

Science Curriculum – Key Stage 1 and 2 Science Learning Intentions and Skills Progression

Working Scientifically - Reception

Understanding the World

- Comments and asks questions about aspects of their familiar world such as the place where they live or the natural world.
- Can talk about some of the things they have observed such as plants, animals, natural and found objects.
- Talks about why things happen and how things work.
- Developing an understanding of growth, decay and changes over time.
- Shows care and concern for living things and the environment.
- Looks closely at similarities, differences, patterns and change.

ELG

- Children know about similarities and difference in relation to places, objects, materials and living things.
- They can talk about the features of their own immediate environment and how environments might vary from one another.
- They can make observations of animals and plants and explain why some things occur, and talk about changes, including in simple experiments.

Skill Map - Science

Early Years – Working Scientifically

Observing Closely	Performing Tests	Identifying and Classifying	Record Findings
<ul style="list-style-type: none"> • Through provision, focus groups and with adult support, can children... • Discuss what they can see, touch, smell, hear or taste • Use simple equipment to help them make observations? 	Through provision, focus groups and with adult support, can children... <ul style="list-style-type: none"> • Perform a simple test? • Describe/explain what they have done? 	Through provision, focus groups and with adult support, can children... <ul style="list-style-type: none"> • Identify and classify things they observe? • Think of some questions to ask? • Answer some scientific questions? • Give a simple reason for their answer? • Explain what they have found out? 	Through provision, focus groups and with adult support, can children... <ul style="list-style-type: none"> • Show their work using pictures, labels and captions? • Record their findings using standard units? • Record some information in a chart or table or using ICT.
Early Years – Greater Depth Challenge			
<ul style="list-style-type: none"> • Can they find out by watching, listening, tasting, smelling and touching. 	<ul style="list-style-type: none"> • Can they give reasons for their answers? 	<ul style="list-style-type: none"> • Can they discuss similarities and differences? • Can they explain what they have found out using scientific vocabulary 	<ul style="list-style-type: none"> • Can they compare measurements?

Reception 'Materials and Products'

- Skills: similarities and differences in materials
- Making observations
- Being able to talk about changes e.g. weather, water, cooking
- For children to achieve ELG will take part in a variety of investigations
- Children also take part in exploring and studying the environment and creatures in their habitat and to notice the changes in weather and seasons.

Vocabulary: same, different, change, why, when, how, what, investigation, explain, blossom, oak, horse, chestnut, spring, autumn, winter, meat eaters and plants eaters; nocturnal, hibernation, body parts: head, face, eyes, nose, mouth, chin, cheek, forehead, eyebrows and lashes, lips, ear lobes, arm, elbow. Fingers, thumbs, knuckles, hair. Hips, shoulders, legs, knees, toes, ankles, vagina, testicles, penis, chest, stomach, coccyx, spine, bottom. For ELG pupils will need to know the properties of some materials and their purposes.

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Year 1 – Working Scientifically		
	Key Vocabulary: Questions, answers, equipment, gather, measure, record, results, pictogram, tally chart, block diagram, table, bar chart, sort, group, test, explore, observe, compare, describe, similarities/differences, order, patterns, link, secondary sources, hand ,lenses, egg timers, stop watch, ruler, tape measure, beaker, pipette, syringe.	
WS1 a. Asking simple questions and b. Recognising that they can be answered in different ways	a. 1. Ask a question 2. Ask questions 3. Ask relevant questions	b. 1. Suggest a way to answer a question. 2. Suggest ways to answer a variety of questions. 3. Suggest a variety of ways to answer questions.
WS2 a. Observing closely b. Using simple equipment	a. 1. List what I can see. 2. Make descriptive observations. 3. Make detailed observations.	a. 1. Safely, whilst supported/guided. Use simple equipment. 2. Safely use simple equipment. 3. Safely and correctly use simple equipment.
WS3 a. Performing simple tests	1. Follow simple instructions. 2. Explain the purpose of the steps. 3. Explain the purpose of the whole test.	
WS4 a. Identifying and classifying	1. Identify simple features. 2. Use features to classify/group. 3. Explain the reason behind groupings (including comparatives).	
WS5 a. Using their observations and ideas to suggest answers to questions	1. Talk about what I have found out. 2. Draw conclusions using similarities and differences. 3. Draw conclusions using comparatives.	
WS6 b. Gathering and recording data to help in answering	1. Collect the information. 2. Record the information correctly. 3. Organise the information correctly.	
WS7 a. communicate findings in a range of ways (non-statutory)	1. Record findings correctly. 2. Explain what I have learned to others. 3. Explain using simple scientific language.	

Year 1 – Biology - Plants			
B1 Plants	Identify and name a variety of common wild ad garden plants, including deciduous and evergreen trees	1. Identify plants by matching them to names images. 2. Identify plants by known features, e.g. leaves. 3. Use scientific language to describe them. *When further afield, spot, plants that are the same as those in the local area studied regularly, describing the key features that helped them	Key Vocabulary Leaf, flower, blossom, petal, fruit, berry, root, seed, trunk, branch, stem, bark. Stalk, bud

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	Identify and describe the basic structure of a variety of common flowering plants, including trees	<ol style="list-style-type: none"> 1. Make close observations of leaves, seeds, flowers, etc. 2. Colour and label the four main parts of a flowering plant - flower, stem, leaf and roots. 3. Discuss the function of each of the four parts. 4. Compare two leaves =, seeds, flowers, etc. 5. Make observations of how plants change over a period of time. 6. Classify leaves, seeds, flowers, etc. using a range of characteristics. 7. Learn that bulbs and seeds can grow into mature plants. 8. Match 5 trees and plants to their bulbs or seeds in a cut and stick activity. 9. Identify whether they are looking at a bulb or a seed 	<p>Names of trees in the local area</p> <p>Names of garden and wild flowering plants in the local area.</p>
B2 Animals	Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals	<ol style="list-style-type: none"> 1. Identify the features of common animals e.g. legs, wings, etc. 2. Identify animals by matching them to named images. 3. Identify and name animals by their image. 4. Learn that mammals give birth to live young. 5. Sort 9 pictures into 2 groups - mammals and non-mammals. 6. Consider what else the mammals have in common. 	<p>Key vocabulary</p> <p>Head, body, eyes, ears, moth, teeth, leg, tail, wing, claw, fin, scales, feathers, fur, beak, paws, hooves.</p> <p>Names of animals experienced first-hand from each vertebrate group</p>
	Identify and name a variety of common animals that are carnivores, herbivores and omnivores	<ol style="list-style-type: none"> 1. Identify if an animal eats plants, animals or both. 2. Match 6 different animals to examples of their food. 3. Explore patterns, such as animals eating the same type of food. 4. Identify if an animal is a carnivore, herbivore or omnivore. 5. Classify animals according to what eat. 	<p>Names of animals experienced first-hand from each vertebrate group</p>
	describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets).	<ol style="list-style-type: none"> 1. Make first hand close observations of the structure of animals from each of the groups. 2. Compare the structure of two animals from the same or different groups. 3. Classify animals using a range of structural features. 	
	<ol style="list-style-type: none"> a. Identify, name, draw and label the basic parts of the human body b. Say which part of the body is associated with each sense 	<ol style="list-style-type: none"> a. <ol style="list-style-type: none"> 1. Make first hand close observations of parts of the body and name them e.g. hands, eyes 2. Compare two people/different parts of own body 3. Look for patterns between people e.g. Do people with big hands have big feet? 4. Use a word bank to label a diagram, showing what part of the body is associated with each sense - sight, hearing, taste, touch and smell. b. <ol style="list-style-type: none"> 1. Know the 5 senses 2. Know the 5 senses and the part of the body needed for each 3. Investigate human senses e.g. which part of my body is good for feeling which is not? Which food/flavour? Can I identify by taste? Which smells can I match? 	<p>Key Vocabulary</p> <p>Parts of the body including these linked to PHSE teaching.</p> <p>Senses, touch, see, smell, taste, hear, fingers (skin), eyes, nose, ear and tongue</p>

Science Curriculum – Key Stage 1 and 2 Science Learning Intentions and Skills Progression

Year 1 – Chemistry – Everyday Materials				
C1 Everyday Materials	Distinguish between an object and the material from which it is made.	<ol style="list-style-type: none">1. Name objects and materials (independent from one another).2. Came objects and the material it is made from.3. Classify objects made of one material in different ways e.g. a group of object made of metal.		Key Vocabulary Object, material, wood, plastic, glass, metal, water, rock, brick, paper, fabric, elastic, foil, card/cardboard, rubber, wool, clay, hard, soft, stretchy, stiff, bendy, floppy, waterproof, absorbent, breaks/tears. Rough, smooth, shiny, dull, see through, not see through.
	Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock.	<ol style="list-style-type: none">1. Name different everyday materials.2. Name and identify different everyday materials.3. Classify in different ways one type of object made from a range of materials e.g. a collection of spoons made of different materials.		
	Describe the simple physical properties of a variety of everyday materials.	<ol style="list-style-type: none">1. Make first hand close observations of the physical properties of a material.2. Make first hand close observations of the physical properties of different materials.3. Carry out an investigation into whether 5 objects from around the classroom float or sink.4. Record their results on a simple table.		
	Compare and group together a variety of everyday materials on the basis of their simple physical properties.	<ol style="list-style-type: none">1. Compare the properties of two materials from the same or different groups2. Classify materials based on their properties.3. Test the properties of objects e.g. absorbency of cloths, strength of party hats made of different papers, stiffness of paper plates, waterproofness of shelters.		
P1 Seasonal Changes	Observe changes across the four seasons.	<ol style="list-style-type: none">1. Collect information, regularly throughout the year, of features that change with the seasons, e.g. plants, animals, humans.2. Present this information in different ways to compare the seasons.		
	Observe and describe weather associate with the seasons and how day length varies.	a. <ol style="list-style-type: none">1. Look at 9 different events from throughout the year. Place them in the right season.2. look at different items of clothing and match them to the correct season.3. Look at pictures of plants at different times of the year and match them to the correct season.	b. <ol style="list-style-type: none">1. look at 6 pictures of different types of weather.2. Cut and paste the correct description, or write their own.3. Look at 4 different types of weather and match them to the seasons.3. Draw another picture of typical weather in each season.4. Match 4 timelines showing the Sun's position in the sky to their respective seasons.	Key Vocabulary Weather (sunny, rainy, windy, snowy etc.), seasons, (Winter, Summer, Spring, Autumn), sun, sunrise, sunset, day length.

Science Curriculum – Key Stage 1 and 2 Science Learning Intentions and Skills Progression

Year 1 – Working Scientifically		
	Key Vocabulary: Questions, answers, equipment, gather, measure, record, results, pictogram, tally chart, block diagram, table, bar chart, sort, group, test, explore, observe, compare, describe, similarities/differences, order, patterns, link, secondary sources, hand ,lenses, egg timers, stop watch, ruler, tape measure, beaker, pipette, syringe.	
WS1 c. Asking simple questions and d. Recognising that they can be answered in different ways	a. 4. Ask a question 5. Ask questions 6. Ask relevant questions	b. 4. Suggest a way to answer a question. 5. Suggest ways to answer a variety of questions. 6. Suggest a variety of ways to answer questions.
WS2 c. Observing closely d. Using simple equipment	a. 4. List what I can see. 5. Make descriptive observations. 6. Make detailed observations.	a. 4. Safely, whilst supported/guided. Use simple equipment. 5. Safely use simple equipment. 6. Safely and correctly use simple equipment.
WS3 c. Performing simple tests	4. Follow simple instructions. 5. Explain the purpose of the steps. 6. Explain the purpose of the whole test.	
WS4 b. Identifying and classifying	4. Identify simple features. 5. Use features to classify/group. 6. Explain the reason behind groupings (including comparatives).	
WS5 b. Using their observations and ideas to suggest answers to questions	4. Talk about what I have found out. 5. Draw conclusions using similarities and differences. 6. Draw conclusions using comparatives.	
WS6 d. Gathering and recording data to help in answering	4. Collect the information. 5. Record the information correctly. 6. Organise the information correctly.	
WS7 b. communicate findings in a range of ways (non-statutory)	4. Record findings correctly. 5. Explain what I have learned to others. 6. Explain using simple scientific language.	

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B1 Plants	Identify and name a variety of common wild ad garden plants, including deciduous and evergreen trees	4. Identify plants by matching them to names images. 5. Identify plants by known features, e.g. leaves. 6. Use scientific language to describe them. *When further afield, spot, plants that are the same as those in the local area studied regularly, describing the key features that helped them	Key Vocabulary Leaf, flower, blossom, petal, fruit, berry, root, seed, trunk, branch, stem, bark. Stalk, bud

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	Identify and describe the basic structure of a variety of common flowering plants, including trees	<ol style="list-style-type: none"> 10. Make close observations of leaves, seeds, flowers, etc. 11. Colour and label the four main parts of a flowering plant - flower, stem, leaf and roots. 12. Discuss the function of each of the four parts. 13. Compare two leaves, seeds, flowers, etc. 14. Make observations of how plants change over a period of time. 15. Classify leaves, seeds, flowers, etc. using a range of characteristics. 16. Learn that bulbs and seeds can grow into mature plants. 17. Match 5 trees and plants to their bulbs or seeds in a cut and stick activity. 18. Identify whether they are looking at a bulb or a seed 	<p>Names of trees in the local area</p> <p>Names of garden and wild flowering plants in the local area.</p>
B2 Animals	Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals	<ol style="list-style-type: none"> 7. Identify the features of common animals e.g. legs, wings, etc. 8. Identify animals by matching them to named images. 9. Identify and name animals by their image. 10. Learn that mammals give birth to live young. 11. Sort 9 pictures into 2 groups - mammals and non-mammals. 12. Consider what else the mammals have in common. 	<p>Key vocabulary</p> <p>Head, body, eyes, ears, moth, teeth, leg, tail, wing, claw, fin, scales, feathers, fur, beak, paws, hooves.</p> <p>Names of animals experienced first-hand from each vertebrate group</p>
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	<ol style="list-style-type: none"> c. Identify, name, draw and label the basic parts of the human body d. Say which part of the body is associated with each sense 	<ol style="list-style-type: none"> a. <ol style="list-style-type: none"> 1. Make first hand close observations of parts of the body and name them e.g. hands, eyes 2. Compare two people/different parts of own body 3. Look for patterns between people e.g. Do people with big hands have big feet? 4. Use a word bank to label a diagram, showing what part of the body is associated with each sense - sight, hearing, taste, touch and smell. b. <ol style="list-style-type: none"> 1. Know the 5 senses 2. Know the 5 senses and the part of the body needed for each 3. Investigate human senses e.g. which part of my body is good for feeling which is not? <p>Which food/flavour? Can I identify by taste?</p> <p>Which smells can I match?</p> 	<p>Key Vocabulary</p> <p>Parts of the body including these linked to PHSE teaching. Senses, touch, see, smell, taste, hear, fingers (skin), eyes, nose, ear and tongue</p>

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Year 1 – Chemistry – Everyday Materials

C1 Everyday Materials	Distinguish between an object and the material from which it is made.	4. Name objects and materials (independent from one another). 5. Name objects and the material it is made from. 6. Classify objects made of one material in different ways e.g. a group of object made of metal.	Key Vocabulary Object, material, wood, plastic, glass, metal, water, rock, brick, paper, fabric, elastic, foil, card/cardboard, rubber, wool, clay, hard, soft, stretchy, stiff, bendy, floppy, waterproof, absorbent, breaks/tears. Rough, smooth, shiny, dull, see through, not see through.
	Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock.	4. Name different everyday materials. 5. Name and identify different everyday materials. 6. Classify in different ways one type of object made from a range of materials e.g. a collection of spoons made of different materials.	
	Describe the simple physical properties of a variety of everyday materials.	5. Make first hand close observations of the physical properties of a material. 6. Make first hand close observations of the physical properties of different materials. 7. Carry out an investigation into whether 5 objects from around the classroom float or sink. 8. Record their results on a simple table.	
	Compare and group together a variety of everyday materials on the basis of their simple physical properties.	4. Compare the properties of two materials from the same or different groups 5. Classify materials based on their properties. 6. Test the properties of objects e.g. absorbency of cloths, strength of party hats made of different papers, stiffness of paper plates, waterproofness of shelters.	
P1 Seasonal Changes	Observe changes across the four seasons.	3. Collect information, regularly throughout the year, of features that change with the seasons, e.g. plants, animals, humans. 4. Present this information in different ways to compare the seasons.	
	Observe and describe weather associate with the seasons and how day length varies.	a. 1. Look at 9 different events from throughout the year. Place them in the right season. 2. Look at different items of clothing and match them to the correct season. 3. Look at pictures of plants at different times of the year and match them to the correct season.	Key Vocabulary Weather (sunny, rainy, windy, snowy etc.), seasons, (Winter, Summer, Spring, Autumn), sun, sunrise, sunset, day length.
		b. 1. Look at 6 pictures of different types of weather. 2. Cut and paste the correct description, or write their own. 3. Look at 4 different types of weather and match them to the seasons. 3. Draw another picture of typical weather in each season. 4. Match 4 timelines showing the Sun's position in the sky to their respective seasons.	

Science Curriculum – Key Stage 1 and 2 Science Learning Intentions and Skills Progression

Curriculum Skills and Progression Map – Year 1 Plants					
National Curriculum Objectives		Sticky Knowledge		Vocabulary	
<ul style="list-style-type: none">Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees.Identify and describe the basic structure of a variety of common flowering plants.Identify and name the roots, truck, branches and leaves of trees.		<ul style="list-style-type: none">Plants grow from seeds/bulbsPlants need light and water to grow and survivePlants are importantWe can eat lots of plants to survive (to clean air, to eat)We can eat different parts of the plants (leaves, stems, roots, seeds, fruit)		Leaf, flower, blossom, petal, fruit, berry, root, seed, trunk, branch, stem, bark, stalk, bud, deciduous, evergreen	
				Key scientists for study	
				Suggested Linked Texts	
		Beatrix Potter (Author & Botanist)		Trees; Seasons Come Seasons Go (Patricia Hegarty and Britt Teckentrup) A Little Guide to Wild Flowers (Charlotte Voake) The Things That I LOVE about TREES (Chris Butterworth) Harry’s Hazelnut (Ruth Parsons)	
Prior Learning		Key Question (s)		Future Learning	
<ul style="list-style-type: none">In EYFS children should:Make observations of plantsKnow some names of plants a, trees and flowersMay be able to name and describe different plants, trees and flowersShow some dare for their world around them		How do plants grow? What do plants need to grow? Do all plants need water? Are all plants green? Why do seeds look different? Can plants grow as big in the shade? What is the biggest/smallest/smelliest, etc) tree/flower/plant on the planet?		<ul style="list-style-type: none">Observe and describe how seeds and bulbs grow into mature plantsFind out and describe how plants need water, light and warmth to grow and stay healthy.	
Some Teaching Ideas					
Comparative Tests	Identify & classify	Observation over time	Pattern Seeking	Research	Big Question: Assessment Opportunity
Which type of compost grows the tallest sunflower? Which tree has the biggest leaves?	How can we sort the leaves that we collected on out walk?	How does a daffodil bulb change over the year? How does my sunflower change each week? How does the oak tree change over the year?	Do trees with bigger leaves lose their leaves first in autumn? Is there a pattern in where we find most growing in the school grounds?	What are the most common British plants and where can we find them? How did Beatrix Potter help out understanding of mushrooms and toadstools?	How many types of plant are there?

