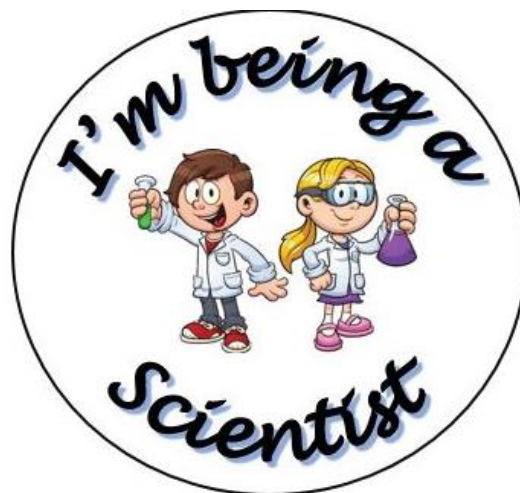




Being a Scientist at St Chad's



What do we want Science to look like at St Chad's?

'The important thing is to never stop questioning'

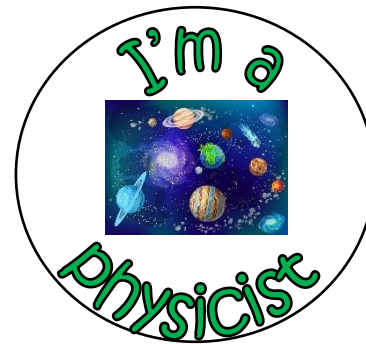
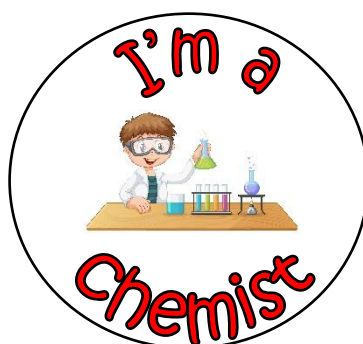
Albert Einstein

This quote from Albert Einstein really encompasses the vision of science at St Chad's. Our ambition is to equip every child with the scientific tools and knowledge needed to become inquisitive and curious individuals. With the St Chad's vision of 'Learning to Love, Loving to Learn' at the heart and being driven by the 5Cs, we want all of the children at St Chad's to be scientists who are confident with applying working scientific enquiry skills to conduct investigations, use scientific equipment and build arguments for and against the scientific knowledge that has been unearthed. By ensuring that the teaching of scientific knowledge is progressive across year groups and phases, key scientific knowledge will be taught and deepened in future scientific units to support children in remembering more. With a focus on subject-specific vocabulary, we want the children of St Chad's to be confident with understanding, and using, subject specific vocabulary accurately. Therefore, subject-specific vocabulary will be taught and built upon across different year groups and key stages. All children will be provided with a broad and balanced science curriculum focused around the key subject drivers of physics, chemistry and biology.

The national curriculum for Science aims to ensure that all pupils:

- develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics;*
- develop understanding of the nature, processes and methods of science through different types of science enquiries that help them to answer scientific questions about the world around them;*
- are equipped with the scientific knowledge required to understand the uses and implications of science, today and for the future.*

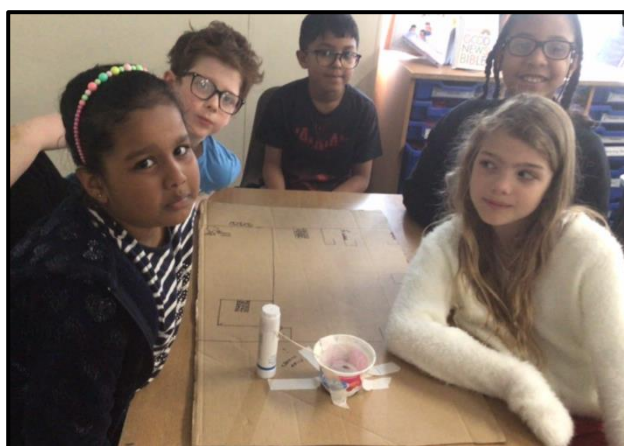
As scientists, children will develop their growing scientific knowledge across three different strands.



