



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

## Year 4 Science Long Term Overview

Biology	Chemistry	Physics
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Term	Knowledge (Objectives)										
Autumn 1	<p><b>Mixtures and Separating Them – 8 sessions</b></p> <p><b>Knowledge Block 1 – What mixtures are</b>  <u>Substantive Knowledge</u>            - A <b>substance</b> is an object with the same properties throughout.            - A <b>mixture</b> is when more than one substance is present in the same container.</p> <p><b>Knowledge Block 2 – What dissolving is</b>  <u>Substantive Knowledge:</u>            - When a substance is added to a liquid the substance can disappear - this is called <b>dissolving</b>.            - A mixture of a substance that has dissolved in a liquid is called a <b>solution</b>.            - Not every substance can dissolve in water.</p> <p><b>Knowledge Block 3 – Separating mixtures</b>  <u>Substantive Knowledge:</u>            - Mixtures can be separated if the substances have different properties.            - This is because the substances in the mixture are still present and are unchanged.            - There are different techniques for separating mixtures.</p> <table border="1" data-bbox="1214 906 2101 1133"> <thead> <tr> <th>Separating technique</th> <th>Substance properties required to work</th> </tr> </thead> <tbody> <tr> <td>Filtration and sieving</td> <td>A substance that does not dissolve in a liquid Different sized substances</td> </tr> <tr> <td>Magnets</td> <td>Some magnetic materials some non-magnetic</td> </tr> <tr> <td>Evaporation</td> <td>A solid substance dissolved in water and the solid has a higher boiling point than water.</td> </tr> <tr> <td>Floating</td> <td>Some substances float, some substances sink</td> </tr> </tbody> </table> <p><u>Disciplinary Knowledge (Working Scientifically):</u>            - 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.            - Setting up simple practical enquiries, comparative and fair tests.            - 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.</p>	Separating technique	Substance properties required to work	Filtration and sieving	A substance that does not dissolve in a liquid Different sized substances	Magnets	Some magnetic materials some non-magnetic	Evaporation	A solid substance dissolved in water and the solid has a higher boiling point than water.	Floating	Some substances float, some substances sink
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Autumn 2	<p><b>Living Things – 6 sessions</b></p> <p><b>Knowledge Block 1: Classifying living things</b>  <u>Substantive Knowledge:</u>            - Living things can be divided into groups based upon their characteristics.            - <b>Classification keys</b> help group, identify and name living things.</p>										