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Curriculum Skills and Progression Map – Year 1(Energy) Seasons and How they Change

Curriculum Skills and Progression Map – Year 1(Energy) Seasons and How they Change					
National Curriculum		Sticky Knowledge		Vocabulary	
Objectives <ul style="list-style-type: none">Observe changes across the four seasonsObserve and describe weather associated with the seasons and how day length varies		<ul style="list-style-type: none">Weather can changeThere are lots of different types of weather: rain, sun. cloud, wind, snow, etc.Days are longer and hotter in the summerDays are shorter and colder in the winterThere are four seasons: Spring, Summer, Autumn, Winter	Seasons, Spring, Summer, Autumn, Winter, windy, sunny, overcast, snow, rain, temperature		
			Key scientists for study		Suggested Linked Texts
			Dr Steve Lyons (Extreme Weather)		Trees; Seasons Come Seasons Go (Patricia Hegarty and Britt Teckentrup)
			Holly Green (Meteorologist)		One Year with Kipper (Mick Inkpen) After the Storm (Nick Butterworth)
Prior Learning		Key Question (s)		Future Learning	
In EYFS children should: <ul style="list-style-type: none">Developing an understanding of change.Observe and explain why certain things may occur (e.g. leaves falling off trees, weather changes)Look closely at similarities, differences, patterns and change.Comments and questions about the place live or the natural world.		Why do more frequent days of rain saturate the ground? How long does it take for the ground to dry after it has been raining? Does more rain take longer to dry? Do countries with higher temperatures have less rain? How does rainfall and temperature change over time in the park, garden or school grounds? Which leaf is the strongest/best shade cover/best at directing water? What do you notice about different leaves? What purpose to leaves serve for a tree? Why do you think leaves turn brown in Winter? What colours can we find outside? Does this change across the seasons? What effect does rain have on the environment? What would happen if there was too much rain? What would happen f there wasn’t enough rain?		<ul style="list-style-type: none">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 sizes of shadows change.	
Some Teaching Ideas					
Comparative Tests	Identify & classify	Observation over time	Pattern Seeking	Research	Big Question: Assessment Opportunity
In which season does it rain the most?	How could you organise all the objects in the solar system into groups?	How does the colour of a UV bead change over the day?	Does the wind always blow the same way?	Are there plants that are in flower in every season? What are they?	What is it like in Winter, Spring, Summer and Autumn?

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Curriculum Skills and Progression Map – Year 1 Animals, Including Humans

National Curriculum Objectives		Sticky Knowledge		Vocabulary	
<ul style="list-style-type: none">Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals.Identify and name a variety of common animals that are carnivores, herbivores and omnivores		<ul style="list-style-type: none">There are many different animals with different characteristics.Animals have senses to help individuals survive. When animals sense things they are able to respond.Animals need food to survive.Animals need a variety of food to help them grow, repair their bodies, be active and stay healthy.		Head, body, eyes, ears, moth, teeth, leg, tail, wing, claw, fin, scales, feathers, fur, beak, paws, hooves, fingers, toes, elbow, amphibians, reptiles, fish, mammals, birds, herbivore, omnivore, sight,	
				Key scientists for study	Suggested Linked Texts
				Chris Packham (Animal Conservationist)	Snail Trail (Ruth Brown) One Year with Kipper (Mick Inkpen) Superworm (Julia Donalrdson & Axel Scheffler)
Prior Learning		Key Question (s)		Future Learning	
In EYFS children should: <ul style="list-style-type: none">Be able to identify different parts of their body.Have some understanding of healthy food and the need for variety in their diets.Be able to show care and concern for living things.Know the effects exercise has on their bodies.Have some understanding of growth and change.Can talk about things they have observed including animals.		<ul style="list-style-type: none">What do animals eat?Do all animals eat the same food?Which of our senses is the most accurate at identifying food?Do all animals hunt?Why are animals different colours and patterns?		<ul style="list-style-type: none">Know that animals including humans, have off spring which grow into adults.Know that basic stages in a life cycle for animals, including humans.Find out 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.	
Some Teaching Ideas					
Comparative Tests	Identify & classify	Observation over time	Pattern Seeking	Research	Big Question: Assessment Opportunity
Is our sense of smell better when we can't see?	How can we organise all the zoo animals? What are the names for all the parts of our bodies?	How does my height change over the year?	Do you get better at smelling as you get older?	Do all animals have the same sense as humans??	What are animals like?

Science Curriculum – Key Stage 1 and 2 Science Learning Intentions and Skills Progression

Curriculum Skills and Progression Map – Year 1 Materials					
National Curriculum Objectives		Sticky Knowledge		Vocabulary	
<ul style="list-style-type: none">Distinguish between an object and the material from which it is made.Identify and name a variety of everyday materials, including wood, metal, plastic, glass, 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 properties.		<ul style="list-style-type: none">There are many different materials that have different describable and measurable properties.Materials that have similar properties are grouped into metals, rocks, fabrics, wood, plastic and ceramics (including glass).The properties of a material determine whether they are suitable for a purpose.		Object, material, wood, plastic, glass, metal, water, rock, brick, paper, fabric, elastic, foil, card/cardboard, rubber, wool, clay, hard, soft, stretchy, stiff, bendy, floppy, waterproof, absorbent, breaks/tears, rough, smooth, shiny, dull, see through, not see through.	
				Key scientists for study	
				Suggested Linked Texts	
				William Addis (Toothbrush inventor) Charles Mackintosh (waterproof coat) John MacAdam (roads)	The Great Paper Caper (Oliver Jeffers) Who Sank the Boat (Pamela Allen) The Story of Cinderella (Walk Disney)
Prior Learning		Key Question (s)		Future Learning	
In EYFS children should: <ul style="list-style-type: none">Be able to ask questions about the place they live.Talk about why things happen and how things work.Discuss the things they have observed such as natural and found objects.Manipulates materials to achieve a planned effect.		It is recommended that materials be taught three times through KS I. Give a theme for each topic e.g. building, exploration, toys, the seaside. Plan to investigate a couple of classes of materials and properties in each topic so children get a depth of experience each topic and cover all the classes of materials over the key stage. <u>Building</u> <ul style="list-style-type: none">Which rocks are he least crumbly?Which materials absorb the most water?Which types of brick would be the easiest to drag to make a pyramid?Which material would e the strongest to use as a floor tile? <u>Toys & Nice Things</u> <ul style="list-style-type: none">Which fabric would make the softest blanket?The baby has spilt her drink, which material would absorb the drink the best?We want to make a really slippery slide, which liquid would be best to use?Which chocolate will melt the fastest on a warm plate (a model of a warm hand)Which wrapping papers are strong enough to wrap and send a present? <u>Clothing & Materials</u> <ul style="list-style-type: none">Which material could be used to make a waterproof hat for the teacher on a raining day?Which plastic would be flexible enough to make a belt?Which material could I wrap my ice egg/snowman in to stop it melting or would it make it melt quicker?What could I wrap a chicken egg in to keep it warm when it is waiting to hatch?What could you paint on the runaway gingerbread man that would allow him to swim the river and get away from the fox and not turn to mush?		<ul style="list-style-type: none">Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses.Find out how shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.	
Some Teaching Ideas					
Comparative Tests	Identify & classify	Observation over time	Pattern Seeking	Research	Big Question: Assessment Opportunity
Which materials are the most flexible? Which materials are the most absorbent?	We need to choose a material to make an umbrella. Which materials are waterproof?	What happens to materials over time if we bury them in the ground? What happens to shaving foam over time?	Is there a pattern I the types of materials that are used to make objects in a school?	How are bricks made? Which materials can be recycled?	What are the things I use ade from?

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Year 2 Working Scientifically			
Key Vocabulary: Questions, answers, equipment, gather, measure, record, results, pictogram, tally chart, block diagram, table, bar chart, sort, group, test, explore, observe, compare, describe, similarities/differences, order, patterns, link, secondary sources, hand ,lenses, egg timers, stop watch, ruler, tape measure, beaker, pipette, syringe.			
WS1 a. Asking simple questions and b. Recognising that they can be answered in different ways		a. 1. Ask a question 2. Ask relevant questions using scientific vocabulary.	b. 1. Suggest a way to answer a question. 2. Suggest ways to answer a variety of questions. 3. Suggest a variety of ways to answer questions.
WS2 a. Observing closely b. Using simple equipment		a. 1 Descriptive observations. 2 Make detailed observations. 3 Make comparative observations.	a. 1. Safely, whilst supported/guided. Use simple equipment. 2. Safely and correctly use simple equipment. 3. Identify information gained from using the equipment.
WS3 Performing simple tests		1. Follow simple instructions. 2. Explain the purpose of the steps. 3. Explain the purpose of the whole test.	
WS4 Identifying and classifying		1. Identify simple features. 2. Use features to classify/group. 3. Explain the reason behind groupings (including comparatives).	
WS5 Using their observations and ideas to suggest answers to questions		1. Talk about what I have found out. 2. Draw conclusions using similarities and differences. 3. Draw conclusions using comparatives.	
WS6 Gathering and recording data to help answering questions		1. Collect the information. 2. Record the information correctly. 3. Organise the information correctly.	
WS7 Communicate findings in a range of ways (non-statutory)		1. Record findings correctly. 2. Explain what I have learned to others. 3. Explain using simple scientific language.	
Year 2 – Biology- Plants			
B1 Plants	Observe and describe how seeds and bulbs grow into mature plants	1. Make close observations of seeds and bulbs. 2. Classify seeds and bulbs. 3. Research and plan when and how to plant a range of seeds and bulbs.	Key Vocabulary

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	Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy	<ol style="list-style-type: none"> 1. Make close observations and measurements of their plants growing from seeds and bulbs. 2. Make comparisons between plants as they grow. 3. Look after the plant as they grow – weeding, thinning, watering, etc. 	As for Yr 1 plus – light, shade, sun, warm, cool, water, grow, healthy
B2 Living Things and their Habitats	Explore and compare the differences between things that are living, dead and things that have never been alive.	<ol style="list-style-type: none"> 1. Explore the outside environment regularly to find objects that are living, dead and have never lived. 2. Classify a range of things that are living, dead and have never lived. 3. Compare a range of things that are living, dead and have never lived. 	Key vocabulary Living, dead, never been alive, suited, suitable, basic needs, food, food chain, shelter, move, feed, names of local habitats e.g. pond, woodland etc, names of micro-habitats, e.g. m=under logs, in bushes, etc.
	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.	<ol style="list-style-type: none"> 1. Explore the outside environment regularly to find habitats of living things. 2. Identify habitats of living things and why they are suited to their living thing. 3. Read about what adaptations are. 4. Match four animals to their habitats and discuss two adaptations that each animal has that enable them to survive in their habitat. 5. Describe how habitats of living things depend on each other. 6. Carry out a field investigation into three local micro-habitats. 7. Predict what they might see, draw what they can see, and after the investigation compare and contrast the three micro-habitats. 	
	describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets).	<ol style="list-style-type: none"> 1. Observe animals and plants in their habitats carefully, drawing and labelling diagrams. 2. Name animals and plants in their habitats. 3. Classify animals and plants by their habitats. 	
B3 Animals, including Humans	Notice that animals, including humans, have offspring which grow into adults	<ol style="list-style-type: none"> 1. Learn about life cycles. Match images to the correct place on a diagram and create 3 life cycles of their own. 2. Sequence five pictures showing the stages of a human life (male) and match labels and descriptions to the pictures. 3. Match four different animals to their offspring and explain what changes have taken place as it has grown. 	Key Vocabulary Offspring, reproduction, growth, child/young/old stages (examples- chick/hen, baby/adult, caterpillar/butterfly), exercise, heartbeat, breathing, hygiene, germs, disease, food
	Find out about and describe the basic needs of animals, including humans, for survival (water, food and air)	<ol style="list-style-type: none"> 1. Discuss what humans need to survive. Cut out pictures of 8 things and sort them into groups - essential and non-essential to survival. 2. Discuss what animals need to survive and group 8 pictures into 2 groups - things that animals need to survive and things that they do not need. 	

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C1 Uses of Everyday Materials	Identify and compare the suitability of a variety of everyday materials including wood, metals, plastic, glass, brick, rock, paper and cardboard for particular users.	<ol style="list-style-type: none"> Suggest ways to change the shape of a solid object. text the properties of some materials to see which can be changed by squashing, bending, twisting and stretching. Use a word bank of materials and their properties to choose the right material for 8 different situations. Draw a picture and explain their reasons. Explain which materials can be changed by squashing, bending, twisting and stretching. 	Key Vocabulary Names of materials- increased range form Yr 1 Properties of materials – as for Yr 1 plus: opaque, transparent and translucent, reflective, non-reflective, flexible, rigid. Shapes, push/pushing, pull/pulling, twist/twisting, squash/squashing, bend/bending, stretch/stretching, metal, properties
	Find out how the shapes of solid objects made from some materials can be changed by squashing, bending twisting and stretching	<ol style="list-style-type: none"> Suggest ways to change the shape of a solid object. Learn about how metals are made. Carry out an investigation into the properties of up to 8 metal objects. learn about three inventors of new materials - John Dunlop, John McAdam, and Charles Macintosh. They match statements to the correct inventor. carry out an investigation into how they can change the shape of up to 8 classroom objects. Predict before they test and then discuss their findings. 	
	Know the difference between a star (sun), moon and planet	<ol style="list-style-type: none"> Explain a feature of a star (sun), a moon and a planet. Explain some features of a star(sun), moon and a planet. Compare and contrast features of a star (sun) , a moon and a planet. 	

Science Curriculum – Key Stage 1 and 2 Science Learning Intentions and Skills Progression

Curriculum Skills and Progression Map – Year 2 Plants					
National Curriculum Objectives		Sticky Knowledge		Vocabulary	
<ul style="list-style-type: none">Observe and describe how seeds and bulbs grow into mature plants.Find out and describe how plants need water, light and warmth to grow and stay healthy.		<ul style="list-style-type: none">Plants grow from seeds/bulbsPlants need light and water to grow and survivePlants are importantWe can eat lots of plants to survive (to clean air, to eat)We can eat different parts of the plants (leaves, stems, roots, seeds, fruit).		Leaf, flower, blossom, petal, fruit, berry, root, seed, trunk, branch, stem, bark, stalk, bud, deciduous, evergreen, sunlight, pollination, dispersal	
				Key scientists for study	
				Suggested Linked Texts	
		Agnes Arber (Botanist)		The Tine Forest (Helen Ward) Jack and the Beanstalk (Richard Walker)	
		Alan Titchmarsh (Botanist & Gardener)		Ten Seeds (Ruth Brown) A Seed is Sleepy (Dianna Aston)	
Prior Learning		Key Question (s)		Future Learning	
<ul style="list-style-type: none">Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees.Identify and describe the basic structure of a variety of common flowering plants.Identify and name the roots, truck, branches and leaves of trees.		Do cress produce seeds, how could we find out? Do all plants produce flowers and seeds? What is different between freshly cut and planted flowers? Do plants flower all year round? What are flower for? What happens to a plant after it has produced seeds?		<ul style="list-style-type: none">Identify and describe the functions of different parts of the flowering plant, roots, stem/trunk/leaves and flowers.Explore the part flowers play in a flowering plant life cycle, including: pollination, seed formation and seed dispersal.Explain the requirements of plants for life and growth (air, light, water, nutrients from soil, room to grow) and how they vary between plants.Know the way in which water is transported between plants.	
Some Teaching Ideas					
Comparative Tests	Identify & classify	Observation over time	Pattern Seeking	Research	Big Question: Assessment Opportunity
Do cress seeds grow quicker inside or outside?	How can we identify the trees that we observed on out tree hunt?	What happens to my bean after I have planted it?	Do bigger seeds grow into bigger plants?	How does a cactus survive in a desert with no water?	What should I do to grow a healthy plant

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Curriculum Skills and Progression Map – Year 2 Animals, Including Humans

National Curriculum Objectives		Sticky Knowledge		Vocabulary		
<ul style="list-style-type: none">Know that animals, including humans, have offspring which grow into adults.Know the basic stages in a life cycle for animals, including humans.Find out 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 animals of different types of food, and hygiene.		<ul style="list-style-type: none">Animals move in order to survive.Different animals move in different ways to help them survive.Exercise keeps animal’s bodies in good condition and increases survival chances.All animals eventually die.Animals reproduce new animals when they reach maturity.Animals grow until maturity and then don’t grow any larger.		living, dead never alive, habitats, micro-habitats, food, food chain, leaf litter, shelter, sea shore, woodland, ocean, rainforest conditions, desert, damp, shade		
				Key scientists for study		Suggested Linked Texts
				Steve Irwin (Crocodile Hunter) Robert Winston (Human Scientist) Joe Wicks (Personal Trainer)		The Gruffalo (Julia Donaldson) Meerkat Mail (Emily Gravett) Tapole’s Promise (Jeanne Willis and Tony Ross)
Prior Learning		Key Question (s)		Future Learning		
In KS1 children should: <ul style="list-style-type: none">Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals.Identify and name a variety of common animals that are carnivores, herbivores and omnivores		<ul style="list-style-type: none">How long do my pets live?Do all animals grow and live the same way?Do bigger animals live longer?What are we all different heights?How and why do we grow and change?		<ul style="list-style-type: none">Identify that animals, including humans, need the right types and amount of nutrition, and they cannot make their own food; they get their nutrition from what they eat.Know how nutrients, water and oxygen are transported within animals and humans.Know about the importance of a nutritious, balanced diet.Identify that humans and some other animals have skeletons and muscles for support, protection and movement.		
Some Teaching Ideas						
Comparative Tests	Identify & classify	Observation over time	Pattern Seeking	Research	Big Question: Assessment Opportunity	
Do amphibians have more in common with reptiles or fish? Do bananas make us run faster?	Which offspring belongs to which animal? How would you group things to show which are living, dead, or have never been alive?	How does a tadpole change over time? How much food and drink do I have over a week?	Which age group of children wash their hands the most in a day?	What food do you need in a healthy diet and why? What do you need to do to look after a pet dog/cat/lizard and keep it healthy?	Do living things change or stay the same?	

