



Science Curriculum and Knowledge Map

Pentecost (Chemistry)
Investigate Materials – *Properties of Materials*
Demonstrate and explain how some mixtures can be separated through filtering, sieving and evaporating, and that some changes are irreversible. (KNO)
Suggest reasons for decisions when sorting and comparing materials based on their properties, including conductivity. (KNO)

Lent 2 (Biology)
Investigate Living things and their Habitats – *Living Things*
Explain the patterns and differences in the life cycles of a mammal, insect, bird and amphibian. (KNO)
Explain the concept of 'reproduction' as a life process in some plants and animals. (KNO)

Advent 1 (Physics)
Understand Light and Seeing – *Light and Sound*
Note that light travels from a light source to an object and then reflects to our eyes. (REM)
Explain that light travels in straight lines and about the transmission of light through materials: absorption, diffuse scattering and specular reflection at a surface. (KNO)
Investigate the colours in white light. (REA)

Advent 2 (Physics)
Understand Electrical Circuits – *Electricity*
Draw symbols when representing components in an electrical circuit. (REM)
Create an electrical circuit and explain how it works. (KNO)
Explain the concept that electricity is an energy and is caused by electrons moving about to make a current. (KNO)
Investigate the effect of changing the number of bulbs and the voltage of cells in an electrical circuit. (REA)

Lent 1 (Biology)
Investigate Living things and their Habitats – *Living Things*
Explain the concept that living things are classified into groups according to common characteristics, including micro-organisms, plants and animals. (KNO)
Summarise the similarities and differences between bad microbes and good microbes. (KNO)
Investigate and give reasons for classifying plants and animals based on specific characteristics. (REM)

Lent 2 (Biology)
Understand Inheritance and Evolution – *Evolution and Inheritance*
Identify features that individuals have inherited from their parents. (REM)
Explain the concept that variations occur within offspring as well as across species. (KNO)
Interpret the advantages and disadvantages of certain characteristics. (REA)

Pentecost 1 (Biology)
Sports Science and Healthy Living – *Living Things*
Describe the impact of diet, exercise, drugs and lifestyle on the way the body functions. (REM)
Explain the amount of exercise that keeps a child and adult healthy. (KNO)
Recommend the content of a healthy human diet: carbohydrates, lipids (fats and oils), proteins, vitamins, minerals, dietary fibre and water, and why justify why each is needed. (REA)

Pentecost 2 (Biology)
Understand Animals Including Humans – *Living Things*
Name the main parts of the human circulatory system, including parts of the heart. (REM)
Explain the functions of the parts of the human heart and parts of the circulatory system. (KNO)
Make generalisations about the effect of life choices on the human heart. (REA)

Key Stage 3

Chemistry
The properties of the different states of matter (solid, liquid and gas) in terms of the particle model, including gas pressure.
Simple techniques for separating mixtures: filtration, evaporation, distillation and chromatography.
The carbon cycle.
Structure & functions of the human skeleton (support, protection, movement and making blood cells).
Consequences of imbalances in diet, including obesity, starvation and deficiating diseases.
Mechanisms of breathing to move air in and out of the lungs, explaining the movement of gases, including simple measurements of lung volume.
Importance of plant reproduction through insect pollination in human food security.
Simple models of chromosomes, genes and DNA in heredity, including the part played by Watson, Crick, Wilkins and Franklin in the development of the DNA model.
Physics
Forces measured in newtons, measurements of stretch or compression as force is changed: force extension: linear relation; Hooke's Law as a special case.
Sound produced by vibrations of objects, in solid speakers, detected by their effects on microphone diaphragms and the ear drum; Sound waves are longitudinal.
Light waves travelling through a vacuum; Speed of light.
Potential difference, measured in volts, battery and bulb ratings; Resistance, measured in ohms, as the ratio of potential difference (p.d.) to current.
Magnetic fields by plotting with compass, representation by field lines.

