



The Science Curriculum

Year 5

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.

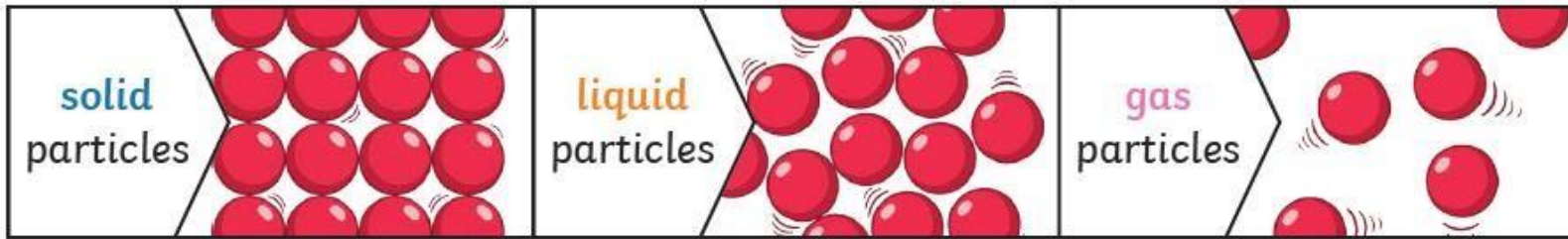
Living Things and their Habitats	<ul style="list-style-type: none"> Make observations of living things in the immediate environment. 	<ul style="list-style-type: none"> Explore and compare the differences between things that are living, dead, and things that have never been alive. Identify that most 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.

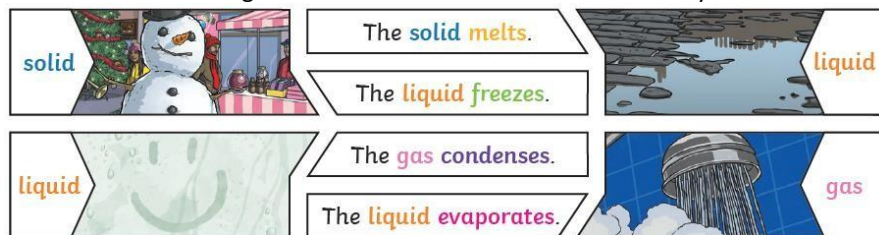
Evolution and Inheritance				<ul style="list-style-type: none">• Know that living things have changed over time.• Know that fossils provide information about living things that inhabited the earth millions of years ago.• Know that living things produce offspring of the samekind, but that normally offspring 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 5 – Autumn 1		Science – Investigators – Properties and changing materials	
Prior Learning			Next Steps
<div>Year 4</div> <ul style="list-style-type: none">• Compare and group materials together, according to whether they are solids, liquids or gases.• Observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C).• Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.			Key Stage Three – Pure and impure substances
<div>National Curriculum:</div> <ul style="list-style-type: none">• Describe magnets as having two poles• Predict whether two magnets will attract or repel each other, depending on which poles are facing.• Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties• Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets• Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution• Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating• Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood• Demonstrate that dissolving, mixing and changes of state are reversible changes• Explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda.			
Knowledge Objectives		Scientific Skills	
<ul style="list-style-type: none">• To know that materials can be grouped according to their differing properties.• To know that some materials are harder than others.• To know that some materials are thermal conductors and some are thermal insulators.• To know that some materials are more absorbent than others.• To know that some materials conduct electricity and some do not.• To know that some materials will dissolve in liquid to form a solution.• To know how to recover a substance from a solution using filtering, sieving and evaporation.• To know that mixing, dissolving and changes of state can be reversed.		<ul style="list-style-type: none">• Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.• Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.• Record data and results of increasing complexity using scientific diagrams and labels, and line graphs.• Use test results to make predictions to set up further comparative and fair tests.• Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays & presentations.• Identify scientific evidence that has been used to support or refute ideas or arguments.	
Key Assessment Questions			
Key Vocabulary			
Knowledge to be taught (Gateway knowledge in red)			

