# Science Knowledge Mapping

# Working Scientifically Through Each Year Group

# Everton Heath

# Year 1

- · Ask questions such as:
- Why are flowers different colours?
- Why do some animals eat meat and others do not?
- Set up a test to see which materials keeps things warmest, know if the test has been successful and can say what has been learned
- Explain to someone what has been learned from an investigation they have been involved with and draw conclusions from the answers to the questions asked
- Measures (within Year 1 mathematical limits) to help find out more about the investigations undertaken

# Year 2

- Ask questions such as:
- Why do some trees lose their leaves in Autumn and others do not?
- How long are roots of tall trees?
- Why do some animals have underground habitats?
- Use equipment such as thermometers and rain gauges to help observe changes to local environment as the year progresses
- Use microscopes to find out more about small creatures and plants
- Know how to set up a fair test and do so when finding out about how seeds grow best
- Classify or group things according to a given criteria, e.g. deciduous and coniferous trees
- Draw conclusions from fair tests and explain what has been found out
- Use measures (within Year 2 mathematical limits) to help find out more about the investigations they are engaged with

# Year 3

- · Ask questions such as:
- Why do shadows change during the day?
- Where does a fossil come from?
- Observe at what time of day a shadow is likely to be at its longest and shortest
- Observe which type of plants grow in different places e.g. bluebells in woodland, roses in domestic gardens, etc.
- Use research to find out how reflection can help us see things that are around the corner
- Use research to find out what the main differences are between sedimentary and igneous rocks
- Test to see which type of soil is most suitable when growing two similar plants
- Test to see if their right hand is as efficient as their left hand.
- Set up a fair test with different variables e.g. the best conditions for a plant to grow
- Explain to a partner why a test is a fair one e.g. lifting weights with right and left hand,

  to
- Measure carefully (taking account of mathematical knowledge up to Year 3) and add to scientific learning
- Use a thermometer to measure temperature and know there are two main scales used to measure temperature
- Gather and record information using a chart, matrix or tally chart, depending on what is most sensible
- Group information according to common factors e.g. plants that grow in woodlands or plants that grow in gardens
- Use bar charts and other statistical tables (in line with Year 3 mathematics statistics) to record findings
- Know how to use a key to help understand information presented on a chart
- Be confident to stand in front of others and explain what has been found out, for example about how the moon changes shape.
- Present findings using written explanations and include diagrams when needed
- Make sense of findings and draw conclusions which help them to understand more about scientific information
- Amend predictions according to findings
- Be prepared to change ideas as a result of what has been found out during a scientific enquiry

# Year 4

- · Ask questions such as:
- Why are steam and ice the same thing?
- Why is the liver important in the digestive systems?
- What do we mean by 'pitch' when it comes to sound?
- Use research to find out how much time it takes to digest most of our food
- Use research to find out which materials make effective conductors and insulators of electricity
- Use research to find out which materials make effective conductors and insulators of electricity
- Set up a fair test with more than one variable e.g. using different materials to cut out sound
- Explain to others why a test that has been set up is a fair one e.g. discover how fast ice melts in different temperatures Measure carefully (taking account of mathematical knowledge up to Year 4) and add to scientific learning
- Use a data logger to check on the time it takes ice to melt to water in different emperatures
- Jse a thermometer to measure temperature and know there are two main scales used to measure temperature Gather and record information using a chart, matrix or tally chart, depending on what is most sensible
- Group information according to common factors e.g. materials that make good conductors or insulators
- Use bar charts and other statistical tables (in line with Year 4 mathematics statistics) to record findings
- Present findings using written explanations and include diagrams, when needed
- Write up findings using a planning, doing and evaluating process
- Make sense of findings and draw conclusions which helps them understand more about the scientific information that has been learned
- When making predictions there are plausible reasons as to why they have done so
- Able to amend predictions according to findings
- Prepared to change ideas as a result of what has been found out during a scientific enquiry

# Year 5

- Set up an investigation when it is appropriate e.g. finding out which materials dissolve or not
- Set up a fair test when needed e.g. which surfaces create most friction?
- Set up an enquiry based investigation e.g. find out what adults / children can do now that they couldn't when a baby
- Know what the variables are in a given enquiry and can isolate each one when investigating e.g. finding out how effective parachutes are when made with different materials
- Use all measurements as set out in Year 5 mathematics (measurement), including capacity and mass
   Use other scientific instruments as needed
- e.g. thermometer, rain gauge, spring scales (for measuring Newtons)
  Able to record data and present them in a range of ways including diagrams, labels, classification keys, tables, scatter graphs and bar and line graphs
- Make predictions based on information pleaned from investigations breate new investigations which take account of what has been learned previously
- Able to present information related to scientific enquiries in a range of ways including using IT such as powerpoint and importe
- Use diagrams, as and when necessary, to support writing
- Is evaluative when explaining findings from scientific enquiry
- Clear about what has been found out from recent enquiry and can relate this to other enquiries, where appropriate
- Their explanations set out clearly why something has happened and its possible impact on other things
- Able to give an example of something focused on when supporting a scientific theory e.g. how much easier it is to lift a heavy object using pulleys
- Keep an ongoing record of new scientific words that they have come across for the first time
- Able to relate causal relationships when, for example, studying life cycles
- Frequently carry out research when investigating a scientific principle or theory.

