

Rowsley Church of England Primary School – Science Progression by Objectives (May 2024)

EYFS – Understanding The World (Natural World)

All About Me	Seasons	Fairy Tales
<p>I will be using all five senses to investigate area around them</p> <p>I will be recognizing similarities and differences between each other</p> <p>I will be learning about different parts of the body.</p> <p>I am learning how to keep my body and teeth healthy.</p> <p>What do humans and animals need to grow?</p> <p>Common misconceptions: only four-legged mammals, such as pets, are animals humans are not animals</p>	<p>I will be recognising similarities and differences between the four seasons.</p> <p>To know what weather we typically have in each season.</p> <p>I will be learning the names of some trees found in the school grounds.</p> <p>I will be learning that leaves change colour in Autumn and discuss these colour changes. I am learning that plants grow, decay and change over time.</p> <p>I will be learning all about hedgehog’s basic needs and habitats and understand that some animals hibernate.</p> <p>Common misconceptions: it always snows in winter it is always sunny in the summer there are only flowers in spring and summer it rains most in the winter</p>	<p>I can find the best material to make the roof of the Three Little Pig house</p> <p>I can design a house with features/materials observed on house walk.</p> <p>Children to have opportunities to touch, smell and hear the natural world around them during outdoor activities.</p> <p>Common misconceptions: Only fabrics are materials Only building materials are materials</p>

Rowsley Church of England Primary School – Science Progression by Objectives (May 2024)

People Who Help Us	Animals (Farms)	Travel
<p>I know how we can stay healthy and the right foods to eat.</p>	<p>I can observe how shadows change throughout the day.</p> <p>I am researching farm animals on the internet using a search engine</p> <p>I am learning about mothers and their young</p> <p>I know the life cycle of a plant and can explain what animals need to grow.</p> <p>I can draw pictures of the natural world including animals</p> <p>Common misconceptions: plants are flowering plants grown in pots with coloured petals and leaves and a stem trees are not plants</p>	<p>I am learning how materials can sink or float</p> <p>I am learning how ice melts.</p>
<p><i>Through continuous provision:</i></p> <p>Water tray (floating, sinking, absorbency of materials)</p> <p>Sand tray/pit (consistency of materials, role play)</p> <p>Bug hunts (logs to turn over, wild flowers and long grass)</p> <p>Construction area (junk modelling, different types of materials)</p> <p>Growing area (seeds, plants, minibeasts)</p> <p>Mud kitchen (consistency of materials, scented herbs, stones, minibeasts)</p> <p>Sound (musical instruments and sound)</p> <p>Small world (different animals, props, dolls' house)</p> <p>Playdough area (birthday props/cake decorations to encourage talk about changing and growing)</p>		

Rowsley Church of England Primary School – Science Progression by Objectives (May 2024)

Y1/2	Y3/4	Y5/6
Biology – Plants, All Living Things & Living Things and their Habitats		
<p>LO: I can describe the basic structure of a flower. (Y1) Children identify roots, stem, leaves and flower.</p> <p>LO: I can describe the journey from seed to plant. (Y2) Explain a seed is planted, grows into a seedling, grows into a matures plant, spreads seeds.</p> <p>LO: I can identify and name a variety of common wild and garden plants, including deciduous and evergreen trees. (Y1) To know and explain what a deciduous and evergreen tree are.</p> <p>LO: I know that plants need water, light and a suitable temperature to grow and stay healthy. (Y2)</p> <p style="background-color: yellow;">LO: I can track the growth of a plant using my measuring skills.</p> <p>Common misconceptions: Plants are flowering plants grown in pots with coloured petals and leaves and a stem Trees are not plants All leaves are green All stems are green A trunk is not a stem</p>	<p>LO: We are labelling the parts of a flowering plant and showing we understand their functions. Functions of roots, stem, leaves and flower.</p> <p>LO: We are showing we know plants need certain things to grow.</p> <p>LO: We are explaining the life cycle of a flowering plant with a focus on pollination and fertilisation. Germination, seedling, mature plant, pollination, seed dispersal.</p> <p>LO: We are learning about the different types of seed dispersal and why seed dispersal is necessary. Different examples of plants for wind, water, animal/bird and bursting seed dispersal.</p> <p style="background-color: yellow;">LO: We are investigating whether the temperature of water affects the speed at which it is transported through a plant. Dye investigation. Use of thermometer. Record results in a table.</p> <p>Enrichment: Children plant vegetables and nurture their growth from seed to seedling to mature plant.</p> <p>Common misconceptions</p> <ul style="list-style-type: none"> • plants are not alive as they cannot be seen to move • all plants start out as seeds • seeds and bulbs need sunlight to germinate <p>flowers are merely decorative rather than a vital part of the life cycle in reproduction</p> <ul style="list-style-type: none"> • plants only need sunlight to keep them warm 	<p>LO: To explain the life cycle of plants Describe and order the stages in the life cycle of a strawberry and/or dandelion plant. They will compare similarities and differences between the two cycles.</p> <p>LO: To understand how to use classification keys to help group, identify and name a variety of living things Classify 2 invertebrates using a classification key i.e. worm and spider</p> <p>LO: To describe how living things can be classified into broad groups. Learn the five vertebrate groups and some of the invertebrate groups - sorting activity, research- use different criteria; e.g. nutrition (omnivore, carnivore or herbivore; animal group (fish, amphibian etc); Vertebrate/invertebrate.</p> <p>LO: To understand how I can use classification keys to help group, identify and name a variety of living things use a classification key to identify animals and create a key using yes/no questions to identify animals.</p> <p>LO: To describe how living things can be classified into broad groups Select criteria to use to sort plants into groups. Use the internet to research information about plants and sort them into groups based on their characteristics.</p> <p>LO: To find out about the significance of the pioneer of classification. Learn about and use the classification keys as set out in the work of scientist, Carl Linnaeus. Explain who Carolus Linnaeus was and why he is an important scientist. In groups, they will create a presentation about his life and work.</p> <p>LO: describe the life process of reproduction in some plants Label the male and female reproduction parts of a plant - create a layered cross section of a flowering plant</p>

