



The Science Curriculum

Year 3

Intent	<p>At Benjamin Adlard Primary School we believe that a high quality science education provides the foundations for understanding the world through the specific disciplines of biology, chemistry and physics. Science has changed our lives and is vital to the world's future prosperity, and all pupils should be taught essential aspects of the knowledge, methods, processes and uses of science. Through building up a body of key foundational knowledge and concepts, pupils should be encouraged to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena. They should be encouraged to understand how science can be used to explain what is occurring, predict how things will behave, and analyse causes.</p> <p>Science in our school is about developing children's ideas and ways of working that enable them to make sense of the world in which they live through investigation, as well as using and applying process skills. The staff at Benjamin Adlard Primary School ensure that all children are exposed to high quality teaching and learning experiences, which allow children to explore their outdoor environment and locality, thus developing their scientific enquiry and investigative skills. They are immersed in scientific vocabulary, which aids children's knowledge and understanding not only of the topic they are studying, but of the world around them. We intend to provide all children regardless of ethnic origin, gender, class, aptitude or disability, with a broad and balanced science curriculum.</p>
Implementation	<p>The planning and teaching of the science curriculum is designed to build on knowledge and skills taught in previous units and year groups. Teachers use the school's science progression framework to plan and teach key concepts and scientific enquiry skills in a progressive manner and support the acquisition and accumulation of knowledge. New vocabulary is planned and is taught explicitly to children, teaching the meaning of homonyms where necessary. Retrieval practice techniques are used to help children to memorise key concepts for use in future science lessons and across the curriculum. When teaching practical science, teachers combine demonstrations with opportunities for children to carry out their own investigations, gaining hands-on experience handling specialist equipment and materials.</p>
Impact	<p>Our science curriculum provides the foundations for our children for understanding the world they live in. Through building up a body of knowledge and key concepts, our children develop a sense of excitement and curiosity and they understand how science can be used to explain what has occurred, predict how things will behave and analyse the causes. Our children understand the value of science and enjoy working scientifically. They are able to communicate their ideas and findings with confidence and using different styles. Our children have a passion for science and engage enthusiastically in their learning. As a result, they achieve well and are keen to continue studying science as they move on to the next stage of their education.</p>

	EYFS	End of Key Stage One	Lower Key Stage Two	Upper Key Stage 2
Working scientifically	<ul style="list-style-type: none"> Observe things closely through a variety of means (photos, magnifiers) With support, notice and discuss patterns around them. 	<ul style="list-style-type: none"> Explore the world around them and raise their own simple questions. Begin to recognise that there are different ways to answer a scientific question. Experience a variety of practical scientific enquiries. Carry out a simple test. Use simple features to compare objects, materials and living things and, with help, decide how to sort and group them (Identify and classify). Observe closely using simple equipment: pooters, magnifying glasses With guidance, begin to notice patterns and relationships. Use simple measurements and equipment to gather data (egg timers, lenses, magnifiers) Use observations and ideas to suggest answers to questions. 	<ul style="list-style-type: none"> Raise their own relevant questions about the world around them. Provide a range of different scientific experiences including different types of scientific enquiries to answer questions. Start to make their own decisions about the most appropriate type of scientific enquiry they might use to answer questions. Set up simple scientific enquiries, comparatives and fair tests. Recognise when a fair test is necessary and help to decide how to set it up. Talk about the criteria for sorting, grouping and classifying; and use simple keys. Make systematic and careful observations. Help to make decisions about the observations to make, how long to make them for and the type of simple equipment that might be used. Begin to look for naturally occurring patterns and relationships and decide what data to collect to identify them. Take accurate measurements using standard units. Learn how to use a greater range of equipment including data loggers and thermometers. 	<ul style="list-style-type: none"> Use their own science experiences to explore ideas and raise different kinds of questions. Talk about how scientific ideas have developed over time. Select and plan the most appropriate type of scientific enquiry to use to answer scientific questions. Recognise when and how to set up comparative and fair tests and explain which variables need to be controlled and why. Use and development keys and other information records to identify, classify and describe living things and materials, and identify patterns that might be found in the natural environment. Make decisions about what observations to make, what measurements to use and long to make them for. Look for different causal relationships in data and identify evidence that refutes or supports their ideas. Choose the most appropriate equipment to make measurements with increasing precision and explain how to use it accurately. Take repeat measurements where appropriate.
Communicating Scientifically	<ul style="list-style-type: none"> With support, talk about patterns and changes that have been seen. 	<ul style="list-style-type: none"> Record simple data. Talk about what you have found out and how you have found out. With support, record and communicate findings in a range of ways, beginning to use simple scientific language. 	<ul style="list-style-type: none"> Collect and record data from observations and measurements in a variety of ways: notes, bar charts and tables, standard units, drawings, labelled diagrams and keys. Look for changes, patterns, similarities and differences in data in order to draw simple conclusions and answer questions. 	<ul style="list-style-type: none"> Decide how to record data and results of increasing complexity from a choice of familiar approaches: scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. Identify scientific evidence that has been used to refute or support ideas or arguments. Use relevant scientific language and illustrations to discuss, communicate and justify scientific ideas, use oral and written forms such as displays and other presentations to report conclusions, causal relationships and explanations of degrees of trust in results. Use results to make predictions and identify when further observations, comparative and fair tests might be needed.
Animals, including humans	<ul style="list-style-type: none"> Identify and name some common animals. This will be linked to personal experiences such as pets, books or days out with family. 	<ul style="list-style-type: none"> Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. Identify and name a variety of common animals that are carnivores, herbivores and omnivores. Understand that animals, including humans, have offspring which grow into adults. Describe the basic needs of animals, including humans, for survival: water, food, air Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene. 	<ul style="list-style-type: none"> Know that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food and that they get their nutrition from the food they eat. Know that humans and some other animals have skeletons and muscles for support and movement. Know the basic functions of the human digestive system. Know the types of teeth in the human mouth and their function. Know how to construct and interpret a food chain, identifying predators, prey and producers. 	<ul style="list-style-type: none"> Know how humans develop and change to old age. Know how to group plants, animals and microorganisms based on common, observable characteristics. Give reasons for the classification chosen. Know the main parts of the human circulatory system. Know the functions of the heart, blood vessels and blood. Know what impact diet, exercise, drugs and lifestyle has on the function of the human body. Know how water is transported within animals.