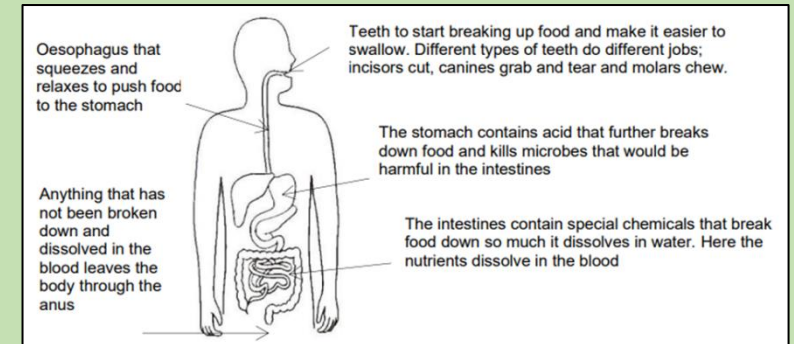
	<ul style="list-style-type: none"> <li>- Animals can be classified as vertebrates (having a spine) or invertebrates (lacking a spine).</li> <li>- In any habitat there are <b>food chains</b> and webs where <b>nutrients</b> are passed from one <b>organism</b> to another when it is eaten.</li> <li>- If the population of one organism in the chain or web is affected, it has a knock-on effect to all the others.</li> </ul> <p><b>Knowledge Block 2: Life cycles</b></p> <p><u>Substantive Knowledge:</u></p> <ul style="list-style-type: none"> <li>- Mammals, amphibians, insects and birds have different life cycles.</li> <li>- Lifecycles vary in time depending on the species of animal- it can be as short as just a few weeks for insects, to up to 200 years for sea urchins. Larger animals often have longer life cycles but not always.</li> <li>- All animal life cycles begin with growth and development followed by reproduction.</li> <li>- Some animals undergo a complete <b>metamorphosis</b> as they grow. Metamorphosis is a process where animals undergo an abrupt and obvious change in the structure of their body and their behaviour.</li> <li>- Some animals are <b>eusocial</b>. This means they live in colonies (groups) with one animal or group producing young and the others working to care for them.</li> </ul> <p><b>Knowledge Block 3: Environmental change</b></p> <p><u>Substantive Knowledge:</u></p> <ul style="list-style-type: none"> <li>- <b>Environmental change</b> affects different habitats differently.</li> <li>- Human activity significantly affects the environment.</li> <li>- Different organisms are affected differently by environmental change.</li> </ul> <p><u>Disciplinary Knowledge (Working Scientifically):</u></p> <ul style="list-style-type: none"> <li>- Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions.</li> <li>- Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.</li> <li>- Identifying differences, similarities or changes related to simple scientific ideas and processes.</li> <li>- Using straightforward scientific evidence to answer questions or to support their findings.</li> <li>- Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.</li> </ul>
<p>Spring 1/2</p>	<p><b>Digestion - 7 sessions</b></p> <p><b>Knowledge Block 1: Food groups</b></p> <p><u>Substantive Knowledge:</u></p> <ul style="list-style-type: none"> <li>- Animals need a variety of foods to help them grow and survive. The main food groups are: <ul style="list-style-type: none"> <li>• <b>Meat, dairy</b> and pulses provide <b>protein</b> for muscles.</li> <li>• <b>Grains</b> and <b>root vegetables</b> provide <b>carbohydrates</b> for energy.</li> <li>• <b>Fat</b> for <b>insulation</b> and energy.</li> <li>• <b>Fruit</b> and <b>vegetables</b> for <b>minerals, vitamins and fibre</b>. These are essential to keep our bodies working well and protect us from illnesses.</li> </ul> </li> </ul> <p><b>Knowledge Block 2: Variation in animals' diet</b></p> <p><u>Substantive Knowledge:</u></p> <ul style="list-style-type: none"> <li>- Different animals require different foods to survive.</li> <li>- Animals get their food from plants and other animals. This can be shown in a <b>food chain</b>. (From Year 2).</li> <li>- A food chain begins with a <b>producer</b>. This is often a green plant because plants can make their own food. (From Year 2).</li> <li>- A living thing that eats other plants is called a <b>consumer</b>. (From Year 2).</li> </ul>

- Humans require a balanced diet to remain **healthy** but healthy diets vary depending upon the type of activity that humans do.
- Humans have 2 sets of teeth in their lifetimes.
- Humans have three main types of teeth- incisors, canines and molars.
- Incisors help to bite off and chew pieces of food.
- Canines are used for tearing and ripping food.
- Molars help to crush and grind food.

### Knowledge Block 3: How humans digest food

#### Substantive Knowledge:

- The **nutrients** in food have to get to every part of the body. The **blood** transports them.
- The role of **digestion** is to get the nutrients in food to dissolve in the blood, if it doesn't dissolve it can't enter the blood and be transported.



#### Disciplinary Knowledge (Working Scientifically):

- Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.
- 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.
- Using straightforward scientific evidence to answer questions or to support their findings.
- 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.

### Plant Reproduction – 7 sessions

#### Knowledge Block 1 – The reproductive parts of a flowering plant

##### Substantive Knowledge:

- Flowering plants **reproduce** by the process of **pollination**.
- Pollination leads to the formation of a **seed** which can grow into a new plant.
- Flowering plants have evolved specific parts to carry out pollination and seed growth.
- Those parts are **stamen** where pollen is produced, **stigma** where pollen is collected, and the **ovaries** which contains the eggs that become a seed when the pollen travels down the stigma and meets the egg.
- Flowers have **petals** also are a range of colours, patterns, and smells to attract insects.

#### Knowledge Block 2 – All flowers are similar but different

##### Substantive Knowledge:

- Plants and flowers look different because they pollinate in different ways.
- There are two types of pollination Insect and wind.
- Insect pollinated flowers are usually bright coloured and strong scents.
- Wind pollinated flowers have less colourful petals and much less scent.

#### Knowledge Block 3 – Seed dispersal

##### Substantive Knowledge:

- Plants have evolved many different ways to **disperse** their seeds.
- Seed dispersal increases the chances of seeds **germinating** and growing into a mature plant.

