#### Science Curriculum Quick view Bromesberrow

Class 1

Chemistry			
Biology- animals			
Biology- plants			
Physics			

Reception	
Autumn	
Marvelous Materials (Knowledge of the World)	
Children:	
Materials and their properties:	

• Children explore the world around them using their senses at a deeper level of play (demonstrating their prior knowledge and experiences of materials) e.g:

- When wanting to build a stage they decide not to use the foam blocks but use the crates and wooden blocks instead. They explain that the foam blocks are too squishy and soft and will not hold their weight. They choose the crate and wooden blocks because they are stronger and do not bend.

-When exploring best material to use to make a 'boat that floats', they decide that paper will become 'soggy', soak up the water and sink. They discard cardboard for the same reason, although they did suggest that it would take longer to become soggy and sink. They decide to use 'plastic' as they felt this would float and not soak water up. They choose to use small Lego. They notice that sometimes their Lego models will float and other times they will sink.

- Children use their vocabulary taught and acquired to explain their choices and reasoning whilst investigating e.g. when describing the effect of water on paper using words like soggy, change, soaked, sink.
- Children learn more about materials and recognise that different materials can be used for different things **e.g. wool is good for soaking up a water spillage and is warm to wear**.

### **Changing Materials**

- Children know that materials change, when 'something happens' e.g. they recognise that water can be changed by freezing it to make ice cubes and that these ice cubes can melt back to water; and that chocolate left in the sun will melt. They know that 'heat' and 'cold' make the change happen.
- Children use an increasing range of vocabulary to explain changes from their observation e.g. when the sun heats up the chocolate it melts. It becomes all sticky and runny, not hard like chocolate usually is. If you put it in a fridge chocolate becomes really hard, so hard that I cannot bite it.

# Spring

### Amazing Animals (Knowledge of the World)

### Children:

Use their senses to explore the natural world at a deeper level of play e.g:

- They listen to the different bird calls of the blackbird and pheasants. They imitate these and can identify the birds from this.
- They discover that we have quite a few different beetles and bugs around. They decide to make them some homes after listening to the story 'Bug Homes' by Clover Robin. They use the story to decide that the beetles will need sticks, canes and straw. They collect some sticks. The following day 2 children bring in straw from home. They work together to create some homes.
- Children collect a worm in a bug pot. They look closely through the magnifier top. They notice the 'saddle' and the ridges on the worm. They decide to draw their own worms including these features.
- They sort and categorise animals based on their similarities and differences e.g. these are all cats so they go together and these are the dogs so they go together
- Children learn to identify, name and describe some of the animals they encounter regularly in their environment. They use taught vocabulary to support them in these descriptions.
- Children learn about their bodies and how these work e.g. my eyes let me see things, my teeth need cleaning and my hands need to be washed to keep germs at bay

# Summer

Plants (Knowledge of the World)

### Children:

Use their senses to explore the natural world at a deeper level of play e.g:

- They find some seeds left over from the ash tree (ash keys) and decide to plant these. They dig a hole, water the seeds and then cover them over carefully with soil. They then make a sign to alert everyone that a seed is growing. Thoughts then turn to how to keep the birds away...

- They notice that under our oak tree a small seedling is growing. They wonder how this happened. The adult shares 'the life cycle of a tree book'. Together the child and adult use the illustrations to predict what stage the seedling will be at next. Other children join in and decide they need to protect the seedling from animals/children. They find some sticks and string to create a guard.
- Children learn to identify, name and describe some of the plants they encounter regularly in their environment and notice how these have changed throughout the year.
- They notice that the rain gauge has filled up more because it has rained heavily
- They see the changes to the environment depending on the season, noticing that in Autumn the leaves change colour and begin to fall from the trees.

