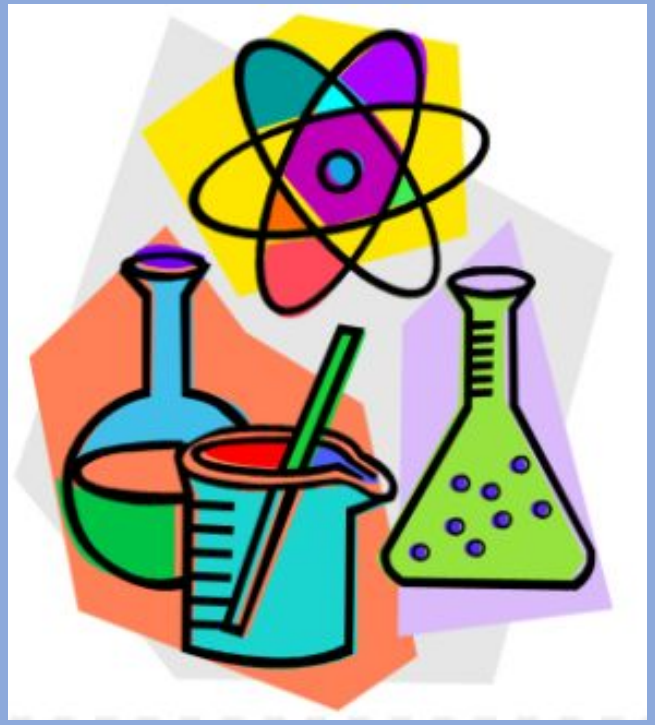


Science

Marish Academy Trust Science Team

- Mrs Newton
- Mrs Stack

This Workshop:

- What is Primary Science?
- Our Curriculum
- Assessment
- Engaging children and how we learn (Science days, clubs)
- Children's work
- Links to support home learning
- Any questions?

Science in Primary School

Science is a core subject in primary school. It provides a great opportunity to nurture children's natural curiosity about the world around them, and allows children to ask questions and develop the skills they need to answer those questions.

The EYFS framework is structured very differently to the national curriculum as it is organised across seven areas of learning rather than subject area.

The tables on the next slide outlines the most relevant statements taken from the Early Learning Goals in the EYFS statutory framework and the Development Matters age ranges for Three and Four-Year-Olds and Reception to match the programme of study for science.

The most relevant statements for science are taken from the following areas of learning:

- **Communication and Language**
- **Personal, Social and Emotional Development**
- **Understanding the World**

Three and Four-Year-Olds	Communication and Language	• Understand 'why' questions, like: "Why do you think the caterpillar got so fat?"
	Personal, Social and Emotional Development	• Make healthy choices about food, drink, activity and toothbrushing.
	Understanding the World	• Use all their senses in hands-on exploration of natural materials. • Explore collections of materials with similar and/or different properties. • Talk about what they see, using a wide vocabulary. Begin to make sense of their own life-story and family's history. • Explore how things work. • Plant seeds and care for growing plants. • Understand the key features of the life cycle of a plant and an animal. • Begin to understand the need to respect and care for the natural environment and all living things. • Explore and talk about different forces they can feel. Talk about the differences between materials and changes they notice.

ELG	**Communication and Language**	**Listening, Attention and Understanding**	• Make comments about what they have heard and ask questions to clarify their understanding
	Personal, Social and Emotional Development	**Managing Self**	• Manage their own basic hygiene and personal needs, including dressing, going to the toilet and understanding the importance of healthy food choices.
	Understanding the World	**The Natural World**	• Explore the natural world around them, making observations and drawing pictures of animals and plants. • Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class. • Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.

Reception	**Communication and Language**	• Learn new vocabulary. • Ask questions to find out more and to check what has been said to them. • Articulate their ideas and thoughts in well-formed sentences. • Describe events in some detail. • Use talk to help work out problems and organise thinking and activities, and to explain how things work and why they might happen. • Use new vocabulary in different contexts.
	Personal, Social and Emotional Development	• Know and talk about the different factors that support their overall health and wellbeing: - regular physical activity - healthy eating - toothbrushing - sensible amounts of 'screen time' - having a good sleep routine - being a safe pedestrian
	Understanding the World	• Explore the natural world around them. • Describe what they see, hear and feel while they are outside. • Recognise some environments that are different to the one in which they live. • Understand the effect of changing seasons on the natural world around them.

These are the most relevant statements that are linked to science within the Early Years. The statements are used to assess the children through observations and discussions.

