

Science Long Term Plan

EYFS: Early Learning Goals

The natural world:

- Explore the natural world around them, making observations and drawing pictures of animals and plants.
- Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class.
- Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.

Write Stuff:

We're going on a bear hunt

If sharks disappeared

I want a pet dog

Fact file - penguins

Katie and the sunflowers

Computing Link:

Pairing for Early Science (stormedapps.co.uk)

Reading links (Rising stars): The Egg (Pink B), Pick a pet (Pink C), The cactus man (Pink C), The best nest (Red A), In the forest (Red A), Chimpanzees (Red B), In the fish tank (Red B)

Promoting scientific enquiry

	Background	Purposeful pedagogy
Observing	The ability to observe accurately is crucial in science. Young children pay attention with all their senses. Their observational skills increase as they gradually start to move from simple to complex: they note more details and start to make connections. As their confidence and vocabulary increases they become more verbal. Children classify objects according to attributes (a maths skill) and use this skill in science to help them to predict and to draw conclusions.	Children need objects and events to observe and a safe place to do this in. Create a sensory rich environment both indoors and outdoors. Think about materials that will engage all the senses. Choose materials that are: rough, knobbly, smooth, smelly, sweet, sour, etc. Provide tools for children to use: magnifying glasses, cameras, microscopes, etc. Provide scientific vocabulary for children to use. Begin by using simple labelling words, e.g. big, blue, before moving on to other less obvious qualities, e.g. cold, dry. Provide lots of objects for children to sort and classify. Go on nature walks to collect objects. Draw attention to similarities and differences in objects and movements. At snack time, provide foods that are different in look, taste or texture.
Predicting	Predicting involves using prior knowledge to anticipate what will happen. Predicting helps young children to think about what they already know in new ways. The more children engage in predictive thinking the better they get at it.	Remind children of previous experiences. Help them to remember what they observed before by asking them if they think it might happen again. Ask children to say what they think and why. This gives you a wider insight into what they are thinking. Encourage children to check out their predictions. Ask questions such as 'How can we be sure?'. Encourage children to ask 'What if?', 'Why?' and 'How?' questions. Respond to questions from children – you don't have to know the answer, just share in their curiosity. Use sophisticated scientific vocabulary, e.g. questioning, predicting and hypothesising.
Checking	Children are naturally curious and want to find out how and why something works or doesn't work. They generate ideas and then experiment to check whether their ideas were valid. In this way, they learn to reflect upon their assumptions.	Guide children who have been using trial and error to a more systematic approach. Do not start off with showing them what to do as children need to have played with the materials to gain some background knowledge before they can predict.
Recording	Recording in Early Years may take many forms: drawing, taking photographs, using their emerging abilities to work with data, or verbal or written reports.	Encourage children to draw what they see. This is a scientific, rather than a creative art opportunity. Non-verbal recording can be valuable for some, including children whose first language is not English. However, the aim is to try to furnish children with a rich, scientific vocabulary as soon as possible. Explain to children the importance of recording so they can check results again or compare their results to someone else's.
Concluding	Concluding involves children looking at what worked and what didn't, comparing what happened to what they thought would happen.	Encourage children to talk about their results in relation to their prediction or hypothesis. Encourage them to use the correct vocabulary. Allow children to compare their results with others in small groups. Call children's attention to things that contradict their hypothesis if they don't notice them themselves. Your role is not to give facts, but to promote a spirit of scientific enquiry.
Communicating	Communicating ideas encourages children to use the language of cause and effect. Communication is an important science skill and highlights the integration of science and literacy skills.	Communicating findings from scientific experiences has been found to be undervalued in the Early Years. The very act of talking makes children more observant. Just being able to describe their findings can be a significant event for pre-school children. As with recording, provide a variety of opportunities for children to share their scientific discoveries.

Curriculum sequencing: biology

	N	R1	R2
Learning experiences	To introduce plants to children, ask them to draw a plant and then discuss what they know about plants. Provide examples of plants that may differ from children's concept of a plant.	Make some small cardboard squares in different colours: green, white, red, brown and black. Sprinkle the squares over an open area of grass. On the command 'Go', children pick up the squares as quickly as possible. Stop about half-way through and ask which colours they have and if any were easier to find than others. Repeat on surfaces of different colours. This is a good introduction to camouflage.	Read <i>The Tiny Seed</i> by Eric Carle. Ask children what they know about seeds and what seeds need to make them grow.
Continuous provision	Provide non-fiction books about plants. Often children will not class trees, vegetables or weeds as plants, so point out that they are. Show some plants that grow in water not soil.	Show children <i>Masters of Disguise: Camouflaging Creatures & Magnificent Mimics</i> by Marc Martin and any other books you have about camouflage. Ask children to choose an object and find a good place to hide it in the classroom.	Plant sunflower seeds in containers and water them. Ask children to recall the order you did things and write an instruction card. Following on from children's initial discussions about what seeds need to grow, provide the seeds with different conditions: sunlight and water, sunlight without water, and darkness. Observe what happens to the seeds.
Outdoor environment	Take children on a plant treasure hunt to see what they can find and what they notice.	Ask children to hide objects in the outdoor area for a partner to find. Ask them to explain why they chose that particular hiding place.	Give children an instruction card with words and pictures for planting sunflowers. Provide equipment: a container (which can be decorated), cotton wool and some sunflower seeds. Ask children to follow the instructions and water them. Leave them in a safe place, reminding children to water them every day.
Purposeful pedagogy	Talk to children about plants, including trees and grasses. Many children will have the misconception that plants only grow in pots, indoors. Ask children what they notice about each plant. Ask children to draw another plant and ask them to note how their drawings have changed as a result of their observations. Give children lots of opportunities to see different types of plants. Only after repeated experiences and discrepancies between their predictions and what they see do children adjust their thinking.	Talk to children about camouflage and why they think animals use it. (There are some excellent camouflage photographs available on the internet to share with children.) As a contrast to camouflage, show children some animals that are brilliantly coloured to scare off predators, such as coral snakes or poison dart frogs.	Give children lots of time to discuss and explain their predictions for what will happen to plants in different conditions. Listen to what children say to correct any misconceptions. Remind children to water their plants every couple of days and encourage them to chart the progress of their plants by taking photographs or drawing pictures. Children can build frames to support their sunflowers. Place some celery in a glass containing water and food colouring. Let them see that water is absorbed by the roots of a plant, not its leaves.
Learning conversations	Ask questions such as 'What do you notice?' and 'What makes you say that?'.	Ask questions such as, 'Where do you think these animals might live?' and 'Why do you think a polar bear is white?'.	Ask questions such as 'What do plants need to grow?', 'What do seeds need to germinate?', 'Do you think all of the plants will grow?' and 'Which plants do you think won't grow? Why?'.