### Year 1

### Autumn

Marvelous Materials Every Day Materials

- Children need to know that 'material' is what an object is made from (not to be confused with fabric).
- Children need to be able to name a range of objects and name what they are made from.
- Children need to name a variety of different materials (wood, plastic, glass, metal, water, and rock) https://www.youtube.com/watch?v=xOKr462HLc0 – materials song
- Children need to be able to describe the physical property of the material (rough/smooth, flat/bumpy, sharp/blunt, hard/soft, rigid/floppy, waterproof/not waterproof)
- Children need to be able to sort and compare materials using their physical properties.
- Children are able to sort materials by a given criteria e.g. waterproof and non- waterproof
- Children explore materials and how they can change their shape by bending, squashing, twisting and stretching.

# Spring

Amazing Animals

# Animals, including humans

- Children need to know there are many different types of animals (mammals, reptiles, amphibians, birds, fish), that some live in water, some live on land, some fly in the sky.
- Children need to understand how to take care of animals taken from their local environment (and **habitat)** and the need to return them after study.

- Children need to be able to group animals according to their features, be able to label a picture of an animal and describe similarities and differences between animals.
- Children need to understand the meaning of **carnivore**, **herbivore** and **omnivore** and be able to classify animals according to these labels.
- Children need to name and label key body parts.
- Children need to know we have five **senses** (**sight**, **hearing**, **touch**, **taste and smell**) and to know which body parts are associated with our senses.
- Children need to know some of the different parts of the eye (eyelashes, eyelids, cornea) and what their purpose is.
- Children need to know that sounds travel through our ears to send messages to our brain.
- Children need to know how to keep their teeth clean and healthy

#### Summer

**Plants** (seasonal changes explicitly taught here, but throughout the year) Weather diaries Temperature recording

- Children need to observe the growth of trees and plants in the school environment throughout the year.
- Children need to observe the changes that occur throughout the year, relating these to the four seasons
- Children need to keep a record of how trees or plants change over time.
- Children need to know the difference between deciduous and evergreen.
- Children need to know tree and plant structures and be able to name the parts.

Class 2	
Year 2/3	

#### Autumn 1a Marvelous Materials Uses of Everyday Materials (Y3)

- Children are able to describe (using their senses) the simple physical properties of a variety of everyday materials
- Children are able to compare and group together a variety of materials based on their simple physical properties
- Children are able to use scientific language to describe observations
- Children explore how the shapes of solid objects can be changed through squashing, bending, twisting and stretching
- Children use this knowledge of properties to suggest suitable uses for different materials
- Children practically and scientifically investigate the suitability of different materials for a particular purpose e.g. a flexible, bouncy, but strong material for a ball.
- Children can share the discoveries of John Dunlop and rubber, understanding the significance this material had on the world

### Rocks Rock! Rocks (Y3)

- Children are able to compare and group together different rocks based upon their observations
- Children are able to describe the differences between a sedimentary, igneous and metamorphic rock
- Children know some of the ways we use rocks e.g. granite for worktops
- Children are able to describe how a fossil is formed and understand that this is an imprint of the object or living thing that once existed.
- Children know that soils are made from rocks and organic matter

### Spring 1

# Awesome Animals! Marvelous Me!

# Animals including humans (Y2 and Y3)

- Children are able to recognise the key characteristics of different animals and how they belong to different families (building on previous knowledge of reptiles, mammals, amphibians, fish and birds) e.g. cat and dog family and different types of whales
- Children understand animal and human lifecycles, recognising that animals give birth to life young who grow into adults

- Children are able to describe some different animals life cycles
- Children are able to describe the importance and impact of good , balanced nutrition and exercise on the body
- Children understand the importance of hygiene in keeping the body safe and well.
- Children know what animals and humans need to survive in terms of nutrition, water, warmth and air
- Children understand that animals and humans cannot make their own food and that they get their nutrition from what they eat.
- Children know how animals and humans take in nutrition, water and air
- Children are able to recognise the importance and role of the skeleton in animals and humans (knowing this provides protection, support and movement)

### Summer 1

Plants Plants (Y2 and Y3)