Living Things and their Habitats	<ul style="list-style-type: none"> Make observations of living things in the immediate environment. 	<ul style="list-style-type: none"> Explore and compare the differences between things that are living, dead, and things that have never been alive. Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other. Identify and name a variety of plants and animals in their habitats, including micro-habitats. 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. 	<ul style="list-style-type: none"> Know that living things can be classified in different ways. Know how to use a classification key to group, identify and name a variety of living things. Know that environments can change and that these changes can pose danger to living things. 	<ul style="list-style-type: none"> Know how lifecycles differ for mammals, insects and birds. Know the process of reproduction for plants and animals.
Plants	<ul style="list-style-type: none"> With support, make observations of plants in the immediate environment 	<ul style="list-style-type: none"> Identify and name a variety of common wild and garden plants. Identify and name a variety of native evergreen and deciduous trees. Know the basic structure of a variety of common flowering plants including: petal, leaf, trunk, branch, stem, root, fruit, bulb, seed Observe and describe how bulbs and seeds grow into mature plants. Know that plants need water, light and a suitable temperature to grow and stay healthy. 	<ul style="list-style-type: none"> Know the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers. Know the requirements of a plant for life and growth (air, water, nutrients from soil, and room to grow) and how they vary from plant to plant. Investigate the way in which water is transported in plants. Know the life cycle of a flowering plants: pollination, seed formation and seed dispersal. 	
Materials, their properties and change	<ul style="list-style-type: none"> Use a variety of materials during independent play: plastic jugs, wooden blocks, fabric puppets. 	<ul style="list-style-type: none"> Distinguish between an object and the material from which it is made. Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water and rock. Describe the simple physical properties of a variety of everyday objects. Compare and group together a variety of everyday materials on the basis of their simple physical properties. Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. 		<ul style="list-style-type: none"> Know how to group materials based on their hardness, solubility, transparency, conductivity and response to magnets. Know that some materials will dissolve in liquid to form a solution and how to recover a substance from a solution. Know how to best separate a mixture using filtering, sieving and evaporating. Know that dissolving, mixing and changes of state are reversible. Know that some changes result in the formation of a new material and that this is usually irreversible.
Seasonal Changes	<ul style="list-style-type: none"> Observe and name the types of weather seen on a daily basis. 	<ul style="list-style-type: none"> Observe changes across the four seasons. Observe and describe weather associated with the seasons and how day length varies. 		
Rocks			<ul style="list-style-type: none"> Compare and group different kinds of rocks on the basis of their appearance and simple physical properties. Describe in simple terms how fossils are formed. Know that soils are made from rocks and organic matter. 	

Light	<ul style="list-style-type: none"> Explore sources of light: torches, ceiling lights, the sun, the moon. 		<ul style="list-style-type: none"> Know that light is needed in order to see. Know that dark is the absence of light. Know that light can be reflected from surfaces. Know that light from the sun can be dangerous and know some ways to protect yourself. Know how shadows are formed and that their size can be changed. 	
Forces and Magnets	<ul style="list-style-type: none"> Explore and investigate bar magnets. Can you find an object that will stick to a magnet? 		<ul style="list-style-type: none"> Know that objects will move in different ways on different surfaces. Know that some forces can act at a distance and that some forces need direct contact between two objects. Know that magnets have two poles and how magnets behave depending on which of the poles meet. Know that some objects are attracted to metals but some are not. 	<ul style="list-style-type: none"> Know that an unsupported object will fall to the Earth because of the effect of gravity. Know how water resistance, air resistance and friction act between moving surfaces. Know how levers, pulleys and gears allow a smaller force to have a greater effect.
States of Matter	<ul style="list-style-type: none"> Explore malleable materials with hands, fingers and a variety of tools. 	<ul style="list-style-type: none"> Know that some objects can be squashed, bent, twisted or stretched depending on the material they are made from. 	<ul style="list-style-type: none"> Know if a material is a solid, liquid or gas. Know that heating or cooling a material can change its state. Know that some changes can be reversed and that some are irreversible. Know that evaporation rate increases as temperature increases. 	
Sound			<ul style="list-style-type: none"> Know that some sounds are created when an object vibrates. Know that vibrations from sounds travel through a medium (usually the air) to the ear. Know that features of an object will change the pitch of a sound. Know that as the strength of vibrations increases, the volume of a sound will increase. Know that sounds get fainter as the distance from the sound source increases. 	
Electricity			<ul style="list-style-type: none"> Know that common appliances require electricity to run. Know how to construct a simple series circuit. Know the basic parts of an electrical circuit. Know that a circuit must complete a full loop in order for the electricity to flow around it. Know how a switch affects a series circuit. Know that some materials conduct electricity and some insulate electricity. 	
Earth and Space				<ul style="list-style-type: none"> Know how the Earth and the other planets move in relation to the sun. Know how the moon moves in relation to the earth. Know that the sun, moon and earth are approximately spherical bodies. Know that the rotation of the Earth explains the concept of day and night.

