



**SUBJECT:** Science (V4)

In Science, using the Plymouth Science Scheme as a reference point, we will inspire our children by giving them the practical opportunities to pursue their natural curiosity, providing hands-on learning and engaging activities for children to learn and staff to teach. We will ensure a progression of knowledge and understanding of the world around them looking at the 'Big Concepts'. Our children will be encouraged to ask questions, experiment, reflect, make and learn from mistakes whilst in a safe environment. We aim that they will acquire and apply the working scientific skills, which equip them for an ever-changing world. We believe that these opportunities will set our children on the path to be life-long learners who will explore the world around them.

- The 'Big Concepts' marry with the National curriculum Programme of studies which stretch across the Key stages allowing for consolidation and progression of knowledge. In being taught these 'Big Concepts' children will be using a range of **Scientific Enquiry (SE)** approaches.

Scientific Enquiry types (SE)

- Plants
- Animals, Including Humans
- Materials & Properties Of Change
- Seasonal Changes, Earth & Space
- Living Things & Their Habitats
- Rocks
- Light, Sound & Electricity
- Forces & Magnets
- State Of Matter
- Evolution & Inheritance

#### Comparative / fair testing

Changing one variable to see its effect on another, whilst keeping all others the same.



#### Research

Using secondary sources of information to answer scientific questions.



#### Observation over time

Observing changes that occur over a period of time ranging from minutes to months.



#### Pattern-seeking

Identifying patterns and looking for relationships in enquiries where variables are difficult to control.



#### Identifying, grouping and classifying

Making observations to name, sort and organise items.



#### Problem-solving

Applying prior scientific knowledge to find answers to problems.



Working Scientifically Skills

- The **Working Scientifically skills (WS)** that enable the understanding of the nature, processes and methods of science for each year group are outlined below. These skills are interwoven within teaching the 'Big Concepts' and are not taught as stand alone strands.

**Asking questions**

Asking questions that can be answered using a scientific enquiry.

**Making predictions**

Using prior knowledge to suggest what will happen in an enquiry.

**Setting up tests**

Deciding on the method and equipment to use to carry out an enquiry.

**Observing and measuring**

Using senses and measuring equipment to make observations about the enquiry.

**Recording data**

Using tables, drawings and other means to note observations and measurements.

**Interpreting and communicating results**

Using information from the data to say what you found out.

**Evaluating**

Reflecting on the success of the enquiry approach and identifying further questions for enquiry.



Nursery	
Working Scientifically	Knowledge
<ul style="list-style-type: none"> <li>• Can comment and ask questions about aspects of their familiar world e.g. the place where they live or the natural world.</li> <li>• Can talk about some of the things they have observed e.g. plants, animals, natural and found objects.</li> <li>• Can talk about why things happen and how things work.</li> <li>• Shows care and concern for living things and the environment. E.g. plant a broad bean, raise a butterfly.</li> </ul>	<ul style="list-style-type: none"> <li>• Use all senses to explore natural materials, with similar and / or different properties and to talk about wide they see using a wide vocabulary - eg. conker, acorns, pine cones, chestnut.</li> <li>• Begin to develop an understanding of the four seasons. - opportunities to discuss &amp; observe at the appropriate time of year.</li> <li>• To be able to explore how things work - wind up toys, gears, magnets</li> <li>• To know what a plant needs to grow, (bean or sunflower) and to show care for living things.</li> <li>• Understand key features of animal / plant life cycles.- butterflies / frogs / bean or sunflower.</li> <li>• To be able to talk about different forces they can feel - water, elastic, magnets</li> <li>• To be able to comment on the differences between materials &amp; changes of the properties of an object e.g paint, ice and food.</li> </ul>

Reception	
Working Scientifically	Knowledge
<ul style="list-style-type: none"> <li>• Can comment and ask questions about aspects of their familiar world e.g. the place where they live or the natural world.</li> <li>• Can talk about some of the things they have observed e.g. plants, animals, natural and found objects.</li> <li>• Can talk about why things happen and how things work.</li> <li>• Shows care and concern for living things and the environment.</li> <li>• Can look closely at similarities, differences, patterns and change in the natural world around them.</li> <li>• Can talk about how animals behave as the seasons change.</li> <li>• Can draw pictures of plants and animals.</li> </ul>	<ul style="list-style-type: none"> <li>• To be able to name some objects found in the natural world e.g. conker, acorns, pine cone, chestnut.</li> <li>• To be able to name the four seasons and the connected weather.</li> <li>• To know what a plant needs to grow and to be able to name some plants.</li> <li>• To be able to name and describe some common bugs.</li> <li>• To be able to catagorise farm and wild animals and pets.</li> <li>• To be able to observe and interact with natural processes e.g. ice melting, sound causing vibration, light travelling through transparent material, object casting a shadow, magnet attracting an object, a boat floating on water.</li> </ul>

## Year 1

### Working Scientifically:

- Ask simple questions and recognise that they can be answered in different ways
- Observe closely, using simple equipment
- Perform simple tests
- Identify and classify
- Using their observations and ideas to suggest answers to questions
- Gather and record data to help in answering questions

### Vocabulary:

- question, observe, answer, observing, equipment, identify, sort, group, record (diagram - chart), compare, contrast, describe

## Animals including humans ([link to medium term planning](#))

### Working Scientifically

	Carry out tests to compare and classify
	Ask questions
	Make comparisons and give reasons
	Venn diagrams
	Make predictions using senses.
	Observe features of human body

### Knowledge



















#### Animals including humans ([Knowledge organiser](#))

- Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. (goldfish, shark, frog, newt, snake, tortoise, chicken, budgie, dog, cat, whale)
- Identify and name a variety of common animals that are carnivores, herbivores and omnivores. (dog, cat, human, rabbit, guinea pig, rats)
- Describe and compare the structure of a variety of common animals (fish - gills vs lungs, amphibians, reptiles, birds and mammals, including pets)
- Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense

**Vocabulary:** head, teeth, fin, paws, body, leg, scales, hooves, eyes, tail, feathers, ears, wing, fur, mouth, claw, beak,






common animals, fish, amphibians, reptiles, birds, mammals, pets, carnivores, meat, cat, dog, lion, tiger, fox, shark, killer whale, eagle, hawk, snake, tyrannosaurus rex, herbivores, plants, cow, hamster, tortoise, triceratops, omnivores, meat and plants, badger, human, bear, chickens, head, neck, arms, elbows, legs, knees, face, ears, eyes, hair, mouth, teeth

## Materials ([link to medium term planning](#))

Working Scientifically		Knowledge												
<table><tr><td></td><td>Simple test</td></tr><tr><td></td><td>Ask and answer questions</td></tr><tr><td></td><td>Record in a table</td></tr><tr><td></td><td>Make predictions on best materials.</td></tr><tr><td></td><td>Use observations to classify</td></tr><tr><td></td><td>Evaluate test</td></tr></table>			Simple test		Ask and answer questions		Record in a table		Make predictions on best materials.		Use observations to classify		Evaluate test	<p><b>Everyday materials:</b> (<a href="#">Knowledge organiser</a>)</p> <ul style="list-style-type: none"><li>• Understand the difference between an object and the material from which it is made</li><li>• Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock</li><li>• Understand the simple physical properties of a variety of everyday materials</li><li>• Compare and group together a variety of everyday materials on the basis of their simple physical properties</li></ul> <p><b>Vocabulary:</b> object, metal, fabric, wool, stiff, rough, material, water, elastic, clay, bendy, smooth, wood, rock, foil, hard, floppy, shiny, plastic, brick, cardboard, soft, waterproof, dull, glass, paper, rubber, stretchy, absorbent, see through</p> <p><del>material, wood, plastic, glass, metal, water, rock, properties, hard, soft, stretchy, stiff, shiny, dull, rough, smooth, bendy, rigid, waterproof, absorbent, brick, paper, fabrics, plastic, foil</del></p> <p><b>SPA visit</b></p>
	Simple test													
	Ask and answer questions													
	Record in a table													
	Make predictions on best materials.													
	Use observations to classify													
	Evaluate test													

## Plants ([link to medium term planning](#))

Working Scientifically	Knowledge
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	Ask yes and no questions to classify.
	I can explain how a seed grows.
	Draw and label a plant Label parts of a plant.
	Make simple predictions.
	Make careful observations.

### Plants [\(Knowledge organiser\)](#)

To identify and describe the basic structure of a variety of common flowering plants including trees.  
To identify and name a variety of common wild and garden plants including deciduous and evergreen trees







1. Read tiny seed -Identify fruits and where they grow -Zoom in activity. -Observation of fruits and veg -Growing potatoes.	2- Read Jack and the beanstalk -Order how seeds grow. -What do plants need to grow? -Plant diary	3- Plant hunt in the local environment. -Identify parts of a plant.
4-Plant bingo -Plant dissection -Plant modelling	5- Read Leaf Man -Leaf walk -ID leaves using ID sheet and group leaves.	6- Odd one out -Why do leaves fall off trees test. -Deciduous vs evergreen.

**Vocabulary:** leaf, berry, branch, flower, root, stem, blossom, seed, bark, bud, stalk, fruit, petal, trunk

~~common, wild plants, garden plants, deciduous, evergreen, tree, trunk, branches, leaf, root, plant, leaves, bud, flowers, blossom, petals, stem, fruit, vegetables, bulb, seed~~

GROW A PLANT FROM A SEED



Seasonal Changes ( <a href="#">link to medium term planning</a> )	
Working Scientifically	Knowledge

	Ask simple questions	<b>Seasonal Changes (<u>Knowledge organiser</u>)</b> <ul style="list-style-type: none"> <li>Observe and understand the changes across the four seasons (At least one lesson per term )</li> <li>Observe and describe weather associated with the seasons and how day length varies. (At least one lesson per term)</li> </ul> <p><b>Vocabulary:</b> weather, seasons, sun, monsoon, sunny, Winter, sunrise, hot / cold, rainy, Summer, sunset, thunderstorm, windy, Spring, day, warm, snowy, Autumn, length, freezing</p> <p><del>season, summer, winter, autumn, spring, day, daytime, weather, wind, rain, snow, hail, sleet, fog, sun, hot, warm, cold</del></p>
	Can explain what winter feels like	
	Labelled diagrams	
	Predict colours in a leaf.	
	Observe similarities and differences.	
	Evaluate test and suggest improvement	

Year 2	
<p><b>Working Scientifically:</b></p> <ul style="list-style-type: none"> <li>Ask simple questions and recognise that they can be answered in different ways</li> <li>Observe closely, using simple equipment</li> <li>Perform simple comparative tests</li> <li>Identify and classify</li> <li>Use observations and ideas to suggest answers to questions</li> <li>Gather and record data to help in answering questions</li> </ul> <p><b>Vocabulary:</b> question, observe, answer, observing, equipment, identify, classify, sort, pattern, group, record (diagram - chart), map, data, compare, contrast, describe, biology, chemistry, physics</p>	
















## Living things and their habitats [\(link to medium term planning\)](#)

Working Scientifically		Knowledge
	Draw basic conclusions Interpret results	<b>Living things and their habitats: (<a href="#">Knowledge organiser</a>)</b> <ul style="list-style-type: none"> <li>Understand the differences between things that are living, dead, and things that have never been alive</li> <li>Understand the term habitat</li> <li>Understand that most living things live in habitats to which they are suited and</li> <li>Understand how different habitats provide for the basic needs of different animals and plants, and how they depend on each other</li> <li>Identify and name a variety of plants and animals in their habitats, including micro-habitats</li> <li>Understand how animals obtain their food from plants and other animals, using the idea of a simple food chain</li> <li>Identify and name different sources of food</li> </ul> <p><b>Vocabulary:</b> living, basic needs, feed, rainforest, dead, food, pond, desert, never been alive, food chain, woodland, Savannah, suited, shelter, biome, Tundra, suitable, move, Grassland, adapted</p> <p><del>living, dead, never alive, habitats, micro-organisms, food, food chain, sun, grass, cow, human, alive, healthy, logs, leaf, litter, shelter, seashore, woodland, ocean, rainforest, conditions, hot, warm, cold, dry, damp, wet, bright, shade, dark</del></p>
	Communicate findings	
	Record observations Use tables and pictograms	
	Ask questions	



















