Murdishaw West Community Primary School
Science Curriculum Overview

Year 5 (Science) – Living Things and their Habitats (Circle of Life)

The **BIG** Picture

Pupils will build on their learning from year 4 and will raise questions about their local environment throughout the year. They will observe life-cycle changes in a variety of living things, for example, plants in the vegetable garden or flower border, and animals in the local environment. They will find out about the work of naturalists and animal behaviourists, for example, David Attenborough and Jane Goodall. Pupils will also explore different types of reproduction, including sexual and asexual reproduction in plants, and sexual reproduction in animals.

Additional experiences to enhance learning: STEM visitors and experiences, links with the local High School, can visit the pond at a local Primary School and use the school grounds

What do we already know?

•Notice that animals, including humans, have offspring which grow into adults. (Y2 - Animals, including humans)

•Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. (Y3 - Plants)

Sticky Knowledge:

Can they describe and compare the life cycles of a range of animals, including humans, amphibians, insects and birds?

Can they describe the life cycles of common plants?

Can they describe and explain the process of reproduction in humans and plants?

Can they talk with knowledge about birth, reproduction and death of familiar animals or plants?

Can they explore the work of well know naturalists? (David Attenborough and Jane Goodall)

Challenge - Can they observe their local environment and draw conclusions about life-cycles? (for example, the vegetable garden or plants in a shrubbery)

Challenge - Can they compare the life cycles of plants and animals in their local environment with the life cycles of those around the world, e.g. rainforests?

NC Objectives:
Working Scientifically taught throughout Year 5/6:

•Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
•Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate
•Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs
•Using test results to make predictions to set up further comparative and fair tests
•Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations
•Identifying scientific evidence that has been used to support or refute ideas or arguments

National Curriculum Knowledge: Year 5:

- Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird.
- Describe the life process of reproduction in some plants and animals.

Types of Scientific Enquiry:

- Identifying and classifying
- Fair testing
- Changes over time

Key vocabulary:

life cycle, reproduce, sexual, fertilises, asexual, plantlets, runners, tubers, bulbs, cuttings

Key Knowledge:

As part of their life cycle, plants and animals reproduce. Most animals reproduce sexually. This involves two parents where the sperm from the male fertilises the female egg. Animals, including humans, have offspring which grow into adults. In humans and some animals, these offspring will be born live, such as babies or kittens, and then grow into adults. In other animals, such as chickens or snakes, there may be eggs laid that hatch to young which then grow to adults. Some young undergo a further change before becoming adults e.g. caterpillars to butterflies. This is called a metamorphosis.
Plants reproduce both sexually and asexually. Bulbs, tubers, runners and plantlets are examples of asexual plant reproduction which involves only one parent. Gardeners may force plants to reproduce asexually by taking cuttings. Sexual reproduction occurs through pollination, usually involving wind or insects.

Scientists across the Curriculum:

Choose from the following options:

David Attenborough – Naturalist and TV Presenter

Jane Goodall – Wildlife Researcher

Roger Arliner Young 0 Zoologist

Ernest Everett Just - Zoologist

Murdishaw West Community Primary School
Science Curriculum Overview

Year 5 (Science) – Animals, including Humans (Reproduction in Animals)

The **BIG** Picture

This unit will provide pupils with the opportunity to draw a timeline to indicate stages in the growth and development of humans. They will also learn about the changes experienced in puberty.

Pupils will build on their knowledge of stages of growth from their History lessons where the children have created a timeline of their lives, looking at the different stages. The children will also build on their knowledge from PSHE lessons where they look at changes as we develop.

Additional experiences to enhance learning: STEM visitors and experiences, links with the local High School, links with the school nurse and Halton Health Team

What do we already know?

Notice that animals, including humans, have offspring which grow into adults. (Y2 - Animals, including humans)

Sticky Knowledge:

Can they create a timeline to indicate stages of growth in humans?

