St John's C of E (Aided) Primary School

Year 3 Science Long Term Overview

Biology	Chemistry	Physics

Term	Knowledge (Objectives)
Autumn 1	**Magnets - 6 sessions** **Knowledge Block 1: What magnets do** Substantive Knowledge: - Magnets exert **attractive forces** on some **metals**. **Knowledge Block 2: Magnets don't need to touch** Substantive Knowledge: - Magnetic forces work through other materials including air, so magnets don't need to be touching to **exert** their force. It is called a **non-contact force.** **Knowledge Block 3: Magnets attract and repel** Substantive Knowledge: - Each end of a magnet is called a **pole**; opposite poles are called north and south. - Magnets exert **attractive** forces on each other when the poles facing each other are north and south (opposites). - Magnets exert **repulsive** forces on each other when the poles facing each other are the same. **Knowledge Block 4: What affects magnetic strength** Substantive Knowledge: - The strength of magnetic forces is affected by: • The strength of the magnet. • The distance between the magnet and the object. • The material the object is made from. Disciplinary Knowledge (Working Scientifically): - Making systematic and careful observations, and, where appropriate, taking accurate measurements using standard units, using a range of equipment. - Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables. - Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. - Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions. - Setting up simple practical enquiries, comparative and fair tests. - Asking relevant questions and using different types of scientific enquiries to answer them.

Autumn 2	**Light – 6 sessions** **Knowledge Block 1: Light and sight** <u>Substantive Knowledge:</u> - There must be light for us to see. - Light comes from a **source**. - We need light to see things, even **shiny** things. - Light from the sun can be dangerous and that there are ways to protect their eyes. **Knowledge Block 2: What light does when it hits materials** <u>Substantive Knowledge</u> - If an object is **transparent** light will go through it and we will be able to see through it. - If an object is **opaque,** it will block the light and no light will get through. - This is what forms shadows. - The closer to the light source an object is, the bigger the shadow will be. This is because the object blocks more of the light. - The further away from the light source an object is, the smaller the shadow will be. This is because the object blocks less of the light. - If an object is perfectly **reflective** light will bounce back off it and we will see reflections of objects. - If the material is **translucent,** it will allow light through, but we won't be able to see through it. <u>Disciplinary Knowledge (Working Scientifically):</u> - Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers. - Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. - Setting up simple practical enquiries, comparative and fair tests. - Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions. - Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions. - Identifying differences, similarities or changes related to simple scientific ideas and processes. - Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.
Spring 1	**Animals, Skeletons and Movement – 6 sessions** **Knowledge Block 1 – Skeletons protect vital organs** <u>Substantive Knowledge</u> - All **vertebrates** have internal **skeletons** that protect **vital organs**. - **Invertebrates** have **exoskeletons** that protect **vital organs**. **Knowledge Block 2 – Skeletons support weight** <u>Substantive Knowledge:</u> - Skeletons support the weight of land animals. - Stronger bones can **support** a greater **mass**. **Knowledge Block 3 – Skeletons support movement** <u>Substantive Knowledge:</u> - Bones are **connected** (but can move relative to each other) at joints. - **Muscles** connect to bones and move them when they **contract**. - Stronger bones can **anchor** stronger muscles.

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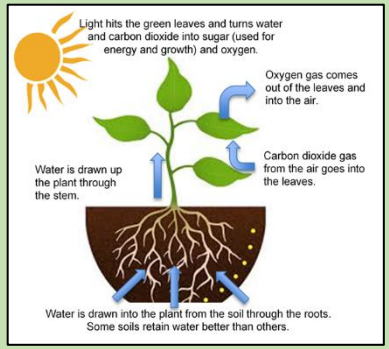
Spring 2	**Rocks and Soils – 6 sessions** **Knowledge Block 1 – The different types of rocks** Substantive Knowledge: - A **rock** is a solid material made up of **minerals** forming part of the surface of the Earth. - Rocks are exposed on the surface at cliffs, hills and mountains but are also under the surface. - Some rocks, called **ores** contain metals. - Some rocks are made of **grains** squashed together and can contain the remains of long-dead organisms, called **fossils**. This type of rock is called **sedimentary** rock, an example would be **limestone**, **sandstone** or **mudstone.** - Some rocks are made of **crystals** that are locked tightly together. These are called **igneous** and **metamorphic** rocks; an example of igneous rock is **granite,** and an example of metamorphic rock is **slate.** **Knowledge Block 2 – The properties of rocks** Substantive Knowledge: - These three types of rocks all have different properties to each other, including **porosity**, **hardness**, reaction to chemicals. - The properties of the rock depend on how the rock was formed, e.g. Some igneous rocks form from lava from volcanoes and cool very quickly leading to very small crystals. **Knowledge Block 3 – The structure of soils** Substantive Knowledge: - **Soil** is made up of small broken-down pieces of rock. - Soil contains a range of different size rock pieces, e.g., sand grains or stones. - Soil also contains **humus** (rotted plant material). - Soil made of very fine rock is called **silt** or **clay**. Disciplinary Knowledge (Working Scientifically): - Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions. - Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers. - Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. - Asking relevant questions and using different types of scientific enquiries to answer them. - Setting up simple practical enquiries, comparative and fair tests