Y2

- Children know what plants need to grow and flourish e.g. water, sunlight, nutrients in soil and the correct temperature.
- Children are able to observe, describe and illustrate how seeds and bulbs grow into mature plants
- Children investigate the impact of removing one of the key 'needs' of a plant e.g. water, light or warmth

Y3

- Children can recognise a range of different trees and plants native to the UK
- Children are able to identify and describe the functions of different parts of flowering plants e.g. root, stem, trunk, petals, buds, leaves and flowers
- Children know what plants need to survive e.g. water, air, sunlight, nutrients, the correct temperature and space
- Children gain an understanding of how water is transported in plants e.g. through carnations/daffodils and coloured water.
- Children explore the life cycle of a flowering plant e.g. watching videos on pollination, seed formation and seed dispersal-leading to new flowering plants

### Autumn 2

Let there be light!

# Light (Y3)

- Children recognise that they need light in order to see things
- Children know that dark is the absence of light
- Children are able to identify different sources of light

- Children know that the sun is a powerful light source and that it should not be looked at directly
- Children understand that light is reflected from surfaces e.g. they know that light travels in a straight line to the object, which reflects in a straight line to the mirror, which reflects in a straight line to the eye.
- Children recognise that shadows are formed when an object blocks the light from a light source, so the light cannot travel through and is reflected (e.g. light shirt) or absorbed (dark shirt).
- Children explore the change in shadows dependent on the position and strength of the light source.

### Spring 2

### Forces and magnets

### Forces and magnets (Y3)

- Children are able to compare how things move on different surfaces e.g. noticing the effect of different textures creating friction and resistance.
- Children know that a magnet has a north and south pole
- Children recognise that forces can work at a distance e.g. moving magnetic filings through paper without touching.
- Children observe how magnets attract and repel each other noticing that like poles repel and opposite attract
- Children can compare and group materials into magnetic and non-magnetic
- Children are able to identify some magnetic materials e.g. iron and some non-magnetic metal materials e.g. aluminium?
- Children are able to use prediction prior to testing to see if a material is magnetic or non-magnetic.

### Summer 2

### Life on Earth

### Living things and their habitats (Y2)

- Children know the differences between living and non-living things
- Children are able to identify and name a variety of plants and animals from different habitats
- Children can match a living thing to its habitat
- Children recognise how different habitats are suited to different living things e.g. cacti are suited to hot, desert habitats and certain fungi to damp, woodland habitats
- Children can recognise how different living things are dependent on each other e.g. birds need trees for shelter and food and birds removing pests from other animals
- Children are able to describe some of the life processes common to animals and humans
- Children are able to describe how some animals get their food using basic food chains

Children recognise how different plants and animals are suited to their habitats

# Class 3

# Y4, 5 and 6

#### Autumn 1 Materials Matter! States of Matter (Y4)

- Children need to know the names and properties of everyday materials.
- Children need to group and classify a variety of different materials.
- Children need to develop simple descriptions of the states of matter (solids hold their shape, liquids form a pool not a pile, gases escape from an unsealed container)
- Children need to observe water as a solid, a liquid and a gas.
- Children need to notice changes to water when it is heated and cooled.
- Children need to explore the effect of temperature on substances such as chocolate, butter, cream.

Children need to observe, record and investigate the changes in materials for example, evaporation over time, solids to liquids, and effect of temperature

### Spring 1

Earth and Space

### Earth and Space (Y5)

- Children need to use a model of the sun and moon to help them understand and be able to explain day and night.
- Children need to know that the Sun is a star at the centre of our solar system.
- Children need to know that our solar system has eight planets; Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune.
- Children need to know that the moon is a celestial body that orbits a planet.
- Children need to understand the difference between a geo and heliocentric solar system and how views have evolved (considering the views of scientists such as Ptolemy, Alhazen, Copernicus and Galileo)
- Children need to have opportunity to reconstruct a model of the solar system in the form of an Orrery.
- Children need to plan, investigate and present findings to support the idea that the Earth moves on its own axis.
- Children need to understand, investigate and demonstrate why the moon appears as it does in the sky.
- Children need to understand about the lunar phases.

