



## **Bingham Primary School - Science Curriculum**

### **National Curriculum:**

A high-quality science education provides the foundations for understanding the world through the specific disciplines of biology, chemistry and physics. Science has changed our lives and is vital to the world's future prosperity, and all pupils should be taught essential aspects of the knowledge, methods, processes and uses of science. Through building up a body of key foundational knowledge and concepts, pupils should be encouraged to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena. They should be encouraged to understand how science can be used to explain what is occurring, predict how things will behave, and analyse causes.

### **Aims**

The national curriculum for science aims to ensure that all pupils:

- develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics
- develop understanding of the nature, processes and methods of science through different types of science enquiries that help them to answer scientific questions about the world around them
- are equipped with the scientific knowledge required to understand the uses and implications of science, today and for the future

### **KS1:**

The principal focus of science teaching in key stage 1 is to enable pupils to experience and observe phenomena, looking more closely at the natural and humanly constructed world around them. They should be encouraged to be curious and ask questions about what they notice. They should be helped to develop their understanding of scientific ideas by using different types of scientific enquiry to answer their own questions, including observing changes over a period of time, noticing patterns, grouping and classifying things, carrying out simple comparative tests, and finding things out using secondary sources of information. They should begin to use simple scientific language to talk about what they have found out and communicate their ideas to a range of audiences in a variety of ways. Most of the learning about science should be done through the use of first-hand practical experiences, but there should also be some use of appropriate secondary sources, such as books, photographs and videos.

'Working scientifically' is described separately in the programme of study, but must always be taught through and clearly related to the teaching of substantive science content in the programme of study. Throughout the notes and guidance, examples show how scientific methods and skills might be linked to specific elements of the content.

Pupils should read and spell scientific vocabulary at a level consistent with their increasing word-reading and spelling knowledge at key stage 1.

### **Lower KS2:**

The principal focus of science teaching in lower key stage 2 is to enable pupils to broaden their scientific view of the world around them. They should do this through exploring, talking about, testing and developing ideas about everyday phenomena and the relationships between living things and familiar environments, and by beginning to develop their ideas about functions, relationships and interactions. They should ask their own questions about what they



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observe and make some decisions about which types of scientific enquiry are likely to be the best ways of answering them, including observing changes over time, noticing patterns, grouping and classifying things, carrying out simple comparative and fair tests and finding things out using secondary sources of information. They should draw simple conclusions and use some scientific language, first, to talk about and, later, to write about what they have found out.

'Working scientifically' is described separately at the beginning of the programme of study, but must always be taught through and clearly related to substantive science content in the programme of study. Throughout the notes and guidance, examples show how scientific methods and skills might be linked to specific elements of the content.

Pupils should read and spell scientific vocabulary correctly and with confidence, using their growing word-reading and spelling knowledge.

### **Upper KS2:**

The principal focus of science teaching in upper key stage 2 is to enable pupils to develop a deeper understanding of a wide range of scientific ideas. They should do this through exploring and talking about their ideas; asking their own questions about scientific phenomena; and analysing functions, relationships and interactions more systematically. At upper key stage 2, they should encounter more abstract ideas and begin to recognise how these ideas help them to understand and predict how the world operates. They should also begin to recognise that scientific ideas change and develop over time. They should select the most appropriate ways to answer science questions using different types of scientific enquiry, including 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 of information. Pupils should draw conclusions based on their data and observations, use evidence to justify their ideas, and use their scientific knowledge and understanding to explain their findings.

'Working and thinking scientifically' is described separately at the beginning of the programme of study, but must always be taught through and clearly related to substantive science content in the programme of study. Throughout the notes and guidance, examples show how scientific methods and skills might be linked to specific elements of the content. Pupils should read, spell and pronounce scientific vocabulary correctly.



| Area                     | EYFS | Year 1  | Year 2  | LKS1 Year A   | LKS2 Year B  | UKS2 Year A  | UKS2 Year B  |
|--------------------------|------|---|---|---|--|--|--|
| Animals including Humans |      | <ul style="list-style-type: none"> <li>identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals;</li> <li>identify and name a variety of common animals that are carnivores, herbivores and omnivores;</li> <li>describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals including pets);</li> <li>identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.</li> </ul> | <ul style="list-style-type: none"> <li>notice that animals, including humans, have offspring which grow into adults;</li> <li>find out about and describe the basic needs of animals, including humans, for survival (water, food and air);</li> <li>describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.</li> </ul> | <ul style="list-style-type: none"> <li>identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat;</li> <li>identify that humans and some other animals have skeletons and muscles for support, protection and movement.</li> </ul>   | <ul style="list-style-type: none"> <li>describe the simple functions of the basic parts of the digestive system in humans;</li> <li>identify the different types of teeth in humans and their simple functions;</li> <li>construct and interpret a variety of food chains, identifying producers, predators and prey.</li> </ul> | <ul style="list-style-type: none"> <li>describe the changes as humans develop to old age.</li> </ul> | <ul style="list-style-type: none"> <li>identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood;</li> <li>recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function;</li> <li>describe the ways in which nutrients and water are transported within animals, including humans.</li> </ul> |
| Plants                   |      | <ul style="list-style-type: none"> <li>identify and name a variety of common wild and garden plants, including deciduous and evergreen trees;</li> <li>identify and describe the basic structure of a variety of common flowering plants, including trees.</li> </ul>   | <ul style="list-style-type: none"> <li>observe and describe how seeds and bulbs grow into mature plants;</li> <li>find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.</li> </ul>  | <ul style="list-style-type: none"> <li>identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers;</li> <li>explore 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;</li> <li>investigate the way in which water is transported within plants;</li> <li>explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.</li> </ul> |  |  |  |

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|----------------------------------|--|--|---|--|---|---|--|
| Living Things and their Habitats |  |  | <ul style="list-style-type: none"> <li>• explore and compare the differences between things that are living, dead, and things that have never been alive;</li> <li>• identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other;</li> <li>• identify and name a variety of plants and animals in their habitats, including microhabitats;</li> <li>• describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food.</li> </ul> |  | <ul style="list-style-type: none"> <li>• recognise that living things can be grouped in a variety of ways;</li> <li>• explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment;</li> <li>• recognise that environments can change and that this can sometimes pose dangers to living things.</li> </ul> | <ul style="list-style-type: none"> <li>• describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird;</li> <li>• describe the life process of reproduction in some plants and animals.</li> </ul> | <ul style="list-style-type: none"> <li>• describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals;</li> <li>• give reasons for classifying plants and animals based on specific characteristics.</li> </ul>   |
| Evolution and Inheritance        |  |  |   |  |   |   | <ul style="list-style-type: none"> <li>• recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago;</li> <li>• recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents;</li> <li>• identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.</li> </ul> |

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|------------------|--|--|--|---|--|--|--|
| Seasonal Changes |  | <ul style="list-style-type: none"> <li>• observe changes across the 4 seasons;</li> <li>• observe and describe weather associated with the seasons and how day length varies.</li> </ul> |  |   |  |  |  |
| Forces           |  |  |  | <ul style="list-style-type: none"> <li>• compare how things move on different surfaces;</li> <li>• notice that some forces need contact between 2 objects, but magnetic forces can act at a distance;</li> <li>• observe how magnets attract or repel each other and attract some materials and not others;</li> <li>• compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials;</li> <li>• describe magnets as having 2 poles;</li> <li>• predict whether 2 magnets will attract or repel each other, depending on which poles are facing.</li> </ul> |  | <ul style="list-style-type: none"> <li>• explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object;</li> <li>• identify the effects of air resistance, water resistance and friction, that act between moving surfaces;</li> <li>• recognise that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect.</li> </ul> |  |

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| Light |  |  |  | <ul style="list-style-type: none"> <li>• recognise that they need light in order to see things and that dark is the absence of light;</li> <li>• notice that light is reflected from surfaces;</li> <li>• recognise that light from the sun can be dangerous and that there are ways to protect their eyes;</li> <li>• recognise that shadows are formed when the light from a light source is blocked by an opaque object;</li> <li>• find patterns in the way that the size of shadows change.</li> </ul> |  |  | <ul style="list-style-type: none"> <li>• recognise that light appears to travel in straight lines;</li> <li>• use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye;</li> <li>• explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes;</li> <li>• use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.</li> </ul> |
| Sound |  |  |  |   | <ul style="list-style-type: none"> <li>• identify how sounds are made, associating some of them with something vibrating;</li> <li>• recognise that vibrations from sounds travel through a medium to the ear;</li> <li>• find patterns between the pitch of a sound and features of the object that produced it;</li> <li>• find patterns between the volume of a sound and the strength of the vibrations that produced it;</li> <li>• recognise that sounds get fainter as the distance from the sound source increases.</li> </ul> |  |   |

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|-----------------|--|--|--|--|--|--|--|
| Earth and Space |  |  |  |  |  | <ul style="list-style-type: none"> <li>• describe the movement of the Earth and other planets relative to the Sun in the solar system;</li> <li>• describe the movement of the Moon relative to the Earth;</li> <li>• describe the Sun, Earth and Moon as approximately spherical bodies;</li> <li>• use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.</li> </ul> |  |
| Electricity     |  |  |  |  | <ul style="list-style-type: none"> <li>• identify common appliances that run on electricity;</li> <li>• construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers;</li> <li>• 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;</li> <li>• recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit;</li> <li>• recognise some common conductors and insulators, and associate metals with being good conductors.</li> </ul> |  | <ul style="list-style-type: none"> <li>• associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit;</li> <li>• compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches;</li> <li>• use recognised symbols when representing a simple circuit in a diagram.</li> </ul> |

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|           |  |  |  |   |  |  |  |
|-----------|--|--|--|---|--|--|--|
| Materials |  | <ul style="list-style-type: none"> <li>distinguish between an object and the material from which it is made;</li> <li>identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock;</li> <li>describe the simple physical properties of a variety of everyday materials;</li> <li>compare and group together a variety of everyday materials on the basis of their simple physical properties.</li> </ul> | <ul style="list-style-type: none"> <li>identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses;</li> <li>find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching</li> </ul> | <p><b>(Rocks)</b></p> <ul style="list-style-type: none"> <li>compare and group together different kinds of rocks on the basis of their appearance and simple physical properties;</li> <li>describe in simple terms how fossils are formed when things that have lived are trapped within rock;</li> <li>recognise that soils are made from rocks and organic matter</li> </ul> | <p><b>(States of Matter)</b></p> <ul style="list-style-type: none"> <li>compare and group materials together, according to whether they are solids, liquids or gases;</li> <li>observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C);</li> <li>identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.</li> </ul> | <ul style="list-style-type: none"> <li>compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets;</li> <li>know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution;</li> <li>use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating;</li> <li>give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic;</li> <li>demonstrate that dissolving, mixing and changes of state are reversible changes;</li> <li>explain 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.</li> </ul> |  |
|-----------|--|--|--|---|--|--|--|



**Bingham Primary School - Science Curriculum**  
**Curriculum Coverage Grid**



|  | Autumn   | Spring   | Summer   |
|--|--|--|--|
| <b>Year 1</b>                            | <i>Seasonal Changes</i><br><i>Everyday Materials</i>                       | <i>Seasonal Changes</i><br><i>Plants</i>                             | <i>Seasonal Changes</i><br><i>Animals including Humans</i>                 |
| <b>Year 2</b>                            | <i>Use of Everyday Materials</i>   | <i>Animals including Humans</i>                                      | <i>Plants</i><br><i>Living Things and their Habitats</i>                   |
| <b>Lower KS2<br/>Year A<br/>(Year 3)</b> | <i>Rocks (Materials)</i><br><i>Animals including Humans</i>                | <i>Forces and Magnets</i>  | <i>Plants</i><br><i>Light</i>  |
| <b>Lower KS2<br/>Year B<br/>(Year 4)</b> | <i>Animals including Humans</i><br><i>States of Matter (Materials)</i>     | <i>Electricity</i><br><i>Sound</i>                                   | <i>Living Things and their Habitats</i>                                    |
| <b>Upper KS2<br/>Year A<br/>(Year 5)</b> | <i>Properties and Changes of Materials</i>                                 | <i>Forces</i><br><i>Earth and Space (linked to Seasonal Changes)</i> | <i>Animals including Humans</i><br><i>Living Things and their Habitats</i> |
| <b>Upper KS2<br/>Year A<br/>(Year 6)</b> | <i>Living Things and their Habitats</i><br><i>Animals including Humans</i> | <i>Electricity</i>   | <i>Evolution and Inheritance</i><br><i>Light</i>                           |

