



Co-op Academy  
Broadhurst

# SCIENCE

Curriculum Intent, Implementation and  
Impact for Science at Co-op Academy  
Broadhurst

## Why is Science an important part of the curriculum at Broadhurst? (INTENT)

At Co-op Academy Broadhurst we have developed a high quality Science curriculum that provides the opportunities for all pupils to:

- develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics.
- develop understanding of the nature, processes and methods of science through different types of science enquiries that help them to answer scientific questions about the world around them.
- be equipped with the scientific skills required to understand the uses and implications of science, today and for the future. We understand that it is important for lessons to have a skills-based focus, and that the knowledge can be taught through this.

## Why is Science an important part of the curriculum at Broadhurst? (INTENT)

At the Co-op Academy Broadhurst, we provide an ambitious science curriculum, which covers the full scope of the National Curriculum. Our science curriculum is designed with the emphasis on pupils building their scientific knowledge sequentially, whilst also developing the skills of scientific enquiry. Our curriculum a progression model so that teachers build on prior knowledge and connect this to what comes next. Key knowledge is revisited within and across units so that pupils can build a secure understanding of increasingly complex scientific concepts. These key concepts are revisited as pupils move through Broadhurst. This, along with opportunities to work practically, contributes to the curriculum design for pupils with SEND.

Our science curriculum provides opportunities for pupils to consolidate and apply their knowledge from other curriculum areas, including mathematics, ICT/Computing, music and English. A heavy emphasis is placed on pupils' acquisition of language and vocabulary, including scientific words and more advanced high frequency words with multiple meanings. The science curriculum also provides the foundational knowledge needed in other wider curriculum subjects, such as geography and design technology. Our curriculum builds pupils' cultural capital through exposing them to great scientists, past and present, and important discoveries. We promote careers in science, taking every opportunity to discuss and describe less well-known jobs. Our curriculum includes a focus on current, diverse (counter-stereotypical) scientists. This is in keeping with our Co-op Values.

## Why is Science an important part of the curriculum at Broadhurst? (INTENT)

Each unit provides opportunities for pupils to work practically, giving them first-hand experiences of investigating and exploring safely. These experiences are designed to foster pupils' critical thinking as well as their reasoning and explanation skills. Key scientific knowledge is revisited, to support pupils in remembering more and assessments are in place to check they can apply their knowledge.

In line with our inclusive values, we support our pupils with SEND to acquire the core knowledge they need to unlock future learning. To this end, we use knowledge organisers to identify the vital knowledge pupils need to remember. Pupils, including disadvantaged pupils, also benefit from the emphasis on science careers, aimed at broadening pupils' horizons and keeping their aspirations on track. As a trust, we promote a range of enrichment opportunities, including the celebration of British Science week and provision of STEM clubs.

## What are the key knowledge concepts in Science at Broadhurst? (What do the children need to know?)

| <b>Working scientifically</b>   | <b>Plants</b>   | <b>Animals, including humans</b>   |
|---|---|--|
| <p>Understanding</p> <p>Questioning and researching</p> <p>Observing over time</p> <p>Comparative fair testing</p> <p>Pattern seeking</p> <p>Classifying and grouping</p> | <p>Plants around us</p> <p>Plants that benefit us</p> <p>Life cycles</p> <p>Reproduction</p> <p>Environmental changes</p> | <p>Senses</p> <p>Healthy eating and exercise</p> <p>Skeletons, muscles and circulation</p> <p>Teeth and digestion</p> <p>Human development</p> |
| <b>Everyday materials</b>   | <b>Living things</b>  | <b>Physical world</b>  |
| <p>Labelling</p> <p>Properties and uses</p> <p>Changing shape</p> <p>States of matter</p>   | <p>Classifying and sorting</p> <p>Food chains</p> <p>Environmental factors</p> <p>Habitats</p>                            | <p>Rocks &amp; soils</p> <p>Light</p> <p>Forces</p> <p>Electricity</p>   |

## What does the Science curriculum look like at Co-op Academy Broadhurst?

- Children are curious and ask questions about what they notice.
- Children develop their understanding of scientific ideas through a range of activities.
- Through our science lessons, children use different types of scientific enquiry to answer their own questions.
- Broadhurst scientists observe changes over a period of time, noticing patterns, grouping and classifying things, carrying out simple comparative tests, and finding things out using secondary sources of information.
- Children use scientific language to talk about what they have found out and communicate their ideas to a range of audiences in a variety of ways.
- Children use scientific equipment and resources in a safe and knowledgeable way.