Curriculum sequencing: chemistry

N

R1

R2

Learning experiences	Show children some ice shapes you have prepared in advance. Ask them what they know about ice.	Read <i>Alan's Big Scary Teeth</i> by Jarvis. Discuss with children how to keep teeth healthy. Show children some hard-boiled eggs. Explain to them that the shell is like our teeth. Put one egg each into a glass of coffee, tea, fizzy drink, vinegar and water. Ask children what they think will happen to them. Protect another egg in toothpaste and put it in tea or coffee. Leave for three days and observe what happens.	Explore dissolving and mixing. Demonstrate dissolving sugar in water and ask children what they think has happened to the sugar. Dilute some squash with water and ask what they think has happened. Show children two beakers of water. Tell them you are going to put a sugar cube in one and a rock in the other and stir them up. Ask them what they think will happen.
Continuous provision	Provide moulds for children to make their own ice shapes. They can add food colouring, hide a small world character inside, or make an egg-shaped one with a dinosaur inside. Freeze the shapes and ask children how long they think it will take for their shapes to melt.	Provide non-fiction texts so children can look at animals' teeth. Provide props for children to role-play being dentists. Make a giant mouth out of recycled materials and teeth out of the bottoms of milk bottles. Make marks on the teeth for children to brush off. Take out some of the teeth to talk about losing milk teeth.	Provide jam jars with lids. Explain to children that they are going to add some water to their jar and then some oil. What do they think will happen? What might they do to mix them up? Encourage them to try out their predictions. Encourage children to make mixtures in different areas.
Outdoor environment	Provide moulds for children to make ice shapes containing some natural materials. Add a piece of string to them before they are frozen. Once the shapes are frozen, ask children to hang them up in different places in the outdoor area. Ask them to make and explain predictions about which one will melt first.	Make marks on walls with paint and encourage children to brush them off. Stick play dough around the bottom of Mega Bloks and give children string (floss) to try and get the dough off.	Ask children what they can mix with water in the outdoor area. Ask them to explain what they discovered.
Purposeful pedagogy	Ask children what they have discovered about the rate that ice melts. Explain to children that you are going to add something different to each of the ice shapes to see if this affects the speed at which they melt. Add equal quantities of salt, turmeric, bicarbonate of soda and cayenne pepper to each shape, labelling each one, and leaving one ice shape as a control. (To be clear, only one of each substance is added to each ice shape). Ask children to predict what might happen, then observe. Take photographs as the shapes melt.	Plan for and systematically use scientific words that children will use. Use images in fiction and non-fiction texts to introduce, discuss and reinforce topical vocabulary that is relevant to children's own investigations. After carrying out investigations (such as the egg investigation, above) ask children what they notice and what they have concluded.	Bring children together (perhaps in small groups) to find out what they have discovered about mixtures. Listen carefully and ask lots of questions, such as 'What did you discover about oil and water?'. Give children the option of adding some salt, sugar, liquid soap or mustard powder to their jars of oil and water. Ask them to watch carefully to see what happens. To end with a bang, show children the 'fireworks in a jar' experiment: www.youtube.com/watch?v=3gNOuNh0Okg
Learning conversations	Ask questions such as, 'Which one did you think would melt fastest?', 'Were your predictions correct?' and 'What makes ice melt faster?'.	Ask questions such as, 'Why do we need to clean our teeth?', 'Which drinks are not good for teeth and therefore we should only have occasionally?' and 'If we do have a sugary drink what might we do to protect our teeth?'.	Ask questions such as, 'What do you think will happen?', 'Why do you think that?', 'What happens when ...?' and 'Were your predictions correct?'.

Curriculum sequencing: physics

N

R1

R2

Learning experiences

Ensure children have had lots of opportunities to play with containers in the water tray before embarking on this activity.
Read *Mr Gumpy's Outing* by John Burningham. Talk to children about why the boat turned over, and what they think makes things sink. Encourage children to share their ideas.

Read *Push and Pull! Learn about Magnets* by Julia Vogel. Discuss with children what they know about magnets. Many may have magnets on their fridges. Ask them which things magnets attract.

This activity is best started on a sunny day and can go on over a week. Ask children what they notice about their shadows. Take photos and draw around shadows. Take children out on an overcast day. What do they notice?
What are their predictions about shadows?
After the initial activities, read *Moonbear's Shadow* by Frank Asch.

Continuous provision

Encourage children to test out their hypotheses about what makes things sink in the water tray. Provide a variety of different containers and objects for children to experiment with.
Ensure there are some small objects that will sink and large ones that will float.

Provide a variety of magnets. Encourage children to test out different things around the classroom, asking them to record three magnetic and three non-magnetic items. Show them a magnet maze: on a simple road map attach a paper clip to a card car. Show how to move the car by moving a magnet underneath. Ask them to make their own.

Encourage children to make and test out their predictions about shadows.
Provide torches for children to experiment with making shadows of objects; project a light onto a white sheet for children to make shadow characters with their bodies.

Outdoor environment

Draw an outline of a boat in the playground. Ask children to predict how many people can fit in the boat. Encourage them to try out their ideas.

Provide magnets for children to test materials in the outdoors. Attach paper clips to small items and place them in a large bucket. Ask children to fish them out with a magnetic fishing rod.

Ask children to investigate shadows made by things outside.

Purposeful pedagogy

Bring children together to discuss their findings. Encourage the development of children's scientific enquiry skills by reminding them of their predictions and comparing them to what they found out. Encourage all children to share what they have noticed. Summarise by saying 'So our hypothesis was ...', 'We checked it by ...' and 'We found out that ...'.
Show children three rocks of different sizes and three foam balls of different sizes. Ask them to predict which will float or sink, and to explain why.

Bring children together to discuss their findings. Encourage the development of children's scientific enquiry skills by reminding them of their predictions and comparing them to what they found out. Model how to present their findings: 'We predicted that ...', 'We experimented by ...', 'We found out that ...' and 'So we think ...'.
Ask children to share their recordings. Show children a gold ring and ask them if they think it is magnetic. (They may think that all things made of metal are magnetic.)

The theories children contribute don't have to be scientifically sound. What's important is helping children think about their experiences and challenging them to construct explanations based on their existing knowledge. It will take many experiences for children to develop conceptual understanding of a topic of study. These activities promote their scientific enquiry skills and increase their natural curiosity. Grasp every opportunity to introduce and reinforce scientific vocabulary.

Learning conversations

Use questions and comments such as, 'Let's check our ideas.', 'How can we be sure?' and 'What else might you check?'.
If children use simple language, model scientific vocabulary.

Ask questions such as, 'How did you decide which items you were going to test?' and 'What have you concluded about magnets?'.

Ask questions such as, 'What happens if I turn out the light?', 'What do you need to make a shadow?', 'Do all things make shadows?' and 'Can you make the shadow of the toy bigger or smaller?'.

Science		
Three and Four-Year-Olds	Communication and Language	Understand 'why' questions, like: "Why do you think the caterpillar got so fat?"
	Personal, Social and Emotional Development	Make healthy choices about food, drink, activity and toothbrushing.
	Understanding the World	- Use all their senses in hands-on exploration of natural materials. - Explore collections of materials with similar and/or different properties. - Talk about what they see, using a wide vocabulary. - Begin to make sense of their own life-story and family's history. - Explore how things work. - Plant seeds and care for growing plants. - Understand the key features of the life cycle of a plant and an animal. - Begin to understand the need to respect and care for the natural environment and all living things. - Explore and talk about different forces they can feel. - Talk about the differences between materials and changes they notice.
Reception	Communication and Language	- Learn new vocabulary. - Ask questions to find out more and to check what has been said to them. - Articulate their ideas and thoughts in well-formed sentences. - Describe events in some detail. - Use talk to help work out problems and organise thinking and activities, and to explain how things work and why they might happen. - Use new vocabulary in different contexts.

Reception Continued	Personal, Social and Emotional Development		- Know and talk about the different factors that support their overall health and wellbeing: - regular physical activity - healthy eating - toothbrushing - sensible amounts of 'screen time' - having a good sleep routine - being a safe pedestrian
	Understanding the World		- Explore the natural world around them. - Describe what they see, hear and feel while they are outside. - Recognise some environments that are different to the one in which they live. - Understand the effect of changing seasons on the natural world around them.
ELG	Communication and Language	Listening, Attention and Understanding	Make comments about what they have heard and ask questions to clarify their understanding.
	Personal, Social and Emotional Development	Managing Self	Manage their own basic hygiene and personal needs, including dressing, going to the toilet and understanding the importance of healthy food choices.
	Understanding the World	The Natural World	- Explore the natural world around them, making observations and drawing pictures of animals and plants. - Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class. - Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.