*As a **biologist**, children will learn all about living things. Much of the science curriculum evolves around studying biology. Throughout KS1 and KS2, children will develop their understanding of animals, living things, plants and evolution and inheritance. To ensure children grow to become responsible citizens in the future, they will have an understanding of the role they can play in positively sustaining the global world.*

*As a **chemist**, children will begin KS1 by developing their understanding of different everyday materials before progressing their knowledge onto thinking about states of matter and how materials can change state whilst in KS2. Developing children's understanding of materials has close links with Art and the D&T process.*

*As a **physicist**, children will develop their knowledge of how things on Earth gain its power. Across KS1 and KS2, children will spend time developing their quizzical nature by studying areas such as light, electricity, sound and forces. Finally culminating with a focus on how the solar system works in Year 5/6.*



How do we achieve our aims in Science at St Chad's?

Creating Our Science Curriculum

When creating our science curriculum, it is important that it links into our connected curriculum as closely as it can. Therefore, allowing links to be made across scientific strands and with other academic subjects enabling knowledge to be sequenced and carefully mapped.

Unit	1
Big Picture Question	What are rainforests and where can we find them?
Rationale	Chance to develop knowledge of the world and use key vocabulary to describe the location of countries and continents in the world. Learn about the layers in a rainforest.

Considering Year 3/4's Big Picture Question of 'What are rainforests and where can we find them?', although it has a geography-led focus, the children learn all about plants within science lessons. Whilst learning about plants, children are able to develop their understanding from KS1 and deepen their knowledge within this unit. It also enables the children to think about the types of plants that grow within a rainforest and what enables these plants to grow and live so effectively.

[*Follow this link to find out more about St Chad's Rolling Programmes.*](#)

The different scientific drivers have been carefully mapped across the curriculum to ensure links can be made with other subjects but also taking into consideration the time of the year and the outdoor learning environment. An example of the Year 1 science map can be seen below. Within this example, you can see that it is planned for children to focus on developing their substantive knowledge of plants throughout the academic year. Therefore, having opportunities to identify the changes that take place with plants and habitats in the different seasons.

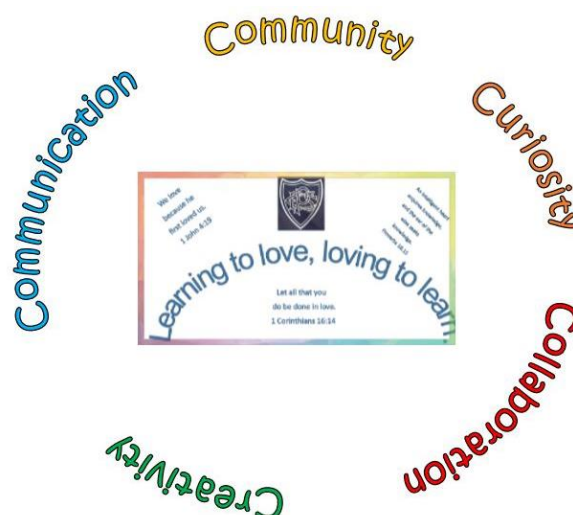
	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Seasonal Changes / Plants Beatrix Potter		Everyday Materials Charles Mackintosh				Seasonal Changes / Plants		Everyday Materials William Addis			
	Which plants/trees are growing in the school grounds? (IGC)		How can you sort materials in different ways? (2 weeks) (OGC)				How are the same parts on different plants the same and different? (CFT)		What happens to these materials if they are buried in the mud? (O)			
	How does a plant grow over time? (O)		Which materials are the most flexible? (CFT)				How does an oak tree change over a year? (O)		What is recycling? Which materials can be recycled? (R)			
			Which materials are the most absorbent? (CFT)						Which materials should we use to create a house to protect it from....? (E)			
Spring	Seasonal Changes / Plants Chris Packham		Animals, including humans Steve Irwin				Seasonal Changes / Plants		Animals, including humans Adam Henson			
	How are the trunks of trees similar and different from each other? (IGC)		Which animals are mammals, fish and birds? (IGC)				What are the leaves like on the different trees? (IGC)		Do all animals eat the same types of food? (IGC)			
	What is the difference between a deciduous tree and an evergreen tree? (IGC)		What is the difference between an amphibian and a reptile? (IGC)				Is there a pattern as to where moss grows around the school? (PS)		What is the difference between an omnivore, herbivore and carnivore? (IGC)			
			Can you create an imaginary creature within a particular animal group? (E)						Do pets have the same senses as humans? (R)			
Summer	Seasonal Changes / Plants STEM Ambassador		Animals, including humans STEM Ambassador				Seasonal Changes / Plants		Plants			
	Which plants are garden plants and which plants are wild? (IGC)		What are the names for the different parts of our bodies? (IGC)				How can I group different seeds? (IGC)		How many different roots can be found? Can we describe what they look like close up? (IGC)			
	How does a wildflower bed change over time? (O)		Is this statement true 'The taller I am, the longer my arm span'? (CFT)				How does my sunflower change each week? (O)		What is the life cycle of a plant / tree? (R)			
			2 weeks on investigating questions to do with senses e.g. Do you get better at smelling as you get older? (CFT)						Which trees have the biggest leaves? (CFT)			
			Which food/flavours can I identify by taste? (IGC)									

