Science Policy

Love bears all things, believes all things, hopes all things, endures all things.'

1 Corinthians 13:7

Approved: November 2023

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Introduction

This policy outlines the purpose, nature and management of science in our school.

The policy reflects the consensus of opinion of the whole teaching staff and has the full agreement of the governing body.

The implementation of this policy is the responsibility of all the teaching staff.

Intent

At All Saints Primary, we believe that Science is a body of knowledge built up through the experimental testing of ideas and systematic investigation. It is about providing opportunities for pupils to be able to explore and make sense of the world around them, while also equipping them with a wealth of skills-based processes.

This journey begins in the EYFS where the children are encouraged to look closely at the world around them, changes that occur and begin to question 'why?' They will make observations about their experiences of the world, talk about similarities and differences in relation to living things, their environment and materials and begin to make comparisons. In addition to this, they will be taught the importance for exercise, eating healthy food and how to look after themselves and keep safe.

This is then built upon in KS1 and KS2 through the National Curriculum, which aims to ensure that all pupils:

- To develop pupil's enjoyment and engagement in Science and an appreciation of the increasingly scientific and technological world they are growing up in.
- To develop lively, enquiring minds with an ability to question.
- To introduce pupils to the language and vocabulary of Science.
- To enable pupils to develop a knowledge of appropriate scientific facts and to develop basic concepts.
- To develop pupils' practical skills and their ability to make accurate measurements.
- To encourage open mindedness so children interpret their findings critically and do not always expect 'the right answer.'

Implementation

The teaching of Science at All Saints Primary involves adapting and extending the curriculum to match all pupils' needs. Small steps learning are built into the planning to ensure full coverage and progression for all.. Where possible, Science will be linked to class topics but will also be taught as discrete units, to ensure coverage. Due to the mixed year groups in our school structure, Science units are taught on a two-year rolling programme, with the exception of Y1 and Y2 who are taught through differentiated tasks. This ensures progression between year groups and guarantees all topics are covered.
Activities are planned to allow pupils to develop key knowledge, concepts and skills and to progress according to their ability. Activities within classes are matched to

specific ability groups. Opportunities are planned for open investigations that allow differentiation by outcome. Pupils are presented with a range of activities. Scientific enquiry skills are covered throughout the units and are progressive. Key symbols have been introduced to make it explicitly clear to the children which key enquiry skill they are focusing on in particular lesson. This begins in EYFS and continues through KS1 and into KS2. This allows the children to be clearer about their own learning and make links between concepts and ideas.

EYFS

Foundation Stage pupils work from Statutory framework – Understanding of the world - detailed as follows:

Understanding the world involves guiding children to make sense of their physical world and their community. The frequency and range of children's personal experiences increases their knowledge and sense of the world around them – from visiting parks, libraries and museums to meeting important members of society such as police officers, nurses and firefighters. In addition, listening to a broad selection of stories, non-fiction, rhymes and poems will foster their understanding of our culturally, socially, technologically and ecologically diverse world. As well as building important knowledge, this extends their familiarity with words that support understanding across domains. Enriching and widening children's vocabulary will support later reading comprehension

The planning aims to develop in pupils the crucial knowledge, skills and understanding that help them make sense of the world. Teachers guide the pupils and plan opportunities that allow them to experience and learn through first-hand experiences that observation, problem solving, prediction, critical thinking, decision making and discussion. The skills covered in Early Years provide the foundation for the Science taught in both Key Stage 1 and 2.

Each child is given the opportunity to work with a range of materials and components, to work independently and in teams and to apply skills, knowledge and understanding from other curriculum subjects, where appropriate.

Key stage 1 and 2

Science is taught as a discrete lesson and as part of cross-curricular themes when appropriate. Science has links with other areas of the curriculum including Geography, English, Numeracy, Art and Design Technology. The programmes of study describe a sequence of knowledge and concepts. While it is important that pupils make progress, it is also vitally important that they develop secure understanding of each key block of knowledge and concepts in order to progress to the next stage.
Pupils should be able to describe associated processes and key characteristics in common language, but they should also be familiar with, and use, technical terminology accurately and precisely. They should build up an extended specialist vocabulary. They should also apply their mathematical knowledge to their understanding of science, including collecting, presenting and analysing data.

Recording in Science

The way in which Science is recorded will vary across the school depending on age and ability. Teachers should ensure that a range of appropriate methods are used. These may include:

- Written accounts including: instructions, reports and explanations;
- Diagrams, drawings and pictures;
- Annotated diagrams;
- Spreadsheets (data collection);
- Charts, graphs and tables;
- Model making.

Although most Science will follow a pattern of 'Question, Prediction, Method, Results, Evaluate', it is important to remember that the most valuable time is spent engaging in practical Science which allows children to understand a concept, rather than recording it.