Can they explain the changes that occur as they develop through each stage?

Can they explain what puberty is?

Can they explain what changes occur during puberty?

Challenging – Can they create a timeline to indicate stages of growth in certain animals, such as frogs and butterflies?

NC Objectives:
Working Scientifically taught throughout Year 5/6:

- Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
- Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate
- Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs
- Using test results to make predictions to set up further comparative and fair tests
- Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations
- Identifying scientific evidence that has been used to support or refute ideas or arguments

National Curriculum Knowledge: Year 5:

Describe the changes as humans develop to old age.

Types of Scientific Enquiry:

- Identifying and classifying
- Research
- Pattern seeking
- Changes over time

Key vocabulary:

period, menstruation, hormones, public hair, vulvas, penis, testicles, puberty, growth, age, development, changes

Key Knowledge:

When babies are young, they grow rapidly. They are very dependent on their parents. As they develop, they learn many skills. At puberty, a child's body changes and develops primary and secondary sexual characteristics. This enables the adult to reproduce.

This needs to be taught alongside PSHE. The new statutory requirements for relationships and health education can be found in the statutory guidance on Physical health and mental wellbeing (primary and secondary) and information can be found in our Learning for Life Curriculum (SCARF) Growing and Changing

Scientists across the Curriculum:

Choose from the following options:

Virginia Apgar – Doctor and Medical Researcher

Robert Winston – Professor of Science and Society, Fertility Studies and TV Presenter

Murdishaw West Community Primary School
Science Curriculum Overview

Year 5 (Science) – Properties and Changes of Materials (Materials: All Change)

The **BIG** Picture

Pupils will build a more systematic understanding of materials by exploring and comparing their properties, relating these to what they learnt about magnetism in year 3 and about electricity in year 4. They will explore reversible changes, recognising that melting and dissolving are different processes. Pupils will also explore changes that are difficult to reverse. They will research to find out about how chemists create new materials.

Additional experiences to enhance learning: STEM visitors and experiences, links with the local High School, can visit the pond at a local Primary School and use the school grounds

What do we already know?

- Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. (Y2 - Uses of everyday materials)
- Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. (Y2 - Uses of everyday materials)
- 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. (Y3 - Forces and magnets)
- Compare and group materials together, according to whether they are solids, liquids or gases. (Y4 - States of matter)
- 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). (Y4 - States of matter)
- Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. (Y4 - States of matter)

Sticky Knowledge:

Can they test and group materials based on scientific evidence? (hardness, solubility, transparency, conductivity, insulation, magnetism)

Can they explain the process of dissolving?

Can they recover a substance from a solution?

Can they decide how a mixture would best be separated? (filtering, sieving, evaporating)

Can they give reasons for the uses of everyday materials based on scientific evidence?

Can they show what they know about the properties of different materials?

Can they use their knowledge of materials to suggest ways to classify? (solids, liquids, gasses)

Can they describe changes using scientific words? (evaporation, condensation)

Can they use the terms 'reversible' and 'irreversible'?

Challenge – Can they describe methods for separating mixtures? (filtration, distillation)
Challenge - Can they work out which materials are most effective for keeping us warm or for keeping something cold?

NC Objectives:
Working Scientifically taught throughout Year 5/6:

- Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
- Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate
- Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs
- Using test results to make predictions to set up further comparative and fair tests
- Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations
- Identifying scientific evidence that has been used to support or refute ideas or arguments

National Curriculum Knowledge: Year 5:

- 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.
- Know that some materials will dissolve in liquid to form a solution and describe how to recover a substance from a solution.
- Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating.
- Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic.
- Demonstrate that dissolving, mixing and changes of state are reversible changes.
- 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.