Children learning and developing through play

Themed science days

Floating and Sinking

Looking for snails

Taking part in experiments and exploring different textures

Caring for animals

Planting and growing

Curriculum Overview Y1

Everyday Materials Identify, describe, compare and sort a variety of everyday materials, including wood, plastic, glass, metal, water, and rock.	**Seasonal Changes** Observe changes across the four seasons. Describe weather associated with the seasons and how day length varies.	**Animals including humans** Identify common animals including fish, amphibians, reptiles, birds and mammals. identify animals that are carnivores, herbivores and omnivores.	**Animals including humans** Describe and compare the structure of a variety of common animals. Identify, draw and label the basic parts of the human body and say which part of the body is associated with each sense.	**Plants** Identify common wild and garden plants, including deciduous and evergreen trees. Be familiar with the common names of flowers, examples of deciduous and evergreen trees, and plant structures (including leaves, flowers (blossom), petals, fruit, roots, bulb, seed, trunk, branches, stem.	**Plants** Identify and describe the basic structure of a variety of common flowering plants, including trees.

Curriculum Overview Y2

Everyday Materials Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses.	**Everyday Materials** Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.	**Living things and their habitats** Explore and compare the differences between things that are living, dead, and things that have never been alive. Identify habitats of living things and how they are suited to their needs.	**Living things and their habitats** 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,	**Plants** 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.	**Animals including humans** Animals, including humans, have offspring which grow into adults. Describe the basic needs of animals, including humans, for survival. Describe the importance for humans of exercise, healthy eating and hygiene.

Curriculum Overview Y3

Light	Plants	Rocks	Animals including humans	Light	Forces and Magnets
Recognise that we need light in order to see things and that dark is the absence of light. Light is reflected from surfaces. Recognise that light from the sun can be dangerous and that there are ways to protect their eyes.	Describe parts of flowering plants. Explore what plants require to thrive. Investigate the way in which water is transported within plants. Explore the life cycle of flowering plants, including pollination, seed formation and seed dispersal.	Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties. Describe how fossils are formed when things that have lived are trapped within rock recognise that soils are made from rocks and organic matter.	Identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food. Identify that humans and some other animals have skeletons and muscles for support, protection and movement.	Recognise that shadows are formed when the light from a light source is blocked by an opaque object. Find patterns in the way that the size of shadows change.	Some forces need contact between two objects, but magnetic forces can act at a distance. Magnets attract or repel each other and attract some materials and not others compare and group according to whether they are attracted to a magnet.

Curriculum Overview Y4

States of Matter	Living things and their habitats	Sound	Sound	Animals including humans	Electricity
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. Identify evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.	Group living things in a variety of ways. 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 be dangerous to living things.	Identify how sounds are made, and that they are caused by vibrations. 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.	Describe the functions of the basic parts of the digestive system in humans. Identify the different types of teeth in humans and their functions. Use a variety of food chains, identifying producers, predators and prey.	Identify common appliances that run on electricity. Construct a simple series electrical circuit, identifying and naming its basic parts. Recognise some common conductors and insulators, and associate metals with being good conductors.

Curriculum Overview Y5

Forces	Earth and Space	Forces	Properties and changes of materials	Living things and their habitats	Animals including humans
Explain that unsupported objects fall towards the Earth because of the force of gravity. Identify the effects of air resistance, water resistance and friction, that act between moving surfaces.	Describe the movement of the Earth, and other planets, relative to the Sun. Describe the movement of the Moon relative to the Earth. Explain how the Earth's rotation gives us day and night.	Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.	Compare and group everyday materials on the basis of their properties. Investigate separating mixtures, including filtering, sieving and evaporating Identify uses of everyday materials. Explore reversible and irreversible changes.	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.	Describe the changes as humans develop to old age. They should learn about the changes experienced in puberty.