Impact

The successful approach at All Saints results in a fun, engaging, high-quality science education, that provides children with the foundations and knowledge for understanding the world. Our engagement with the local environment ensures that children learn through varied and first hand experiences of the world around them. Frequent, continuous and progressive learning outside the classroom is embedded throughout the science curriculum. Through various workshops, trips and interactions with experts and local charities, children have the understanding that science has changed our lives and that it is vital to the world's future prosperity. Children learn the possibilities for careers in science and are exposed to a range of different scientists from various backgrounds; all children feel they are scientists and capable of achieving.

Resources

Resources are available in a central resource area in the hall store cupboard to be accessed by the teacher and on request from children during projects. All staff are responsible for returning equipment, storing it safely and tidily and informing the Science leader when resources run low or become lost or damaged.

Assessment, recording and reporting

The purpose of assessment, recording and reporting in science is to track progress and identify the next steps in learning for each child.

Assessments are made over a period of time and are based on the evidence of more than one activity.

Formative assessment
Class teachers assess science skills, knowledge and understanding based on outcomes from learning intentions. Marking will be in line with the school's marking policy.

Summative assessment
Assessment of progress is made at the end of each project based on evidence from independent activities and end of unit assessments. Outcomes are recorded using the

school assessment ladders. This information will be used to complete a child's individual report to parents and for the science leader to determine the impact of the provision in the school.

Standards are assessed against EYFS and National Curriculum descriptors as appropriate. Assessment will be through:

- Observations
- Discussions with learners
- Learners' self-assessment
- Assessments on school assessment ladders at the end of topics.

Review

This policy will be reviewed in 2024-2025

Appendices

1. All Saints Curriculum Intent
2. Whole school overview
3. Whole school progression grids
4. Scientific enquiry skills progression
5. Scientific enquiry symbols overview
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Appendix 1 – All Saints Curriculum Intent

As God's children, we are **beginning** our journey towards **becoming** lifelong learners and **belonging** to our Christian and diverse community and **believing** in that we can live life in all its fullness and flourish.

Reflective & Spiritual
- Our strong Christian ethos and special family atmosphere permeates all we do in school and provides children with the opportunity to reflect upon their special place in the world.

Motivated & Aspirational
- Children are inspired to strive for the highest possible goals, making them fully prepared for an ever changing world. Learning is challenging and engaging, ensuring pupils develop a 'can do' attitude.

Curious & Investigative
- Learning takes places in many different forms, providing pupils with opporunitites to lead their own learning through investigations and open-ended tasks. Following their own interests enables our pupils to develop into life-long learners.

Independent & Resilient
- The curriculum inspires pupils to take responsibility for their own learning, meaning that they are tackle complex problems and develop independence skills. Pupils are armed with a range of self-help strategies and are able to persist when challenged.

Collaborative & Inlcusive
- A culture of understanding and empathy for others enables pupils to appreciate and respect difference, preparing them for life in modern Britain. The deep sense of community within our Christian context is built upon through learning of other cultures, times and places in the world; everyone is valued, happy, safe and secure.

Creative & Skilful
- No one type of learning is favoured over others; skills are developed through their application to many different contexts. Taught skills across the curriculum are progressive and enable pupils to respond in a variety of creative ways.

Knowledgeable & Thoughtful
- A knowledge-rich curriculum enables pupils to progressively build upon their learning. They consider all information critically and are able to make links between different subjects.

Flexible & Risk-taker
- Our learning journey is flexible and provides challenge for all. Pupils are taught how to manage risk and approach tasks in a flexible manner, meaning that they are well-prepared for an ever-changing world.

Science Curriculum Whole School Overview

EYFS

One Year Programme					
Aut1	Aut2	Spr1	Spr2	Sum1	Sum2
Autumn BQ: What colour are the leaves?	**My body** BQ: How **can I look after myself?**	**Compare & contract environments** BQ: Where is a camel from?	**Spring** BQ: What is best material for the Three Pigs to build a house from	**Growth** BQ: How do things change/ grow over time?	**Recycling** BQ: Is the world changing a bad thing?

Years 1 and 2

One Year programme					
Aut1	Aut2	Spr1	Spr2	Sum1	Sum2
Everyday materials BQ: Can we improve on the way we live our lives today?	**<u>Seasonal changes</u> and STEM activities linked to design and make weather tools** BQ: What would happen if the world stopped moving?	**Animals including humans – the body** BQ: Do I grow in the same way as a tomato?	**Animals including humans - animals** BQ: Is it fair to keep animals as pets?	**Living things and their habitats** BQ: Should we be part of the food chain?	**Plants** **<u>Seasonal changes</u>** BQ: What would happen if we lived for hundreds of years like a tree?