Types of Scientific Enquiry:

- Identifying and classifying
- Fair testing
- Changes over time

Key vocabulary:

Thermal/electrical insulator/conductor, change of state, mixture, dissolve, solution, soluble, insoluble, filter, sieve, reversible/non-reversible change, burning, rusting, new material

Key Knowledge:

Materials have different uses depending on their properties and state (liquid, solid, gas). Properties include hardness, transparency, electrical and thermal conductivity and attraction to magnets. Some materials will dissolve in a liquid and form a solution while others are insoluble and form sediment.

Mixtures can be separated by filtering, sieving and evaporation.
Some changes to materials such as dissolving, mixing and changes of state are reversible, but some changes such as burning wood, rusting and mixing vinegar with bicarbonate of soda result in the formation of new materials and these are not reversible.

Scientists across the Curriculum:

Choose from the following options:

Spencer Silver and Arthur Fry – Chemical Engineer and Chemist who invented the post-it note

Ruth Benerito – Chemist who developed wrinkle-free cotton fabric

Andre Geim and Konstantin Novoselov – Physicist who discovered grapheme

Jamie Garcia – Chemist who discovered a fully recyclable plastic

Raquel Prado – Chemist who developed a sustainable fabric

Murdishaw West Community Primary School
Science Curriculum Overview

Year 5 (Science) – Earth and Space (The Earth and Beyond)

The **BIG** Picture

Pupils will explore space and the Earth they live on. They will look at a model of the sun and Earth and they will explore how we have day and night. Pupils will learn that the sun is a star at the centre of our solar system and that there are 8 planets: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune. They will be made aware that a moon is a celestial body that orbits a planet and they will know that Earth has 1 moon; Jupiter has 4 large moons and numerous smaller ones. Pupils will also be warned that it is not safe to look directly at the sun, even when wearing dark glasses.

Additional experiences to enhance learning: STEM visitors and experiences, links with the local High School and use the school grounds

What do we already know?

•Explore the natural world around them. (Reception – Earth and space)
•Describe what they see, hear and feel whilst outside. (Reception – Earth
•and space)
•Observe changes across the four seasons. (Y1 - Seasonal changes)
•Observe and describe weather associated with the seasons and how day
•length varies. (Y1 - Seasonal changes)

Sticky Knowledge:

Can they identify and explain the movement of the Earth relative to the sun?

Can they explain how seasons and the associated weather is created?

Can they identify and explain the movement of the moon relative to the Earth?

Can they explain the size, shape and position of the earth, sun and moon?

Can they explain how night and day are created and use diagrams to show this?

Can they explain how planets are linked to stars?

Challenging – Can they compare the time of day at different places on the earth?

Challenging – Can they create shadow clocks?

Challenging – Can they begin to understand how older civilizations used the sun to create astronomical clocks?

Challenging – Can they explore the work of some space pioneers?

NC Objectives:
Working Scientifically taught throughout Year 5/6:

•Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
•Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate
•Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs
•Using test results to make predictions to set up further comparative and fair tests
•Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations
•Identifying scientific evidence that has been used to support or refute ideas or arguments

National Curriculum Knowledge: Year 5:

- Describe the movement of the Earth, and other planets, relative to the Sun in the solar system.
- Describe the movement of the Moon relative to the Earth.
- Describe the Sun, Earth and Moon as approximately spherical bodies.
- Use the idea of the Earth's rotation to explain day and night and the apparent movement of the Sun across the sky.

Types of Scientific Enquiry:

- Identifying and classifying
- Research

Scientists across the Curriculum:

Choose from the following options:
Claudius Ptolemaeus
Nicolaus Copernicus
Galileo Galilei
Jahannes Kepler
Stephen Hawkins
Neil Armstrong
Margaret Hamilton – Computer Scientist
Caroline Herschel – Astronomer
Valentina Tereshkova
Mae Jemison
Dr Claudia Alexander
Maggie Aderin-Pocock
Helen Sharman
Tim Peake

See Scientist across the curriculum document for information

Key vocabulary:

Sun, Moon, Earth, planets (Mercury, Jupiter, Saturn, Venus, Mars, Uranus, Neptune), spherical, Solar System, rotate, star, orbit

Key Knowledge:

The Sun is a star. It is at the centre of our solar system. There are 8 planets (can choose to name them, but not essential). These travel around the Sun in fixed orbits. Earth takes 365¼ days to complete its orbit around the Sun. The Earth rotates (spins) on its axis every 24 hours. As Earth rotates half faces the Sun (day) and half is facing away from the Sun (night). As the Earth rotates, the Sun appears to move across the sky. The Moon orbits the Earth. It takes about 28 days to complete its orbit. The Sun, Earth and Moon are approximately spherical.

Murdishaw West Community Primary School
Science Curriculum Overview

Year 5 (Science) – Forces (Feel the Force)

The **BIG** Picture

Pupils will explore falling objects and raise questions about the effects of air resistance by observing how different objects fall. They will experience forces that make things begin to move, get faster or slow down. Pupils will explore the effects of friction on movement and find out how it slows or stops moving objects. Pupils will also explore the effects of levers, pulleys and simple machines on movement. Pupils will find out how scientists helped to develop the theory of gravitation.

Additional experiences to enhance learning: STEM visitors and experiences, links with the local High School and use the school grounds

What do we already know?

•Compare how things move on different surfaces. (Y3 - Forces and magnets)
•Notice that some forces need contact between two objects, but magnetic forces can act at a distance. (Y3 - Forces and magnets)
•Observe how magnets attract or repel each other and attract some materials and not others. (Y3 - Forces and magnets)
•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. (Y3 - Forces and magnets)
•Describe magnets as having two poles. (Y3 - Forces and magnets)
•Predict whether two magnets will attract or repel each other, depending
•on which poles are facing. (Y3 - Forces and magnets)

Sticky Knowledge:

Can they explain what gravity is and its impact on our lives?

Can they explain why a wheeled object that is initially pushed will slow down and stop?

Can they explain the impact of friction on a moving object?

Can they explain the effect of drag force on moving objects?

Can they explain how force and motion can be transferred through gears, pulleys, levers and springs?

Challenge - Can they describe and explain how motion is affected by forces? (including gravitational attractions, magnetic attraction and friction)

Challenge - Can they design very effective parachutes?

Challenge - Can they work out how water can cause resistance to floating objects?

NC Objectives:
Working Scientifically taught throughout Year 5/6:

•Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
•Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate
•Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs
•Using test results to make predictions to set up further comparative and fair tests
•Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations
•Identifying scientific evidence that has been used to support or refute ideas or arguments

National Curriculum Knowledge: Year 5:

- Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object.
- Identify the effects of air resistance, water resistance and friction that act between moving surfaces.
- Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.

Types of Scientific Enquiry:

- Identify and classifying
- Research
- Fair tests
- Pattern seeking

Key vocabulary:

Force, gravity, Earth, air resistance, water resistance, friction, mechanisms, simple machines, levers, pulleys, gears

Key Knowledge:

A force causes an object to start moving, stop moving, speed up, slow down or change direction. Gravity is a force that acts at a distance. Everything is pulled to the Earth by gravity. This causes unsupported objects to fall.
Air resistance, water resistance and friction are contact forces that act between moving surfaces. The object may be moving through the air or water, or the air and water may be moving over a stationary object.
A mechanism is a device that allows a small force to be increased to a larger force. The pay back is that it requires a greater movement. The small force moves a long distance and the resulting large force moves a small distance, e.g. a crowbar or bottle top remover. Pulleys, levers and gears are all mechanisms, also known as simple machines.

Scientists across the Curriculum:

Choose from the following options:

Archimedes – developed theories about levers and pulleys

Galileo Galilei – test theories about gravity and the Solar System

Issac Newton – developed theories about gravity

George Cayley – designed the first successful glider to carry a human

Brahmagupta – first scientist to talk about gravity