Rowsley Church of England Primary School – Science Progression by Objectives (May 2024)

		<p>Plant potatoes looking at how they are tubers to start and then harvest in the summer</p> <p>Common Misconceptions:</p> <ul style="list-style-type: none"> •movement, number of legs, body covering, and habitat are the only way to classify animals •marine mammals such as whales are fish •only large land animals are mammals •No mammals live in (or around) Antarctica •classifying vertebrates as invertebrates (and vice versa) • all plants start out as seeds & all life cycles start with an egg • all plants have flowers • plants that grow from bulbs do not have seeds <p>LO: To understand that microorganisms are also living things To explain that microorganisms are living things and will have conducted an experiment to prove that yeast respire and is therefore a living microorganism. Scientific enquiry - Yeast Investigation - different conditions/food for yeast. Record growth of dough on bar graph/ charts</p> <p>LO: To describe how living things can be classified into broad groups. Name the five main groups scientist use to classify microorganisms. They will be able to give examples of some of the characteristics and features of each group</p> <p>Common Misconceptions:</p> <ul style="list-style-type: none"> • all microorganisms are harmful
<p>LO: I can identify if something is living, dead or has never been alive. (Y1) LO: I can explore and compare the differences between things that are living, dead, and things that have never been alive (Y2) Explore the outside environment regularly to find objects that are living, dead and have never lived.</p> <p>LO: I can match animals to their habitat. (Y1) LO: I can 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 (Y2)</p> <p>LO: I can identify and name a variety of plants and animals in their habitats, including microhabitats (Y2)</p>	<p>LO: We are learning what all living things have in common. MRS GREN</p> <p>LO: We are naming the 6 basic animal classes and giving examples of each. Amphibians, birds, fish, mammals, reptiles, invertebrates.</p> <p>LO: We are using Venn diagrams to group living things in different ways. e.g. lays eggs/breathes air/lives in water.</p> <p>LO: We are creating classification keys to describe living things. Create classification key to identify four animals.</p> <p>LO: We are recognising that environments can change and that this sometimes poses danger for living things.</p>	<p>LO: To discuss the seven life processes. Revise MRS GREN Explain how animals and plants complete each of the life processes and be able to distinguish living from non-living objects</p> <p>LO: To explain how mammals reproduce. Name the five animal groups and understand that the way each of those groups reproduce may be different. They will be able to explain how mammals reproduce and understand that the gestation periods for different mammals may vary</p> <p>LO: To explain how animals reproduce. Explain which groups of animals lay eggs and which do not and compare groups of animals that look after their young with those that don't.</p>

Rowsley Church of England Primary School – Science Progression by Objectives (May 2024)