## Animals Including Humans [\(link to medium term planning\)](#)

Working Scientifically	Knowledge
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	Ask simple questions Answer questions using scientific knowledge	<b>Animals, including humans: (<a href="#">Knowledge organiser</a>)</b> <ul style="list-style-type: none"> <li>Understand that animals, including humans, have offspring which grow into adults</li> <li>Understand the basic needs of animals, including humans, for survival (water, food and air)</li> <li>Understand the importance for humans of exercise, eating the right amounts of different types of food, and hygiene</li> </ul> <b>Vocabulary:</b> offspring, old, germs, minerals, reproduction, exercise, disease, fats, growth, heartbeat, protein, dairy, child, breathing, carbohydrates, pulse, young, hygiene, vitamins, balanced diet  <del>offspring, grow, adults, nutrition, reproduce, survival, water, food, air, exercise, hygiene, egg, chick, chicken, egg, caterpillar, pupa, butterfly, spawn, tadpole, frog, lamb, sheep, baby, toddler, child, teenager, adult</del>
	Communicate findings Communicate findings about animals Communicate using models	
	Sort food into groups and record Use art to represent food groups	
	Make simple predictions	
	Identify animals and offspring	
	Evaluate test	
	Plan and carry out test	

Plants ( <a href="#">link to medium term planning</a> )		
Working Scientifically		Knowledge
	Carry out simple tests	<b>Plants: (<a href="#">Knowledge organiser</a>)</b> <ul style="list-style-type: none"> <li>Observe and describe how seeds and bulbs grow into mature plants</li> <li>Understand how plants need water, light and a suitable temperature to grow and stay healthy</li> </ul> <b>Vocabulary:</b> leaf, berry, branch, shade, grow, flower, root, stem, sun, healthy, blossom, seed, bark, warm, germinate, bud, stalk, fruit, cool, climate, petal, trunk, light, water, temperature  <del>water, light, suitable temperature, grow, healthy, germination, reproduction</del>  GROW A PLANT FROM A BULB
	Ask questions to investigate	
	Communicate clearly how plants grow	
	Label parts of a flower Use Venn diagram to sort and classify Record results / accurate measurements	
	Make observations on how a plant grows Identify plants using observations Observe plants in different climates	
	Evaluate learning	

## Materials ([link to medium term planning](#))

Working Scientifically		Knowledge												
<table><tr><td></td><td>Carry out simple and comparative tests</td></tr><tr><td></td><td>Draw basic conclusions</td></tr><tr><td></td><td>Labelled diagrams</td></tr><tr><td></td><td>Predicting best material</td></tr><tr><td></td><td>Identify and classify materials</td></tr><tr><td></td><td>Evaluate findings of tests</td></tr></table>			Carry out simple and comparative tests		Draw basic conclusions		Labelled diagrams		Predicting best material		Identify and classify materials		Evaluate findings of tests	<p><b>Use of everyday materials:</b> (<a href="#">Knowledge organiser</a>)</p> <ul style="list-style-type: none"><li>Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses</li><li>Understand how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching</li></ul> <p><b>Vocabulary:</b> opaque, flexible, squash, transparent, rigid, bend, translucent, push, stretch, reflective, pull, non reflective, twist</p> <p><del>wood, metal, plastic, glass, brick, rock, paper, cardboard, squashing, bending, twisting, stretching, metal, coins, cans, cars, table legs, wood, matches, floors, telegraph poles, spoons,</del></p>
	Carry out simple and comparative tests													
	Draw basic conclusions													
	Labelled diagrams													
	Predicting best material													
	Identify and classify materials													
	Evaluate findings of tests													

## Year 3



















### Working Scientifically:

- asking relevant questions and using different types of scientific enquiries to answer them
- setting up simple practical enquiries, and fair tests
- making systematic and careful observations
- taking accurate measurements using standard units using thermometers
- gathering, recording, classifying and presenting data in a variety of ways to help in answering questions
- recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables
- reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions
- using results to draw simple conclusions, make predictions, suggest improvements and raise further questions
- identifying differences, similarities or changes related to simple scientific ideas and processes
- using straightforward scientific evidence to answer questions or to support their findings.

### Vocabulary:







comparative / fair test, systematic, careful, accuracy, observation, accurate measurement, variables, equipment (thermometers, data logger), data (gather, record) classify, present, record (drawings, labelled diagrams, keys, bar charts, tables, prediction, method, results, conclusion, interpret