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Curriculum Skills and Progression Map – Year 2 Materials					
National Curriculum Objectives		Sticky Knowledge		Vocabulary	
<ul style="list-style-type: none">Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses.Find out how shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.	<ul style="list-style-type: none">There are many different materials that have different describable and measurable properties.Materials that have similar properties are grouped into metals, rocks, fabrics, wood, plastic and ceramics (including glass).The properties of a material determine whether they are suitable for a purpose.		Waterproof, fabric, rubber, cars, rock, paper, cardboard, wood, plastic, glass, brick, twisting, squashing, bending, matches, cans, spoons		
			Key scientists for study	Suggested Linked Texts	
			William Addis (Toothbrush inventor) Charles Mackintosh (waterproof coat) John MacAdam (roads)	The Tin Forest (Helen Ward) Traction Man (Mini Grey) Three Little Pigs (Lesley Sims)	
Prior Learning		Key Question (s)		Future Learning	
<p>In KS1 children should:</p> <ul style="list-style-type: none">Distinguish between an object and the material from which it is made.Identify and name a variety of everyday materials, including wood, metal, plastic, glass, 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 properties.	<p>It is recommended that materials be taught three times through KS 1. Give a theme for each topic e.g. building, exploration, toys, the seaside. Plan to investigate a couple of classes of materials and properties in each topic so children get a depth of experience each topic and cover all the classes of materials over the key stage.</p> <p><u>Building</u></p> <ul style="list-style-type: none">Which rocks are the least crumbly?Which materials absorb the most water?Which types of brick would be the easiest to drag to make a pyramid?Which material would be the strongest to use as a floor tile? <p><u>Toys & Nice Things</u></p> <ul style="list-style-type: none">Which fabric would make the softest blanket?The baby has spilt her drink, which material would absorb the drink the best?We want to make a really slippery slide, which liquid would be best to use?Which chocolate will melt the fastest on a warm plate (a model of a warm hand)?Which wrapping papers are strong enough to wrap and send a present? <p><u>Clothing & Materials</u></p> <ul style="list-style-type: none">Which material could be used to make a waterproof hat for the teacher on a raining day?Which plastic would be flexible enough to make a belt?Which material could I wrap my ice egg/snowman in to stop it melting or would it make it melt quicker?What could I wrap a chicken egg in to keep it warm when it is waiting to hatch?What could you paint on the runaway gingerbread man that would allow him to swim the river and get away from the fox and not turn to mush?		<ul style="list-style-type: none">Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses.Find out how shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.		
Some Teaching Ideas					
Comparative Tests	Identify & classify	Observation over time	Pattern Seeking	Research	Big Question: Assessment Opportunity
Which shapes make the strongest paper bridge? Which material would be best for the roof of the little pig's house?	Which material will float and which will sink? Which materials will let electricity go through them, and which will not? Which materials are shiny and which are dull?	How long do bubble bath bubbles last for? What will happen to our snowman??	How do materials change with heat? <i>Leave outside in sunshine/windowsill/radiator</i> How does amount of water affect the strength of a kitchen towel?	How have the materials we use changed over time? How are plastics made?	Can we change materials? How do we choose the best material?

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Year 3 Working Scientifically

Key Vocabulary: Questions, scientific enquiry, similarities/differences, changes, increase, decrease, identify, classify, sort, group, order, observe, patterns, link, secondary sources, comparative tests, fair tests, method, variable, accurate, appearance, equipment, gather, measure, results evidence, present, data/evidence/results, unit keys, bar charts, table, results, conclusions, prediction, thermometers, data loggers, microscope.

WS1 a. Asking questions and b. Using different types of scientific enquiries to answer them	a. 1. Ask relevant questions using scientific language 2. Knowledge to ask further, more probing questions e.g I know this... I know ... but what I want to know is... 3. Ask a relevant testable question	b. 1. Suggest next step in an enquiry 2. Plan next few steps 3. Plan observations/measurements to take
WS2 Setting up simple practical enquiries, comparative and fair tests	a. 1. Make judgement on the fairness of a test. 2. Explain why the test is fair/unfair. 3. Identify variable that could affect the measurement.	
WS3 a. Making systematic and careful observations and, where appropriate b. Taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers	a. 1. Make detailed observations. 2. Make comparative observations. 3. Generate criteria linked to observation e.g. sort, group, classify.	b. 1. Suggest equipment to use and measurements to take. 2. Use equipment correctly e.g. thermometers and data loggers, with use of correct units. 3. Use equipment accurately.
WS4 a. Gathering, recording b. Classifying and presenting data in a variety of ways to help in answering questions	a. 1. Identify relevant data/information to be gathered	b. 1. Classify information (sort) 2. Justify classification using criteria 3. Justify using scientific vocabulary
WS5 a. Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables	1. Record observations in different ways: labelled diagrams, charts, tables, etc. Use secondary sources.	
WS6 Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions	1. Present findings clearly and correctly. 2. Choose a variety of ways to present findings using simple scientific language. 3. Explain what they have found out and use their measurements to say whether it helps to answer their questions.	

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WS7		a.	b.	c.
a. Using results to draw simple conclusions b. Make predictions for new values c. Suggest improvements and raise further questions		1. Use further evidence to answer a question using comparatives 2. Use scientific evidence to find simple patterns and relationships 3. Use numerical data to support findings	1. Identify patterns and connections in data 2. Use patterns to predict 3. Suggest further questions. 4. Can they set up a simple test to make comparisons?	1. Identify negatives in an investigation (evaluate) 2. Suggest ways to overcome the negatives in an investigation 3. Start to justify the reliability of results
WS8 Identify differences, similarities or changes related to simple scientific ideas and processes		1. Compare scientific ideas or processes. 2. Use scientific vocabulary to explain the differences, similarities or change. 3. Plan and set up a fair test and explain why it was fair.		
WS9 Using straightforward scientific evidence to answer questions or to support their findings		1. Explain findings in different ways (display, presentation, writing)? 2. Evaluate and communicate their methods and findings. 3. Use a range of scientific equipment to take accurate measurements or reading.		
Year 3 – Biology- Plants				
B1 Plants	Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers	1. Identify parts of flowering plants: roots, stem/trunk, leaves and flowers. 2. Describe the of the parts of a flowering plants: roots, stem/trunk, leaves and flowers. 3. Observe parts of a flowering plant for four weeks. 4. Observe and describe changes of the parts of a flowering plant throughout the year.		Key Vocabulary Root, stem trunk, leaves, flowers. Pollen, insect/wind pollination, seed formation, seed dispersal – wind dispersal, animal dispersal water dispersal
	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	1. Observe what happens to plants over time when the leaves or roots are removed. 2. Investigate what happens to plants when they are put in different conditions e.g. darkness, in the cold deprived of air, different types of soil, different fertilizers, varying amount of space.		
	Investigate the way I which water is transported within plants	1. Explore the outside environment regularly to find objects that are living, dead and have never lived. 2. Classify a range of things that are living, dead and have never lived. 3. Compare a range of things that are living, dead and have never lived.		

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	Explore the parts that flowers play in the life cycle of flowering plants, including pollination, seed information and seed dispersal.	<ol style="list-style-type: none"> 1. Read about the 4 stages in the life cycle of a flowering plant - germination, growth, flowering, and fertilisation/seed production. 2. Create a life cycle diagram, cutting and pasting descriptions and pictures or writing and drawing their own. 3. Observe flowers carefully to identify the pollen. 4. Learn how pollination is vital to flowering plant reproduction. 5. Read about insect pollination and create their own process description by either cutting and pasting descriptions or writing in their own words. 6. Sport flowers, seeds, berries and fruits outside throughout the year. 7. Observe flowers being visited by pollinators e.g. bees and butterflies in the summer. 8. Observe seeds being blown from the trees e.g. sycamore seeds. 9. Research different types of seed dispersal. 10. Classify seeds in a range of ways including by how they are dispersed. 	
B2 Animals including Humans	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	<ol style="list-style-type: none"> 1. Learn about the 5 food groups - bread, cereals and potatoes (carbohydrates), meat and fish, fruit and vegetables, milk and dairy, and fats and sugars. 2. Identify some food which belong to each of these groups and create a pictogram showing how many portions of each food group they should eat in per day. 3. Use food labels to explore the nutritional content of a range of food items. 4. Use secondary sources to find out the types of food that contain the different nutrients. 5. Use food labels to answer enquiry questions e.g. How much fat do different types of pizza contain? How much sugar is in soft drinks? 6. Understand what a daily diet should contain and what is in a good balance of nutrients. 7. Learn that all living things ultimately get their energy from the Sun, either directly as a producer (plant) or indirectly as a consumer (animal). 8. Cut and paste three simple food chains using images provided. Create their own food chain. 9. a daily diet contain in a good balance of nutrients, 	Key Vocabulary Nutrition, nutrients, carbohydrates, sugars, proteins, vitamins, minerals, fibre, fat, water, skeleton, bones, muscles, support, protect, move, skull, ribs, spine, muscles, joints
	Identify that humans and some other animals have skeletons and muscles for support, protection and movement	<ol style="list-style-type: none"> 1. Use secondary sources to research the parts and functions of the skeleton. 2. Investigate pattern seeking questions such as: <ul style="list-style-type: none"> • Can people with longer legs run faster? • Can people with bigger hands catch a ball better? 	

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		<p>3. Learn that muscles always pull and never push, and because of this they often work in pairs to allow movement in both directions.</p> <ol style="list-style-type: none"> 4. Create their own model of the human arm, with biceps and triceps pulling the lower arm up and down accordingly 5. Match three different animals to their endoskeletons. 6. Use a word bank to identify and label the major bones, such as skull ribs, tusk, pelvis and spine. 7. Discuss the similarities and differences between the skeletons. 8. Learn about the different types of animal skeleton - endoskeletons (skeletons on the inside), exoskeletons (skeletons on the outside), and hydroskeletons (boneless skeletons made of muscle). 9. Cut out different pictures of animals and paste them into the correct skeletal group. 	
C1 Rocks	Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties	<ol style="list-style-type: none"> 1. Use a hand lens to look at a selection of rocks. Make observational drawings and describe them with the help of a word bank. 2. Try to identify the name of each rock and whether it contains grains, crystals, or fossils. 3. Classify rocks in a range of ways based on their appearance. 4. Investigate the properties of rocks; predict and then observe whether 8 different rocks can be scratched with a nail, are porous, or can float in water. 5. Use their results to create and label a 1-set Venn diagram. 6. Using hand lenses, children explore two different soil samples. 7. Identify differences and similarities, looking for sand, plant parts, water and minibeasts. 8. Create an observational drawing and write a description of each sample. 9. Learn that rocks can be placed into three categories - sedimentary, metamorphic and igneous. 10. Examine pictures of familiar rocks - chalk, diamond, sandstone, slate, granite, flint, marble and limestone - and match them to their descriptions and physical properties. Suggest potential uses for each of these rocks. 11. Devise a text to investigate how much water different rocks absorb. 12. Observe how rocks change over time e.g. gravestones or old building. 	<p>Key Vocabulary Rock, stone, pebble, boulder, grain, crystals, layers, hard, soft, texture, absorb water, soil, fossil, marble, chalk, granite, sandstone, slate, soil, peat, sand/chalk/clay soil</p>
	Describe in simple terms how fossils are formed when things that have lived are trapped within rock	<ol style="list-style-type: none"> 1. Research using secondary sources how fossils are formed. 2. Explore how fossils are formed in sedimentary rock. 3. Learn that some ancient organisms died, were covered soon after death, formed fossils and were then uncovered. 	

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		4. Create their own process description with diagrams by cutting and pasting, or draw their own diagrams and write their own descriptions.	
	Recognise that soils are made from rocks and organic matter	<ol style="list-style-type: none"> 1. Observe soils closely. 2. Classify soils in a range of ways based on their appearance. 3. Devise a test to investigate the water retention of soils. 4. Examine a soil sample. Mix it with water inside a bottle, then allow it to settle. 5. Draw and label its initial appearance, and then its appearance after several days. Discuss how it changes over time. 6. Observe how soil can be separated through sedimentation. 7. Research the work of Mary Anning. 	
Year 3 – Physics – Light and Sight			
P1 Light and Sight	Recognise that they need light in order to see things and that dark is the absence of light	<ol style="list-style-type: none"> 1. Explore how different objects are more or less visible in different levels of lighting. 2. Learn that we see things because they are either light sources that make light, and that we see them because light travels directly into our eyes, or they are non-light sources that we can see because light reflects off them into our eyes. 3. Cut out different images and place them into 2 groups - light sources and non-light sources. 	Key Vocabulary Light, light source, dark, absence of light, transparent, translucent, opaque, shiny, matt, surface, shadow, reflect, mirror, sunlight, dangerous
	Notice that light is reflected from surfaces	<ol style="list-style-type: none"> 1. Explore how objects with different surfaces e.g. shiny vs matt are more or less visible. 2. Learn that some objects are visible because they are light sources and some are visible because they reflect light. 3. Look at 9 different images of objects that help us to see at night. 4. Identify whether they are light sources or reflectors, and place them on a single-set Venn diagram to record their classification. 	
	Recognise that light from the sun can be dangerous and that there are ways to protect their eyes	<ol style="list-style-type: none"> 1. Learn about the importance of the Sun as the ultimate energy source for all life on Earth and about different ways in which exposure to the Sun can be dangerous to humans. 2. Explain, and illustrate, ways in which the Sun can damage our eyes and skin and ways that this damage can be minimised. 	
	Recognise that shadows are formed when the light from a light source is blocked by an opaque object.	<ol style="list-style-type: none"> 1. Explore how shadows vary as the distance between a light source, an object or surface is changed. 2. Learn that shadows are formed when an opaque object blocks the path of light, which travels in straight lines. 	

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		3. Use a light source to cast an object's shadow onto a piece of paper and draw around the outline.	
	Find patterns in the way that the size of shadows change	<ol style="list-style-type: none"> 1. Investigate and explain into how the shape of an object affects its shadow 2. Choose suitable materials to make shadow puppets. 3. Create artwork using shadows. 4. Learn that shadows cast by the Sun change in length and direction during the day because of the apparent motion of the Sun across the sky (though this is really caused by the rotation of the Earth). 5. Using a gnomon (such as a cricket wicket) and chalk, children create their own sundial on the yard. calibrate their sundial and explain how it works 	
	Recording findings using simple scientific language, drawing, labelled diagrams, keys, bar charts and table.	<ol style="list-style-type: none"> 1. Learn that we can classify objects as transparent, translucent or opaque depending on how light behaves when it hits them. 2. Carry out an investigation to classify a selection of classroom objects as transparent, translucent, or opaque. 3. Display their findings in a Venn diagram with 2 sets, one nested inside the other. 	
P2 Forces ad Magnets	Compare things move on different surface	<ol style="list-style-type: none"> 1. Carry out investigations to explore how objects move on different surfaces e.g. spinning tops/coins, rolling balls/cars, clockwork toys, soles of shoes, etc. 2. Investigate how magnets can make objects move on different surfaces. Attach a metal paperclip to a book and investigate how placing it on different surfaces affects how easily a magnet can move it. 3. Record their predictions and measurements in a table, and then transfer their results to a bar chart. 	Key Vocabulary Force, push, pull, twist, contact force, non-contact force, magnetic force, magnet, strength, bar magnet, ring magnet, button magnet, horseshoe magnet, attract, repel, magnetic material, metal, iron, steel, poles north pole, south pole
	Notice that some forces need contact between two objects, but magnetic forces can act at a distance.	<ol style="list-style-type: none"> 4. Investigate which objects and materials will prevent a paperclip from being attracted to a magnet when placed between them. Attempt to identify the main material each object is made from and use their results to complete a Venn diagram containing a single set. Explain their findings. 	
	Observe how magnets attract or repel each other and attract some materials and not others.	<ol style="list-style-type: none"> 1. Investigate how powerful 5 different magnets are. 2. Predict and then measure the distance at which each magnet will attract a paperclip, recording their results in a table and transfer their results to a bar chart and place the magnets in order of strength. 3. Carry out an investigation to find out which classroom objects are magnetic. Consider what they are going to measure and how to make their test fair. Predict and measure which classroom objects are magnetic. 	

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		<ol style="list-style-type: none"> Transfer their results to a 2-dimensional Carroll diagram, showing both which objects were magnetic and which were made of metal. Find a pattern in their results. 	
	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	<ol style="list-style-type: none"> Explore what materials are attracted to a magnet. Classify materials according to whether they are magnetic. Explore how magnets work at a distance e.g. through the table, in water, jumping paper clip up off the table. Devise an investigation to test the strength of magnets. 	
	describe magnets as having two poles	<ol style="list-style-type: none"> Use a marked magnet to find the unmarked poles on other types of magnets. Investigate which metal classroom objects are also magnetic. Think about how they will make their test fair. Place their results in a Venn diagram containing 2 overlapping sets, and think about in which of the 4 areas to place each result. Discuss the relationship between the type of metal an object is composed of and whether it is magnetic. Carry out an investigation to test the strength of up to 10 magnets. Predict and then measure how many 1p coins they can place in a bag held by a paper clip attracted by the magnet before the bag and paper clip fall off. Transfer their results to a bar chart and place the magnets in order of strength. 	
	Predict whether two magnets will attract or repel each other, depending on which poles are facing.	<ol style="list-style-type: none"> Learn that magnets are made up of tiny magnetic particles which have all lined up in the same direction, producing a noticeable magnetic effect (field). Learn that magnets always contain two poles (north and south) and that if a magnet is broken in two, each piece will still have two poles. Investigate whether the poles from two magnets will attract or repel each other when brought together. Record their results in a 2-dimensional Carroll diagram. Properties of magnetic attraction and repulsion make useful machines. Learn about powerful magnets, called electromagnets and about 5 different machines that use magnets (a maglev train, an MRI machine, a crane, a button magnet, and a compass) and match their images to their descriptions. For an added challenge, children write descriptions in their own words. 	

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Curriculum Skills and Progression Map – Year 3 Plants					
National Curriculum Objectives		Sticky Knowledge		Vocabulary	
<ul style="list-style-type: none">Identify and describe the functions of different parts of the flowering plant: roots, stem/trunk/leaves and flowers.Explore the part flowers play in a flowering plants life cycle, including: pollination, seed formation and seed dispersal.Explain the requirements of plants for life and growth (air, light, water, nutrients from soil room to grow) and how they vary between plants.Know the way in which water is transported between plants.		<ul style="list-style-type: none">Plants are producers, they make their own food.Their leaves absorb sunlight and carbon dioxide.Plants have roots, which provide support and draw water from the soil.Flowering plants have specific adaptations which help it to carry out pollination, fertilisation and seed production.Seed dispersal improves a plants chances of successful reproduction.Seeds/bulbs require the right conditions to germinate and grow.Seeds contain enough food for the plant’s initial growth.		Air, light, water, nutrients, soil support, anchor, reproduction, pollination, dispersal, transportation, flower, energy, growth, seedling, carbon dioxide, oxygen, sugar, material, photosynthesis, chlorophyll	
				Key scientists for study	
				Suggested Linked Texts	
				Jan Ingenhousz (photosynthesis)	
				Joseph Banks (Botanist)	
				The Hidden Forest (Jeannie Baker)	
				George and Flora’s Secret Garden (Jo Elworthy)	
Prior Learning		Key Question (s)		Future Learning	
<ul style="list-style-type: none">Observe and describe how seeds and bulbs grow into mature plants.Find out and describe how plants need water, light and warmth to grow and stay healthy.		How do plants reproduce? Do all flowers look the same? How do insects know which flower to pollinate? Why do flowers smell? What do seeds do? Can a plant live without its leaves? Do grass/trees make flowers? What conditions are perfect for a seed to grow? Where do weeds come from? How does the space between seeds affect how well they grow? Does seed size match plant size? Do plants take in water through their roots? How does water move through the plant? How do plants make their food? How does light affect plant growth? How does a plant get carbon dioxide?		<ul style="list-style-type: none">Recognise that living things have changed over time and that fossils provide information about living things.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 adaption can lead to evolution.	
Some Teaching Ideas					
Comparative Tests	Identify & classify	Observation over time	Pattern Seeking	Research	Big Question: Assessment Opportunity
How does the length of the carnation stem affect how long it takes for the food colouring to dye the petals? Which conditions help seeds germinate faster?	How many different ways can you group our seed collection?	What happen to celery when it is left in a glass of coloured water? How do flowers in a vase change over time?	What colour flowers do pollinating insects prefer?	What are all the different ways that seeds dispersal?	Why do plants have flowers?