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## Year 1 – Seasonal Changes – **Complete during each season. Plan into half-term at a time when weather is 'typical' for that particular season.**

| Prior Learning                |  | •  |   |   |
|-------------------------------|--|--|---|---|
| Scientific Tools (Hierarchy)  |  | •observe changes across the 4 seasons    •observe and describe weather associated with the seasons and how day length varies.  |   |   |
| Week                          | To Know statement  | How to Learning Activities   | Resources   | Vocabulary  |
| <b>Lesson 1 – Autumn Term</b> | To know, observe and describe weather associated with the seasons. | Chn TTYP 'What is weather?'. Display IWB on weather to support discussion. Discuss how in different weather we do certain things to keep safe. Match weather to weather symbols. Challenge chn to think of ways to measure weather (rainfall, temp and wind) and discuss ideas. Introduce 'weather station' (either pre-made or make with chn) and show how it works.  | •Check Weather Station Instructions to make Rain Gauge and Weathervane<br>• Thermometer | • <u>Seasons</u> : spring, summer, autumn, winter, seasonal change.<br><br>• <u>Weather</u> : e.g. sun, rain, snow, sleet, frost, ice, fog, cloud, hot/warm, cold, storm, wind, thunder, weather forecast.<br><br>• <u>Measuring weather</u> : temperature, rainfall, wind direction, thermometer, rain gauge.<br><br>• <u>Day length</u> : night, day, daylight. |
|                               | To know, observe and describe weather associated with the seasons. | Check weather forecast and when weather is reflecting typical expectations during each season - complete a weather diary. Include temperature, rainfall, and wind direction. This could be done as morning task/quick afternoon task throughout the week. Take a picture of the whole class with trees in picture during the week of recording the weather. After each week, compare the findings to the previous seasons and discuss changes that occur when seasons change – include how length of day varies. | • Weather diary<br>• Camera   |   |
|                               | To know, observe and describe weather associated with the seasons. | Take chn on a walk of the local area during typical weather for each seasons and spot the signs of the season. Discuss what they notice and how it is different to other seasons.  |   |   |
|                               | To know, observe and describe weather associated with the seasons. | After each weather diary week, chn to make an 'overview of the season' in their science books that displays their findings. It could include what they've learned from the weather diary, what trees are like in that season, what people tend to wear and why, daylight hours, signs of each season, months and events in those seasons (e.g. Christmas in Winter) etc. Use science lesson each half term to complete.  |   |   |
|                               |  |  |   |   |
|                               |  |  |   |   |
|                               |  | By the end of the unit most of the children will know: <ul style="list-style-type: none"><li>➢ how to describe the weather associated with each season</li><li>➢ how day length varies in all seasons</li><li>➢ the changes across all seasons</li></ul>   |   |   |

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## Year 1 Autumn – Everyday Materials



| Prior Learning               |   | •Explore the natural world around them •Describe what they see, hear and feel whilst outside  |   |  |
|------------------------------|---|---|---|--|
| Scientific Tools (Hierarchy) |   | •distinguish between an object and the material from which it is made • identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock; •describe the simple physical properties of a variety of everyday materials; • compare and group together a variety of everyday materials on the basis of their simple physical properties.  |   |  |
| Week                         | To Know statement   | How to Learning Activities  | Resources   | Vocabulary   |
| 1                            | To know how to identify and name different materials                                | Gather a group of materials – where possible, ensure that these are raw examples e.g. a plank of wood for wood rather than a wooden chair. Can children name any of the materials? Go through the names of the different materials and what they may be used for (not in too much detail as this is lesson 2's focus). Chn to label materials to show their understanding. Give each pair a different material and children have to think of three adjectives to describe their material. Keep these for lesson 3.  | •Wood, plastic, glass, metal, water (if possible, not objects made from these materials)<br>• Material Photopack                                | • <u>Names of materials</u> : wood, plastic, glass, metal, water, rock, paper, cardboard, rubber, fabric.<br><br>• <u>Properties of materials</u> : hard, soft, shiny, dull, stretchy, rough, smooth, bendy, not bendy, transparent, opaque, waterproof, not waterproof, absorbent, not absorbent, sharp, stiff.<br><br>• <u>Other</u> : object. |
| 2                            | To know and tell the difference between an object and the material it is made from. | Display images of different objects made from the same materials, <i>What do you notice?</i> Ask chn to feedback as a whole class. Display IWB which looks at this in more detail. Discuss the difference between actual objects and materials they are made from Ask chn to identify the objects in the pictures, as well as the materials they are made from. Chn to identify objects and explain the material(s) that each object is made from.  | • A range of objects made from different materials could be used to support learning.   |  |
| 3                            | To know how to describe the properties of everyday materials                        | Recap word lists for different materials made at the end of lesson 1. Go through the vocabulary and discuss the meaning. Display words on IWB – did the chn use any of these words? Explain that these words are known as properties. Chn to explore a range of materials and objects. Chn to describe what materials look like and how they feel. Chn to use Everyday Materials Vocabulary Cards to label a material or object with that property. Chn to explain why. Chn to write properties of different materials in books. Feely bag game – put a material in the bag and select a child to explain the properties they can feel and class to predict the material being described. | • Gather materials and objects made of different materials.<br>• Feely bag, rock, wood, plastic, metal<br>• Everyday Materials Vocabulary Cards |  |
| 4                            | To know which materials have certain properties                                     | Chn TTYP and think of as many properties of materials as they can. Display properties from previous lessons and discuss meanings. Discuss how some properties are easier to identify than others e.g. you can see if an object is shiny/dull. Model how to test to see if something is waterproof, transparent or opaque or absorbent. Chn to test the properties of different materials and record their findings by testing objects made from different materials. Discuss findings as a class – which materials were bendy/waterproof/absorbent? Which materials were transparent/opaque?  | • Gather materials and objects made of different materials.<br>•Shallow containers filled with water  |  |
| 5                            | To know how to test different materials   | Introduce Ted's problem to the chn and discuss how they could help (create an umbrella, what material would be best?). Show chn 4 materials they'll be testing (the materials need to be able to cover a small plastic pot and be able to be attached to the pot using an elastic band. One of the materials should ideally be a type of plastic like an umbrella). Chn to carry out and record the investigation in groups. Discuss findings and answer Ted's question. <i>Which materials would be best? What material wouldn't work? Why? (e.g. glass).</i>  | •Investigation resources per group: a small bear, plastic pot, elastic band, a pipette, a pot with water, 4 different materials.                |  |
| 6                            | To know how to sort objects by their properties                                     | Display pictures and ask chn to discuss how they could be sorted (e.g. red and not red, hard and soft etc). Pass objects around in a circle and describe the properties. Display properties on IWB to support. Model how to use sorting hoops and label each one. Ask chn where each object needs to go, modelling a few different examples. Include overlapping hoops and modelling how objects/materials with both can go in the middle. Chn to sort objects based on properties – pictures to be evidenced in books.   | • Gather materials and objects made of different materials.<br>• Sorting Hoops<br>• Camera  |  |
|                              |   | By the end of the unit most of the children will know: <ul style="list-style-type: none"><li>➤ the materials that everyday objects are made from.</li><li>➤ how to identify, name and describe properties of everyday materials.</li><li>➤ how to compare, group and sort materials.</li></ul>  |   |  |



# Bingham Primary School - Science Curriculum

## Year 1 Spring – Plants

| Prior Learning               |   | •   |   |   |
|------------------------------|---|---|---|---|
| Scientific Tools (Hierarchy) |   | • identify and name a variety of common wild and garden plants, including deciduous and evergreen trees • identify and describe the basic structure of a variety of common flowering plants, including trees.   |   |   |
| Week                         | To Know statement   | How to Learning Activities  | Resources   | Vocabulary  |
| 1                            | To know how to describe and compare plants, seeds and bulbs                   | Recap chn's prior knowledge of plants by displaying a range of images and seeing what chn can tell you about the plants. Introduce plant eBook – read up to page 4 and discuss what the chn would like to learn. Compare images of plants on IWB ( <b>or have selection of real plants</b> ). Explain 'similar' and 'different' and allow chn the opportunity to examine and make comparisons about what they notice. Introduce seeds and bulbs via IWB/real examples. Chn generate questions about bulbs and seeds. Explain to chn that they will be planting seeds or bulbs to observe growing over the next few weeks. Chn to plant seeds and start a Plant Diary which they will observe/draw and update. Ask chn to make predictions about the changes they expect to see over the upcoming weeks.   | •Plant Pots<br>•Soil<br>•Seeds and bulbs for planting (e.g. beans/ tomatoes/ sunflower/ carrot) | • <u>Names of common plants:</u> wild plant, garden plant, evergreen tree, deciduous tree, common flowering plant, weed, grass.<br><br>• <u>Name some features of plants:</u> e.g. flower, vegetable, fruit, berry, leaf/leaves, blossom, petal, stem, trunk, branch, root, seed, bulb, soil.<br><br>• <u>Name some common types of plant</u> e.g. sunflower, daffodil. |
| 2                            | To know the different parts of plants   | Give chn a moment to look at their seeds and update their Plant Diary from the previous lesson. Read p5-p10 of the Plant eBook and match the seeds to the name of the plant they are from. Look at the parts of a plant on IWB and match the name of the part to its name in TP. Discuss the basic feature of each part of the plant. Allow chn to examine real plants (they are on IWB if not resourced) and ask them to compare how the parts of plants are the same or different on each plant. Chn to make an observational drawing of one plant and add labels for each part of the plant (if using real plants, remove from pot so chn can see roots).  | •Fully grown flowering plants that are easily removable from their pots                         |   |
| 3                            | To know how to identify and name some common garden and wild plants.          | Repeat process from last lesson for Plant Diary. Read p11-20 of Plant eBook that focuses on garden and wild plants. Chn to discuss where they might see plants growing and what the differences between garden plants and wild plants are. Use IWB to identify and describe different plants that may grow in gardens/parks. Use grass as e.g. and explain that some plants can be garden plants <b>and</b> wild plants. Continue on IWB to identify and discuss wild plants. TTYP – what do you know about wild plants and garden plants? Go on a plant hunt around school and allow chn to identify a range of plants using the plant identification key resource. Chn to make observational drawings of plants they see (could be taken pictures on iPad and done in classroom or use clipboards). Take pictures of plants for plenary. Ask chn what they found and see if they can explain whether they are garden or wild plants.            | • Camera<br>• Clip boards<br>• Magnifying Glass   |   |
| 4                            | To know how to identify and name some common trees.                           | Repeat process from last lesson for Plant Diary. Read p21-p30 of Plant eBook to learn about trees. Discuss different parts of trees using images on IWB. Explain that some trees grow fruit, nuts and cones and what these are for. Explain that not all nuts and fruits can be eaten by people. Look at the oak tree through the seasons on IWB to remind chn that deciduous trees lose their leaves in Autumn. Chn to then see if they can name the deciduous tree from the clues given. Repeat the process on IWB of pine tree. Explain that different part of the tree can be used to help identify it. Show the leaves on IWB and discuss how each are different. Chn to describe each leaf. Chn to explore and investigate which trees are in the school grounds using the Tree Identification Key to support. Collect any fallen leaves as these can be observed more carefully in class with magnifying glasses and used on working wall. |   |   |
| 5                            | To know how to name, sort and compare some common fruit and vegetable plants. | Repeat process from last lesson for Plant Diary. Recap last lesson's learning and decide whether the pictured trees (IWB) are deciduous or evergreen, and how they know. Read p27-p34 of Plant eBook to find out about fruit and vegetable plants. Display images to teach names of some vegetables and introduce them to the part of the plant each one is. Explain how fruit contains a plant's seed and repeat the previous process with fruits. Using prompts from IWB, chn work together to look closely at different photographs of fruit and vegetables, identify them and describe their similarities and differences. Finally, they decide how to sort them into a table.  | •Variety of fruit and vegetables (including stem, leaf, flower and root vegetables)             |   |
| 6                            | To name and compare common plants and trees.                                  | Repeat process from last lesson for Plant Diary and discuss questions on IWB. Recap last lesson's learning through discussion from IWB. Read p35-p40 of Plant eBook reviewing everything they have learned so far with the quiz and use glossary to support with unfamiliar words. Explain the meaning of 'compare' and demonstrate how to do so with the list of similarities and differences on IWB. Chn to work in small groups/pairs to compare real plants (or use picture pack if needed). Chn can be supported with question cards. Chn then to sort plants into 2 groups of their choice.   | •Variety of live plants<br>•Sorting hoops   |   |
|                              |   | By the end of the unit most of the children will know:<br>➢ How to identify a range of common wild and garden plants and trees<br>➢ What deciduous and insidious trees are<br>➢ The different parts and structure of common plants including trees  |   |   |