<p>LO: I can order animals in a food chain. (Y1) LO: I can explain how a simple food chain works, and identify and name different sources of food (Y2) Using a food chain can explain what animals eat.</p> <p>Common misconceptions: An animal's habitat is like its 'home' All animals that live in the sea are fish</p>	<p>Visiting speakers from Derbyshire Wildlife Trust regarding local swift population.</p>	<p>LO: To understand reproduction in plants. Explain the process of pollination and fertilisation. They will be able to label parts of a flower and understand the purpose of each part. They will be able to explain what seed dispersal is and name some seed dispersal methods.</p> <p>LO: Describe the differences in the life cycles of mammals, amphibians, reptiles, insects and birds. Match & draw lifecycles. Discuss reproduction in animals - metamorphosis, sexual and asexual reproduction (seahorses), cloning. Describe the differences and similarities in the life cycles of mammals, amphibians, reptiles, insects and birds.</p>
<h3>Biology – Animals including Humans</h3>		
<p>Animals including Humans LO: I can order the human life cycle. (Y1) LO: I can explain the different stages of the human life cycle. (Y2)</p> <p>LO: I can order the stages in a frog's life cycle. (Y1) LO: I can describe in detail and draw a diagram of a frog's life cycle. (Y2)</p> <p>LO: I can talk about the effect exercise has on the body and why it is important.</p> <p>LO: I can investigate the effect different exercises have on our heart rate.</p> <p>LO: I can explain how to look after my teeth (Y1). LO: I can explain in detail how and why we need to look after our teeth. (Y2)</p> <p>LO: I can explain why eating more fruits and vegetables than fats and sugars is important. (Y1) LO: I can identify which food group common foods belong to and explain how to build a healthy meal. (Y2)</p> <p>LO: I can label many parts of the body. (Y2) LO: I can label some parts of the body. (Y1)</p>	<p>Animal Skeletons & Food Chains LO: We are learning that different animals have different dietary needs. Necessity of food to survive. Omnivore, herbivore, carnivore. Link to Plants.</p> <p>LO: We are learning the terms <i>consumer</i>, <i>producer</i> and <i>decomposer</i>. Use of terms in relation to food chains.</p> <p>LO: We are explaining the relationship between different animals in a food chain. Diagrams of food chains. Understanding the effect one animal becoming scarce or abundant has on the rest of the chain.</p> <p>LO: We are explaining the difference between a parasite and a predator. Consumption of nutrients from living host.</p> <p>LO: We are naming major bones in the body and learning why humans need a skeleton.</p> <p>LO: We are sorting organisms into vertebrates and invertebrates. Endoskeletons, exoskeletons and hydrostatic skeletons. Advantages and disadvantages to having a skeleton.</p> <p>Common misconceptions: • snakes are similar to worms, so they must also be invertebrates • invertebrates have no form of skeletons</p>	<p>Life cycles and Puberty Link to PSHE - Changes LO: To describe the human life cycle. Name and describe the main stages of the human life cycle.</p> <p>LO: To understand how a foetus develops in the womb. Explain how the foetus grows in the womb at different stages.</p> <p>LO: To describe what happens to their bodies when they become teenagers. Explain what puberty is and how human bodies change during puberty.</p> <p>LO: To describe the changes as humans develop to old age by understanding the changes that take place in old age. Create a timeline, research the gestation periods of other animals and compare them with humans; find out and record the length and mass of a baby as it grows. Create a care plan for an expectant mother as her baby grows.</p> <p>Common misconceptions: • a baby grows in a mother's tummy • a baby is "made" • that adults stop learning as well as stop growing. • that our bodies can still change when we are an adult • bodily changes during puberty of the opposite sex</p>

Rowsley Church of England Primary School – Science Progression by Objectives (May 2024)

<p>LO: I can name the basic things all animals need for survival (Y1). LO: I can name, and give examples relating to specific animals, what basic things all animals need for survival. (Y2)</p> <p>LO: With support, I can explain what a mammal is and give examples. (Y1) LO: I can explain what a mammal is and give examples. (Y2)</p> <p>LO: I can identify and name a variety of common animals that are carnivores, herbivores and omnivores (Y1) To know that a carnivore eats meat, a herbivore eats plants and an omnivore eats both.</p> <p>LO: I can use a Venn diagram to sort animals according to whether they are carnivores, herbivores and omnivores. (Y2)</p> <p>Common misconceptions: Humans are not animals Insects are not animals All 'bugs' or 'creepy crawlies', such as spiders, are part of the insect group</p>		
	<p>Digestive System Including Teeth LO: We are learning how the human digestive system functions. Organs involved in digestion: mouth, oesophagus, stomach, small intestine, large intestine, anus.</p> <p>LO: We are learning about the human digestive system in more detail. Further details about each step of digestive process.</p> <p>LO: We are identifying the different types of teeth in humans and their simple functions. Functions of molars, premolars, canines and incisors.</p> <p>LO: We are learning about how to keep our teeth healthy and predicting which liquids could harm them. Tooth health</p>	<p>Circulatory System LO: To identify and name the main parts of the human circulatory system. Name the main parts of the human circulatory system and explain how the system works.</p> <p>LO: To identify and name the main parts of the heart. Dissect lambs' hearts to find the parts of the heart to help name the main parts of the heart and explain how the heart pumps blood.</p> <p>LO: To investigate which activity increases my heart rate the most. Find their pulse, calculate their heart rate and investigate different activities to see which increases the heart rate. Scientific enquiry - How does exercise affect my heart rate? Children to devise their own investigation. Record results in an appropriate format.</p>

Rowsley Church of England Primary School – Science Progression by Objectives (May 2024)

	<p>LO: We are investigating the effect different liquids have on teeth. Egg shells in different liquids.</p> <p>Link to English: Reading comprehension on digestive system and writing explanation texts of digestive system.</p> <p>Link to DT: Understanding of food groups and a balanced diet.</p> <p>Common misconceptions:</p> <ul style="list-style-type: none"> • Diet drinks are better for our teeth than sugary versions. • A healthy diet is only necessary to ensure we don't become overweight. • The large intestine is bigger or more important than the small intestine. • Food simply drops down the oesophagus due to gravity. 	<p>LO: To describe how water and nutrients are transported in humans. Explain how the blood plays a role in transporting nutrients and water around the body.</p> <p>LO: To identify how humans can live a healthy lifestyle. Describe how we can keep healthy by exercising, eating a healthy diet and taking care of our hygiene</p> <p>LO: identify how humans can live a healthy lifestyle Talking heads - to identify different things that people do that can lead to them being unhealthy. One head talking to the other.</p> <p>Common misconceptions:</p> <ul style="list-style-type: none"> • your heart is on the left side of your chest • the heart makes blood • the blood travels in one loop from the heart to the lungs and around the body • when we exercise, our heart beats faster to work the muscles more • some blood in our bodies is blue and some blood is red • we just eat food for energy • all fat is bad for you • all dairy is good for you • protein is good for you, so you can eat as much as you want • foods only contain fat if you can see it • all drugs are bad for you
<p>Biology – Evolution and Inheritance</p>		
		<p>LO: recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago. Look at the evolution of the peppered moth, how whales walked, and the bones of snakes. Make observations of fossils to identify living things that lived on Earth millions of years ago - Look at Mary Anning and findings of Charles Darwin. 1st hand experience of handling fossils and exploring which creatures they once were.</p> <p>LO: Explain natural selection and how it may lead to evolution. explain what natural selection is using the peppered moth as an example. They will understand how adaptation and natural selection lead to species changing (evolving) over time in order to survive</p>