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Curriculum Skills and Progression Map – Year 3 - Forces					
National Curriculum Objectives		Sticky Knowledge		Vocabulary	
<ul style="list-style-type: none">There are no specified National Curriculum Objectives for forces at KS I.	<ul style="list-style-type: none">Pushing and pulling can make things move faster or slower.Pushing and pulling can make thins move or stop.Things can move in different ways.Larger masses take bigger pushes and pulls to move to stop them.Pushing and pulling can change the shape of things.Bigger pushes and pulls have bigger effects.	Force, push, pull, surface, attract, repel, compass, float, sink			
		Key scientists for study		Suggested Linked Texts	
		The Wright Brothers (Aeroplanes)		Traction Man (Mini Grey)	
		Henry Ford (Cars)		Three Little Pigs (Lesley Sims)	
Prior Learning		Key Question (s)		Future Learning	
<ul style="list-style-type: none">Know about similarities and differences in relation to places, objects, materials and living things.Talk about the features of their own immediate environment and how environments might vary from one another.Make observations of animals and plants and explain why some things occur, and talk about changes.	<p>How can we move objects? How can we change the way an object moves? How does a material affect how fast a ball rolls down a slope? How does the length/steepness of a slope affect how a ball/car/tin will roll off thee end? What is a push or a pull that makes it go further? How does how hard/long I press a pop up toy for affect how high it jumps? On what surface do objects roll best on? Is it the same for sliding? Which material would be best for a teddy bungee cord? How does length of an elastic band affect how elastic it is? Which sock is the elastic? Which tights are the most elastic (denier)? Which recipe play dough needs the greatest push to squash it? How does the height of an egg is dropped from affect how bug the splat patter is? (you could use wet tissue paper balls)</p>		<ul style="list-style-type: none">Compare how things move on different surfaces.Know how a simple pulley works and use making lifting an object simpler.Notice that some forces need contact between two objects, but magnetic forces can act as a distance.Observe how magnets attract and 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 with attract or repel each other, depending on which poles are facing.		
Some Teaching Ideas					
Comparative Tests	Identify & classify	Observation over time	Pattern Seeking	Research	Big Question: Assessment Opportunity
Which material would be best for the roof of the little pig’s house?	Which materials will float and which will sink?	Would a paper boat float forever??	How does changing the force change the speed of a toy car?	Why do objects float or sin??	How can we change how things move?

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Curriculum Skills and Progression Map – Year 3 – Forces (& Magnetism)							
National Curriculum Objectives		Sticky Knowledge		Vocabulary			
<ul style="list-style-type: none">Compare how things move on different surfaces.Know how a simple pulley words and use making lifting an object simpler.Notice that some forces need contact between two objects, but magnetic forces can act at a distance.Observe how magnets attract and repel each other and attract some materials and not others.Describe magnets as having two poles.Predict whether two magnets with attract or repel each other, depending on which poles are facing.		<ul style="list-style-type: none">Magnets exert attractive and repulsive forces on each other.Magnets exert non-contact forces, which work through some materials,Magnets exert attractive forces on some materials.Magnet forces are affected by magnet strength object mass, distance from object and object material.		Force, push, pull, surface, friction, magnet, magnetic field, pole, north, south, attract, repel, compass			
				Key scientists for study		Suggested Linked Texts	
				William Gilbert (Theories o Magnetism)		The Iron Man (Ted Hughes)	
				Mrs Armitage: Queen of the Road (Quentin Blake)			
				Mr Archimedes’ Bath (Pamela Allen)			
Prior Learning		Key Question (s)		Future Learning			
<p>In KS 1 children:</p> <ul style="list-style-type: none">May have an awareness of how to make things stop and start, using simple pushes and pulls.They may know about floating and sinking.		<p>What are magnetic materials? How can we find out? Can I make a magnetic material non-magnetic? How far away does a magnet have to be before it attracts a magnetic material? How far away can the magnetic attraction between two magnets be experiences? Is the repulsive force the same size? How is the magnetic attraction of repulsion force affected by putting materials between the magnets? Are bigger magnets stronger? How could you use magnets to measure the number of pages in a book?</p>		<ul style="list-style-type: none">Explain that supported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object and the impact of gravity on our lives.Identify the effects of air resistance, water resistance and friction, which act between moving water surface.Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.Describe the movement of the Earth, and other planets, relative to the Sun in the solar system.Describe the movement of the Moon relative to the Earth.Describe the Sun, Earth and Moon as approximately spherical bodies.Describe the idea of the Earth’s rotation to explain day and nights and the apparent movement of the sun across the sky.			
Some Teaching Ideas							
Comparative Tests	Identify & classify	Observation over time	Pattern Seeking	Research	Big Question: Assessment Opportunity		
How does the mass of an object affect how much force is needed to make it move? Which magnet is strongest? Which surface is best to stop you slipping?	Which materials are magnetic?	If we magnetise a pin, how long does it stay magnetised for?	Do magnetic materials always conduct electricity? Does the size and shape of a magnet affect how strong it is?	How have our ideas about forces changed over time? How does a compass work?	How can we change how things move?		

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Curriculum Skills and Progression Map – Year 3 Animals, Including Humans						
National Curriculum Objectives		Sticky Knowledge		Vocabulary		
<ul style="list-style-type: none">Identify that animals, including humans, need the right types and amount of nutrition, and they cannot make their own food; they get their nutrition from what they eat.Know how nutrients, water and oxygen are transported within animals and humans.Know about the importance of a nutritious, balanced diet.Identify that humans and some other animals have skeletons and muscles for support, protection and movement.		<ul style="list-style-type: none">Different animals are adapted to eat different foods.Many animals have skeletons to support their bodies and protect vital organs.Muscles are connected to bones and move them when they contract.Movable joints connect bones.		Nutrients, nutrition, carbohydrates, protein, fats, vitamins, water, fibre, skeleton, bones, joints, endoskeleton, exoskeleton, hydrostatic, vertebrates, invertebrates, muscles, contract, relax.		
				Key scientists for study		Suggested Linked Texts
				Adelle Davis (20 th Cnetury Nutritionist) Marie Curie (Radiation/X-Rays)		The Story of Frog Belly Rat Bone (Timothy Basil Ering) Funnybones (Janet and Allan Ahlberg) I Will Never Not Eat Ever Eat a Tomato (Lauren Child) Goldilocks and the Three Bears (Samantha Berger)
Prior Learning		Key Question (s)		Future Learning		
<p>In KS1 children should:</p> <ul style="list-style-type: none">Know that animals, including humans, have offspring which grow into adults.Know the basic stages in a life cycle for animals, including humans.Find out 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 animals of different types of food, and hygiene.		<ul style="list-style-type: none">Why do we need a skeleton?What types of skeleton are there?Are all skeletons the same?Can something survive without a skeleton?What happens if we break a bone?How do we move?Are bones that are bigger, stronger?Why do we need joints?Why do muscles get tired?Can we ‘break’ muscles?		<ul style="list-style-type: none">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.Construct and interpret a variety of food chains, identifying producers, predators and prey.		
Some Teaching Ideas						
Comparative Tests	Identify & classify	Observation over time	Pattern Seeking	Research	Big Question: Assessment Opportunity	
How does the angle that your elbow/knee is bent affect the circumference of your upper arm/thigh? How does the skull circumference of a girl compare with that of a boy?	How do the skeletons of different animals compare?	How does our skeleton change over time? (from birth to death)	Do male humans have larger skulls that female humans?	Why do different types of vitamins keep us healthy and which foods can we find them in?	Why do animals have skeletons? What is a healthy diet and why is it important?	

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Curriculum Skills and Progression Map – Year 3- (Energy) Light and Sight					
National Curriculum Objectives		Sticky Knowledge		Vocabulary	
<ul style="list-style-type: none">• 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 sizes of shadows change.		<ul style="list-style-type: none">• There must be light for us to see. Without light it is dark.• We need light to see things even shiny things.• Transparent materials let light through them and opaque materials don't let light through.• Beams of light bounce off some materials (reflection).• Shiny materials reflect light beams better than non-shiny material.• Light comes from a source.		Light source, dark, reflect, ray mirror, bounce, visible, beam, sun, glare, travel straight opaque, shadow, block, transparent, translucent	
				Key scientists for study	
				James Clerk Maxwell (Visible and Invisible Waves of Light)	
				Suggested Linked Texts	
				The Owl Who was Afraid of the Dark (Jill Tomlinson)	
				The Dark (Lemony Snicket)	
				The Firework Maker's Daughter (Philip Pullman)	
Prior Learning		Key Question (s)		Future Learning	
In KS 1 children should have: <ul style="list-style-type: none">• Observed changes across the four seasons.• Observed and describe weather associated with the seasons and how day length varies. Children may: <ul style="list-style-type: none">• have some knowledge of where light comes from.• Have seen their shadows and may know they appear when it is sunny.• Have some understanding of a reflection.• May understand they need light to be able to see things.		A coin is lost, what would be the best way to find it? Turn the lights out and see it shine? Use a torch to see it reflect? How does distance from a light source affect how bright it looks? How does being in darkness affect your sense of hearing? What colour would be the best to make a safety jacket from? How does the colour of a material affect how reflective it is? What would be the best material to make a blind for a baby's room? How does thickness of a material affect how much light can pass through it? How many pieces of tracing paper are as translucent as a single piece of white paper? How does the shape of a mirror affect how the light reflects? How can we change the darkness, size and shape of shadow?		<ul style="list-style-type: none">• Recognise 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 eye.• Explain that we see things because light travels from light source to our eyes or from light sources to objects and then to our eyes.• Use the idea that light travels in straight lines to explain why shadows gave the same shape as the objects that cast them.• Know how simple optical instruments work e.g. periscope, telescope, binoculars, mirror, magnifying glass, etc.	
Some Teaching Ideas					
Comparative Tests	Identify & classify	Observation over time	Pattern Seeking	Research	Big Question: Assessment Opportunity
How does the distance between the shadow puppet and the screen affect the size of the shadow? Which pair of sunglasses will be best at protecting our eyes?	How would you organise these light sources into natural and artificial sources?	When is our classroom darkest? Is the Sun the same brightness all day?	Are you more likely to have bad eye sight and to wear glasses if you are older?	How does the Sun make light?	What is a shadow?

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Curriculum Skills and Progression Map – Year 3 Materials (Rocks)					
National Curriculum Objectives		Sticky Knowledge		Vocabulary	
<ul style="list-style-type: none">Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties.Describe in simple terms how fossils are formed when things that have lived are trapped within rock.Recognise that soils are made from rocks and organic matter.		<ul style="list-style-type: none">There are different types of rock.There are different types of soil.Soils change over time.Different plants grow in different soils.Fossils tell us what has happened before.Fossils provide evidence.Paleontologist use fossils to find out about the past.Fossils provide evidence that living things have changed over time.		Rocks, igneous, metamorphic, sedimentary, anthropic, impermeable, chemical fossil, body fossil, trace fossil, Mary Anning, cast Fossil, mould fossil replacement fossil, extinct, organic matter, top soil, sub soil, base rock	
		Key scientists for study		Suggested Linked Texts	
		Mary Anning (Discovery of Fossils)		The Pebble in My Pocket (Meredith Hooper)	
		Inge Lehmann (Earth's Mantle)		Stone Girl, Bone Girl (Laurence nholt)	
				The Street Beneath My Feet (Charlotte Guillain & Yuval Zammer)	
Prior Learning		Key Question (s)		Future Learning	
<p>In KS1 children should:</p> <ul style="list-style-type: none">Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses.Find out how shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. <p>Children may:</p> <ul style="list-style-type: none">May have some understanding of a variety of different rocks in the natural world.Some understanding of what soil is (how to identify soil etc.)May have some knowledge of what a fossil is.		<ul style="list-style-type: none">How are the soils different?Which do you think has best drainage?Which is more likely to lead to flooding?How many soil types have we found?Where might you find more?How might the soil be different in different countries?What rock is best for a kitchen chopping board? What might be the issues with various materials and what they have to withstand?What types of rocks are there?How do rocks change?What would grow best in your soil?Why do you think worms are important to the creation of soil?How can we use composting to make our own soil?Does it currently look like real soil?How long do you think this process will take and why?How are fossils created?Why do fossils help us find out about historical events?If you could follies an object what would it be?		<ul style="list-style-type: none">Compare and group materials together, according to whether they are solids, liquids or gases.Observe that some materials change state when heated or cooled, and measure and research the temperature at which this happens in degrees Celsius.Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. <p>In Yr 6 children will:</p> <ul style="list-style-type: none">Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth million years ago.	
Some Teaching Ideas					
Comparative Tests	Identify & classify	Observation over time	Pattern Seeking	Research	Big Question: Assessment
How does adding different amounts of sand to soil affect how quickly water drains through it? Which soil absorbs the most water?	Can you use the identification key to find the name of each of the rocks in your collection?	How does tumbling change a rock over time? What happens when water dripping on a sandcastle?	Is there a pattern in where we find volcanoes on planet Earth?	Who was Mary Anning and what did she discover?	What are rocks and soils like?

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Year 4 – Science Learning Intentions and Skill Progression Working Scientifically		
Key Vocabulary: Questions, scientific enquiry, similarities/differences, changes, increase, decrease, identify, classify, sort, group, order, observe, patterns link, secondary sources, comparative tests, fair tests, method, variable, accurate, appearance, equipment, gather, measure, record, results, evidence, present, data/evidence/results, unit, keys, bar charts, table, results, conclusions, prediction, thermometers, data loggers, microscope		
WS1 a. asking relevant questions and b. using different types of scientific enquiries to answer them	a. 1. Use knowledge to ask further, more probing questions e.g. I know this... I know this... but what I want to know is... 2. Ask a relevant testable question. 3. Ask a range of testable questions.	b. 1. Plan next few steps in an enquiry. 2. Plan observations/measurements to take. 3. Suggest most appropriate method/enquiry and measurements.
WS2 a. Setting up simple practical enquiries, comparative and fair tests	a. 1. Explain why the test is fair/unfair. 2. Identify variables that could affect the measurement. 3. Select an independent variable and control variable(s).	
WS3 c. Making systematic and careful observations and, where appropriate d. Taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers	a. 1. Make detailed observations. 2. Make comparative observations. 3. Generate criteria linked to observation e.g. sort, group, classify.	b 4. Suggest equipment to use and measurements to take. 5. Use equipment correctly e.g. thermometers and data loggers, with use of correct units. 6. Use equipment accurately.
WS4 c. Gathering, recording d. Classifying and presenting data in a variety of ways to help in answering questions	a. 1. Identify relevant data/information to be gathered. 2. Record relevant data/information correctly e.g. list, table chart, diagram (differentiation). 3. Systematically record data.	b 2. Classify information (sort). 3. Justify classification using criteria. 4. Justify using scientific vocabulary.
WS5 a. Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables		
WS6 Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions	1. Present findings clearly and correctly. 2. Choose a variety of ways to present findings using simple scientific language. 3. Explain findings using simple scientific language and knowledge. 4. Justify their method of presentation e.g. table, chart, lis diagram, captions, explanation, etc	

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WS7		a.	b.	c.
a. Using results to draw simple conclusions b. Make predictions for new values c. Suggest improvements and raise further questions		1. Use further evidence to answer a question using comparatives 2. Use scientific evidence to find simple patterns and relationships 3. Use numerical data to support findings	1. Identify patterns and connections in data 2. Use patterns to predict 3. Suggest further questions	1. Identify negatives in an investigation (evaluate) 2. Suggest ways to overcome the negatives in an investigation 3. Start to justify the reliability of results
WS8 Identify differences, similarities or changes related to simple scientific ideas and processes		1. Compare scientific ideas or processes. 2. Use scientific vocabulary to explain the differences, similarities or change.		
WS9 Using straightforward scientific evidence to answer questions or to support their findings				
Year 4 – Biology – Living things and their Habitats				
B 1 Living things and their habitat	Recognise that living things can be grouped in a variety of ways Identify whether an animal is a vertebrate or an invertebrate,	1. Learn about 5 different groups of animals - fish, amphibians, reptiles, bird, and mammals - and how we can identify them from their body features, behaviour, and life cycles. 2. Cut out different images of these animals and place them in the correct group. Explain what the animals in each group have in common. 3. Learn that a dichotomous key (a branching classification key in which each question has exactly two answers) can be used to identify organisms. 4. Use the key provided to identify different animals and use a word bank to help them name the animals. 5. Children use a dichotomous classification key to identify different types of invertebrate (centipede, slug, worm, snail, ant, beetle, woodlouse, spider and millipede). 6. Cut and paste them in place and name them with the help of a word bank,		Key Vocabulary Classification, classification keys, environment, habitat, human impact, positive, negative, migrate, hibernate, dichotomous
	Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment	1. Investigate the local area and draw pictures of different organisms. Create their own classification key by repeatedly asking dichotomous questions (with exactly two answers), splitting the group up until each group only has one member. Discuss the best sort of questions to ask when making a classification key.		

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		<ol style="list-style-type: none"> 2. Select a habitat in the local environment; draw a picture of how it appears now, and describe or measure the weather, temperature and hours of daylight. 3. Predict what this habitat will look like in 6 months' time, and identify any changes that might take place. If possible, children revisit the site in 6 months and investigate the habitat as it actually appears. 	
	Recognise that environments can change and that this can sometimes pose dangers to living things	<ol style="list-style-type: none"> 1. Learn what deforestation is, and why humans deliberately choose to cut down trees and destroy forests. 2. Learn about several negative effects of deforestation. 3. use the writing frame provided to create their own information text on deforestation. 	
B2 Animals including humans	Describe the simple functions of the basic parts of the digestive system in humans	<ol style="list-style-type: none"> 1. Learn about the role of the human digestive system. 2. Learn about the functions of the mouth, oesophagus, stomach, small intestine and large intestine. 3. Cut out pictures of the individual organs and paste them in place to complete a diagram, which they then label. 4. Learn about the functions of the mouth, oesophagus, stomach, small intestine and large intestine. 5. Use this information to complete an explanation text with accompanying diagram by either cutting and pasting text or writing their own explanation. 	Key Vocabulary Digestive system, digestion, mouth, teeth, saliva, oesophagus, stomach, small, intestine, nutrients, large intestine, rectum, anus, teeth, incisor, canine, molar, premolars, herbivore. Carnivore, omnivore, producer, predator, prey, food chain
	Identify the different types of teeth in humans and their simple functions	<ol style="list-style-type: none"> 1. Explore eating different types of food, to identify which teeth are being used for cutting, tearing and grinding (chewing). 2. Learn that humans have 2 sets of teeth, and that teeth can be classified into different groups. 3. Learn about the number, location and function of the incisors, canines and molars. 4. Create a colour-coded diagram explaining the role of each type of tooth. 5. Learn that teeth are made up of different materials (enamel, dentine, pulp) and are embedded in the gums and skull/jawbone. 6. Create their own labelled diagram showing these different parts and their functions, by cutting and pasting or writing their own descriptions. 7. Learn about the stages of tooth decay and how it can be caused. Learn how tooth decay can be prevented and treated. 8. Use a writing frame to complete an interview text, imagining themselves in the role of a dentist and explaining how we can look after our teeth. 	