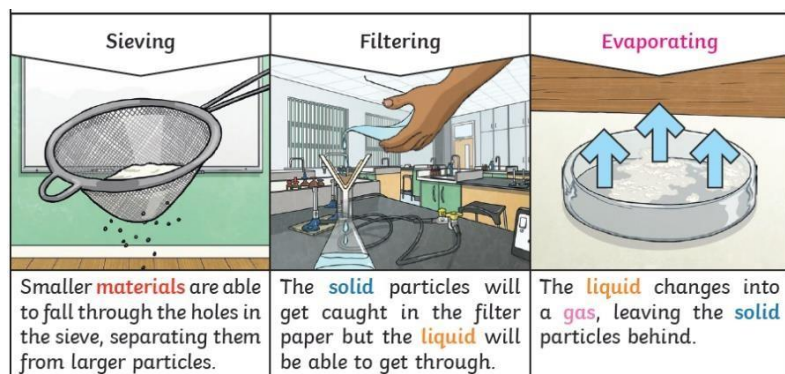
Different materials are used for different jobs depending on their properties: electrical conductivity, thermal conductivity, hardness, insulators, magnetism, solubility
Materials can exist in three different states: Solid, liquid and gas



Materials can be changed from one state to another and in many cases this is reversible.



Some materials can be mixed into a liquid and they will dissolve. Materials such as sugar that do dissolve in a liquid are called soluble. Materials such as sand that do not dissolve are called insoluble. It is possible to retrieve that material again using a range of processes including: sieving, filtering and evaporating



Scientific Enquiry

Investigate hard materials suitable for food preparation.	Investigate thermal insulating properties of materials to keep refreshments hot or cold.
Investigate the absorbency of materials suitable for cleaning with.	Investigate electrical insulators/conductors for health and safety purposes.

Medium Term Planning

Week 1	Week 2	Week 3	Week 4	Week 5	Week 6
To compare and group together everyday materials based on their properties	To know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution	To decide how mixtures might be separated	To give reasons for the particular uses of every day materials	To demonstrate that dissolving, mixing and changes of state are reversible changes	To explain that some changes result in the formation of new materials

Year 5 – Spring 1		Science – Earth and Space	
Prior Learning		Next Steps	
Year 1 – There are 7 planets in our Solar System and they orbit the sun. The hottest planets are the closest to the sun.		KeyStage3–SpacePhysics: Gravityforce, galaxies, seasonsandtheEarth’s tilt, the light year	
National Curriculum objectives: <ul style="list-style-type: none">• Describe the movement of the Earth, and other planets, relative to the Sun in the solar system• Describe the movement of the Moon relative to the Earth• Describe the Sun, Earth and Moon as approximately spherical bodies• Use the idea of the Earth’s rotation to explain day and night and the apparent movement of the sun across the sky.• Recognise that shadows are formed when the light from a light source is blocked by an opaque object• Recognise that light from the sun can be dangerous and that there are ways to protect their eyes• 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			
Knowledge Objectives		Scientific Skills	
<ul style="list-style-type: none">• To know that the earth, moon and sun are approximately spherical bodies.• To know that Earth and the other planets in the solar system orbit the sun.• To that the Earth rotates on an axis to create day and night.• To know that time zones are linked to the rotation of the Earth.• To know how the moon moves in relation to the earth.		<ul style="list-style-type: none">• Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.• Identify scientific evidence that has been used to support or refute ideas or arguments.• Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.• Record data of increasing complexity using tables, scatter graphs, bar and line graphs.• Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms.	
Key Assessment Questions			
Can you explain how day and night is produced on earth? Can you draw a model of our solar system to explain the heliocentric model? Can you explain what a time zone is and how it is related to the rotation of the earth? Can you describe the phases of the moon?			
Key Vocabulary			
Celestial body, spherical body,			

Knowledge to be taught (Gateway Knowledge in red)

The sun, moon, Earth and other planets in our Solar System are roughly spherical.

People once believed that our solar system was 'Geocentric' meaning that the sun and the other planets orbited the earth. This was disputed by Galileo who said the Earth, like all of the planets in our solar system, orbits the sun. This is why our solar system is called 'Heliocentric'.

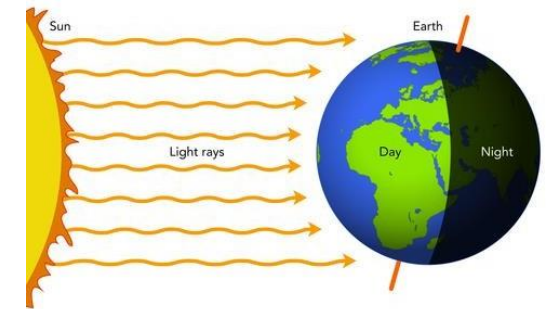
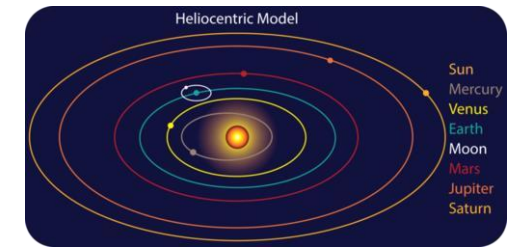
The earth rotates on its axis and it takes 24 hours for the Earth to make one full rotation. It is this rotation that creates day and night. Countries that are facing the sun are in daylight. Countries facing away from the sun are experiencing night time.

