2021-22 CURRICULUM MAP FOR SCIENCE YEAR 7

HALF TERM 1: 'Becoming a scientist' (Purple text = skills) Key knowledge 1. Science safety rules –always wear safety glasses, walk don't run, stand to do practical work (can jump out of the way in case of a spill) stools under the bench, and coats and bags in designated areas (trip hazards) 2. Hazards are the dangers we face when working in the lab. E.g. **Corrosive** – destroys living tissues, **oxidising** – provides oxygen which causes substances to burn, **toxic** – a poisonous substance. 3. Scientific equipment and uses. (**Beaker** – mixing chemicals, can be heated. **Measuring cylinder** – measuring volumes accurately. **Bunsen burner** – to heat chemicals. **Pipette** – safely transfer liquids 4. Types of variables: **Dependent** (what you measure), **independent** (what you change) and **control** (what must remain the same) and identify these in an experiment. 5. Famous scientists through time: **Newton** (Gravity) **Fleming** (Penicillin), **Pasteur** (Pasteurisation), **Hawking** (Theory of relativity). Key skills 1. Be able to plan and carry out a scientific experiment safely 2. Be able to make measurements accurately (mm, ml, s etc) 3. Make and record observations in a table (including appropriate table headings and units) 4. Be able to draw a bar chart and a line graph and draw a line of best fit.		Stories of famous scientists Reading experimental methods.
		Report on their favourite Scientist. Write a plan for an experiment.
		Scientist presentations Communicaton with group members in various experiments.
		Maths – Graph drawing skills. A link to any famous scientists/mathematicians? History – Famous scientists.
HALF TERM 2: 'All about me' Cells 1. Structure and function of plant and animal cells, including organelles. **Nucleus** (contains DNA), **cell membrane** (movement of substances), **Chloroplast** (contains chlorophyll for photosynthesis). 2. Specialised cells (a cell with a specific function) and how they are adapted to their function. **Sperm** (tail to move, head containing DNA to produce baby) **Root hair cell** (large surface area to absorb water/minerals from soil). 3. Be able to safely use a microscope and prepare a sample on a slide. 4. A **tissue** is a group of similar cells, **organs** are a group of tissues with similar functions (heart, lungs, liver, brain). 5. **Diffusion** is the movement of particles from a high to low concentration (e.g. gas exchange in the lungs). Human reproduction 1. **Puberty** is the physical changes that happen to a body to become an adult. (hair grows, breasts grow, hips/shoulders widen, hormones, spots, voice deepens). 2. The structure and functions of the male and female reproductive systems. 3. **Fertilisation** is when the sperm and egg fuse together, and a new life is created (zygote) 4. The **menstrual cycle** lasts 28 days on average. The body 1.The **skeleton** is made of bones and its function is to provide support and protection and to allow movement.		Reading and extracting key information on specialised cells Reading information provided on joints.
		Extended response answer on the function of the skeleton. Extended piece of creative writing – 'The race to make a baby'.
		Group work and presentation on organ systems Group work through microscope practical. Class discussion of reproduction.
		PE – muscles, joints and skeleton PSHE – puberty and reproduction

2020-21 CURRICULUM MAP FOR SCIENCE YEAR 7

2. The four different **joints** in the body are fixed (skull), hinge (elbow), pivot (neck) and ball and socket (hip). 3. **Ligaments** join bone to bone. **Tendons** join muscle and bones. **Cartilage** covers the end of bones. 4. **Muscles** work in pairs.		
HALF TERM 3: 'CSI' Particle theory 1. Particle arrangement in **solids** (close together, can vibrate), **liquids** (fixed volume, irregular order) and **gases** (no bonds between the, can move freely). 2. The **properties** of solids (fixed shape), liquids (can flow and change shape to fill container) and gases (no fixed shape or volume). Acids and alkalis 1. Household **acids** include fizzy drinks, citric fruits, vinegar. Household **alkalis** are washing up liquid, soap, baking soda). 2. Use Universal indicator to test for acids and alkalis. 3. The **pH scale** is used to determine the strength of acids and alkalis. 4. Making and testing different vegetable indicators (red cabbage, kale, carrot) 5. **Neutralisation** reactions happen when the concentration of acid and alkali is balanced. **(acid + alkali = salt + water)** 6. Be able to make a neutral solution. Separating techniques 1. Mixtures can be separated by: **evaporation, filtration, distillation or chromatography**. 2. Safely carry out the four main separation techniques. 3. Carry out fingerprinting and know that no two individuals have the same **fingerprints** – not even identical twins. 4. identify fingerprints as whorls, loops, or arches.		Extracting information on states of matter. Research of evidence found at a crime scene.
		Writing a crime scene report. Writing experimental methods of using the different separating techniques.
		Court room debate where students will take on different roles and examine evidence collected throughout the CSI topic.
		History – Notorious crimes in history? Food tech – Acids and alkalis in foods and cleaning products.
HALF TERM 4: 'To infinity and beyond' Earth 1. The earth is made up of three layers – **core**, **mantle** and **crust**. They have different thicknesses and compositions. 2. The earth is the third planet from the sun. 3. The earth's axis is tilted which causes the seasons as it orbits the sun. It takes **365** days to orbit the sun. 4. The Earth rotates on its axis so one side faces the sun and the other side is in darkness. This is **night and day**. It takes 24 hours to rotate on its axis. Space 1. The sun is the biggest object in the solar system the 8 planets orbit the sun due to its massive gravitational pull. 2. The components of the universe including stars and galaxies. Our own **galaxy** is the Milky Way 3. **Light years** are a unit of distance, used when objects are very far away (such as other stars). Forces (contact and non-contact) 1. **Gravity** is a non-contact force caused by the mass of any object – bigger masses produce more gravity. 2. Gravity holds objects like moons and planets in orbit. 3. Gravity is a **force** (measured in Newtons) that acts on the mass (measured in Kg) of an object. 4. Accurately use a balance and Newton meter to find the weight and mass of objects.		Reading about scientists that have developed our understanding of space (Galileo, Copernicus, Kepler, Newton Hubble)
		A letter from space describing a journey through the solar system and beyond into the rest of the Milky Way and the universe.
		Group work and presentation on "the earth in space" relating to seasons and day and night. Pupils produce a presentation and use props to show how we get seasons and day and night.
		Geography – structure of the earth and plate tectonics. Maths - calculating weight from mass and gravitational field strength. Calculating balanced forces.