Curriculum Overview Y6

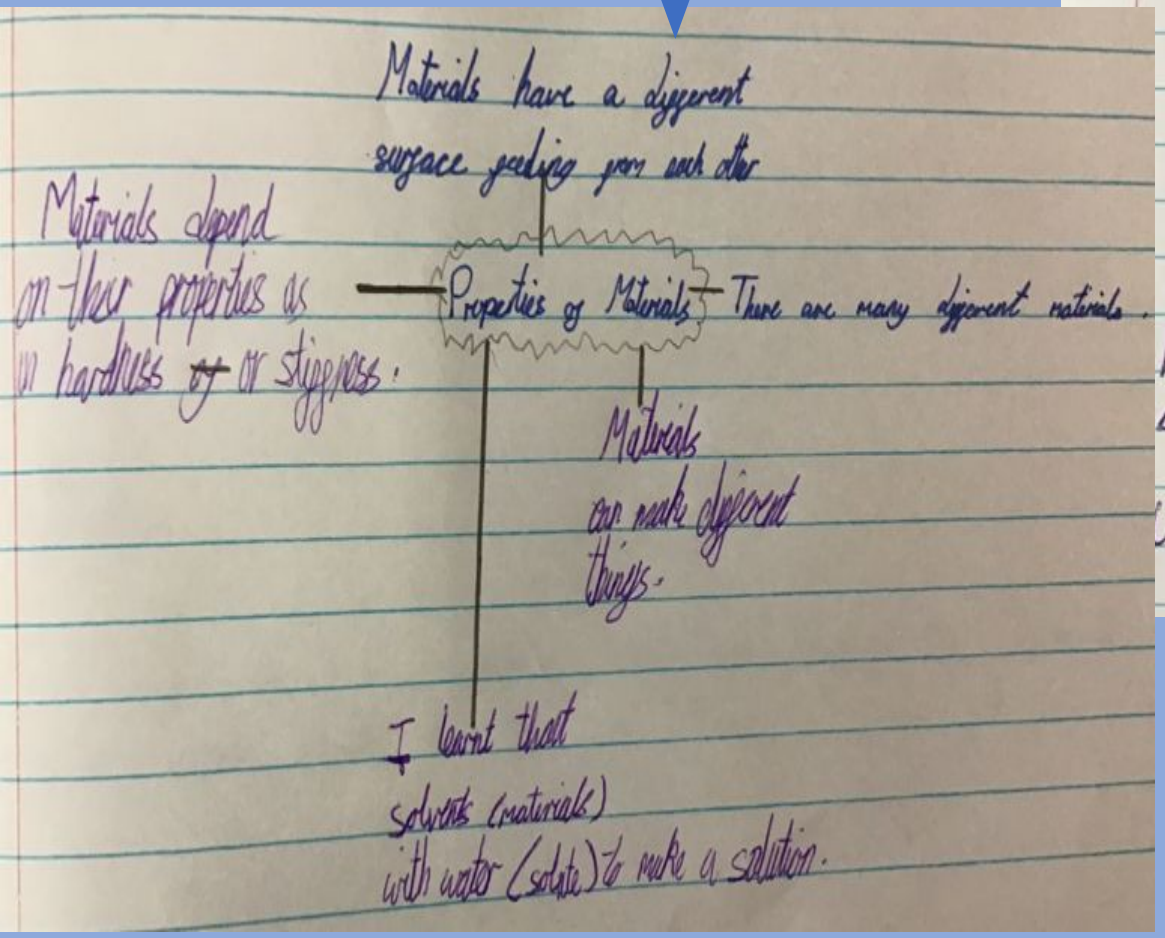
Living things and their habitats	Evolution and Inheritance	Electricity	Animals including humans	Electricity	Light
Describe how living things are classified into groups according to their characteristics. Give reasons for classifying plants and animals based on specific characteristics.	Recognise that 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. Explain how animals and plants adapt/ evolve to suit their environment in different ways.	Investigate what happens to the brightness of a lamp or the volume of a buzzer when the number and voltage of cells used in the circuit increases/ decreases.	Name 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 our bodies function. Describe the ways in which nutrients and water are transported within animals, including humans.	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.	Explain that we see things because light travels from light sources to our eyes or from light sources to objects and then reflects into 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.