Time Zones

Scientists divided the Earth into 24 small sections and called these time zones. These imaginary dividing lines are called meridians. The imaginary line that runs through the UK is called the Prime Meridian and this runs through Greenwich in London. The Prime Meridian splits the Earth into the Eastern hemisphere and the Western hemisphere. Large countries such as the USA and Russia have parts of their country in more than one time zone.

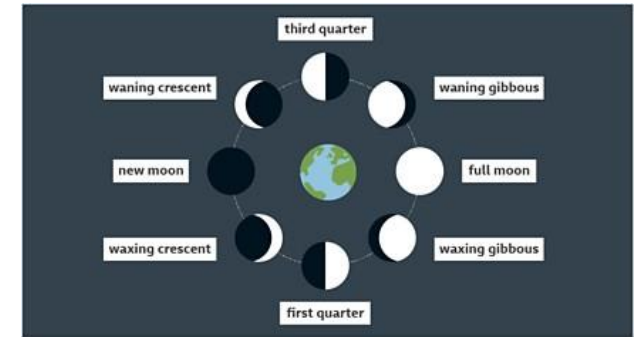
Time in countries to the east of the Prime Meridian is always in front of that in the UK.

Time in countries to the west of the Prime Meridian is always behind that of the UK.



The Moon

The Moon is lit by the Sun. At any time, half of the Moon is lit and half is dark. When the dark side of the Moon is facing Earth we cannot see it; this is called a new moon. As the Moon starts to orbit Earth we can see more and more of the lit side. At various stages in its orbit it is called a crescent moon, a quarter moon and a full moon. It is called a full moon when we can see all of the sunlit side of the Moon.



Scientific Enquiry

Develop scientific enquiry questions that match a series of statements about space.
Match possible scientific enquiry approaches to specific scientific enquiry questions.

Create a scale model of the solar system.

Create an orrery to explore heliocentricity.

To create a shadow clock to explore day and night.

To create a sundial to explore time zones.

Investigate moon phases

Medium Term Planning – Using Year 5 Hamilton Science as a starting point.

Week 1	Week 2	Week 3	Week 4	Week 5	Week 6
To plan a scientific enquiry to answer questions.	To know how the earth and other planets move in relation to the sun.	To know the difference between geo and heliocentric solar system and how views have evolved.	To know that the rotation of the earth creates day and night and the apparent movement of the sun across the sky.	To know about time zones and how these are related to the rotation of the earth.	To know the phases of the moon.

Year 5 – Spring 2		Science – Forces	
Prior Learning		Next Steps	
Year 3 – Magnetism		Key Stage 3 – Moment as the turning effect of force, measuring force in Newtons, forces and equilibrium,	
National Curriculum: <ul style="list-style-type: none">• Notice that some forces need contact between two objects, but magnetic forces can act at a distance• Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object• Identify the effects of air resistance, water resistance and friction, that act between moving surfaces• Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.			
Knowledge Objectives		Scientific Skills	
<ul style="list-style-type: none">• To know that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object.• To know the effects of air resistance, water resistance and friction, that act between moving surfaces.• To know that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.		<ul style="list-style-type: none">• Identify scientific evidence that has been used to support or refute ideas or arguments.• Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.• Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.• Record data and results of increasing complexity using scientific diagrams and labels, and tables.• Use test results to make predictions to set up further comparative and fair tests.• Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral form.	
Key Assessment Questions			
What is the name of the force that makes objects fall to Earth? Which force does air resistance act against? Can you give a definition of friction? What is the purpose of gears, levers and pulleys?			
Key Vocabulary			
Force, motion, gravity, air resistance, water resistance, friction, lever, fulcrum, pivot, gear, pulley, effort,			
Knowledge to be taught (Gateway knowledge in red)			

An unsupported object will fall towards the earth because of the force of gravity acting between the earth and the falling object.

Air resistance or drag, acts against gravity on falling objects. This is how a parachute works.