Years 3 and 4

Rolling Programme Cycle A					
Aut1	Aut2	Spr1	Spr2	Sum1	Sum2
Light and Dark *BQ: How does the sun make light?*	**Forces** *BQ: How have our ideas about forces changed over time?*	**Magnets** *BQ: How does a compass work?*	**Animals, including the human body** *BQ: What you, you?*	**Rocks and Fossils** *BQ: Can learning about the past help us learn about the future?*	**Plant lifecycles** *BQ: What are all the different ways that seeds disperse?*

Rolling Programme cycle B					
Aut1	Aut2	Spr1	Spr2	Sum1	Sum2
Classifying Living Things and Food Chains *BQ: How and why do we classify living things?*	**Sound and Hearing** *BQ: Does a sound happen if nobody is around to hear it?*	**Materials: Solids, liquids and Gases** *BQ: Where does a puddle go?*	**Plants** *BQ: What do plants need to grow as strong and healthy as possible?*	**Electricity** *BQ: Why are insulators as important as conductors?*	**Digestion and Health** *BQ: What does it mean to be healthy?*

Years 5 and 6

Rolling Programme - cycle A				
Aut1	Aut2	Spr1	Spr2	Sum1
Scientists and Inventors BQ: Can you make your own luck?	**Properties and changes of materials** BQ: Is everlasting ice possible?	**Forces** BQ: Can the weak overcome the strong?	**Animals including Humans, life cycles** BQ: What does it mean to lead and happy and fulfilling life?	**Living Things and their Habitats** BQ: What impact do I have on the environment?

Rolling Programme cycle B					
Aut1	Aut2	Spr1	Spr2	Sum1	Sum2
Electricity BQ: Does electricity improve your life?	**Earth & Space** BQ: Do I have what it takes to be an astronaut?	**Light** BQ: Does light ever stop travelling?	**Animal including humans, healthy living** BQ: What does healthy look like?	**Evolution and Inheritance** BQ: Do you always have to agree?	**Living things and classification** BQ: Should everything have a label?

	Working Scientifically	Working Scientifically	Materials & Living Things	Habitats & The Natural World	Human Health
EYFS	Looks closely at similarities, differences, patterns and change	They make observations of animals and plants and explain why some things occur, and talk about changes	Children know about similarities and differences in relation to places, objects, materials and living things.	They talk about the features of their own immediate environment and how environments might vary from one another.	Children know the importance for good health of physical exercise, and a healthy diet, and talk about ways to keep healthy and safe.

	Working Scientifically	Plants	Animals Including Humans	Materials	Earth and Space
Year One	Asks questions raised by their own exploration of the world around them. Draws on their everyday experiences to help answer questions. Begins to use simple features to compare objects, materials and living things. Asks people questions to find answers. Responds to prompts by making some suggestions about how to find an answer or make observations.	Identifies and names a variety of common wild and garden plants, including deciduous and evergreen trees. Identifies and describes the basic structure of a variety of common flowering plants, including trees.	Identifies and names a variety of common animals including fish, amphibians, reptiles, birds and mammals. Identifies and names a variety of common animals that are carnivores, herbivores and omnivores. Describes and compares the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets). Identifies, names, draws and labels the basic parts of the human body and says which	Distinguishes between an object and the material from which it is made. Identifies and names a variety of everyday materials, including wood, plastic, glass, metal, water, and rock. Describes the simple physical properties of a variety of everyday materials. Compares and groups together a variety of everyday materials on the basis of their simple physical properties.	Names the four seasons and understands that they have differences. Begins to describe the different seasons. Observes changes across the 4 seasons and identifies what time of year they fall. Observes and describes weather associated with the seasons and how day length varies. *Could work scientifically by: making tables and charts about the weather.*

	Uses their senses and simple equipment to make observations. Begins to record data in simple templates provided for them. Responds to prompts to talk about what they have found out. Says what has changed when observing objects, living things or events.		part of the body is associated with each sense.	Could work scientifically by: performing simple tests to explore questions, for example "What is the best material for ....."?	

	Working Scientifically	Plants	Animals Including Humans	All Living Things	Materials
Year Two	Uses different types of scientific enquiry...Finding things out using secondary sources of information. Asks their own questions about what they notice. Uses different types of scientific enquiry...Observing changes over time. Uses different types of scientific enquiry...Carrying out simple comparative tests. Communicates their ideas, what they do and what they find out in a variety of ways.	Describes basic needs of plants for survival and the impact of changing these and the main changes as seeds and bulbs grow into mature plants. Finds out and describes how plants need water, light and a suitable temperature to grow and stay healthy. Describes seasonal changes.	Notices that animals, including humans, have offspring which grow into adults. Describes the basic needs of animals for survival and the main changes as young animals, including humans, grow into adults. Names and locates parts of the human body, including those related to the senses, and describes the importance of exercise, balanced diet and hygiene for humans. Describes and compares the observable features of	Identifies whether things are alive, dead or have never lived. Describes how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other. Names different plants and animals and describe how they are suited to different habitats. Groups animals according to what they eat, describe how animals get their food from other animals and/or plants, and use simple food chains	Distinguishes objects from materials, describes their properties, identifies and groups everyday materials and compares their suitability for different uses. Finds out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching

	Uses different types of scientific enquiry...Noticing patterns. Uses different types of scientific enquiry...Grouping and classifying things.		animals from a range of groups.	to describe these relationships.	