Rowsley Church of England Primary School – Science Progression by Objectives (May 2024)

		<p>LO: recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parent. Crossbreeds of dog - why do we crossbreed? Guess who game with their class photos. Look at inherited and learned characteristics. Explain that genetic traits are passed on from parents to offspring. They will be able to list characteristics that are possible to inherit and characteristics that aren't.</p> <p>LO: identify how animals are adapted to suit their environment in different ways and that adaptation may lead to evolution. Look at species such as pigeons and finches - how the breeds change to suit their environment - look at why the beaks of finches are different. Scientific Enquiry - Complete bird beak investigation - create a line graph of results. Study the animals on the Galapagos islands i.e. marine iguanas and giant tortoise</p> <p>Building on what they learned about fossils in the topic on rocks in LKS2 LO: identify how plants are adapted to their environment. Explain how vegetation has adapted to live in arctic/antarctic conditions. Explain the features and adaptations of other plants i.e. cacti</p> <p>LO: To recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago. Look at a range of fossils and explain how fossils tell us about evolution.</p> <p>LO: To understand how animals have adapted to the polar areas. Create a fact poster about a polar animal. Present accurate information to a group. Explain how polar animals have adapted to the polar environment.</p> <p>LO: To recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago in the context of the evolution of human beings. Understand how humans evolved. Discuss fields of study/ new discoveries/ competing theories e.g. whether Homo Neanderthalensis is a different species and where our genetic inheritance comes from. Discuss the misconception that we come from monkeys. Compare modern humans with different human ancestors</p> <p>Common misconceptions:</p> <ul style="list-style-type: none">• adaptation occurs during an animal's lifetime: giraffes' necks stretch during their lifetime to reach higher leaves and animals living in cold environments grow thick fur during their life
--	--	---

Rowsley Church of England Primary School – Science Progression by Objectives (May 2024)

		<ul style="list-style-type: none"> • That evolution happens quickly and that individual species adapt rapidly to changes in their environment. • offspring most resemble their parents of the same sex, so that sons look like fathers • all characteristics, including those that are due to actions during the parent's life such as dyed hair or footballing skills, can be inherited • cavemen and dinosaurs were alive at the same time • That if you believe in evolution then you can't believe in God; (Link to RE Cosmology) • that humans evolved from monkeys
<h3 style="margin: 0;">Chemistry – Materials and their States</h3>		
<p>LO: I can group materials by what they are made from. (Y1) LO: I can group materials in different ways (Y2). Wood, metal, plastic and glass. Y2s begin using Venn diagrams to group by different uses.</p> <p>LO: I can compare the suitability of difference everyday materials (Y2) LO: I can identify properties of materials and why they're suitable for certain objects (Y1) Considering what properties of a material make it good for a specific purpose e.g. why a fork is made of metal.</p> <p>LO: I can identify uses of different everyday materials. (Y1) Finding things around the classroom and identifying whether they are wood, plastic, glass, metal, rock or paper. Identifying what objects are made from e.g. wood > fence, glass > window.</p> <p>LO: I can explain how the shape of objects made from some materials can be changed (Y2) Investigate whether materials can twist, squash, bend or stretch</p> <p>LO: I can complete an investigation report for the question "what material will be the best to make a raincoat?" (Y1 & 2 working scientifically) Using our knowledge of waterproof and absorbent to think what materials would be best. We can explain why glass wouldn't be suitable even though it is waterproof.</p>	<p>Solids, Liquids and Gases LO: We are sorting statements to help us understand the properties of a solid and the properties of a liquid. Shape, ability to pour, compression, hardness, flow, wetness, volume.</p> <p>LO: We are learning the properties of a gas. Following on from above.</p> <p>LO: We are investigating the weight of the gas in fizzy drinks. How to remove gas from fizzy drink? Do the bubbles have mass? Maths calculation to find difference. Repeat test to check results.</p> <p>LO: We are learning how heating and cooling solids, liquids and gases effects them. Melting/freezing, boiling/condensing, different boiling and melting points.</p> <p>LO: We are showing we understand the meaning of different scientific words to describe changing states of matter. Scientific vocabulary relating to above,.</p> <p>Common misconceptions:</p> <ul style="list-style-type: none"> • solids are hard and cannot break or change shape easily and are often in one piece • substances made of very small particles like sugar or sand cannot be solids • particles in liquids are further apart than in solids and they take up more space • when air is pumped into balloons, they become lighter • water in different forms – steam, water, ice – are all different substances • all liquids boil at the same temperature as water (100 degrees) 	<p>LO: To compare and group materials according to whether they are solids, liquids or gases and name their properties. Name examples of solids, liquids and gases, identifying the properties of each type of material. They will understand how states of matter change and name some of these processes.</p> <p>LO: To describe the properties of materials using scientific vocabulary. Describe the properties of materials using the scientific vocabulary.</p> <p>LO: To compare and group materials based on their response to magnets. Predict, test and group materials according to their magnetic properties. Include ferrous fluid.</p> <p>LO: To know that some materials dissolve in a liquid to make a solution. Know that some materials dissolve in a liquid to make a solution. They will be able to explain the process of dissolving using scientific vocabulary (soluble, insoluble, solution) and understand that solutions have a saturation point. Make salt crystals in a saturated solution.</p> <p>LO: To predict how I could separate mixtures. Understand that they can separate some mixed materials through various processes (evaporation, filtering, sieving or using magnets). They will be able to predict how they could separate mixtures depending on the properties of the mixed materials. Investigation - scientific enquiry</p> <p>LO: To explain why some changes are irreversible.</p>