Evolution and Inheritance				<ul style="list-style-type: none">• Know that living things have changed over time.• Know that fossils provide information about living things that inhabited the earth millions of years ago.• Know that living things produce offspring of the samekind, but that normally offspring vary and are not identical to their parents.• Know that animals have adapted to suit their environment in different ways and that this adaption may lead to evolution.
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Year 3 – Autumn 1		Magnets and Forces
National Curriculum objectives: <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		Next Steps
Prior to Year 3 children are not have had direct teaching on forces and magnets. They will have had opportunities to explore during EYFS as part of Understanding the World.		Year 5 – Forces – Gravity, air resistance, water resistance, friction.
Knowledge Objectives	Scientific Skills	
<ul style="list-style-type: none">• To know that forces are pushes and pulls which can make things move, stop or change shape.• To know that some forces need contact between two objects, but magnetic forces can act at a distance.• To know that magnets attract or repel each other and attract some materials and not others.• To know that magnets have two poles.	<ul style="list-style-type: none">• Ask relevant questions and using different types of scientific enquiries to answer them.• Set up simple practical enquiries, comparative and fair tests.• Make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment.• Gather, record, classify and present data in a variety of ways to help in answering questions• Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.	
Key Assessment Questions		
What is a force? Can you give an example of a contact force and a non-contact force? Can you name some materials that are attracted to a magnet and some that are not? Which ends of a magnet will attract and which will repel?		
Key Vocabulary		
Force, push, pull, theory, fair test, investigate, measure, gravity, contact, magnet, magnetism, results, table, attract, attraction		

Knowledge to be taught:

Forces

Everything on Earth is powered by **forces, pushes and pulls which act on our bodies and the things around us**. Forces make things move and stop moving. Almost all these forces can be divided into either a **push** or a **pull**. For example:

Most forces need some kind of contact in order for them to act eg. a hand touches a door in order to open or close it, a foot touches a ball in order to kick it.

Gravity is a force that can act without contact eg. a paperclip will slide off a piece of paper if the paper is tipped up.

Magnetic force can also act without contact.

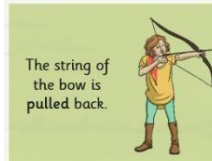
Pushing Forces	Pulling Forces
Closing a door Moving a shopping trolley forwards Pushing a swing	Stretching a rubber band Opening a door



The rower pulls the oar.



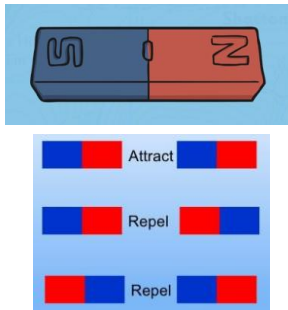
The tug of war teams pull the rope.



The string of the bow is pulled back.



Pulling the sledge.

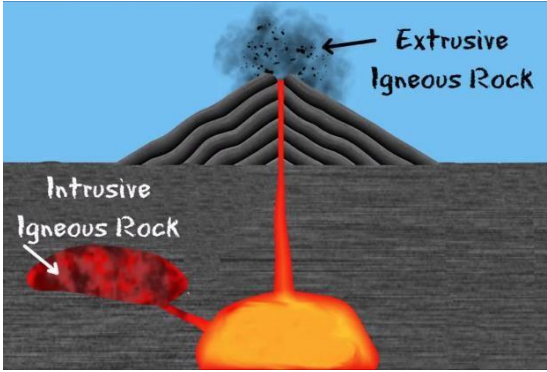
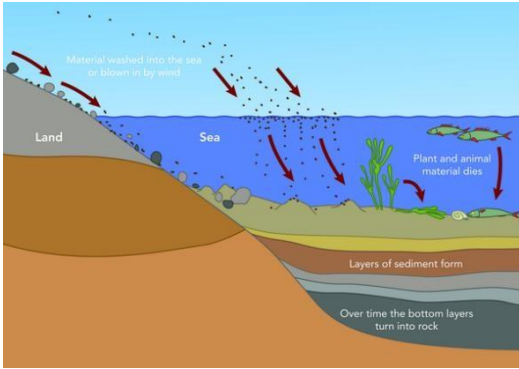
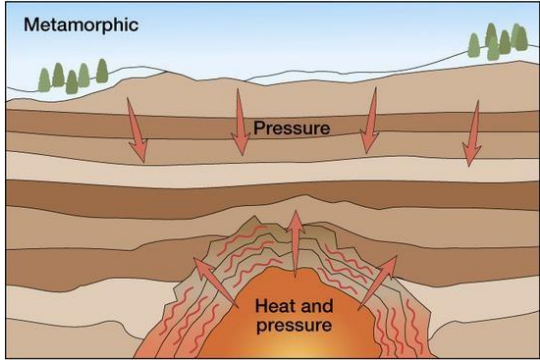
Magnets and Magnetism Magnets are objects that have magnetic and therefore the ability to attract some materials. Some materials are attracted to a magnet and some are not.					
Attracted by a magnet	Not attracted by a magnet				
Iron Cobalt Nickel	Aluminium Wood Plastic Paper				
Every magnet has a north pole and a south pole. Opposites attract: this means the north pole of a magnet attracts (pulls towards) the south pole of another magnet. Likes repel: this means that the north pole of a magnet repels (pushes away) the north pole of another magnet and the south pole of a magnet repels (pushes away) the south pole of another magnet.					
Scientific Enquiry					
Ask questions and then investigate how toy vehicles run on different surfaces. Begin to explain in terms of forces.		Investigate how it is forces that make things move (pushes and pulls) and that magnetic forces can move things at a distance without forces touching.			
Investigate how magnets attract some materials and not others. Compare and group materials.		Investigate the polarisation of magnets, making predictions and testing ideas.			
Develop a game or activity that uses magnetic forces by trying out a variety of ideas.					
Definitions					
Force	Forces make things move and stop moving.				
Attract	To move towards something.				
Repel	To move away from something.				
Gravity	A force that pulls objects towards the centre of the Earth.				
Medium Term Planning					
Week 1	Week 2	Week 3	Week 4	Week 5	Week 6
To know that forces are pushes and pulls which can make things move, stop or change shape.	To know that some forces need contact between two objects, but magnetic forces can act at a distance.	To know how to 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.	To know that magnets have 2 poles and that opposite poles attract and like poles repel.	To know whether two magnets will attract or repel each other, depending on which poles are facing.	Assessment Opportunity