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	Construct and interpret a variety of food chains, identifying producers, predators and prey	<ol style="list-style-type: none"> 1. Learn what a food chain is and that the arrow shows energy flow within an ecosystem. 2. Use the pictures provided to create food chains with 2 and 3 organisms. 3. Identify each organism using a word bank and whether they are a predator, prey, consumer or producer. 4. Learn that a food web is a way of showing the energy flow in an ecosystem in a more complex way. 5. Create a food web containing 8 different organisms and identify and label each organism as a consumer, producer, predator, prey, and apex predator. Add their own arrows to show energy flow through the food web. 6. Classify animals as herbivores, carnivores or omnivores according to the type of teeth they have in their skulls. 7. Use food chains to identify producers, predators and prey within a habitat. 8. Use secondary sources to identify animals in a habitat and find out what they eat. 	
Year 4 – Chemistry – State of Matter			
C 1 State of Matter	Compare and group materials together, according to whether they are solids, liquids or gases	<ol style="list-style-type: none"> 1. Learn that many materials other than water will melt if heated to a high enough temperature. 2. Carry out a networking activity, where each child has an incomplete set of information, to find out the melting points of 6 different metals. 3. Record their information in a table and transfer it to a bar chart. 4. Learn about the differences between solid, liquids and gases and how they can be identified. 5. Cut out different images of familiar substances and group them as solid, liquids or gases. Discuss which materials were most difficult to group and how temperature can affect whether it is a solid, liquid or a gas. 6. Explore making gases visible e.g. squeezing sponges under water to see bubbles, and showing their effect e.g using straws to blow objects, tress moving in the wind. 7. Classify materials according to whether they are solids, liquids and gases. 	Key Vocabulary Classification, classification keys, environment, habitat, human impact, positive, negative, migrate, hibernate

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	<p>Observe that some materials change state when they are heated or cooled and measure or research the temperature at which this happens in degrees Celsius (C)</p>	<ol style="list-style-type: none"> 1. Using the particle model, children learn about the different states of matter (solids, liquids, and gases). 2. Learn how the amount of energy that the particles have affects the state of the material. 3. Use scientific vocabulary (melt, freeze, evaporate, condense) to create a diagram explaining how matter changes state. 4. Investigate the melting point of 3 familiar materials - ice, chocolate and butter. 5. Use a thermometer to measure temperature and record their results in a table and discuss how accurate their predictions were and whether melting is a reversible change. 6. Investigate how effective different materials are at insulating a cold drink and slowing its increase in temperature. 7. Use thermometers to measure the temperature of each cup every 15 minutes over the course of 2 hours. Record their information in a table and then create a line graph showing the temperature of all 4 cups over a 2-hour period. 8. Learn about the water cycle and that water is not created or lost, but simply moved around the Earth. 9. Learn that heat from the Sun drives the water cycle. 10. Create their own water cycle diagram, explaining the processes of evaporation, condensation and precipitation by cutting and pasting or using their own words. 11. Learn how to make their own solar still to recover water. 12. Learn that solar heating of water-laden soil causes some water to evaporate, which can then be captured by a plastic sheet where it evaporates and is recovered by a bowl or mug. Explain how the solar still works. 13. Investigate how rapidly 100ml of water placed in locations with different temperatures will evaporate. 14. Using a table, they record the capacity of 4 different measuring containers over the course of 14 days. Complete a line graph showing the capacity of all 4 containers over that period. 15. Learn how a line graph can help us infer missing results (such as weekend measurements). 	
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Year 4 – Physics – Sounds and Electricity

P1 Sound	Identify how sounds are made, associating some of them with something vibrating	<ol style="list-style-type: none"> 1. Learn that sounds are caused by vibrations. 2. Know sound can be made when a sound source vibrates. 3. Learn about the difference between pitch and volume. 4. Carry out an investigation where children place 5 different water containers in order, depending on the pitch made when air is gently blown across the top of each. Find a pattern and explain their results. 5. Explore how a string instrument makes a sound; using an ice cream tub, elastic bands, and Lego blocks, they create their own string instrument. 6. Explore how adding more Lego blocks affects the pitch of each string (band). 7. Know that the tighter the drum skin, strings or elastic is pulled the higher the pitch will be. 8. Know that the looser the drum skin, strings or elastic is pulled the lower pitch will be. 9. Know that the bigger the sound source is the lower the pitch will be. 10. Know that the smaller the sound source is the higher the pitch will be. 11. Know when you blow across the top of a bottle with water in, the less water there is in it the lower the pitch. 	Key Vocabulary Sound, source, vibrate, vibration, travel pitch (high, low), volume, faint, loud insulation
	Recognise that vibrations from sounds travel through a medium to the ear	<ol style="list-style-type: none"> 1. Learn that sounds travel from an object, through a medium (usually the air), travel into the ear where they are carried down the ear canal and processed by the brain. 2. Complete an explanation text explaining how we hear things, by cutting and pasting or writing their own descriptions. 3. Investigate how effective 5 different materials are at blocking sound. Recognising the difficulty of accurately measuring the loudness of a sound, they make each measurement 3 times and choose the median. 4. Use their results to create a bar chart and place the materials in order of effectiveness as sound insulators. 5. Explore how string telephones or ear gongs work. 	

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	Find patterns between the pitch of a sound and features of the object that produced it	<ol style="list-style-type: none"> 1. Learn that pitch and volume are two different properties of sounds. 2. Investigate the pitch and volume of the sound made when 5 different balls are dropped. 3. Recognising the difficulty of measuring pitch and volume without equipment, children make 5 measurements and then choose the modal value. 4. Transfer their results to a scatter graph showing both pitch and volume. 5. Explore using objects that change in feature to change in pitch and volume such as length of guitar string, bottles of water or tuning forks. 	
	Find patterns between the volume of a sound and the strength of the vibrations that produce it.	<ol style="list-style-type: none"> 1. Know that volume is the loudness of a sound. 2. Know that harder a sound source is hit or blown the greater the vibrations produced. 3. Know the greater the vibrations produced, the louder the volume. 4. Know the weaker a sound source is hit or blown the lesser the vibrations produced. 5. Know the lesser the vibrations produced, the quieter the sound. 6. Measure sounds through different insulation materials 7. Explore using objects that change in feature to change pitch and volume such as length of guitar string, bottles of water or tuning forks. 	
	Recognise that sounds get fainter as the distance from the sound source increases,	<ol style="list-style-type: none"> 1. Know the further you are away from a sound source the fainter the sound is. 2. Measure sounds over different distances 3. Investigate the maximum distance at which somebody can hear one of 5 body sounds (hand clap, sniff, cough, foot stamp and thigh slap) in the playground or hall.. They place each sound in order of loudness and create a bar chart showing their results. 4. Discuss the difficulty of getting accurate results without measuring equipment and ways of improving the investigation. 5. Investigate the height a ball needs to be dropped from in order to be heard at different distances. 6. Predict and then measure the minimum height required, recording their results in a table. 7. Create a line graph and explore the link between the distance and the minimum height (and therefore volume) required. 	

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P2 Electricity	Identify common appliances that run on electricity	<ol style="list-style-type: none"> 1. Know some appliances use a cell or battery (many cells) and some use mains electricity. 2. Identify appliances that use a cell or batteries (torch phone clock, etc) and appliances that need to be connected to the mains electricity 9 television, kettle, computer, etc 	Key Vocabulary Electricity, electrical appliance/device, mains, plug, electrical circuit, complete circuit, component, cell, battery, positive, negative
	Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers	<ol style="list-style-type: none"> 1. Learn about 6 different electrical components - bulb, switch, cell, battery, switch, buzzer and bell. They match each component to its picture, description, and circuit diagram symbol. 2. Learn what an electrical circuit is. Using simple apparatus, children look at illustrations of different circuits and attempt to create them. 3. Children attempt to create the circuit diagram for each, and explain what happens when each circuit is completed. 4. Know a series circuit is a single-path circuit, where electrical current follows along one path in one direction – positive to negative. 5. Know s simple series circuit contains a cell or battery, wires and an electrical component, such as a bulb, motor or buzzer. 6. Know the cell or battery is the energy source. 7. Construct a range of circuits. 8. Pupils work scientifically by: observing patterns, for example, that bulbs get brighter if more cells are added, that metals tend to be conductors of electricity, and that some materials can and some cannot be used to connect across a gap in a circuit. 	
	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.	<ol style="list-style-type: none"> 1. Learn what an electrical circuit is. Using simple apparatus, they look at illustrations of different circuits and attempt to create them. They attempt to create the circuit diagram for each, and explain what happens when each circuit is completed. 2. Look at 5 different circuit illustrations. In each circuit, the bulb will not light. Children explain how each circuit can be changed so that the bulb will light. If possible, test their ideas with simple apparatus. 3. Draw a circuit diagram for their improved circuits. 4. Know a lamp will light in a single-path circuit when electrical current is flowing from a cell and there is no break in the circuit. 5. Know that the lamp must be part of the circuit to light. 	

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	<p>Recognise that a switch opens and closes a circuit and associates this with whether or not a lamp lights in a simple series circuit.</p>	<ol style="list-style-type: none"> 1. Learn about 6 different electrical components - bulb, switch, cell, battery, switch, buzzer and bell. Match each component to its picture, description, and circuit diagram symbol. 2. Know a switch opens and closes a circuit. 1. Know that components will only work if there is a complete circuit. 2. Know that an incomplete circuit has a break e.g. gap in the wire, wire not connected to component. 3. Know when a switch is open, the electrical circuit is broken and the current cannot flow around the entire circuit. 4. Explore how to connect a range of different switches and investigate how they function in different ways. 	
	<p>Recognise some common conductors and insulators, and associate metals with being good conductors.</p>	<ol style="list-style-type: none"> 1. Know conductors allow electricity to flow through them. 2. Know most metals are good conductors of electricity. 3. Know some non-metals, such as graphite, conduct electricity. 4. Know that insulators do not allow electricity to pass through them. 5. Know that plastic, rubber and wood are insulators. 6. Explore which materials can be used instead of wires to make a circuit. 7. Classify the materials that were suitable/not suitable for wires. 8. Learn that mains electricity is more dangerous than the electricity. 9. Learn that the human body, metal, and water all conduct electricity. 10. Look at illustrations of different dangerous situations and identify what the danger is and how it can be made safe. 	

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Curriculum Skills and Progression Map – Year 4 – Living Things & their Habitats

National Curriculum Objectives		Sticky Knowledge		Vocabulary		
<ul style="list-style-type: none">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 water environment.Recognise that environment can change and that this can sometimes pose a danger to living things		<ul style="list-style-type: none">Living things can be divided into groups based upon their characteristics.Environmental change affects different habitats differently.Different organisms are affected differently by environmental change.Different food chains occur in different habitats.Human activity significantly affects the environment.	Air, light, water, nutrients, soil support, anchor, reproduction, pollination, dispersal, transportation, flower, energy, growth, seedling, carbon dioxide, oxygen, sugar, material, photosynthesis, chlorophyll			
			Key scientists for study		Suggested Linked Texts	
			Cindy Looy (Environmental Change and Extinction) Jaques Cousteau (Marine Biologist)		The Vanishing Rainforest (Richard Platt) The Morning I Met a Whale (Michael Morpurgo) Journey to the River Sea (Eva Ibbotson)	
Prior Learning		Key Question (s)		Future Learning		
<p>In LKS2, children should:</p> <ul style="list-style-type: none">Explore and compare the difference between things that are living, dead, and things that have never been alive.Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other.Identify and name a variety of plants and animals in their habits, 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 the different sources of food.		<ul style="list-style-type: none">What food chains and webs are there I our local habitat?How does energy move through the food chain?How does removal of one species from an environment affect others? (keystone species)How oes environmental change affect different organisms?What are the most important things we could do to improve our outside area? (big hotels, pond, compost, wildflowers)How does human activity affect our environment? (ferries on the Solent? Sandown Airport? KFC?)		<ul style="list-style-type: none">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. <p>In Yr 6 (Living things & their Habitats):</p> <ul style="list-style-type: none">Classify living things into broad groups according to observable characteristics and based on similarities and differences.Give reasons for classifying plants and animals based on specific characteristics.		
Some Teaching Ideas						
Comparative Tests		Identify & classify	Observation over time	Pattern Seeking	Research	Big Question: Assessment Opportunity
Does the amount of light affect how many woodlice move around? How does the average temperature of the pond water change in each season?		Can we use the classification keys to identify all the animas that we caught pond dipping?	How does the variety of invertebrates in the park or garden change over the year?	How does the use of insecticides affected bee population?	Why are people cutting down the rainforests and what effect does that have?	Are living things in danger?

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Curriculum Skills and Progression Map – Year 4 Animals, Including Humans

National Curriculum Objectives		Sticky Knowledge		Vocabulary			
<ul style="list-style-type: none">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.Construct and interpret a variety of food chains, identifying producers, predators and prey.		<ul style="list-style-type: none">Animals have teeth to help them eat.Different types of teeth do different jobs.Food is broke down by the teeth and further in the stomach and intestines where nutrients of into the blood.The blood takes nutrients around the body.Nutrients produced by plants move to primary consumers then to secondary consumers through food chains.		Herbivore, Carnivore, Digestive system, tongue, mouth, teeth, oesophagus, stomach, gall bladder, small intestine, pancreas, large intestine, liver tooth, canine incisor, molar premolar, producer, consumer.			
				Key scientists for study		Suggested Linked Texts	
				Adelle Davis (20 th Cnetury Nutritionist)		The Story of Frog Belly Rat Bone (Timothy Basil Ering)	
				Marie Curie (Radiation/X-Rays)		Funnybones (Janet and Allan Ahlberg)	
						I Will Never Not Eat Ever Eat a Tomato (Lauren Child)	
						Goldilocks and the Three Bears (Samantha Berger)	
Prior Learning		Key Question (s)		Future Learning			
<p>In LKS2 children should:</p> <ul style="list-style-type: none">Identify that animals, including humans, need the right types and amount of nutrition, and they cannot make their own food; they get their nutrition from what they eat.Know how nutrients, water and oxygen are transported within animals and humans.Know about the importance of a nutritious, balanced diet.Identify that humans and some other animals have skeletons and muscles for support, protection and movement.		<ul style="list-style-type: none">What difference types of food are there?Why do we need a variety of different foods?Do all organisms eat the same things?Why do some people need different diets? (weightlifter vs marathon runner)Why are teeth important?What happens to our food?What is our digestive system?How does our food turn into poo and wee?		<ul style="list-style-type: none">Know the life cycle of different living things, e.g. Mammal, amphibian, inset, birdKnow the difference between different life cyclesKnow the process of reproduction in plantsKnow the process of reproduction in animals.			
Some Teaching Ideas							
Comparative Tests	Identify & classify	Observation over time	Pattern Seeking	Research	Big Question: Assessment Opportunity		
In our class, are omnivores taller than vegetarians?	What are te names for all the organs involved n the digestive system? How can we organise teeth into groups?	How does an egg shell change when it is left in cola?	Are foods that are high in energy always high in sugar?	How do dentists fix broken teeth?	What do our bodies do with the food we eat?		

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Curriculum Skills and Progression Map – Year 4 Materials – Solids, Liquids & Gas

National Curriculum Objectives		Sticky Knowledge		Vocabulary	
<ul style="list-style-type: none">Compare and group materials together, according to whether they are solids, liquids or gases.Observe that some materials change state when heated or cooled, and measure and research the temperature at which this happens in degree Celsius.Identify the part played by evaporation and condensation in the water cycle and associated the rate of evaporation with temperature.		<ul style="list-style-type: none">Solids, liquids and gases are described by observable properties.Materials can be divided into solids, liquids and gases.Heating causes solids to melt into liquids and liquids evaporate into gases; Cooling causes gases to condense into liquids and liquids to freeze into solids.The temperature at which given substances change state are always the same.		Solid, liquid, gas, particles, state materials, properties, matter, melt, freeze, water, ice, temperature, process, condensation, evaporation, water vapour, energy, precipitation, collection	
				Key scientists for study	Suggested Linked Texts
				Anders Celcius (Celcius Tempeprature Scale) Daniel Fahrenheit (Fahrenheit (Fahrenheit Temperature scale/Invention of the Thermometer)	Once Upon a Raindrop: The Story of Water (James Carter) Sticks (Diane Alber)
Prior Learning		Key Question (s)		Future Learning	
<p>In KS 1 children should:</p> <ul style="list-style-type: none">Distinguish between an object and the material from which it is made.Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock.Describe the simple physical properties of a variety of everyday 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, including wood, metal, plastic, glass, brick, rock,, paper and cardboard for particular uses.Find out how the shapes of solid objects made from some materials can be changed by squashing, neding, twisting and stretching.		<ul style="list-style-type: none">How does the amount of water added to flour affect its state?How does the amount of detergent added to water affect how slippery it is?How does the temperature affect how viscous a liquid is use cooking oil)?Place a peach in a glass of lemonade and watch it spin. Why does it behave that way and can you prove it?How does the material sprinkled on ice and snow affect how quickly it melts?What chocolate would be best to smuggle? How does the type of chocolate affect its melting temperature?What is the melting temperature of ice and how does it compare with the freezing temperature of water?Is the melting temperature of wax the same as its freezing temperature?		<p>In UKS2 children will:</p> <ul style="list-style-type: none">Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity(electrical and thermal), and response to magnets.Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution.Use knowledge of solids, liquids, and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating.Give reasons based on evidence from comparative and fair tests, for the particular uses of everyday materials, including wood, metals and plastic.Demonstrate that dissolving, mixing ad changes of state are reversible changes,Explain that some changes result in the formation of new materials, and this kind of change is usually no reversible, including changes associated with burning and the action of acid on bicarbonate of soda.	
Some Teaching Ideas					
Comparative Tests	Identify & classify	Observation over time	Pattern Seeking	Research	Big Question: Assessment Opportunity
How does the mass of a block affect how long it takes to melt? How does the surface area of water affect how long it takes to evaporate? Does seawater evaporate faster than fresh water?	Can you grou these materials and objects into solids, liquids and gases? How would you sort these objects/materials based on their temperature?	Which material is best for keeping our hot chocolate warm? How does the level of water in a glass change when left n the windsill?	Is there a pattern in how long it takes different sized ice lollies to melt? How does evaporation rate change as you add more salt to your water?	What are hurricanes, and why do they happen?	Where do ice cube of when they disappear? Why does it rain and hail?

