes to observe the Earth and to explore the solar system			

Light			
that light travels in a straight line at a finite speed in a uniform medium			
How to draw light ray diagrams			
that non-luminous objects are seen because light scattered from them enters the eye			
The law of reflection			
The difference between regular and diffuse reflection			
that, on a qualitative basis, light changes direction when it reaches the boundary between two different materials and that this phenomenon is called refraction			
that white light can be dispersed to give a range of colours			
how a prism disperses white light and that a similar effect occurs naturally in a rainbow			
Basic mixing of light colours			

Sound			
that light can travel through a vacuum but sound cannot,			
that light travels very much faster than sound			
that sound travels through solids, liquids and air, but not through a vacuum; that an event observed from a distance is seen before it is heard			
the relationship between the pitch of a sound and the frequency of the vibration causing it			
that increasing frequency increases pitch			
that increasing amplitude increases the loudness of a sound			
that sound causes the eardrum to vibrate and that different people have different audible ranges			
that loud sounds can cause temporary or permanent damage to hearing			

Speed			
relationship between speed, distance and time;			
how to use this for simple quantitative work			
about the timing of moving bodies to measure speed;			
the concept of constant speed			
The concept of speeding up and of slowing down, without a formal definition of acceleration			

Year 8

Forces			
that the unit of force is the newton and that forces can be measured using a force meter (newton meter)			
that there is a gravitational force of attraction between any two masses that this force causes bodies to fall towards the centre of the Earth;			
that the weight of a body is the pull of gravity on it			
that unbalanced forces change the speed or direction of objects and that balanced forces produce no change in the movement of an object			
about the effects of forces on an object; that forces can act in different directions			
about the force of friction, including air resistance (drag), and its applications			
Effects of streamlining and its advantages			

Moments			
that forces can cause objects to turn about a pivot			
about the use of levers to change direction and magnitude of a force and their use in simple machines, e.g. crowbars, pliers, scissors			
the principle of moments			
that the unit of a moment is a newton metre (or newton centimetre)			
its application to situations involving one pivot			
simple quantitative examples involving moments about a single pivot;			
Pressure			
the quantitative relationship between force, area and pressure			
that the unit of pressure is N/m ² or N/cm ²			
apply knowledge of pressure in every day calculations			
how to use this for simple quantitative work			

Springs			
about experiments and calculations with springs and combinations of springs			

Electricity			
that a battery or cell transforms chemical energy into electrical energy			
electrical energy is converted into other forms in electrical components			
that the current in a series circuit depends on the number of cells and the number and nature of other components			
and that current is not 'used up' by components			
that the unit of current is the ampere(amp)			
an ammeter and that it should be connected in series in the circuit			
Knowledge of resistors qualitative only			
That volt meters are connected in parallel			
how to design and construct series and parallel circuits,.			
about parallel and series circuits, involving cells, lamps, switches (push button, SPST, reed switches)			
resistors, variable resistors, motors, buzzers, LDRs, LEDs, fuses			
AND and OR circuits using switches			
about truth tables for these			

Magnetism			
about magnetic fields as regions of space where magnetic materials experience forces			
that like magnetic poles repel and unlike magnetic poles attract			
and that both poles will attract unmagnetised iron			
that the Earth has a magnetic field			
that a freely suspended bar magnet will align itself north-south			
the terms north-seeking and south-seeking poles			
that lines showing the direction of the field should have arrows pointing away from the north-seeking pole			
that repulsion by a known magnet is the only true test for another magnet			
that a current in a coil produces a magnetic field pattern similar to that of a bar magnet			
how to use plotting compasses and/or iron filings to show that current in a coil produces a magnetic field			
how to construct a simple electromagnet using an iron core and insulated wire; how to use relays			
Factors that affect the strength of an electro magnet			