# Year 6

- Know which type of investigation is needed to suit particular scientific enquiry e.g. looking at the relationship between pulse and exercise
- Set up a fair test when needed e.g. does light travel in straight lines?
- Know how to set up an enquiry based investigation e.g. what is the relationship between oxygen and blood?
- Know what the variables are in a given enquiry and can isolate each one when investigating
- Justify which variable has been isolated in scientific investigation
- Use all measurements as set out in Year 6 mathematics (measurement), including capacity, mass, ratio and proportion
- Able to record data and present them in a range of ways including diagrams, labels, classification keys, tables, scatter graphs and bar and line graphs
- Make accurate predictions based on information gleaned from their investigations and create new investigations as a result
   Able to present information related to
- including using IT such as powerpoint, animoto and iMovie

  Use a range of written methods to report findings, including focusing on

scientific enquiries in a range of ways

- the planning, doing and evaluating phases
  Clear about what has been found out from their enquiry and can relate this
- to others in class

  Explanations set out clearly why
- something has happened and its possible impact on other things

   Aware of the need to support
- conclusions with evidence

  Keep an ongoing record of new scientific words that they have come across for the first time and use these
- regularly in future scientific write ups

  Use diagrams, as and when necessary, to support writing and be confident enough to present findings orally in front of the class
- Able to give an example of something they have focused on when supporting a scientific theory e.g. classifying vertebrate and invertebrate creatures or why certain creatures choose their unique habitats
- Frequently carry out research when investigating a scientific principle or theory

# **Science Sticky Knowledge Mapping**

- · Know how light travels • Know and demonstrate how we see objects
- Know why shadows have the same shape as the object that casts them
- Know how simple optical instruments work e.g. periscope, lescope, binoculars, mirror, egnifying glass etc.

Animals including

humans

· Create a timeline

to indicate stages of

growth in humans

# Years 5&6

#### Sound

- Know how sound is made, associating some of them with vibrating
- Know how sound travels from a source to our ears · Know the correlation
- between pitch and the object producing a sound
- Know the correlation between the volume of a sound and the strength of the vibrations that
- produced it Know what happens to
- a sound as it travels away from its source

#### States of matter

- Know the temperature at which materials change state
- Know about and explore how some materials can change state
- Know the part played by evaporation and condensation in the water cycle

### Properties and changes in materials

- Compare and group materials based on their properties (e.g. hardness, solubility, transparency, conductivity, [electrical & thermal], and response to magnets
  - Know and explain how a material dissolves to form a solution
- Know and show how to recover a substance from a solution
- Know and demonstrate how some materials can be separated (e.g. through filtering, sieving and evaporating) . Know and demonstrate that some
- changes are reversible and some are not Know how some changes result in the formation of a new material and that this is usually irreversible

### All living things and their habitats

- Know the life cycle of different living things e.g. mammal, amphibian, insect and bird
- · Know the differences between
- different life cycles Know the process of reproduction in plants
- · Know the process of reproduction in animals

 Know what gravity is and its impact on our lives Identify and

Forces

- know the effect of air and water resistance · Identify and
- know the effect of friction · Explain how
- levers, pulleys and gears allow a smaller force to have a greater effect

#### Electricity

- Compare and give reasons for why components work and do not work in a circuit
- Draw circuit diagrams using correct symbols
- . Know how the number and voltage of cells in a circuit links to the brightness of a lamp or the volume of a buzzer

#### Earth and Space

- · Know about and explain the movement of the Earth and other planets relative to the Sun
- Know about and explain the movement of the Moon relative to the Earth
- Know and demonstrate how night and day are created
- · Describe the Sun, Farth and Moon (using the term spherical)

#### **Evolution and inheritance**

- Know how the Earth and living things have changed over time . Know how fossils can be used to find out about the past
- . Know about reproduction and offspring (recognising that offspring normally vary and are not
- identical to their parents) Know how animals and plants are adapted to suit
- their environment
- · Link adaptation over time to evolution

### . Know about evolution and can explain what it is

### Animals including humans

- · Identify and name the main parts of the human circulatory system
- · Know the function of the heart, blood vessels and blood
- . Know the impact of diet, exercise, drugs and lifestyle on health • Know the ways in which nutrients and water are transported in animals, including humans

### All living things and their habitats

- · Classify things by living, dead or never lived
- · Know how a specific habitat provides for the basic needs of things living there (plants and animals)
- Match living things to their habitat
- · Name some different sources of food for animals
- Know about and explain a simple food chain

### All living things and their habitats

- . Know the life cycle of different living things e.g. mammal, amphibian. insect and bird
- Know the differences between different life cvcles
- Know the process of reproduction in plants
- Know the process of reproduction in animals

