Science statement of intent

Science education provides the foundation for understanding our rapidly changing world, from the challenge of climate change and loss of biodiversity, to renewable energy and manned flights to Mars. At Ashleworth C of E Primary School we aspire for all students to develop a passion for Science and a keen desire to learn more about the subject as they transition from Primary to Secondary school. We offer our students a broad and balanced science curriculum that evokes curiosity, excitement and an awareness of the world around them, through the disciplines of biology, chemistry and physics.

How do we teach Science at Ashleworth C of E Primary School?

The recently restructured KS1 and KS2 rolling programmes have provided an ambitious curriculum which is coherently planned to ensure progression of cumulative learning, building on and supporting the student's learning strategies through effective and vocabulary-rich teaching.

In Class 1 the 2-year rolling programme of Science covers KS1 and includes children in the Early Years setting, with pupils having one hour-long lesson of Science per week.

Key Stage 1 Science Rolling Programme:

Year A			Year B		
Seasonal changes (Link to FSch on-going) Everyday Materials (EM) Objects & what they're made of. Identify & name variety of EM's. Describe properties of variety of EM's. Compare & group EM's based on simple properties.	Animals, including humans Identify & name variety of common animals (vertebrates). Describe & compare their structure. Identify common carnivores, herbivores & omnivores. Identify basic parts of human body (senses)	Seasonal Changes Observe changes across 4 seasons, including how weather changes. Describe how day length varies. Plants Identify & name variety of common plants/trees. Identify structure of flowering plant/tree	Seasonal changes (Link to FSch on-going) Uses of Everyday Materials (EM) Identify suitability of EMs for particular uses. Explore how some solids change shape by squashing, bending, twisting, stretching.	Plants How seeds & bulbs grow into mature plants. Plants need water, light, & warmth to grow. Animals, inc. humans Animals have offspring which grow into adults. Basic needs of animals for survival (water, food, air) Importance to humans of good diet, exercise & good hygiene.	Living things & their Habitats Explore/compare living, non-living & never-lived. Living things & their habitats - provide all basic needs for plants/animals & inter-dependence. Identify & name variety of plants & animals in their habitats. Describe idea of simple food chain.

In Class 2 there is a 4-year rolling programme of Science to cover both upper and lower KS2, and the pupils devote a whole afternoon to the exploration of the subject, on a fortnightly basis.

Key Stage 2 Science Rolling Programme:

YEAR A	YEAR B	YEAR C	YEAR D
Autumn	**Autumn**	**Autumn**	**Autumn**
Y3 Light Recap Light (Year C)	Y3 Plants:	Y4 Living things & their Habitats: Recap basic structure of plants (Year B)	Y4 Electricity Recap Electricity (Year B)
Y4 Animals including Humans Recap Nutrition (Year D)	Y4 Sound:	Y3 Forces & Magnets Recap Forces (Year A)	Y3 Animals including Humans Recap Digestive system (Year A)
Spring	**Spring**	**Spring**	**Spring**
Y3 Rocks Recap fossils (Year B)	Y5 Living things & Habitats: Recap life cycle of plants (Year B) Y5 Animals including humans	Y4 States of Matter Recap Properties of materials (Year D)	Y5 Properties & changes of Materials Recap States of Matter (Year C)
Y5 Forces Recap force between surfaces (Year C)	Y6 Electricity: Recap simple circuits (Year D)	Y5 Earth & Space	
Summer	**Summer**	**Summer**	**Summer**
Y6 Animals including humans	Y6 Evolution & Inheritance: Recap Rocks (Year A)	Y6 Light Recap Light (Year A)	Y6 Living Things & their Habitats Recap Sorting living things (Year C)

(Further details of the KS2 Rolling Programme can be seen at Appendix 1)

Planning for science is based on the National Curriculum 2014 with the working scientifically skills following a progressive approach. Existing knowledge is checked at the beginning of each topic, as part of the KWL strategy (What I know, What I would like to Know and What I have Learned). This ensures that teaching is informed by the children's starting points and that it takes account of pupil voice, incorporating children's interests. At the start of a new topic, class teachers provide an input to stimulate and engage the pupils, and evoke critical thinking. The programmes have a strong emphasis on practical activities, providing exciting investigations with plenty of opportunity for students to simply explore, investigate and question, while developing their knowledge, skills and abilities.