## Bingham Primary School - Science Curriculum

### Year 1 Summer – Animals including Humans

| Prior Learning               |   | <ul style="list-style-type: none"> <li>Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals</li> <li>Identify and name a variety of common animals that are carnivores, herbivores and omnivores</li> <li>Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals including pets)</li> <li>Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.</li> </ul>  |   |   |
|------------------------------|---|---|---|---|
| Scientific Tools (Hierarchy) |   |   |   |   |
| Week                         | To Know statement   | How to Learning Activities  | Resources   | Vocabulary  |
| 1                            | To know how to identify and name some common animals.   | Display images on IWB – chn to discuss what an animal is and what animals they can name in the image. Address misconceptions. Introduce different animals groups and names of some of the animals. Ask chn to discuss the questions on IWB and think about where they might see different types of animals. Take chn into local environment to observe different kinds of animals (e.g. birds, worms etc). Chn to observe, draw and name the animal, note where they saw it (e.g. in a tree/sky) and then the animal group it comes from. <b>(prepare images of animals that could be found in school grounds in case none are found).</b>  | <ul style="list-style-type: none"> <li>Camera (iPad)</li> <li>Animal Groups Key</li> </ul>                              | <ul style="list-style-type: none"> <li><u>Names of animal groups</u>: fish, amphibians, reptiles, birds, mammals.</li> <li><u>Animal diets</u>: carnivore, herbivore, omnivore.</li> </ul>  |
| 2                            | To know how to describe and compare the structure of a variety of common animals              | Display images of animals from IWB – chn to discuss groups that animals belong to. Chn to look closely at animal features e.g. beak, claws, legs etc. Share statement on IWB about birds and ask chn to discuss whether they agree/disagree. Ask chn to suggest ways in which they could find out whether it is true or not. Show pictures of the penguin and robin on IWB. Chn to feedback about and compare features (could be added to working wall). Use eBook on IWB to prove whether all birds can fly or not. Chn to use photos and other secondary sources to compare animals from different groups.  |   | <ul style="list-style-type: none"> <li><u>Human and animal body parts</u>: e.g. body, head, neck, arms, elbows, legs, knees, face, ears, eyes, nose, hair, mouth, teeth, hands, feet, tail, wings, feathers, fur, beak, fins, gills.</li> </ul> |
| 3                            | To know how to identify, name and sort animals that are herbivores, carnivores and omnivores. | Chn to fill in animal names for statements on IWB to recap previous learning. Explain to chn that diet means food animals eat. Chn to predict what they think each animal eats on IWB. Chn to share ideas and discuss agree/disagree. Introduce 3 diet types: carnivore, herbivore and omnivore and define each. Chn TTYP – <i>What type of diet do you have?</i> Give examples of animals from each diet type on IWB. Chn use animal fact cards to discover what each animal eats and then sorts them into the correct group based on their diets.   | <ul style="list-style-type: none"> <li>Animal fact cards</li> </ul>   | <ul style="list-style-type: none"> <li><u>Human senses</u>: sight, hearing, touch, smell, taste.</li> <li><u>Exploring senses</u>: loud, quiet, soft, rough.</li> </ul>   |
| 4                            | To know and label parts of the human body.  | Play sorting game on IWB as a class. As chn suggest ideas for each photo, ask them which features they think the animals has that makes it part of that group. Remind chn that humans are mammals. Explain that they are going to find out more about the human body. Play Simon Says with the chn starting with basic parts of the body. Show chn a diagram of the human body. Ask them to identify the main parts of the body, such as leg, arm, head etc. Do this for each label and discuss the function of each part of the body. Chn to label human body/add in missing parts onto diagram for books. Challenge: write what each body part does.  | <ul style="list-style-type: none"> <li>Sticky notes</li> <li>A3 paper</li> </ul>  | <ul style="list-style-type: none"> <li><u>Other</u>: human, animal, pet.</li> </ul>   |
| 5                            | To know the name of the five senses and to perform simple tests to find out more about them.  | Recap parts of the body on IWB game. Go through IWB slides which introduces and explains the five senses and gets the chn to use each of the senses through different tasks. Chn to take part in and conduct different tests conducting senses. These could be delivered as a carousel activity in small groups or select a couple to complete as a whole class. Chn to record their findings in books/take pictures of chn conducting tests and chn to write what they have learned about their senses. <b>Senses Activity Sheet has information on all the different activities.</b>  | <ul style="list-style-type: none"> <li><b>Senses Activity Sheet – there are lots of resources, see list.</b></li> </ul> |   |
| 6                            | To know how to sort animals according to a criterion  | Discuss true/false statements from IWB linking to last lesson's learning. Display set of animals on IWB and give chn criteria to sort to in TP. Chn to share their reasoning for grouping the animals. Repeat with next criteria. Chn to then work in pairs to find a new way to sort the animals. Explain that the animals in each group must have something that is the same (e.g. all birds) but chn can choose how to sort them. Chn work in pairs or small groups to sort the images of the animals according to their own criteria. When choosing their own criteria, children will explain either in writing or verbally why they have chosen to sort the animals in this way. Children use the Animal Photographs to choose their own ways to group the animals into sorting hoops. The list of Animal Diets is provided to support children who wish to sort by diet. Chn could also use the eBook or other secondary sources as needed to help them with their sorting. Chn's sorting could be photographed, or they could record in books. | <ul style="list-style-type: none"> <li>iPad</li> <li>Non-fiction books re animals/animal groups</li> </ul>              |   |
|                              |   | By the end of the unit most of the children will know: <ul style="list-style-type: none"> <li>How to identify a variety of common animals including fish, amphibians, reptiles, birds and mammals</li> <li>That animals inc humans are grouped into carnivores, herbivores or omnivores based on their diets</li> <li>How to identify, name, draw and label basic parts of the body and say which part of the body is associated with the five senses.</li> </ul>   |   |   |

# Bingham Primary School - Science Curriculum

## Year 2 Autumn – Use of Everyday Materials



| Prior Learning               |   | •Distinguish between an object and the material from which it is made. • Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock. •Describe the simple physical properties of a variety of everyday materials. •Compare and group together a variety of everyday materials on the basis of their simple physical properties.   |  |  |
|------------------------------|---|--|--|--|
| Scientific Tools (Hierarchy) |   | •Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses • Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.   |  |  |
| Week                         | To Know statement   | How to Learning Activities   | Resources  | Vocabulary   |
| 1                            | To know the uses of different everyday materials                          | Ask chn which materials they can remember from Y1 and record their answers. Allow chn opportunity to examine e.gs of the materials and recap which ones are man-made and which are natural. Chn to discuss what the materials are used for. Encourage chn to look around and identify where different materials have been used. Chn to suggest uses of different everyday materials and record this in books. Share answers as a whole class and discuss how the same materials can be used for a number of different things e.g. metal for coins, keys, cans and bridges.   | •wood, plastic, glass, metal, rock, brick, paper and cardboard (eg of materials not objects made from them)                            | • <b>Changing shape:</b> squash, bend, twist, stretch.<br><br>• <b>Properties of materials:</b> e.g., hard, soft, stretchy, stiff, shiny, dull, rough, smooth, bendy, not bendy, absorbent, not absorbent, waterproof, not waterproof, transparent, opaque..<br><br>• <b>Other: suitability,</b> recycle, pollution. |
| 2                            | To know how to identify and group the uses of everyday materials          | Explain to chn that we will be going on a local walk to look out for everyday materials being used in different ways. Chn to record findings on clipboards during walk and take photos where possible... Chn to feedback findings to class when back in school. Encourage chn to see if they can group similar uses together. Encourage children to think of materials which may be used for similar purposes, for example materials used for building. Go through any unusual uses of materials and discuss why they might be used for that purpose. Encourage chn to lookout for different uses of materials at home and out.  | •Clipboard<br>•Camera/iPad<br>•Trip Resources  |  |
| 3                            | To know and compare the suitability of different everyday materials       | Remind chn of the properties of everyday materials (from Y1). Discuss why objects are made out of particular materials, e.g. why are window panes made out of glass? Look at the rulers, using the prompt questions to discuss materials and their uses. In groups chn to discuss which material spoons are made from (hopefully they will realise spoons are made from a variety of different materials) – <i>Can chn explain why different materials can be used for the same object?</i> Chn to read the mini-brief for an object and suggest which material would be suitable or unsuitable for the job.   | •  |  |
| 4                            | To know how the shapes of objects made from some materials can be changed | Chn in TP think about how the shape of objects made from some materials can be changed, e.g. squashing a cardboard box. Go through the different ways materials can be manipulated. Encourage chn to do each action with their hands. Chn to record in tables and record findings when exploring how to manipulate materials. Chn to find 3 objects that cannot be changed in the ways discussed on IWB.   | •Objects to be manipulated: play dough, pipe cleaners, tea towels, socks, plastic bottles, elastic bands, drinking straws and sponges. |  |
| 5                            | To know the process of recycling.   | Chn to discuss recycling and what it means. Briefly discuss the importance of recycling objects. Go through materials that can be recycled and look at e.g. that are easily found at school. Discuss local area's recycling arrangements e.g. 'Do you use coloured wheelie bins/bags/boxes? How do you dispose of garden materials/food?' Explain different areas in the country have a slightly different system but the goal is the same. Also discuss what your school does to recycle - do you have recycling bins? Do you have recycling monitors or eco monitors? Does recycling get discussed at your school council meetings? Go through recycling process on IWB and explain what happens once recycling is collected. Chn sequence pictures and write explanations of what is happening. | •  |  |
| 6                            | To know about the inventor John McAdam                                    | Read through IWB on John McAdam. Explain the process of macadamisation and emphasise that this was a significant change in road building. Until then rural roads were often muddy, slippery and dangerous and urban roads were cobbled making them bumpy and uncomfortable to travel over. Chn to use information to create a fact file of John McAdam.  | •  |  |
|                              |   | By the end of the unit most of the children will know:<br>➢ How to compare the uses of different everyday materials.<br>➢ How to compare the suitability of different everyday materials for different purposes.<br>➢ The basic process of recycling.  |  |  |

