Yearly overview

Subject: Year 7 Science

Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
Prior knowledge: **Animals including humans -** Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood, recognise the impact of diet, exercise, drugs and lifestyle on the way their body's function, describe the ways in which nutrients and water are transported within animals, including humans. **Forces -** Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. Identify the effects of air resistance, water resistance and friction, that act between moving surfaces.	**Prior knowledge:** **Electricity -** Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit. Compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches. Use recognised symbols when representing a simple circuit in a diagram. **Evolution and inheritance -** Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago. Recognise that living	**Prior knowledge:** **Living things and their habitats -** Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals. Give reasons for classifying plants and animals based on specific characteristics.	**Prior knowledge:** **Properties and changes of materials -** Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets know that some materials will dissolve in liquid to form a solution and describe how to recover a substance from a solution. Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating. Give reasons based on evidence from comparative and fair tests, for the	**Prior knowledge:** **Living things and their habitats -** Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird. Describe the life process of reproduction in some plants and animals. **Animals, including humans -** Describe the changes as humans develop to old age. **Earth and space -** Describe the movement of the Earth, and other planets, relative to the Sun in the solar system. Describe the movement of the Moon relative to the Earth. Describe the Sun, Earth and Moon as approximately spherical bodies. Use the idea of the Earth's rotation to explain day and night	**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 cells. Each has a different structure or feature so it can do a specific job.

Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.	things produce offspring of the same kind, but normally offspring vary and are not identical to their parents. Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.		particular uses of everyday materials, including metals, wood and plastic. Demonstrate that dissolving, mixing and changes of state are reversible changes. Explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda. **Light -** Recognise that light appears to travel in straight lines. Use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye. Explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes. Use the idea that light travels in straight lines	and the apparent movement of the sum across the sky.	

			to explain why shadows have the same shape as the objects that cast them.		
Term 1 knowledge	**Term 2 knowledge**	**Term 3 knowledge**	**Term 4 knowledge**	**Term 5 knowledge**	**Term 6 knowledge**
This term: **Movement -** Explore how the skeletal system and muscular system in a chicken wing work together to cause movement. The parts of the human skeleton work as a system for support, protection, movement, and the production of new blood cells. Antagonistic pairs of muscles create movement when one contracts and the other relaxes. **Particle Model -** Relate the features of the particle model to the properties of materials in different states. Properties of solids, liquids and gases can be described in terms	This term: **Interdependence -** Use a model to investigate the impact of changes in a population of one organism on others in the ecosystem. Organisms in a food web (decomposers, producers and consumers) depend on each other for nutrients. So, a change in one population leads to changes in others. The population of a species is affected by the number of its predators and prey, disease, pollution and competition between individuals for limited resources such as water and nutrients. **Metals and Non-metals -**	This term: **Variation -** Graph data relating to variation and explain how it may lead to the survival of a species. There is variation between individuals of the same species. Some variation is inherited, some is caused by the environment and some is a combination. Variation between individuals is important for the survival of a species, helping it to avoid extinction in an always changing environment. **Earth's structure -** Model the processes that are responsible for rock formation and link these to the rock.	This term: **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. **Separating mixtures -** Devise ways to separate mixtures, based on their properties. A pure substance consists of only one type of element or compound and has a fixed melting and boiling point. Mixtures may	This term: **Plant and human reproduction -** Use models to evaluate the features of various types of seed dispersal Relate advice to pregnant women to ideas about transfer of substances to the embryo. 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. **Acids and Alkalis -** Devise an enquiry to compare how well indigestion remedies work. The pH of a solution depends on the strength of the acid: strong acids have lower pH values than	This term: **Photosynthesis -** Use lab tests on variegated leaves to show that chlorophyll is essential for photosynthesis. Plants and algae do not eat, but use energy from light, together with carbon dioxide and water to make glucose (food) through photosynthesis. They either use the glucose as an energy source, to build new tissue or store it for later use. Plants have specially adapted organs that allow them to obtain resources needed for photosynthesis. Revision of Year 7 content QLA based review work.