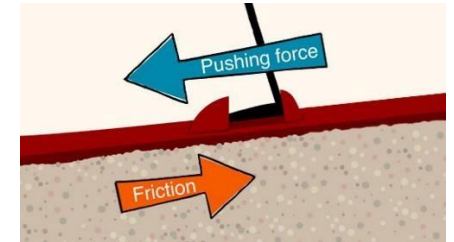
Water resistance is the friction between an object and the water that slows the object down.

Friction is a force between two surfaces that are sliding, or trying to slide, across each other. For example, friction is created when a book is slid across a table. Imagine sliding two strips of ribbon over each other and then think how hard it would be with two velcro strips. There is more friction between the velcro strips than the ribbon. The amount of friction between two objects depends on what the objects are made from.

What is the purpose of levers, pulleys and gears?

Lever, pulleys and gears are all types of mechanisms that make jobs easier to do, in other words they will require less effort.

Air resistance



Lever

Levers are the simplest type of mechanism. They are really good at lifting objects and can be used to make objects easier to lift. The blue circle represents the fulcrum. The purple bar represents the lever. The purple square represents the weight being lifted. Lever A is the most effective at making an object easier to lift as the fulcrum is closest to the object being lifted. Examples – a seesaw, tweezers, wheelbarrow, a hammer, nutcracker

Gears

Gears are toothed wheels that lock together and turn one another.

The wheels are usually different sizes so that one gear speeds up to slow down the next gear. Gears are also used to change the direction of movement.

How will turning a small gear wheel affect the speed of a larger gear wheel?

If the first gear wheel is smaller (and has fewer teeth) than the second one, then the second (bigger) gear doesn't have to move as quickly to keep up with the smaller gear. So the second gear wheel turns more slowly than the first.

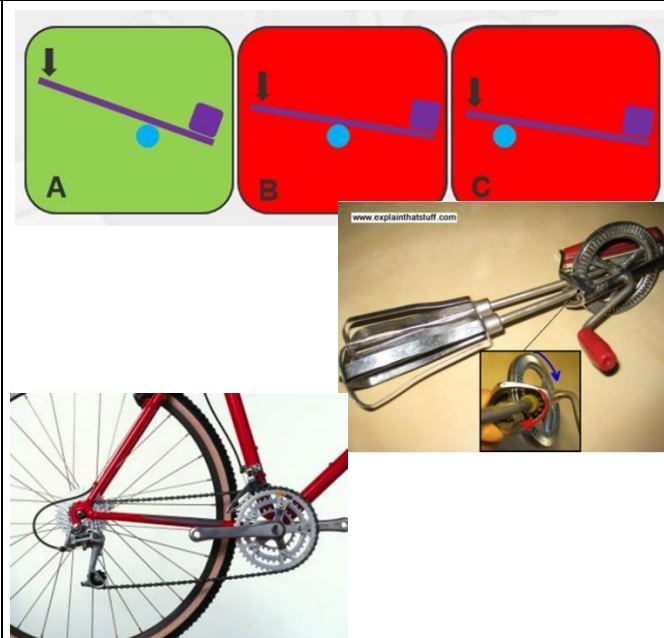
Examples – drill, clock

Pulleys

Pulleys are like gears but the two wheels do not lock together.

Instead the wheels are joined by a belt. Pulleys can be used to change the speed, direction or force of a movement.

Examples – Hoisting a flag up a pole



Scientific Enquiry

Investigate parachutes and air resistance.	Investigate and create levers.
Investigate and create pulleys	To know how a pulley works and how the number of pulleys used changes the effort required.
Investigate gears and find out how they help cyclists ride.	Investigate the effect of ground friction on the force needed to move a toy car.
Investigate and identify which shape of boat is best to beat the water resistance of a river, offering an explanation.	

Medium Term Planning – Using Year 5 Hamilton Science as a starting point.

Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7
To know that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object	To know the effects of air resistance, that acts between moving surfaces.	To know how levers work and investigate how the position of the fulcrum, load and effort impact on use.	To know how a pulley works and how the number of pulleys used changes the effort required.	To know how a gear works and how they help cyclists to ride.	To know the effects of friction that acts between moving surfaces.	