Lent 1 (Biology)
Understand Animals Including Humans – *Living Things*
Note the gestation of humans. (REM)
Explain the patterns and changes humans experience as they develop to old age. (KNO)
Compare the gestation period of humans with other animals. (REM)

Advent 2 (Physics)
Understand the Earth's Movement in Space – *Stars and Space*
Describe the sun, Earth and Moon as approximately spherical bodies. (REM)
Explain that the solar system is heliocentric, describing the movement of the Earth relative to the Sun. (KNO)
Present information about our solar system. (KNO)

Advent 1 (Physics)
Understand Movement, Forces and Magnets – *Forces*
Name the 6 outcomes of forces upon an object (move, stop, change shape, change direction, move faster, move slower). (REM)
Explain that unsupported objects fall towards the Earth because of the force of gravity. (KNO)

Lent 2 (Biology)
Understand Inheritance and Evolution – *Evolution and Inheritance*
Identify features that individuals have inherited from their parents. (REM)
Explain the concept that variations occur within offspring as well as across species. (KNO)
Interpret the advantages and disadvantages of certain characteristics. (REA)

Pentecost 2 (Biology)
Investigate Living things and their Habitats – *Living Things*
Demonstrate that living things can be classified in a variety of ways. (REM)
Name the main parts of the human circulatory system, including parts of the heart. (REM)
Explain the functions of the parts of the human heart and parts of the circulatory system. (KNO)
Research examples of human impact on natural habitats and relate this to negative and positive global effects. (REA)

Pentecost 1 (Physics)
Investigate Sound and Hearing – *Light and Sound*
Note that the pitch and volume of a sound change when the vibrations or features of an object change. (REM)
Explain that sound is created through vibrations which travel through a medium to the ear. (KNO)
Research 'Evelyn Glennie' to find out how she can 'hear' sounds through vibrations, even though she is deaf. (REA)

Lent 1 (Physics)
Understand Movement - Forces and Magnets – *Forces*
Notice that some forces (e.g. friction) need contact between 2 objects, but magnetic forces can act at a distance. (REM)
Recognise that iron, nickel and cobalt are three magnetic materials/metals. (REM)
Compare and contrast everyday materials on the basis of whether they are attracted to a magnet. (KNO)

Pentecost 1 (Physics)
Understand Light and Seeing – *Light and Sound*
Describe that shadows are formed when the light from a light source is blocked by an opaque object. (REM)
Explain the concept of reflection and how light from an object is reflected by a surface, it changes direction and bounces off the surface at the same angle as it hits it. (KNO)

Advent 1 (Biology)
Understand Animals including humans – *Living Things*
Name the different types of teeth. (REM)
Explain the purpose of the different teeth. (KNO)
Explain the role of each part of the digestive system to break down food into substances we can use. (KNO)
Summarise the role of the digestive system as a whole, explaining why it is vital for humans to stay healthy. (REA)

Advent 2 (Physics)
Understand Electrical Circuits – *Electricity*
Demonstrate how to construct a simple circuit, naming the different parts (cells, wires, bulbs, switches and buzzers). (REM)
Give examples of conductors and insulators and explain how they work. (KNO)
Investigate the difference between a direct current and an alternating current. (REA)

Lent (Chemistry)
Investigate Materials – States of Matter – *Properties of Materials*
Describe what happens to the state of some materials when temperature is altered. (REM)
Compare and contrast the properties of solids, liquids and gases. (KNO)
Set up and complete a simple, practical enquiry to create a fair test. (REA)

Lent 2 (Biology)
Understand Animals including humans – *Living Things*
Identify and name the main parts of the human skeleton. (REM)
Give examples of and explain 3 different types of skeleton (endoskeletons, exoskeletons, hydrostatic). (KNO)
Explain how muscles work, knowing that it contracts and so pulls on the bone it is attached to and can relax. (KNO)
Recognise that muscles can only pull and cannot push. (REM)

Advent 2 (Chemistry)
Investigate Materials – Rocks and Soils – *Properties of Materials*
Recognise that there are three types of rock and name igneous, sedimentary and metamorphic.
Explain how different types of rock are formed they are formed and give examples. (KNO)
Explain that soil is the uppermost layer of the earth and is a mixture of minerals, air, water and organic matter. (KNO)