Y3/4	Working Scientifically	Light and Dark *BQ: How does the sun make light?*	Forces *BQ: How have our ideas about forces changed over time?*	Magnets *BQ: How does a compass work?*	Animals Including the Human Body *BQ: What makes you, you?*	Rocks & Fossils *BQ: Can learning about the past help us learn about the future?*	Plant Lifecycles *BQ: What are all the different ways that seeds disperse?*
Cycle A	Responds to suggestions of how to answer questions about the world around them, and begins to raise their own relevant questions. Is able to use suggested methods of enquiry. Understands what a simple fair test is, and with support helps to set it up. Begins to look for patterns and with help decides what data to collect to identify them. Learns how to use new equipment, such as data loggers, appropriately. With help collects data from their own observations and measurements, using notes, simple tables and standard units. Talks about how the data may be recorded. Beginning to use scientific language to discuss their ideas and communicate their findings. Beginning to report findings using basic oral and written explanations,	Recognises that they need light in order to see things and that dark is the absence of light. Notices that light is reflected from surfaces. Recognises that light from the sun can be dangerous and that there are ways to protect their eyes. Recognises that shadows are formed when the light from a light source is blocked by a solid object. Could work scientifically by: finding patterns in the way that the size of shadows change.	Compares how things move on different surfaces. Notices that some forces need contact between 2 objects. Could work scientifically by: Raise questions when carrying out their tests to find out how far things move on different surfaces, and gather and record data to find out answers to these questions.	Observes how magnets attract or repel each other and attract some materials and not others. Compares and groups together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identifies some magnetic materials. Describes magnets as having 2 poles. Predicts whether 2 magnets will attract or repel each other, depending on which poles are facing.	Identifies that humans and some other animals have skeletons and muscles for support, protection and movement. Explores ideas about what would happen if humans did not have skeletons. Could work scientifically by: identifying and grouping animals with and without skeletons and observing and comparing their movement.	Compares and groups together different kinds of rocks on the basis of their appearance and simple physical properties. Describes in simple terms how fossils are formed when things that have lived are trapped within rock. Recognises that soils are made from rocks and organic matter. Could work scientifically by: observing rocks, including those used in buildings and gravestones, and exploring how and why they might have changed over time.	Explore the part that flowers play in the life cycle of flowering parts, including pollination, seed formation and seed dispersal. Discover the essential role of bees and other insects in the pollination of flowers. Recognise that different plants disperse their seeds in different ways.

	displays or presentations of results. With help makes prediction for new values within or beyond the data they have collected.						

Y3/4	Working Scientifically	Classifying Living Things and Food Chains *BQ: How do we classify living things?*	Sound and Hearing *BQ: Does a sound happen if nobody is around to hear it?*	Materials: Solids, Liquids and Gases *BQ: Where does the puddle go?*	Plants *BQ: What do plants needs in order to grow as strong and healthy as possible?*	Electricity *BQ: Why are insulators as important as conductors?*	Animals, including Humans: Digestion and Health *BQ: What does it mean to be healthy?*
Cycle B	Raises their own relevant questions about the world around them. Uses different types of scientific enquiry to answer the questions they raise. Recognises when and how secondary sources should be used. Starts to make their own decisions about the most appropriate type of scientific enquiry they might use to answer questions. Recognises when a simple fair test is necessary and helps to decide how to set it up. Begins to look for patterns and decides what data to collect to identify them. Makes some decisions about what observations to make, how long to make them for and the type of simple equipment that might be used. Uses a range of equipment, including thermometers and data loggers, appropriately. Collect data from their own observations and	Recognises that living things can be grouped in a variety of ways. Explores and uses classification keys to help group, identify and name a variety of living things in their local and wider environment. Recognises that environments can change and that this can sometimes pose dangers to living things. Construct and interpret a variety of food chains, identifying producers, predators and prey.	Identifies how sounds are made, associating some of them with something vibrating. Recognises that vibrations from sounds travel through a medium to the ear. Finds patterns between the pitch of a sound and features of the object that produced it. Finds patterns between the volume of a sound and the strength of the vibrations that produced it. Recognises that sounds get fainter as the distance from the sound source increases. Could work scientifically by: finding patterns in the sounds	Compares and groups materials together, according to whether they are solids, liquids or gases. Observes that some materials change state when they are heated or cooled, and measures or researches the temperature at which this happens in degrees Celsius (C). Could work scientifically by: grouping and classifying a variety of different materials; exploring the effect of temperature on substances such as chocolate, butter, cream etc. Identifies the part played by evaporation and condensation in the water cycle and associates the rate of evaporation with temperature.	Identifies and describes the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers. Explores 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. Investigates the way in which water is transported within plants. Could work scientifically by: comparing the effect of different factors on plant growth, for example, the amount of light, the amount of fertiliser etc. that are made by different objects such as saucepan lids of different sizes or elastic bands of different thicknesses.	Identifies common appliances that run on electricity. Constructs a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers. Identifies 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. Recognises that a switch opens and closes a circuit and associates this with whether or not a lamp lights in a simple series circuit. Recognises some common conductors.	Identifies that animals, including humans, need the right types of nutrition, and that they cannot make their own food; they get nutrition from what they eat. Describe the simple functions of the basic parts of the digestive systems in humans. Identify the different types of teeth in humans and their simple functions.

