

Yearly overview

Subject: Year 8 Science

Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
<p>Prior knowledge: Cells: Identify the principal features of a cheek cell and describe their functions. Multicellular organisms are composed of cells which are organised into tissues, organs and systems to carry out life processes. There are many types of cell. Each has a different structure or feature so it can do a specific job.</p> <p>Separating Mixtures: A pure substance consists of only one type of element or compound and has a fixed melting and boiling point. Mixtures may be separated due to differences in their physical properties. The method chosen to separate a mixture depends on which</p>	<p>Prior knowledge: Plant reproduction: Use models to evaluate the features of various types of seed dispersal. Plants have adaptations to disperse seeds using wind, water or animals. Plants reproduce sexually to produce seeds, which are formed following fertilisation in the ovary.</p> <p>Facts: Flowers contain the plant's reproductive organs. Pollen can be carried by the wind, pollinating insects or other animals.</p> <p>Acids and Alkalis: Devise an enquiry to compare how well indigestion remedies work. The pH of a</p>	<p>Prior knowledge: Human Reproduction: Relate advice to pregnant women to ideas about transfer of substances to the embryo. The menstrual cycle prepares the female for pregnancy and stops if the egg is fertilised by a sperm. The developing foetus relies on the mother to provide it with oxygen and nutrients, to remove waste and protect it against harmful substances.</p> <p>Facts: The menstrual cycle lasts approximately 28 days. If an egg is fertilised it settles into the uterus lining.</p> <p>Universe: Relate observations of changing day length to an appropriate model of the solar system</p>	<p>Prior knowledge: Breathing: Investigate a claim linking height to lung volume. In gas exchange, oxygen and carbon dioxide move between alveoli and the blood. Oxygen is transported to cells for aerobic respiration and carbon dioxide, a waste product of respiration, is removed from the body. Breathing occurs through the action of muscles in the ribcage and diaphragm. The amount of oxygen required by body cells determines the rate of breathing.</p> <p>Periodic table: Sort elements using chemical data and relate this to their position in the periodic table</p>	<p>Prior knowledge: Evolution: Review the evidence for theories about how a particular species went extinct. Natural selection is a theory that explains how species evolve and why extinction occurs. Biodiversity is vital to maintaining populations. Within a species variation helps against environment changes, avoiding extinction. Within an ecosystem, having many different species ensures resources are available for other populations, like humans.</p> <p>Chemical Energy: Investigate a phenomenon that relies on an exothermic or endothermic reaction.</p>	<p>Prior knowledge:</p>

<p>physical properties of the individual substances are different.</p> <p>Skill: Use techniques to separate mixtures.</p> <p>Fact Air, fruit juice, sea water and milk are mixtures.</p> <p>Liquids have different boiling points.</p> <p>Gravity: Explain the way in which an astronaut's weight varies on a journey to the moon</p> <p>Mass and weight are different but related.</p> <p>Mass: is a property of the object; weight depends upon mass but also on gravitational field strength. Every object exerts a gravitational force on every other object. The force increases with mass and decreases with distance. Gravity holds planets and moons in orbit around larger bodies.</p>	<p>solution depends on the strength of the acid: strong acids have lower pH values than weak acids.</p> <p>Mixing an acid and alkali produces a chemical reaction, neutralisation, forming a chemical called a salt and water.</p> <p>Facts: Acids have a pH below 7, neutral solutions have a pH of 7, alkalis have a pH above 7. Acids and alkalis can be corrosive or irritant and require safe handling. Hydrochloric, sulfuric and nitric acid are strong acids. Acetic and citric acid are weak acids.</p> <p>Current: Compare and explain current flow in different parts of a parallel circuit</p> <p>Current is a movement of electrons and is the same everywhere in a series circuit. Current</p>	<p>The solar system can be modelled as planets rotating on tilted axes while orbiting the Sun, moons orbiting planets and sunlight spreading out and being reflected. This explains day and year length, seasons and the visibility of objects from Earth. Our solar system is a tiny part of a galaxy, one of many billions in the Universe. Light takes minutes to reach Earth from the Sun, four years from our nearest star and billions of years from other galaxies.</p> <p>Energy transfer and Contact forces: Explain the energy transfers in a hand-crank torch. Investigate factors that affect the size of frictional or drag forces. We can describe how jobs get done using an energy model where energy is transferred from</p>	<p>The elements in a group all react in a similar way and sometimes show a pattern in reactivity. As you go down a group and across a period the elements show patterns in physical properties.