Examples of children's learning:

Class 1 activities are planned, carried out and results recorded in the class Big Science Book, using photographs, observations and pictures produced by the pupils.

(See Appendix 2)

Class 2 students have individual Science books, recording their learning in a variety of methods including planning grids, photographs, diagrams, observation frameworks, tables and graphs.

(See Appendix 3)

Individual topics within the rolling programmes are planned to ensure the relevant key features of scientific enquiry have been taught: observing over time; pattern seeking; identifying, classifying and grouping; comparative and fair testing; and researching using secondary sources. Key scientific language is modelled throughout lessons, enabling our children to become familiar with and use vocabulary accurately. Science is taught discretely, but links across other subjects are made to ensure creative cross-curricular learning. We want our children to make strong connections between scientific concepts, and use these to support their learning and

understanding across other subject areas, especially Forest School, Maths and Technology. Children are offered a wide range of visits, trips and visitors to complement and broaden the curriculum. These are purposeful and link with the knowledge being taught in class. Whole-school 'Science Days' (supported by the Cheltenham Science Group) are used to expose the children to a wealth of inspirational and challenging activities, and children participate in the annual Cheltenham Science Festival.

How do we assess Science?

Milestones are used to ensure full coverage of the Science curriculum. Milestone 1 is for KS 1, Milestone 2 is for lower KS2 and Milestone 3 is for upper KS2.

Reception pupils are assessed against the appropriate Early Learning Goals.

Outcomes of work in Class 1 are regularly monitored to ensure they reflect a sound understanding of the key identified vocabulary and knowledge, utilising materials produced for the Big Book.

In Class 2 we use a range of assessment strategies, including:

- Pupil questioning and discussion; '3 Quick Questions' at the start of each lesson (based on a previously taught topic) reinforce the embedding of existing knowledge.
- Self-assessment using the RAG system – the children evaluate their own learning.
- Regular marking of classwork and homework by teacher.
- We use CIEC (Centre for Industry Education Collaboration) evaluation grids to monitor the range of Working Scientifically skills experienced in lessons. (Appendix 4)

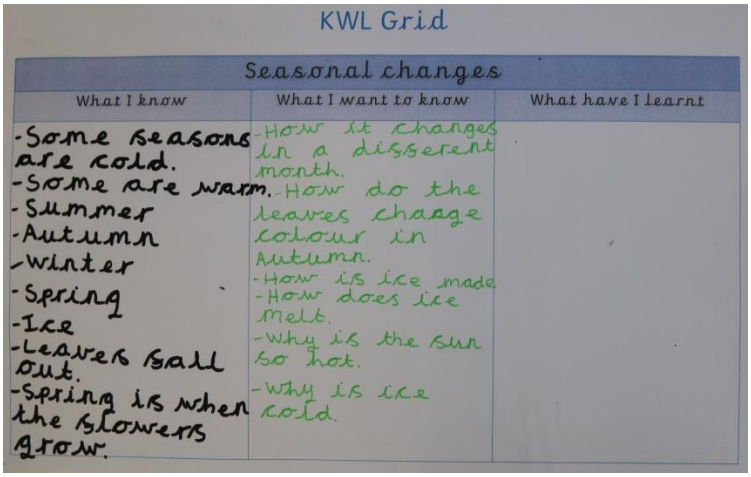
Children are assessed at the end of Years 2 and 6 for the end of Key Stage Statutory assessments.

** *In 2021, schools do not need to make or submit teacher assessment (TA) judgements for pupils in science*. ** (Standards & Testing Agency, December 2020)

Appendix 1: Key Stage 2 Science - Rolling Programme:

YEAR A	YEAR B	YEAR C	YEAR D
Autumn	**Autumn**	**Autumn**	**Autumn**
Y3 Light **Recap Light (Year C)** Light & Dark. Reflection of light. Light from Sun & protecting eyes. How are shadows formed? Investigating shadows.	**Y3 Plants:** Structure & function, requirements for life & growth, water transport, flowers, pollination, seed formation & dispersal	**Y4 Living things & their Habitats:** **Recap basic structure of plants (Year B)** Living things can be grouped in variety of ways, explore, create & use classification keys. Envts change – can cause danger to living things.	**Y4 Electricity** **Recap Electricity (Year B)** Appliances that use electricity. Making simple series circuits – cells, wires, lamps, switches & buzzers. Exploring conductors & insulators.
Y4 Animals including Humans **Recap Nutrition (Year D)** Digestive system. Different types of human teeth & functions. Construct food chains; producer, predator, prey.	**Y4 Sound:** How sounds are made, vibrations travel to the ear, exploring pitch and volume, volume decreases with distance.	**Y3 Forces & Magnets** **Recap Forces (Year A)** Friction of surfaces, magnetic forces, magnets attract or repel & have 2 poles. Magnetic & non-magnetic materials.	**Y3 Animals including Humans** **Recap Digestive system (Year A)** Animals need right types of nutrition. Some animals have skeletons & muscles for support, protection & Movement.
Spring	**Spring**	**Spring**	**Spring**
Y3 Rocks **Recap fossils (Year B)** Compare & group rocks by appearance & physical properties. Describe how fossils are formed. Soils – made from rocks & organic matter	**Y5 Living things & Habitats:** **Recap life cycle of plants (Year B)** Life cycles of mammal, amphibian, insect & bird. Reproductive processes of plants & animals. **Y5 Animals including humans** Changes to humans as they age.	**Y4 States of Matter** **Recap Properties of materials (Year D)** Compare & group materials (solid, liquid, gas). Investigate how materials can change state. Water Cycle – evaporation & condensation.	**Y5 Properties & changes of Materials** **Recap States of Matter (Year C)** Group everyday materials by properties; hardness, solubility, transparency, electrical & thermal conductivity, response to magnets. Exploring solubility. Separating materials by filtering, sieving & evaporating using knowledge of solids, liquids & gases. Uses of materials & fair tests. Reversible and irreversible reactions.
Y5 Forces **Recap force between surfaces (Year C)** Gravity – objects falling toward Earth. Exploring friction, air resistance & water resistance. Mechanisms – levers, pulleys & gears using small forces.	**Y6 Electricity:** **Recap simple circuits (Year D)** Increasing no. of cells increases brightness of lamps/loudness of buzzer. Function of components of a circuit. Simple circuit diagrams.	**Y5 Earth & Space** Movement of Earth, Sun & planets. Sun, Earth & Moon as spheres. Movement of Moon relative to Earth. Explain night & day in terms of Earth's rotation.	
Summer	**Summer**	**Summer**	**Summer**
Y6 Animals including humans Main structure & function of circulatory system. How nutrients & water are transported in animals (inc humans) Impact of diet, exercise, drugs & lifestyle on body.	**Y6 Evolution & Inheritance:** **Recap Rocks (Year A)** Living things change over time, fossil information. Offspring from parents vary. Living things adapt to environment and how this may lead to evolution.	**Y6 Light** **Recap Light (Year A)** Light travels in straight lines – formation of shadows. Light reflects from objects into our eyes, using light from a light source.	**Y6 Living Things & their Habitats** **Recap Sorting living things (Year C)** How animals, plants & micro-organisms are classified into groups by characteristics. Why we sort living things in this way.

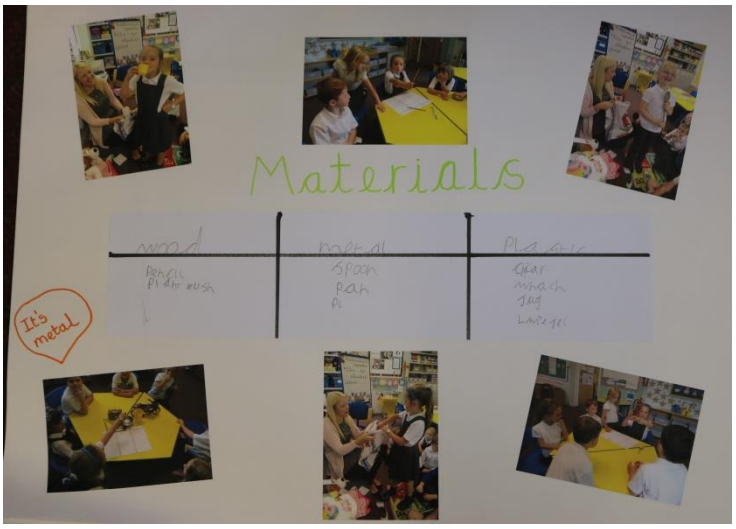
Appendix 2: Examples of work produced in the Science Big Book (KS1)

