KS3 Science Curriculum Guide

Year Group	Autumn Term	Spring Term	Summer Term
Year 7	**Cells** • Multicellular organisms are composed of cells. • Cells have structures within them called organelles which have specific jobs. • Plants, animals and unicellular organisms have particular features. • There are many types of cell. Each has a different structure or feature so it can do a specific job. **Particle Model** • Properties of solids, liquids and gases can be described in terms 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.	**Energy** • We can describe how jobs get done using an energy model where energy is transferred from 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. **Organisation** • 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.	**Atoms, Elements, Compounds and the Periodic Table** • Most substances are not pure elements, but compounds or mixtures containing atoms of different elements. They have different properties to the elements they contain • 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. **Forces** • If the overall, resultant force on an object is non-zero, its motion changes and it slows down, speeds up or changes direction. • 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.
Year 8	**Gas Exchange** • 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. **Chemical Reactions** • During a chemical reaction bonds are broken (requiring energy) and new bonds formed (releasing energy). If the energy released is	**Sound** • 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. **Light** • 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	**Electricity in Circuits** • 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. 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. • Current is a movement of electrons and is the same everywhere in a series circuit. Current divides between loops in a parallel circuit, combines when loops meet, lights up bulbs and makes components work.

	greater than the energy required, the reaction is exothermic. If the reverse, it is endothermic. • 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.	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 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. **Reproduction** • 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. • 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.	**Space** • 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.
Year 9	**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. **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.	**Earth and Atmosphere** • Sedimentary, igneous and metamorphic rocks can be inter converted over millions of years through weathering and erosion, heat and pressure, and melting and cooling. • Carbon is recycled through natural processes in the atmosphere, ecosystems, oceans 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. **Ecosystems**	**Inheritance** • 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. • Natural selection is a theory that explains how species evolve and why extinction occurs. • 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.

		• 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.	

Year Group	What parents can do to support learning	Useful links and reference materials	Revision for end of Year Exam
Year 7	Purchase a KS3 science revision guide such as CGP Support your child to use Educake to support retrieval and consolidation.	BBC Bitesize: https://www.bbc.co.uk/bitesize/subjects/zng4d2p Seneca Revision Notes: https://senecalearning.com/en-GB/revision-notes/ks3/science/science-ks3 Cognito: https://cognito.org/courses/ks3	Materials will be shared on Arbor
Year 8	Purchase a KS3 science revision guide such as CGP Support your child to use Educake to support retrieval and consolidation.	BBC Bitesize: https://www.bbc.co.uk/bitesize/subjects/zng4d2p Seneca Revision Notes: https://senecalearning.com/en-GB/revision-notes/ks3/science/science-ks3 Cognito: https://cognito.org/courses/ks3	Materials will be shared on Arbor
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