Year 5 – Summer 1	Science – Living Things and their habitats	
Prior Learning		Next Steps
EYFS – Care for a plant by watering it every day. Year 1 – Identify and describe the basic structure of flowering plants and trees: petal, leaf, stem, trunk, roots Year 2 – Describe the basic needs of a flowering plant. Year 3 – Identify and describe the functions of the different parts of a flowering plant: petal, leaf, stem, roots.		Year 6 – Classification of plants based on their characteristics.
National Curriculum: <ul style="list-style-type: none">Describe the differences in the life cycles of a mammal, an amphibian, an insect and a birdDescribe the life process of reproduction in some plants and animals.		
Knowledge Objectives	Scientific Skills	
To describe the life process of reproduction in some plants and animals. To know the key structural features of a flowering plant. To know about processes of natural and artificial asexual reproduction in plants To investigate artificial forms of asexual reproduction in plants To know and describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird	To record data and results of increasing complexity using scientific diagrams and labels. To report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations. To identify scientific evidence that supports or refute ideas or arguments. To plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.	
Key Assessment Questions		
Can you give a definition for sexual reproduction and asexual reproduction? Can name and describe 2 different types of asexual reproduction in plants? Can you describe the life cycle of an animal that reproduces sexually?		
Key Vocabulary		
life cycle, mammal, bird, amphibian, insect, reproduction, gamete, stamen, stigma, carpel, pistil, pollination, germination, flowering, sexual reproduction, seed, pollen, anther, filament, style, ovary, botanical illustration, dissection, corm, bulb, spores, cutting, fern, moss, liverwort, tubers, asexual, non-flowering, propagation, artificial, natural		
Knowledge to be taught (Gateway Knowledge in red)		

Know the key structural parts of a flowering plant: Sepal, filament, anther, pollen, petal, stigma, style, ovary, ovule

Sexual reproduction, male and female material (gametes) combine to produce offspring. This applies to plants and animals.

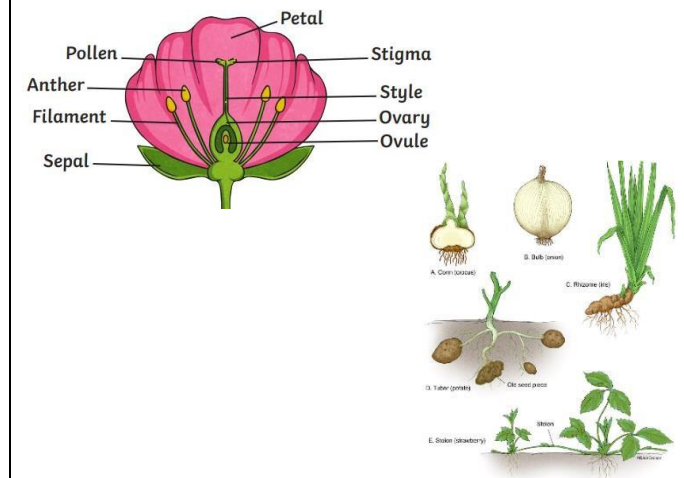
Asexual Reproduction

This happens in some plants (both flowering and non-flowering). This is where one plant produces offspring without the need to combine female and male gametes. It is worth noting that most plants that reproduce asexually also reproduce sexually.

Three methods of plant asexual reproduction are:

- Bulbs - underground food storage organs with fleshy leaves that store food and can grow and develop into new plants, eg onions and garlic.
- Runners - horizontal stems, eg strawberry or spider plants.
- Tubers - underground food stores. Groups of cells in the tuber use this food to produce the energy needed for cell division. These cells then grow and develop into new plants.

Parts of a Plant



It is possible to force plants to reproduce asexually through vegetative propagation. This is cloning of the parent plant by using other parts of it, not just the seeds. For example, root cuttings.

Sexual Reproduction

Most animals reproduce sexually (although there are a few examples of asexual reproduction including sea anemones and starfish).

Recap features of amphibians, insects, mammals and birds:

Amphibians are cold-blooded, smooth skinned vertebrates which during part or all of their lives can move and breathe both on land and under water (the latter is usually early in their life cycle).

Insects are arthropods that have a body divided into three main parts: head, thorax and abdomen, an exoskeleton, 6 legs, 2 antennae and 2 pairs of wings.

Amphibians and insects both undergo a process of metamorphosis during their life cycles.

Mammals have mammary glands, which the female develop and produce milk for their young, they are warm blooded and normally have hair/fur all over their body. They generally have live births but the gestation period can vary dramatically.