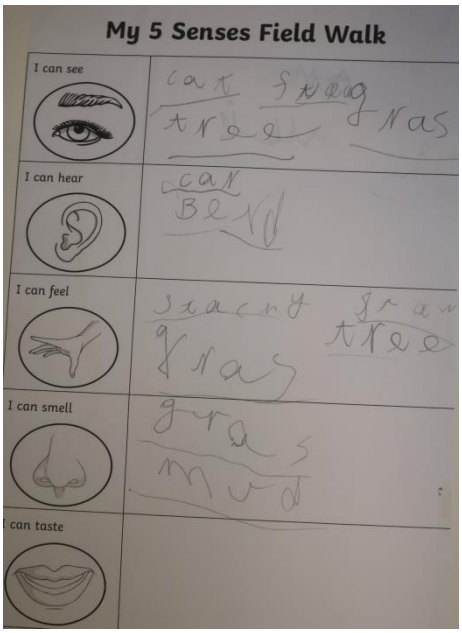


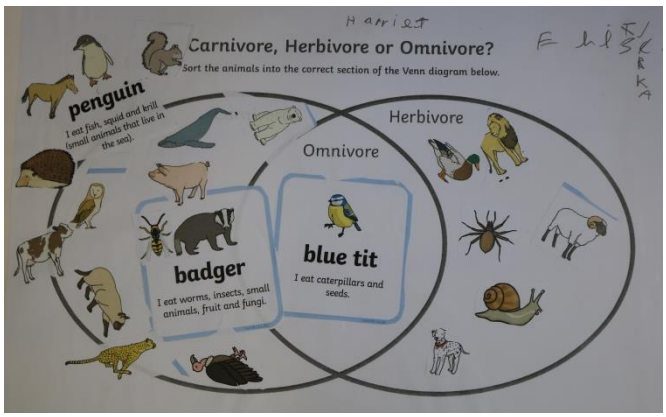
KWL Grid

Seasonal changes

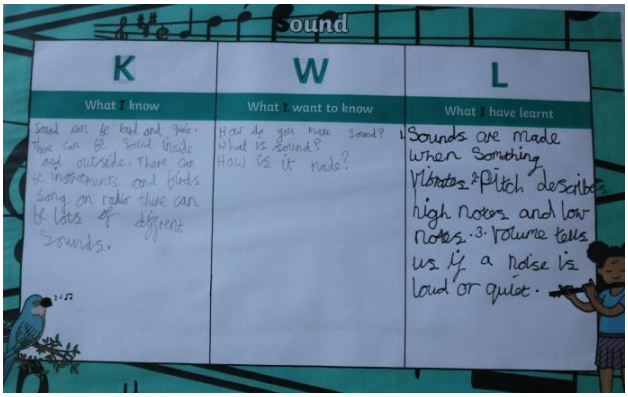
What I know	What I want to know	What have I learnt
-Some seasons are cold. -Some are warm. -Summer -Autumn -Winter -Spring -Ice -Leaves fall out. -Spring is when the flowers grow.	-How it changes in a different month. -How do the leaves change colour in Autumn. -How is ice made -How does ice melt. -Why is the sun so hot. -Why is ice cold.	

