



Year 3

Science Curriculum

Ravensdale Junior School

Year 3 Working Scientifically (all to be assessed across the year through the 6 topics taught and have equal weighting)

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| <p>Ask questions such as: Why does the moon appear as different shapes in the night sky? Why do shadows change during the day? Where does a fossil come from?</p> | <p>Use research to find out what the main differences are between sedimentary and igneous rocks.</p> | <p>Measure carefully (taking account of mathematical knowledge up to Year 3) and add to scientific learning.</p> |
| <p>Observe at what time of day a shadow is likely to be at its longest and shortest.</p> | <p>Test to see which type of soil is most suitable when growing two similar plants.</p> | <p>Use a thermometer to measure temperature and know there are two main scales used to measure temperature.</p> |
| <p>Observe which type of plants grow in different places. E.g. bluebells in woodland, roses in domestic gardens etc.</p> | <p>Test to see if their right hand is as efficient as their left hand.</p> | <p>Gather and record information using a chart, matrix or tally chart depending on what is most sensible.</p> |
| <p>Use research to find out how reflection can help us see things that are around the corner.</p> | <p>Set up a fair test with different variables e.g. the best conditions for a plant to grow.</p> | <p>Group information according to common factors, e.g. plants that grow in woodlands or plants that grow in gardens.</p> |
| <p>Know how to use a key to help understanding information presented on a chart.</p> | <p>Explain to a partner why a test is a fair one, e.g. lifting weights with the right and the left hand etc.</p> | <p>Use bar charts and other statistical tables to record findings.</p> |
| <p>Make sense of findings and draw conclusions which help them to understand more about scientific information.</p> | <p>Be confident to stand in front of others and explain what has been found out, for example about how the moon changes shape.</p> | <p>Amend predictions according to findings.</p> |
| | | <p>Present findings using written explanations and include diagrams when needed.</p> <p>Be prepared to change ideas as a result of what has been found out during a scientific enquiry.</p> |



| Year | 3 | Topic | Plants |
|---|---|-------|--------|
| <p>Key question: How green fingered am I?</p> <ul style="list-style-type: none"> Identify and describe the functions of different parts of flowering plants: roots; stem/trunk; leaves; and flowers. 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. Investigate the way in which water is transported within plants. Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. | | | |

| Prior learning | Future learning |
|--|---|
| <ul style="list-style-type: none"> Observe and describe how seeds and bulbs grow into mature plants. (Y2 - Plants) Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy. (Y2 - Plants) | <ul style="list-style-type: none"> Describe the life process of reproduction in some plants and animals. (Y5 - Living things and their habitats) Reproduction in plants, including flower structure, wind and insect pollination, fertilisation, seed and fruit formation and dispersal, including quantitative investigation of some dispersal mechanisms. (KS3) |

| WHAT PUPILS NEED TO KNOW OR DO TO BE SECURE | |
|---|---|
| Show understanding of a concept using scientific vocabulary correctly | |
| Key learning | Possible evidence |
| <p>Many plants, but not all, have roots, stems/trunks, leaves and flowers/blossom. The roots absorb water and nutrients from the soil and anchor the plant in place. The stem transports water and nutrients/minerals around the plant and holds the leaves and flowers up in the air to enhance photosynthesis, pollination and seed dispersal. The leaves use sunlight and water to produce the plant's food. Some plants produce flowers which enable the plant to reproduce. Pollen, which is produced by the male part of the flower, is transferred to the female part of other flowers (pollination). This forms seeds, sometimes contained in berries or fruits which are then dispersed in different ways. Different plants require different conditions for germination and growth.</p> | <ul style="list-style-type: none"> Can explain the function of the parts of a flowering plant Can describe the life cycle of flowering plants, including pollination, seed formation, seed dispersal, and germination Can give different methods of pollination and seed dispersal, including examples |
| Key vocabulary | |
| <p>Photosynthesis, pollen, insect/wind pollination, seed formation, seed dispersal (wind dispersal, animal dispersal, water dispersal)</p> | |

Common misconceptions

Some children may think:

- plants eat food
- food comes from the soil via the roots
- flowers are merely decorative rather than a vital part of the life cycle in reproduction
- plants only need sunlight to keep them warm
- roots suck in water which is then sucked up the stem.

Apply knowledge in familiar related contexts, including a range of enquiries

Activities

- Observe what happens to plants over time when the leaves or roots are removed.
- Observe the effect of putting cut white carnations or celery in coloured water.
- Investigate what happens to plants when they are put in different conditions e.g. in darkness, in the cold, deprived of air, different types of soil, different fertilisers, varying amount of space.
- Spot flowers, seeds, berries and fruits outside throughout the year.
- Observe flowers carefully to identify the pollen.
- Observe flowers being visited by pollinators e.g. bees and butterflies in the summer.
- Observe seeds being blown from the trees e.g. sycamore seeds.
- Research different types of seed dispersal.
- Classify seeds in a range of ways, including by how they are dispersed.
- Create a new species of flowering plant.