	measurements, using notes, simple tables and standard units. Helps to make decisions about how to record and analyse the data. Gathers, records, classifies and presents data in a variety of ways to help in answering questions. Uses relevant scientific language to discuss their ideas and communicate their findings in ways that are appropriate for different audiences. Records findings using a range of methods including drawings, labelled diagrams, keys, bar charts, and tables. Reports on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. Uses straightforward scientific evidence to answer questions and to support their findings. Finds ways of improving what they have already done.						

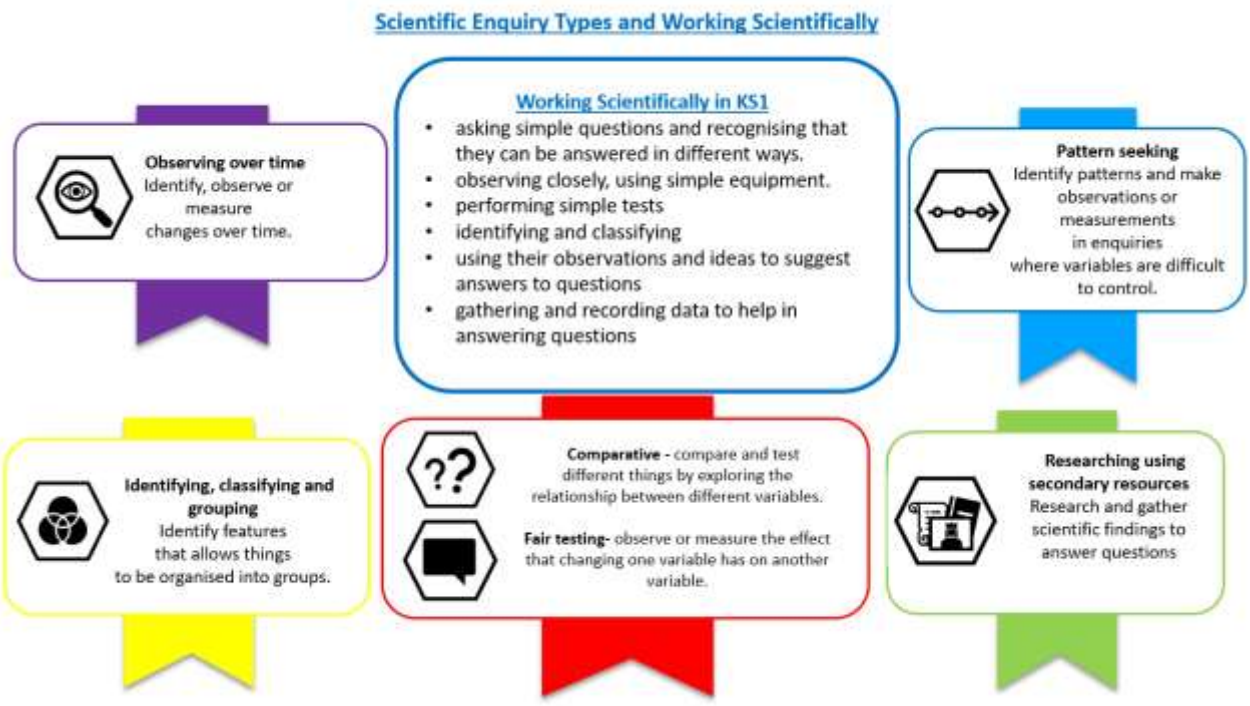
Y5/6	Working Scientifically	Scientists & Inventors **BQ: Can you make your own luck?**	Materials **BQ: Is everlasting ice possible?**	Forces **BQ: Can the weak overcome the strong?**	Animals Including Humans **BQ: What does it mean to live a happy and fulfilling life?**	Living Things and Their Habitats **BQ: What impact do I have on the environment?**
Cycle A	Explores ideas and raises different kinds of relevant questions. Recognises which secondary sources are most useful to research their ideas and begins to recognise that there are differences between fact and opinion. With increasing confidence selects and plans the most appropriate type of scientific enquiry for answering a scientific question. Recognises when and how to set up comparative and fair tests and is beginning to explain which variables need to be controlled and why. Makes their own decisions about what observations to make, what measurements to use and how long to make them for. Chooses appropriate equipment to make measurements. Decides how to record data from a choice of familiar approaches. Uses relevant scientific language and illustrations to discuss and communicate their ideas. Is sometimes able to justify their scientific ideas. Talks about how scientific ideas have developed over time. Uses and develops keys and other information records to	Explore Stephen Hawking's work on Black holes. Explore the work of zoologist Libbie Hyman. Describe how the work of Marie Maynard Daly has changed lives. Describe the impact of Alexander Fleming's discovery has had on life. Explore the work of Steve Jobs and the impact of modern technology. Give a reasoned argument as to which scientist or inventor has had the greatest impact on modern life.	Knows that some materials will dissolve in liquid to form a solution, and describes how to recover a substance from a solution. Uses knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating. Gives reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic. Demonstrates that dissolving, mixing and changes of state are reversible changes. Explains 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.	Explains that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. Identifies the effects of air resistance, water resistance and friction which act between moving surfaces. Recognises that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect.	Describes the changes as humans develop to old age. Draws a timeline to indicate stages in the growth and development of humans. Learns about the changes experienced in puberty. Could work scientifically by researching the gestation periods of other animals and comparing them with humans. Could work scientifically by finding out and recording the length and mass of a baby as it grows.	Describes the differences in the life cycles of a mammal, an amphibian, an insect and a bird. Describes the life process of reproduction in some plants and animals. Could work scientifically by: observing and comparing the life cycles of plants and animals in their local environment with other plants and animals around the world (in the rainforest, in the oceans, in desert areas and in prehistoric times), asking pertinent questions and suggesting reasons for similarities and differences.