Year 3 – Spring 1		Rocks, fossils and soils
Prior Learning		Next Steps
Year 1 – Children learn about dinosaurs and their fossils. Focus on the Lincoln Plesiosaur		Year 6 – Evolution. Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago.
National Curriculum objectives: Compare and group rocks and describe the formation of fossils. 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. <u>Cross-Curricular Links</u> History – The Age of the Dinosaurs. Geography – Earthquakes and volcanoes		
Knowledge Objectives		Scientific Skills
<ul style="list-style-type: none"> To know the names of six common rocks. To know that rocks are formed in three different ways. To know that the properties of rock will determine what it is used for. To know in simple terms how fossils are formed when things that have lived are trapped within rock. To know that soils are made of rocks and other organic matter. 		<ul style="list-style-type: none"> Ask relevant questions and use different types of scientific enquiries to answer them. Set up simple practical enquiries and comparative and fair tests. Make systematic and careful observations. Record findings using simple scientific language, drawings and labelled diagrams. Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. Identify differences, similarities or changes related to simple scientific ideas and processes. Use straightforward scientific evidence to answer questions or to support findings.
Key Assessment Questions		
Can you name the six common types of rock? Can you name the three different ways that rocks are formed? Can you describe, in simple terms, how a fossil is formed? What is soil made of?		
Key Vocabulary		
Rock, sandstone, limestone, chalk, granite, slate, marble, classify, brick, tile, concrete, igneous, sedimentary, metamorphic, permeable, impermeable, acid, erosion, fossil, sediment, minerals, soil, micro-organisms, organic matter, particles, sand, silt		
Knowledge to be taught:		



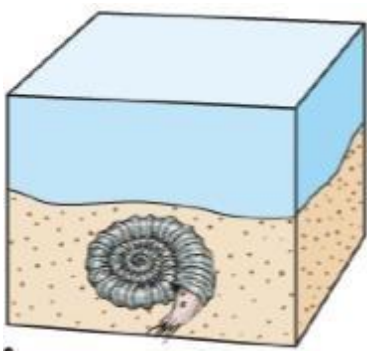
Rocks are formed in three different ways:

Sandstone	Limestone	Chalk	Granite	Slate	Marble
Sedimentary	Sedimentary	Sedimentary	Igneous	Metapmorphic	Metamorphic

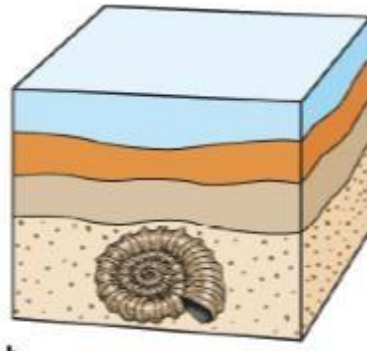
Igneous Rock	Sedimentary Rock	Metamorphic Rock
		
<p>Formed when magma from a volcano cools either below the Earth's surface on top of it.</p>	<p>Formed from the broken sediments of other rocks. These fall to the bottom of rivers and lakes and the weight of the sediment above causes compaction to form rock.</p>	<p>Made of smaller rocks that are cemented together when exposed to heat and pressure.</p>
<p>Granite and basalt</p>	<p>Limestone and Sandstone</p>	<p>Slate and marble</p>

How are fossils formed?

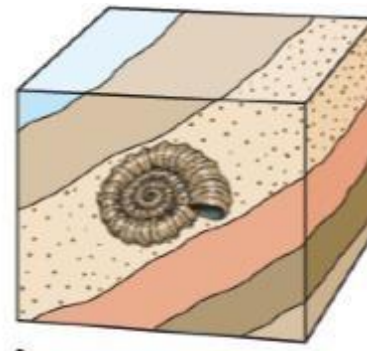
1. An animal dies (in this case an ammonite) and falls to the bottom of the ocean. It is covered by sediment and the soft body parts eventually decay, only leaving the shell.
2. More and more sediment covers the shell and over time it is squeezed at high pressure and the original shell is replaced by minerals such as limestone and quartz.
3. Over millions of years the Earth's crust may thrust layers of sedimentary rocks containing the fossil up to form mountain ranges.
4. Erosion from the weather eventually wears down the rock and the fossil becomes exposed for fossil hunters to find!