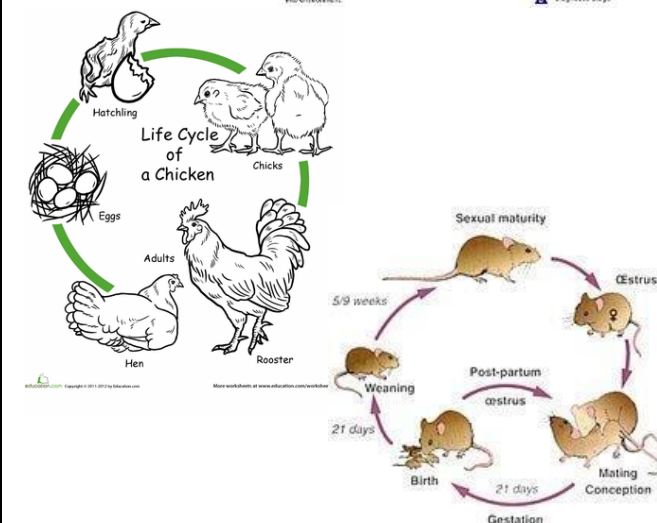
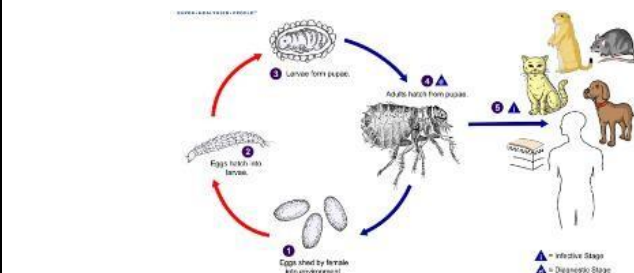
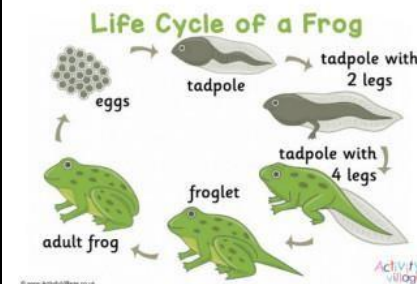
Birds lay eggs, they have wings (although not all can fly), they have feathers and they have beaks.

Know the life cycle of the frog and the flea (linked to the current history topic of the Black Death).

Know the life cycle of the bird and the rat (linked to current history topic of the Black Death).

Birds and eggs

Birds lay eggs! Clarify that if the egg has been fertilised before it was laid (internal fertilisation) the germinal disc gradually grows into the chick using the nutrients stored in the yolk. The white protects the egg and the cords hold the yolk in place. The air cell/sac allows the bird to breathe just before it breaks out of its shell. There are tiny pores in the egg shell which allow air to enter.



Scientific Enquiry

Dissect a flowering plant and record findings as an annotated botanical illustration.

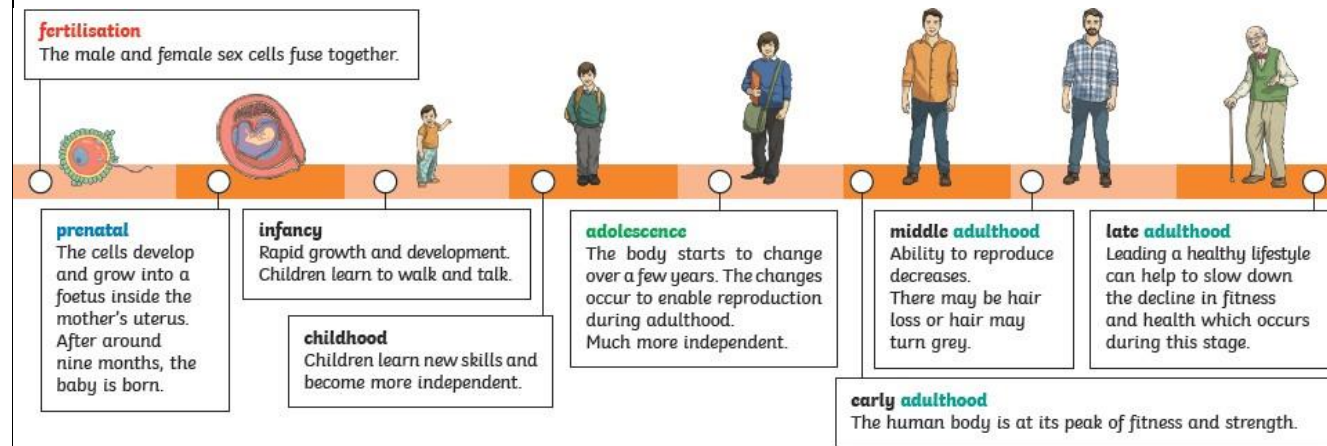
Explore a variety of bulbs, tubers, corms and runners to investigate how they might reproduce asexually.