Autumn Term

- Myself and my body (Literacy Link: Funny bones): parts of the body and exercise.
 - Seasons (Snap Science our changing world Autumn)
 - What might happen at night? - the moon (space)
- Animals and humans: British wildlife hibernation and nocturnal animals
 - Senses (What does it feel like?)
 - Forces (Maths link: shapes - will it roll?)

Seasons - Winter
Penguins and habitats
Changes of state: melting and freezing.
Maths link: recording data (Statistics)

Spring Term

- Healthy bodies

- Seasonal changes Spring

• Habitats (Literacy link - Pandas and their habitat, bears. • Plants: Is all of a plant green? Growing different plants (e.g. cress), metamorphism in gardening • Habitats	• Growth and change: What is inside of an egg? • Metamorphism
Summer Term	
• Earth and Space: Our solar system, the moon and stars, day turns to night, make a rocket • Forces: floating and sinking • Materials: Magnets and materials- What hat is best to wear? • Maths link: recording data (Statistics)	• Seasonal changes - Summer • Habitats: Under the sea (Literacy link: Rainbow fish) • The seaside - how to build the perfect sandcastle • Maths link: recording data (Statistics)
In addition to themes and topics, continuous provision promotes exploration and investigation particularly in sensory trays, water, sand and magnet play. Children are provided with seasonal natural resources and enjoy gardening, feeding the birds and regular natural play and walks. Daily weather provides play and learning opportunities such as splashing in puddles, catching falling rain, mark making in frost and watching freezing and melting of ice in Winter and Summer.	
Working Scientifically: Observation over time, comparative tests, finding things out (research), pattern seeking, identify and classify	
Vocabulary: animal, check, describe, explain, hypothesise, material, observe, plant, predict, pull, push, seasons, weather	

Year 1/2 working scientifically: Disciplinary skills

- Ask simple questions.
- Observe closely, using simple equipment.
- Perform simple tests.
- Identify and classify.
- Use observations and ideas to suggest answers to questions.
- Gather and record data to help in answering questions.

Class 2 Odd

Autumn Term

Topics and objectives	Vocabulary	Prior Learning	Literacy links	Other links
Physics - Understand the Earth's movement in space (Seasons) - Autumn / Winter Understand plants (Biology): <u>Seasonal changes (Y1):</u> • Observe changes across the four seasons. • Observe and describe weather associated with the seasons and how day length varies. • Identify and name a variety of common plants, including garden plants, wild plants and trees and those classified as deciduous and evergreen. <u>Scientific enquiry types:</u> Observation over time. Research Identify and classify Pattern seeking	weather, temperature, seasons, winter, summer, spring, autumn, Sun, sunrise, sunset, day length, deciduous, evergreen, leaves, names of common trees (oak, horse chestnut, beech, sycamore, conifer, pine, etc) and their seeds (pinecones, conker, acorn, sycamore seed, beech nut)	Seasons covered termly <u>Reception:</u> Explore the natural world around them. • Describe what they see, hear and feel whilst outside. • Understand the effect of changing seasons on the natural world around them. <u>Year 1</u> • Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees. Observe changes across the four seasons. Materials - clothes. Weather/ climate, parts of the UK and continents (climate zones) - Geography	<u>Write Stuff:</u> Seasons (Non-fiction information report) Hibernation (non-chronological report) <u>Other links:</u> One year with Kipper	<u>Computer links:</u> <u>Apps:</u> • Season and weather (appropriate activities in different weathers and what to wear) • BBC weather site or app
Biology- Understand animals and humans <u>All about me (Y1):</u> • Identify name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.	Parts of the body including those within the school's RSE policy, senses, touch, see, smell, taste, hear, fingers, skin, eyes, nose, ear, tongue.	<u>Reception:</u> • Use all their senses in hands-on exploration of natural materials in the natural environment. Describing different textures. <u>Year 1</u>		<u>Computer links:</u> How the Body Works (for Kids) - Nemours KidsHealth (videos, quizzes and activities)

Investigate sound and hearing: • <i>Observe and name a variety of sources of sound, noticing that we hear with our ears.</i> <i>Physics theme: sound/ light investigation.</i> <u>Scientific enquiry types:</u> Comparative and fair testing Research Identify and classify Observation Pattern seeking		Materials and textures DT - Smoothies. PSHE - Name body parts, Pants are private (NSPCC) Music - sound		
Spring Term				
Topics and objectives	Vocabulary	Prior Learning	Literacy links	Other links
Physics - Understand the Earth's movement in space (Seasons) - Spring: <u>Seasonal changes (Y1):</u> • Observe changes across the four seasons. • Observe and describe weather associated with the seasons and how day length varies. • Identify and name a variety of common plants, including garden plants, wild plants and trees and those classified as deciduous and evergreen. <u>Scientific enquiry types:</u> Observation over time. Research Identify and classify Pattern seeking	See autumn term.	Seasons covered termly		<u>Computer links:</u> <u>Apps:</u> • Season and weather (appropriate activities in different weathers and what to wear) • BBC weather site or app
Biology- Understanding animals and humans: <u>Life cycles (Y2):</u> • Notice that animals, including humans, have offspring which grow into adults.	offspring, reproduction, growth, baby, toddler, child, teenager, adult, elderly, names of animals and their babies (e.g.	<u>Reception (Ourselves):</u> • Name and describe people who are familiar to them. • Describe what they look like and how they change.	<u>Other links:</u> Once there were giants (growing and changing)	

Evolution and inheritance: • Identify how humans resemble their parents in many features. <u>Growth (Y2):</u> • Investigate and describe the basic needs of animals, including humans, for survival (water, food and air). • Describe the importance for humans of exercise, eating the right amounts of different types of food and hygiene. <u>Scientific enquiry types:</u> Comparative and fair test Identify and classify Pattern seeking Research Observation over time	chick/hen, kitten/cat, caterpillar/butterfly survive, survival, water food, air, exercise, heartbeat, breathing, hygiene, germs, disease, food types (e.g. meat, fish, vegetables, bread, rice, pasta, dairy)	DT - (Healthy Plate), fruit and vegetables PE - effects of exercise on the body	Handa's surprise (diet) Croc and bird (identify)	
Summer Term				
Topics and objectives	Vocabulary	Prior Learning	Literacy links	Other links
Physics - Understand the Earth's movement in space (Seasons) - Summer Understand plants (Biology): <u>Seasonal changes (Y1):</u> • Observe changes across the four seasons. • Observe and describe weather associated with the seasons and how day length varies. • Identify and name a variety of common plants, including garden plants, wild plants and trees and those classified as deciduous and evergreen. <u>Scientific enquiry types:</u> Observation over time.	See autumn term.	Seasons (termly)		