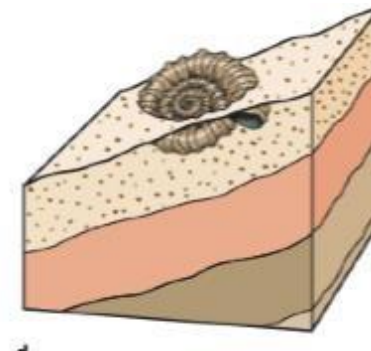
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Soil

- Soil is a mixture of tiny particles of rock, organic matter (dead plants and animals), air and water.

- Different soils have different properties depending on their composition:
 - **Sandy soil** is pale coloured and has large particles. These create lots of small air gaps. Water drains through them easily so it usually feels dry.
 - **Clay soil** is usually sticky and has small particles. They contain very few air gaps and water does not drain through it easily.
 - **Chalky soil** is a light brown soil. Water drains through it quickly.
 - **Peat** does not contain any rock particles. It's made from very old decayed plants and is dark, crumbly and rich in nutrients

Scientific Enquiry

Explore a variety of rocks and group them in different ways according to their observable features and attributes.	Investigate the properties of different rocks with fair testing e.g. permeability, hardness and an acid test for the presence of calcium carbonate. Use a rock identification key.
Learn about how fossils are made and the life and contribution of the great fossil hunter Mary Anning.	Investigate different soils, asking questions and seeking answers through a variety of scientific enquiries (exploring/ classifying and identifying /fair testing)
Assemble a variety of exciting exhibits for the Rock and Fossil Museum.	

Definitions

Rock	Rock, sandstone, limestone, chalk, granite, slate, marble, classify, brick, tile, concrete, igneous, sedimentary, metamorphic, permeable, impermeable, acid, erosion, fossil, sediment, minerals, soil, micro-organisms, organic matter, particles, sand, silt
Igneous	Rock formed by hardening of melted mineral material within the earth eg. granite
Sedimentary	Rocks that are formed by sediment that is deposited over time, usually as layers at the bottom of lakes and oceans eg. limestone
Metamorphic	Rocks that are formed when other rocks are affected by great temperatures and pressures eg. marble
Sediment	Material that sinks to the bottom of a liquid.
Permeable	A material that allows liquids to pass through.
Impermeable	A material that does not allow liquids to pass through.
Erosion	The gradual wearing away of rocks and soils, usually by wind and/or rain.
Microorganisms	Tiny organisms, especially a bacterium, virus, or fungus.
Organic Matter	The remains of dead plants and animals and their waste products.
Sand	A granular substance made from tiny particles of eroded rock.
Silt	Small pieces of material carried by running water and deposited further away.

Medium Term Planning

Week 1	Week 2	Week 3	Week 4	Week 5	Week 6
To know the names of six common rocks.	To know that rocks are formed in three different ways.	To know that the properties of rock will determine what it is used for.	To know in simple terms how fossils are formed when things that have lived are trapped within rock.	To know that soils are made of rocks and other organic matter.	Assessment opportunity

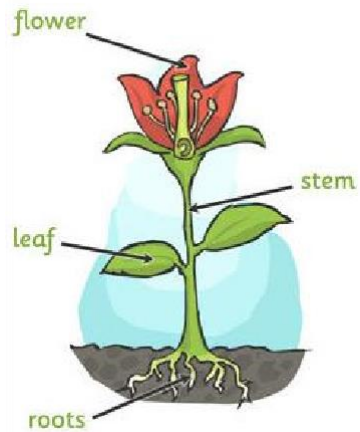
Year 3 – Spring 2		Plants
National Curriculum objectives: Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers Explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary 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		Next Steps
Year 1 – Identify and name a variety of common wild and garden plants. Identify and describe the basic structure of plants and trees. Year 2 – Observe and describe how seeds grow into mature plants. Find out and describe that plants need water, light and a suitable temperature to grow and stay healthy.		Year 5 – Reproduction in plants Year 6 – Classification of plants using classification keys. Evolution and inheritance.
Knowledge Objectives	Scientific Skills	
<ul style="list-style-type: none">To know and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers.To know how water is transported within plants.To know the requirements of plants for life and growth and how this varies from plant to plant.To know which parts of the flower contribute to the lifecycle of plants.To that fruits develop from pollinated flowers.To know that seeds develop inside fruits.To know how seeds can be dispersed.	<ul style="list-style-type: none">Ask relevant questions and use different types of scientific enquiries to answer themsetting up simple practical enquiries, comparative and fair tests.Make systematic and careful observations and, where appropriate, take accurate measurements use standard units, using a range of equipment, including thermometers and data loggers.Gather, record, classify and present data in a variety of ways to help in answering questions.Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.Identify differences, similarities or changes related to simple scientific ideas and processesusing straightforward scientific evidence to answer questions or to support their findings.	
Key Assessment Questions		
Can you describe the functions of the root/stem/leaves/flowers? How does water move in plants? What do plants need in order to grow and thrive? Which parts of the plant contribute to reproduction? Can you name some ways in which seeds are dispersed?		
Key Vocabulary		
Soil, seedling, thrive, wilting, reproduction, pollinate, seed, fruit, disperse, expulsion, anther, filament, stamen, stigma, style, ovary, carpel, pollen		