Science in the EYFS Curriculum

Scientific knowledge within our children at St Chad's begins with the learning that takes place in the EYFS classroom. Within continuous provision, children have opportunities to explore changes within seasons, whilst also using natural resources to complete cross-curricular activities e.g. in art. Children also investigate the properties of different types of materials that they use within their play. There are also a range of different scientific resources e.g. magnifying glasses available for children to freely use around the environment.

Power through the 5C's of learning

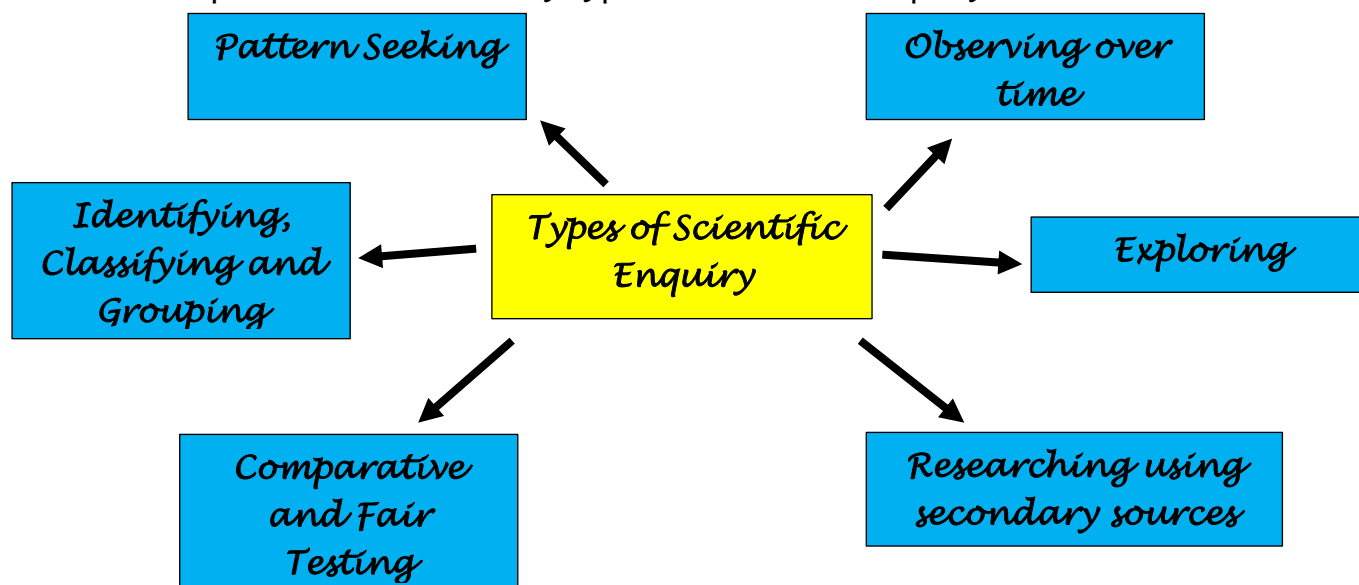
Alongside St Chad's vision of 'learning to love, loving to learn', St Chad's 5C's of learning drive the creation of our Curriculum. Further information as to how the 5C's of learning positively support the teaching of Science can be identified in the table below.