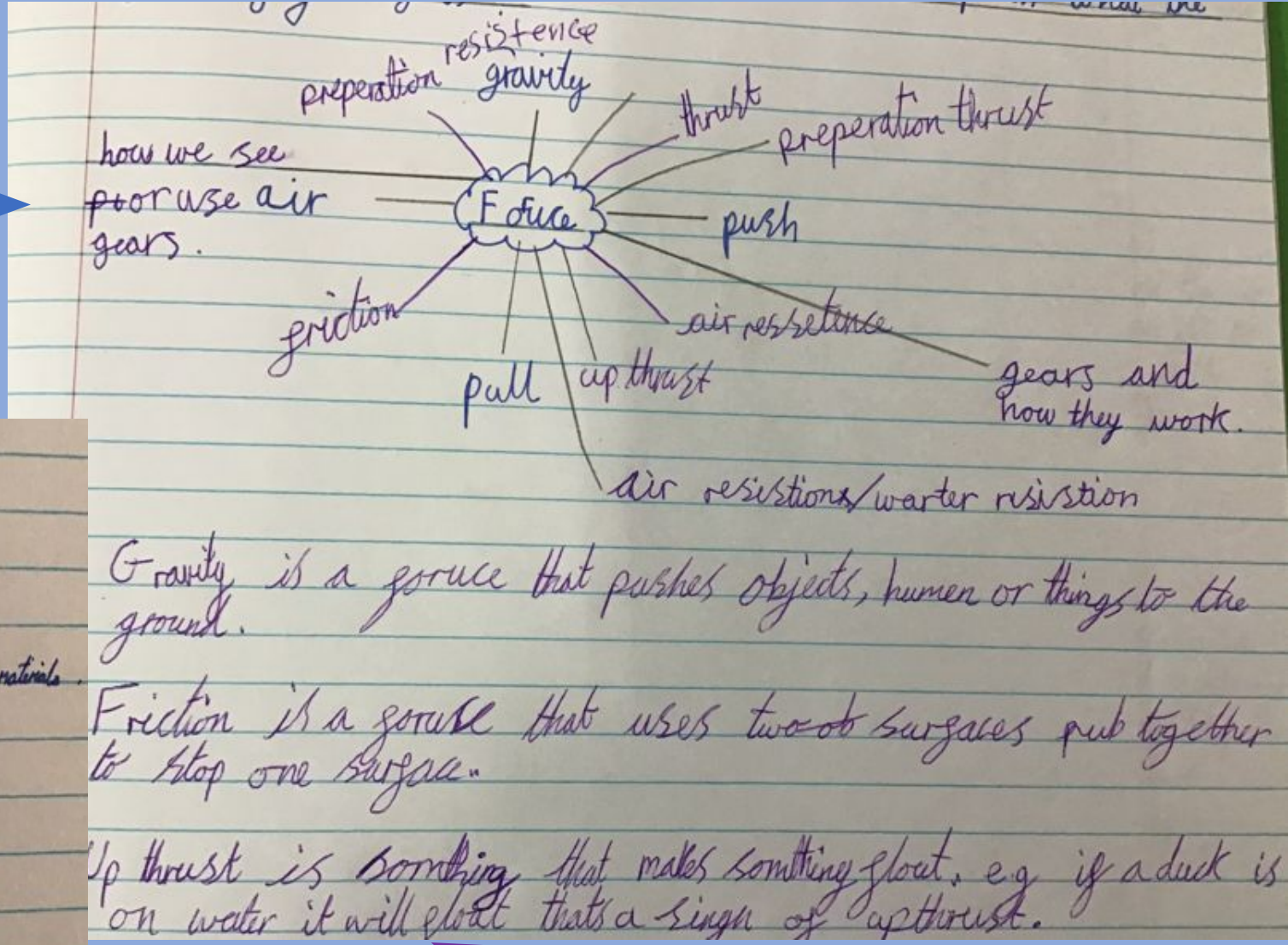
Assessment

- At the beginning of each unit of work, children complete a ‘mind- map diagram which shows what they already know about the topic.
- The mind map is revisited at the end of the unit of work and children update it with what they have learned.
- Links to prior learning in previous years is made to their current learning to show how they will build on their learning in previous years.
- Vocabulary linked to the unit of work is also displayed and given to the children to refer to.
- In addition to this, children complete a Proof of Progress (POP) activity.
- This is used also used to assess children’s knowledge and understanding of the topic.

Mind Maps

What child already knows written with a blue pen.





What child has learned written in purple pen.

Tiered Vocabulary

Words used frequently that children would have come across.

Academic vocabulary. Words that appear or are related to specific topics.

Words that might be used across a range of curriculum areas.

Tier 1 – Ordinary	Tier 2 – Subject Specific	Tier 3 – Transferrable
Air	Resistance	Gravity
Water	Force	Friction
Surface	Mechanism	Accelerate
Effect	Pulley	Decelerate
Move	Gear	External
Stop	Spring	Mass
Change	Isaac Newton	Coil
Motion	Up thrust	Lever
Movement	Drag theory	
Brake	Galileo Galilei	
Balanced	Fulcrum	
Height		

Vocabulary

Tier O
absorb
protein
carbohydrates
sugar
fat
swallow
digest
stomach

Tier S
starch
gut
Semi-liquid
dairy

Tier T
saliva
bile
acids
defaecation
rectum
small intestine
large intestine
pancreas
enzymes
oesophagus

Tier Vocabulary:

Tier 1: exercise, describe, experiment, fruit, heart, increase, learn, opposite, straight

Tier 2: Nutrition, nutrients, minerals, proteins, carbohydrates, fibre, carnivore, herbivore, omnivore, joint, skeleton, vertebrates, invertebrates, endoskeleton, exoskeleton, hydrostatic, skull, spine, pelvis, shin, contract, biceps, triceps

Tier 3: water, sugar, unhealthy, healthy, muscles, bones, vitamins, movement.