Research Identify and classify Pattern seeking				
Biology- Investigate living things: <u>Living things and their habitats (Y2):</u> <u>Habitats around the world (Y2):</u> • Explore and compare the differences between things that are living, that are dead and 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. Scientific enquiry types: Observation Identify and classify Pattern seeking Research	living, dead, never been alive, suited, suitable, basic needs, food chain, shelter, move, feed, water, air, survive, survival , names of local habitats (e.g. pond, woodland etc.), names of micro-habitats (e.g. under logs, in bushes etc.), conditions, light, dark, shady, sunny, wet, damp, dry, hot, cold, names of living things in the habitats and micro-habitats studied	Reception: Local area habitat exploration, British animals, nocturnal animals. Year 1: Understanding animals and humans: different types of animals and eaters. Features of animals in different kingdoms.	Write Stuff: Habitats (Non-chronological report) The storm whale Instructions - how to make a bird feeder <u>Reading Links (rising Stars):</u> Fluff the little owl (Yellow Plus) Outback animals (Yellow Plus) Out of the pond (Blue) In the desert (Green) Sahara survival (Purple) Woodland scavenger hunt (Purple) My Arctic blog (Gold) <u>Other links:</u> Little read riding hood (habitats/ food chains) The Gruffalo (habitats) Sonny the meerkat (visits relatives that don't suit him - link to habitats)	Computing: InsectIdentifier APP <u>Science by Storm - Storm Educational Software</u> 'Picture this' plant identifier app Great Bug Hunt national initiative
Class 2 Even				
Autumn Term				
Topics and objectives	Vocabulary	Prior Learning	Literacy links	Other links

Physics - Understand the Earth's movement in space (Seasons) - Autumn and Winter Understand plants (Biology): <u>Seasonal changes (Y1):</u> • Observe changes across the four seasons. • Observe and describe weather associated with the seasons and how day length varies. • Identify and name a variety of common plants, including garden plants, wild plants and trees and those classified as deciduous and evergreen. <u>Scientific enquiry types:</u> Observation over time. Research Identify and classify Pattern seeking	weather, sunny, rainy, raining, shower, windy, snowy, cloudy, hot, warm, cold, storm, thunder, lightning, hail, sleet, snow, icy, frost, puddles, rainbow, seasons, winter, summer, spring, autumn, Sun, sunrise, sunset, day length, deciduous, evergreen, leaves, names of common trees (oak, horse chestnut, beech, sycamore, conifer, pine, etc) and their seeds (pinecones, conker, acorn, sycamore seed, beech nut)	Seasons covered termly <u>Reception:</u> Explore the natural world around them. • Describe what they see, hear and feel whilst outside. • Understand the effect of changing seasons on the natural world around them. <u>Year 1</u> • Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees. Observe changes across the four seasons. Materials - clothes. Weather/ climate, parts of the UK and continents (climate zones) - Geography	<u>Write Stuff:</u> Hibernation Way back Home - Oliver Jeffers (space)	<u>Computer links:</u> <u>Apps:</u> • Season and weather (appropriate activities in different weathers and what to wear) • BBC weather site or app
Chemistry - Investigate materials: <u>Exploring everyday materials (Y1):</u> • 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 materials. • Compare and group together a variety of everyday materials on the basis of their simple physical properties. <u>Uses of everyday materials (Y2):</u> • Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.	Object, material, wood, plastic, glass, metal, water, rock, brick, paper, fabric, elastic, foil, card/cardboard, rubber, wool, clay. Properties, hard, soft, stretchy, stiff, bendy, floppy, waterproof, absorbent, breaks/tears, rough, smooth, shiny, dull, see-through, not see-through, opaque, transparent, translucent, reflective. Flexible, rigid, shape, push, pull, twist, squash, bend, stretch	<u>Reception:</u> Floating and sinking/ magnets exploration. • Use all their senses in hands-on exploration of natural materials. • Explore collections of materials with similar and/or different properties. • Talk about the differences between materials and changes they notice. Describing textures of different materials.	<u>Other links:</u> Three little pigs (materials)	

Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick/rock, and paper/cardboard for particular uses. Scientific enquiry types: Comparative and fair test Observation Identify and classify Research (John McAdam, Makintosh, Dunlop) Pattern seeking Problem solving				
Spring Term				
Topics and objectives	Vocabulary	Prior Learning	Literacy links	Other links
Physics - Understand the Earth's movement in space (Seasons) - Spring Understand plants (Biology): <u>Seasonal changes (Y1):</u> - Observe changes across the four seasons. - Observe and describe weather associated with the seasons and how day length varies. - Identify and name a variety of common plants, including garden plants, wild plants and trees and those classified as deciduous and evergreen. Scientific enquiry types: Observation over time. Research (Galileo) Identify and classify Pattern seeking	See autumn Term	Seasons covered termly	<u>Reading Links (rising Stars):</u> Helen Sharman (Yellow) Guide to the Galaxy (White)	
Biology- Understanding animals and humans:	Birds, fish, mammals, reptiles, amphibians, insects, head, body, eyes,	<u>Reception</u> British wildlife (local area walk) <u>Year 1</u>	<u>Write Stuff:</u>	<u>Computing:</u> InsectIdentifier APP

<u>All about animals (Y1):</u> - Identify and name a variety of common animals that are birds, fish, amphibians, reptiles, mammals and invertebrates. - Identify and name a variety of common animals that are carnivores, herbivores and omnivores. - Describe and compare the structure of a variety of common animals (birds, fish, amphibians, reptiles, mammals and invertebrates, including pets) <u>Scientific enquiry types:</u> Observation. Research (Charles Darwin) Identify and classify Pattern seeking	ears, mouth, teeth, leg, tail, wing, claw, fin, scales, feathers, fur, beak, paws, hooves, names of animals from each vertebrate group, carnivore, herbivore, omnivore.	Investigate living things: Habitats/ Food chains. Identify and name a variety of common animals that are carnivores, herbivores and omnivores.	How to make a bird feeder (instructions) Big Cats (Non-fiction non-chronological report) Reading Links (rising Stars): In the fish tank (Red B) Chimpanzees (Red B) Big Beasts (Purple) Endangered animals (Gold) Animal sanctuary - Wildlife warning (White) Other links: RSPB My first book of garden birds Tadpole's promise (life cycles)	Game: Earth Squad Go! (bbc.co.uk) (assessment opportunity) Science by Storm - Storm Educational Software Big schools Bird Watch (RSPB) national initiative
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Summer Term

Topics and objectives	Vocabulary	Prior Learning	Literacy links	Other links
Physics - Understand the Earth's movement in space (Seasons) - Summer Understand plants (Biology): <u>Seasonal changes (Y1):</u> - Observe changes across the four seasons. - Observe and describe weather associated with the seasons and how day length varies. - Identify and name a variety of common plants, including garden plants, wild plants and trees and those classified as deciduous and evergreen.	See autumn Term	Seasons covered termly		

<u>Scientific enquiry types:</u> Observation over time. Research Identify and classify Pattern seeking				
Biology- Understanding Plants: Plants (Y1/Y2): • Identify and name a variety of common plants, including garden plants, wild plants and trees and those classified as deciduous and evergreen. • Identify and describe the basic structure of a variety of common flowering plants, including roots, stem/trunk, leaves and flowers. • Observe and describe how seeds and bulbs grow into mature plants. • Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy <u>Scientific enquiry types:</u> Observation over time. Comparative and fair testing Identify and classify Pattern seeking Research	Leaf, flower, blossom, petal, fruit, berry, root, seed, trunk, branch, stem, bark, stalk, bud, light, shade, warm, cool, sun, water, space, grow, healthy, bulb, germinate, seed, shoot, seedling. Names of trees in the local area. Names of garden and wild flowering plants in the local area.	<u>Reception:</u> • Begin to understand the need to respect and care for the natural environment and all living things. • Explore the natural world around them. • Recognise some environments that are different. Growing cress. <u>Year 1:</u> Investigate living things: Habitats/ Food chains. Seasons (termly) RE/PSHE - taking care of the environment	<u>Write Stuff:</u> Plants (Information text) <u>Reading Links (rising Stars):</u> The bean (Blue) <u>Other links:</u> Jack and the beanstalk A flower grows (amaryllus bulb)	<u>Computing:</u> Picture this (plant identifier APP) <u>Science by Storm - Storm Educational Software</u> <u>Great Plant hunt national initiative</u>

Year 3/4 working scientifically: Disciplinary skills

- Ask relevant questions.
- Set up simple, practical enquiries and comparative and fair tests.
- Make accurate measurements using standard units, using a range of equipment, e.g. thermometers and data loggers.
 - Gather, record, classify and present data in a variety of ways to help in answering questions.
 - Record findings using simple scientific language, drawings, labelled diagrams, bar charts and tables.
- Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.
- Use results to draw simple conclusions and suggest improvements, new questions and predictions for setting up further tests.
 - Identify differences, similarities or changes related to simple, scientific ideas and processes.
 - Use straightforward, scientific evidence to answer questions or to support their findings.