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Curriculum Skills and Progression Map – Year 4 – (ENERGY) Sound

National Curriculum Objectives		Sticky Knowledge		Vocabulary			
<ul style="list-style-type: none">Know how sound is made associating some of them with vibrating.Know what happens to a sound as it travels from its source to our ears.Know the correlation between the volume of a sound and the strength of the vibrations that produced it.Know how sound travels from a source to our ears.Know the correlation between pitch and the object producing a sound.		<ul style="list-style-type: none">Sound travels from its source in all directions and we hear it when it travels to our ears.Sound travel can be blocked.Sound spreads out as it travels.Changing the shape, size and material of an object will change the sound it produces.Sound is produced when an object vibrates.Sound moves through all materials by making them vibrate.Changing the way an object vibrates changes its sound.Bigger vibrations produce louder sounds and smaller vibrations produce quieter sounds.Faster vibrations (higher frequencies) produce higher pitched sounds.		Amplitude, volume, quiet, loud, ear, pitch, high, low, particles, instruments, wave.			
				Key scientists for study		Suggested Linked Texts	
				Aristotle – Sound Waves		Horrid Henry Rocks (Francesca Simon)	
		Gallileo Galilei (Frequency and Pitch of Sound Waves)		Moonbird (Joyce Dunbar)			
		Alexander Graham Bell (Invented the Telephone)		The Pied Piper of Hamelin (Natalia Vasquez)			
Prior Learning		Key Question (s)		Future Learning			
<p>In KS 1 children:</p> <ul style="list-style-type: none">May have some understanding that objects make different sounds.Some understanding that they use their ears to hear sounds.Know about their different senses.		<p>How can you change the volume of a sound?</p> <p>How does the size of an ear trumpet affect the volume of sound detected?</p> <p>How does the type of material affect how well it blocks a sound?</p> <p>How does thickness of material affect how well it blocks a sound?</p> <p>Which materials vibrate best and produce louder sounds? Can we identify any patterns?</p> <p>Which materials make the best string telephone components? (tin cans, paper cups, plastic cups, wire, cable, string, plastic or elastic- predict and test).</p> <p>How does length of the tube (when making a straw oboe) affect the pitch and volume?</p> <p>Can you predict the relative pitch of tuning forks from the patterns of ripples they make in the water?</p>		<ul style="list-style-type: none">Frequencies of sound waves, measured in hertz (Hz); echoed, reflection absorption of sound.Sound needs a medium to travel, the speed of sound in air, in water, in solids.Sound produced by vibrations of objects, in loud speakers, detected by their effects on microphone diaphragm and the ear drum; sound waves are longitudinal.			
Some Teaching Ideas							
Comparative Tests	Identify & classify	Observation over time	Pattern Seeking	Research	Big Question: Assessment Opportunity		
<p>How does the volume of drum change as you move further away from it?</p> <p>How does the length of a guitar string/tuning fork affect the pitch of the sound?</p> <p>Are two ears better than one?</p>	<p>Which material is best use for muffing sound in ear defenders?</p>	<p>When is our classroom the quietest?</p>	<p>Is there a link between how loud it is in schools and the time of day? If there is a pattern, is it the same in every area of the school?</p>	<p>Do all animals have the same hearing range?</p>	<p>Who can we make different sounds?</p>		

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Year 5 – Science Learning Intentions and Skill Progression Working Scientifically		
Key Vocabulary: Questions, scientific enquiry, similarities/differences, changes, increase, decrease, identify, classify, sort, group, order, observe, patterns link, secondary sources, comparative tests, fair tests, method, variable, accurate, appearance, equipment, gather, measure, record, results, evidence, present, data/evidence/results, unit, keys, bar charts, table, results, conclusions, prediction, thermometers, data loggers, microscope, classification, observations, measurements, causal relationships		
WS1 a. Asking relevant questions and b. Using different types of scientific enquiries to answer them	a. 1. Choose the best way to answer a question and use information from different sources to plan investigation. 2. Make prediction which links with other scientific knowledge.	b. 1. Plan next few steps in an enquiry. 2. Plan observations/measurements to take. 3. Suggest most appropriate method/enquiry and measurements. 4. Planning range of scientific enquiries to answer questions, recognising and controlling variables where necessary.
WS2 a. Setting up simple practical enquiries, comparative and fair tests	a. 1. Explain why the test is fair/unfair. 2. Identify the key factors when planning a fair test. 3. Vary one factor whilst keeping others the same in an experiment; explain why they do this. 3. Select an independent variable and control variable(s). 4. Plan and carry out a scientific enquiry to answer questions, including recognising and controlling variable.	
WS3 a. Making systematic and careful observations and, where appropriate b. Taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers	a. 1. Make detailed observations. 2. Make comparative observations. 3. Generate criteria linked to observation e.g. sort, group, classify. 4. Make predictions with reasons.	b 1. Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate. 2. Decide which units of measurement need to be used. 3. Explain why a measurement needs to be repeated
WS4 a. Gathering, recording b. Classifying and presenting data in a variety of ways to help in answering questions	a. 1. Identify relevant data/information to be gathered. 2. Record relevant data/information correctly e.g. list, table chart, diagram (differentiation). 3. Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.	b 1. Classify information (sort) 2. Justify classification using criteria. 3. Justify using scientific vocabulary.

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<p>WS5</p> <p>a. Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables</p>	<ul style="list-style-type: none"> Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. Use information to make a prediction and give reasons for it. Use test results to make further predictions and set up further comparative tests. Explain, in simple terms, a scientific idea and what evidence supports it. Draw conclusions from their work. Record more complex data and results using scientific diagrams, classification keys, tables, bar charts line graphs and models. 		
<p>WS6</p> <p>Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions</p>	<ol style="list-style-type: none"> Explain why they have chosen specific equipment (including ICT based equipment). Decide which units of measurement they need to use. Make precise measurements. Explain why a measurement needs to be repeated. Record measurements in different ways (including bar charts, tables and line graphs) 		
<p>WS7</p> <p>a. Using results to draw simple conclusions</p> <p>b. Make predictions for new values</p> <p>c. Suggest improvements and raise further questions</p>	<p>a.</p> <ol style="list-style-type: none"> Use further evidence to answer a question using comparatives Use scientific evidence to find simple patterns and relationships Use numerical data to support findings 	<p>b.</p> <ol style="list-style-type: none"> Identify patterns and connections in data Use patterns to predict Suggest further questions Link what they have found out to other science. <p>Suggest how to improve their work and say why they think this.</p>	<p>c.</p> <ol style="list-style-type: none"> Identify negatives in an investigation (evaluate) Suggest ways to overcome the negatives in an investigation Start to justify the reliability of results
<p>WS8</p> <p>Identify differences, similarities or changes related to simple scientific ideas and processes</p>	<ol style="list-style-type: none"> Compare scientific ideas or processes. Use scientific vocabulary to explain the differences, similarities or change. Explore different ways to test an idea, choose the best way and give reasons. Vary one factor whilst keeping the others the same in an experiment. 		
<p>WS9</p> <p>Using straightforward scientific evidence to answer questions or to support their findings</p>	<ol style="list-style-type: none"> Identifying scientific evidence that has been used to support or refute ideas or arguments. Use information to help make a prediction. Explain, in simple terms, a scientific idea and what evidence supports it. Explain how they could improve their way of working. Finding things out using a wide range of secondary sources. Explain qualitative and quantitative data. 		

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Year 5 – Biology – Animals, including Humans

B 1 Living things and their habitat	Know the differences between life cycles of a mammal, amphibians, an insect and a bird.	<ol style="list-style-type: none"> Describe the differences in the life cycles of a mammal, amphibians, an insect and a bird. Learn about the life cycles of 3 different mammals - the human, the kangaroo, and the platypus. Create a life cycle diagram for each mammal, writing their own descriptions and either cutting and pasting pictures or drawing their own. Discuss similarities and differences between the life cycles of these mammals. Compare the life cycles of plants and animals in their local environment with the life cycles of those around the world, e.g. rainforests. Create a timeline to indicate stages of growth in certain animals, such as frogs and butterflies. Learn about the lifecycle of the butterfly and two different species of bee - the honey bee and the mason bee. Create 3 life cycle diagrams, one for each insect, and compare them. Explore different ways of sorting animals according to their life cycles. Using 9 challenge cards containing descriptions such as 'undergo metamorphosis' and 'are eusocial'; children sort 10 different animals. They discuss which grouping was most difficult and attempt to create their own challenge cards. 	Key Vocabulary reproduction, pollination, germination, cell, fertilization, metamorphosis, egg, sexual, asexual, life cycle, processes, dispersal
	Know the process of reproduction in plants and animals.	<ol style="list-style-type: none"> Identify the reproductive processes of some animals. Describe how plants reproduce, the process of germination, pollination and seed dispersals. Learn that, unlike animals, pieces broken off from plants can grow into another individual organism. Learn that this is used by farmers to create many crops with identical characteristics (such as planting potato tubers). Cutting up a plant such as a potato or tomato plant, children investigate which parts will grow into a new individual. 	
B2 Animals including humans	Describe the life cycles of common plants.	<ol style="list-style-type: none"> Present a report of their findings through writing, display and presentation. Learn about the purpose of a flower and its basic structures, including petal, anther, sepal, carpel, stigma, style, ovary, pollen grain, pollen tube and ovule. Label a diagram of a flower and carpel and complete an explanation text showing how flowering plants reproduce. 	Key Vocabulary mammal, reproduction, insect, amphibian, bird, offspring, foetus, embryo, womb, gestation, baby, toddler, teenager, elderly, puberty, timeline, zygote, fertilisation, mating
	Use basic ideas of inheritance, variation and adaptation to describe how living things have changed over time.	<ol style="list-style-type: none"> Understand that some organisms reproduce sexually where offspring inherit information from both parents. Describe the changes experienced in puberty. Understand that hormones control changes; which can be physical and/or emotional. 	
	Describe the changes as humans develop to old age.	<ol style="list-style-type: none"> Draw a timeline to indicate stages in the growth and development of humans. Learn that animals reproduce sexually and each individual has a male and a female parent from which they inherit various traits. Explain the process of animal reproduction, including the stages of sperm and egg production, mating, fertilisation, and the growth of a zygote into an embryo. 	

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Year 5 – Chemistry – Properties and Changes to Materials			
C 1 State of Matter	Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets.	<ol style="list-style-type: none">Understand that all matter (including gas) has mass.Identify and group materials together, according to their properties such as: colour, state, texture, solubility, smell, hardness, conductivity, etc.Use their knowledge of materials to suggest ways to classify solids, gases and liquids.Work out which materials are most effective for keeping warm or cold.	Key Vocabulary hardness, solubility, transparency, conductivity, magnetic, filter, evaporation, dissolving, reversible, irreversible, mixture, comparative, fair tests
	Know that some materials will dissolve in liquid to form a solution and describe how to recover a substance from a solution.	<ol style="list-style-type: none">Explain how some materials dissolve in liquid to form a solution.Explain what happens when dissolving occurs.Describe changes using scientific words e.g. evaporation, condensation, etc.Use the terms ‘reversible’ and irreversible’ with understanding.	
	Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating.	<ol style="list-style-type: none">Demonstrate that dissolving, mixing and changes of state are reversible changes.Explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda.Describe methods for separating mixtures (filtration, distillation, sieving)	
	Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic.	<ol style="list-style-type: none">Plan and carry out a scientific enquiry to answer questions, concluding recognising and controlling variables where necessary.Make a prediction with reasons.Use test results to make predictions to set up comparative and fair tests.Take repeat readings when appropriate.	
Year 5 – Physics – Force, Earth and Space			
P 1 Force	Explain unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object and the impact of gravity on our lives.	<ol style="list-style-type: none">Describe and explain how motion is affected by forces (including gravitational attractions, magnetic attraction and friction.Learn that objects fall to the Earth due to the force of gravity.Explore why people don't fall off the 'bottom' of the Earth, and why the Moon does not fall out of the sky.Investigate the force of gravity by weighing 5 objects in grams, and then measuring the pull between them and the Earth using a force meter, measuring the force in Newtons (N).Look for a relationship between their two measurements.	Key Vocabulary air resistance, water resistance, friction, gravity, Newton, gears, pulleys, force, pull, push, opposing, streamline, lever, newtons, force meter,
	Identify the effects if air resistance, water resistance and friction, which act between moving surfaces.	<ol style="list-style-type: none">Explain how surface area of a parachute affect the time it takes to fall.Learn that air resistance can be put to use in devices such as parachutes. Investigate how canopy size affect's a parachute's rate of descent. Construct 4 parachutes with different canopy areas and predict.Measure how long they take to descend from a given height; take each measurement 3 times and calculate the mean.Show their results in a bar chart and attempt to answer the scientific question.Describe how air can cause resistance to objects moving through air.Describe how water can cause resistance to floating objects.	

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	Recognise that some mechanism, including levers, pulleys and gears, allow a smaller force to have a greater effect.	<ol style="list-style-type: none"> 1. Explain why some objects require large forces to make them move; gears, pulley and levers can reduce the force needed to make things move. 2. Know how a simple pulley works and making lifting objects simpler. 3. Learn that a lever is a simple machine that can give a mechanical advantage. 4. Set up their own lever, with fulcrum, beam and load, and investigate how far from the fulcrum different forces (weights) need to be in order to balance the load. 5. Transfer their results to a line graph and attempt to find a relationship between the force required and the distance from the fulcrum. 6. Learn that a pulley is a simple machine that can be used to change the direction of a force, and can also be used to reduce the force required to lift a load. C 7. Construct a simple pulley from 2 karabiner clips. Use a force meter to compare the force required to lift loads with and without the pulley. 8. Record their results in a table and then transfer their results to a line graph showing two lines. Compare both sets of results and explain. 9. Learn that a gear is a toothed wheel; gears can work together as a gear train in order to change the speed or direction of rotation. 10. Work out whether the driven gear will rotate clockwise or anticlockwise and whether it will rotate more quickly or slowly than the driver e.g. Lego gears. 	
	Present a report of their findings through writing, display and presentation using appropriate scientific vocabulary.	<ol style="list-style-type: none"> 1. Use graphs to answer scientific questions. 2. Use test results to make predictions to set up comparative and fair tests. 3. Create own force meter using simple classroom equipment. Use known masses to calibrate their force meter, adding a sensible scale. 4. Learn that a mass of 100g experiences a pull towards the Earth due to the force of gravity of approximately 1 newton. 5. Explain how their force meter works and why they needed to calibrate it before using it. 	
P2- Earth and Space	Identify and explain the movement of the Earth and other planets relative to the sun in the solar system.	<ol style="list-style-type: none"> 1. Learn about the modern theory for the formation of the solar system. 2. Learn that a cloud of gas and dust collapsed under its own gravity, compressing the centre until thermonuclear fusion began and the Sun was formed 3. Learn that the Sun is a star at the centre of our solar system and that it has eight planets: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune (Pluto classified dwarf) 4. Learn that the planets and other bodies accreted from smaller objects over time because of gravity. 5. Complete an information text explaining the origins of the solar system. 	Key Vocabulary Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune, Pluto, celestial body, Moon, Sun, solar system, rotate, night, day, orbit, axis, spherical, geocentric, heliocentric
	Describe and explain the movement of the Moon relative to the Earth.	<ol style="list-style-type: none"> 1. Understand that a moon is a celestial body that orbits a planet (Earth has one moon; Jupiter has four large moons and numerous smaller ones). 2. Learn that the appearance of the Moon changes because of the movement of the Moon around the Earth. 3. Complete a diagram showing the eight phases of the Moon and why the Moon's appearance seems to change. 	

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	Describe the sun, earth and moon as approximately spherical bodies.	<ol style="list-style-type: none"> 1. Find out about the way that ideas about the solar system have developed, understanding how the geocentric model of the solar system gave way to the heliocentric model by considering the work of scientists such as Ptolemy, Alhazen and Copernicus. 2. Learn about 3 different planet groups - terrestrial, gas giant, and ice giant. Children look at diagrams of the planets which are in proportion to one another. 3. Use an 'Earth ruler' to measure the diameter of the planets in Earth diameters in order to compare them to the Earth. Use a ruler marked in cm to measure the diameter, before using a formula to calculate their true size. 4. Record their data in a table and look for patterns. Children can use the planet diagrams to make a display. 	
	Use the idea of the earth's rotation to explain day and night and the apparent movement of the sun across the sky.	<ol style="list-style-type: none"> 1. Introduced to a model of the Sun and Earth that enables them to explain day and night. 2. Learn that the Moon is not a light source and that we can see it only because it reflects light from the Sun. 3. Compare the time of day at different places on the earth through internet links and direct communication. 4. Create simple shadow clocks and sundials, calibrated to show the school day. 5. Talk about and understand how older civilizations used the sun to create astronomical clocks, e.g. Stonehenge. 	

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Curriculum Skills and Progression Map – Year 5 – Animals, including Humans					
National Curriculum Objectives		Sticky Knowledge		Vocabulary	
<ul style="list-style-type: none">Describe the changes as humans develop to old age.Know the life cycle of different living thnings, e.g. mammal, amphibian, insect, etc.Know the differences between different life cycles.Know the process of reproduction in plants.Know the process of reproduction in animals.		<ul style="list-style-type: none">Different animals mature at different rates and live at different ages.Puberty id something we all go through, a process which prepares our bodies for being adults, and reproduction.Hormones control these changes; where can be physical and/or emotional.Some organisms reproduce sexually where offspring inherit information from both parents.Some organisms reproduce asexually by making a copy of a single parent.Environmental change can affect how well an organism is suited to its environment.Different types of organism have different lifecycles.		Foetus, embryo, womb, gestation, baby toddle, teenager, elderly, growth, development, puberty, hormone, physical emotional sexual, asexual, pollination, dispersal, reproduction, cell, fertilisation, pollination, male, female, pregnancy, young, mammal, metamorphosis, amphibian, insect, egg, bird, plant.	
				Key scientists for study	Suggested Linked Texts
				David Attenborough (Naturalist and Nature Documentary Broadcaster) James Brodie of Brodie (Reproduction of Plants by Spores)	The Land of Neverbelieve (Norman Messenger) Mummy Liad an Egg (Barbara Cole) Hair in Funny Places (Babette Cole) Giant (Kate Scott) You’re Only Old Once! (Dr. Seuss)
Prior Learning		Key Question (s)		Future Learning	
In LKS2, children should: <ul style="list-style-type: none">Describe the simple functions of the basic parts of the digestive system in humans.Identify the different types f teeth in humans and their simple functions.Construct and interpret a variety of food chains, identifying producers, predators and prey.		<ul style="list-style-type: none">What do humans look like?Do all animal embryos look the same?How do humans change?Why do humans change?What is a life cycle? What types of life cycles are there?Are life cycles the same?What causes puberty?What changes do we go through during puberty?Are there ay patterns between vertebrate animals and their gestation periods?Do plants reproduce in the same ways as us?How do plants spread their seeds?		<ul style="list-style-type: none">Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood.Recognise the impact of diet, exercise drugs and lifestyle on the way their bodies function.Describe the ways in which nutrients and water are transported within animals, including humans.	
Some Teaching Ideas					
Comparative Tests	Identify & classify	Observation over time	Pattern Seeking	Research	Big Question: Assessment Opportunity
How does the level of salt affect how quickly brine shrimp hatch? How does age affect a human’s reaction time? Who grows the fastest, girls or boys?	Can you identify all the stages in the human life cycle? Compare this collection of animals based on similarities and differences in their lifecycle.	How do brine shrimp change over their life time? How does a bean change as it germinates? How do different animal embryos change?	Is there a relationship between a mammal’s size and its gestation period?	What are the differences between the life cycle of an insect and a mammal? Why do people get grey/white hair when they get older?	Do all plants and animals reproduce in the same way?