Record life cycles using botanical illustration techniques.

Medium Term Planning						
Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7
To know and label the parts of a flowering plant, including the male and female parts.	To know the processes of natural and artificial asexual reproduction in plants.	To know the life cycle and reproduction of amphibians.	To know the life cycle and reproduction of insects.	To know the life cycle and reproduction in mammals.	To know the life cycle and reproduction of birds.	To research the life cycle of an unusual animal.

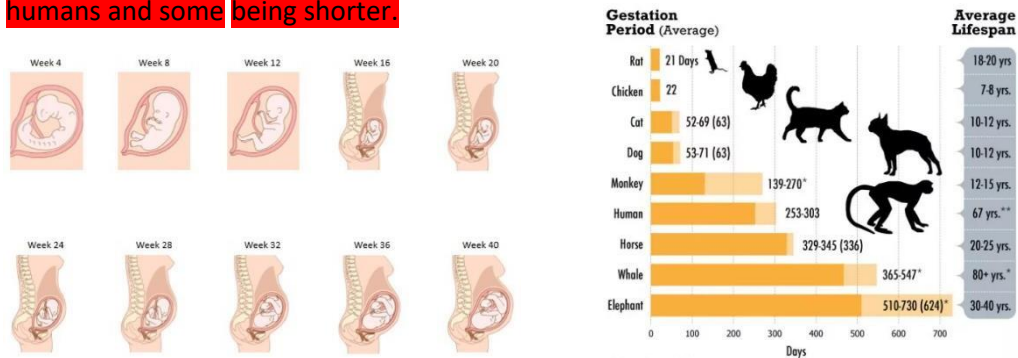
Year 5 – Summer 2	Science –Human Body and Puberty	
Prior Learning	Next Steps	
Year 1 – Basic human body parts and the senses. Year 2 - Notice that animals, including humans, have offspring which grow into adults.	Year 6 – Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents. Key Stage 3 - Heredity as the process by which genetic information is transmitted from one generation to the next	
<u>National Curriculum:</u> <ul style="list-style-type: none">Describe the changes as humans develop to old age.		
Knowledge Objectives		Scientific Skills
To know the gestation period of humans and some other mammals. To know the key stages of foetal development. To know the milestones and key development stages for babies and children. To know and understand the changes in the adolescent human body during puberty and know that these changes are gender specific. To know the physical and mental changes that happen from adulthood to old age. To know, order and explain the 6 key stages in a human life.		<ul style="list-style-type: none">Record data using tables, scatter graphs, bar and line graphs.Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms.Identify scientific evidence that has been used to support or refute ideas or argument.
Key Assessment Questions		
Can you describe the 6 key stages of human life? What is a gestation period and do all mammals have a gestation period of the same length? What changes occur in humans from birth to childhood, childhood to adolescence, adulthood to old age?		
Key Vocabulary		
Adolescence, embryo, foetus, gestation, hormones, life cycle, life span, menstruation, oestrogen, offspring, puberty, reproduction, species, testosterone, toddler, uterus		
Knowledge to be taught (Gateway Knowledge in red)		

As humans grow, they undergo many physical and emotional changes. As a child, we learn new skills such as walking and talking and as we develop into old age, we may get wrinkles and greying hair. These changes are all part of the human life cycle.