Rowsley Church of England Primary School – Science Progression by Objectives (May 2024)

	<ul style="list-style-type: none"> • melting, as a change of state, is the same as dissolving • steam is visible water vapour (only the condensing water droplets can be seen) 	<p>To identify the difference between irreversible and reversible change. They will be able to give examples of each type of change. Link to Christmas - make popcorn and mendian chocolate discs.</p> <p>Common misconceptions: Lots of misconceptions exist around reversible and irreversible changes, including around the permanence or impermanence of the change. There is confusion between physical/chemical changes and reversible and irreversible changes. They do not correlate simply. Chemical changes result in a new material being formed. These are mostly irreversible. Physical changes are often reversible but may be permanent. These do not result in new materials e.g. cutting a loaf of bread. It is still bread, but it is no longer a loaf. The shape, but not the material, has been changed.</p> <p>Some children may think:</p> <ul style="list-style-type: none"> • thermal insulators keep cold in or out • thermal insulators warm things up • solids dissolved in liquids have vanished and so you cannot get them back • lit candles only melt, which is a reversible change
	<p>The Water Cycle LO: We are drawing and labelling a diagram of the water cycle. Link to Solids, Liquids and Gases.</p> <p>LO: We are demonstrating we understand the scientific vocabulary relating to the water cycle. precipitation, evaporation, condensation, run-off, water vapour, cycle, atmosphere.</p> <p>LO: We are writing a quiz to show that we have a good understanding of the water cycle. Write multiple choice questions about stages in the water cycle.</p> <p>Link to Geography: Further learning on the water cycle.</p> <p>Common misconceptions:</p> <ul style="list-style-type: none"> • More water is 'produced' rather than water being relocated in the water cycle. • Water needs to be at 100 degrees C to evaporate. 	
	<p>Rocks LO: We are learning about the differences between igneous, metamorphic and sedimentary rocks.</p>	

Rowsley Church of England Primary School – Science Progression by Objectives (May 2024)

	<p>LO: We are learning about why different rocks are used for different purposes. Link to Materials.</p> <p>LO: We are learning how fossils are formed.</p> <p>LO: We are learning about how soil is formed. Composition of soil and four stages of soil formation.</p> <p>LO: We are creating our own compost and understanding the difference between soil and compost. Create mini compost bin over time using scraps from dinner and other green and brown material. Link to Plants.</p> <p>LO: We are investigating the permeability of soil. Investigate permeability of 3 soils using coffee paper. Why does the permeability of soil matter? Record results in a bar chart.</p> <p>Common misconceptions</p> <ul style="list-style-type: none"> • rocks are all hard in nature • rock-like, man-made substances such as concrete or brick are rocks • materials which have been polished or shaped for use, such as a granite worktop, are not rocks as they are no longer 'natural' • certain found artefacts, like old bits of pottery or coins, are fossils • a fossil is an actual piece of the extinct animal or plant • soil and compost are the same thing. 	
<h3 style="margin: 0;">Physics – Forces</h3>		
	<p>LO: We are considering the contact and non-contact forces that occur in a children’s playground. Understanding a force as a push or pull. Which forces require contact and which don’t.</p> <p>LO: We are showing the direction of a force on a piece of playground equipment. Understanding that forces cause movement in a predictable direction e.g. gravity on fireman’s pole pulls you down.</p> <p>LO: We are investigating which material allows a toy car to travel quickest down a slope. Friction investigation. Use of data logger. Record results in table.</p> <p>LO: We are learning what is meant by ‘magnetic fields’. Different types of magnets with iron filings.</p>	<p>LO: To know that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and falling objects. To describe the force of gravity and talk about the work of Sir Isaac Newton. Scientific enquire: They will plan a fair test to answer the question; do objects fall at the same rate?</p> <p>LO: To identify the effect of friction between moving surfaces. To understand that friction is a force that acts between two surfaces or objects that are moving. Identify scenarios in which friction is a useful force and scenarios where friction is an unhelpful force.</p> <p>LO: To plan different types of scientific enquiries to answer questions, including recognising and controlling variables. I can take measurements using a range of scientific equipment.</p>

Rowsley Church of England Primary School – Science Progression by Objectives (May 2024)