## Bingham Primary School - Science Curriculum

### Year 2 Spring – Animals including Humans



| Prior Learning               |   | • Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals • Identify and name a variety of common animals that are carnivores, herbivores and omnivores • describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals including pets) • identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.  |  |   |
|------------------------------|---|--|--|---|
| Scientific Tools (Hierarchy) |   | • notice that animals, including humans, have offspring which grow into adults • find out about and describe the basic needs of animals, including humans, for survival (water, food and air) • describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.  |  |   |
| Week                         | To Know statement   | How to Learning Activities   | Resources  | Vocabulary  |
| 1                            | To know how to match, sort and group young animals to their adults.   | Use IWB to display questions to recap different animal groups learned in Y1. Introduce the knowledge organisers and the sections being discussed in the lesson. Use alongside discussion of 'Do all animal offspring look like their adult when they are born?'. Highlight meaning of 'live young' to prevent misconceptions. Chn to match adult to young and sort on IWB. Prompt chn to discuss changes from young to adult. Reinforce that a young animal that is a different colour or size to the adult when it is born (e.g. a cygnet and a swan), would still be put in the 'look like their adult' section. Chn to match the adult animal to its young using the Animal Offspring Picture Cards and sort into two groups – 'offspring looks like its adult' or 'offspring does not look like its adult. Sticky notes to be used to further sort into their own groups.                    | •Sticky notes<br>•Knowledge Organiser  | • <u>Being born and growing:</u> Young, offspring, live young, grow, develop, change, hatch, lay, fly, crawl, talk.   |
| 2                            | To know how animals change as they grow into adults.                  | Introduce the relevant section of the Knowledge Organiser and explain they are to open an exhibition explaining how different animals change as they grow into adults. On IWB go through sheep and frog lifecycles. Chn to compare life cycles. Reinforce that frogs are different to sheep (amphibian compared to mammal) because they go through a cycle of major changes (metamorphosis). Using the eBook, chn research the life cycles of humans, ducks or butterflies. They then make their own version of a life cycle. Encourage the use of art materials to make the life cycles visually interesting for the exhibition.  | •Colouring equipment<br>•A3 paper<br>•eBook printed/on iPads<br>•Knowledge Organiser     | • <u>Young and adult names:</u> e.g. lamb and sheep, kitten and cat, duckling and duck.<br><br>• <u>Life cycle stages:</u> e.g. baby, toddler, child, teenager, adult; frogspawn, tadpole, froglet, frog. |
| 3                            | To know and compare the stages of the human life cycle.               | Recap frog life cycle on IWB from last lesson. Read p21-22 on eBook to recap the human life cycle. Chn look at Ajani's life cycle on IWB. Chn look at Ajani's heights and ask the children to match the correct heights to each stage of the life cycle to show how he has grown. Using IWB, chn to discuss: Can you do any of these activities? Chn select which of the suggested things they should be able to do. Ask chn if older/younger siblings can do the same things? Why do you think you can only do some of these things as you get older? Chn to sort activities into the different stages that a human might start to do the activity. Chn may decide to sort them into distinct stages, sort them so that some may overlap stages or sort them sequentially around the life cycle thinking about how humans develop. Discuss answers as answers may vary. Address misconceptions. | •eBook   | • <u>Survival and staying healthy:</u> basic needs, survive, food, air, exercise, diet, nutrition, healthy, balanced diet, hygiene, germs.  |
| 4                            | To know and describe what animals, including humans need to survive.  | 'What do all animals need to stay alive?'. Chn identify the three basic things all animals need to survive (using the example of a dog). Discuss how some things are classed as basic needs to survive (air, water and food) and clarify that the other things are still important. Introduce the relevant section on the Knowledge Organiser. Look at p27-p36 of eBook and draw attention to the fact that the needs of an animal changes depending on stage of development to discuss how to care for animals on IWB. Chn to create a fact file about how to take care of either a chameleon, a budgerigar or a stick insect. Children can refer to the eBook (printed or on devices) and any relevant non-fiction books.  | •eBook printed/on iPads  | • <u>Food groups:</u> fruit and vegetables, proteins, dairy and alternatives, carbohydrates, oil and spreads, fat, salt, sugar.   |
| 5                            | To know how to test the effects of exercise on the human body.        | Generate questions about exercise that children would like to find the answer to (e.g.s on IWB). Record these and save for later when looking at eBook p37-42. Explain chn will try answer 'Which activity will make my heart rate faster?' Discuss activities that raise HR. Introduce investigation using IWB bank of activities. Chn predict whether it would/wouldn't increase HR. Chn to choose one activity and complete a prediction as to why they think that activity would increase HR. Chn to record HR before and after activities and discuss whether their predictions were correct or not. Chn share their findings. Discuss: What kind of activities should we do to help our bodies stay healthy?   | •Stopwatch/timer   | Previously introduced vocabulary: water.  |
| 6                            | To know and investigate the importance of healthy eating and hygiene. | Review the three basic needs for survival that all animals have (air, water and food), and how exercise is important for humans to stay healthy. Chn to think people need to help them to stay healthy. Draw attention to the food and hygiene sections and key definitions on Knowledge Organiser. Discuss balanced diet and read p43-50 of eBook. Chn to create their own healthy meal plan. Chn to complete Removing Germs Investigation.   | • Paper towels<br>• Glitter<br>• Soap<br>• Water<br>• Large sheets scrap paper/newspaper |   |
|                              |   | By the end of the unit most of the children will know:<br>➢ That animals, including humans, have offspring that grow into adults<br>➢ The basic needs of animals, including humans, for survival<br>➢ The importance of exercise, balanced diet and hygiene.   |  |   |



# Bingham Primary School - Science Curriculum

## Year 2 Summer 1 – Plants



| Prior Learning               |  | • identify and name a variety of common wild and garden plants, including deciduous and evergreen trees •identify and describe the basic structure of a variety of common flowering plants, including trees.   |  |  |
|------------------------------|--|--|--|--|
| Scientific Tools (Hierarchy) |  | •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.   |  |  |
| Week                         | To Know statement  | How to Learning Activities   | Resources  | Vocabulary   |
| 1                            | To know what plants need to stay healthy.  | Chn to recap learning from Y1 – plant names and parts of a plant. Read up to p6 of eBook and introduce Knowledge Organiser. Show example of a healthy plant, and unhealthy plant (IWB can be used if not). How can you identify a healthy plant? Look at seeds and unhealthy plants on IWB. Chn to discuss what they think a plant needs to grow and stay healthy. Ask: how could we find out? Discuss how to set up their test. Chn plant seeds. Put each pot into your chosen place for each set of conditions. You will have the following plants: 1. A plant planted in soil, in a warm place, with light and with water. 2. A plant with no soil (e.g. planted in cotton wool) in a warm place, with light and with water. 3. A plant planted in soil, in a warm place, with light, that stays unwatered. 4. A plant planted in soil, in a warm place, with water, but no light. 5. A plant planted in soil, with light and water, but kept in a cold place. Take a photo of Plant 1 for Class Plant Diary. | •Soil<br>•Small Pots<br>•Fast growing seeds e.g. cress or beans<br>•fully grown plants (one healthy, one wilting)<br>•Cotton wool<br>•Bulbs or different seeds for class plant | • <u>Growth of plants:</u> germination, shoot, seed dispersal, grow, food store, life cycle, die, wilt, seedling, sapling.<br><br>• <u>Needs of plants:</u> sunlight, nutrition, light, healthy, space, air.<br><br>• <u>Name different types of plant:</u> e.g. bean plant, cactus.<br><br>• <u>Names of different habitats:</u> e.g. rainforest, desert. |
| 2                            | To know the parts of a seed that will grow into a plant and explain how it will germinate. | Observe Plant 1 from previous lesson and update Class Plant Diary. Use IWB to recap parts of a plant. Read p7-10 of eBook to learn about more things that living things have in common. Show chn different types of seeds and allow them to handle them (also on IWB). Discuss how different plants grow from different seeds and ask chn what they think will be inside them? Use IWB to introduce chn to inside of seed, including embryo and explain how seeds germinate. Demonstrate dissecting a seed by following the instructions on IWB as the chn follow along. Model how to locate the baby plant and the food store, using a magnifying glass to look closely. Chn to then label the parts of a seed and explain the function of the parts.   | • seeds (e.g. pumpkin, cress, beans)<br>•Large beans (e.g.kidney beans)one per child pre-soaked for 24-hours<br>•paper towels<br>•magnifying glasses                           |  |
| 3                            | To know how to describe the life cycle of a plant.   | Observe Plant 1 from previous lesson and update Class Plant Diary. Use IWB to recap seeds and parts of a plant. Discuss term 'life cycle' and briefly look at frog's on IWB explaining all living things have one. Read p11-14 of eBook. Show chn life cycle of bean plant and discuss each stage with chn. Use IWB slides to explore the process of germination including time-lapse video. Chn to record and order the stages of a Bean Plant's life cycle explaining what is happening at different stages. Plenary: show images of plants on IWB. Chn to discuss which is younger and decide what stages in the lifecycle each plant is at.  |  |  |
| 4                            | To know what plants need to grow and stay healthy.   | Observe Plant 1 from previous lesson and update Class Plant Diary. Use IWB to recap lifecycles of a plant. Review with chn the investigation they set up in L1. Chn to carefully observe the plants to see if predictions of what plants need was correct and record observations. Continue to model how to observe rest of the plants and record results. Chn to observe each plant and note down their observations making comparisons between each and explaining their answers. Use IWB to facilitate discussion about what they found from the results. Finalise, together as a class, a list of what plants need and display on working wall.  |  |  |
| 5                            | To know what happens if plants don't get all the things they need.                         | Observe Plant 1 from previous lesson and update Class Plant Diary. Use IWB to recap chn's findings about what plants need to grow well. Discuss whether they think all plants need the same things. Look at photos of healthy plants on IWB and discuss how we can tell they are healthy. Read p21-22 of eBook to see what happens if plants don't get what they need. Explore what happens if they don't get what they need on IWB by comparing unhealthy and healthy plants. Chn to sort plants into healthy and unhealthy plants and explain how they know it is unhealthy and what it might need.  |  |  |
| 6                            | To know and explain how plants are suited to their habitats.                               | Observe Plant 1 from previous lesson and update Class Plant Diary. Use IWB to recap chn knowledge of un/healthy plants. Ask chn to look at different habitats. Do you think plants can grow here? Discuss and explain answers. Read p23-30 of eBook to learn about where pants grow across the world and how they are suited to their habitats. Discuss how plants that grow in different environments are similar to each other. Explain how these are ways the plants have adapted to their environments. Draw attention to features e.g. thick, fleshy leaves, spikes or hairy stems, and encourage children to explain what those features may help with. Chn sort plants into groups according to habitats thy grow in and describe similarities.   |  |  |
|                              |  | By the end of the unit most of the children will know:<br>➤ That plants need water, light and a suitable temperature to grow and stay healthy<br>➤ What happens if a plant does not get everything it needs.<br>➤ How to explain the process of germination.   |  |  |



