Stanton Bridge Primary School

Science in the Stanton Bridge Primary Curriculum

Intent

Stanton Bridge Primary School's Curriculum Statement of Intent has been constructed to reflect and incorporate each curriculum subject whilst ensuring that each subsequent content designed meets the intent at every opportunity.

Thus, the context - past, present and future - are factored in. The past - family influences, social experience and how that may contribute to their new experiences. The present – school and expanding social networks, and how this can positively shape their future given the right environmental and social factors. Finally, the future - in search of what awaits them in a fast evolving technological world.

Hence the premise upon which our pupils will grow:

- High ambition.
- Rich in language with a passion for learning.
- Habits of Mind that serves to support achievement across all areas of learning.
- Strong basis for continuous academic growth beyond their primary years.
- Ability to regulate their social, emotional well-being, with knowledge & skills to tap into a bank of resources that enable them to be flexible in their approach to problem-solving.
- Stand shoulder to shoulder and thrive with others in a range of different roles, exhibiting leadership qualities and skills.
- Acknowledge and appreciate their heritage in world where accepting themselves as individuals and celebrating who they are is key in steering a complex and ever-changing environment.
- Having a voice and knowing that they can make a difference to the world in which they live, changing things for the better.
- Positive relationships and social networks from which they can thrive and excel, seeking and working to include others.
- Belonging to the House of Values, focused on developing character, competence and connectedness. (Relationships, Equality, Care, Thinking Flexibly, and Listening)

Character	Our pupil are taught to learning with a sense of **honesty**, coming to know, acknowledge and appreciate both strengths and areas for further growth learning. They are then taught to **respect** the learning ahead of them and to appreciate this opportunity to learn where this is not the case for many across the world.
Competence	Pupils will have high **aspiration** for learning, demonstrate **confidence** in key concepts learned, use subject specific vocabulary, working both **independently** and interconnected dependent on task set.
Connectedness	Pupils will work in **harmony** with others, within familiar and unfamiliar surroundings.

Implementation:

Pedagogy: The understanding of how concepts are taught.

Pedagogy is the 'method of teaching'. At Stanton Bridge, we use the Barak Rosenshine's Principles of Instruction to establish Effective Teaching Practice. This is further strengthened by the use of Thinking Frames that support in the development of Metacognition. Our school's approach to Teaching and Learning is rooted in the Science of Learning and as such, all staff members are routinely engaged in school improvement activities to develop pedagogy and specific CPD to ensure subject content is expertly delivered. This of course sits alongside individualised mentoring and coaching to support continuous improvements in practice. Responsive coaching also serves to ensure each adult knows the relevant next steps to maximise learning opportunities for all groups of pupils.

Core concepts

Core Concepts in Science by Strand			
Working Scientifically	**Biology** Animals, including Humans Living Things and Their Habitats Plants Evolution and Inheritance	**Chemistry** Materials	**Physics** Light Electricity Forces Rocks Sounds Earth and Space

Science Delivery:

Lesson timings	Type of delivery
Science is taught weekly for 50 mins per lesson. In KS1, it is taught once a week. In KS2, it is taught twice a week.	The lessons are predominantly discrete to enable focus on the core concepts of science, although vocabulary is continually developed using sentence stems and tiers universally across the subject areas. Each science lesson compromises of time to consolidate key vocabulary and concepts for the first section before focussing on the new learning taking place in the subsequent section.

Science Planning:

Lesson Structure

Lesson Structure	Notes
1. Starter	Key skills focussed.
2. Review	Pupils review prior learning (previous lesson, previous topic, previous year) in the form of low-stake quizzes.
3. Learning Intention Learning Outcomes Vocabulary	Teacher to share learning intention, learning outcomes and key vocabulary including definitions and images.
4. Main Teach	Didactic teaching of the key concepts.
5. Teacher Model	Teacher to verbalise thinking out loud, with no pupil input.
6. Shared Model	Pupil input using directed questions.
7. Independent	White board work and teachers check through questioning and observation.
8. Main Task	Independent/pair/groups – pupils practice and embed new concept/consolidate through scaffolded tasks designed tasks by their teacher. Teacher facilitates learning through teacher live marking and checks on progress throughout the lesson, intervene and question for understanding, furthering knowledge.
9. Plenary/Reflection	Check in at the end or during the lesson, flexible, as and when best suited.

Annual Organisation

Terms	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Autumn 1	Animals including humans	Animals including humans	Magnets	Living things and their habitats	Living things and their habitats	Evolution and inheritances
Autumn 2	Animals including humans	Plants	Animals including humans Food and our bodies	Animals including humans Teeth and eating	Forces	Animals including humans
Spring 1	Everyday Materials	Living things and their habitats	Rocks	Electricity	Animals including humans	Electricity
Spring 2	Everyday Materials	Uses of everyday materials	Plants	Sound	Properties and changes of materials	Light

					Classifying car materials	
Summer 1	Plants	Scientific Enquiry	Light	States of matter	Earth and space	Evolution and inheritances
Summer 2	Scientific Enquiry	Animals including humans	Scientific Enquiry	Scientific Enquiry	Scientific Enquiry	Living things and their habitats

Impact

The ultimate test of the impact of the curriculum is in whether the students know what you want them to know, and what you think they should know. This has been carefully mapped against the core concepts for computing in the tables on the following pages. To determine this, we check and monitor children's learning, providing teachers and students with information about progress and analysis of deliberate retrieval practice. We need to be able to fluidly use 'checking for understanding' techniques in the moment as well as being able to know what has been learnt and retained over time and the depth of that learning:

- We use checking for understanding techniques through quizzes and questions to ensure we are aware of all students learning during the lesson and adapt the pace as necessary.
- Retrieval practice is built in where most impactful to interrupt the forgetting curve and secure constructs in long term memory.
- Depth of knowledge is then assessed through end of unit assessment quizzes, teacher discussion and observation and pupil portfolios on Showbie. Pupils are assessed against core concepts, which is recorded on DC Pro.