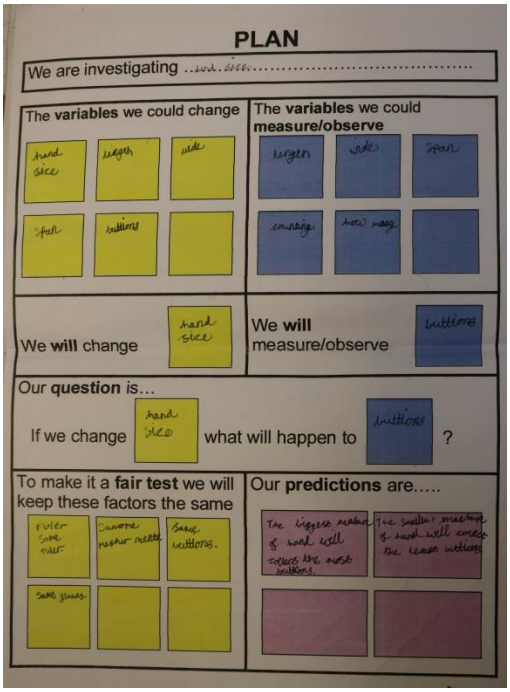


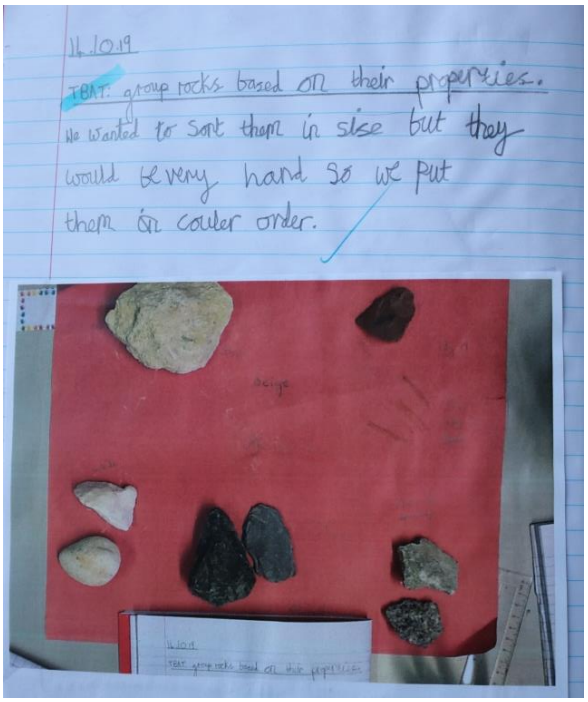


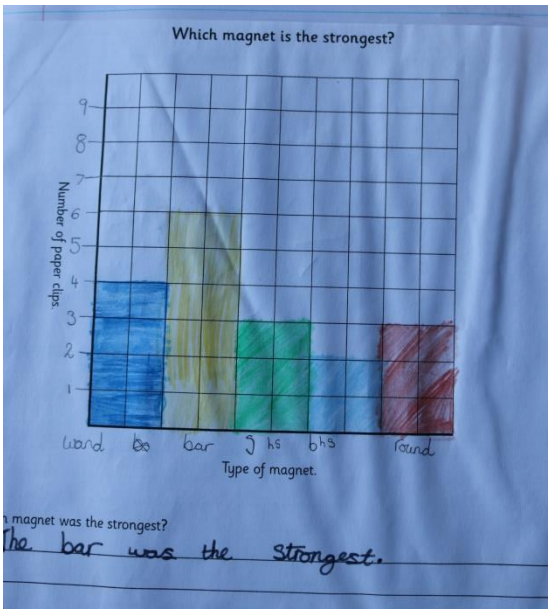


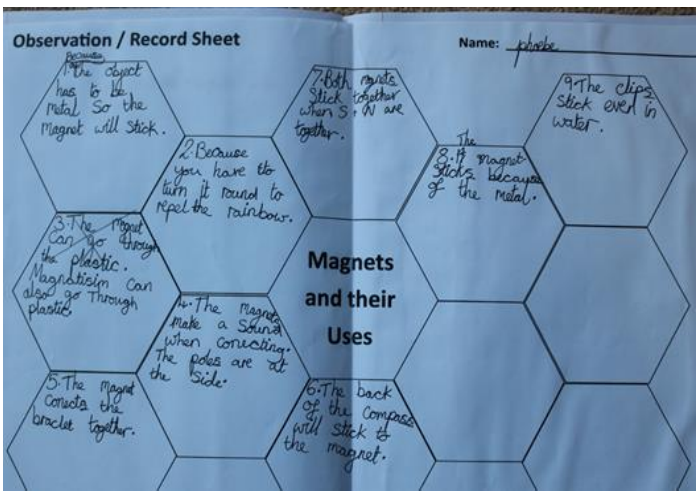
Appendix 3: Examples of learning produced in individual pupil's books (KS2)











Appendix 4: CIEC evaluation grids to monitor Working Scientifically skills experienced in lessons