| Year: 3/4 Subject: Science<br>PoS: Light Y3 | Topic Question: *Can we see in the dark?* | Term - Autumn 1 and 2 Curriculum - B |
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| **Prior Knowledge** | **Key Vocabulary** | **Outcome** |
|---|---|---|
| Children will be familiar with the basic concepts of light and dark. In addition, they will know how to:-<br>• 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)<br>• Describe the simple physical properties of a variety of everyday materials. (Y1 - Materials)<br>• | Light, dark, opaque, solid, transparent, light source, block, shadow, reflect, see, seen, eyes, trace, reflection, dangerous | Shadow Puppets |
| **Future Learning**<br>• Recognise that light appears to travel in straight lines. (Y6 - Light)<br>• 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)<br>• 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)<br>• 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) | **Stimulus**<br>Odd One Out<br>**First hand experiences (enrichment)**<br>Exploring Shadows | **World of Work**<br>Scientist, engineer, designer |

| **National Curriculum PoS** | Key Knowledge | Possible evidence |
|---|---|---|
| • Recognise that they need light in order to see things and that dark is the absence of light<br>• Notice that light is reflected from surfaces<br>• Recognise that light from the sun can be dangerous and that there are ways to protect their eyes<br>• recognise that shadows are formed when the light from a light source is blocked by a solid object<br>• find patterns in the way that the size of shadows change.<br><br>**Working Scientifically**<br>• Asking relevant questions and using different types of scientific enquiries to answer them<br>• Setting up simple practical enquiries, comparative and fair tests<br>• Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers<br>• Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions<br>• Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables<br>• Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions<br>• Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions<br>• Identifying differences, similarities or changes related to simple scientific ideas and processes<br>• Using straightforward scientific evidence to answer questions or to support their findings | We see objects because our eyes can sense light. Dark is the absence of light. We cannot see anything in complete darkness.<br><br>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.<br><br>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.<br><br>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. | • Can describe how we see objects in light and can describe dark as the absence of light<br>• Can state that it is dangerous to view the sun directly and state precautions used to view the sun, for example in eclipses<br>• Can define transparent, translucent and opaque<br>• Can describe how shadows are formed |
| | Application of Key Skills | Possible evidence |
| | • Explore how different objects are more or less visible in different levels of lighting.<br>• Explore how objects with different surfaces, e.g. shiny vs matt, are more or less visible.<br>• Explore how shadows vary as the distance between a light source and an object or surface is changed.<br>• Explore shadows which are connected to and disconnected from the object e.g. shadows of clouds and children in the playground<br>• Choose suitable materials to make shadow puppets.<br>• Create artwork using shadows. | • Can describe patterns in visibility of different objects in different lighting conditions and predict which will be more or less visible as conditions change<br>• Can clearly explain, giving examples, that objects are not visible in complete darkness<br>• Can describe and demonstrate how shadows are formed by blocking light<br>• Can describe, demonstrate and make predictions about patterns in how shadows vary |

| Year: 3/4 Subject: Science<br>PoS: Forces Y3 | Topic Question: *What Makes Things Move?* | Term - Spring 1 Curriculum - B |
|---|---|---|

**Prior Knowledge**

- 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)

**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

**Outcome**

Short written reports explaining findings from enquiries

**Future Learning**

- 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)

**Stimulus**

Coin spinning experiment

**World of Work**

Designer, recycler

**National Curriculum PoS**

- 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.

**Working Scientifically**

- 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

**Key Knowledge**

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.
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.

**Possible evidence**

- 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

**Application of Key Skills**

- 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

| Year: 3/4 Subject: Science<br>PoS: Plants Y3 | Topic Question: *Why do we have flowers?* | Term - Spring 2 Curriculum - B |
|---|---|---|

| **Prior Knowledge** | **Key Vocabulary** | **Outcome** |
|---|---|---|
| • Observe and describe how seeds and bulbs grow into mature plants. (Y2 - Plants)<br>• Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy. (Y2 - Plants) | Photosynthesis, pollen, insect/wind pollination, seed formation, seed dispersal (wind dispersal, animal dispersal, water dispersal) | An information text to be used as a revision guide for Year 6 |
| **Future Learning**<br>• Describe the life process of reproduction in some plants and animals. (Y5 - Living things and their habitats)<br>• 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) | **Stimulus**<br>Botanicum by Kathy Willis | **World of Work**<br>Horticulturalist<br>Gardener |