</p> <p>Facts: Metals are generally found on the left side of the table, non-metals on the right. Group 1 contains reactive metals called alkali metals. Group 7 contains non-metals called halogens. Group 0 contains unreactive gases called noble gases.</p> <p>Work: Explain how an electric motor raising a weight is doing work</p> <p>Work is done and energy transferred when a force moves an object. The bigger the force or distance, the greater the work.</p> <p>Machines make work</p>	<p>During a chemical reaction bonds are broken (requiring energy) and new bonds formed (releasing energy). If the energy released is greater than the energy required, the reaction is exothermic. If the reverse, it is endothermic.</p> <p>Light: Use ray diagrams to model how light passes through lenses and transparent materials. When a light ray meets a different medium, some of it is absorbed and some reflected. For a mirror, the angle of incidence equals the angle of reflection. The ray model can describe the formation of an image in a mirror and how objects appear different colours. When light enters a denser medium it bends towards the normal; when it enters</p>	
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<p>Skill: Use the formula: weight (N) = mass (kg) x gravitational field strength (N/kg).</p> <p>Fact: g on Earth = 10 N/kg. On the moon it is 1.6 N/kg.</p>	<p>divides between loops in a parallel circuit, combines when loops meet, lights up bulbs and makes components work. Around a charged object, the electric field affects other charged objects, causing them to be attracted or repelled. The field strength decreases with distance.</p> <p>Fact: Two similarly charged objects repel, two differently charged objects attract.</p>	<p>one store at the start to another at the end. When energy is transferred, the total is conserved, but some energy is dissipated, reducing the useful energy. When the resultant force on an object is zero, it is in equilibrium and does not move, or remains at constant speed in a straight line. One effect of a force is to change an object's form, causing it to be stretched or compressed. In some materials, the change is proportional to the force applied.</p> <p>Skill: Sketch the forces acting on an object, and label their size and direction.</p>	<p>easier by reducing the force needed. Levers and pulleys do this by increasing the distance moved, and wheels reduce friction.</p>	<p>a less dense medium it bends away from the normal. Refraction through lenses and prisms can be described using a ray diagram as a model.</p> <p>Skill: Construct ray diagrams to show how light reflects off mirrors, forms images and refracts.</p> <p>Facts: Light travels at 300 million metres per second in a vacuum. Different colours of light have different frequencies.</p>	
Term 1 knowledge	Term 2 knowledge	Term 3 knowledge	Term 4 knowledge	Term 5 knowledge	Term 6 knowledge
<p>This term: Breathing: Investigate a claim linking height to lung volume. In gas</p>	<p>This term: Respiration: Use data from investigating fermentation with</p>	<p>This term: Evolution: Review the evidence for theories about how a particular species went extinct</p>	<p>This term: Digestion: Evaluate how well a model represents key features of the digestive system</p>	<p>This term: Inheritance: Model the inheritance of a specific trait and explore the variation in the offspring</p>	<p>This term:</p>

<p>exchange, oxygen and carbon dioxide move between alveoli and the blood. Oxygen is transported to cells for aerobic respiration and carbon dioxide, a waste product of respiration, is removed from the body. Breathing occurs through the action of muscles in the ribcage and diaphragm. The amount of oxygen required by body cells determines the rate of breathing.</p> <p>Periodic Table: Sort elements using chemical data and relate this to their position in the periodic table The elements in a group all react in a similar way and sometimes show a pattern in reactivity. As you go down a group and across a period the elements show patterns in physical properties.</p> <p>Facts:</p>	<p>yeast to explore respiration. Respiration is a series of chemical reactions, in cells, that breaks down glucose to provide energy and form new molecules. Most living things use aerobic respiration but switch to anaerobic respiration, which provides less energy, when oxygen is unavailable.</p> <p>Fact: Yeast fermentation is used in brewing and breadmaking.</p> <p>Chemical Energy: Investigate a phenomenon that relies on an exothermic or endothermic reaction During a chemical reaction bonds are broken (requiring energy) and new bonds formed (releasing energy). If the energy released is greater than the energy required, the reaction is</p>	<p>Natural selection is a theory that explains how species evolve and why extinction occurs. Biodiversity is vital to maintaining populations. Within a species variation helps against environment changes, avoiding extinction. Within an ecosystem, having many different species ensures resources are available for other populations, like humans.