## Bingham Primary School - Science Curriculum

### Year 2 Summer 2 – Living Things and their Habitats



| Prior Learning               |  |  |  |  |
|------------------------------|--|--|--|--|
| Scientific Tools (Hierarchy) |  | <ul style="list-style-type: none"> <li>• explore and compare the differences between things that are living, dead, and things that have never been alive</li> <li>• Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other</li> <li>• identify and name a variety of plants and animals in their habitats, including microhabitats</li> <li>• describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food.</li> </ul>   |  |  |
| Week                         | To Know statement  | How to Learning Activities   | Resources  | Vocabulary   |
| 1                            | To know the differences between things that are living, dead and have never been alive.                                      | Chn discuss things that we do that let us know we are alive. Record on IWB. Introduce 7 life processes and the mnemonic Mrs Gren providing examples of these in animal and plants. Make links to list from chn. Chn to sort images into sorting hoops as a class labelled 'Living' and 'Non-Living'. Chn to provide reasoning – address misconceptions. Repeat with 'Dead' and 'Never Alive' labels. Chn to sort images on IWB into living, dead or never alive providing reasoning – must link to 7 processes. Chn to work alone or in groups: provide chn with one example of each, chn to label example and write a sentence for their answers.   | • Sorting hoops  | <ul style="list-style-type: none"> <li>• <u>Living or dead</u>: living, dead, never living, not living, alive, never been alive, healthy.</li> </ul>                             |
| 2                            | To know how to map a habitat and identify what is in it.   | What do humans need to stay alive? Revisit life processes and discuss how humans and all other living things need certain conditions to stay alive and healthy. Discuss how humans have adapted their habitats so that they meet the right conditions to keep us healthy and safe. Introduce on IWB urban habitats, woodland, ponds and coastal habitats. Remind chn how the life processes can identify if something is living, dead or has never been alive. In TP chn identify the objects in a heathland habitat from IWB that are living, dead or have never been alive. Chn survey the habitat and list of all the things that are living, dead or have never been alive. Invite chn to look closely into cracks and crevices with their magnifying glasses. Draw their attention to fallen leaves and plant debris (dead), to rocks and stones (never alive) and what is beneath them (alive) etc. Chn to draw a map of local habitat when back in class. | <ul style="list-style-type: none"> <li>• Magnifying Glasses</li> <li>• Clipboards</li> <li>• <b>Make preparations to visit a local habitat.</b></li> </ul>                 | <ul style="list-style-type: none"> <li>• <u>Habitats including microhabitats</u>: depend, shelter, safety, survive, suited, space, minibeast, air.</li> </ul>                    |
| 3                            | To know how to identify animals in their habitats  | Using IWB introduce chn to key vocab and common minibeasts. <i>Do all minibeasts like living in the same microhabitats?</i> Allow chn to answer then explain they are going to investigate the answer. Chn to look at maps from last lesson and spot possible microhabitats. In a suitable outdoor location, chn work in pairs to identify two different microhabitats, draw them and write a sentence to describe the habitat. Using magnifying glasses, chn survey their microhabitats and count up the number of each minibeast they find there. Chn make a pictogram to show the number of bugs in one of the two microhabitats that were surveyed, so that each pair produce a pictogram for both of their surveyed locations.  | <ul style="list-style-type: none"> <li>• Magnifying Glasses</li> <li>• Clipboards</li> <li>• <b>Make preparations to visit same habitat as previous lesson.</b></li> </ul> | <ul style="list-style-type: none"> <li>• <u>Life processes</u>: movement, sensitivity, growth, reproduction, nutrition, excretion, respiration.</li> </ul>                       |
| 4                            | To know how to describe a habitat and identify the animals that live in them.  | On IWB introduce habitats: ocean, Arctic, tropical rainforest and desert. Split class into 4 and designate a habitat for each group to research. Introduce how to research. Chn to use internet/books to draw and label their habitat and write sentences describing conditions there. Ask chn to generate a question for the other groups (IWB to support) about the habitat they researched. In turn, each group answers questions to rest of the class. Using IWB to support, chn to consider an animal from each habitat and suggest how it survives in its environment.   | <ul style="list-style-type: none"> <li>• Internet access</li> <li>• Topic books: ocean, rainforest, desert and the Arctic</li> </ul>                                       | <ul style="list-style-type: none"> <li>• <u>Food chains</u>: food sources, food, producer, consumer, predator, prey.</li> </ul>  |
| 5                            | To know how to explain how an animal is suited to its habitat. To know that living things in a habitat depend on each other. | Chn to discuss what they learned about world habitats last lesson – <i>What are the conditions of these habitats? What animals/plants live there?</i> Chn to play World Habitats game in 3s/4s. On IWB discuss the example of a squirrel, an oak tree and a fox to explain how the living things in a habitat depend on one another to stay alive. Chn to label a habitat with living things and a brief description of their dependencies to show how the living things in their habitat depend on each other to stay alive. Children complete sentences to explain how plants and animals in a habitat depend on each other.   | • World Habitats Game  | <ul style="list-style-type: none"> <li>• <u>Names of habitats and microhabitats</u>: e.g. under leaves, woodland, rainforest, sea shore, ocean, urban, local habitat.</li> </ul> |
| 6                            | To know how animals get their food.  | Recap prior learning about herbivores, carnivores, and omnivores. As a class discuss e.g.s of each. On IWB outline a food chain and introduce key vocab. Chn discuss the living things given on IWB and how they can be arranged into food chains. Chn arrange images into as many food chains as possible. Chn to draw two food chains and record which habitat they would be found in. Chn to draw a four-step food chain in a mini concertina book format adding 'producer' and 'consumer'.   |  | <ul style="list-style-type: none"> <li>• Previously introduced vocabulary: senses, carnivore, herbivore, omnivore, seed, water, names of materials.</li> </ul>                   |
|                              |  | By the end of the unit most of the children will know: <ul style="list-style-type: none"> <li>➢ The difference between things that are living, dead and never been alive.</li> <li>➢ That living things live in a habitat that provides basic needs it.</li> <li>➢ How animals obtain their food from plants and other animals on a food chain.</li> </ul>   |  |  |

# Bingham Primary School - Science Curriculum

## Year 3 Autumn 1 – Rocks (Materials)



| Prior Learning               |   | •Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses.   |   |  |
|------------------------------|---|--|---|--|
| Scientific Tools (Hierarchy) |   | • compare and group together different kinds of rocks on the basis of their appearance and simple physical properties • describe in simple terms how fossils are formed when things that have lived are trapped within rock • recognise that soils are made from rocks and organic matter.   |   |  |
| Week                         | To Know statement   | How to Learning Activities   | Resources   | Vocabulary   |
| 1                            | To know and compare different types of rocks                    | Ask chn What are rocks? Are rocks alive? How do you know? Why are there rocks everywhere? How do rocks form? Show chn pics of different environments on IWB and spot rocks. Introduce/recap three types of rock. Show video of formation of each. Introduce chn to man-made rocks like concrete and bricks. Chn to label and sort rocks into natural or man-made and then the type of rock they are.   | <ul style="list-style-type: none"> <li>• Igneous, sedimentary and metamorphic rocks</li> <li>• Video to show the formation of above rocks.</li> </ul>   | <ul style="list-style-type: none"> <li>• <u>Types of rock:</u> sedimentary rock, igneous rock, metamorphic rock.</li> <li>• <u>Properties of rocks:</u> permeable, semi-permeable, impermeable, durable.</li> </ul>  |
| 2                            | To know how to group rocks based on their properties.           | Recap learning from last lesson on IWB and address misconceptions. Chn to describe properties of rocks. Chn feedback and discuss. Are all rocks hard? Discuss clay and how different rocks have different properties. Carousel of activities: <b>Permeability and Durability Group:</b> teacher led. Chn to make observation in relation to the permeability and durability of a range of rocks - add a few drops of water using pipette and ask the chn to observe whether it is absorbed. Use a small square of sandpaper to test how durable the rocks are. Children record their observations. <b>Books Group:</b> Using a selection of books on rocks, chn make notes about the properties of rocks. <b>Density Group:</b> Chn test the buoyancy of different rocks using a large container of water to decide which rocks have higher and which have lower density and take notes. Chn use their results to group rocks. | <ul style="list-style-type: none"> <li>• Igneous, sedimentary and metamorphic rocks</li> <li>• Laptops</li> <li>• Sandpaper</li> <li>• Pipette</li> <li>• Large container</li> <li>• Books on rocks</li> </ul>  | <ul style="list-style-type: none"> <li>• <u>Names of rocks:</u> e.g. marble, chalk, granite, sandstone, slate.</li> <li>• <u>Formation of rocks and fossils:</u> natural, human-made, magma, lava, molten rock, sediment, erosion, fossilisation, layers, bone, fossil.</li> </ul> |
| 3                            | To know how fossils are formed                                  | Chn to discuss whether dinosaurs are real or not. Chn to feedback. End discussion with fact we discovered their bones/fossils. Read info on IWB explaining the difference between fossils and bones. Go through fossilisation process on IWB. Why do we only find fossils in sedimentary rocks? Chn to sequence and explain the fossilisation process.   | • Real fossils if possible  |  |
| 4                            | To know and explain Mary Anning's contribution to palaeontology | Teach chn pronunciation of palaeontology and palaeontologist and ask them to predict meanings. Read idea about fossils in ancient time from IWB and explain how Cuvier proved extinction as a fact and the link between them and Mary Anning. Chn recap and feedback on type of fossils. Show chn video of Mary Anning's life and fossil find. Chn discuss questions on IWB as a whole class. Chn to read and answer comprehension questions about modern palaeontology. Whole class - <u>Would you like to be a palaeontologist? Why? Why not?</u>  |   | <ul style="list-style-type: none"> <li>• <u>Soil:</u> sandy, chalky, clay, peaty, loamy, topsoil, subsoil, bedrock, mineral, organic matter, compost.</li> </ul>   |
| 5                            | To know how soil is formed.                                     | What is soil? What is soil made from? Show chn soil in school grounds. Chn observe and feedback about what could be in soil. On IWB address misconceptions about what soil is made of and show and explain the diagram of the different layers of soil present in the ground. Explain soil formation process. Read info on compost as a class. Read through instructions for creating a mini compost bin. Chn to complete and create their own mini compost bin. How can we care for the worm correctly? After chn feedback, use checklist to ensure coverage of points.   | <ul style="list-style-type: none"> <li>• clear plastic 2l bottles</li> <li>• fabric, cardboard, shredded paper</li> <li>• fruit and veg scraps chopped to small pieces</li> <li>• compost</li> <li>• small stones</li> <li>• plastic gloves</li> <li>• plant saucers</li> <li>• elastic bands</li> <li>• 5/6 tiger worms per group</li> </ul> | <ul style="list-style-type: none"> <li>• <u>Other:</u> palaeontology.</li> </ul> <p>Previously introduced vocabulary: soil, water, air.</p>  |
| 6                            | To know how to test the permeability of different soils.        | Complete rock quiz on IWB and discuss types of soil. Chn match soils to the rocks that are formed. Use IWB to discuss how different types of soil can be classified based on their colour and texture. Encourage chn to compare and contrast soils shown. Read info on importance of soil permeability. Show chn different types of soil they will be testing and allow predictions regarding permeability. Model how to test permeability on visualiser. Chn in groups to collect necessary equipment for their practical investigation. Chn to share their results as an oral presentation – chn given time to rehearse quickly beforehand. Each group presents findings.  | <ul style="list-style-type: none"> <li>• Samples of soil (pre-measured for chn to use)</li> <li>• beakers, funnels</li> <li>• Coffee filter paper</li> <li>• Measuring cylinders</li> <li>• Water</li> <li>• Visualiser</li> </ul>  |  |
|                              |   | <p>By the end of the unit most of the children will know:</p> <ul style="list-style-type: none"> <li>➢ how to group different rocks based on their properties and appearance</li> <li>➢ what fossils are and that they were once living things</li> <li>➢ that soils are made from rocks and organic matter</li> </ul>   |   |  |