## What does the delivery of the Science curriculum look like at Broadhurst?

### Science Teaching

At Broadhurst, Science is taught through cross curricular themes. In Key Stage Two, science is taught weekly and linked to learning challenges where this is possible. Each class will study a famous scientist each term.

### Extra Curricular Opportunities

We provide opportunities for all children to engage in extra-curricular activities before, during and after school, in addition to competitive sporting events. This is an inclusive approach which endeavours to encourage not only physical development but also well-being for all pupils.

### Curriculum Enhancements

Forest schools enables science to be linked to children's outdoor learning.

### EYFS

Through the joys of continuous provision, children are able to test out their own ideas and ask questions related to their scientific enquiry.

## How do we plan for progression of knowledge and skills within Science at Broadhurst?

### Rationale for progression

- Knowledge taught becomes more in depth.
- Increasing complexity of language and precision expected.
- Pupils demonstrate their knowledge and understanding as a scientist through investigations and experiments.
- A pre learning task establishes the starting point of the children and assessments are used at the end of the units to determine the knowledge and skills acquired.
- Whole school progression document for working scientifically and subject fluency to ensure knowledge and skills are built on.

# How do we plan for progression of knowledge and skills within Science at Broadhurst?

## Implementation

|                        | Key Stage One  | Lower Key Stage Two  | Upper Key Stage Two  |
|------------------------|--|--|--|
| To work scientifically | <ul style="list-style-type: none"> <li>● Ask simple questions</li> <li>● Know how to use simple equipment</li> <li>● Know how to observe closely</li> <li>● Understand how to perform simple tests</li> <li>● Know how to identify and classify Use observations and ideas to suggest answers to questions</li> <li>● Know how to gather and record data to help answer questions</li> </ul> | <ul style="list-style-type: none"> <li>● Ask relevant questions</li> <li>● To know how to set up simple practical enquiries and comparative and fair tests To know how to make accurate measurements using standard units, using a range of equipment, e.g. thermometers and data loggers.</li> <li>● To know how to gather, record, classify and present data in a variety of ways to help in answering questions.</li> <li>● Record findings using simple scientific language, drawings, labelled diagrams, bar charts and tables.</li> <li>● Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. Know how to use results to draw simple conclusions and suggest improvements, new questions and predictions for setting up further tests.</li> <li>● Knows how to identify differences, similarities or changes related to simple, scientific ideas and processes.</li> <li>● Understands how to use straightforward, scientific evidence to answer questions or to support their findings</li> </ul> | <ul style="list-style-type: none"> <li>● Plan enquiries, including recognising and controlling variables where necessary. Knows how to use appropriate techniques, apparatus, and materials during fieldwork and laboratory work.</li> <li>● Knows how to take measurements, using a range of scientific equipment, with increasing accuracy and precision.</li> <li>● Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, bar and line graphs, and models. Report findings from enquiries, including oral and written explanations of results, explanations involving causal relationships, and conclusions. Present findings in written form, displays and other presentations. Use test results to make predictions to set up further comparative and fair tests.</li> <li>● Know how to use simple models to describe scientific ideas, identifying scientific evidence that has been used to support or refute ideas or arguments.</li> </ul> |

# How do we plan for progression of knowledge and skills within Science at Broadhurst?

## Implementation

|                          | Key Stage One  | Lower Key Stage Two   | Upper Key Stage Two   |
|--------------------------|--|---|---|
| Animals Including humans | <ul style="list-style-type: none"> <li>-Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals</li> <li>-Identify and name a variety of common animals that are carnivores, herbivores and omnivores</li> <li>-Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets)</li> <li>-Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense</li> <li>-Understand that animals, including humans, have offspring which grow into adults</li> <li>-Describe the basic needs of animals, including humans, for survival (water, food and air)</li> <li>-Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene</li> </ul> | <ul style="list-style-type: none"> <li>-Identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat</li> <li>-Identify that humans and some other animals have skeletons and muscles for support, protection and movement</li> <li>-Describe the simple functions of the basic parts of the digestive system in humans</li> <li>-Identify the different types of teeth in humans and their simple functions</li> <li>-Construct and interpret a variety of food chains, identifying producers, predators and prey</li> </ul> | <ul style="list-style-type: none"> <li>-Describe the changes as humans develop to old age</li> <li>-Describe the life process of reproduction in some animals.</li> <li>-Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood</li> <li>-Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function</li> <li>-Describe the ways in which nutrients and water are transported within animals, including humans</li> </ul> |