**Plants** ([link to medium term planning](#))

Working Scientifically		Knowledge												
<table><tr><td></td><td>I can plan a comparative test.</td></tr><tr><td></td><td>I can interpret my findings using scientific knowledge.</td></tr><tr><td></td><td>I can record my findings using labelled scientific diagrams.</td></tr><tr><td></td><td>I can explain in detail what pollination is.</td></tr><tr><td></td><td>I can look carefully at seeds.</td></tr><tr><td></td><td>I can evaluate my seed spinner.</td></tr></table>			I can plan a comparative test.		I can interpret my findings using scientific knowledge.		I can record my findings using labelled scientific diagrams.		I can explain in detail what pollination is.		I can look carefully at seeds.		I can evaluate my seed spinner.	<p><b>Plants</b> (<a href="#">Knowledge organiser</a>)</p> <ul style="list-style-type: none"><li>Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers</li><li>Understand 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</li><li>Investigate the way in which water is transported within plants</li><li>Understand the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal</li></ul> <p><b>GROW A PLANT FROM A CUTTING</b></p> <p>(EXPECTED THAT CHILDREN WILL HAVE GROWN THEIR OWN PLANT BY END OF Y3)</p> <p><b>Vocabulary:</b> photosynthesis, wind dispersal, stem / trunk, pollen, animal, dispersal, absorb, pollination, water dispersal, reproduce, seed formation, nutrients, stamens, seed dispersal, fertiliser, style, structure, flowering plants,, soil, roots, stem, trunk, leaves, flowers, function, nutrition, support, reproduction, air, light, water, nutrients, fertiliser, life cycle, flowers, pollination, seed formation, seed dispersal</p>
	I can plan a comparative test.													
	I can interpret my findings using scientific knowledge.													
	I can record my findings using labelled scientific diagrams.													
	I can explain in detail what pollination is.													
	I can look carefully at seeds.													
	I can evaluate my seed spinner.													

**Animals Including Humans** ([link to medium term planning](#))

Working Scientifically	Knowledge
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	I can answer questions about the uses of our bones.
	I can use scientific language to discuss ideas.
	I can record my results in a bar chart. I can record my results in a table. Record using labelled drawings and scientific language. Locate and label the bones in the body
	I can make predictions from questions raised.
	I can make careful observations to sort animals into groups.
	I can evaluate my learning using scientific language. I can evaluate my design and suggest improvements.

**Animals Including Humans ([Knowledge organiser](#))**



















- Understand 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
- Understand that humans and some other animals have skeletons and muscles for support, protection and movement

**Vocabulary:** nutrition, nutrients, carbohydrates, sugar, protein, vitamin, vitamins, minerals, fibre, fat, water, skeleton, bones, muscles, support, protect, move, skull, ribs, spine, joints

~~nutrition, vitamins, minerals, fat, protein, , fibre, water, skeletons, support, protection, skull, brain, ribs, heart, lungs, movement, joint, muscles, movement, pull, contract, relax, diet~~








Rocks ( <a href="#">link to medium term planning</a> )											
Working Scientifically	Knowledge										
<table> <tr> <td data-bbox="110 1199 228 1291">  </td><td data-bbox="228 1199 794 1291">I can set up tests to answer questions.</td></tr> <tr> <td data-bbox="110 1291 228 1383">  </td><td data-bbox="228 1291 794 1383">Ask questions to deepen my learning about rock formation.</td></tr> <tr> <td data-bbox="110 1383 228 1476">  </td><td data-bbox="228 1383 794 1476">Interpret the process of fossilisation using models and pictures.</td></tr> <tr> <td data-bbox="110 1476 228 1648">  </td><td data-bbox="228 1476 794 1648">Record classifications in a table, Venn or Carroll diagram.  I can record my results in a table</td></tr> <tr> <td data-bbox="110 1648 228 1749">  </td><td data-bbox="228 1648 794 1749">Make careful observations and identify similarities and differences.</td></tr> </table>		I can set up tests to answer questions.		Ask questions to deepen my learning about rock formation.		Interpret the process of fossilisation using models and pictures.		Record classifications in a table, Venn or Carroll diagram.  I can record my results in a table		Make careful observations and identify similarities and differences.	<p><b>Rocks (<a href="#">Knowledge organiser</a>)</b></p> <ul style="list-style-type: none"> <li>Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties</li> <li>Understand how fossils are formed when things that have lived are trapped within rock</li> <li>Understand that soils are made from rocks and organic matter.</li> </ul> <p><b>Vocabulary:</b> rock, stone, pebble, boulder, grain, crystal, layers, hard, soft, texture, absorb, water, soil, fossil, marble, chalk, granite, sandstone, slate, peat, sandy, chalky, clay</p> <p><del>appearance, physical properties, hard, soft, shiny, dull, rough, smooth, absorbent, fossil, sedimentary rock, soil, rock, organic matter, buildings, grains, crystals</del></p>
	I can set up tests to answer questions.										
	Ask questions to deepen my learning about rock formation.										
	Interpret the process of fossilisation using models and pictures.										
	Record classifications in a table, Venn or Carroll diagram.  I can record my results in a table										
	Make careful observations and identify similarities and differences.										

## Forces and Magnets ([link to medium term planning](#))

Working Scientifically		Knowledge												
<table><tr><td></td><td>I can plan a fair test</td></tr><tr><td></td><td>I can use models to explain findings.</td></tr><tr><td></td><td>I can record my findings using scientific drawings</td></tr><tr><td></td><td>I can predict whether materials are magnetic or not</td></tr><tr><td></td><td>I can observe different forces</td></tr><tr><td></td><td>Evaluate my choices and suggest further improvements.</td></tr></table>			I can plan a fair test		I can use models to explain findings.		I can record my findings using scientific drawings		I can predict whether materials are magnetic or not		I can observe different forces		Evaluate my choices and suggest further improvements.	<p><b>Forces &amp; Magnets:</b> <a href="#">(Knowledge organiser)</a></p> <ul style="list-style-type: none"><li>• Understand how things move on different surfaces</li><li>• Understand that some forces need contact between two objects, but magnetic forces can act at a distance</li><li>• Observe how magnets attract or repel each other and attract some materials and not others describe magnets as having two poles</li><li>• Understand why two magnets will attract or repel each other, depending on which poles are facing</li><li>• Compare and group everyday materials on the basis of whether they are attracted to a magnet</li><li>• Identify some magnetic materials (ensure some non magnetic metals are identified)</li></ul> <p><b>Vocabulary:</b> force, push, pull, twist, contact force, non-contact force, magnetic force, magnet, button magnet, horseshoe magnet, attract, repel, magnetic material, metal, iron, steel, poles, north pole, south pole</p> <p><del>force, push, pull, open, surface, magnet, magnetic, attract, repel, magnetic poles, North, South</del></p>
	I can plan a fair test													
	I can use models to explain findings.													
	I can record my findings using scientific drawings													
	I can predict whether materials are magnetic or not													
	I can observe different forces													
	Evaluate my choices and suggest further improvements.													