Possible evidence

- Can explain observations made during investigations
- Can look at the features of seeds to decide on their method of dispersal
- Can draw and label a diagram of their created flowering plant to show its parts, their role and the method of pollination and seed dispersal



Year

3

Topic

Animals, including humans

Key question: How healthy am I?

- 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.
- Identify that humans and some other animals have skeletons and muscles for support, protection and movement.

Prior learning

- Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. (Y1 - Animals, including humans)
- Identify and name a variety of common animals that are carnivores, herbivores and omnivores. (Y1 - Animals, including humans)
- Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets). (Y1 - Animals, including humans)
- Find out about and describe the basic needs of animals, including humans, for survival (water, food and air). (Y2 - Animals, including humans)
- Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene. (Y2 - Animals, including humans)

Future learning

- Describe the simple functions of the basic parts of the digestive system in humans. (Y4 - Animals, including humans)
- Identify the different types of teeth in humans and their simple functions. (Y4 - Animals, including humans)
- Construct and interpret a variety of food chains, identifying producers, predators and prey. (Y4 - Animals, including humans)
- Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function. (Y6 - Animals, including humans)

WHAT PUPILS NEED TO KNOW OR DO TO BE SECURE

Show understanding of a concept using scientific vocabulary correctly

Key learning

Animals, unlike plants which can make their own food, need to eat in order to get the nutrients they need. Food contains a range of different nutrients – carbohydrates (including sugars), protein, vitamins, minerals, fats, sugars, water – and fibre that are needed by the body to stay healthy. A piece of food will often provide a range of nutrients.

Humans, and some other animals, have skeletons and muscles which help them move and provide protection and support.

Possible evidence

- Can name the nutrients found in food
- Can state that to be healthy we need to eat the right types of food to give us the correct amount of these nutrients

Key vocabulary

Nutrition, nutrients, carbohydrates, sugars, protein, vitamins, minerals, fibre, fat, water, skeleton, bones, muscles, support, protect, move, skull, ribs, spine, muscles, joints

- Can name some bones that make up their skeleton, giving examples that support, help them move or provide protection
- Can describe how muscles and joints help them to move

Common misconceptions

Some children may think:

- certain whole food groups like fats are 'bad' for you
- certain specific foods, like cheese are also 'bad' for you
- diet and fruit drinks are 'good' for you
- snakes are similar to worms, so they must also be invertebrates
- invertebrates have no form of skeleton.

Apply knowledge in familiar related contexts, including a range of enquiries

Activities

- Classify food in a range of ways.
- Use food labels to explore the nutritional content of a range of food items.
- Use secondary sources to find out the types of food that contain the different nutrients.
- Use food labels to answer enquiry questions e.g. How much fat do different types of pizza contain? How much sugar is in soft drinks?
- Plan a daily diet to contain a good balance of nutrients.
- Explore the nutrients contained in fast food.
- Use secondary sources to research the parts and functions of the skeleton.
- Investigate patterns asking questions such as:
 - Can people with longer legs run faster?
 - Can people with bigger hands catch a ball better?
- Compare, contrast and classify skeletons of different animals.

Possible evidence

- Can classify food into those that are high or low in particular nutrients
- Can answer their questions about nutrients in food, based on their gathered evidence
- Can talk about the nutrient content of their daily plan
- Use their data to look for patterns (or lack of them) when answering their enquiry question
- Can give similarities e.g. they all have joints to help the animal move, and differences between skeletons




| Year | 3 | Topic | Rocks |
|--|---|-------|-------|
| <p>Key question: What is beneath our feet?</p> <ul style="list-style-type: none"> • Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties. • Describe in simple terms how fossils are formed when things that have lived are trapped within rock. • Recognise that soils are made from rocks and organic matter. | | | |

| Prior learning | Future learning |
|---|--|
| <ul style="list-style-type: none"> • Distinguish between an object and the material from which it is made. (Y1 - Everyday materials) • Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock. (Y1 - Everyday materials) • Describe the simple physical properties of a variety of everyday materials. (Y1 - Everyday materials) • Compare and group together a variety of everyday materials on the basis of their simple physical properties. (Y1 - Everyday materials) • 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) | <ul style="list-style-type: none"> • Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago. (Y6 - Evolution and inheritance) • The composition of the Earth. (KS3) • The structure of the Earth. (KS3) • The rock cycle and the formation of igneous, sedimentary and metamorphic rocks. (KS3) |