- Compare and group rocks based on their appearance and physical properties. giving reasons
  - Know how soil is made and how fossils are formed

Rocks

 Know about and explain the difference between sedimentary, metamorphic and igneous rocks

#### Forces

- Know about and describe how objects move on different surfaces
- Know how a simple pulley works and use to on to lift an object
- Know how some forces require contact and some do not, giving examples
- . Know about and explain how magnets attract and repel Predict whether magnets will attract or repel and give a reason

## **Plants**

- Know the function of different parts of flowering plants and trees
- Know how water is transported within
- Know the plant life cycle, especially the importance of flowers

### Animals including humans

- Identify and name the parts of the human digestive system
- . Know the functions of the organs in the human digestive system
- · Identify and know the different types of human teeth
- Know the functions of different human teeth
- Use and construct food chains to identify producers, predators and prey

### Electricity

- · Identify and name Animals including appliances that require humans electricity to function Know about the
  - · Construct a series circuit • Identify and
- a series circuit (including Know how nutrients, cells, wires, bulbs, water and oxygen are switches and buzzers) transported within

importance of a

nutritious, balanced

animals and humans

. Know about the

skeletal and muscular

system of a human

 Predict and test whether a lamp will light within a circuit

name the components in

- . Know the function of a switch
- Know the difference between a conductor and an insulator; giving examples of each

## Light

. Know that dark is the absence of light . Know that light is needed in order to see and is reflected from a surface • Know and demonstrate how a shadow is formed and explain how a shadow changes shape . Know about the danger of direct sunlight and describe how to keep protected

#### **ELG The Natural World**

- around them, making observations and drawing pictures of animals and plants
- differences between the and contrasting environments, drawing on has been read in class processes and changes in the

# humans

parts of the human body that can be

### Animals including humans

- . Know how to classify a range of animals by amphibian, reptile, mammal, fish and birds
- Know and classify animals by what they eat (carnivore. herbivore and omnivore) Know how to sort by living and non living things

# All living things and their

- habitats · Classify things by living. dead or never lived
- basic needs of things living
- their habitat · Name some different
- Know about and explain a simple food chain

#### Animals including humans

- · Know the basic stages in a life cycle for animals, (including humans)]
- . Know why exercise. a balanced diet and good hygiene are important for humans

## Seasonal change

· Name the seasons and know about the type of weather in each

### squashing, bending, twisting and

 Know why a material might or might not be used for a specific job

### **Everyday materials**

- . Know the name of the materials an object is made from
- · Know about the properties of everyday materials

- **Everyday materials** · Know how materials can be changed by
  - stretching

- Plants • Know and name a variety of common wild and garden plants
- Know and name the petals, stem, leaves and root of a plant
- . Know and name the roots, trunk, branches and leaves of a tree

# Years 3&4

- . Know and explain how seeds and bulbs grow into plants
- · Know what plants need in order to grow and stay healthy (water, light & suitable temperature)



- Explore the natural world
- Know some similarities and natural world around them their experiences and what Understand some important

natural world around them,

including the seasons and

changing states of matter.

# **Years**

1&2

# Animals including

. Know the name of

- Know how a specific habitat provides for the
- there (plants and animals) · Match living things to
- sources of food for animals

season

## Adapted from Assessing a Knowledge Rich Curriculum – Focus Education

# **Science National Curriculum Content**



for it

						Everton Primary S
Year Group	Themes					
	Cycle A			Cycle B		
Year 1 & 2	Animals, including humans Naming and describing common animals / Identifying seen body parts  Materials Properties of and grouping of everyday materials	Habitats All living things and their habitats	Animals, including humans Life cycles	Seasonal Change The four seasons / Seasonal weather (throughout the year)	Materials Properties of and grouping of everyday materials  Materials Uses of different materials	Plants Know about structure of plants and name common plants  Plants Growing plants from seeds and bulbs and keeping them healthy
Year 3 & 4	Light Reflections and shadows  Electricity Simple circuits and switches Conductors and insulators	Animals, including humans Skeleton, muscles and exercise and health  Animals, including humans Digestive system and Teeth	Plants  Basic structure and functions Life cycle and transportation of water	Forces and magnets Different forces Investigating magnets  Rocks Fossil formation Compare and group rocks Soil	Living things and their habitats Classification and habitats.	States of Matter  Sound  Sound vibrations Pitch and Volume
Year 5 & 6	Light How light travels Reflection Ray models of light  Animals, including humans Changes in humans from birth to death	Properties and changes in materials Reversible and Irreversible substances	Living things and their habitats Life cycles and reproduction in some plants and animals  Forces Gravity, Friction Pulleys. etc	Electricity Electrical components, Simple circuits, Fuses and voltage  Earth and Space Movement of the Earth and the planets, Movement of the Moon, Night and day	Animals, including humans The circulatory system Water transportation Impact of exercise on body	Evolution and Inheritance Identical and nonidentical offspring Fossil evidence and evolution Adaptation and evolution  Living things and their habitats Classification of living things and the reasons