# Bingham Primary School - Science Curriculum

## Year 3 Autumn 2 – Animals including Humans



| Prior Learning               |   | • Notice that animals, including humans, have offspring which grow into adults. • Find out about and describe the basic needs of animals, including humans, for survival (water, food and air). • Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene. • Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food.   |   |  |
|------------------------------|---|---|---|--|
| Scientific Tools (Hierarchy) |   | • identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat • identify that humans and some other animals have skeletons and muscles for support, protection and movement.   |   |  |
| Week                         | To Know statement   | How to Learning Activities  | Resources   | Vocabulary   |
| 1                            | To know how to sort foods into food groups and find out about the nutrients that different foods provide. | Discuss with chn the things which animals need to survive and stay healthy, including that helping them to understand that animals cannot make their own food like plants. Show the chn different food groups from Eatwell Guide. Chn to name the food groups and sort foods into the relevant groups. Explain and explore that different foods provide different nutrients for the body. Compare meals: display meals and model how chn can name the foods, identify the food groups and list the main nutrients it provides.  |   | <ul style="list-style-type: none"><li>• <u>Food groups and nutrients</u>: fibre, fats (saturated and unsaturated), vitamins, minerals.</li><li>• <u>Skeletons and muscles</u>: skeleton, muscles, tendons, joints, protection, support, organs, voluntary muscles, involuntary muscles, biceps, triceps, contract, relax, bone, cartilage, shell, vertebrate, invertebrate, endoskeleton, exoskeleton, hydrostatic skeleton.</li><li>• <u>Names of human bones</u>: e.g. skull, spine, backbone, vertebral column, ribcage, pelvis, clavicle, scapula, humerus, ulna, pelvis, radius, femur, tibia, fibula.</li><li>• Other: energy.</li></ul> |
| 2                            | To know and explore the nutritional values of different foods.  | Recap the things needed to survive and be healthy. Focus on healthy diet: Does a healthy diet look the same for all animals? Remind chn of carnivores, herbivores and omnivores. Chn to explain how different animals require a different balance of nutrients. Show chn how food labels show the amounts of nutrients different foods contain. Remind chn about the difference between saturated and unsaturated fats. Get chn to predict and order foods based on most and least saturated fats. Provide statements for chn to investigate using the food labels to prove/disprove them.  | <ul style="list-style-type: none"><li>• Food labels – be mindful about allergies.</li><li>• Packaged goods could be used for sorting Sat Fat content</li></ul>              |  |
| 3                            | To know how to sort animal skeleton into groups.  | Explain to chn what is meant by vertebrates and invertebrates. Provide chn with animal x-rays and sort them. Discuss as a class how they were able to sort them. Show different kinds of skeletons and discuss the advantages and disadvantages of different types. Chn to sort pictures of animals into different skeleton types.  |   |  |
| 4                            | To know and investigate how the human skeleton supports movement.   | Display the human skeleton and allow chn to look at labels for a short amount of time and then hide the image. Set a timer and allow chn in groups to label the human skeleton in the allotted time. Introduce the question 'Can people with longer femurs jump further?'. Discuss how this could be tested, highlighting the importance of a fair test. Chn to write how to investigate and make a prediction. Chn to work in groups and carry out the investigation – measuring their femurs and jumps and putting their results into a table. Chn to share conclusions in class discussion from their results and record their findings. | <ul style="list-style-type: none"><li>• Measuring tape/metre sticks</li><li>• Chalk</li></ul>   |  |
| 5                            | To know how bones and muscles work together to create movement.   | Recap bones/skeletons from previous learning. Can the chn locate the bones on their bodies? Go through pages 45 to 48 of eBook and discuss whether the actions shown on slides are voluntary or involuntary movements. Watch a short animation that shows how biceps and triceps work. Play again without sound allowing opp for chn to describe what is happening. Chn to then feel their own bicep working and explain the movement using vocab bank. Follow instructions of moving arm model. Chn use moving arm model to explain to their partners how the muscles work in pairs, using scientific vocabulary.                          | <ul style="list-style-type: none"><li>• Healthy Eating, Bones and Bodies eBook.</li><li>• split pins</li><li>• elastic bands</li><li>• tape</li><li>• sticky tack</li></ul> |  |
| 6                            | To know how to design and carry out an investigation.   | Discuss the stages chn went through when they investigated last lesson's question and how they planned a fair test. Put chn in mixed ability groups and generate ideas for questions that they could investigate involving the human skeleton (remind chn it needs to be safe and easy to carry out). Each group to then decide an overarching question they could investigate. Chn to plan how they could carry out their investigations and record their results whilst considering a fair test. Chn to then complete their investigation and record/share their findings.  | <ul style="list-style-type: none"><li>• Objects chn could use for their investigations e.g. balls, measuring equipment, chalk etc</li></ul>                                 |  |
|                              |   | By the end of the unit most of the children will know: <ul style="list-style-type: none"><li>➢ that humans and animals need the right types of nutrition to be healthy</li><li>➢ that humans and animals get their nutrition from what they eat, and they cannot make their own food</li><li>➢ that humans and some animals have skeletons and muscles for support, protection and movement</li></ul>   |   |  |

## Bingham Primary School - Science Curriculum

### Year 3 Spring – Forces and Magnets



| Prior Learning               |  | •  |   |   |
|------------------------------|--|--|---|---|
| Scientific Tools (Hierarchy) |  | • compare how things move on different surfaces • notice that some forces need contact between 2 objects, but magnetic forces can act at a distance • observe how magnets attract or repel each other and attract some materials and not others • compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials • describe magnets as having 2 poles • predict whether 2 magnets will attract or repel each other, depending on which poles are facing.  |   |   |
| Week                         | To Know statement  | How to Learning Activities   | Resources   | Vocabulary  |
| 1                            | To know the forces acting on objects.  | Explain forces using IWB. Ask chn to come up with their own examples of pushes and pulls. Make a class list and add to this using e.g. on IWB. Ask chn to work in pairs to create freeze-frame of actions to show a pushing or pulling force. Chn to identify forces acting on objects in pictures and record whether they are pushes or pulls. Play forces bingo.   | • Forces cards<br>• Forces Bingo  | • <u>How things move:</u> move, movement, surface, distance, strength.<br><br>• <u>Types of forces:</u> push, pull, contact force, non-contact force, friction.<br><br>• <u>Magnets:</u> magnetic, magnetic field, magnetic force, bar magnet, horseshoe magnet, ring magnet, magnetic poles (north pole, south pole), attract, repel, compass.<br><br>• <u>Magnetic and non-magnetic materials:</u> e.g. iron, nickel, cobalt.<br><br>Previously introduced vocabulary: metal, names of materials. |
| 2                            | To know and compare how things move on different surfaces.   | Recap forces using IWB and ask chn to discuss how the cyclist can change the motion of the bike. Explain the force friction and how it is created by different surfaces using the information and diagrams on IWB. Explain the investigation described on IWB and get chn to conduct investigation in groups. Chn to write their prediction, results and conclusion. Use IWB as prompt, chn discuss their results as a class and answer questions.   | • Toy car<br>• 5 boards covered with different surfaces (e.g. sandpaper, towel, tinfoil, lino, carpet, corrugated card, bubble wrap).   |   |
| 3                            | To know how to sort magnetic and non-magnetic materials  | Explain 'magnetic force' using IWB – Chn attract a paper clip to a magnet to experience magnetic force. Use images and info on IWB to explain what a magnetic field is. Explain how magnets are used at scrapyards to sort different materials. Chn to use magnets to sort piles of mixed materials according to whether they are magnetic or non-magnetic and record their findings. Play magnetic bingo.   | • Steel paper clips<br>• Bar magnets<br>• pile of magnetic and non-magnetic materials mixed together per group  |   |
| 4                            | To know how magnets attract or repel each other and attract some materials but not others.                       | Chn to carry out the hovering paper clip activity as described in IWB. Explain the different types of magnets using the images on IWB and introduce the investigation by going through the method and address any misconceptions. Chn to complete their predictions before carrying out the investigation. Chn record findings, draw a bar chart and write a conclusion. Chn share results and discuss which magnet was the strongest. Discuss any differences in results.   | • Steel paper clips<br>• Cotton thread<br>• Masking tape<br>• Variety of different types of magnets (horseshoe, bar, disc, arc, cylinder or square).                            |   |
| 5                            | To know that magnets have two poles and be able to predict whether two magnets will attract or repel each other. | Give each child in a pair a magnet and allow chn to explore how the two magnets interact using prompts from IWB. Then discuss findings, supported by statements on IWB. Give images of different magnet formations to chn and get them to make predictions before observing what happens. Feedback as a class. Chn to follow instructions on 'Make a Magnetic Compass' in groups. Provide each group with a direction card. Chn to use their compasses in groups to find the treasure hidden in the playground. Chn to explain how their compass worked to enable them to find the treasure. | • Bar magnets<br>• Flat plastic lids<br>• Plastic bowls<br>• Water<br>• 'treasure' for chn to find hidden at the edge of the playground in different directions of the compass. |   |
| 6                            | To know and observe how magnets attract some materials.  | Chn to play forces and magnets game on IWB. Chn check that magnets attract materials through paper following activity outline on IWB. Explain the following uses of magnets: to point north in a compass; to hold a fridge door closed; in a laptop lid so that the computer can tell if it is open or closed; to sort coins in a vending machine. Discuss the magnetic game suggestions on IWB. Chn design and explain their own game, and then make it. Chn share and play their games in pairs. Chn then evaluate each other's games.   | • Magnets<br>• Paperclips,<br>• plastic bowls/trays<br>• Straws or dowels<br>• string<br>• card   |   |
|                              |  | By the end of the unit most of the children will know: <ul style="list-style-type: none"><li>➤ Whether magnets will repel or attract based on their poles</li><li>➤ How the force friction is produced on different surfaces</li><li>➤ How to identify magnetic and non-magnet materials.</li></ul>  |   |   |

# Bingham Primary School - Science Curriculum

## Year 3 Summer 1 – Plants



| Prior Learning               |   | • 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.   |  |  |
|------------------------------|---|--|--|--|
| Scientific Tools (Hierarchy) |   | • identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers •explore 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 •investigate the way in which water is transported within plants •explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.   |  |  |
| Week                         | To Know statement   | How to Learning Activities   | Resources  | Vocabulary   |
| 1                            | To know the name of different parts of flowing plants and explain their jobs.                             | Show chn a range of house plants. Ask chn to discuss the different parts of the plants they can see. Chn to work in pairs to label plants and then compare against IWB. Look at the pictures of the different parts of a plant and then discuss their functions using the IWB. Children work in pairs to share what they can remember about the functions of the different parts of plants. Children label each part and fill in the gaps of each job description.   | • House plants   | • <u>Water transportation</u> : transport, evaporation, evaporate, nutrients, absorb, anchor.<br><br>• <u>Life cycle of flowering plants</u> : pollination (insect/wind), pollen, nectar, pollinator, seed formation, seed dispersal (animal/wind/water), reproduce, fertilisation, fertilise, stamen, anther, filament, carpel (pistil), stigma, style, ovary, ovule, sepal, carbon dioxide.<br><br>Previously introduced vocabulary: life cycle. |
| 2                            | To know what plants need to grow well.  | Recap 7 life processes. Remind chn of work from Y2 and ask what they needed to provide their plants. Discuss different investigations with chn from the IWB. Chn work in pairs and choose a question that they would like to focus on for their investigation. Chn to make predictions and complete a plan of how to carry out their investigation – this could be written or through images. Allow opportunity for chn to set up their investigation. They may need to put their plants in a dark cupboard or in a fridge. They should measure the height of their plant and record it so that they can tell if it grows taller during the investigation. Allow chn time each day to record their observations ready for next lesson.   | •Small plants (e.g. tomato, bean or sunflower seedlings) in pots.<br>•Measuring cylinder/breakers  |  |
| 3                            | To know how to record findings when observing plant growth.   | Remind chn of their investigation which started last lesson. Chn discuss their observations and to record their findings. Chn to look back at their predictions and decide whether they were accurate or not. Introduce the idea of a 'conclusion' that summarises the answers to questions. Look at the concept of reliability using IWB. Put chn into groups that were (where possible) all investigating a range of questions. Ask chn to discuss and share their findings. As a class, summarise the findings of all investigations. Chn to plan an imaginary TV show on how to grow healthy plants. The aim is to allow them to present an explanation of their investigation and findings. Chn could record their show on iPads. If not, chn should act programmes out in front of the class.  | •Plants from lesson 2<br>•iPads  |  |
| 4                            | To know how water is transported in plants.   | <b>Might be worth doing in AM for experiment.</b> Challenge chn to work as a group to create a human model of the function of the stem (IWB to support). Use IWB to explain the process of water transportation. Ask chn to explain their understanding of how water is transported using diagram for support on IWB. Explain Transportation Investigation from IWB. Chn will carry out a comparative investigation to find out whether temperature affects the speed that water is transported. Show chn the pre-dyed flower. Discuss how it was dyed. How does this show the process of water transportation? Use IWB to explain how it was set up. As a class, discuss how this idea could be used to investigate the rate of water transportation in different temperatures. Organise chn into groups and set up investigation. Chn to check flowers throughout the day. May be necessary to leave overnight for a clear change or difference to be observed. Use IWB to explain 'conclusion'. Chn to write their own conclusions and explain why they came to their conclusion. | •Bright white flowers<br>•Food colourings (range of colours)<br>•Pipettes<br>• Same sized beakers with 100ml water<br>• Access to places with different temp.<br>• Thermometers<br>•A pre-dried white flower put in coloured water day before lesson |  |
| 5                            | To know and name the different parts of a flower and explain their role in pollination and fertilisation. | Use IWB to discuss role of a flower and the different parts it is made up from. Give each pair of chn a flower. Chn to dissect it carefully into the different parts as stated on IWB. Discuss that each part of the flower has a job to do in order to make a seed. Play the video and watch as each part of the flower is discussed. After watching the video, chn should match the parts of the plant with the explanations of their jobs. Explain the processes of pollination and fertilisation using IWB and address any misconceptions. Chn complete cloze task on pollination and fertilisation.   | •Flowers with visible stamens, stigma and style - tulips and lilies are good examples  |  |
| 6                            | To know and order the stages of the life cycle of a flowering plant                                       | Chn tell TP 3 things they already know about life cycles then have class discussion. Briefly discuss the stages of the life cycle using IWB.Look at the different methods of seed dispersal on IWB. Chn to work in groups and act out a method of dispersal. Once planned and practised, groups should act out their dispersal and rest of class guess which is being demonstrated. Recap the stages of life cycle with chn. Chn to sequence life cycle and add descriptions to each part.   |  |  |
|                              |   | By the end of the unit most of the children will know:<br>➤ The different parts of a plant<br>➤ The functions of the different parts of plants<br>➤ And describe the stages of the life cycle of flowering plants.   |  |  |