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Curriculum Skills and Progression Map – Year 5 Forces

National Curriculum Objectives		Sticky Knowledge		Vocabulary	
<ul style="list-style-type: none">Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object and the impact of gravity on our lives.Identify the effects of air resistance, water resistance and friction, which act between moving surfaces.Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.		<ul style="list-style-type: none">Air resistance and water resistance are forces against motion caused by objects having to move air and water out of their way.Friction is a force against motion caused by two surfaces rubbing against each other.Some objects require large forces to make them move; gears, pulley and levers can reduce the force needed to make things move		air resistance, water resistance, friction, gravity, newton, gears, pulleys, force, push pull, opposing, streamline, brake, mechanism, lever, cog, machine	
				Key scientists for study Galileo Galilei (Gravity and Acceleration) Isaac Newton (Gravitation) Archimedes of Syracuse (Levers)	
				Suggested Linked Texts The Enormous Turnip (Kate Daynes) Leonardo's Dream (Hans de Beer) The Aerodynamics of Biscuits (Clare Helen Welsh)	
Prior Learning		Key Question (s)		Future Learning	
<p>In LKS2 children should:</p> <ul style="list-style-type: none">Compare how things move on different surfaces.Know how a simple pulley works and use making lifting an object simpler.Notice that some forces need contact between two objects but magnetic forces can act at a distance.Observe how magnets attract ad 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.		<ul style="list-style-type: none">What actually is a force? How can a force act on an object?How can we see forces?How can we measure force?How does the saltiness (salinity) of water affect the water resistance?How does the length of a piece of paper helicopter's wings affect the time it takes to fall?How does changing the stage of a piece of plasticine affect water resistance?How does adding holes to a parachute affect the time it takes to fall?How does the amount/depth of tread affect the friction between a shoe and a surface?How can we use levers to lift more?What is the most effective way to move an object?How do see-saws work?Can you create a pulley system to lift a given load?		<p>In KS 3 children will learn about:</p> <ul style="list-style-type: none">opposing forces and equilibrium: weight held by stretched spring or supported on a compressed surface.forces being needed to cause objects to stop or start moving, or to change their speed direction of motion (qualitative only)	
Some Teaching Ideas					
Comparative Tests	Identify & classify	Observation over time	Pattern Seeking	Research	Big Question: Assessment Opportunity
How does the angle of launch affect how far a paper rocket will go? How does the surface area of an object affect the time it takes to sink?	Can you label and name all the forces acting on the objects I each of these situations?	How long does a pendulum swing for before it stops?	Do all objects fall through water in the same way?	How do submarines sink if they ate full of air?	How and why do objects move?

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Curriculum Skills and Progression Map – Year 5 Earth & Space					
National Curriculum Objectives		Sticky Knowledge		Vocabulary	
<ul style="list-style-type: none">Describe the movement of the Earth, and other planets, relative to the Sun in the solar system.Describe the movement of the Moon relative to the EarthDescribe the Sun, Earth and Moo as approximately spherical bodies.Describe the idea of the Earth’s rotation to explain day and night and the apparent movement of the sun across the sky.		<ul style="list-style-type: none">Stars, planets and moons have so much mass they attract other things, including each other due to a force called gravity. Gravity works over distance.Objects with larger masses exert bigger gravitational forces. Objects like planets, moons and stars spin.Smaller mass objects like planets orbit large mass objects like stars.Stars produce vast amounts of heat and light.All other objects are lumps of rock, metal or ice and can be seen because they reflect the light of stars.		Earth, Sun, Moon, Axis, Rotation, Day, Night, Phases of the Moon, star, constellation, waxing, waning, crescent, gibbous. Mercury, Venus, Mars, Jupiter, Saturn, Uranus, Neptune, planets, solar system, day, night, rotate, orbit, axis, spherical, geocentric, heliocentric.	
				Key scientists for study	Suggested Linked Texts
				Claudius Ptolemy and Nicholas Copernicus- (Heliocentric vs Geocentric Universe)Neil Armstrong (First man on the moon)Helen Sharman (First British astronaut)Time Peake (First British ESA astronaut)	The Skies Above My Eyes (Charlotte Guillian & Yuval zommer)George’s Secret Key to the Universe (Lucy and Stephan Hawking with Christopher Galford)The Way Back Home (Oliver Jeffers)
Prior Learning		Key Question (s)		Future Learning	
In LKS2 children should: <ul style="list-style-type: none">Understand changes in weather patterns and seasons.Compare how things move on different surfaces.Notice that some forces need contact between two objects, but magnetic forces can act at a distance.Describe magnets as having two poles, predict whether two magnets will attract or repel each other, depending on which poles are facing.		<ul style="list-style-type: none">How does temperature/size/day length/year length change as you get closer/further to the sun?How does distance from a light source affect how much light hits an object?Does having more moons result in more light hitting a planet? How could you test this?How does speed/size of a meteorite affect the size of the moon crater formed?If the moon became heavier as a result of meteorite collisions what would happen to its position relative to Earth?If the mass of the Earth is 80x that of the moon, why is the gravity at the Earth’s surface only 6x greater than at the surface of the moon?Why do we have day/night/months/years/seasons?Why does day length change?Why does shadow size change over the course of a day?		In KS 3 children will learn about: <ul style="list-style-type: none">Gravity force, weight = mass x gravitational field strength(g) on Earth g=10 N/kg, different on other planets ad stars; gravity forces between Earth and Moon and between Earth and Sun (qualitative only).Our Sun as a star, other stars in our galaxy, other galaxies.The seasons and the Earth’s tilt, day length at different times of year, in different hemispheres the light year as a unit of astronomical distance.	
Some Teaching Ideas					
Comparative Tests	Identify & classify	Observation over time	Pattern Seeking	Research	Big Question: Assessment
How does the length of daylight hours change in each season?	How could you organise all the objects in the solar system into groups?	Can you observe and identify all the phrases I the cycle of the Moon?	Is there a pattern between the size of a planet and the time it takes to travel around the Sun?	What unusual objects did Jocelyn Bell Burnell discover? How do astronomers know what stars are made of? How have our ideas about the solar system changed over time?	Sun, Earth & Moon: What is moving and how do we know?

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Curriculum Skills and Progression Map – Year 5 Materials (Changes)					
National Curriculum Objectives		Sticky Knowledge		Vocabulary	
<ul style="list-style-type: none">Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency conductivity (electrical and thermal), and response to magnets.Comparative and fair tests, for the particular uses of everyday materials, including wood, metals and plastic.Demonstrate that dissolving, mixing and changes of state are reversible changes.Explain that some changes result I the formation of new materials, and this kind of change is usually not reversible, including changes associated with burning and the action of acid on bicarbonate of soda.		<ul style="list-style-type: none">All matter (including gas) has mass.Sometimes mixed substances react to make a new substance. These changes are usually irreversible.Heating can sometimes cause materials to change permanently. When this happens, a new substance is made. These changes are not reversible.Indicators that something new has been made are: The properties of the material are different (colour, state, texture, hardness, smell, temperature).If it is not possible to get the material back easily, it is likely that it is not there anymore and something new has been made (irreversible changer)..		hardness, solubility, transparency, conductivity, magnetic, filter evaporation, dissolving, mixing, material, conductor, dissolve, insoluble, suspension, chemical, physical, irreversible, solution, reversible separate, mixture, insulator, transparent, flexible, permeable, soluble property, magnetic, hard.	
				Key scientists for study	
				Suggested Linked Texts	
		Spencer Silver, Arthur Fry and Alan Amron (Post-It-Notes)		Itch (Simon Mayo)	
		Ruth Benerito (Wrinkle-Free Cotton)		Kensuke’s Kingdom (Michael Morpurgo)	
				The BFG (Roald Dahl)	
Prior Learning		Key Question (s)		Future Learning	
In LKS2 children should: <ul style="list-style-type: none">Compare and group materials together, according to whether they are solids, liquids or gases.Observe that some materials change state when heated or cooled, and measure and research the temperature at which this happens in degrees Celsius.Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.		<ul style="list-style-type: none">What are mixtures?What does dissolving mean?Which of the following dissolve in water: sugar, bicarbonate of soda, oil, chocolate, coffee, dark vinegar and wax?How does the amount of water used affect how much sugar will dissolve in it?Which sweets dissolve in water?How can we separate mixtures?How can we clean out dirty water?		In KS3 children will learn about: <ul style="list-style-type: none">the concept of a pure substance mixtures, including dissolvingDiffusion in terms of the particle modelsimple techniques for separating mixtures, filtration, evaporation, distillation and chromatography.the identification of pure substances	
Some Teaching Ideas					
Comparative Tests	Identify & classify	Observation over time	Pattern Seeking	Research	Big Question: Assessment Opportunity
Which materials rusts fastest/slowest? How can we change the ‘jellyness’ of jelly	Can you identify and classify these reactions and changes into reversible, and irreversible? Can you describe their groups similarities and differences?	How does a nail in salt water change over time?	What patterns can you notice in different reactions? How does the amount of bicarbonate of soda, washing up liquid and vinegar affect the reaction?	What are smart materials and how can they help us?	How can we change materials reversibly and irreversibly

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Year 6 – Science Learning Intentions and Skill Progression Working Scientifically

Key Vocabulary: Questions, scientific enquiry, similarities/differences, changes, increase, decrease, identify, classify, sort, group, order, observe, patterns link, secondary sources, comparative tests, fair tests, method, variable, accurate, appearance, equipment, gather, measure, record, results, evidence, present, data/evidence/results, unit, keys, bar charts, table, results, conclusions, prediction, thermometers, data loggers, microscope, classification, observations, measurements, causal relationships

<p>WS1</p> <p>c. Asking relevant questions and</p> <p>d. Using different types of scientific enquiries to answer them</p>	<p>a.</p> <ol style="list-style-type: none"> 1. Choose the best way to answer a question and use information from different sources to plan investigation. 2. Make prediction which links with other scientific knowledge. 	<p>b.</p> <ol style="list-style-type: none"> 1. Plan next few steps in an enquiry. 2. Plan observations/measurements to take. 3. Suggest most appropriate method/enquiry and measurements. 4. Planning range of scientific enquiries to answer questions, recognising and controlling variables where necessary.
<p>WS2</p> <p>a. Setting up simple practical enquiries, comparative and fair tests</p>	<p>a.</p> <ol style="list-style-type: none"> 1. Explain why the test is fair/unfair. 2. Identify the key factors when planning a fair test. 3. Vary one factor whilst keeping others the same in an experiment; explain why they do this. 3. Select an independent variable and control variable(s). 4. Plan and carry out a scientific enquiry to answer questions, including recognising and controlling variable where necessary. 	
<p>WS3</p> <p>c. Making systematic and careful observations and, where appropriate</p> <p>d. Taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers</p>	<p>a.</p> <ol style="list-style-type: none"> 1. Make detailed observations. 2. Make comparative observations. 3. Generate criteria linked to observation e.g. sort, group, classify. 4. Make predictions with reasons. 	<p>b</p> <ol style="list-style-type: none"> 4. Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate. 5. Decide which units of measurement need to be used. 6. Explain why a measurement needs to be repeated
<p>WS4</p> <p>c. Gathering, recording</p> <p>d. Classifying and presenting data in a variety of ways to help in answering questions</p>	<p>a.</p> <ol style="list-style-type: none"> 1. Identify relevant data/information to be gathered. 2. Record relevant data/information correctly e.g. list, table chart, diagram (differentiation). 3. Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations. 	<p>b</p> <ol style="list-style-type: none"> 4. Classify information (sort) 5. Justify classification using criteria. 6. Justify using scientific vocabulary.

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<p>WS5</p> <p>a. Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables</p>	<ul style="list-style-type: none"> Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. Use information to make a prediction and give reasons for it. Use test results to make further predictions and set up further comparative tests. Explain, in simple terms, a scientific idea and what evidence supports it. Draw conclusions from their work. Record more complex data and results using scientific diagrams, classification keys, tables, bar charts, line graphs and models. 		
<p>WS6</p> <p>Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions</p>	<ol style="list-style-type: none"> Explain why they have chosen specific equipment (including ICT based equipment). Decide which units of measurement they need to use. Make precise measurements. Explain why a measurement needs to be repeated. Record measurements in different ways (including bar charts, tables and line graphs) 		
<p>WS7</p> <p>d. Using results to draw simple conclusions</p> <p>e. Make predictions for new values</p> <p>f. Suggest improvements and raise further questions</p>	<p>a.</p> <ol style="list-style-type: none"> Use further evidence to answer a question using comparatives Use scientific evidence to find simple patterns and relationships Use numerical data to support findings 	<p>b.</p> <ol style="list-style-type: none"> Identify patterns and connections in data Use patterns to predict Suggest further questions Link what they have found out to other science. <p>Suggest how to improve their work and say why they think this.</p>	<p>c.</p> <ol style="list-style-type: none"> Identify negatives in an investigation (evaluate) Suggest ways to overcome the negatives in an investigation Start to justify the reliability of results
<p>WS8</p> <p>Identify differences, similarities or changes related to simple scientific ideas and processes</p>	<ol style="list-style-type: none"> Compare scientific ideas or processes. Use scientific vocabulary to explain the differences, similarities or change. Explore different ways to test an idea, choose the best way and give reasons. Vary one factor whilst keeping the others the same in an experiment. 		
<p>WS9</p> <p>Using straightforward scientific evidence to answer questions or to support their findings</p>	<ol style="list-style-type: none"> Identifying scientific evidence that has been used to support or refute ideas or arguments. Use information to help make a prediction. Explain, in simple terms, a scientific idea and what evidence supports it. Explain how they could improve their way of working. Finding things out using a wide range of secondary sources. Explain qualitative and quantitative data. 		

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Year 6 – Biology – Living Things and Their Habitats; Animals, including Humans; Evolution & Inheritance

B 1 Living things and their habitat	Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences including microorganisms, plants and animals.	<ol style="list-style-type: none"> Learn that evolutionary taxonomy is the most modern way of grouping organisms. Learn that it is a development of Linnaeus' system, but is superior because it shows how closely organisms are related to each other. Group 5 mammals (including homo sapiens) into an evolutionary diagram. Use this to explain how closely related the other 4 mammals are to modern humans. Work out the binomial (genus-species) name for each organism. 	Key Vocabulary variation organisms populations, classification characteristics environment, flowering non flowering, plants, animals, vertebrates, fish, amphibians, reptiles, mammals, invertebrate, human impact, nature, reserves, deforestation, classify, compare, bacteria, microorganism, organism, invertebrate, vertebrates, Linnaeus
	Give reasons for classifying plants and animals based on specific characteristics.	<ol style="list-style-type: none"> Learn that a dichotomous classification key has exactly two answers to each question. Use the 6 pictures of animals provided to create their own dichotomous classification key. Discuss why some classification questions are better than others. Learn that Carl Linnaeus developed a classification system which placed organisms into hierarchical groups. Learn about binomial nomenclature by sorting 20 different objects into Linnaeus' kingdoms. Discuss the elements from Linnaeus's Learn that animals can be classified as vertebrates (those that have a spinal column) and invertebrates. Learn that vertebrates have a common ancestor and comprise the fish and tetrapods. Identify 18 organisms as vertebrates or invertebrates and place them in the correct sub-group (fish, birds, mammals, amphibians, reptiles, insects, arachnids, molluscs, worms); system that we still use, those that we have abandoned, and why. Learn that arthropods are a large and diverse phylum (group), comprising insects, arachnids, crustaceans and myriapods. Learn that all arthropods have a segmented body, a hard exoskeleton, and jointed legs. Use a dichotomous classification key to identify 10 different arthropods and discuss why arthropods have certain body features in common. Learn that one way of identifying trees is by examining their leaves. Learn terms used to describe leaves, such as pinnate, palmate, simple, compound and lobed. Look at the leaves of 5 different British trees and identify them using a dichotomous key and discuss which of these trees they have seen in the local area. 	
B2 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.	<ol style="list-style-type: none"> Make a diagram of the human body and explain how different parts work and depend on one another. Name and locate the major organs in the human body. Learn that the human heart is a vital organ. Learn how blood flows through its double pumps system to the lungs and all around the body, supplying oxygen and removing waste products. 	Key Vocabulary oxygenated, deoxygenated, valve, exercise, respiration, circulation system, heart, lungs, blood vessels, blood, artery,

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		<ol style="list-style-type: none"> Create their own 8-part explanation text, showing how blood is pumped around the body; cut and paste, or write their own descriptions. Learn to measure their heart rate in beats per minute (bpm) by taking their radial pulse. Take and record their resting heart rate, then perform a vigorous exercise and measure their heart rate afterwards at an interval of 1 minute for 8 minutes. Record their results in a table and transfer them to a line graph. Interpret their results, discussing how their heart rate changed over time and why. Learn that smoking involves inhaling tobacco smoke which contains the active ingredient, nicotine. Learn about the many health issues associated with smoking, such as cancer, heart damage, lung damage, and reproductive damage. Learn about other negative effects such as the unpleasant smell, high cost, and effects on the skin. Carry out a survey, using a tally chart to find out the worst side effect of smoking and transfer their results to a bar chart and place the negative effects in order of concern. 	vein, pulmonary, alveoli, capillary, digestive, transport, gas exchange, villi, nutrients, water, oxygen, alcohol, drugs, tobacco.
	Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function.	<ol style="list-style-type: none"> Learn that our bodies are constantly using energy, and that we get all of our energy from food. Learn that we can store excess food energy in our bodies in the form of fat deposits to help us in times of starvation. Look at 6 different people profiles; calculate whether each person is eating the right amount of food, and suggest ways in which they can improve their lifestyles. Learn about the many benefits of physical exercise, and identify some aerobic exercises. Carry out a survey, identifying the most popular forms of exercise in their class or school. Record their results in a tally chart, displaying their results in a horizontal bar chart; identify the most popular forms of exercise and suggest ways to promote in school. 	
B 3 Evolution and Inheritance	Recognise that living things have changed over time and that fossils provide information about living things that inhabited the earth millions of years ago.	<ol style="list-style-type: none"> Learn about the life and work of the early palaeontologist, Mary Anning. Use what they have learned and answer questions such as 'What do your fossils tell us?' and 'Do you think you received enough recognition for you finds?' Learn what fossils are and how they are formed. Learn how palaeontologists build up a picture of the past. 	Key Vocabulary fossils, adaptation, evolution, characteristics, reproduction, genetics, variation, inherited, environmental, mutation, competition, survival of the fittest, evidence, organisms,
	Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents.	<ol style="list-style-type: none"> Introduced to the idea that characteristics are passed from parents to their offspring e.g different breeds of dogs, and what happens when, for example, Labradors are crossed with poodles. Appreciate that variation in offspring over time can make animals more or less able to survive in particular environments, e.g. giraffe necks got longer, or insulating fur on the arctic fox. 	