</p> <p>Climate and Earth's Resources: Investigate the contribution that natural and human chemical processes make to our carbon dioxide emissions. Predict the method used for extracting metal based on its position in the reactivity series. Carbon is recycled through natural processes in the atmosphere, ecosystems, oceans</p>	<p>The body needs a balanced diet with carbohydrates, lipids, proteins, vitamins, minerals, dietary fibre and water, for its cells' energy, growth and maintenance. Organs of the digestive system are adapted to break large food molecules into small ones which can travel in the blood to cells and are used for life processes.</p> <p>Facts: Iron is a mineral important for red blood cells. Calcium is a mineral needed for strong teeth and bones. Vitamins and minerals are needed in small amounts to keep the body healthy.</p> <p>Elements: Compare the properties of elements with the properties of a compound formed from them. Most substances are not pure elements, but</p>	<p>produced Inherited characteristics are the result of genetic information, in the form of sections of DNA called genes, being transferred from parents to offspring during reproduction. Chromosomes are long pieces of DNA which contain many genes. Gametes, carrying half the total number of chromosomes of each parent, combine during fertilisation.</p> <p>Facts: The DNA of every individual is different, except for identical twins. There is more than one version of each gene e.g. different blood groups.</p> <p>Types of Reaction: Investigate changes in mass for chemical and physical processes Combustion is a reaction with oxygen in which energy is transferred to the surroundings as heat</p>	
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<p>Metals are generally found on the left side of the table, non-metals on the right. Group 1 contains reactive metals called alkali metals. Group 7 contains non-metals called halogens. Group 0 contains unreactive gases called noble gases.</p> <p>Contact Forces: Investigate factors that affect the size of frictional or drag forces. When the resultant force on an object is zero, it is in equilibrium and does not move, or remains at constant speed in a straight line. One effect of a force is to change an object's form, causing it to be stretched or compressed. In some materials, the change is proportional to the force applied.</p> <p>Skill: Sketch the forces acting on an object,</p>	<p>exothermic. If the reverse, it is endothermic.</p> <p>Magnetism and Electromagnetism: Explore the magnetic field pattern around different types or combinations of magnets. Investigate ways of varying strength of an electromagnet</p> <p>Magnetic materials, electromagnets and the Earth create magnetic fields which can be described by drawing field lines to show the strength and direction. The stronger the magnet, and the smaller the distance from it, the greater the force a magnetic object in the field experiences.</p> <p>Facts: Two 'like' magnetic poles repel and two 'unlike' magnetic poles attract. Field lines flow from the north-seeking pole to the south-seeking pole. An</p>	<p>and the Earth's crust (such as photosynthesis and respiration) as well as human activities (burning fuels). Greenhouse gases reduce the amount of energy lost from the Earth through radiation and therefore, the temperature has been rising as the concentration of those gases has risen. Scientists have evidence that global warming caused by human activity is causing changes in climate.</p> <p>Facts: Methane and carbon dioxide are greenhouse gases. Earth's atmosphere contains around 78% nitrogen, 21% oxygen, <1 % carbon dioxide, plus small amounts of other gases. There is only a certain quantity of any resource on Earth, so</p>	<p>compounds or mixtures containing atoms of different elements. They have different properties to the elements they contain.</p> <p>Skills: Use particle diagrams to classify a substance as an element, mixture or compound and as molecules or atoms. Name simple compounds using rules: change non-metal to -ide; mono, di, tri prefixes; and symbols of hydroxide, nitrate, sulfate and carbonate.</p> <p>Fact: The symbols of hydrogen, oxygen, nitrogen, carbon, hydrogen, iron, zinc, copper, sulfur, aluminium, iodine, sodium, potassium and magnesium.</p> <p>Heating and Cooling: Investigate how to prevent heat loss by conduction, convection and</p>	<p>and light. Thermal decomposition is a reaction where a single reactant is broken down into simpler products by heating. Chemical changes can be described by a model where atoms and molecules in reactants rearrange to make the products and the total number of atoms is conserved.</p> <p>Skill: Write word equations from information about chemical reactions.</p> <p>Wave effects and Properties: Relate the impact of different types of waves on living cells to their frequency and the energy carried by the wave. Use the wave model to explain observations of the reflection, absorption and transmission of waves. When a wave travels through a substance, particles</p>	