Class 3 Odd

Autumn Term

Topics and objectives	Vocabulary	Prior Learning	Literacy links	Other links
Chemistry - States of matter: <u>States of Matter (Y4):</u> • 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 the temperature at which this happens in degrees Celsius (°C), building on their teaching in mathematics. • Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. <u>Scientific enquiry types:</u> Comparative and fair testing Identify and classify Observation over time	solid, liquid, pour, flow, pile, pool, surface, horizontal, viscous, ice, water, temperature, cool, warm, hot, degree Celsius, melt, freeze, solidify, heat, states of matter, change of state, melting point, freezing point, gas, air, carbon dioxide, oxygen, particle, compress, squash, volume, evaporate, water vapour, boiling point, thermometer, droplets, condensation, droplets, water cycle	<u>EYFS:</u> melting and freezing investigation and exploration in Winter. <u>KS1:</u> Materials: • Distinguish between an object and the material from which it is made • Identify and name a variety of everyday materials. • Describe the simple physical properties of a variety of everyday materials. • 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 for particular uses. • Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.	<u>Other links:</u> Charlie and the chocolate factory	<u>Computing:</u> Brain Pop https://www.youtube.com/watch?v=aOCX4qJ3ztQ

		Seasons and weather in science and geography.		
Physics - Investigating sound and hearing: <u>Sound (Y4):</u> - Identify how sounds are made, associating some of them with something vibrating. - Recognise that vibrations from sounds travel through a medium to the ear. Scientific enquiry types: Comparative and fair testing Pattern seeking Research (Alexander Graham Bell) Identify and classify	sound, loud, quiet, high, low, repeating, continuous, strike, blow, shake, pluck, vibration, vibrate, solid, gas, volume, strength of vibrations, sound source, fainter, distance, pitch, particles, question, investigation, fair test, change, measure, predict, prediction, explanation, observations, draw conclusions	Reception: - Explore how things work. - Describe what they see, hear and feel whilst outside. KS1: - Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. Music	Other links: Horrid Henry rocks	Computing: - dbSoundMeter APP - Decibels App - STEM sound elibrary
Spring Term				
Topics and objectives	Vocabulary	Prior Learning	Literacy links	Other links
Biology- Investigate living things: <u>Living things and their habitats (Y4):</u> - Recognise that living things can be grouped in a variety of ways. - Explore and use classification keys. Scientific enquiry types: Identify and classify Pattern seeking Research (Attenborough, Rachel Carson) Observation	food chain, producer, consumer, predator, prey, herbivore, omnivore, carnivore, migrate, hibernate, classification keys, features, vertebrate, fish, amphibian, reptile, bird, mammal, backbone, cold blooded, warm blooded, suckle, head, thorax, abdomen, segment, antennae, arachnids, crustaceans, myriapods, molluscs	KS1: Different types of habitats and how animals are adapted to live there. - 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. - Describe and compare the structure of a variety of common, including pets - Find out about and describe the basic needs of animals, including humans, for survival (water, food and air).	Write Stuff: The Last Bear Reading links: The animals of Farthing Wood by Colin Dann Non-fiction - Rivers	Computing: InsectIdentifier APP Brain Pop air Pollution: https://www.youtube.com/watch?v=f0gTFx-l8f0 Practical Action

Physics - Understanding light and seeing: <u>Light (Y3):</u> • Recognise that they need light in order to see things and that dark is the absence of light. • Notice that light is reflected from surfaces. • Recognise that light from the sun can be dangerous and that there are ways to protect their eyes. • Recognise that shadows are formed when the light from a light source is blocked by a solid object. • Find patterns in the way that the size of shadows change. <u>Scientific enquiry types:</u> Comparative and fair testing Pattern seeking Observation over time Research (Edison) Identify and classify	light, dark, shadow, mirror, bright, dim, reflect, eye, opaque, transparent, translucent, ultraviolet, ray, beam, absorb, luminous, non-luminous, infrared, question, investigation, fair test, change, measure, predict, prediction, explain, explanation, observations, draw conclusions	<u>Reception:</u> • Describe what they see, hear and feel whilst outside. <u>KS1:</u> • Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. • Describe the simple physical properties of a variety of everyday materials.	<u>Write Stuff:</u> <u>Explanation text - light to dark</u> <u>Other links:</u> The firework maker's daughter	<u>Computing:</u> • <u>STEM - how we see things elibrary</u> • <u>Shadows - https://www.youtube.com/watch?v=ppET8N_-zos</u> • <u>LUX - light sensor APP</u> • <u>Holograms by Chisti</u> • <u>Ogden Trust - Pinhole cameras</u> • <u>Science Journal app (data recording app - light, sound, pressure and motion)</u>
Summer Term				
Topics and objectives	Vocabulary	Prior Learning	Literacy links	Other links
Biology- Understand Plants: <u>Plants (Y3):</u> • Identify and describe the functions of different parts of flowering plants: roots, stem, leaves and flowers. • Explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant. • Investigate the way in which water is transported within plants.	photosynthesis, pollen, insect/wind pollination, male, female, seed formation, seed dispersal (wind dispersal, animal dispersal, water dispersal), air, nutrients, minerals, soil, absorb, transport	<u>KS1:</u> • Observe and describe how seeds and bulbs grow into mature plants. • Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy. • Identify the basic structure of plants. • Seasonal changes.	<u>Write Stuff:</u> <u>Poetry - Autumn is here</u> <u>Letter - The gardener</u> <u>Reading link:</u> <u>Non-fiction: Plants</u> <u>Other links:</u> The story of Frog Belly Rat Bone (plants and benefit to the env)	<u>Computing:</u> <u>Picture this (plant identifier APP)</u> <u>Great plant Hunt national initiative</u>

• Explore the role of flowers in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. <u>Scientific enquiry types:</u> Identify and classify Comparative and fair testing Research Observation over time Pattern seeking				
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Class 3 Even