# How do we plan for progression of knowledge and skills within Science at Broadhurst?

## Implementation

|   | Key Stage One   | Lower Key Stage Two  | Upper Key Stage Two  |
|---|---|--|--|
| <p>Living Things and their Habitats (Evolution)</p> | <ul style="list-style-type: none"> <li>-Explore and compare the difference between things that are living, dead, and things that have never been alive</li> <li>-Identify that most living things live in habitats to which they are suited and describe how different habitats provide the basic needs of different kinds of animals and plants, and how they depend on each other.</li> <li>-Identify and name a variety of plants and animals in their habitats, including micro-habitats</li> <li>-Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food.</li> </ul> <p><b><u>Seasonal Changes</u></b></p> <ul style="list-style-type: none"> <li>-Observe changes across the four seasons</li> <li>-Observe and describe weather associated with the seasons and how day length varies</li> </ul> | <ul style="list-style-type: none"> <li>-Recognise that living things can be grouped in a variety of ways</li> <li>-Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment</li> <li>-Recognise that environments can change and that this can sometimes pose dangers and have an impact on living things</li> </ul> | <ul style="list-style-type: none"> <li>-Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird</li> <li>-Describe the life process of reproduction in some plants.</li> <li>-Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals</li> <li>-Give reasons for classifying plants and animals based on specific characteristics</li> </ul> <p><b><u>Evolution and Inheritance</u></b></p> <ul style="list-style-type: none"> <li>-Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago</li> <li>-Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents</li> <li>-Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution</li> </ul> |

# How do we plan for progression of knowledge and skills within Science at Broadhurst?

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|  | Key Stage One  | Lower Key Stage Two  | Upper Key Stage Two   |
|--|--|--|---|
| Materials and States of Matter and Rocks | <ul style="list-style-type: none"> <li>-Distinguish between an object and the material from which it is made</li> <li>-Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock</li> <li>-Describe the simple physical properties of a variety of everyday materials</li> <li>--Compare and group together a variety of everyday materials on the basis of their simple physical properties</li> <li>-Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses</li> <li>-Describe how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching</li> </ul> | <ul style="list-style-type: none"> <li>-Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties</li> <li>-Describe in simple terms how fossils are formed when things that have lived are trapped within rock</li> <li>- Recognise that soils are made from rocks and organic matter</li> <li>-Compare and group materials together, according to whether they are solids, liquids or gases</li> <li>-Observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C)</li> <li>-Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature</li> </ul> | <ul style="list-style-type: none"> <li>-Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets</li> <li>-Recognise that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution</li> <li>-Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating</li> <li>-Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic</li> <li>-Demonstrate that dissolving, mixing and changes of state are reversible changes</li> <li>-Explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda</li> </ul> |

## How do we plan for progression of knowledge and skills within Science at Broadhurst?

### Implementation

|        | Key Stage One  | Lower Key Stage Two  | Upper Key Stage Two |
|--------|--|--|---------------------|
| Plants | <ul style="list-style-type: none"><li>-Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees</li><li>-Identify and describe the basic structure of a variety of common flowering plants, including trees</li><li>-Observe and describe how seeds and bulbs grow into mature plants</li><li>-Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy</li></ul> | <ul style="list-style-type: none"><li>-Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers</li><li>-Explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant</li><li>-Investigate the way in which water is transported within plants</li><li>-Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal</li></ul> |                     |

## How do we plan for progression of knowledge and skills within Science at Broadhurst?

### Implementation

|                         | Key Stage One | Lower Key Stage Two  | Upper Key Stage Two   |
|-------------------------|---------------|--|---|
| Forces, Earth and Space |               | <ul style="list-style-type: none"><li>-Compare how things move on different surfaces</li><li>-Notice that some forces need contact between two objects, but magnetic forces can act at a distance</li><li>-Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials</li><li>-Describe magnets as having two poles<br/>Predict whether two magnets will attract or repel each other, depending on which poles are facing</li></ul> | <ul style="list-style-type: none"><li>-Describe the movement of the Earth, and other planets, relative to the Sun in the solar system</li><li>-Describe the movement of the Moon relative to the Earth</li><li>-Describe the Sun, Earth and Moon as approximately spherical bodies</li><li>-Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky</li></ul> |