## Light ([link to medium term planning](#))

Working Scientifically	Knowledge
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	I can set up practical comparative tests using my own ideas.
	I can raise questions when exploring materials and light.
	I can record my results in a table.
	I can record my results in a table.
	I can make predictions based on scientific questions.
	I can observe what happens when an object is moved closer to a light source.
	I can evaluate my test and suggest improvements.

**Light ([Knowledge organiser](#))**

**Light:**

- Understand that light is needed in order to see things and that dark is the absence of light
- Understand that light is reflected from surfaces
- Understand that light from the sun can be dangerous and that there are ways to protect their eyes
- Understand that shadows are formed when the light blocked by a solid object
- Find patterns in the way that the size of shadows change

**Vocabulary:** light, light source, dark, absence of light, transparent, opaque, shiny, matt, surface, shadow, reflect, mirror, sunlight, dangerous,

~~light, see, dark, reflect, surface, natural, star, Sun, Moon, shadow, blocked, solid, artificial, torch, candle, lamp, sunlight, dangerous, protect eyes~~

## Year 4



















### Working Scientifically:

- asking relevant questions and using different types of scientific enquiries to answer them
- setting up simple practical enquiries, and fair tests
- making systematic and careful observations
- taking accurate measurements using standard units using thermometers
- gathering, recording, classifying and presenting data in a variety of ways to help in answering questions
- recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables
- reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions
- using results to draw simple conclusions, make predictions, suggest improvements and raise further questions
- identifying differences, similarities or changes related to simple scientific ideas and processes
- using straightforward scientific evidence to answer questions or to support their findings.

### Vocabulary:








comparative / fair test, systematic, careful, accuracy, observation, accurate measurement, variables, equipment (thermometers, data logger), data (gather, record) classify, present, record (drawings, labelled diagrams, keys, bar charts, tables, prediction, method, results, conclusion, interpret





[Living things and their habitats](#) (link to medium term planning)



Working Scientifically		Knowledge												
<table><tr><td></td><td>Record findings about endangered species</td></tr><tr><td></td><td>I can ask relevant questions to classify things</td></tr><tr><td></td><td>I can use evidence to answer questions and present findings.</td></tr><tr><td></td><td>To gather and record data in a table.I can record observations from Scientific enquiry</td></tr><tr><td></td><td>Observe characteristics of living things</td></tr><tr><td></td><td>Identify similarities and differences in characteristics.</td></tr></table>			Record findings about endangered species		I can ask relevant questions to classify things		I can use evidence to answer questions and present findings.		To gather and record data in a table.I can record observations from Scientific enquiry		Observe characteristics of living things		Identify similarities and differences in characteristics.	<p><b>Living things and their habitats (<a href="#">Knowledge organiser</a>)</b></p> <ul style="list-style-type: none"><li>• Understand that living things can be grouped in a variety of ways</li><li>• Use classification keys to help group, identify and name a variety of living things in their local and wider environment</li><li>• Understand that environments can change and that this can sometimes pose dangers to living things</li></ul> <p><b>Vocabulary:</b> classification, classification keys, environment, habitat, human impact, positive, negative, migrate, hibernate, environment</p> <p><del>environment, flowering, non-flowering, plants, animals, vertebrate, environment, fish, amphibians, reptiles, birds, mammals, invertebrates, snails, slugs, worms, spiders, insects,</del></p> <p>(An outdoor lesson expected for this)</p>
	Record findings about endangered species													
	I can ask relevant questions to classify things													
	I can use evidence to answer questions and present findings.													
	To gather and record data in a table.I can record observations from Scientific enquiry													
	Observe characteristics of living things													
	Identify similarities and differences in characteristics.													







<a href="#">Animals, including humans</a> (link to medium term planning)	
Working Scientifically	Knowledge









	I can ask questions to find out what animals eat.	<b>Animals, including humans: (<a href="#">Knowledge organiser</a>)</b> <ul style="list-style-type: none"> <li>Understand the simple functions of the basic parts of the digestive system in humans</li> <li>Identify the different types of teeth in humans and understand their simple functions</li> <li>Construct and interpret a variety of food chains, identifying producers, predators and prey</li> </ul> <b>Vocabulary:</b> digestive system, digestion, mouth, teeth, saliva, oesophagus, stomach, small intestine, large intestine, nutrients, rectum, anus, teeth, incisor, canine, molar, premolars, herbivore, carnivore, omnivore, producer, predator, prey, food chain  <del>human digestive system, mouth, tongue, mixes, moistens, saliva, tooth, incisors, cutting, slicing, canines, ripping, tearing, molars, chewing, grinding, oesophagus, transports, stomach, acids, enzymes, small intestine, absorbs water, vitamins, large intestine, compacts, carnivore, herbivore, brush, floss, food chain, sun, producers, prey, predators</del>
	Make predictions based on scientific Knowledge of liquids to decay teeth.	
	Evaluate learning	
	Interpret and present learning of digestive system through models.	
	I can record my results in a table and Bar graph.	
	Observe the similarities and differences in human/animal teeth	
	Set up own test to see the effects of different liquids on tooth decay	

<b>Electricity (<a href="#">link to medium term planning</a>)</b>		
<b>Working Scientifically</b>		<b>Knowledge</b>
	I can record my work using labelled drawings	<b>Electricity: (<a href="#">Knowledge organiser</a>)</b> <ul style="list-style-type: none"> <li>Identify and name common appliances that run on electricity</li> <li>Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers</li> <li>Understand if 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</li> <li>Understand that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit</li> <li>Identify some common conductors and insulators,</li> <li>Understand that some metals are good conductors</li> </ul> <b>Vocabulary:</b> Electricity, electrical device, mains, Plug, electrical circuit, complete circuit, component , Cell, Battery, positive , Negative, Connect, loose connection, short circuit, crocodile clip,
	I can pose scientific questions	
	I can make predictions using scientific language	
	I can evaluate my switch design	