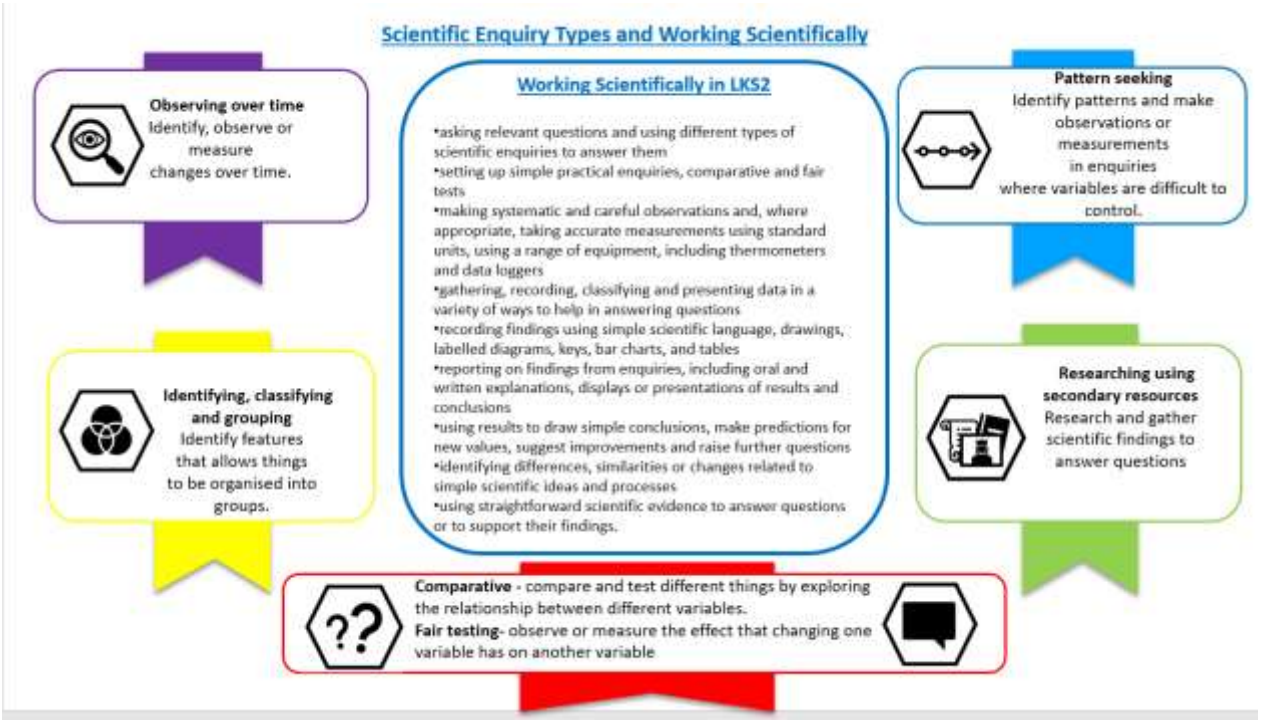
	identify, classify and describe living things and materials, and identify patterns that might be found in the natural environment. Records data and results using scientific diagrams and labels, classification keys, tables, and bar and line graphs. Uses simple models to describe scientific ideas. Reports and presents findings from enquiries, including conclusions, causal relationships and explanations of results, in oral and written forms such as displays and other presentations. Looks for different causal relationships in their data and begins to identify evidence that refutes or supports their ideas. Uses their results to identify when further tests and observations might be needed.					