2020-21 CURRICULUM MAP FOR SCIENCE YEAR 7

5. Weight is calculated using the formula **weight=mass X gravitational field strength**. 6. **Friction and air resistance** are contact forces, they both work against movement but can be useful. 7. **Terminal velocity** happens when the upwards forces and gravity become equal. 8. Objects that are **streamlined** can move faster through air and water because there is less resistance. 9. When forces are **balanced** objects move at a constant speed.		
HALF TERM 5: 'Going off grid' Plant reproduction 1. **Asexual** reproduction – all the same genes and characteristics as the one parent. Plants often use this form of reproduction. 2. Asexual reproduction involves **no genetic variation**. Advantage is this happens quickly and can be used to ensure a desired characteristic, disadvantage is that it narrows the gene pool and offspring may not be resistant to disease. 3. Methods of different seed dispersal are **wind, explosive seed pods, animals and water.** 4. Male and female parts of the plant. The **anther** is the male sex cell which produces pollen grains. The **stigma** which is the female part collects the pollen grains. Leaf and Gas exchange 1. The **roots, stem and leaves** of a plant form a plant organ system for transport of substances around the plant. 2. Plants have separate transport systems for mineral ions, water and sugars. – **Root hair** cells, **photosynthetic** cells, **xylem** cells (water) and **phloem** cells (minerals). 3. **Temperature and pH** affects the rate of diffusion. Gas exchange in plants happens via diffusion. 4. **Osmosis** is the movement of water from a high to a low concentration. This is important to maintain turgor in plants. – Turgor makes the cells hard and rigid, which in turn keeps the leaves and stems of the plant rigid and firm.		How different plants reproduce. The journey of a coconut.
		A journey of a seed. Writing a plan for an experiement.
		Dissussing advantages of plant reproductions. What possible disadvantages could asexual reproduction have. Investigate the effect of surface area on osmosis.
		PE – gas exchange within the body. Art – plant/flower drawings?
HALF TERM 6: 'Going off grid' Gardening Club 1. Growing vegetables, '**garden to gourmet**' project. Pupils to grow and cultivate own produce and then produce a meal with their crops. 2. Learning about soil, the right conditions for plants to grow, factors affecting the rate of **photosynthesis**. These factors include temperature, humidity, air flow, and light intensity. 3. Investigating stomata - 1. Be able to plan and carry out a scientific experiment safely 2. Be able to make measurements accurately 3. Make and record observations in a table. Sustainable energy 1. The increasing global demand for energy, while reducing the risk of damage to the environment or contributing to global warming. 2.Types of renewable energy. – **Wind, Solar, Geothermal**, and **hydroelectric**. 3. Advantages of renewable energy are that it won't run out, doesn't create as much pollution, cheaper once set up (although initial cost is large), reliable.		The effects global warming has on the earth.
		The disadvantages global warming is having on the Earth.
		Gardening club, discussing what is needed for plants to grow. The energy debate- fossil fuels vs renewable energy.
		Maths – calculating the mean, sampling, estimating. Technology – Building an island. Engineering – how communities are structured. Food tech – Cooking produce.

2020-21 CURRICULUM MAP FOR SCIENCE YEAR 7

4. Disadvantage is that it doesn't create enough energy for us to solely use renewable sources.		