	I can interpret my results using my scientific knowledge	Bulb, Switch, Buzzer, Motor, Conductor, Insulator, Metal, Non-metal, symbol, wire
	I can record how electricity can help us	<del>appliances, danger, electrical safety, sign, wood, rubber, plastic, glass, water, open, closed</del>

States of matter (link to medium term planning)		
Working Scientifically		Knowledge
	I can record using diagrams what I know about the water system.	<b>States of matter: (<a href="#">Knowledge organiser</a>)</b> <ul style="list-style-type: none"> <li>Understand the terms solid, liquid and gas</li> <li>Compare and group materials together, according to whether they are solids, liquids or gases</li> <li>Understand 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)</li> <li>Understand that evaporation and condensation are part of the water cycle</li> <li>Understand the rate of evaporation is related to temperature</li> </ul> <b>Vocabulary:</b> solid, liquid, gas, state change, melting, freezing, melting point, boiling point, evaporation, temperature, water cycle, water vapour, precipitation, oxygen, molecules, condensation  <del>solid, iron, water, ice, melt, freeze, liquid, evaporate, condense, gas, container, changing state, chocolate, butter, cream, heated, heat, cooled, cool, degrees Celcius, thermometer, water cycle, evaporate, evaporation, condense, condensation, temperature, melting, melt, water vapour</del>
	I can make predictions using Straightforward evidence and observations	
	I can interpret what I have observed using my own scientific knowledge.	
	I can use a thermometer to take accurate measurements.	
	I can set up tests to answer questions.	
	Make careful observations and identify similarities and differences	

Sound (link to medium term planning)		
Working Scientifically		Knowledge
	Set up own tests based on animal ear shapes or this could be asking questions.	<b>Sound: (<a href="#">Knowledge organiser</a>)</b> <ul style="list-style-type: none"> <li>Understand how sounds are made, associating some of them with something vibrating</li> <li>Understand that vibrations from sounds travel through a medium to the ear</li> </ul>

	Evaluate musical instruments based on sound and knowledge of pitch.	<ul style="list-style-type: none"> <li>Investigate patterns between the pitch of a sound and features of the object that produced it</li> <li>Investigate patterns between the volume of a sound and the strength of the vibrations that produced it</li> <li>Understand that sounds get fainter as the distance from the sound source increases</li> </ul> <p><b>Vocabulary:</b> sound, Source, Vibrate, Vibration, Travel, Pitch, High, Low, Volume, Faint, Loud, Quiet, Insulation, soundwaves, decibels  vibrating, air, medium, ear, hear, fainter, louder, string, percussion, woodwind, brass, insulate</p>
	Record results in a table and spot patterns. Record sound measured in DB in a table. Produce line graph.	
	I can observe vibrations which cause Sound. Measure distance to nearest cm.	
	Set up tests to create the best string phone.	
	Observe how sounds are created.	

## Year 5







### Working Scientifically:






- planning different types of scientific enquiries (comparative / fair/ to answer questions, including recognising and controlling variables)
- taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate
- recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs
- using test results to make predictions to set up further comparative and fair tests
- 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
- identifying scientific evidence that has been used to support or refute ideas or arguments.


### Vocabulary:

comparative / fair test, systematic, careful, accuracy, observation, accurate measurement, variables, equipment (thermometers, data logger), data (gather, record) classify, present, record (drawings, labelled diagrams, keys, bar charts, tables, prediction, method, results, conclusion, interpret



















[Living things and their habitats](#) (link to medium term planning)

Working Scientifically		Knowledge:
Living things and their habitats		Living things and their habitats: ( <a href="#">Knowledge organiser</a> ) <ul style="list-style-type: none"> <li>Understand differences in the life cycles of a mammal, an amphibian, an insect and a bird</li> <li>Understand the life process of reproduction in some plants and animals</li> </ul> <p><b>Vocabulary:</b> life cycle, Reproduce, Sexual, Asexual, Sperm, Fertilises, Egg, live young, Metamorphosis, Plantlets, Runners, Bulbs, Cuttings, gestation, mammal, amphibian, insect, bird</p> <p><del>, plants,, animals, rainforest, ocean, desert, similarities, differences</del></p>
	Present data in a variety of different ways to help answer my questions.	
	Ask relevant questions and find ways to answer them.	
	I can make accurate and relevant predictions.	
	I can suggest next steps based on the weakest aspects of the enquiry.	
	Use oral and written forms to report conclusions.	
	Record my results using a bar chart and explain the results.	

<a href="#">Animals, including humans</a> (link to medium term planning)		
Working Scientifically		Knowledge:
	Record data using scatter graphs	<p><b>Animals, including humans:</b> (<a href="#">Knowledge organiser</a>)</p> <ul style="list-style-type: none"> <li>Understand the changes as humans develop to old age</li> </ul> <p><b>Vocabulary:</b> Adolescent, Adult, asexual reproduction, sexual reproduction, Fertilisation, Death, Teenager, Elderly, Toddler, Reproduction, Foetus, Growth, Puberty, Menstrual cycle, gestation</p> <p><del>human development, baby, child, length, mass, grows, grow, growing</del></p>
	Make careful observations as we grow older	
	Make predictions on gestation Periods.	
	Evaluate my learning	
	Interpret findings to help others.	







