

Science – Year 9 Overview

	Term 1	Term 2	Term 3	Term 4	Term 5	Term 6	Careers
Year 9	Forces	Waves	Systems 2	Bonding & Molecules	Energy	Forces	
	<p>Forces are pushes or pulls.</p> <p>Forces can deform objects through stretching or squashing.</p> <p>There is a linear relationship between force and extension; Hooke's Law is a special case.</p> <p>Work done = force x distance.</p> <p>Power is a measure of the energy transferred over time – it is also a measure of the work done over time.</p>	<p>Photosynthesis takes in light, which is a wave. Plant cells contain chlorophyll which appears green because green light is reflected, and the other 6 colours of white light are absorbed.</p> <p>Sound is a different type of wave, which can also be reflected.</p>	<p>The musculo-skeletal system contains our muscles and our bones. This system provides support, protection and allows us to move through muscle contraction. Muscle contraction occurs because respiration in muscle cells releases energy.</p> <p>The circulatory system allows blood, containing glucose and oxygen, to circulate around the body to every muscle cell.</p>	<p>Respiration produces Water which contains non-metals joined by covalent bonds where electrons are shared.</p> <p>Another type of bonding is metallic bonding which occurs in metals.</p> <p>Metals and non-metals can be mixed (rather than bonded) together to form alloys, composites and ceramics.</p>	<p>Respiration is a chemical reaction. The rate of a chemical reaction can be increased by heating it.</p> <p>Heating is one example of transferring energy. The other ways of transferring energy are mechanical, electrical and radiation.</p>	<p>Acceleration and deceleration involve a change in velocity over time. Falling objects reach terminal velocity when the resultant forces are zero meaning they move at a constant speed in a constant direction.</p> <p>Vehicles decelerate on the road by braking and will eventually come to a stop. There are many factors that affect their thinking distance and braking distance, and therefore their overall stopping distance.</p>	<p>Term 1: A career as an Embryologist.</p> <p>When studying inheritance and how a sperm cell fertilises an egg cell, students will look at how embryologists are involved in fertility treatment and reproductive research.</p> <p>Term 3: A career as a physiotherapist.</p> <p>When studying systems 2 and the musculo-skeletal system, students will look at how a physiotherapist helps to restore movement and function when someone is affected by injury, illness or disability.</p> <p>Term 4: A career in the oil and plastic industry.</p> <p>When studying organic chemistry and crude oil, students will look at the many careers that exist in the oil and plastic industry.</p>
	Inheritance	Cells 1	Cells 2	Organic Chemistry	Electricity & Magnetism		
<p>DNA mutations can be passed between generations via Natural Selection. This leads to variation within, and between, species. Some species are less able to compete and can become extinct.</p>	<p>Photosynthesis requires water; plants get this from the soil via the process of Osmosis. Water moves through the Xylem tissue to the palisade cells in the leaves. Plants contain other cells in their roots called meristem cells which are stem cells.</p>	<p>Respiration requires glucose and oxygen as the reactants. When there is not enough Oxygen available, anaerobic respiration happens instead. In humans, this produces lactic acid in the muscles; in yeast this produces</p>	<p>Crude Oil is a mixture of hydrocarbons and is extracted from the Earth. It is separated into smaller hydrocarbons each of which is a polymer. This is done using fractional distillation.</p>	<p>Energy can be transferred electrically, in a circuit.</p> <p>Recall: power = energy transferred / time. Power can also be calculated by using: Power = potential difference x current.</p>			

<p>Fossils provide evidence of this.</p>	<p>Stem cells in humans are found in adult bone marrow or embryos. Human stem cells can differentiate into any kind of human cell, for example:</p> <ul style="list-style-type: none"> • Sperm and Egg Cells. • Muscle Cells. • Red Blood Cells. 	<p>ethanol – this can be utilised in the industrial process of fermentation.</p>		<p>This is used to calculate domestic fuel bills. When a current passes through a wire it creates a magnetic field around the wire. Putting a magnetic core inside a coil of wire creates an electromagnet. The strength of electromagnets can be changed; electromagnets can also be used to create motors.</p>		
<p>Natural World</p>	<p>Systems 1</p>	<p>Atoms & Elements</p>	<p>Reactions & Energy</p>			
<p>Different species occupy different places in a food chain; some species act as predators which affects the population size of their prey.</p> <p>'Abiotic' factors also affect species populations.</p> <p>Food chains begin with a photosynthesising species, which can be affected by light intensity and the presence of chlorophyll.</p>	<p>The normal process of fertilisation involves a sperm cell fusing with an egg cell. There are numerous ways in which contraception prevents this from happening. Some of these are hormonal, others are non-hormonal.</p>	<p>Respiration uses Oxygen. Oxygen atoms all contain 8 protons and 8 electrons which orbit the nucleus. Electrons orbit in shells and fill the shell closest to the nucleus first. Molecular formulae contain symbols and numbers. This information can be used to calculate the total mass of the molecule.</p>	<p>Respiration is a chemical reaction. In reactions, atoms cannot be created or destroyed. The rate of any reaction can be increased or decreased. Respiration is irreversible but some reactions are reversible. Other reactions are determined by the reactivity of the elements/compounds involved and the displacement that occurs.</p>			