| WHAT PUPILS NEED TO KNOW OR DO TO BE SECURE | |
|---|--|
| Show understanding of a concept using scientific vocabulary correctly | |
| Key learning | Possible evidence |
| <p>Rock is a naturally occurring material. There are different types of rock e.g. sandstone, limestone, slate etc. which have different properties. Rocks can be hard or soft. They have different sizes of grain or crystal. They may absorb water. Rocks can be different shapes and sizes (stones, pebbles, boulders). Soils are made up of pieces of ground down rock which may be mixed with plant and animal material (organic matter). The type of rock, size of rock pieces and the amount of organic matter affect the property of the soil.</p> <p>Some rocks contain fossils. Fossils were formed millions of years ago. When plants and animals died, they fell to the seabed. They became covered and squashed by other material. Over time the dissolving animal and plant matter is replaced by minerals from the water.</p> | <ul style="list-style-type: none"> • Can name some types of rock and give physical features of each • Can explain how a fossil is formed • Can explain that soils are made from rocks and also contain living/dead matter |

| Key vocabulary | | |
|---|--|--|
| Rock, stone, pebble, boulder, grain, crystals, layers, hard, soft, texture, absorb water, soil, fossil, marble, chalk, granite, sandstone, slate, soil, peat, sandy/chalk/clay soil | | |
| Common misconceptions | | |
| <p>Some children may think:</p> <ul style="list-style-type: none"> • rocks are all hard in nature • rock-like, man-made substances such as concrete or brick are rocks • materials which have been polished or shaped for use, such as a granite worktop, are not rocks as they are no longer 'natural' • certain found artefacts, like old bits of pottery or coins, are fossils • a fossil is an actual piece of the extinct animal or plant • soil and compost are the same thing. | | |
| Apply knowledge in familiar related contexts, including a range of enquiries | | |
| Activities | Possible evidence | |
| <ul style="list-style-type: none"> • Observe rocks closely. • Classify rocks in a range of ways, based on their appearance. • Devise a test to investigate the hardness of a range of rocks. • Devise a test to investigate how much water different rocks absorb. • Observe how rocks change over time e.g. gravestones or old building. • Research using secondary sources how fossils are formed. • Observe soils closely. • Classify soils in a range of ways based on their appearance. • Devise a test to investigate the water retention of soils. • Observe how soil can be separated through sedimentation. • Research the work of Mary Anning. | <ul style="list-style-type: none"> • Can classify rocks in a range of different ways, using appropriate vocabulary • Can devise tests to explore the properties of rocks and use data to rank the rocks • Can link rocks changing over time with their properties e.g. soft rocks get worn away more easily • Can present in different ways their understanding of how fossils are formed e.g. in role play, comic strip, chronological report, stop-go animation etc. • Can identify plant/animal matter and rocks in samples of soil • Can devise a test to explore the water retention of soils | |

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|---|---|---|-------|-------|
|  | Year | 3 | Topic | Light |
| | <p>Key question: What lights up our life?</p> <ul style="list-style-type: none"> • Recognise that they need light in order to see things, and that dark is the absence of light. • Notice that light is reflected from surfaces. • Recognise that light from the sun can be dangerous and that there are ways to protect their eyes. • Recognise that shadows are formed when the light from a light source is blocked by an opaque object. • Find patterns in the way that the size of shadows change. | | | |

| Prior learning | Future learning |
|---|---|
| <ul style="list-style-type: none"> • Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. (Y1 - Animals, including humans) | <ul style="list-style-type: none"> • Recognise that light appears to travel in straight lines. (Y6 - Light) • 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. (Y6 - Light) • 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. (Y6 - Light) • Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them. (Y6 - Light) |

| WHAT PUPILS NEED TO KNOW OR DO TO BE SECURE | |
|--|--|
| Show understanding of a concept using scientific vocabulary correctly | |
| Key learning | Possible evidence |
| <p>We see objects because our eyes can sense light. Dark is the absence of light. We cannot see anything in complete darkness. Some objects, for example, the sun, light bulbs and candles are sources of light. Objects are easier to see if there is more light. Some surfaces reflect light. Objects are easier to see when there is less light if they are reflective.</p> <p>The light from the sun can damage our eyes and therefore we should not look directly at the sun and can protect our eyes by wearing sunglasses or sunhats in bright light.</p> <p>Shadows are formed on a surface when an opaque or translucent object is between a light source and the surface and blocks some of the light. The size of the shadow depends on the position of the source, object and surface.</p> | <ul style="list-style-type: none"> • Can describe how we see objects in light and can describe dark as the absence of light • Can state that it is dangerous to view the sun directly and state precautions used to view the sun, for example in eclipses • Can define transparent, translucent and opaque • Can describe how shadows are formed |