| **National Curriculum PoS** | Key Knowledge | Possible evidence |
|---|---|---|
| • Identify and describe the functions of different parts of flowering plants: roots; stem/trunk; leaves; and flowers.<br>• 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.<br>• Investigate the way in which water is transported within plants.<br>• Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.<br>**Working Scientifically**<br>• Asking relevant questions and using different types of scientific enquiries to answer them<br>• Setting up simple practical enquiries, comparative and fair tests<br>• Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers<br>• Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions<br>• Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables<br>• Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions<br>• Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions<br>• Identifying differences, similarities or changes related to simple scientific ideas and processes<br>• Using straightforward scientific evidence to answer questions or to support their findings | 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.<br>The leaves use sunlight and water to produce the plant's food.<br>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).<br>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. | • Can explain the function of the parts of a flowering plant<br>• Can describe the life cycle of flowering plants, including pollination, seed formation, seed dispersal, and germination<br>• Can give different methods of pollination and seed dispersal, including examples |
| | Application of Key Skills | Possible evidence |
| | • Observe what happens to plants over time when the leaves or roots are removed.<br>• Observe the effect of putting cut white carnations or celery in coloured water.<br>• 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.<br>• Spot flowers, seeds, berries and fruits outside throughout the year.<br>• Observe flowers carefully to identify the pollen.<br>• Observe flowers being visited by pollinators e.g. bees and butterflies in the summer.<br>• Observe seeds being blown from the trees e.g. sycamore seeds. • Research different types of seed dispersal.<br>• Classify seeds in a range of ways, including by how they are dispersed.<br>• Create a new species of flowering plant. | • Can explain observations made during investigations<br>• Can look at the features of seeds to decide on their method of dispersal<br>• 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: 3/4 Subject: Science<br>PoS: Rocks Y3 | Topic Question: *Are all rocks the same?* | Term - Summer 1 Curriculum - B |
|---|---|---|

**Prior Knowledge**

- 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)

**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

**Outcome**

Children make a display and present their learning to another class

**Future Learning**

- 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)

**Stimulus**

Craggy cliff- pictures of famous rocks around the world.

**World of Work**

Geologist
Archaeologist
Builder
Stone mason

**National Curriculum PoS**

- 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.

**Working Scientifically**

- 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.

**Key Knowledge**

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.
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.

**Possible evidence**

- 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

**Application of Key Skills**

- 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.

**Possible evidence**

- 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

| Year: 3/4 Subject: Science<br>PoS: Living Things and Their Habitats Y4 | Topic Question: *Where have all the bees gone?* | Term - Summer 2 Curriculum - B |
|---|---|---|

| **Prior Knowledge** | **Key Vocabulary** | **Outcome** |
|---|---|---|
| • Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees. (Y1 - Plants) • Identify and describe the basic structure of a variety of common flowering plants, including trees. (Y1 - Plants) • Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. (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) • Identify and name a variety of plants and animals in their habitats, including microhabitats. (Y2 - Living things and their habitats) | Classification, classification keys, environment, habitat, human impact, positive, negative, migrate, hibernate | Persuasive letter asking for bee friendly planting |
| **Future Learning**<br>Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird. (Y5 - Living things and their habitats) • Describe the life process of reproduction in some plants and animals. (Y5 - Living things and their habitats) • Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants and animals. (Y6 - Living things and their habitats) • Give reasons for classifying plants and animals based on specific characteristics. (Y6 - Living things and their habitats) | **Stimulus**<br>Nature/ mini beast hunt | **World of Work**<br>Naturalist<br>Conservationist |

**National Curriculum PoS**

- Recognise that living things can be grouped in a variety of ways.
- Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment.
- Recognise that environments can change and that this can sometimes pose dangers to living things.

**Working Scientifically**

- 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.

| Key Knowledge | Possible evidence |
|---|---|
| Living things can be grouped (classified) in different ways according to their features.<br>Classification keys can be used to identify and name living things. Living things live in a habitat which provides an environment to which they are suited (Year 2 learning).<br>These environments may change naturally e.g. through flooding, fire, earthquakes etc. Humans also cause the environment to change.<br>This can be in a good way (i.e. positive human impact, such as setting up nature reserves) or in a bad way (i.e. negative human impact, such as littering).<br>These environments also change with the seasons; different living things can be found in a habitat at different times of the year. | • Can name living things living in a range of habitats, giving the key features that helped them to identify them<br>• Can give examples of how an environment may change both naturally and due to human impact |
| **Application of Key Skills** | **Possible evidence** |
| • Observe plants and animals in different habitats throughout the year.<br>• Compare and contrast the living things observed.<br>• Use classification keys to name unknown living things.<br>• Classify living things found in different habitats based on their features.<br>• Create a simple identification key based on observable features.<br>• Use fieldwork to explore human impact on the local environment e.g. litter, tree planting.<br>• Use secondary sources to find out about how environments may naturally change.<br>• Use secondary sources to find out about human impact, both positive and negative, on environments. | • Can keep a careful record of living things found in different habitats throughout the year (diagrams, tally charts etc.)<br>• Can use classification keys to identify unknown plants and animals<br>• Can present their learning about changes to the environment in different ways e.g. campaign video, persuasive letter |