St Chad's Learning Cogs	Using our Learning Cogs within Science
Community	<ul style="list-style-type: none"> • Visits and Visitors • Answering Big Questions • Knowledge linked within the connected curriculum
Communication	<ul style="list-style-type: none"> • Talking Like A Scientist • Study of Scientists Past and Present • Knowledge Organisers • Stem sentence starters to support all Children across the school.
Curiosity	<ul style="list-style-type: none"> • Learning knowledge through enquiry based activities • Children ask further questions of the knowledge investigated within lessons.
Collaboration	<ul style="list-style-type: none"> • Working in groups to investigate and explore 'Big Questions.' • Opportunities to participate in after-school science clubs across KS1 and KS2.
Creativity	<ul style="list-style-type: none"> • Make links with our connected Curriculum as well as with maths and English. • Exploring scientific knowledge through real-life contexts both inside and outside of the Classroom.

Being a scientist at St Chad's

Across our school, we want our children to be enthusiastic and inquisitive scientists who continuously pose questions to deepen and embed learnt knowledge. Children focus on developing their scientific knowledge by actively doing the science within lessons. Each lesson is based upon one of the six key types of scientific enquiry.



Working Scientifically

Within each school phase, children develop a range of 'Working Scientifically' skills. These important skills are constantly developed in each Science lesson, which is focused on one of the six types of scientific enquiry. When working scientifically, children follow a pattern of plan, do, record, review. A progression of working scientifically skills has been developed to ensure that children are constantly building and deepening skills they have been taught in previous school phases.

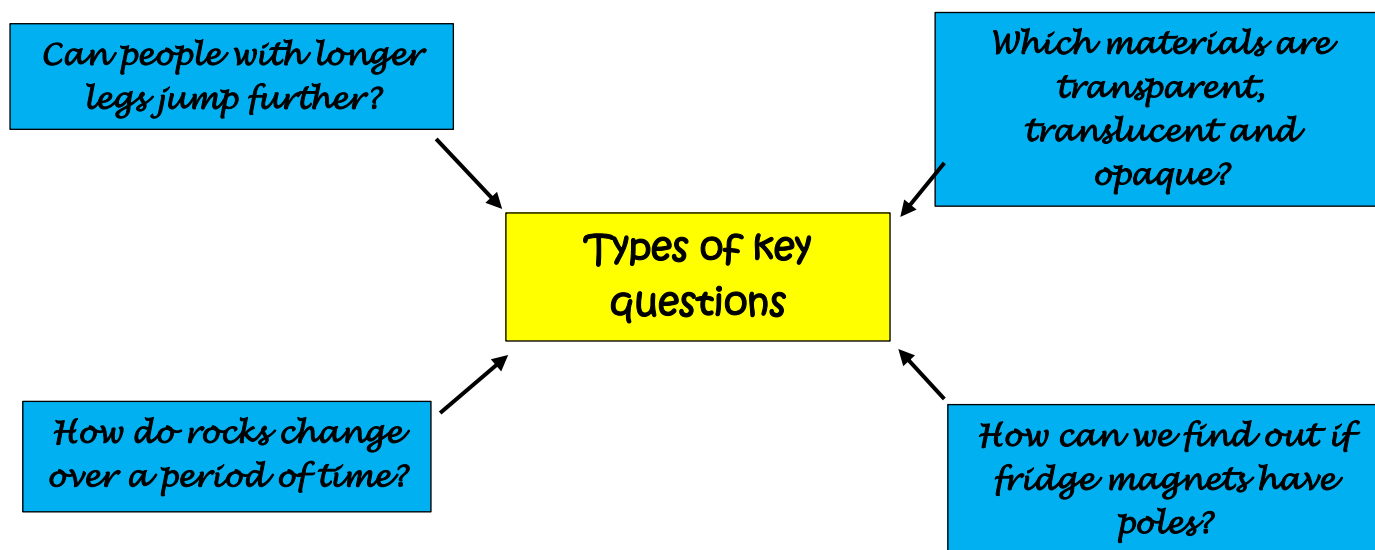
Year Group	Plan	Do	Record	Review
KS1	Asking simple questions and recognising that they can be answered in different ways. Make a simple prediction when appropriate	Observing closely, using simple equipment. Performing simple tests Identifying and classifying	Gathering and recording data to help in answering questions. Pupils may record in the following ways: <ul style="list-style-type: none"> • Simple drawings/pictures • Simple sentences and descriptions • Photos • Photograms • Simple charts and tables e.g. tally charts • Sorting circles or Venn diagrams • Practical block graphs • Drawn block graphs • Making models 	Using their observations and ideas to suggest answers to questions
LKS2	Ask relevant questions and use different types of scientific enquiries to answer them. Setting up simple practical enquiries, comparative and fair tests	Make systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.	Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions. Recording findings in simple scientific language, drawings, labelled diagrams, keys, bar charts and tables. Reporting on findings from enquiries, including oral and written	Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions. Identifying differences, similarities or changes related to simple scientific ideas or processes.