Links to previous and future learning - States of Matter

EYFS	Year 1	Year 2
Children learned: To explore collections of materials with similar and/or different properties. To understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.	**Children learned:** To identify materials everyday objects have been made from and describe them. To group materials according to their simple physical properties. To identify and sort natural and man-made materials. To become familiar with the names of materials and properties. To explore and investigate a wide range of materials.	**Children learned:** To identify different everyday materials. To suggest materials that everyday objects are made from. To explain what 3 different materials can be used for. To describe the simple physical properties of everyday materials. To compare and group together a variety of everyday materials on the basis of their physical properties.

Links to previous and future learning.

Year 4	Year 5
Children will learn: To continue to explore a variety of everyday materials and develop simple descriptions of the states of matter. To compare and group materials together, according to whether they are solids, liquids or gases. To observe that some materials change state when they are heated or cooled, and measure the temperature at which this happens. To identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.	**Children will learn:** To compare and group together everyday materials on the basis of their properties. To know that some materials will dissolve to form a solution, and describe how to recover a substance from a solution. To use knowledge of solids, liquids and gases to decide how mixtures might be separated including through filtering, sieving and evaporating. To give reasons, based on evidence from comparative and fair tests, for particular uses of everyday materials. To demonstrate that dissolving, mixing and changes of state are reversible changes. To explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible. To explore reversible changes. To explore changes that are difficult to reverse.

Engaging Children

- Science Week
- Silly Science Workshops
- Science Trips

Engaging Children

Clubs - Science Club

Engaging Children

School trip to the Science Museum (Year 2)

Engaging Children

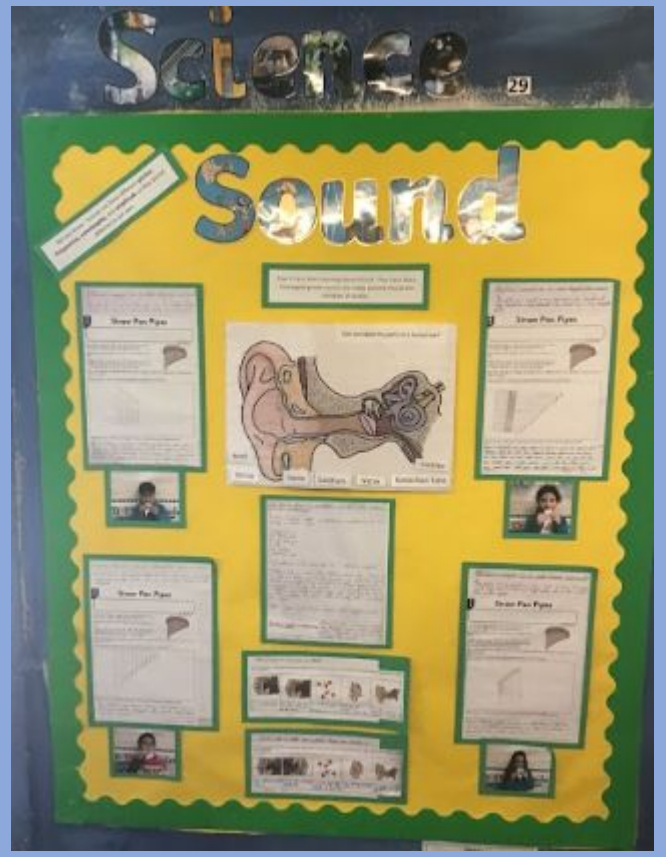
School trip to the Natural History Museum (Year 6)

Engaging Children

School trip to the Natural History Museum (Year 6)

Engaging Children

Lessons and Projects



Links to support home learning

Some websites to enjoy Science at home…
https://www.stem.org.uk/home-learning/primary

Activities based on the primary Science curriculum to do at home.
http://www.show.me.uk/section/science
Science and technology games, homework help and more from museums and galleries.
https://pst.org.uk/resources/curriculum-materials/Science-Fun-at-Home
Exciting practical science activities
https://www.bbc.co.uk/bitesize/primary

Any questions?