# Bingham Primary School - Science Curriculum

## Year 3 Summer 2 – Light



| Prior Learning               |  | <ul style="list-style-type: none"> <li>• recognise that they need light in order to see things and that dark is the absence of light</li> <li>• notice that light is reflected from surfaces</li> <li>• recognise that light from the sun can be dangerous and that there are ways to protect their eyes</li> <li>• recognise that shadows are formed when the light from a light source is blocked by an opaque object</li> <li>• find patterns in the way that the size of shadows change.</li> </ul>  |  |   |
|------------------------------|--|--|--|---|
| Scientific Tools (Hierarchy) |  |  |  |   |
| Week                         | To Know statement  | How to Learning Activities   | Resources  | Vocabulary  |
| 1                            | To know that light is needed to see things and dark is the absence of light. | What is light? Chn to complete mindmap to see what they already know/what they want to know. Use IWB to explain sources of light and discuss e.g.s. Chn to work in pairs to sort image cards into light source and those that are not. Use IWB to explain the reason why tricky objects like the moon, a window and a mirror are not light sources. Address any misconceptions. Talk to the chn about dark and explain that it is the absence of light. Ask them about their own experiences of dark, such as places that are dark, or times that it is dark. Discuss which light sources are absent in these places or at these times to make it dark. Can we see in the dark? Discuss the idea that we cannot see in complete darkness, but it is rare to find this. There is often light from street lamps, a night light etc. that allows us to see objects, but not as clearly as in full light. Play 'What's in the Bag?'. Chn to complete cloze task.   | <ul style="list-style-type: none"> <li>• 5 'feely bags'</li> <li>• 5 objects to place inside them – e.g. orange, a shell, pine cone, bubble wrap, cotton wool etc.</li> </ul>  | <ul style="list-style-type: none"> <li>• <u>Light and seeing:</u> dark, absence of light, light source, illuminate, visible, shadow, translucent, energy, block.</li> </ul>   |
| 2                            | To know which surfaces reflect light.  | Why do we use/need reflective materials? (to help us or things be seen, especially when outside at night, for safety reasons). Can you think of where you would see reflective materials? (e.g. on cyclists, runners, road signs, road workers, fire-fighters, builders, bike reflectors/stickers, etc.). Which colours do you think reflect most light? (white, light or fluorescent colours e.g. yellow, orange). What does it look like if a material reflects light well? (you will be able to see the material, it might look bright, etc.). Use IWB to explain reflection. Explain chn have been asked to design a new bookbag with a reflective strip. Chn to predict the most reflective material and record prediction. IWB to show chn how to make a reflection tester. Chn then to test materials and rank from most to least reflective. Chn to come to a conclusion as to which material would be best, draw and label their design and explain why they have chosen it.                  | <ul style="list-style-type: none"> <li>• Torch per pair</li> <li>• A5 card per pair</li> <li>• 6 materials to test e.g. CDs, tin foil, paper, fabrics, bubble wrap, cardboard.</li> </ul>  | <ul style="list-style-type: none"> <li>• <u>Light sources:</u> e.g. candle, torch, fire, lantern, lightning.</li> <li>• <u>Reflective light:</u> reflect, reflection, surface, ray, scatter, reverse, beam, angle, mirror, moon.</li> </ul> |
| 3                            | To know how to reflect light and explain how mirrors work.                   | Discuss characteristics of reflective surface using IWB. Explain how mirrors are commonly made, and the image appears reversed in a mirror. Model how to use a mirror to reflect light. Allow chn to explore this and discuss how the mirrors have to be angled to be effective. Chn to play 'Mirror Games'. Chn to draw and explain what they did. <b>Mirror Messages:</b> chn use a mirror to write a short reversed message to their partner. They should then swap messages and try to decipher them with their mirrors. <b>Mirror Maze:</b> chn will attempt to walk along a wavy line while looking only in a mirror held overhead. Chn to use knowledge of mirrors to write their own quiz, including answers to their own questions. Quizzes shared and answered by classmates.  | <ul style="list-style-type: none"> <li>• Mirror per child</li> <li>• A wavy chalk line (3-5m)</li> </ul>   | <ul style="list-style-type: none"> <li>• <u>Sun safety:</u> dangerous, glare, damage, UV light, UV rating, sunglasses, direct.</li> </ul>   |
| 4                            | To know that light from the sun can be dangerous.                            | Chn to vote with their feet against statements to 'hero sign' or 'villain sign' to state when they think the statement is beneficial or dangerous. Address misconceptions throughout. Use IWB to discuss UV light and its effects. Chn to work in groups to set up a simple investigation into UV light. Place card shapes onto coloured paper, then position the paper in sunlight for a week. When they come back to it, the paper around the shapes will have lightened, showing the effects of UV. Explain the function of the pupil and the retina using IWB. Chn to look at their pupil in a mirror, close their eyes for 30 seconds, open their eyes to see that the light quickly makes their pupil smaller. Discuss the damaging effect of bright lights. Emphasise the importance of never looking directly at the sun, or other bright lights. Chn use their knowledge from IWB to create design sunglasses and/or hat and create a poster/leaflet on how they protect people from the sun. | <ul style="list-style-type: none"> <li>• Mirror per child</li> <li>• Coloured paper and card</li> <li>• Colouring pens</li> </ul>  | Previously introduced vocabulary: opaque, transparent, sunlight, sun.   |
| 5                            | To know that shadows are formed when the light is blocked.                   | Explain how light travels using IWB. Address misconceptions. Chn to work in groups to set up a model demonstrating that light travels in a straight line. Using three pieces of card with a hole punched in each one, they can shine a torch through the holes when they are in a straight line. Ask what happens when the holes in the card do not line up. Explain and discuss opaque, translucent and transparent. Focus on opaque objects block light. Chn to spot these objects around room. Use IWB to explain opaque objects cause shadows. Introduce context of investigation. (Material for curtains for baby sister's room). Chn to investigate using torches and materials on table, looking at shadows created and decide whether they are opaque, transparent or translucent. Chn conclude which material would be best. Chn to write their explanation for choice.   | <ul style="list-style-type: none"> <li>• 3 card per group</li> <li>• Hole punch</li> <li>• Torch per pair</li> <li>• Range of materials to test e.g. cotton, cling film, muslin, black out curtain lining, tracing paper.</li> </ul> |   |
| 6                            | To know and find patterns when investigating how shadows change size.        | Go through IWB and ask chn about when and how shadows change and introduce investigation (seeing how shadows change when the distance between the light source and object changes). Chn to plan their investigation and make a prediction. Chn then complete their investigation and record results. Encourage chn to spot a pattern – they should look for anomalies and try to suggest a reason for them. Chn to make a concluding statement.  | <ul style="list-style-type: none"> <li>• Torch per pair</li> <li>• Metre stick per pair</li> <li>• Objects to make shadows</li> </ul>  |   |
|                              |  | By the end of the unit most of the children will know: <ul style="list-style-type: none"> <li>➢ That light is needed to see things and darkness is the absence of light.</li> <li>➢ That shadows are formed when the light from a light source is blocked by an opaque object.</li> <li>➢ That the sun can be dangerous.</li> </ul>  |  |   |