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<p>and label their size and direction.</p>	<p>electromagnet uses the principle that a current through a wire causes a magnetic field. Its strength depends on the current, the core and the number of coils in the solenoid.</p> <p>Fact: The magnetic field of an electromagnet decreases in strength with distance.</p>	<p>the faster it is extracted, the sooner it will run out. Recycling reduces the need to extract resources.</p> <p>Most metals are found combined with other elements, as a compound, in ores. The more reactive a metal, the more difficult it is to separate it from its compound. Carbon displaces less reactive metals, while electrolysis is needed for more reactive metals.</p> <p>Work and Pressure: Explain how an electric motor raising a weight is doing work. Investigate how pressure from your foot onto the ground varies with different footwear. Work is done and energy transferred when a force moves an object. The bigger the force or distance, the greater the work. Machines make</p>	<p>radiation. The thermal energy of an object depends upon its mass, temperature and what it's made of. When there is a temperature difference, energy transfers from the hotter to the cooler object. Thermal energy is transferred through different pathways, by particles in conduction and convection, and by radiation.</p>	<p>move to and fro. Energy is transferred in the direction of movement of the wave. Waves of higher amplitude or higher frequency transfer more energy. A physical model of a transverse wave demonstrates it moves from place to place, while the material it travels through does not, and describes the properties of speed, wavelength and reflection.</p>	
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<p>Future knowledge: Digestion: Evaluate how well a model represents key</p>	<p>Future knowledge: GCSE Biology Types of Reaction: Investigate changes in</p>	<p>Future knowledge: Inheritance: Model the inheritance of a specific trait and</p>	<p>Future knowledge: GCSE Biology GCSE Chemistry GCSE Physics</p>	<p>Future knowledge: GCSE Biology GCSE Chemistry GCSE Physics</p>	<p>Future knowledge:</p>

<p>features of the digestive system The body needs a balanced diet with carbohydrates, lipids, proteins, vitamins, minerals, dietary fibre and water, for its cells' energy, growth and maintenance. Organs of the digestive system are adapted to break large food molecules into small ones which can travel in the blood to cells and are used for life processes.</p> <p>Facts: Iron is a mineral important for red blood cells. Calcium is a mineral needed for strong teeth and bones. Vitamins and minerals are needed in small amounts to keep the body healthy.</p> <p>Elements: Compare the properties of elements with the properties of a compound formed from them. Most</p>	<p>mass for chemical and physical processes Combustion is a reaction with oxygen in which energy is transferred to the surroundings as heat and light. Thermal decomposition is a reaction where a single reactant is broken down into simpler products by heating. Chemical changes can be described by a model where atoms and molecules in reactants rearrange to make the products and the total number of atoms is conserved.</p> <p>Skill: Write word equations from information about chemical reactions. GCSE Physics.</p>	<p>explore the variation in the offspring produced. Inherited characteristics are the result of genetic information, in the form of sections of DNA called genes, being transferred from parents to offspring during reproduction. Chromosomes are long pieces of DNA which contain many genes. Gametes, carrying half the total number of chromosomes of each parent, combine during fertilisation.</p> <p>Facts: The DNA of every individual is different, except for identical twins. There is more than one version of each gene e.g. different blood groups. GCSE Chemistry</p> <p>Heating and Cooling: Investigate how to prevent heat loss by conduction, convection and radiation. The thermal</p>			
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<p>substances are not pure elements, but compounds or mixtures containing atoms of different elements. They have different properties to the elements they contain.</p> <p>Skills: Use particle diagrams to classify a substance as an element, mixture or compound and as molecules or atoms. Name simple compounds using rules: change non-metal to -ide; mono, di, tri prefixes; and symbols of hydroxide, nitrate, sulfate and carbonate.</p> <p>Fact: The symbols of hydrogen, oxygen, nitrogen, carbon, hydrogen, iron, zinc, copper, sulfur, aluminium, iodine, bromine, chlorine, sodium, potassium and magnesium.</p> <p>Pressure: Investigate how pressure from your</p>		<p>energy of an object depends upon its mass, temperature and what it's made of. When there is a temperature difference, energy transfers from the hotter to the cooler object. Thermal energy is transferred through different pathways, by particles in conduction and convection, and by radiation.</p>			
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