	Record learning using scientific diagrams.	
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### Properties of change and materials (link to medium term planning)


Working Scientifically		Knowledge												
<table><tr><td></td><td>I can record results in a table</td></tr><tr><td></td><td>I can make careful observations when heating solutions.</td></tr><tr><td></td><td>I can make predictions about which materials are soluble and insoluble</td></tr><tr><td></td><td>Evaluate my test.</td></tr><tr><td></td><td>I can use scientific language and illustrations to discuss, communicate and justify ideas.</td></tr><tr><td></td><td>I can plan my own test based on how Materials react with one another.</td></tr></table>			I can record results in a table		I can make careful observations when heating solutions.		I can make predictions about which materials are soluble and insoluble		Evaluate my test.		I can use scientific language and illustrations to discuss, communicate and justify ideas.		I can plan my own test based on how Materials react with one another.	<p><b>Properties of change and materials:</b> <a href="#">(Knowledge organiser)</a></p> <ul style="list-style-type: none"><li>• 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</li><li>• Know that some materials will dissolve in liquid to form a solution</li><li>• Describe how to recover a substance from a solution</li><li>• Use knowledge of solids, liquids, gases to decide how mixtures might be separated, including through filtering, sieving and evaporating</li><li>• Give reasons based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic</li><li>• Demonstrate that dissolving, mixing and changes of state are reversible changes</li><li>• 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</li></ul> <p><b>Vocabulary:</b> Thermal, Electrical, Insulator, Conductor, change of state, Mixture, Dissolve, Solution, Soluble, Insoluble, Filter, Sieve, reversible change, irreversible change, Burning, Solid, Liquid, Gas, Distilling, materials</p> <p><del>properties, hardness, solubility, transparency, conductive, electrical, dissolve, liquid, separate, mixing, evaporation, filtering, sieving, melting, rusting, magnetism, electricity, conductivity, insulation.</del></p>
	I can record results in a table													
	I can make careful observations when heating solutions.													
	I can make predictions about which materials are soluble and insoluble													
	Evaluate my test.													
	I can use scientific language and illustrations to discuss, communicate and justify ideas.													
	I can plan my own test based on how Materials react with one another.													

### Earth and space (link to medium term planning)













Working Scientifically	Knowledge
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	Record my work using scientific diagrams and labels	<p><b>Earth and space: <a href="#">(Knowledge organiser)</a></b></p> <ul style="list-style-type: none"> <li>Understand the movement of the Earth, and other planets, relative to the Sun in the solar system</li> <li>Understand the movement of the Moon relative to the Earth</li> <li>Know that the Sun, Earth and Moon are approximately spherical bodies</li> <li>Understand the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky</li> </ul> <p><b>Vocabulary:</b> Earth, Sun, Moon, spherical, solar system, rotates, star, orbit, planets, galaxy, celestial body, hemisphere, lunar calendar, revolve, sundial</p> <p><del>Earth, Sun, Moon, moon, planets, star, solar system, Mercury, Venus, Mars, Jupiter, Saturn, Uranus, Neptune, Pluto, dwarf planet, movement, rotate, orbit, axis, celestial body, spherical, sphere, day, night, light, heat, eclipse, satellite, universe, solar, astronomer, Ptolemy</del></p>
	Use measurement to represent planets in a model	
	Raise questions and suggest reasons for similarities and differences	
	Use a model to discuss, communicate and justify scientific ideas using scientific vocabulary.	
	Present results in a variety of ways to answer a question.	
	Plan own test and control variables.	







<b><a href="#">Forces</a> (link to medium term planning)</b>		
<b>Working Scientifically</b>		<b>Knowledge</b>
	Record results in a table.	<p><b>Forces: <a href="#">(Knowledge organiser)</a></b></p> <ul style="list-style-type: none"> <li>Understand that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object</li> <li>Understand the effects of air resistance, water resistance and friction, that act between moving surfaces</li> <li>Understand that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect</li> </ul> <p><b>Vocabulary:</b> force, gravity, Earth, air resistance, water resistance, friction, mechanisms, simple machines, levers, pulleys, gears, balance, drag forces, mass, springs, force meter, Newton meter (N), floats</p> <p><del>gravity, air resistance, water resistance, friction, surface, force, effect move, accelerate, decelerate, stop, change direction, brake, mechanism, pulley, gear, spring, theory of gravitation, Galileo Galilei, Isaac Newton</del></p>
	Observe different forces and measure the force using different equipment.	
	Take measurements using a range of scientific equipment.	
	Interpret and communicate results from data using scientific vocabulary	
	Set up a test to change the speed of a	

	pendulum.	
	Plan different types of enquiry to answer a question.	

Year 6
<p><b>Working Scientifically:</b></p> <ul style="list-style-type: none"> <li>planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary</li> <li>taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate</li> <li>recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs</li> <li>using test results to make predictions to set up further comparative and fair tests</li> <li>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</li> <li>identifying scientific evidence that has been used to support or refute ideas or arguments.</li> </ul> <p><b>Vocabulary:</b> comparative / fair test, systematic, careful, accuracy, observation, accurate measurement, variables, equipment (thermometers, data logger), data (gather, record) classify, present, record (drawings, labelled diagrams, keys, bar charts, line graphs, tables, prediction, method, results, conclusion, interpret</p>







<u><a href="#">Living things and their habitats</a></u> (link to medium term planning)							
Working Scientifically:	Knowledge:						
<p><b>Living things and their habitats:</b></p> <table border="1"> <tr> <td></td><td>Record in a table</td></tr> <tr> <td> </td><td>Answer own questions. Use classification keys.</td></tr> <tr> <td></td><td>Raise questions about animals to group.</td></tr> </table>		Record in a table	 	Answer own questions. Use classification keys.		Raise questions about animals to group.	<p><b>Living things and their habitats: (<a href="#">knowledge organiser</a>)</b></p> <ul style="list-style-type: none"> <li>Understand how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals</li> <li>Understand reasons for classifying plants and animals based on specific characteristics</li> </ul> <p><b>Vocabulary:</b> Organism, Bacteria, Amphibians, Reptiles, Birds, Microorganism, Virus, Insects, Arachnid, Vertebrate, Fungus, Fish, Non-flowering, Mollusc, Invertebrate, Carl Linnaeus, Edward Jenner, Alexander Fleming, Environment, Classification Key</p>
	Record in a table						
 	Answer own questions. Use classification keys.						
	Raise questions about animals to group.						