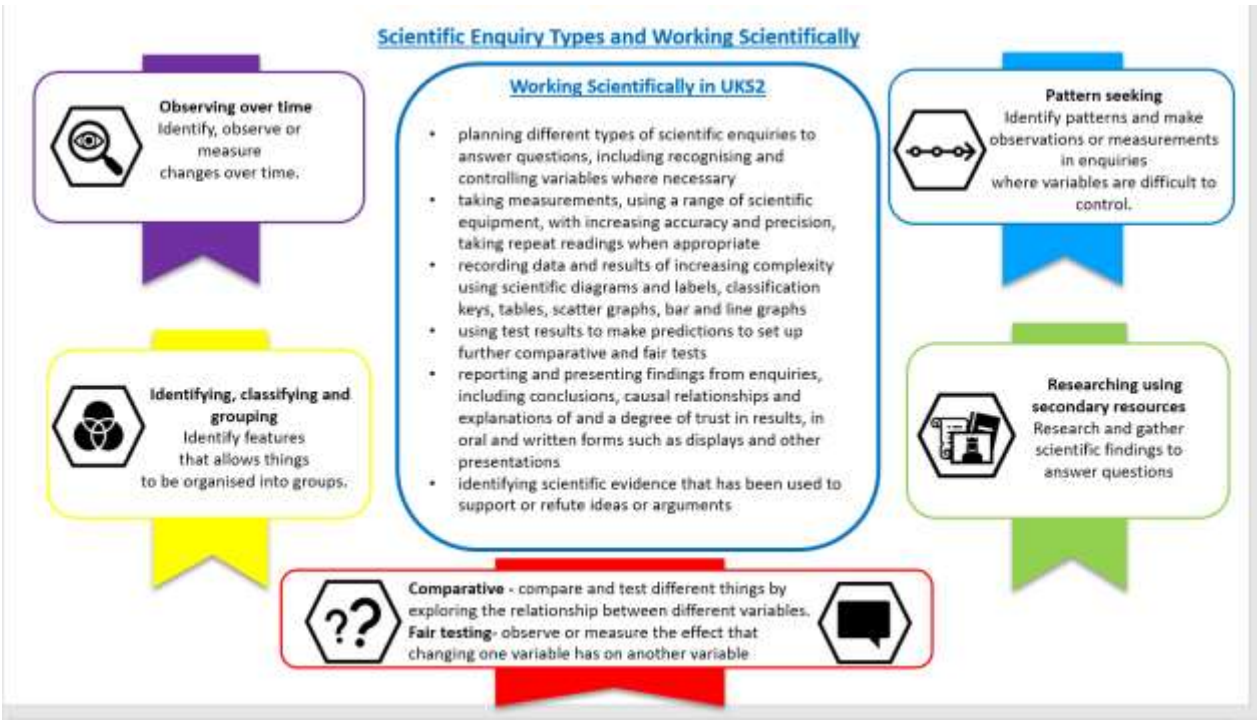
Y5/6	Working Scientifically	Electricity **BQ: Does electricity improve your life?**	Earth & Space **BQ: Do I have what it takes to be an astronaut?**	Light **BQ: Does light ever stop travelling?**	Animals Including Humans **BQ: What does healthy look like?**	Evolution & Inheritance **BQ: Do you always have to agree?**	All Living Things **BQ: Should everything have a label?**
Cycle B	Asks their own questions about the scientific phenomena that they are studying, and select the most appropriate ways to answer these questions, recognising and controlling variables where necessary (i.e. observing changes over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests, and finding things out using a wide range of secondary sources). Uses a range of scientific equipment to take accurate and precise measurements or readings, with repeat readings where appropriate. Uses a range of scientific equipment to take accurate and precise measurements or readings, with repeat readings where appropriate. Records data and results using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. Describes and evaluates their own and others scientific ideas related to topics in the national curriculum (including ideas that have changed over time), using	Associates the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit. Compares and gives reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches. Uses use simple apparatus to construct and control a series circuit, and describe how the circuit may be affected when changes are made to it; and use recognised symbols to represent simple series circuit diagrams. Could work scientifically by: systematically identifying the effect of changing one component at a time in a circuit; designing and making a set of traffic lights, a burglar alarm or some other useful circuit.	Describes the movement of the Earth and other planets relative to the sun in the solar system. Describes the movement of the moon relative to the Earth. Describes the sun, Earth and moon as approximately spherical bodies. Uses the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.	Uses the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye. Explains that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes. Uses the idea that light from light sources, or reflected light, travels in straight lines and enters our eyes to explain how we see objects, and the formation, shape and size of shadows. Could work scientifically by: designing and making a periscope and using the idea that light appears to travel in straight lines to explain how it works.	Names and describe the functions of the main parts of the digestive, musculoskeletal and circulatory systems; and describes and compares different reproductive processes and life cycles in animals. Describes the effects of diet, exercise, drugs and lifestyle on how their bodies function. Names, locates and describes the functions of the main parts of plants, including those involved in reproduction and transporting water and nutrients.	Can use the basic ideas of inheritance, variation and adaptation to describe how living things have changed over time and evolved; and describe how fossils are formed and provide evidence for evolution. Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents. Identifies how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution. Describes the requirements of plants for life and growth; and explains how environmental changes may have an impact on living things.	Uses the observable features of plants, animals and microorganisms to group, classify and identify them into broad groups, using keys or in other ways. Gives reasons for classifying plants and animals based on specific characteristics. Could work scientifically by: using classification systems and keys to identify some animals and plants in the immediate environment. Can construct and interpret food chains.