Knowledge to be taught:

In order to grow and thrive a plants needs:

- Water
- A suitable temperature
- Sunlight
- Nutrients from the soil
- Space to grow

The Parts of a Flowering Plant

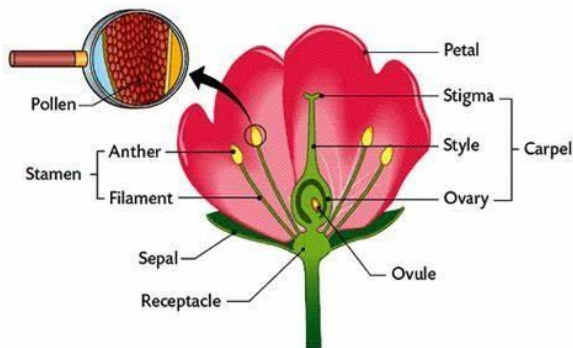


- Flower – Make seeds to grow new plants. Attract flying insects and allow for pollination to take place.
- Stem – This holds the plant up and carries nutrients from the soil to the leaves. A trunk is the stem of a tree.
- Leaf – These make food for the plant using sunlight and carbon dioxide from the air.
- Roots – These anchor the plant into the ground and absorb water and nutrients from the soil.

How does water travel within plants?

Roots absorb water from the soil where the plant is planted. Then, the water travels through the plant to the stem. Water is sucked up through the stem (just like the way you suck up a drink through a straw!) and then the stem passes water on to the leaves. The tubes that the water is transported through are called xylem.

Which parts of the flower are needed as part of the flowering plant lifecycle?



The female part of the plant is called the carpel (stigma, style and ovary).

The male parts of the plant is called the stamen (anther and filament).

When pollen is transferred from the male part of the flower to the female part of the flower this is called **pollination**. It is usually done by flying insects such as bees. A pollinated flower is then able to produce a fruit and in turn, seeds. These seeds can be planted to produce new plants.



Seeds can be dispersed in a variety of different ways:

- By the wind
- By animals
- By water
- By expulsion



Scientific Enquiry

Make a list of what we know and what we want to find out. Plant some beans in transparent jars and place them in different conditions to begin some observations. Use data loggers and other equipment to record light levels, water etc.

Use secondary sources to discover the parts of a plant and how they vary. Look at a variety of different plants making labelled sketches.

Make a list of plants the aliens will need to take to the space farm. Classify according to human use for leaves, stems, roots, flowers, fruits and seeds. Investigate the way in which water is transported within plants.

Identify male and female parts and learn their function. Make model flowers and insect puppets for the exhibition. Use puppets and models to demonstrate pollination.

Investigate other types of dispersal e.g. burrs and wind dispersal. Conduct a wind dispersal investigation.

Definitions

Seedling	A young plant raised from a seed.
Thrive	To grow well.
Wilt	To droop through heat or water loss.
Reproduction	The production of offspring.
Pollinate	To move and spread pollen from one part of a flower to another.
Seed	A unit of reproduction of a flowering plant.
Fruit	The sweet and fleshy product of a tree or other plant that contains seed and can be eaten as food
Disperse	Spread over a wide area.

Expulsion	The act of forcing seeds out of a seed pod.
Stamen (Anther and Filament)	The male parts of a flowering plant.
Carpel (Stigma, style and ovary)	The female parts of a flowering plant.

Medium Term Planning – Combination of Roots and Shoots and Artful flowers, fruits and seeds from Hamilton

Week 1	Week 2	Week 3	Week 4	Week 5	Week 6
Roots and Shoots Session 1	Roots and Shoots Session 2	Roots and Shoots Session 4	Artful flowers, fruits and seeds – Session 2	Artful flowers, fruits and seeds – Session 3	Artful flowers, fruits and seeds – Session 5
To know the requirements of plants for life and growth and how this varies from plant to plant.	To know and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers.	To know how water is transported within plants.	To know that flowers vary in size, colour, shape and form but all play a crucial role in reproduction.	To know that fruits develop from pollinated flowers.	To know that the function of fruits is to produce and distribute seeds.

Year 3 – Summer 1		Animals, including humans
National Curriculum objectives: Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense Identify that humans and some other animals have skeletons and muscles for support, protection and movement 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 <u>Cross-Curricular Links</u> PSHE – Maintaining a healthy lifestyle		
Prior Learning		Next Steps
Year 1 – Name and identify basic body parts. Name and identify common omnivores, herbivores and carnivores. Year 2 – Basic needs of animals – food water and air. Know the importance of eating the right amounts of different types of foods.		Year 4 – The human digestive system, constructing and interpreting food chains. Year 6 – Describe how water and nutrients are transported within animals. The heart and respiratory system in humans.
Knowledge Objectives	Scientific Skills	
<ul style="list-style-type: none">• To know that not all animals have an internal skeleton and that the presence of this is an important feature in classifying them.• To know that a skeleton is needed for support, protection and movement.• To know that muscles contract and relax to produce movements.• To know 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.• To know that animals can be grouped according to what they eat: carnivores, herbivores and omnivores.• To know the 5 food groups and the proportions of each needed to create a healthy, balanced diet.• To know the nutritional properties of carbohydrates, fruit and vegetables, proteins and dairy foods as well as importance of limiting fat and sugar intake.	<ul style="list-style-type: none">• Gather, record, classify and present data in a variety of ways to help in answering questions.• Record findings using simple scientific language, bar charts, and tables.• Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.	
Key Assessment Questions		

Can you describe how muscles work to move the arm?
 Can you name and label some of the main bones of the human body? What is the function of a skeleton?
 Can you name some vertebrates and some invertebrates?
 Can you describe the movement of the diaphragm when breathing in and breathing out?
 Can you name the five key types of food in a human diet? What is the function of each of these food types?
 Can you draw a plate to show how much of each food type should be consumed at each meal?
 How much water should a human drink every day?