[Follow this link to access the working scientifically at St Chad's Progression.](#)



Answering Big Questions

In every science lesson, children focus on answering a key question. Each key question is focused around a specific type of enquiry. As a school, we want to develop curious, and quizzical children who are always wanting to question the science and what they know. Theory always suggests that children are able to learn more and remember more when they are actively involved within the learning process. Therefore, it is important that children are taught the relevant substantive knowledge through the investigations that they are completing.



Talking like a scientist

It is important that children are able to demonstrate a growing understanding of subject-specific vocabulary. A progression of scientific vocabulary has been created to demonstrate vocabulary that gets revisited before identifying the vocabulary that is introduced.

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Being a biologist	Animals, including humans					
	Head, body, eyes, ears, mouth, teeth, leg, tail, wing, claw, fin, scales, feather, fur, beak, paws, hooves, touch, smell, taste, tongue, nose, see, ear	Offspring, reproduction, growth, child, young/old stages (hen/chick), exercise, heartbeat, breathing, hygiene, germs, disease, meat, fish, vegetables, bread, rice, pasta.	Nutrition, nutrients, carbohydrates, sugars, protein, vitamins, minerals, fibre, fat, water, skeleton, bones, muscles, joints, support, protect, move, skull, ribs, spine	Digestive system, digestion, mouth, teeth, saliva, oesophagus, stomach, small intestine, nutrients, large intestine, rectum, anus, teeth, incisor, canine, molar, pre-molars, herbivore, carnivore, omnivore, producer, predator, prey, food chain	womb, foetus, embryo, gestation, baby, toddler, teenager, elderly growth, development, puberty	Heart, pulse, rate, pumps, blood, blood vessels, transported, lungs, oxygen, carbon dioxide, nutrients, water, muscles, circulatory system, diet, exercise, drugs, lifestyle
	Plants and living things and their habitats					
	Leaf, flower, blossom, petal, fruit, berry, root, seed, trunk, branch, stem, bark, stalk, bud	Light, shade, sun, warm, cool, water, grow, healthy Living, dead, never been alive, suited, suitable, basic needs, food, food chain, shelter, move, feed	Photosynthesis, pollen, insect/wind pollination, seed formation, seed dispersal (wind, animal, water)	Classification, classification keys, environment, habitat, human impact, positive, negative, migrate, hibernate	Life cycle, reproduce, sperm, fertilises, egg, metamorphosis, asexual, plantlets, runners, bulbs, cuttings	Vertebrates, fish, amphibians, reptiles, birds, mammals, invertebrates, insects, spiders, snails, worms, flowering, non-flowering

[Follow this link to see the St Chad's Science Vocabulary Progression.](#)

Discovering scientists both past and present

Throughout their time at St Chad's Patchway CofE Primary School, it is important that children develop their scientific knowledge and skills. However, we want our children to have an understanding of the work completed by scientists in the outside world. Therefore, we aim to promote science as relevant to everyday life and inspire a knowledge of the scientific used within everyday roles and jobs that adults carry out. Within science lessons in our connected curriculum, children have opportunities to study the lives of different scientists across the different scientific strands.