Advent 1 (Biology)
Understand Plants – *Living Things*
Identify and name the parts of a flowering plant (root, stem, leaves, flower). (REM)
Explain the functions of the parts of a flowering plant. (REM)
Explain the lifecycle of a flowering plant (germination, growing and flowering, pollination and seed formation, seed dispersal). (KNO)

Lent 2 (Biology)
Understand Inheritance and Evolution – *Evolution and Inheritance*
Identify features that individuals have inherited from their parents. (REM)
Explain the concept that variations occur within offspring as well as across species. (KNO)
Interpret the advantages and disadvantages of certain characteristics. (REA)

Pentecost 2 (Biology)
Investigate Living Things and their Habitats – *Living Things*
Identify whether something is dead, alive or never been alive and organise these into groups. (KNO)
Identify and explain how an animal or plant is suited to its habitat. (KNO)
Summarise the differences between living things in a food chain, including herbivores and omnivores. (REA)

Pentecost 1 (Biology)
Understand Plants – *Living Things*
List the things a plant needs to grow well and stay healthy. (REM)
Compare and contrast the similarities and differences between seeds and bulbs. (KNO)
Explain the lifecycle of a flowering plant (seed, germination, roots and shoots, leaves, flowers, fruit, seed dispersal). (KNO)
True or false? Germination and growing are the same thing. (REA)

Lent 1 (Physics)
Understand the Earth's Movement, and Space – *Stars and Space*
Identify and name the planets in our solar system and their order from the sun. (REM)
Recognise and describe some of the features of the planets in the solar system. (REM)
Explain what is meant by the 'solar system' and that there are other planets, more than Earth. (KNO)

Pentecost (Biology)
Understand Plants – *Living Things*
Identify and name a variety of common plants, including garden plants and wild plants. (REM)
Recognise what a seed and plant is and why plants are important. (REM)
Identify and name the different parts of a plant. (REM)
Observe and describe what a plant needs to grow. (KNO)
Identify different types of trees and explain what is meant by deciduous and evergreen. (KNO)

Advent (Biology)
Understand Animals including humans – *Living Things*
Identify the three basic needs of all animals to stay alive (air, water and food). (REM)
Explain how all living things grow and reproduce, describing some of the changes. (KNO)
Identify the different food groups and explain their impact on a healthy lifestyle. (KNO)
Investigate the effects of exercise on the body. (REA)

Lent (Chemistry)
Investigate Materials – *Properties of Materials*
Name different types of materials and describe what they can be used for. (REM)
Group materials according to their properties. (KNO)
Compare and contrast how some materials can be changed by stretching, twisting, squashing, bending) and others cannot. (KNO)
Suggest reasons why a material is suitable to use for different objects. (REA)

Advent

- Looks closely at patterns and change.
- Explores outside and comments by using some their senses.
- Begins to make observations of the natural world, plants and animals.

Lent

- Looks closely at similarities, differences, patterns and change.
- Describe outside by using their senses.
- Makes observations of the natural world, plants and animals.
- Begins to talk about some important processes and changes in the natural world around them e.g. effects of changing seasons.
- Begins to identify some similarities and differences between the natural world around them and contrasting environments.

Pentecost

- Explore the natural world around them; making observations and drawing pictures of animals and plants.
- Knows some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class.
- Understand some important processes and changes in the natural world around them; including seasons and changing states of matter.

Lent 2 (Chemistry)
Investigate Materials – *Properties of Materials*
Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water and rock. (REM)
Recognise and name what is meant by the 'properties' of a material. (REM)
Compare and group together a variety of everyday materials based on their simple physical properties. (KNO)

Advent 1 (Biology)
Understand Animals including humans – *Living Things*
Recognise that animals are birds, reptiles, mammals, amphibians and fish. (REM)
Identify and name a variety of birds, reptiles, mammals, amphibians and fish. (REM)
Identify and name examples of carnivores, herbivores and omnivores. (REM)
Explain that a carnivore eats meat, a herbivore eats plants and an omnivore eats meat and plants. (KNO)

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