Summer 1	**Plants and the Food Production – 7 sessions** **Knowledge Block 1 – Plants don't go to McDonalds** <u>Substantive Knowledge:</u> - Plants do not eat food so have to make their own. - This food provides then with energy, and materials to grow. - To make the food (sugar) plants need water from the ground, **carbon dioxide** from the air and light from the sun. - The water is taken up through the **roots** from the **soil.** - The carbon dioxide is taken in through the **leaves.** - As well as food, plants also make **oxygen** which is given out back into the air through the leaves. <u>Disciplinary Knowledge (Working Scientifically):</u> - Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions. - Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables. - Setting up simple practical enquiries, comparative and fair tests. 
Summer 2	**Solids, Liquids and Gases – 7 sessions** **Knowledge Block 1 – Properties of solids, liquids and gases** <u>Substantive Knowledge:</u> - Materials can be divided into solids, liquids and gases. - **Solids** hold their shape unless forced to change. - **Liquids** flow easily but stay in their container because of **gravity**. The more **viscous** a liquid the less runny it is. - **Gases** move everywhere and are not held in containers by **gravity**. **Knowledge Block 2 – Changing state** <u>Substantive Knowledge:</u> - **Heating** causes solids to **melt** into liquids and liquids to **evaporate** to gases. - **Cooling** causes gases to **condense** to liquids and liquids to **freeze** to solids. **Knowledge Block 3 – Melting, freezing, boiling and condensation temperatures** <u>Substantive Knowledge:</u> - Different substances change **state** at different temperatures but the temperatures at which given substances changes state is always the same. **Knowledge Block 4 – All about the water cycle** <u>Substantive Knowledge:</u> - The temperature at which a substance **melts** from a solid to a liquid is the same at which it **freezes** from a liquid to a solid. - The temperature at which a substance **boils** from a liquid to a gas is the same at which it **condenses** from a gas to a liquid. - Liquids **evaporate** slowly, even below their boiling temperatures. - The water cycle is the process by which water is continuously transferred between the surface of the earth and the atmosphere. - Liquid water evaporates into water vapor, condenses to form clouds, and precipitates back to earth in the form of rain and snow. <u>Disciplinary Knowledge (Working Scientifically):</u> - Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment. - Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions. - Setting up simple practical enquiries, comparative and fair tests. - Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables. - Using straightforward scientific evidence to answer questions or to support their findings.

	- Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions. - Asking relevant questions and using different types of scientific enquiries to answer them. - Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.

Disciplinary Knowledge (Working Scientifically)				
Years	Types of enquiry that must be introduced in phase	All children should learn to	Recording and teaching that supports key learning	Statutory requirements NC
1 and 2	• Comparing differences and changes. • Describing in order to classify. • Surveys to identify patterns and support classification. • Describing the effect of changing things. • Using secondary sources, including the internet and *experts.* • Pupils begin to look for relationships between variables (patterns)	• Gather evidence to describe the differences and similarities between different organisms, habitats and objects. • Gather evidence to describe how things change over time or as a result of something happening (e.g. how some things spring back when bent and others do not, or plants will wilt when they are not watered). • Begin to gather evidence to describe the relationship between variables and patterns (cause and effect) by identifying and seeking to quantify what must be changed and what measured (*what change and what measure).*	Venn diagrams, bar charts. Timelines and tables showing how one and more than one thing changes over time, bar charts, tally charts. Results tables with the independent variable increasing in one column and the dependent variable in the other.	• Asking simple questions and recognising that they can be answered in different ways. • Observing closely, using simple equipment. • Performing simple tests. • Identifying and classifying. • Using their observations and ideas to suggest answers to questions. • Gathering and recording data to help in answering questions.
3 and 4	• Pupils become confident in identifying relationships between variables (patterns).	• Recognise that factors other than that we are changing may have an effect and seek to control these factors (what change and what measure *and what keep same*). • Gather evidence to describe and classify patterns of behaviour, characteristics and properties of materials and make generalisations from data samples.	Results tables with independent variable increasing in one column and dependent variable in the other. Increasing use of equipment that allows for standard measure (thermometers, data loggers, measuring cylinders, force meters, digital balances).	• Asking relevant questions and using different types of scientific enquiries to answer them. • Setting up simple practical enquiries, comparative and fair tests. • Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.

				• Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions. • Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables. • Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. • Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions. • Identifying differences, similarities or changes related to simple scientific ideas and processes. • Using straightforward scientific evidence to answer questions or to support their findings.