Autumn Term

Topics and objectives	Vocabulary	Prior Learning	Literacy links	Other links
Biology- Understanding animals and humans <u>Animals including humans (Y3 unit):</u> • Identify that humans and some animals have skeletons and muscles for support, protection and movement. • Identify that animals, including humans, need the right types and amounts of nutrition, that they cannot make their own food and they get nutrition from what they eat. • Construct and interpret a variety of food chains, identifying producers, predators and prey. <u>Animals including humans (Y4 unit):</u> • Describe the simple functions of the basic parts of the digestive system in humans. • Identify the different types of teeth in humans and their simple functions. <u>Scientific enquiry types:</u>	Nutrition, nutrients, carbohydrates, sugars, protein, vitamins, minerals, fibre, fat, roughage, mechanical process, chemical process, balanced diet, water, skeleton, bones, muscles, joints, support, protect, move, skull, ribs, spine. mouth, oesophagus, stomach, small intestine, large intestine, rectum, anus, digestive system, absorb, nutrients, saliva, chemicals, enzyme. teeth, canine, incisor, premolar, molar, jaw, cutting, tearing, grinding, dental hygiene, decay.	Key stage 1: Growing up: • Stages of growth and how people and animals change as they get older (how they look and what they are able to do.) • Life cycles (chicks, frogs, plants) Notice that animals, including humans, have offspring which grow into adults. Taking Care of ourselves: • Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene. Animals and humans (food chains/ types of eaters) • Identify that animals, including humans, need the right types and amount of nutrition • Identify and name a variety of common animals that are carnivores, herbivores and omnivores. • Find out about and describe the basic needs of animals, including	<u>Write Stuff:</u> Non-chronological report - skeletons and muscles Journey into the wonderful world of your microbiome. <u>Other links:</u> Wolves (Emily Gravett) - food chains) The little mole who knew it was none of his business!	<u>Computing:</u> • The human body Lite APP - interactive anatomy(circulatory, respiratory, muscular, skeletal, digestive) • https://www.innerbody.com/htm/body.html • Siemens Healthcare Interactive (thehumanbodygame.co.uk)

Comparative and fair testing Research Identify and classify		humans, for survival (water, food and air). PE - effects of exercise on the body		
Spring Term				
Topics and objectives	Vocabulary	Prior Learning	Literacy links	Other links
Chemistry - Rocks and soils: <u>Rocks (Y3):</u> • Compare and group together different kinds of rocks on the basis of their simple, physical properties. • Relate the simple physical properties of some rocks to their formation (igneous or sedimentary). • Describe in simple terms how fossils are formed when things that have lived are trapped within sedimentary rock. • Recognise that soils are made from rocks and organic matter. Scientific enquiry types: Identify and classify Pattern seeking Research (Mary Anning)	rock, stone, pebble, boulder, grain, crystals, layers, hard, soft, texture, absorb water, fossil, bone, flesh, minerals, marble, chalk, granite, sandstone, slate, soil, types of soil (e.g. peaty, sandy, chalk, clay)	<u>KS1:</u> Materials - • 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 materials. • 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 for particular uses.	<u>Other links:</u> The pebble in my pocket The earth beneath our feet	
Physics - Understanding electrical circuits: <u>Electricity (Y4):</u> • Identify common appliances that run on electricity. • Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers. • Identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is	electricity, electrical appliance/ device, mains, plug, battery, power, rechargeable, solar, cell, wire, bulb, bulb holder, buzzer, motor, component, complete circuit, short circuit, flow, break, metal, connect, disconnect, terminal, positive, negative, switch, property, electrical conductor, electrical insulator, electron, filament, symbol.	<u>Reception:</u> Explore how things work. <u>Key Stage 1:</u> Computing - technology in the school with inputs and outputs. Science club	<u>Reading link:</u> Non-fiction - electricity <u>Other links:</u> The shocking story of electricity (Anna Claybourne) Oscar and the bird (Geoff Waring)	<u>Computing links:</u> Circuit Construction Kit: DC (colorado.edu) (phet)

part of a complete loop with a battery. • Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit. • Recognise some common conductors and insulators, and associate metals with being good conductors. <u>Scientific enquiry types:</u> Comparative and fair testing Identify and classify Observation Pattern seeking Problem solving				
Summer Term				
Topics and objectives	Vocabulary	Prior Learning	Literacy links	Other links
Physics - Understanding movement, forces and magnets (Y3): • Compare how things move on different surfaces. • Notice that some forces need contact between two objects, but magnetic forces can act at a distance. • Observe how magnets attract or repel each other and attract some materials and not others. • Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials. • Describe magnets as having two poles. • Predict whether two magnets will attract or repel each other, depending on which poles are facing. <u>Scientific enquiry types:</u>	Force, push, pull, twist, contact force, non-contact force, magnetic force, magnet, strength, bar magnet, ring magnet, button magnet, horseshoe magnet, attract, repel, magnetic / non-magnetic material, metal, iron, steel, poles, north pole, south pole	<u>Reception:</u> • Explore how things work. Floating and sinking/ magnets exploration. • Explore the natural world around them and describe what they see, hear and feel whilst outside. <u>KS1:</u> • Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching using a push and pull force.	<u>Other links:</u> The iron man The Tin snail	

Comparative and fair testing Pattern seeking Identify and classify Observation Problem solving				
Biology- Investigate living things: <u>Living things and their habitats - conservation (Y4):</u> • Recognise that environments can change and that this can sometimes pose dangers to specific habitats. <u>Scientific enquiry types:</u> Pattern seeking Observation Problem solving Research	environment, impact, positive, negative, litter, pollution, waste, biodiversity, global issue, destruction, deforestation, climate change, endangered, conservation, habitat	<u>KS1:</u> Different types of habitats and how animals are adapted to live there. • 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. • Describe and compare the structure of a variety of common, including pets • Find out about and describe the basic needs of animals, including humans, for survival (water, food and air). •Plastic pollution / environmental studies (science week / PSHE)	<u>Write Stuff:</u> Non-fiction magazine article - Climate action Persuasive advert - an alternative to plastic straws <u>Other links:</u> The vanishing rainforest Wild Robot	<u>Computing:</u> The Regenerators - Schools and home - lessons and tips to live green and protect the planet - BBC Bitesize Practical Action

Year 5/6 working scientifically: Disciplinary knowledge

- Plan enquiries, including recognising and controlling variables where necessary.
- Use appropriate techniques, apparatus, and materials during fieldwork and laboratory work.
- Take measurements, using a range of scientific equipment, with increasing accuracy and precision.
- Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, bar and line graphs, and models.
 - Report findings from enquiries, including oral and written explanations of results, explanations involving causal relationships, and conclusions.
 - Present findings in written form, displays and other presentations.
 - Use test results to make predictions to set up further comparative and fair tests.
- Use simple models to describe scientific ideas, identifying scientific evidence that has been used to support or refute ideas or arguments.

Class 4 Odd

Autumn Term

Topics and objectives	Vocabulary	Prior Learning	Literacy links	Other links
Physics - Understanding movement, forces and magnets: <u>Forces (Y5):</u> Magnets - Describe magnets as having two poles. - Predict whether two magnets will attract or repel each other, depending on which poles are facing. Forces - Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. - Identify the effect of drag forces, such as air resistance, water resistance and friction that act between moving surfaces. - Understand that some mechanisms including levers, pulleys and gears, allow a smaller force to have a greater effect. <u>Scientific enquiry types:</u> Comparative and fair testing Pattern seeking Identify and classify Research (Isaac Newton, Aristotle) Observation Problem solving	Air resistance, Aristotle, balanced, forces, bevel gears, cogs, compress, extend, effort, friction, fulcrum, gravity, Galileo, gear ratio/ trains, lever, pulleys, gears, mechanisms, Newton meter, pinion, pivot, pulley, resistance, rotary motion, speed, time, unbalanced force, upthrust, water resistance	<u>Reception:</u> Exploration - Floating and sinking/ magnets <u>Year 3/4:</u> - Compare how things move on different surfaces. - Notice that some forces need contact between two objects, but magnetic forces can act at a distance. - Observe how magnets attract or repel each other and attract some materials and not others. - Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials. - Describe magnets as having two poles. D/T - mechanisms	<u>Other links:</u> The Tin Snail by Cameron McAllister	<u>Computing:</u> Brain Pop Isaac Newton: https://www.youtube.com/watch?v=TQke--UHwug <u>Madeley school Year 7 career links:</u> Engineer - exploring the concept of forces and how they interact (balanced and unbalanced, friction, mass and weight). Rollercoaster Engineer - further develop understanding of forces to explain how they impact motion and introduce the concept of energy stores and transfers (speed, changing motion, drag).
Physics - Describe the Earth's movement in space: <u>Earth and space (Y5):</u> Describe the movement of the Earth, and other planets, relative to the Sun in the solar system.	Earth, Jupiter, Mars, Mercury, Milky Way, Moon, North Pole, Saturn, South Pole, Sun, Neptune, Universe, Uranus, Venus, asteroid, axis, compass, crescent, dawn, degrees, dusk, equator, equinox, Full	<u>KS1:</u> Seasons/ weather: - Observe changes across the four seasons. - Observe and describe weather associated with the seasons and how day length varies.	<u>Other links:</u> George's secret key to the universe <u>Write Stuff:</u> One small step	<u>Computing:</u> - App: Space 4D - Night Sky APP - NASA Explorer - Compass APP (tracking solar flares)