Science Specific Impact Measures

Stanton Bridge Primary School

In Science, quizzing is used as a method of assessing pupils, understanding at the end of a core concept to analyse the extent to which knowledge has been consolidated into long-term memory. Retrieval practice tasks throughout the lessons also interrupt the forgetting curve to enable faster access to prior learning.

Each topic pupils also complete a diagnostic test, a mid-topic test and end of topic test which further supports staff in identifying any children in need of additional support.

Progression Points against the Core Concepts.

Core Concept	KSI		LKS2		UKS2	
Working Scientifically	During years 1 and 2, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content: ● Asking simple questions and recognising that they can be answered in different ways. ● Observing closely, using simple equipment. ● Performing simple tests. ● Identifying and classifying. ● Using their observations and ideas to suggest answers to questions. ● Gathering and recording data to help in answering questions.		During years 3 and 4, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content: ● Asking relevant questions and using different types of scientific enquiries to answer them. ● Setting up simple practical enquiries, comparative and fair tests. ● Making 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 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 for new values, 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.		During years 5 and 6, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content: ● Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. ● 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 a degree of trust in results, in oral and written forms such as displays and other presentation. ● Identifying scientific evidence that has been used to support or refute ideas or arguments.	
Animals, including Humans	Year 1	Year 2	. Year 3	Year 4	Year 5	Year 6
	Pupils should be taught to: ● Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. ● Identify and name a variety of common animals that are carnivores, herbivores and omnivores. ● Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals including pets).	Pupils should be taught to: ● Notice that animals, including humans, have offspring which grow into adults. ● Find out about 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.	Pupils should be taught to: ● 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. ● Identify that humans and some other animals have skeletons and muscles for support, protection and movement.	Pupils should be taught to: ● 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.	Pupils should be taught to: ● Describe the changes as humans develop to old age.	Pupils should be taught to: ● 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.

	● Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense					
Living Things and Their Habitats	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
		Pupils should be taught to: ● Explore and compare the differences 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 habitats, including microhabitats. ● Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food.		Pupils should be taught to: ● 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 dangers to living things.	Pupils should be taught to: ● 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.	Pupils should be taught to: ● 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. ● Give reasons for classifying plants and animals based on specific characteristics.
Materials	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
	<u>Everyday Materials</u> Pupils should be taught to: ● 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	<u>Use of Everyday Materials</u> Pupils should be taught to: ● 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, bending, twisting and stretching.	<u>Magnets</u> Pupils should be taught to: ● Compare how things move on different surfaces notice that some forces need contact between two objects, but magnetic forces can act at a distance. ● Observe how magnets attract or repel each other and attract some materials and not others. ● Compare and group together a variety of everyday	<u>States of matter</u> Pupils should be taught to: ● Compare and group materials together, according to whether they are solids, liquids or gases. ● Observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C). ● Identify the part played by evaporation and condensation in the water cycle and	<u>Properties and changes of Materials</u> Pupils should be taught to: ● 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	

	of their simple physical properties.		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.	associate the rate of evaporation with temperature.	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 metals, wood and plastic 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.	
Plants	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	Pupils should be taught to: ● 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, including trees.	Pupils should be taught to: ● Observe and describe how seeds and bulbs grow into mature plants. ● Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.	Pupils should be taught to: ● Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers. ● Explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant Investigate the way in which water is transported within plants. ● Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.			
Light	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
			Pupils should be taught to: ● Recognise that they need light in order to	Pupils should be taught 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 solid objects. ● Find patterns in the way that the size of shadows changes.	● 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		
Electricity	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
				Pupils should be taught to: ● Identify common appliances that run on electricity. ● Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers. ● Identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery. ● Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit. ● Recognise some common conductors and insulators, and associate metals with being good conductors.		Pupils should be taught to: ● Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit. ● Compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches. ● Use recognised symbols when representing a simple circuit in a diagram.
Forces	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
			Pupils should be taught to: ● Compare how things move on different surfaces. ● Notice that some		Pupils should be taught to: ● Explain that unsupported objects fall towards the Earth because of the	

			forces need contact between 2 objects, but magnetic forces can act at a distance. ● Observe how magnets attract or repel each other and attract some materials and not others. ● Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials. ● Describe magnets as having 2 poles. ● Predict whether 2 magnets will attract or repel each other, depending on which poles are facing.		force of gravity acting between the Earth and the falling object. ● Identify the effects of air resistance, water resistance and friction that act between moving surfaces. ● Recognise that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect.	
Rocks	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
			Pupils should be taught to: ● 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.			
Sound	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
				Pupils should be taught to: ● Identify how sounds are made, associating some of them with something vibrating. ● Recognise that vibrations from sounds travel through a medium to the ear. ● Find patterns between the pitch of a sound and features of the object that produced it. ● Find patterns between the volume of a sound and the		

				strength of the vibrations that produced it. ● Recognise that sounds get fainter as the distance from the sound source increases.		
Earth and Space	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
					Pupils should be taught to: ● 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. ● Use the idea of the Earth's rotation to explain day and night, and the apparent movement of the sun across the sky.	
Evolution and Inheritance	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
						Pupils should be taught to: ● Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago. ● Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents. ● Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.