of particles in motion but with differences in the arrangement and movement of these same particles: closely spaced and vibrating (solid), in random motion but in contact (liquid), or in random motion and widely spaced (gas). Observations where substances change temperature or state can be described in terms of particles gaining or losing energy. A substance is a solid below its melting point, a liquid above it, and a gas above its boiling point. **Speed -** Investigate variables that affect the speed of a toy car rolling down a slope. If the overall, resultant force on an object is non-zero, its motion changes and it slows down, speeds up or changes direction.	Use experimental results to suggest an order of reactivity of various metals. Metals and non-metals react with oxygen to form oxides which are either bases or acids. Metals can be arranged as a reactivity series in order of how readily they react with other substances. Some metals react with acids to produce salts and hydrogen. **Voltage, current and resistance -** Compare the voltage drop across resistors connected in series in a circuit. Compare and explain current flow in different parts of a parallel circuit We can model voltage as an electrical push from the battery, or the amount of energy per unit of charge transferred through the electrical pathway.	**Features -** Sedimentary, igneous and metamorphic rocks can be inter converted over millions of years through weathering and erosion, heat and pressure, and melting and cooling. **Energy costs and transfers -** Compare the running costs of fluorescent and filament light bulbs Explain the energy transfers in a hand-crank torch. We pay for our domestic electricity usage based on the amount of energy transferred. Electricity is generated by a combination of resources which each have advantages and disadvantages. Calculate the cost of home energy usage, using the formula: cost = power (kW) x time (hours) x price (per kWh).	be separated due to differences in their physical properties. The method chosen to separate a mixture depends on which physical properties of the individual substances are different. **Sound and Light -** Relate changes in the shape of an oscilloscope trace to changes in pitch and volume. Use ray diagrams to model how light passes through lenses and transparent materials. Sound consists of vibrations which travel as a longitudinal wave through substances. The denser the medium, the faster sound travels. The greater the amplitude of the waveform, the louder the sound. The greater the frequency (and therefore the shorter the wavelength), the higher the pitch.	weak acids. Mixing an acid and alkali produces a chemical reaction, neutralisation, forming a chemical called a salt and water. **Gravity and Universe -** Explain the way in which an astronaut's weight varies on a journey to the moon Relate observations of changing day length to an appropriate model of the solar system. Mass and weight are different but related. 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. The solar system can be modelled as planets	

	In a series circuit, voltage is shared between each component. In a parallel circuit, voltage is the same across each loop. Components with resistance reduce the current flowing and shift energy to the surroundings.			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.	
Future 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	**Future 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,	**Future 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	**Future 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	**Future knowledge: Respiration and Evolution -** Use data from investigating fermentation with yeast to explore respiration. Review the evidence for theories about how a particular species went extinct. Respiration is a series of chemical reactions, in cells, that breaks	**Future knowledge:** GCSE Biology

of cell. Each has a different structure or feature so it can do a specific job. **Separating mixtures -** Devise ways to separate mixtures, based on their properties. 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 physical properties of the individual substances are different. **Gravity -** Explain the way in which an astronaut's weight varies on a journey to the moon. Mass and weight are different but related. Mass is a property of the object; weight depends upon mass but also on gravitational field	which are formed following fertilisation in the ovary. **Facts -** Flowers contain the plant's reproductive organs. Pollen can be carried by the wind, pollinating insects or other animals. **Acids and alkalis -** Devise an enquiry to compare how well indigestion remedies work. The pH of a solution depends on the strength of the acid: strong acids have lower pH values than weak acids. Mixing an acid and alkali produces a chemical reaction, neutralisation, forming a chemical called a salt and water. **Facts -** Acids have a pH below 7, neutral solutions have a pH of 7, alkalis have a pH above 7.	relies on the mother to provide it with oxygen and nutrients, to remove waste and protect it against harmful substances. The menstrual cycle lasts approximately 28 days. **Universe: -** Relate observations of changing day length to an appropriate model of the solar system. 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	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. **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. **Wave effects -** Relate the impact of different types of waves on living cells to their frequency and the energy carried by the wave. When a wave travels through a substance,	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. populations, like humans. **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 exothermic. If the reverse, it is endothermic. **Contact forces and climate -** Investigate factors that affect the	

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.	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. **Electromagnets -** Investigate ways of varying strength of an electromagnet. An 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. **Fact -** The magnetic field of an electromagnet decreases in strength with distance.	billions of years from other galaxies. **Work -** Explain how an electric motor raising a weight is doing work. Work is done and energy transferred when a force moves an object. The bigger the force or distance, the greater the work. Machines make work easier by reducing the force needed. Levers and pulleys do this by increasing the distance moved, and wheels reduce friction.	particles move to and from. Energy is transferred in the direction of movement of the wave. Waves of higher amplitude or higher frequency transfer more energy.	size of frictional or drag forces. Investigate the contribution that natural and human chemical processes make to our carbon dioxide emissions. 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.	