	Observe and raise questions.	micro-organisms, plants, animal, classification, classify, invertebrates, insects, spiders, snails, worms, vertebrates, fish, amphibians, reptiles, birds, mammals, Carl Linnaeus
	Predict how microorganisms will decay food	
	Evaluate effects of yeast.	

<a href="#">Animals, including humans</a> (link to medium term planning)		
Working Scientifically:		Knowledge:
	Use scientific diagrams	<p><b>Animals, including humans: <a href="#">(knowledge organiser)</a></b></p> <ul style="list-style-type: none"> <li>Identify and name the main parts of the human circulatory system</li> <li>Understand the functions of the heart, blood vessels and blood</li> <li>Understand the impact of diet, exercise, drugs and lifestyle on the way their bodies function</li> <li>Understand the ways in which nutrients and water are transported within animals, including humans</li> </ul> <p><b>Vocabulary: heart, pulse, rate, pumps, blood, blood vessels, transported, lungs, oxygen, carbon dioxide, nutrients, water, muscles, cycle, circulatory system, diet, exercise, lifestyle, artery(ies), vein</b></p> <p>human internal organs, heart, lungs, liver, kidney, brain, skeletal, skeleton, muscle, muscular, digest, digestion, digestive, human circulatory system, heart, blood vessels, blood, impact, diet, exercise, drugs, lifestyle, nutrients, water, damage, drugs, alcohol, substances</p>
	Take accurate measurements	
	Observe what happens using a model.	
	Use labelled diagrams to explain	
	Plan investigation and record results.	
	Use models to explain my thinking	

<a href="#">Evolution and inheritance</a> (link to medium term planning)	
Working Scientifically:	Knowledge:









	Use scientific diagrams to explain abstract concepts.
	Raise questions about a range of phenomena
	Develop predictions which can be found in natural environments.
	Describe and evaluate my own and other people's scientific ideas
	Use ideas from secondary sources to explain ideas.
	Use scientific reasons to make overall comparisons.

**Evolution and inheritance:** ([knowledge organiser](#))

- Understand that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago
- Understand that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents
- Understand how animals and plants are adapted to suit their environment
- Understand different ways and that adaptation may lead to evolution

**Vocabulary:** Offspring, sexual reproduction, Variance, Characteristics, Suited, Adapted, Environment, Inherited, Species, Fossils, Survival, Evolution, Genetics, living thing, Charles Darwin

~~living things, change, fossils, offspring, vary, not identical, characteristics, variation, evolution, adaption, inherit, inheritance, Charles Darwin, adapt, environment, extreme, conditions, advantageous, disadvantageous, Mary Anning~~

<a href="#">Light</a> (link to medium term planning)	
Working Scientifically:	Knowledge:
	Use scientific models and labelled diagrams.
	Make careful observations.
	Make predictions based on SK.
	Evaluate using scientific language
	Use diagrams to support explanation.
	Draw diagrams with accuracy







**Light:** ([knowledge organiser](#))

- Understand that light travels in straight lines
- Understand that objects are seen because they give out or reflect light into the eye
- Understand 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

**Vocabulary:** light, light source, dark, absence of light, transparent, translucent, opaque, shiny, matt, surface, shadow, reflect, mirror, sunlight, dangerous, straight lines, light rays, refraction, medium, density

~~light, travels, straight, reflect, reflection, light source, object, shadows, rainbow, filters, reflect, reflection, mirrors, periscope~~

## Electricity (link to medium term planning)

Working Scientifically:		Knowledge:
	Present results in line graph.	<p><b>Electricity:</b> (<a href="#">knowledge organiser</a>)</p> <ul style="list-style-type: none"> <li>• Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit</li> <li>• Understand the reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches</li> <li>• Identify and use symbols when representing a simple circuit in a diagram</li> </ul> <p><b>Vocabulary:</b> circuit, complete circuit, circuit diagram, circuit symbol, cell, battery, bulb, buzzer, motor, switch, voltage, fuse, terminal</p> <p><del>voltage, brightness, volume, switch, danger, series circuit, circuit diagram, bulb, buzzer, motor, symbol</del></p>
	Take accurate measurements	
	Answer questions by investigating	
	Develop predictions	
	Use diagrams to support explanation	
	Scientific diagrams.	

# High quality teaching benefits pupils with SEND

## The 'Five-a-day' principle



The research underpinning the EEF's guidance report 'Special Educational Needs in Mainstream Schools' indicates that supporting high quality teaching improves outcomes for pupils with SEND. Five specific approaches—the 'Five-a-day' indicated below—are particularly well-evidenced as having a positive impact. Teachers should develop a repertoire of these strategies, which they can use daily and flexibly in response to individual needs, using them as the starting point for classroom teaching for all pupils, including those with SEND.

### 1 Explicit instruction

*Teacher-led approaches with a focus on clear explanations, modelling and frequent checks for understanding. This is then followed by guided practice, before independent practice.*



### 2 Cognitive and metacognitive strategies

*Managing cognitive load is crucial if new content is to be transferred into students' long-term memory. Provide opportunities for students to plan, monitor and evaluate their own learning.*



### 3 Scaffolding

*When students are working on a written task, provide a supportive tool or resource such as a writing frame or a partially completed example. Aim to provide less support of this nature throughout the course of the lesson, week or term.*



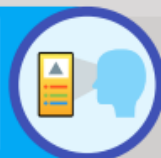
### 4 Flexible grouping

*Allocate groups temporarily, based on current level of mastery. This could, for example, be a group that comes together to get some additional spelling instruction based on current need, before re-joining the main class.*



### 5 Using technology

*Technology can be used by a teacher to model worked examples; it can be used by a student to help them to learn, to practice and to record their learning. For instance, you might use a class visualiser to share students' work or to jointly rework an incorrect model.*



More information about finding better ways to support pupils with SEND, including these five principles and more specialist interventions can be found in the EEF's guidance report '[Special Educational Needs in Mainstream Schools](#)'.