Animals, including humans	
Year 1	Chris Packham (conservationist)
Year 2	Steve Irwin (Crocodile Hunter)
	Robert Winston (Human Scientist)
	Joe Wicks (Personal Trainer)
Year 3	Adelle Davis (20 th Century Nutritionist)
	Marie Curie (radiation / xrays)
Year 4	Ivan Pavlov (Digestive System Mechanisms)
	Joseph Lister (Discovered Antiseptics)
Year 5	Dr Steve Jones (Geneticist)
Year 6	Leonardo Da Vinci (Anatomy)
	Sir Richard Doll (Linking smoking and health problems)
	Justus Von Liebig (theories of nutrition and metabolism)



[Follow this link to see the St Chad's 'Celebrating Scientists both Past and Present' progression.](#)

Knowing More and Remembering More

To ensure children are strengthening schemas within their memory, it is important that scientific substantive and disciplinary knowledge is constantly being developed and embedded within children's long term memories. Therefore, a science knowledge progression has been developed to demonstrate how knowledge is introduced and then deepened throughout further units of learning.

Year 1 Science knowledge to be taught		Working Scientifically Skills	Previously taught knowledge
Plants	Growing locally, there will be a vast array of plants which all have specific names.	Asking simple questions and recognising that they can be answered in different ways.	Plant seeds and care for growing plants. (EYFS)
	These can be identified by looking at the key characteristics of the plant.		
	Plants have common parts, but they vary between the different types of plants.	Observing closely, using simple equipment	Begin to understand the need to respect and care for the natural environment and all living things. (EYFS)
	The parts of a plant are a leaf, root, stem and flower.	Identifying and classifying	Explore the natural world around them. (EYFS)
	Plants produce seeds	Pupils may record in the following ways: <ul style="list-style-type: none">o Simple drawings/pictureso Simple sentences and descriptionso Photoso Sorting circles or Venn diagramso Making models	
	Rose, tulip and daffodil are plants that are planted in the garden.		
	Dandelion, daisy and thistle are names of plants that are wild. Therefore, they are not planted by humans.		
	The parts of a tree are a trunk, branch, roots and leaves.		
	Some trees keep their leaves all year while other trees drop their leaves during autumn and grow them again during spring.	Using their observations and ideas to suggest answers to questions	
Deciduous trees change throughout the year. During Autumn, all deciduous trees' leaves fall off. They're preparing for winter. When spring comes along, the trees can grow buds and flowers again and their leaves can grow back. When summer is over and autumn comes around again, the process happens again.			

The Year 1 knowledge progression, above, shows the key scientific knowledge that is to be taught, learned and embedded as children progress through the academic year. Through lessons and retrieval activities, teachers will identify whether this knowledge has been learned and embedded or whether continued teaching is required.



Knowledge Organisers

To support all children in knowing more and remembering more when developing their scientific knowledge, knowledge organisers are used within lessons. Knowledge organisers are used to help children strengthen schemas within their memory and transfer taught knowledge into the long term memory.

Science Unit - Plants

What should I know?

- Plants need certain conditions to survive
- Plants are living things
- Plants come from seeds

Key Knowledge

- A plant needs water, light, nutrients from the soil, air and room to grow
- A plant is made up of roots, stems, leaves and flowers- each part has its own functions
- Different plants vary in how much of these things they need
- Photosynthesis is the process in which green plants use sunlight to make their own food.
- Different plants disperse seeds in different ways- water, shaking, dropping, carrying, eating, bursting

A circular school crest featuring a shield with a cross and other heraldic symbols, surrounded by a decorative border.

Key Vocabulary

Roots	Stem	Leaves	Flowers	Nutrients	Evaporation
Fertilisation	Petal	Stamen	Carpel (pistil)	Sepal	Pollination
Pollinator	Seed	Dispersal	Photosynthesis	Germination	

What should I know by the end of the unit?

