



Year 9 Syllabus in a nutshell

PHYSICS





Year 9 Syllabus in a nutshell – Physics

Topic	Learning Objective
Conduction and Convection	<p>Pupils should be able to explain conduction in terms of vibration of atoms and movement of 'free' electrons in metals through it by conduction.</p> <p>Pupils should be able to explain convection in terms of movement of fluids due to their density differences</p>
Radiation	<p>Pupils should be able to explain heat transfer by infrared radiation</p> <p>Pupils should be able to state that dull, black surfaces absorb and emit IR better than shiny, bright surfaces</p>
Evaporation	<p>Pupils should be able to explain heat loss by evaporation in terms of more energetic surface particles escaping and carrying energy away from the liquid</p> <p>Pupils should also be able to identify surface area and air speed as factors that affect the rate of evaporation</p>
Energy Resources and their Uses	<p>Know the definitions of non-renewable and renewable energy resources and be able to tell which resources are which</p> <p>Know that non-renewable energy resources include fossil fuels (coal, oil and gas) and nuclear fuels (uranium and plutonium)</p> <p>Know that renewable energy sources include wind, water, waves, tides, hydroelectricity, the Sun (solar), geothermal and bio-fuel</p> <p>Know that energy resources are used for electricity generation, transportation and heating</p> <p>Be able to compare how non-renewable and renewable energy resources are used in transport and heating</p>
Wind, Solar and Geothermal	<p>Be able to compare the ways that wind power, solar cells and geothermal power are used for electricity generation</p> <p>Describe the environmental issues that come from using different energy resources</p> <p>Understand why certain energy resources are more reliable than others</p>
Hydroelectric, Waves and Tides	<p>Be able to compare the ways that hydroelectric power stations, wave power and tidal power are used for electricity generation</p> <p>Describe the environmental issues that come from using different energy resources</p> <p>Understand why certain energy resources are more reliable than others</p>
Bio-fuels and Non-Renewables	<p>Be able to compare the ways that bio-fuels, fossil fuels and nuclear fuels are used for electricity generation</p> <p>Describe the environmental issues that come from using different energy resources</p>



	Understand why certain energy resources are more reliable than others
Trends in Energy Resource Use	Understand how the ways we use energy resources have changed over time Understand that although scientists have identified environmental issues with energy resources, other factors can limit our ability to deal with these issues
Energy Stores and Transfers	Know that an object or group of objects can be considered a system Know that when a system changes, energy is transferred between stores Be able to describe changes in the way energy is stored when energy is transferred in changing systems Know that energy is transferred between stores when work is done by a force or by a current flowing Know the principle of conservation of energy Know and be able to give examples to show that, whenever energy is transferred, some energy will be transferred to non-useful stores (dissipated). This energy is said to be 'wasted' Be able to describe and give examples of the energy transfers that take place in a closed system, where there is no net change in energy
Energy and Power	Know that power is the rate of transfer of energy, and be able to carry out calculations using power, energy and time.
The life cycle of stars	Know that stars (such as the Sun) are formed when dust and gas (a nebula) are pulled together by gravity Understand how the gravitational attraction causes the temperature to increase enough for hydrogen fusion Know that the outward force of fusion reactions balances the gravitational attraction of the star, leading to a stable period called the main sequence Know the life cycle of stars of similar size to the Sun and stars much bigger than the Sun Understand how fusion reactions in main sequence stars and supernovae have created all natural elements, and that supernovae have distributed them throughout the universe
The Solar System and Orbits	Know that our solar system contains the Sun, the eight planets and dwarf planets which orbit the Sun, moons which orbit planets and artificial satellites Know the similarities and differences between planets, moons and artificial satellites Know that our solar system is located within the (much larger) Milky Way galaxy Know that the force which keeps objects in the solar system in circular orbits is provided by gravity Understand that acceleration towards the centre of a circular orbit is caused by gravity acting in that direction and this acceleration can cause a change in the velocity but not the speed of an orbiting object Understand why if the speed of a stable orbit changes, the radius must change too
Working Scientifically	Pupils should be able to use the 'Working Scientifically' terms in descriptions of practical investigations.