	evidence from a range of sources. Draws conclusions, explains and evaluates their methods and findings, communicating these in a variety of ways. Raises further questions that could be investigated, based on their data and observations. Looks for different causal relationships in their data and identifies evidence that refutes or supports their ideas. Uses test results to make predictions to set up further comparative and fair tests.						

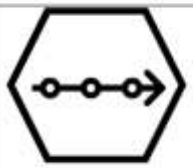
Appendix 4 – SC1 skills progression






Scientific Enquiry Types and Working Scientifically
Observing over time
Identify, observe or measure changes over time.
Working Scientifically in UKS2
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 presentations
identifying scientific evidence that has been used to support or refute ideas or arguments
Pattern seeking
Identify patterns and make observations or measurements in enquiries where variables are difficult to control.
Identifying, classifying and grouping
Identify features that allows things to be organised into groups.
Researching using secondary resources
Research and gather scientific findings to answer questions
Comparative - compare and test different things by exploring the relationship between different variables.
Fair testing- observe or measure the effect that changing one variable has on another variable

Appendix 5 – SC1 symbol overview

Observing	Grouping	Questioning	Explaining	Linking	Researching
					

Appendix 6 – Knowledge organiser example

UKS2 Science: Scientists and Inventors

Cycle A: Autumn Term 1

Key driver: Resilience (Wisdom & Dignity)

Big Question:
Can you make your own luck?

Learning Sequence:

1. Explore Stephen Hawking's work on Black Holes.
2. Explore the work of zoologist Libbie Hyman.
3. Describe how the work of Marie Maynard Daly has changed lives.
4. Describe the impact of Alexander Fleming's discovery has had on life.
5. Explore the work of Steve Jobs and the impact of modern technology.
6. Give a reasoned argument as to which scientist or inventor has had the greatest impact on modern life.

Key Vocabulary:
astrophysicist
Black Hole
event horizon
classification
cholesterol
innovator
technology
invertebrates
penicillin
'mould juice'
antibiotic
bacteria

Key Knowledge:

Key Individuals	
Stephen Hawking	Stephen Hawking was an astrophysicist whose theories, including those concerning black holes, have changed the way we understand the universe.
Libbie Hyman	Libbie Hyman was a zoologist who is best known for her work on the classification of invertebrates.
Marie Maynard Daly	Marie Maynard Daly is known for her work on how the heart and circulatory system are affected by sugar and cholesterol.
Alexander Fleming	Alexander Fleming is well known for discovering the world's first antibiotic that could be used to treat illnesses caused by bacteria. He called it penicillin.
Steve Jobs	Steve Jobs was an innovator, inventor and entrepreneur who introduced new technologies to the public. He co-founded the technology company, Apple Incorporated, and launched the iPod, iPhone and iPad.

How Penicillin Was Discovered

Before going away on holiday, Alexander Fleming had not cleaned up his recent experiments with bacteria. On his return, he noticed that mould had grown in one of the Petri dishes. The colonies of bacteria around the mould had been destroyed, whereas the bacteria in other Petri dishes were still alive.

He originally called his discovery 'mould juice', but in March 1929 he officially named the substance 'penicillin', now a widely used antibiotic.

The Effects of Cholesterol

Too much of one type of cholesterol in our diets can cause it to build up and block blood vessels, which can be very dangerous. This type of cholesterol was what interested Marie Maynard Daly.

Her work has demonstrated that too many fatty and sugary foods can make the arteries narrower and can cause heart disease.

Appendix 5 - Flipchart Planning Example