Key Vocabulary

Vertebrate, invertebrate, contract, relax, muscle, tendon, omnivore, carnivore, herbivore, carbohydrate, protein, fat, dairy product, sugar, energy, balanced.

Knowledge to be taught:

The Skeleton

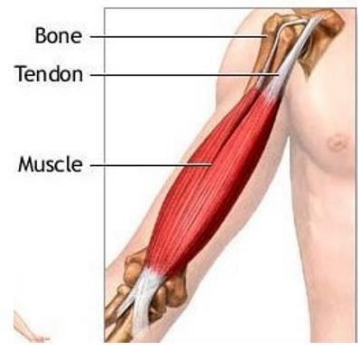
- Skeletons are made of bones. There are 206 bones in the human body. The largest is the femur and the smallest are the bones of the inner ear.
- Bones are strong, light and rigid. They do not bend.
- All animals can be divided into 2 groups:
 - Vertebrates – animals with a backbone.
 - Invertebrates – animals without a backbone.

Vertebrates	Invertebrates
Humans	Jelly fish
Dogs	Sea anenomes
Foxes	Starfish
Hedgehogs	Squid
Otters	Octopus
Fish	Worm
Snakes	Slugs

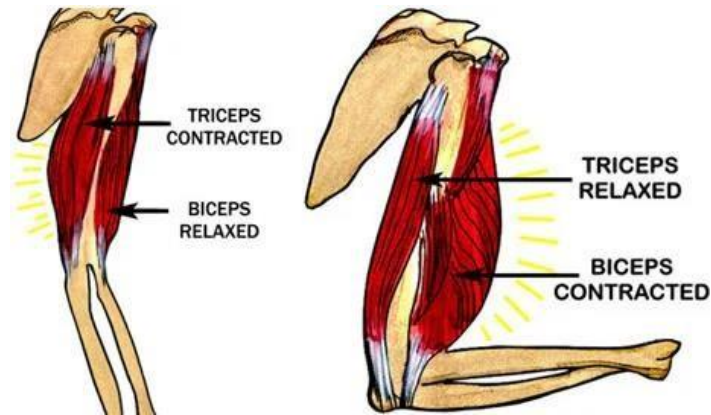
Muscles and Movement

Muscles are responsible for every movement made by the human body. They are also responsible for holding your body in a good posture.

Muscles work in pairs. As one muscle contracts (gets shorter), the other relaxes (gets longer). Muscles are joined to the body by tendons and as the muscles move they pull the bones and move the joints.



The biceps and triceps

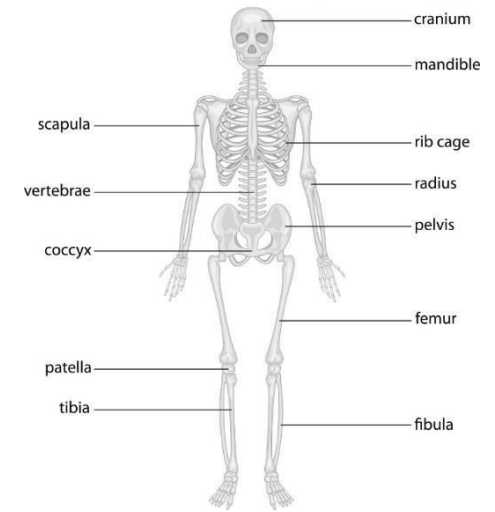


The **diaphragm** is a special muscle located at the bottom of the ribcage, underneath the lungs.

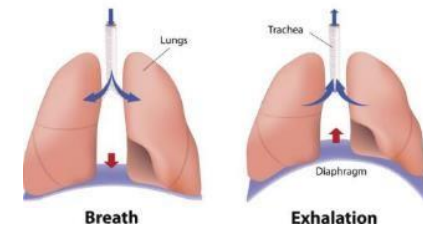
When you breath in (a do a big belly breath) it contracts and moves downwards. This allows more air to flow into the lungs.

When you breath out, it relaxes and moves upwards, expelling the air from the lungs.

Human Skeletal System



The diaphragm functions in breathing



An animal's diet is everything it eats and drinks.

Omnivores are animals that eat meat and plant material.

Carnivores are animals that only eat meat.

Herbivores are animals that only eat plant material.

There are five main types of food in our diet:

- **Carbohydrates** eg. bread, potatoes, rice and pasta. Starchy foods that help us to feel full after a meal. They give us energy but release the energy slowly. This stops us from feeling hungry for a longer period of time.
- **Fruits and vegetables** are packed with vitamins to keep our bodies working well and to strengthen our immune system. They are also full of fibre which passes right through your body and out of the other end! It gives bulk to your poo making it soft and easier to pass. It keeps your bowels healthy.
- **Dairy products** are made from milk and include cheese, cream and yoghurt. These foods are rich in the mineral calcium which helps to build strong teeth and bones. Some dairy products do contain a lot of fat.
- **Proteins** include meat, fish, eggs, chickpeas, lentils and nuts. Protein is essential for helping the body to grow and repair itself when needed.
- **Sugars and Fats** – We all know that we must limit our sugar intake because too much sugar can cause tooth decay, diabetes and weight gain. It provides a short burst of energy but energy levels quickly flatten out. Fats are found in



both animal products and plants. Fat is a high energy food and if we eat more than we need then our bodies store it and we gain weight.