Gestation in Humans

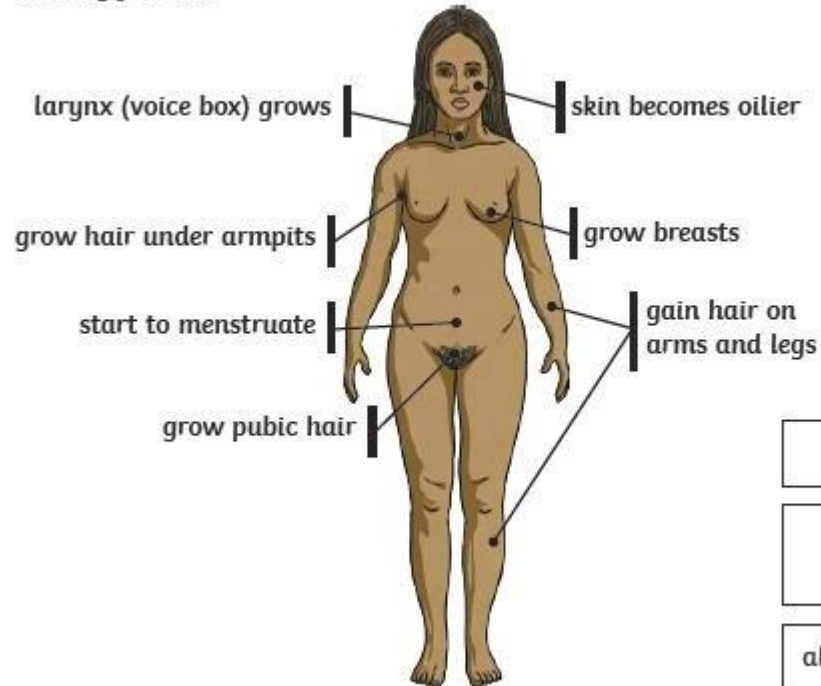
From conception to birth, the gestation period in humans is approximately 40 weeks. Gestation periods vary between different mammals with some being longer than humans and some being shorter.



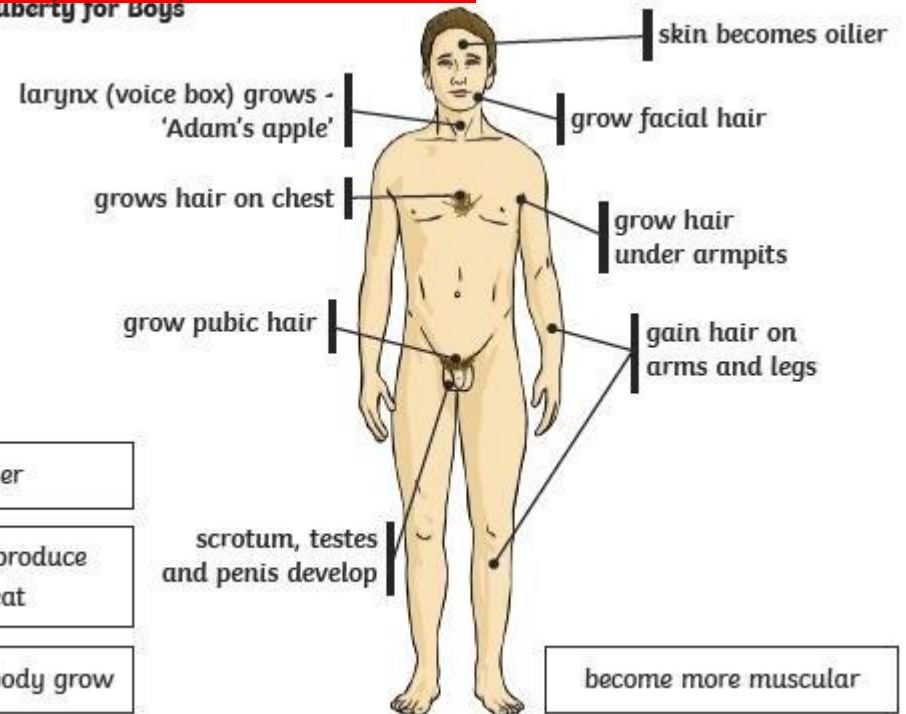
Changes that happen from adolescence to adulthood

Boys and girls will undergo physical changes as they get older. They can increase in height and weight, they may get acne or spots and their moods can change regularly. In boys, they may grow body and facial hair, their voice can get deeper and their Adam's apple may start to protrude. In girls, their breasts will grow, their body fat may increase, including the widening of their hips and they will start menstruation.

Puberty for Girls



Puberty for Boys



grow taller

sweat glands produce more sweat

all parts of the body grow

Scientific Enquiry

Create gestation period graphs for a range of animals.

Research and create an infographic on baby growth.
Compare 'red books' and predict growth patterns.

Create a human timeline.
Create a human growth quiz.

Medium Term Planning – Using Year 5 Hamilton Science as a starting point.

Week 1	Week 2	Week 3	Week 4	Week 5	Week 6
To know the gestation period of humans and some other mammals.	To know the key stages of foetal development.	To know the milestones and key development stages for babies and children.	To know and understand the changes in the adolescent human body during puberty and know that these changes are gender specific.	To know the physical and mental changes that happen from adulthood to old age.	To know, order and explain the 6 key stages in a human life.