	<p>LO: We are learning that magnets have two poles and that some materials are magnetic while some are not. Attract, repel, north pole and south pole.</p> <p>LO: We are investigating which items in a set of objects are magnetic. Record results in a table.</p> <p>Common misconceptions:</p> <ul style="list-style-type: none"> • the bigger the magnet the stronger it is • all metals are magnetic. 	<p>Plan an investigation to answer the question – whose shoe has the greatest friction? They will use their results to draw conclusions.</p> <p>LO: To identify the effect of air resistance. Understand that air resistance is a type of frictional force that slows an object down when travelling through air. Scientific Enquiry - Plan an investigation to determine who can make the best plane, taking careful measurements and drawing conclusions about how streamlined the plane is and how this affects air resistance and therefore distance the plane will travel.</p> <p>LO: To identify the effect of water resistance. Explain that water resistance is a type of frictional force. They will investigate which shapes have the greatest/least water resistance and write a conclusion.</p> <p>LO: To recognise that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect. Link to DT Describe how mechanisms use a smaller force to have a greater effect. They will be able to identify gears, levers and pulleys and give everyday examples for each.</p> <p>Common misconceptions</p> <ul style="list-style-type: none"> • the heavier the object the faster it falls, because it has more gravity acting on it • forces always act in pairs which are equal and opposite • smooth surfaces have no friction • objects always travel better on smooth surfaces • a moving object has a force which is pushing it forwards and it stops when the pushing force wears out • a non-moving object has no forces acting on it • heavy objects sink and light objects float
<h3 style="margin: 0;">Physics – Electricity</h3>		
	<p>LO: We are identifying objects that need electricity to run. Understanding the difference between battery operated, mains operated and non-electrical items.</p> <p>LO: We are learning that electricity can only flow around a continuous circuit and explaining how we can identify if electricity is flowing.</p>	<p>LO: To use symbols when drawing a simple circuit diagram. Construct and draw a variety of circuits using scientific symbols to represent each component. Look at a drawing of a circuit and work out if it will work or not.</p>

Rowsley Church of England Primary School – Science Progression by Objectives (May 2024)

	<p>Practical exploration of circuits with lights and buzzers. Understanding that a lit light and buzzing buzzer indicate electricity can flow around the circuit.</p> <p>LO: We are learning how to draw a diagram of an electrical circuit. Symbols for battery, buzzer, light, motor, switch. Straight wires.</p> <p>LO: We are learning about the role of a switch in an electrical circuit. Recognising a switch opens/closes a circuit. Identifying from a diagram whether a circuit is complete or not.</p> <p>LO: We are sorting objects as to whether they would act as an insulator or conductor in an electrical circuit. Recognising metals of conductors but that level of conductivity changes.</p> <p>LO: We are investigating which item is the most effective conductor of electricity in our circuits. Predict which objects will insulate/conduct then complete investigation.</p> <p>Common misconceptions:</p> <ul style="list-style-type: none"> • electricity flows to bulbs, not through them • electricity flows out of both ends of a battery • electricity works by simply coming out of one end of a battery into the component. 	<p>LO: To associate the brightness of a lamp with the number and voltage of cells used in the circuit. Conduct an investigation to discover the effect that increasing the voltage in a circuit has on the brightness of a bulb. They will be able to describe this relationship and draw conclusions. Link to History (WII) and the blackouts.</p> <p>LO: To investigate variations in how components function and write a conclusion. Scientific Investigation- Plan and conduct a fair test investigation to determine variations in how components function in a circuit. Write a clear conclusion using the data collected in their investigation</p> <p>LO: To name renewable and non-renewable sources of energy. Produce a leaflet to explain renewable and non-renewable energy.</p> <p>Common misconceptions:</p> <ul style="list-style-type: none"> • larger-sized batteries make bulbs brighter • a complete circuit uses up electricity • components in a circuit that are closer to the battery get more electricity.
--	--	---

Physics - Light

	<p>LO: We are considering what is a light source and what is not a light source. Sorting light sources/non-light sources. Understanding dark to be the absence of light.</p> <p>LO: We are explaining what happens to our eyes when the light level changes. Observing and recording pupil dilation.</p> <p>LO: We are showing we understand sun safety by making posters about how to keep our eyes and body safe in the sun. Risks of UV light.</p> <p>LO: We are learning to describe objects as transparent, translucent or opaque. Sorting objects.</p> <p>LO: We are explaining how shadows change depending on the location of a light source and the opacity of the object.</p>	<p>LO: To recognise that light appears to travel in straight lines. Identify light sources and draw an annotated, scientific diagram to explain how light travels in straight lines from a light source.</p> <p>LO: To use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye. To predict which materials make good reflectors. Identify reflective materials and understand how light is reflected. They will be able to predict which materials make good reflectors and discuss the properties of these materials.</p> <p>LO: To use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye. To explain how the eye works. Explain how light, from a light source is reflected from an object and enters the eye. They will be able to name/ label parts of the eye (and talk about their functions).</p>
--	--	---

Rowsley Church of England Primary School – Science Progression by Objectives (May 2024)