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|                              | Lower Key Stage Two  | Upper Key Stage Two   |
|------------------------------|--|---|
| Sound, Light and Electricity | <ul style="list-style-type: none"> <li>-Recognise that he/she needs light in order to see things and that dark is the absence of light</li> <li>-Notice that light is reflected from surfaces</li> <li>-Recognise that light from the sun can be dangerous and that there are ways to protect eyes</li> <li>-Recognise that light from the sun can be dangerous and that there are ways to protect eyes</li> <li>--Find patterns in the way that the size of shadows change</li> <li>-Identify how sounds are made, associating some of them with something vibrating</li> <li>-Recognise that vibrations from sounds travel through a medium to the ear</li> <li>-Find patterns between the pitch of a sound and features of the object that produced it</li> <li>-Find patterns between the volume of a sound and the strength of the vibrations that produced it</li> <li>-Recognise that sounds get fainter as the distance from the sound source increases</li> <li>-Identify common appliances that run on electricity</li> <li>-Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers Identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery</li> <li>-Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit</li> <li>-Recognise some common conductors and insulators, and associate metals with being good conductors</li> </ul> | <ul style="list-style-type: none"> <li>-Recognise that light appears to travel in straight lines</li> <li>-Use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye</li> <li>-Explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes</li> <li>-Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them</li> <li>-Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit</li> <li>-Compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches</li> <li>-Use recognised symbols when representing a simple circuit in a diagram</li> </ul> |

## Long term Plan

|                   | Topic content of Science covered in each year group |                                |                                  |        |  |
|-------------------|---|--------------------------------|----------------------------------|--------|--|
| <b>Year<br/>1</b> | Seasonal<br>Change                                  | Animals<br>including<br>humans | Materials                        | Plants |  |
| <b>Year<br/>2</b> | Living things<br>and their<br>habitat               | Animals<br>including<br>humans | Uses of<br>everyday<br>materials | Plants |  |

## Long term Plan

|                   | Topic content of Science covered in each year group |                          |       |                  |             |
|-------------------|---|--------------------------|-------|------------------|-------------|
| <b>Year<br/>3</b> | Forces and magnets                                  | Animals including humans | Rocks | Light            | Plants      |
| <b>Year<br/>4</b> | Living things and their habitats                    | Animals including humans | Sound | States of matter | Electricity |

## Long term Plan

|                   | <b>Topic content of Science covered in each year group</b> |                          |                           |                                     |             |
|-------------------|--|--------------------------|---------------------------|-------------------------------------|-------------|
| <b>Year<br/>5</b> | Living things and their habitats                           | Animals including humans | Earth and space           | Properties and changes of materials | Forces      |
| <b>Year<br/>6</b> | Living things and their habitats                           | Animals including humans | Evolution and inheritance | Light                               | Electricity |

### How do we know that the children have made progress in Science?

#### Assessments

Children's progress is continually monitored throughout their time at the Co-op Academy Broadhurst and is used to inform future teaching and learning. By the end of each key stage, pupils are expected to know, apply and understand the matters, skills and processes specified in the relevant programme of study as set out in the National Curriculum.

#### AFL

Children receive effective feedback through teacher assessment, both orally and through written feedback in line with the success criteria. Children are guided towards achievement of the main objective through the use of process based 'success criteria', provided by and explained by the teacher. Children will have these to refer to in the lesson, where they will be evident in their books and used to identify areas of difficulty by children and teachers when reviewing and assessing work.

## How do we know that our Science Curriculum is successful?

### Pupil Voice

Children can talk about Science with enthusiasm and are able to apply and test out their knowledge. Children being encouraged to ask and answer questions and discuss their work and ideas.

### Assessment Analysis

Children will be tested on their scientific knowledge through the use of TAP assessments in KS1 at the end of each unit of Science which is completed in across curricular manner.

In KS2, children will be assessment at the end of each unit of Science using Testbase questions to assess their understanding of the concepts taught.