- What plants need to survive
- How plants produce their own food
- The function of different parts of a plant
- How plants reproduce
- How plants' seeds are dispersed

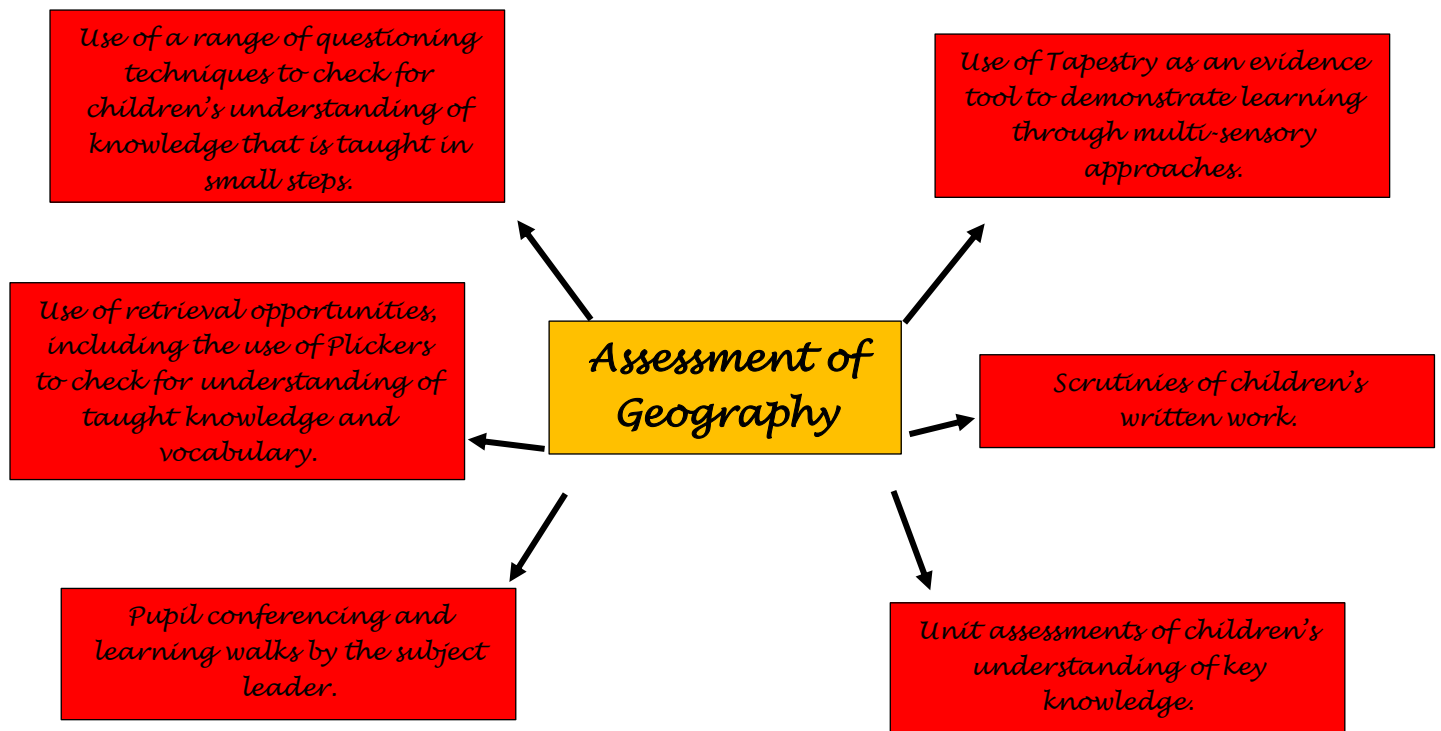
Making Links - Remember when you.....

- Studied how plants grow in Key Stage 1
- Studied weather patterns that affect plants

Participating in extra-curricular science clubs

It is important to promote science within lessons but also to advance the scientific thinking of those children who want to participate in after-school science experiments. Children have the opportunity to participate in a range of different scientific investigations focusing on developing their scientific thinking and explorative skills.

How is progress assessed in Science?



I like to go out and explore different things within the school grounds.

Using different equipment, like microscopes, is really enjoyable.

Children's Voice

We get to learn new knowledge and different facts.

I liked when we put water on the bags to prove if the material is waterproof or not.

I enjoyed when we went on a tree hunt to see some different types of leaves.