	<p>Explaining shadows in relation to position of the sun link to</p> <p>LO: We are investigating how well light travels through different materials.</p> <p>Which material would be the most effective curtain? (Link to Properties of Materials)</p> <p>Common misconceptions:</p> <ul style="list-style-type: none"> • the moon and reflective surfaces are light sources • a transparent object is a light source • shadows contain details of the object, such as facial features on their own shadow • shadows result from objects giving off darkness. 	<p>LO: To use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them. I can explain how shadows change during the day.</p> <p>Plan a fair investigation to answer the question - how do shadows change during the day? They will be able to draw a conclusion using data collected in their investigation. (Link to Earth and Space)</p> <p>LO: To use the idea that light travels in straight lines to explain that we can see objects because they give out or reflect light into the eye.</p> <p>Explain why objects in water appear to be bent. They will be able to explain the difference between reflection and refraction.</p> <p>LO: To use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye.</p> <p>Explain how mirrors reflect light. Through their explorations, they will understand how light behaves when it is reflected. They are able to draw a diagram to show the path of reflected light.</p> <p>Common misconceptions:</p> <ul style="list-style-type: none"> • we see objects because light travels from our eyes to the object. • think that the moon and other shiny/ reflective objects are light sources as they appear to shine • That shadows always forms on the opposite side of the object from the light source; the shadow is a similar shape as the object and the base of the shadow always touches the object • that light can bend around an opaque object
<h3>Physics – Sound</h3>		
	<p>LO: We are learning about how the size of a vibration effects the volume of a noise.</p> <p>LO: We are learning about how the speed of a vibration effects the volume of a noise.</p> <p>LO: We are investigating how to change the pitch and volume of a note on different musical instruments. Investigate how and why the pitch/volume can be changed. Create table.</p> <p>LO: We are learning how sound travels to us.</p>	

Rowsley Church of England Primary School – Science Progression by Objectives (May 2024)

	<p>How sound is transmitted through solids, liquids and gases (link to States of Matter).</p> <p>LO: We are learning how sound vibrations travel through our ears and transmit messages to our brains. Anatomy of ear. Vibration of nerve endings to send message to brain.</p> <p>LO: We are investigating different sound levels in school using a sound level meter. Create bar graph of different sound level readings.</p> <p>Alternative/additional investigation: pitch of notes when you hit milk bottles with different water levels.</p> <p>Common misconceptions:</p> <ul style="list-style-type: none"> • sound only travels in one direction from the source • sound can't travel through solids and liquids • high sounds are loud and low sounds are quiet. • pitch and volume are frequently confused, as both can be described as high or low 	
--	--	--

Physics – Seasons, Earth and Space

<p>LO: I can observe changes across the 4 seasons. (Y1) LO: I can describe and explain changes across the 4 seasons. (Y2) Name the four seasons and which months they occur.</p> <p>LO: I can observe weather across different seasons and match weather to the correct season. (Y1) LO: I can observe weather across different seasons and explain how it changes across different seasons.</p> <p>LO: I can explain how day length varies during winter and summer. (Y1) LO: I can explain how the position of the sun effects the length of the day. (Y2) Observe and describe the position in the sky at different times in the day</p> <p>LO: I am investigating how much rain falls in a week. Differentiated by investigation report.</p> <p>Common misconceptions:</p> <ul style="list-style-type: none"> • It always snows in winter • It is always sunny in the summer • Not knowing the order of seasons 		<p>LO: To describe the planets in the solar system</p> <p>Children to name the planets in order based on their distance from the Sun. To know that the Sun is a star (not a planet).</p> <p>Start a moon diary to look at at the end of the unit.</p> <p>LO: To describe the Sun, Earth and Moon as approximately spherical bodies</p> <p>Learn about how Aristotle came to the conclusion that the earth was spherical (approximately), understanding how this knowledge has been attained.. Identifying scientific evidence that has been used to support or refute ideas or arguments in the context of how ideas changed from a flat earth view. To understand why we don't fall off earth.</p> <p>LO: To describe the movement of the Earth and other planets relative to the Sun in the solar system</p> <p>To learn that it takes each planet one year to orbit the Sun. Because the planets all move at different speeds, an Earth year is a different length of time to a year on Saturn (or any other planet). Use three different sized balls to represent Sun, Earth, moon - model the movement of the Earth and</p>
---	--	---

Rowsley Church of England Primary School – Science Progression by Objectives (May 2024)

		<p>Moon around the Sun. Note that the Earth would not only spin (orbit the Sun) but would also be rotating on its axis (day and night).</p> <p>LO: To describe the movement of the Moon relative to the Earth.</p> <p>Complete a moon fact file - look at what creates craters on the moon and how the moon orbits the earth.</p> <p>LO: To use the idea of the Earth's rotation to explain day and night and the apparent movement of the Sun across the sky.</p> <p>Examine why the sun appears to move and the arguments for the Earth's rotation. Scientific enquiry - plan & carry out an investigation to discover what happens to the Sun during the day. Create a line graph and plot the results of the investigation.</p> <p>LO: To describe the movement of the Moon relative to the Earth.</p> <p>Learn the Moon in different phases and then label each phase. Look at their moon diaries.</p> <p>Common Misconceptions:</p> <ul style="list-style-type: none">• the Earth is flat• the Sun is a planet• the Sun rotates around the Earth• the Sun moves across the sky during the day• the Sun rises in the morning and sets in the evening• the Moon appears only at night• night is caused by the Moon getting in the way of the Sun or the Sun moving further away from the Earth
--	--	---

Rowsley Church of England Primary School – Science Progression by Objectives (May 2024)