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	Explain the process of evolution and describe the evidence for this.	<ol style="list-style-type: none">1. Read and learn about Charles Darwin in early life, his role in the voyage of the HMS Beagle, his relationship with Alfred Russel Wallace, and how he developed and published his theory of natural selection. Use the information in the autobiography to create their own third-person information text about the life of Charles Darwin.2. Learn about the process of evolution by natural selection and that offspring inherit traits of their parents might occasionally carry a random mutation which gives them a survival advantage and that they pass on to their own offspring.3. Learn that this process can change a population over time and use what they have learned to create an explanation text.4. Cut and paste the diagrams and explanations provided, or create their own.	
	Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution	<ol style="list-style-type: none">1. Learn that over time, the process of natural selection can cause a range of beneficial traits (adaptations) to build up in a population e.g. the polar bear, barn owl and penguin, identify three useful adaptations, and explain the survival advantage that they provide.2. Learn that all organisms possess adaptations, not just animals.3. Examine 3 plants - the dandelion, cactus, and Venus fly trap - and identify 3 adaptations for each. Research another plant and describe its adaptations.	
Year 6 – Physics – Electricity, Light and Sight			
P 1 Electricity	Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells in the circuit.	<ol style="list-style-type: none">1. Learn about the appearance and function of different electrical components, including switches, bulbs, buzzers, motors, cells and wires.2. Match pictures of each component to their electrical symbols; cut and paste descriptions of how each component functions, or write their own.	Key Vocabulary electricity, neutrons, protons, neutrons, atom, electric current, appliances, mains, crocodile clips, wires, bulb, battery cell, battery holder, motor, buzzer, switch, conductor, electrical insulator, conductor.
	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.	<ol style="list-style-type: none">1. Learn that electrical cells produce a flow of electrons (current) through the reaction of 2 chemicals inside them.2. Learn that one measure of the power of a cell is voltage (V) and that connecting cells in series adds their voltages together.3. Investigate the effect of changing the number of cells in a circuit.4. Create the circuits shown in the illustrations, attempt to draw the circuit diagrams, and explain what they observed.5. Attempt to place the circuits in order of brightness and explain why.	
		<ol style="list-style-type: none">1. Look at circuit diagrams; predict how bright the bulbs will be in each circuit and place them in order of brightness.2. Use simple apparatus, construct the circuits shown in the diagrams and test their predictions.3. Explain what they observed.	
	Use recognised symbols when representing a simple circuit in a diagram.	<ol style="list-style-type: none">1. Using the illustration provided, construct own burglar alarm.2. Draw a circuit diagram for their burglar alarm and explain how it works.3. Learn about how traffic lights are central to road safety. Use simple apparatus to construct a set of traffic lights, with a single switch (which they construct themselves) turning two lights on and off in turn.	

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		4. Create a suitable casing for their traffic lights and consider how they could construct a 3-way traffic light.	
P1- Light		<ol style="list-style-type: none"> 1. Look at different defective circuit illustrations. Explain why each circuit will not work. Change each circuit so that it will work. 2. Show that electrical components can be represented by symbols in circuit diagrams. 3. Learn that wires are always shown as unbroken horizontal or vertical lines. 4. Look at different circuit illustrations and draw an accurate circuit diagram for each illustration. 5. Create the circuit using simple apparatus circuit diagram. Test their improvements with simple apparatus. 	
		<ol style="list-style-type: none"> 1. Use a ruler to draw the shape of a shadow cast by an object on a simple plan diagram. 2. Predict and then measure the width of each shadow, and try to find what kind of set-up produces the widest shadows. 	
	Recognise that light travels in straight lines.	<ol style="list-style-type: none"> 1. Learn that light rays travel in straight lines, and that mirrors can make light reflect (predict) at precise angles, depending on their own position and angle. Look at simple light rays travel diagrams. 2. Predict, and then calculate (using a ruler and protractor) the best position for a mirror, so that the viewer (a car driver) can see an object (a motorcycle headlamp). 3. Look for patterns between different distances and angles in their diagrams. 4. Learn that a periscope is a device made from 2 angled mirrors that enables the user to see around obstacles. 5. Construct their own simple periscope and explain how it works 	
	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.	<ol style="list-style-type: none"> 1. Learn about the main parts of the human eye, including the cornea, iris, pupil, lens, retina and optic nerve. 2. Use this information to create and label their own diagram of a human eye, cutting and pasting the descriptions provided or writing their own. 	
P 2 - Sight	Use the idea that light travels in straight lines and explain why shadows have the same shape as the objects cast.	<ol style="list-style-type: none"> 1. Learn that light travels in straight lines and can be made to follow a path by placing mirrors in its path. 2. Use a simple grid and position mirrors at 45° angles to make light travel through a maze. Solve increasingly difficult problems, using a blank sheet to create their own. 3. Learn that shadows have the same shape as the objects that cast them because they create light which travels in a straight line into our eyes. 	Key Vocabulary light source, dark, reflect. Ray, mirror, visible, beam, sun, glare, travel., straight, opaque, shadow, block, transparent, translucent, absorb, emitted, scattered, refraction, colour, eye, retina, cornea, pupil retina, lens, optic nerve, travel,

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	Investigate the relationship between light sources, objects and shadows by using shadow puppets.	<ol style="list-style-type: none"> 1. Learn that we can see non-light sources because light from light sources reflects (bounces) off them into our eyes. 2. Use a selection of images to build their own diagram showing how we see light sources and non-light sources. 3. Learn that white light is a combination of different colours, and that these colours exist on the visible light spectrum. 4. Learn how white light can be split up into its component colours. Create a spinner, which they spin using either a string or a pencil, to demonstrate that when colours combined it turns into white light. 5. Use a prism and a light source to create a rainbow effect and discuss how it is cause. 6. Learn that shadows are formed when light is blocked by an opaque object, creating a pattern of light on a surface. 7. Investigate what happens to its shadow when an object is moved towards a light source. 8. Predict and then measure the width of an objects shadow at different distances from the light source. 9. Record their information in a table and use it to create a line graph. 10. Explain the relationship between distance and shadow width. 	
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Curriculum Skills and Progression Map – Year 6 – Living Things & their Habitats							
National Curriculum Objectives		Sticky Knowledge		Vocabulary			
<ul style="list-style-type: none">Classify living things into broad according to observable characteristics and based on similarities and differences.Give reasons for classifying plants and animals based on specific characteristics.		<ul style="list-style-type: none">Variation exists within a population (and between offspring of some plants.Organisations best suited to their environment are more likely to survive long enough to reproduce.Organisms are best adapted to reproduce are more likely to do so.Organisms reproduce and offspring have similar characteristic patterns.Competition exists for resource and mates.		variation organisms populations, classification characteristics environment, flowering non flowering, plants, animals, vertebrates, fish, amphibians, reptiles, mammals, invertebrate, human impact, nature, reserves, deforestation, classify, compare, bacteria, microorganism, organism, invertebrate, vertebrates, Linnaeus			
				Key scientists for study		Suggested Linked Texts	
				Carl Linnaeus (Identifying, Naming and Classifying Organisms)		Beetle Boy (M G Leonard) Insect Soup (Barry Louis Polisar) Fur and Feathers (Janet Halfmann)	
Prior Learning		Key Question (s)		Future Learning			
In LKS 2 children should: <ul style="list-style-type: none">Recognise that living things can be grouped in a variety of ways.Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment.Recognise that environments can change and that this can sometimes pose danger to living things.		Why do we need to classify living things? How do we classify? What are the difficulties with classification? (penguins, whales, platypus) How do animals change over time? Why does variation exist? What happens if animals of different species breed? (hybrids) What happens to house plants outside? What are microorganisms? How can we prevent the spread of disease? Why do animals and plants compete – and what for?		In Key Stage 3 children will learn about: <ul style="list-style-type: none">the independence of almost sll life on Earth on thr ability of photosynthetic organisms, such as plants and algae, to use sunlight in photosynthesis to build organic molecules that are an essential energy store and to maintain levels of oxygen and carbon dioxide in the atmosphere.The adaptation of leaves for photosynthesisthe independence of organisms in an ecosystem, including food webs and insect pollinated crops.the importance of plant reproduction through insect pollination in human food security.how organisms affect, and are affected by, their environment, including accumulation of toxic materials.			
Some Teaching Ideas							
Comparative Tests	Identify & classify	Observation over time	Pattern Seeking	Research	Big Question: Assessment Opportunity		
How does the temperature affect how much gas is produced by yeast? Which is the most common invertebrates in the park?	How would you make a classification key for vertebrate/invertebrates or microorganisms?	What happens to a piece of bread if you leave it on the windowsill for two weeks?	Do all flowers have the same number of petals?	What do different types of microorganisms do? Are they always harmful?	In what ways can we sort living things?		

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Curriculum Skills and Progression Map – Year 6 Animals, Including Humans

National Curriculum Objectives	Sticky Knowledge	Vocabulary			
<ul style="list-style-type: none">Identify and name the main parts o the human circulatory system and de the functions of the heart, blood vessels and blood.Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function.Describe the ways in which nutrients and water are transported within animals, including humans.	<ul style="list-style-type: none">The heart pumps blood around the body.Oxygen is breathed into the lungs where it is absorbed by the blood.Muscles need oxygen to release energy from food to do work. (Oxygen is taken into the blood in the lungs; the heart pumps the blood through blood vessels to the muscles; the muscles take oxygen and nutrients from the blood).	oxygenated, deoxygenated, valve, exercise, respiration, circulation system, heart, lungs, blood vessels, blood, artery, vein, pulmonary, alveoli, capillary, digestive, transport, gas exchange, villi, nutrients, water, oxygen, alcohol, drugs, tobacco.			
		Key scientists for study		Suggested Linked Texts	
		Justus von Liebig (Theories of Nutrition and Metabolism) Sir Richard Doll (Linking Smoking and Health Problems) Leonardo Da Vinci (Anatomy)		Pig-Heart Boy (Malorie Blackman) Skellig (David Almond) A Heart Pumping Adventure (Heather Manley)	
Prior Learning	Key Question (s)	Future Learning			
<p>In LKS2 children should:</p> <ul style="list-style-type: none">Describe the changes as humans develop to old age.Know the life cycle of different living things e.g. mammal, amphibian, insect bird.Know the differences between different life cycles.Know the process of reproduction in plants.Know the process of reproduction in animals.	<ul style="list-style-type: none">Why do we need oxygen?How do we breathe?Do fish and plants breathe?Do all living things need oxygen?How does the size of a person’s lungs affect their lung capacity?Are there ways to increase/decrease out lung capacity? Is lung capacity fixed?Why do we have food blood?How does our heart work?How does size of muscle affect our pulse rate?How does exercise effect our pulse rate?How might the circulatory system of an elephant, a hummingbird, or a polar bear differ?Is the air you breathe out, the same as that you breathe in?	<p>In Key Stage 3 children will learn about:</p> <ul style="list-style-type: none">The hierarchical organisation of multicellular organisms: from cells to tissues to organs to system to organisms.The tissues and organs of the human digestive system, including adaptations to function and how the digestive system digest food (enzymes simply as biological catalysts).Calculations of energy requirements in a healthy daily diet.The consequences of imbalances in the diet, including obesity, starvation and deficiency diseases.the structure and functions f the gas exchange system in system in humans, including adaptations to function.the effects of recreational drugs (including substance misuse) on behaviour, health and life processes.			
Some Teaching Ideas					
Comparative Tests	Identify & classify	Observation over time	Pattern Seeking	Research	Big Question: Assessment Opportunity
<p>How does the length of time we exercise for affect our heart rate?</p> <p>Can exercise regularly affect your lung capacity?</p> <p>Which type of exercise has the greatest effect on our heart rate?</p>	<p>Which organs of the body make-up the circulation system, and where are they found?</p>	<p>How does my heart rate change over the day?</p> <p>How much exercise do I do in a week?</p>	<p>Is there a pattern between what we eat for breakfast and how fast we can run?</p>	<p>How have our ideas about disease and medicine changed over time?</p>	<p>How do our choices affect how our bodies work? Why does my heart beat?</p>

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Curriculum Skills and Progression Map – Year 6 Electricity					
National Curriculum Objectives	Sticky Knowledge		Vocabulary		
<ul style="list-style-type: none">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/off position of switches.Use recognised symbols when representing a simple circuit in a diagram.	<ul style="list-style-type: none">Batteries are a store of energy. This energy pushes electricity round the circuit. When the battery’s energy is gone it stops pushing. Voltage measures the ‘push’.The greater the current flowing through a device the harder it works.Current is how much electricity flowing round a circuit.When current flows through wires heat is released. The greater the current , the more heat is released.		electricity, neutrons, protons, neutrons, atom, electric current, appliances, mains, crocodile clips, wires, bulb, battery cell, battery holder, motor, buzzer, switch, conductor, electrical insulator, conductor.		
			Key scientists for study	Suggested Linked Texts	
			Alessandro Volta (Electrical Battery) Nicola Tesla (Alternating Currents)	Good night Mister Tom (Michelle Magorian) Blackout (John Rocco) Hitler’s Canary (Sandi Toksvig)	
Prior Learning	Key Question (s)		Future Learning		
<p>In LKS 1 children should:</p> <ul style="list-style-type: none">Identify common appliances that run on electricity.Construct a simple series of 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 part of a complete loop with a battery.Recognise that a switch opens and closes the 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.Know the difference between a conductor and an insulator; giving examples of each.Safety when using electricity.	<ul style="list-style-type: none">Do all batteries push as hard as each other?What is electricity?How does the voltage of a battery affect how much current is pushed?How does the length of time I leave the current flowing for affect the brightness of the bulb?How does number of bulbs affect the brightness of a bulb?Are all types of wires as good as conducting electricity?Why are wires insulated in plastic?Does type of material make a difference?Does length of wire make a difference?Does the type of circuit affect how the components work/long the battery lasts?What renewable ways can we generate electricity?How does current affect heat?What are the dangers of a short circuit?		<p>In Key Stage 3 children will learn:</p> <p>Electric current, measured in amperes, in circuits, series and parallel circuits, currents add where branches meet and current as flow of charge.</p> <p>Potential difference, measured in volts, battery and bulb ratings; resistance, measured in ohms, as the ratio of potential difference (p.d.) to current.</p> <p>Differences in resistance between conducting and insulating components (quantitative).</p> <p>Separation of positive or negative charges when objects are rubbed together: transfer of electrons, forces between charged objects.</p>		
Some Teaching Ideas					
Comparative Tests	Identify & classify	Observation over time	Pattern Seeking	Research	Big Question: Assessment Opportunity
<p>How does the voltage of the batteries in a circuit affect the brightness of the lamp?</p> <p>How does the voltage of the batteries in a circuit affect the volume of the buzzer?</p> <p>Which make of battery lasts the longest?</p> <p>Which type of fruit makes the best fruit battery</p>	<p>How would you group electrical components and appliances based on what electricity makes them do?</p>	<p>How does brightness of bulb change as the battery runs out?</p> <p>How can we measure how quickly a battery is used up?</p>	<p>Does the temperature of a light bulb go up the longer it is on?</p>	<p>How has our understanding of electricity changed over time?</p>	<p>Can we vary the effects of electricity?</p>

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Curriculum Skills and Progression Map – Year 6 – Light and Sight					
National Curriculum Objectives	Sticky Knowledge		Vocabulary		
<ul style="list-style-type: none">• Recognise 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 eye.• 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.• Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.• Know how simple optical instruments work, e.g. periscope, telescope, binoculars, mirror, magnifying glass, etc.	<ul style="list-style-type: none">• Animals see light sources when light travels from the source into their eyes.• Animals see objects when light is reflected off that object and enters their eyes.• Light reflects off all objects (unless they are black). Non shiny surfaces scatter the light so we don't see the beam.• Light travels in straight lines.		light source, dark, reflect. Ray, mirror, visible, beam, sun, glare, travel., straight, opaque, shadow, block, transparent, translucent, absorb, emitted, scattered, refraction, colour, eye, retina, cornea, pupil, lens, optic nerve, travel,		
			Key scientists for study		Suggested Linked Texts
			Thomas Young (Wave Theory of Light) Ibn al-Haytham (Alhazen) – (Light and our Eyes) Percy Shaw (The Cat's Eye)		Letters from the Lighthouse (Emma Carroll) The Gruffalo's Child (Julia Donaldson) The King Who Banned the Dark (Emily Howorth-Booth)
<p>Prior Learning</p> <p>In LKS2 children will:</p> <ul style="list-style-type: none">• Recognise that they need light in order to see things and that darkness 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 a way that the sizes of shadows change.	<p>Key Question (s)</p> <p>How does the size of an object affect the size of a shadow?</p> <p>How does the distance between the light and the object change the size of a shadow?</p> <p>How does the distance between the object and the size of the screen affect the size of a shadow?</p> <p>How would a solar eclipse be different if:</p> <ul style="list-style-type: none">• the moon was a different size?• The earth spun faster or slower?• The sun was larger or smaller?• If the earth and moon were the same size but further away in the solar system? <p>How does the amount of aluminium foil scrunch affect how much light is scattered?</p> <p>How does the amount of polishing affect how well a piece of metal scatters light?</p> <p>How perfect are our mirrors? Do some scatter light more than others?</p> <p>What happens to light when it is shone through water? How is this affected by putting glitter, salt or talc in the water?</p> <p>How does a periscope/microscope/telescope work?</p> <p>from the patterns of ripples they make in the water?</p>		<p>Future Learning</p> <p>In Key Stage 3 children will learn about:</p> <p>The similarities and differences between light waves and waves in matter.</p> <p>Light waves travelling through a vacuum; speed of light.</p> <p>The transmission of light through materials: absorption, diffuse scattering and specular reflection at a surface</p> <p>Science.</p> <p>Use of ray model to explain imaging in mirrors, the pinhole camera, the refraction of light and action of convex lens in focusing (qualitative); the human eye.</p> <p>Light transferring energy from source to absorber leading to chemical and electrical effects; photo-sensitive material in the retina and in cameras.</p> <p>Colours and the different frequencies of light =, white light and prisms (qualitative only); differential colour effects in absorption and diffuse reflection.</p>		
Some Teaching Ideas					
Comparative Tests	Identify & classify	Observation over time	Pattern Seeking	Research	Big Questions
How does the angle that a light ray hits a plane mirror affect the angle at which it reflects off the surface? Which material is most reflective?	Can you identify all the colours of light that make white light when mixed together? What colours do you get if you mix different colours of light together?	Does the temperature of a light bulb go up the longer it is on? How does my shadow change over the day?	Is there a pattern to how bright it is in school over the day? And if, there is a pattern, is it the same in every classroom?	Why do some people need to wear glasses to see clearly? How do our eyes adapt to different conditions?	Why does my shadow change length over the course of a day?



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