| Key vocabulary | |
|---|--|
| Light, light source, dark, absence of light, transparent, translucent, opaque, shiny, matt, surface, shadow, reflect, mirror, sunlight, dangerous | |
| Common misconceptions | |
| <p>Some children may think:</p> <ul style="list-style-type: none"> • we can still see even where there is an absence of any light • our eyes 'get used to' the dark • the moon and reflective surfaces are light sources • a transparent object is a light source • shadows contain details of the object, such as facial features on their own shadow • shadows result from objects giving off darkness. | |
| Apply knowledge in familiar related contexts, including a range of enquiries | |
| Activities | Possible evidence |
| <ul style="list-style-type: none"> • Explore how different objects are more or less visible in different levels of lighting. • Explore how objects with different surfaces, e.g. shiny vs matt, are more or less visible. • Explore how shadows vary as the distance between a light source and an object or surface is changed. • Explore shadows which are connected to and disconnected from the object e.g. shadows of clouds and children in the playground. • Choose suitable materials to make shadow puppets. • Create artwork using shadows. | <ul style="list-style-type: none"> • Can describe patterns in visibility of different objects in different lighting conditions and predict which will be more or less visible as conditions change • Can clearly explain, giving examples, that objects are not visible in complete darkness • Can describe and demonstrate how shadows are formed by blocking light • Can describe, demonstrate and make predictions about patterns in how shadows vary |



| Year | 3 | Topic | Forces and magnets |
|--|---|-------|--------------------|
| <p>Key questions: What keeps me grounded? Can you feel the force?</p> <ul style="list-style-type: none"> • Compare how things move on different surfaces. • Notice that some forces need contact between two objects, but magnetic forces can act at a distance. • Observe how magnets attract or repel each other and attract some materials and not others. • 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. • Describe magnets as having two poles. • Predict whether two magnets will attract or repel each other, depending on which poles are facing. | | | |

| Prior learning | Future learning |
|--|--|
| <ul style="list-style-type: none"> • 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) | <ul style="list-style-type: none"> • Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. (Y5 - Forces) • Identify the effects of air resistance, water resistance and friction, that act between moving surfaces. (Y5 - Forces) • Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect. (Y5 - Forces) • Magnetic fields by plotting with compass, representation by field lines. (KS3) • Earth's magnetism, compass and navigation. (KS3) |

WHAT PUPILS NEED TO KNOW OR DO TO BE SECURE

Show understanding of a concept using scientific vocabulary correctly

| Key learning | Possible evidence |
|--------------|-------------------|
| | |

A force is a push or a pull. When an object moves on a surface, the texture of the surface and the object affect how it moves. It may help the object to move better or it may hinder its movement e.g. ice skater compared to walking on ice in normal shoes.

A magnet attracts magnetic material. Iron and nickel and other materials containing these, e.g. stainless steel, are magnetic. The strongest parts of a magnet are the poles. Magnets have two poles – a north pole and a south pole. If two like poles, e.g. two north poles, are brought together they will push away from each other – repel. If two unlike poles, e.g. a north and south, are brought together they will pull together – attract.

- Can give examples of forces in everyday life
- Can give examples of objects moving differently on different surfaces
- Can name a range of types of magnets and show how the poles attract and repel
- Can draw diagrams using arrows to show the attraction and repulsion between the poles of magnets

For some forces to act, there must be contact e.g. a hand opening a door, the wind pushing the trees. Some forces can act at a distance e.g. magnetism. The magnet does not need to touch the object that it attracts.

Key vocabulary

Force, push, pull, twist, contact force, non-contact force, magnetic force, magnet, strength, bar magnet, ring magnet, button magnet, horseshoe magnet, attract, repel, magnetic material, metal, iron, steel, poles, north pole, south pole

Common misconceptions

Some children may think:

- the bigger the magnet the stronger it is
- all metals are magnetic.

Apply knowledge in familiar related contexts, including a range of enquiries

Activities

- Carry out investigations to explore how objects move on different surfaces e.g. spinning tops/coins, rolling balls/cars, clockwork toys, soles of shoes etc.
- Explore what materials are attracted to a magnet.
- Classify materials according to whether they are magnetic.
- Explore the way that magnets behave in relation to each other.
- Use a marked magnet to find the unmarked poles on other types of magnets.
- Explore how magnets work at a distance e.g. through the table, in water, jumping paper clips up off the table.
- Devise an investigation to test the strength of magnets.

Possible evidence

- Can use their results to describe how objects move on different surfaces
- Can use their results to make predictions for further tests e.g. it will spin for longer on this surface than that, but not as long as it spun on that surface
- Can use classification evidence to identify that some metals, but not all, are magnetic
- Through their exploration, they can show how like poles repel and unlike poles attract, and name unmarked poles
- Can use test data to rank magnets