Imagine everything you eat divided into 3 equal groups:

- One third should be carbohydrates
- One third should be fruit and vegetables
- One third should be proteins, dairy, fats and sugars combined

Water also plays a vital role in the diet of animals, including humans. An adult human should drink at least 2 litres of water every day.

Scientific Enquiry

Create a skeleton string puppet that has moving joints.

Investigate the question –Do some people have stronger muscles because they use them more?

Plan and carry out an investigation to answer a health and fitness question

Give an illustrated presentation to clients on health and fitness, using resources they have made throughout the block and evidence from their own research.

Review a food survey to answer questions on diet and look for patterns and trends display using tables and bar charts.

Use knowledge of food groups and a balanced diet to design healthy meals.

Definitions

Vertebrate An animal that has a spine (backbone).

Invertebrate An animal that does not have a spine (backbone).

Contract To become shorter and thicker.

Relax To become longer and narrower.

Muscle A bundle of fibrous tissue that has the ability to relax and contract and move joints.

Tendon	A cord that attaches muscles to bones.

Omnivore	An animal that eats meat and plant-based foods.
Herbivore	An animal that only eats plant-based foods.
Carnivore	An animal that only eats meat.
Carbohydrate	Foods containing sugars and starch eg. Potatoes, rice, pasta, bread.
Protein	Compound made of amino acids that help the body to grow and repair eg. Meats, eggs, nuts, seeds, dairy products

Medium Term Planning					
Week 1	Week 2	Week 3	Week 4	Week 5	Week 6
To know that humans and some other animals have skeletons for support, protection and movement.	To know that humans and some other animals have muscles for support, protection and movement.		To know 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.	To know 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.	To know that there are five key food groups and that a balanced diet can be achieved with a specific combination of these.

Year 3 – Summer 2		Light and shadows
National Curriculum objectives: 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		Next Steps
Key Stage One – Materials – describe the simple properties of materials including whether they are opaque or transparent.		Year 6 – the law of reflection, the visible spectrum, prisms and the colour spectrum
Knowledge Objectives	Scientific Skills	
<ul style="list-style-type: none">• To know that darkness is the absence of light.• To know that the human eye needs light in order to see.• To know that that light travels in straight lines.• To know that light comes from a variety of different sources.• To know that some materials can reflect light.• To know that shadows are formed when the light from a light source is blocked by an opaque object.	<ul style="list-style-type: none">• Ask relevant questions and using different types of scientific enquiries to answer them.• Set up simple practical enquiries, comparative and fair tests.• Make systematic and careful observations.• Gather, record, classify and present data in a variety of ways to help in answering questions.• Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.• Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.• Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.• Identify differences, similarities or changes related to simple scientific ideas and processes.• Use straightforward scientific evidence to answer questions or to support their findings.	
Key Assessment Questions		
How does light travel? What do humans need in order to see something? Can you name some natural and some manmade light sources? Can you name a reflective material? How is a shadow formed? Can you explain how you would change the size of a shadow?		
Key Vocabulary		
Absence, source, natural, manmade, reflect, opaque, translucent, transparent		

Knowledge to be taught:

When we see darkness, it is because there is an absence of light.

The human eye needs light in order to see.

Light travels in straight lines from a light source.

There are a variety of different sources of light. Some are natural sources and some are manmade.

Some materials are able to reflect light. For example:

- A bicycle reflector
- A hi-vis jacket
- Tin foil
- Mirrors.

Shadows

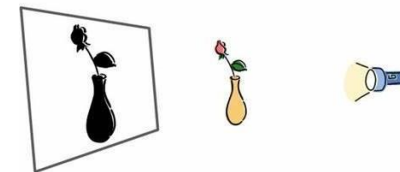
Shadows are formed when an opaque object blocks the light travelling from a light source.

Shadows take the shape of the object that has created them.

The size of a shadow can be changed.

If the object is moved closer to the light source then the shadow will be smaller. If the object is moved away from the light source then the shadow will be bigger.

Examples of light sources:



Scientific Enquiry

Investigate the nature of darkness, light and sight with a torch, a cardboard box and pencil holes.

Predict and then investigate how well different colours and materials reflect light in a simulated dark cave. Use results to sort and classify the samples.

Discover the properties of mirrors and reflections by undertaking different investigative tasks and use scientific knowledge on light to explain findings.

Investigate how different objects create shadows.

Investigate the effect of moving the light source on the size of shadows.

Definitions

Light source An object that emits its own light.

Reflect When light bounces off a surface.

Natural Derived from nature.

Manmade Created by humans.

Opaque Describes objects that do not let light pass through them.

Translucent Describes objects that allow some light through them.

Transparent Describes objects that will let light travel through them with ease.

Medium Term Planning

Week 1	Week 2	Week 3	Week 4	Week 5	Week 6
To know that darkness is the absence of light. To know that light travels in straight lines.	To know that some surfaces will reflect light.	To know that mirrors can reflect light.	To know that shadows are formed when the light from a light source is blocked by an opaque object.	To know that the size of a shadow can be changed.	Assessment Opportunity