Rowsley Progression Map for Disciplinary Science

Key Stage	Classification	Observation over Time	Observing Patterns	Control of Variables Strategy (Fair Testing)	Researching using secondary sources	Knowledge of apparatus and techniques, including measurement	Knowledge of data analysis	Knowledge of how science uses evidence to develop explanations
EYFS	Names are the beginnings of classification – Pupils name plants including trees and animals. Early classification includes types of trees and birds.	Pupils observe changes linked to the seasons, growth over time i.e. themselves, plants and simple animal life cycles (i.e. frog).		Pupils are introduced to the concept of fairness to compare simple situations, such as which plant grows fastest?	Pupils will use picture books and images to ask and answer questions	Pupils use sand timers, sieves, measuring jugs etc as part of guided play or maths lessons.	Pupils will make marks which may be used for simple counts - e.g. how many bugs did you see?	
KS1	<p>Pupils use simple features to compare objects, materials and living things and, with help, decide how to sort and group them, such as man-made vs natural.</p> <p>With adult support and guidance pupils begin to make conclusions, use scientific terminology and ask effective questions.</p>	<p>Pupils make and record observations over time. For example: plant growth, life cycle of a butterfly and seasonal changes using scientific vocabulary with support.</p> <p>Pupils may use simple equipment such as rulers, magnifying glasses and simple timers.</p> <p>With adult support and guidance pupils come to conclusions, begin to use scientific terminology and ask effective questions.</p>	<p>Pupils make and record patterns including:</p> <ul style="list-style-type: none"> •Where can you find woodlice? •Which materials float? •How does the phase of the Moon change over the course of several days? <p>With adult support and guidance pupils observe useful patterns, begin to use scientific terminology and ask effective questions.</p>	<p>Fair testing, is modeled and discussed as a class and group decisions are made.</p> <p>With support, pupils observe useful patterns, begin to use scientific terminology and ask effective questions about the variables and the results.</p>	<p>Pupils should ask people questions and use simple secondary sources, such as books, photographs, or websites, to find answers.</p>	<p>Measurement: length and time, Pupils measure time using a simple stop clock. Pupils also learn to measure volume (rain collecting), weight and temperature accurately.</p> <p>Technique: using a sieve to separate mixtures;</p>	<p>With support, pupils gather, record data and with analyse data. They use pictograms and tallies. Pupils will need support to choose appropriate ways of recording data.</p>	Pupils should begin to use their observations and ideas to suggest answers to questions.
LKS2	<p>Pupils develop their knowledge of common categorisation in science, for example vertebrates and invertebrates; conductors and insulators.</p> <p>They should practice using this knowledge themselves, beginning with simple examples and moving on to examples which are more difficult to categorise, such as whales as mammals, toothpaste as liquid/solid etc.</p>	<p>Pupils make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers</p> <p>With guidance, pupils will make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers</p>	<p>With support, pupils make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers- with this data pupils identify patterns with support.</p>	<p>By the end of year 4, pupils are expected to set up simple fair tests. In LKS2 this process is carefully scaffolded and modelled to the children.</p>	<p>pupils should begin to recognise when and how secondary sources might help them to answer questions that cannot be answered through practical investigations.</p>	<p>Pupils begin to make their own decisions about the most appropriate type of equipment to use for taking measurements.</p> <p>They should be taught how to use new equipment, such as data loggers, appropriately. They should collect data from their own observations and measurements, using notes, simple tables and standard units, and help to make decisions about how to record and analyse this data.</p>	<p>With careful guidance, pupils look for changes, patterns, similarities and differences in their data in order to draw simple conclusions and answer questions.</p> <p>With support, they identify new questions arising from the data, making predictions for new values within or beyond the data they have collected, and finding ways of improving what they have already done.</p>	<p>Pupils begin to gain an understanding that science doesn't know all of the answers: it is constantly developing and correcting ideas that evidence subsequently shows is incorrect, or only partially correct.</p>
UKS2	<p>Pupils continue to develop their knowledge of common categorisation in science, for example reversible and irreversible changes.</p> <p>They use and develop 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.</p>	<p>Pupils make systematic and careful observations and take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers</p>	<p>Pupils make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers- using the data and their substantive knowledge pupils identify patterns.</p>	<p>With support, pupils recognise when and how to set up comparative and fair tests and explain which variables need to be controlled and why.</p>	<p>Pupils will recognise which secondary sources will be most useful to research their ideas and begin to separate opinion from fact.</p>	<p>Pupils take measurements independently, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate. They will use thermometers, stop clocks, measuring jugs and data loggers with precision. They will recognise anomalies in results and repeat readings.</p> <p>Pupils in years 5 and 6 use their science experiences to: explore ideas and raise different kinds of questions; select and plan the most appropriate type of scientific enquiry to use to answer scientific questions.</p>	<p>Pupils record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.</p> <p>Pupils decide how to record data from a choice of familiar approaches; look for different causal relationships in their data and identify evidence that refutes or supports their ideas. They should use their results to identify when further tests and observations might be needed;</p>	<p>With guidance, pupils identify scientific evidence that has been used to support or refute ideas or arguments. This may be using historical examples of key discoveries such as the heliocentric model of the Solar System, Darwin's finches and germ theory.</p> <p>In their own experimental work, pupils will use their results to make predictions to set up further comparative and fair tests with support.</p>