# Summer 1

Fabulous Forces

# Forces (Y5)

• Children need to explore falling objects, knowing that the force of gravity acting between the Earth and the object means that the object will fall to Earth.

- Children need to raise questions about air resistance, water resistance and surface resistance acting against gravity e.g. ice skaters and surface resistance
- Children need to explore forces that make things begin to move, get faster and slow down e.g. a boulder pushed to begin with, then speeds up down a hill with gravity and then slowed down by water resistance in a lake
- Children need to explore the effects of friction on movement and how it slows or stops moving objects.
- Children need to recognise that some mechanisms including levers, pulleys and gears allow a small force to have a great effect
- Children need to understand centripetal force and planets in orbit
- Children need to know that Sir Isaac Newton discovered gravity and how

### Autumn 2b

#### Life on Earth! Living Things and their habitats (Y4 and Y6)

- Children need to recognise that living things can be grouped in a variety of ways
- Children are able to classify and group animals into vertebrates and non-vertebrates
- Children can identify change in habitat throughout the year e.g. noticing that the hedgerows change with some plants retaining their leaves (evergreen) and others losing them (deciduous). \* All year round
- Children are able to use classification keys to group, identify and name a variety of living things in their local and wider environment e.g. using a wildlife camera and bird survey to monitor the variety of bird species we have in school, or classifying plants based on: with seeds or without seeds; flowering plants, conifers, ferns and mosses.
- Children need to understand how micro-organisms can be divided into groups, according to common observable characteristics
- Children to know that bacteria can be harmful to us e.g. strep throat and streptococcus Aureus and beneficial, Penicillin and yogurt cultures
- Children need to know that Alexander Flemming discovered Pencillin from experiments involving mould
- Children need to understand how animals can be divided into groups, according to common observable characteristics. e.g. a pigeon and a blackbird both have feathers, beaks and wings and are animals, but can be subdivided and classified as birds
- Children are able to use and devise classification keys for living things, giving reasons for why animals and plants belong in particular group <a href="https://www.stem.org.uk/resources/elibrary/resource/32764/newly-discovered-species-age-7-11">https://www.stem.org.uk/resources/elibrary/resource/32764/newly-discovered-species-age-7-11</a>
- Children to understand the impact of the Swedish scientist (taxonomist) Linnaeus, who developed a way of organising living things that forms the basis of how we classify living things today
- Know that there are 8 steps to classifying living things, Domain, Kingdom, Phylum, Class, Order, Family, Genus, Species

• Children recognise that environments can change and that this can sometimes pose dangers to living things e.g. exploring the positive impact of conservation headlands around the Bromesberrow Estate fields and the impact of plastic pollution in the sea on marine animals.

### Spring 2a

### Matter Matters!

### **Properties and changes of material (Y5)**

- Children need to be able to group everyday materials using evidence and scientific investigations e.g. is a material a good conductor of electricity?
- Children need to explore and recognise reversible changes including evaporating, filtering, sieving, melting, dissolving.
- Children need to decide based on their knowledge of states of matter how to separate mixtures e.g. how to separate salt from water
- Children need to recognise that melting and dissolving are two different processes.
- Children need to explore changes that are difficult to reverse e.g. burning and rusting
- Children need to undertake a scientific study that involves carrying out tests, comparing materials, observing and comparing changes that take place.
- Children need to research and discuss how chemical changes have an impact on our lives for example cooking.

Children need to discuss the creative use of new materials for example such as polymers, super-sticky and super-thin materials (PTFE and Roy J Plunket and Glue on sticky notes and Spencer Silver <a href="https://www.youtube.com/watch?v=bvalMbOdseU">https://www.youtube.com/watch?v=bvalMbOdseU</a> (how Post its were 'accidentally created' explained).