#### Knowledge Block 4 – What a seed does

Spring 2/  
Summer 1

	<p><u>Substantive Knowledge:</u></p> <ul style="list-style-type: none"> <li>- A seed contains a miniature, undeveloped version of the plant.</li> <li>- They contain a food store for the first stage of growth (until the plant can make its own food).</li> <li>- They are surrounded with a protective coat.</li> </ul> <p><u>Disciplinary Knowledge (Working Scientifically):</u></p> <ul style="list-style-type: none"> <li>- Making systematic and careful observations.</li> <li>- Identifying differences, similarities or changes related to simple scientific ideas and processes.</li> <li>- Setting up simple practical enquiries, comparative and fair tests.</li> </ul>
<p>Summer 2</p>	<p><b>Making Electrical Circuits Work – 6 sessions</b></p> <p><b>Knowledge Block 1 – Electricity as a power source</b></p> <p><u>Substantive Knowledge:</u></p> <ul style="list-style-type: none"> <li>- Lots of <b>devices</b> are powered by <b>electricity</b>.</li> <li>- Electricity comes from a source.</li> <li>- There are two main sources - <b>batteries and mains</b>.</li> </ul> <p><b>Knowledge Block 2 – What batteries do</b></p> <p><u>Substantive Knowledge:</u></p> <ul style="list-style-type: none"> <li>- A battery pushes electricity to the device.</li> <li>- To be able to push electricity the battery must be connected to the device using <b>wires</b>.</li> <li>- This is called a <b>circuit</b>.</li> </ul> <p><b>Knowledge Block 3 – Making devices work harder</b></p> <p><u>Substantive Knowledge:</u></p> <ul style="list-style-type: none"> <li>- If there are more batteries added to a circuit this provides a bigger push on the electricity.</li> <li>- This will make the device work harder e.g., brighter bulbs, faster spinning motor, louder buzzer.</li> </ul> <p><b>Knowledge Block 4 – Insulators and conductors</b></p> <p><u>Substantive Knowledge:</u></p> <ul style="list-style-type: none"> <li>- Some materials will allow electricity to flow through them- <b>Conductors</b></li> <li>- Metals such as silver, gold and copper are good conductors. Water is also a conductor of electricity.</li> <li>- Other materials will not allow electricity to flow through them - <b>Insulators</b></li> <li>- Plastic, wood, glass and rubber are good electrical insulators. That is why they are used to cover materials that carry electricity.</li> <li>- A switch opens and closes a circuit.</li> </ul> <p><u>Disciplinary Knowledge (Working Scientifically):</u></p> <ul style="list-style-type: none"> <li>- Asking relevant questions and using different types of scientific enquiries to answer them.</li> <li>- Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.</li> <li>- Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.</li> <li>- Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions.</li> </ul>

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	<ul style="list-style-type: none"> <li>• Comparing differences and changes.</li> <li>• Describing in order to classify.</li> <li>• Surveys to identify patterns and support classification.</li> <li>• Describing the effect of changing things.</li> <li>• Using secondary sources, including the internet and <i>experts</i>.</li> <li>• Pupils begin to look for relationships between variables (patterns)</li> </ul>	<ul style="list-style-type: none"> <li>• Gather evidence to describe the differences and similarities between different organisms, habitats and objects.</li> <li>• 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).</li> <li>• 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 (<i>what change and what measure</i>).</li> </ul>	<p>Venn diagrams, bar charts.</p> <p>Timelines and tables showing how one and more than one thing changes over time, bar charts, tally charts.</p> <p>Results tables with the independent variable increasing in one column and the dependent variable in the other.</p>	<ul style="list-style-type: none"> <li>• Asking simple questions and recognising that they can be answered in different ways.</li> <li>• Observing closely, using simple equipment.</li> <li>• Performing simple tests.</li> <li>• Identifying and classifying.</li> <li>• Using their observations and ideas to suggest answers to questions.</li> <li>• Gathering and recording data to help in answering questions.</li> </ul>
3 and 4	<ul style="list-style-type: none"> <li>• Pupils become confident in identifying relationships between variables (patterns).</li> </ul>	<ul style="list-style-type: none"> <li>• Recognise that factors other than that we are changing may have an effect and seek to control these factors (<i>what change and what measure and what keep same</i>).</li> <li>• Gather evidence to describe and classify patterns of behaviour, characteristics and properties of materials and make generalisations from data samples.</li> </ul>	<p>Results tables with independent variable increasing in one column and dependent variable in the other.</p> <p>Increasing use of equipment that allows for standard measure (thermometers, data loggers, measuring cylinders, force meters, digital balances).</p>	<ul style="list-style-type: none"> <li>• Asking relevant questions and using different types of scientific enquiries to answer them.</li> <li>• Setting up simple practical enquiries, comparative and fair tests.</li> <li>• Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.</li> <li>• Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions.</li> <li>• Recording findings using simple scientific language, drawings,</li> </ul>

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