• 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. <u>Scientific enquiry types:</u> Observation Research (Galileo Galilei, Katherine Johnson, Mae Jemison) Comparative test	Moon, galaxy, hemisphere, longitude, lunar, orbit, rotation, solar system, solstice, sunrise, sunset, tilt, time zone, waning, waxing, year, spherical	<u>Year 3/4:</u> Light and shadows		• Esero.uk • Jpl.nasa.gov • BrainPop Moon phases: https://www.youtube.com/watch?v=t6l6UK7D6xI
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Spring Term

Topics and objectives	Vocabulary	Prior Learning	Literacy links	Other links
Chemistry - Investigate Materials: <u>Properties of materials (Y5):</u> • Compare and group together everyday materials based on evidence from comparative and fair tests, including their hardness, solubility, conductivity (electrical and thermal), and response to magnets. • Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic. <u>Scientific enquiry types:</u> Identify and classify Comparative and fair testing Pattern seeking Observation	properties, material, solid, liquid, gas, soluble, insoluble, electrical / thermal conductor/insulator, change of state, viscosity, dissolve, mixture, solution, reversible/ non-reversible, burning, rusting, new material, organic, polymer, natural, manufactured, man-made, weathering, decay, decompose, break down, biodegradable, environmentally friendly, durability, reusable, names of materials, including types of plastic, properties of materials.	<u>KS1:</u> • Identify and compare the suitability of a variety of everyday materials for particular uses. • Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. Melting/ freezing (KS1) <u>Year 3/4:</u> States of Matter: • Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials. • 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 the temperature at which this happens in degrees Celsius (°C) • Identify the part played by evaporation and condensation in the	<u>Other links:</u> Kensuke's Kingdom Itch (Simon Mayo) - changes of state	<u>Madeley school Year 7 career links:</u> Molecular Chemist - understanding the particle arrangement (model) in states of matter as well as developing a greater understanding of atomic structure and chemical symbols and formulae.

		water cycle and associate the rate of evaporation with temperature.		
Summer Term				
Topics and objectives	Vocabulary	Prior Learning	Literacy links	Other links
Biology- Investigate living things: <u>Living things and their habitats (Y5):</u> - Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird. - Describe the life process of reproduction in some plants and animals. <u>Scientific enquiry types:</u> Observation over time Research (Carl Linnaeus, David Attenborough, Jane Goodall) Identify and classify Pattern seeking	life cycle, reproduce, reproduction, sexual, asexual, fertilises, asexual, plantlets, runners, rhizomes, gender, tubers, bulbs, cuttings, flower, organ, carpel, stamen, pollen, seeds, pollinator, pollination, fertilisation, propagate, metamorphosis, mate, sperm, pregnant, young, pup, calf, foal, chick, hatch, fledgling, offspring, hibernate, nocturnal, marsupial, breeding cycle, clutch, brood, hatch, fledge, migration, navigate, genetic, endangered, threatened, extinct, evolution.	<u>KS1:</u> - Notice that animals, including humans, have offspring which grow into adults. Plants (growing plants) and animals (species and habitats): - Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. - Describe and compare the structure of a variety of common animals. <u>Y3/4:</u> - Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. - Recognise that living things can be grouped in a variety of ways. - Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment. - Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird. - Describe the life process of reproduction in some plants and animals.	<u>Other links:</u> Beetle Boy (classification)	<u>Madeley school Year 7 career link:</u> Biochemist - explaining and applying knowledge of the processes of photosynthesis, cellular respiration and enzyme action.
Biology - Investigate living things: (DFE Science sustainability curriculum) <u>Looking after our environment (Y6):</u> Understand what climate is and how it changes. Understand the difference between man-made and natural environments.	Weather, global warming, recycle, biodegrade, net zero, greenhouse gases, industrial revolution, COP, combustion, species, habitat	<u>EYFS/ KS1</u> Habitats and plants <u>Y3/4</u> Recognise that environments can change and that this can pose dangers to living things (ecosystems, deforestation, human impact, air and water pollution, conservation)	<u>Write Stuff:</u> Plastic pollution Persuasive letter Biography - David Attenborough Speech - Greta <u>Other links:</u>	<u>Computing:</u> InsectIdentifier APP Brain Pop air Pollution: https://www.youtube.com/watch?v=f0gTFx-l8f0 <u>The Regenerators - Schools and home - lessons and tips to</u>

Identify where different types of animals live.			The vanishing rainforest Wild Robot	live green and protect the planet - BBC Bitesize Practical Action
<u>Scientific enquiry types:</u> Observation over time Research (David Attenborough, Rachel Carson, Greta Thunberg) Pattern seeking Problem solving				

Class 4 Even

Autumn Term

Topics and objectives	Vocabulary	Prior Learning	Literacy links	Other links
Biology- Understanding animals and humans <u>Animals including humans (Y6):</u> • Recognise the importance of diet, exercise, drugs and lifestyle on the way the human body functions. • Describe the ways in which nutrients and water are transported within animals, including humans. • Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood. • Describe the changes as humans develop to old age. <u>Scientific enquiry types:</u> Research (Alexander Flemming) Observation over time Comparative and fair testing	alcohol, smoking, balanced diet, beats per minute (bpm), caffeine, calories, carbohydrates, diet, drugs, mineral, energy, exercise, fat, roughage, protein, vitamin, James Lind, lifestyle, impact, long-term effect, medicine, nutrition, rickets, scurvy, RDA (recommended daily allowance) heart, rate, pulse, muscle, pump, blood vessels, recovery/ resting rate, transported, lungs, oxygen, carbon dioxide, circulatory system, vein, artery, oxygenated, deoxygenated	<u>KS1:</u> Taking care of ourselves: Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene. <u>Y3/4</u> • Identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat.		<u>Computing:</u> BrainPop Flu and vaccines: https://www.youtube.com/watch?v=olO_dBg7CU <u>Madeley School Year 7 career link:</u> Cell Biologist - using microscopy to understand the structure and function of cells and from this further understand how the human body works, including cell structure, specialisation and microscopy and transport in cells.
Chemistry - Investigate Materials <u>Changes of materials (Y5):</u>	Thermal/electrical insulator/conductor, material, separate, mixture, sieve, filter,	<u>KS1:</u> • Identify and compare the suitability of a variety of everyday materials for particular uses.		<u>Computing:</u> https://www.primaryschoolscience.co.uk/Matter-Lab/materials-interactive-2.html

• Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating. • 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, oxidation and the action of acid on bicarbonate of soda. • Understand how some materials will dissolve in liquid to form a solution and describe how to recover a substance from a solution. Scientific enquiry types: Comparative and fair test Identify and classify Pattern seeking Observation Problem solving	evaporate, solid, liquid, gas, powder, particle, dissolve, melt, boil, flammable, solidified, soluble, solution, contamination, impurity, pure, suspension, saturation, reversible, non-reversible, microbes, bacteria, filter, residue, change of state, reaction, oxidise, corrode, rusting, types of metal: iron, steel, chromium, tin, zinc	• Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. <u>Y3/4:</u> States of matter: • Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials. • 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 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.		Madeley school Year 7 career links: Pharmacist - exploring the processes of dissolving, solubility, filtration, distillation, evaporation and chromatography from a chemistry perspective. Analytical Chemist - to explore product formation in chemical reactions (physical or chemical). Investigate word equations, burning fuels, neutralisation, metal carbonate and acid)
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Spring Term

Topics and objectives	Vocabulary	Prior Learning	Literacy links	Other links
Physics - Understanding light and seeing: <u>Light (Y6):</u> • Understand that light appears to travel in straight lines. • Use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eyes.	light, dark, shadow, mirror, bright, dim, reflect, eye, opaque, transparent, translucent, ultra violet, ray, beam, refraction, periscope, spectrum, dispersion, inverted	<u>KS1:</u> • Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. <u>Y3/4</u> Can you see me: • 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.	<u>Other links:</u> The firework maker's daughter	<u>Computing:</u> • STEM - how we see things eLibrary • Shadows - https://www.youtube.com/watch?v=ppET8N_-zos • LUX - light sensor APP • Holograms by Chisti • Ogden Trust - Pinhole cameras

• Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them, and to predict the size of shadows when the position of the light source changes. • Explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes. <u>Scientific enquiry types:</u> Observation Comparative and fair testing Pattern seeking Research		• Recognise that light from the sun can be dangerous and that there are ways to protect their eyes. • Recognise that shadows are formed when the light from a light source is blocked by an opaque object. • Find patterns in the way that the size of shadows change.		• https://www.primaryschoolscience.co.uk/(light lab) • Human Eye Vision Direct UK • Science Journal app <u>Madeley school Year 7 career link:</u> Sound and light engineer - to explore the properties of light and sound (speed of sound, detecting sound/ characteristics of light, refraction, reflection, colour and rainbows)
Biology- Understanding animals and humans <u>Living things and their habitats (Y6)</u> • Describe how living things are classified into broad groups according to common observable characteristics. • Give reasons for classifying plants and animals based on specific characteristics. <u>Scientific enquiry types:</u> Research (James Lind) Observation over time Comparative and fair testing	Classification, microorganism, habitat, living organism, species, ecosystem, kingdom, Linnaean system, cell	<u>KS1</u> Parts of the body <u>Y3/4:</u> Amazing bodies/ teeth/ skeletons/ digestions: • Describe the simple functions of the basic parts of the digestive and skeletal systems in humans. • Identify the different types of teeth in humans and their simple functions. <u>Y5:</u> Circulatory system, body health	<u>Other links:</u> Pig heart boy	<u>Computing:</u> • DIY Human body App • The human body Lite APP - interactive anatomy(circulatory, respiratory, muscular, skeletal, digestive) • Build a Body: Biology Systems - app • Siemens Healthcare Interactive (thehumanbodygame.co.uk) <u>Madeley School Year 7 career link:</u> Cell Biologist - using microscopy to understand the structure and

				function of cells and from this further understand how the human body works, including cell structure, specialisation and microscopy and transport in cells.
Summer Term				
Topics and objectives	Vocabulary	Prior Learning	Literacy links	Other links
Biology- Understanding evolution and inheritance: <u>Evolution and inheritance (Y6):</u> • Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago. • Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents. • Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution. <u>Scientific enquiry types:</u> Observation over time Identify and classify Research (Darwin) Pattern seeking	population, variation, environment, inheritance, adaptation, selective breeding, generation, survival, natural selection, evolution, evolve, fossils, genes, genetics, DNA, extinct, extinction, speciation, vary, characteristics, suited, adapted, species.	<u>KS1:</u> • 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. • Notice that animals, including humans, have offspring which grow into adults. <u>Y3/4:</u> Our changing world - plants • Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. Investigating living things - environments/ Human impact: • Recognise that environments can change and that this can sometimes pose dangers to living things. (• Describe the life process of reproduction in some plants and animals. • Describe in simple terms how fossils are formed when things that have lived are trapped within rock.	<u>Write stuff</u> Non-chronological report - The origin of the species <u>Other links:</u> Charlottes' web (lifecycles) One Smart Fish by Christopher Wormell Little changes (Tiffany Taylor) Island - A Galapagos Story The Mollie Bird (Jules Pottle)	<u>Madeley School Year 7 career link:</u> Geneticist- to explore how genetic information is passed on through generations (genomes, growth, human sexual reproduction, menstrual cycle and pregnancy, contraception).
Physics - Understanding electrical circuits: <u>Electricity (Y6):</u>	cell, battery, wire, buzzer, bulb, motor, circuit, current, voltage, filament, electrical insulator/ conductor, mains electricity, terminal, switch (toggle, push, slide,	<u>Y3/4:</u> • Identify common appliances that run on electricity. Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers.		<u>Computing:</u> BrainPop electricity video https://www.youtube.com/watch?v=3LsX6AbwTOQ <u>Circuit Construction Kit: DC (colorado.edu) (phet)</u>

• Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit. • Compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches. • Use recognised symbols when representing a simple circuit in a diagram. <u>Scientific enquiry types:</u> Observation Comparative testing Pattern seeking Problem solving	tilt, trembler, pressure, reed), complete circuit, series circuit, resistance, resistor, diagram, symbols, generator, fossil fuels, biomass, power stations, wind turbine, wave hub, tidal flow, hydro-electric, grid, pylon, transmission, transformer, solar panels	• Identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery. • Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit. • Recognise some common conductors and insulators, and associate metals with being good conductors.		
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Y5/6 additional:

Through music:

- Find patterns between the pitch of a sound and features of the object that produced it.
- Find patterns between the volume of a sound and the strength of the vibrations that produced it.
- Recognise that sounds get fainter as the distance from the sound source increases.

Through DT (optional - not statutory in the Science National Curriculum.):

- *Describe, in terms of drag forces, why moving objects that are not driven tend to slow down.*
- *Understand that force and motion can be transferred through mechanical devices such as gears, pulleys, levers and springs.*

General science ICT links:

- <https://www.developingexperts.com/>
- <https://priscimagpie.wordpress.com/resources-library/> - ideas for each enquiry type
- <https://www.childrensuniversity.manchester.ac.uk/learning-activities/science/>

- Science starts videos: <https://pstt.org.uk/resources/curriculum-materials/Starters-for-Science>
- <https://pstt.org.uk/resources/curriculum-materials/Science-at-Work> - famous scientists
- <https://edu.rsc.org/primary-science> - Royal Society from Chemistry Steps into Science teaching ideas
- <https://www.dropbox.com/sh/an94te0c0hvxw4b/AAA5Fk5sfQ13C71SpPNbKJLBa?dl=0> - Snap science and aligning with the new EYFS framework
- <https://www.planassessment.com/plan-knowledge-matrices-teacher> - PLAN knowledge matrices
- <https://gratnellslearningrooms.com/curriculum-resources/teaching-resources/whats-in-my-tray/> - What's in my tray - ideas and lessons
- <https://wowscience.co.uk/>
- <https://practicalaction.org/schools/> - science real world
- <https://www.xplorationstation.com/stories/DIY-Science---Make-a-Mummified-Apple> (Egyptians link)
- [Healthy eating games and activities | Healthy Eating Advisory Service](#)
- [PhET: Free online physics, chemistry, biology, earth science and math simulations \(colorado.edu\)](#)