# Spring 2b

# Sound (X4

- Sound (Y4)
  - Children need to explore and identify the way sound is made through vibration in a range of different instruments/sources e.g. finding patterns between the volume of sounds and the strength of vibrations that produce it/distance of the source
  - Children need to know how the pitch and volume of sounds can be changed in a variety of ways e.g. how to make a sound louder/quieter and how pitch is changed based on the features of the source/instrument that makes it
  - Children need to know how a sound travels through a medium to an ear, being received by the ear drum and then sent as a message to the brain
  - Children need to recognise how different materials can affect the pitch and volume of sounds

### Summer 2

#### Awesome Animals including Humans! Animals including humans (Y4, 5 and 6)

Y4-

- Children are able to identify, name and describe the different parts and functions of the human digestive system
- Children are able to identify the simple function of different types of teeth in humans e.g. know that canine teeth were for tearing meat, incisors cutting through and molars for grinding
- Children know the significance of saliva and the role of the tongue in the digestion process within the mouth e.g. the tongue helps to keep the food in place whilst the teeth grind and detects flavours and temperature
- Children are able to compare the different sets of teeth in herbivores and carnivores
- Children are able to identify, construct and interpret a variety of food chains, identifying producers, predators and prey

### Y5-

- Children are able to describe the physical changes as humans develop to old age
- Children can use basic ideas of inheritance, variation and adaptation to describe how living things have changed over time

### Y6-

- Children are able to identify and name the main parts of the human circulatory system; describing the functions of the heart, blood vessels and blood
- Children know the importance and impact of diet, exercise, drugs and lifestyle on the body. They know how to stay healthy.
- Children know how different animals get their nutrition and hydration, recognising plants are autotrophs and animals heterotrophs

### Autumn 3

Let there be light!

# Light (Y6)

- Children need to understand that light can be absorbed, reflected, transmitted or refracted
- Children need to investigate the relationship between light sources, objects and shadows.
- Children need to investigate the effect of different light source positioning on shadows.
- Children need to understand that a prism splits white light into the colour spectrum of light.
- Children need to understand how a convex and concave lens works making a water lens to investigate this
- Children need to explore different colour filters and understand that a colour filter only allows light of that colour to pass through it (be transmitted)
- Children need to understand that light appears to travel in straight lines and undertake a scientific enquiry to observe this.

• Children need to understand the significance of Sir Isaac Newton's scientific discoveries on light e.g. making light spinners to prove that rainbow colours combine so that we see white light.

### Spring 3

Electrifying!

# Electricity (Y4 and 6)

- Children are able to identify common appliances that run on electricity form within a familiar environment
- Children are able to construct a simple series electric circuit
- Children are able to identify and name the basic part in a series circuit, including cells, wires, bulbs, switches and buzzers
- Children recognise and use symbols to represent simple series circuit diagrams
- Children can 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
- Children know that a switch opens and closes a circuit
- Children recognise some common insulators and conductors from their previous work on materials, knowing that metals make good conductors.
- Children are able to identify and name the basic part in a series circuit, including cells, wires, bulbs, switches and buzzers
- Children are able to compare and give reasons for variations
- Can they compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers, the on/off position of switches

Children can confidently use recognised symbols when representing a simple circuit in a diagram

### Summer 3

Inheritance and Evolution

# Inheritance and Evolution (Y6)

- Children need to know that all living things have offspring of the same kind and features in the offspring are inherited from the parents but the offspring are not identical to their parents and vary from each other.
- Children need to know about evolution, recognising that although individuals in a species share similarities, they are not exact copies of each other; there were small differences or variations between them.
- Children need to recognise that through competition species have evolved different characteristics over time e.g. Darwin's Finches, the Peppered Moth or lapwings

- Children need to be able to recognise how plants and animals are uniquely adapted to their environment e.g. cacti spines to protect the plant from being eaten
- To be able to use fossils as evidence of what lived on the Earth millions of year ago