# Bingham Primary School - Science Curriculum

## Year 4 Autumn 1 – Animals including Humans



| Prior Learning               |   | • identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat • identify that humans and some other animals have skeletons and muscles for support, protection and movement.  |   |  |
|------------------------------|---|--|---|--|
| Scientific Tools (Hierarchy) |   | • describe the simple functions of the basic parts of the digestive system in humans •identify the different types of teeth in humans and their simple functions •construct and interpret a variety of food chains, identifying producers, predators and prey.   |   |  |
| Week                         | To Know statement   | How to Learning Activities   | Resources   | Vocabulary   |
| 1                            | To know how to keep teeth healthy.  | Question chn about how food is broken down to extract nutrients. Introduce the term 'digestion' and that digestion starts in the mouth and the role of teeth in this process. Gather chn's ideas about how teeth can be damaged and why it is important to look after them using IWB. Read pages from the eBook on IWB. Chn plan investigation (Tooth Decay Investigation) using IWB and record their prediction and their method. Chn record observations over the next 5 days.   | •Transparent beakers/jars of equal size and shape and labels for each<br>• Measuring Jugs<br>• Spoons<br>•Eggs (hard boiled)<br>•Selection of drinks (cola, OJ, milk, water etc).   | • <u>Digestive system</u> : digest, digestion, tongue, teeth, saliva, salivary glands, oesophagus, stomach, liver, pancreas, gall bladder, small intestine, duodenum, large intestine, rectum, anus, faeces, organ.<br><br>• <u>Types of teeth and dental care</u> : molar, premolar, incisor, canine, wisdom teeth, tooth decay, plaque, enamel, baby (milk) teeth.<br><br>• <u>Food chains and animal diets</u> : decomposer, food web.<br><br>Previously introduced vocabulary: producer, consumer, prey, predator, excretion, habitat. |
| 2                            | To know how to keep teeth healthy and identify and examine different type of teeth. | Chn shown the preventing tooth decay section of knowledge organiser on IWB with text removed. Chn work in pairs to fill in gaps. Compare answers with completed section on IWB. Chn to look at investigation from last lesson and record final results. Chn to write conclusion and evaluation. Ensure chn become aware that sugary drinks (and food) are proven to cause tooth decay. Show images of teeth on IWB. Chn discuss function of each tooth. Show eBook on IWB to learn about type of teeth. Chn to use mirrors to observe own teeth and record observations (chn can also use model of teeth if appropriate for them) and record function of each tooth. Chn to include a key to highlight each tooth type.      | •Mirrors<br>•Model of teeth (if available)  |  |
| 3                            | To know the parts of the digestive system and their function.                       | Chn play 'What am I?' teeth game. Using IWB, assess chn knowledge of digestive system. Chn work in pairs to identify key parts from images on IWB. Discuss the role of the digestive system on IWB and recap how humans need nutrients from their diet and what nutrients are needed for. Use IWB to look at eBook pages and find out main digestive organs and their functions. Chn in groups: draw around one child on large paper. Cut out organs and add in the correct part of body outline. Chn use sticky notes to add labels. Chn to feedback and make corrections against IWB. Chn to then match the part of the digestive system to its function and write the name of each part. Chn use eBook pages for support. | •Large paper to draw around the outline of a child)<br>•Sticky notes  |  |
| 4                            | To know and explain the process of digestion.                                       | Recap function of digestive system. Chn to work in groups and sequence the digestion process. Use IWB to demonstrate the process of digestion using the scientific model. Introduce each piece of equipment and the part of the digestive system it represents. Chn to work in groups and carry out their own demonstration of the digestion process, verbally explaining what is happening at each stage. Chn to then summarise the key stages of digestion and explain their learning. EBook to be used to support if necessary. Exit ticket: which part of the digestive system is the most important and why? Chn to give two reasons to justify their answer.   | • Sticky notes, measuring jugs, classroom trays, bowls, spoons, green and yellow food colouring, loaf of bread, cartons of orange juice, sealable sandwich bags, kitchen roll, pair of tights (per group), potato mashers |  |
| 5                            | To know how to construct food chains for different habitats.                        | Chn use knowledge from last lesson to sequence events of digestion. Using IWB, explain living things are linked by what they eat. Chn to look at images on IWB and arrange them in order of what eats what. Remind chn of food chains and arrows show transfer of energy. Look at eBook to develop vocab further. Chn to construct food chains from different habitats and add their own labels.   | •Sticky notes   |  |
| 6                            | To know and compare the teeth of different animals and their role in a food chain.  | Chn use their knowledge from lesson 2 to match up the name, function and picture of different types of teeth on IWB. Chn then discuss what each animal eats. Prompt chn to focus on the animals' teeth and how this might give clues about their diets. Chn to become 'teeth detectives' and investigate the teeth of animals on food chains using eBook to support as necessary. Chn compare and identify what diet the animals have and explain the similarities and differences between the sets of teeth.  | •Sticky notes   |  |
|                              |   | By the end of the unit most of the children will know: <ul style="list-style-type: none"><li>➢ The simple functions and parts of the digestive system in humans</li><li>➢ The different types of teeth in humans and their simple functions</li><li>➢ How to construct and interpret a variety of food chains.</li></ul>   |   |  |

# Bingham Primary School - Science Curriculum

## Year 4 Autumn 2 – States of Matter



| Prior Learning               |   | • compare and group together different kinds of rocks on the basis of their appearance and simple physical properties • describe in simple terms how fossils are formed when things that have lived are trapped within rock • recognise that soils are made from rocks and organic matter.   |  |  |
|------------------------------|---|--|--|--|
| Scientific Tools (Hierarchy) |   | • 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, and measure or research the temperature at which this happens in degrees Celsius (°C) •identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.  |  |  |
| Week                         | To Know statement   | How to Learning Activities   | Resources  | Vocabulary   |
| 1                            | To know how to sort and describe materials.                   | Explain the 3 states of matter, Chn to sort image cards into the 3 groups. Share answers using IWB. Go through e.gs on IWB and ask chn to describe the materials and states. Chn to match properties to the states of matter. Share key information on particles and look at how they are arranged for each state. Chn to dramatize in groups after being given a state to demonstrate. Do this outside/in hall. In books, chn to match states of matter to particle arrangements and properties.                    |  | <ul style="list-style-type: none"><li>• <u>States of matter:</u> solids, liquids, gases, particles.</li><li>• <u>State change:</u> evaporate, condense, melt, freeze, heat, cool, melting point, freezing point, boiling point, water vapour.</li><li>• <u>Water cycle:</u> precipitation, evaporation, condensation, ground run-off, collection, underground water, bodies of water (sea, river, stream), water droplets, hail.</li><li>• <u>Other:</u> atmosphere.</li></ul> <p>Previously introduced vocabulary: temperature, rain, cloud, snow, wind, sun, hot, cold, absorb, carbon dioxide</p> |
| 2                            | To know and investigate the properties of gases.              | Place a clear bottle of fizzy drink on each table. Chn identify materials they can see, as well as their states. IWB to explain how all 3 can be seen. Look closer at bubbles in fizzy drink and discuss questions on IWB – explain carbon dioxide. Show chn video of experiment discuss whether gases weigh anything. Explain method to chn using IWB. Ensure they understand how to find weight of carbon dioxide in each drink. Chn complete predictions and then record their findings.                          | <ul style="list-style-type: none"><li>•Plastic bottle of lemonade – 1 per group</li><li>•3-5 different fizzy drinks</li><li>•Digital weighing scales</li><li>•Beakers or plastic cups</li></ul>  |  |
| 3                            | To know that materials change state.                          | Explain process of melting and freezing and how a material's particles behave when they change state using IWB. Explain freezing and melting points using illustration on IWB. Model how to complete melting chocolate experiment by placing a square of chocolate in three different foil tins and then floating in different temperature water.Chn to plan to observe how long it will take to melt and provide a prediction and conclusion when finished.   | <ul style="list-style-type: none"><li>•Thermometers</li><li>• Foil pie tins</li><li>•Chocolate broken into equal squares</li><li>• Trays – 3 per group with different temp of water</li><li>•Stopwatches</li></ul>                           |  |
| 4                            | To know and investigate how water changes state               | Chn work in groups to find answers to the questions. Place the eight Three States of Water Answer Cards at the front of the classroom and groups take one at a time to answer. Explain and clarify the chn's understanding of the process of melting, freezing, evaporation and condensation using IWB. Chn complete 'Ice Cube Investigation, Reversing Changes and Salt and Ice'. Chn to draw and label their observations and work through the carousel of activities. Chn to play 'Guess the Process' as plenary. | <ul style="list-style-type: none"><li>•Container of warm water with cling film stretched over</li><li>•Ice cubes</li><li>•Kettle, plate, beakers, teaspoon, salt</li></ul>   |  |
| 5                            | To know how water evaporates.                                 | Recap process of evaporation. Explain that it is responsible for drying clothes on the line. Share statements and chn to discuss whether they agree/disagree. Chn to carry out investigation into how temperature affects how fast towels dry. Chn plan the investigation and make a prediction. Chn carry out the investigation and record their results. Chn look at their results and conclude about what they have found. Chn to look at and compare their findings and discuss.                                 | <ul style="list-style-type: none"><li>•Tea towels – 3 per group</li><li>•Water</li><li>• Measuring jugs</li><li>•Weighing scales</li><li>•3 washing lines in places in different temperatures</li><li>•Thermometers</li><li>•Clock</li></ul> |  |
| 6                            | To know and describe the different stages of the water cycle. | Share info on water cycle on IWB an discuss each part of the cycle. Explain the four stages: evaporation, condensation, precipitation and collection. Address any misconceptions. Chn to work in pairs to make mini water worlds. Take photos of the water worlds over the coming days and record in books. Chn to complete water wheel explaining the different stages of the water cycle.  | <ul style="list-style-type: none"><li>•Clear plastic cups – 1 per pair</li><li>•Compost</li><li>•Cress seeds</li><li>•Cling film.</li></ul>  |  |
|                              |   | By the end of the unit most of the children will know: <ul style="list-style-type: none"><li>➤ How to compare and group materials, according to whether they are solids, liquids or gases</li><li>➤ That materials change state when they are heated or cooled</li><li>➤ The different stages of the water cycle.</li></ul>  |  |  |





## Year 4 Spring 1 – Electricity

| Prior Learning               |  |  |  |  |
|------------------------------|--|--|--|--|
| Scientific Tools (Hierarchy) |  | •identify common appliances that run on electricity •construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers •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 •recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit •recognise some common conductors and insulators, and associate metals with being good conductors.  |  |  |
| Week                         | To Know statement  | How to Learning Activities   | Resources  | Vocabulary   |
| 1                            | To know common appliances that run on electricity                      | Discuss with chn items they have at home powered by electricity and which they would struggle to live without. Chn write these on sticky notes. Prepare a table with 'Battery-Powered' and 'Mains-Powered'. After IWB chn to put sticky notes in the correct place. Could any be both? Introduce term 'appliance' and share examples. And again with 'electrical appliance' using eBook and IWB. Chn to sort objects onto a Venn Diagram e.g. electrical vs non-electrical or battery vs mains powered.  | •sticky notes  | • <u>Electricity</u> : mains-powered, battery-powered, mains electricity, plug, appliances, devices.<br><br>• <u>Circuits</u> : circuit, simple series circuit, complete circuit, incomplete circuit.<br><br>• <u>Circuit parts</u> : bulb, cell, wire, buzzer, switch, motor, battery.<br><br>• <u>Materials</u> : electrical conductor, electrical insulator.<br><br>• <u>Other</u> : safety.<br><br>Previously introduced vocabulary: names of materials. |
| 2                            | To know circuit components and build working circuits                  | Recap last lesson using IWB. Discuss with chn their ideas about circuits and then go through definitions on knowledge organiser. Ensure chn understand they will be building series circuits. Share eBook pages on electricity safety in the classroom. With minimal input (other than safety reminders), allow chn in groups to explore a selection of bulbs, switches, buzzers etc. Take feedback on what they discover and discuss with class. Chn to build a selection of circuits using given instructions. Chn to make them, and then draw labelled diagrams.  | •circuit equipment   |  |
| 3                            | To know how to investigate whether circuits are complete or incomplete | Play 'Three in a Row' with class on IWB. Hone in on definition of 'conductor' and 'circuit'. Introduce energy ball. Demonstrate how the energy ball can be used to create a circuit with a human conductor. Add a child each time until whole class circuit. Remind definition of 'series circuit'. Explore how the circuit can be broken and explain what is happening at each stage. Introduce 'complete circuit' and 'incomplete circuit' using eBook. Chn build a series of incomplete/complete circuits using diagrams and record with predictions and findings.  | •circuit equipment<br>•energy ball/video of one  |  |
| 4                            | To know which materials are electrical conductors or insulators        | Display 3 circuits and chn discuss in partners how they would fix them using their knowledge from the unit so far. Recap definition of 'conductor', and share definition of 'insulator'. Re-visit whole class circuit using energy ball, but this time add an insulator (e.g. book/plastic ruler). Recap KS1 learning on distinction between an object and the material it is made from. Chn plan how to set up their test so that they are only changing one thing. Then, after making a prediction, chn test a range of materials in their circuits to check if they are insulators or conductors. Chn to record the object and the material that it is made from. | •circuit equipment<br>•Coins, plastic rulers, paper, aluminium foil, metal paperclips, rubbers<br>•energy ball/video of one    |  |
| 5                            | To know how a switch works in a circuit                                | Use IWB to gather chn's ideas about switches. Use eBook to discuss answers. Chn try adding a switch into a simple series circuit (bulb, wire and cell). If more than one type of switch is available, allow chn to explore to identify similarities and differences. Chn to work in groups. Each group builds a different type of switch. Chn test their switches in a circuit and then present their findings to the class. Chn present their findings to the rest of the class.  | •circuit equipment<br>•split pins<br>•binder clips<br>•cardboard<br>•paperclips<br>•modelling clay/sticky tack or a hole punch |  |
| 6                            | To know how to solve problems about electricity                        | Chn work with partners to discuss and fill in missing words/pictures from the knowledge organiser on IWB. Chn to work in pairs/groups to complete the carousel of tasks from the reasoning discussion cards. Chn to record their answers for each and discuss findings as a class.   | •circuit equipment if demonstrating circuits   |  |
|                              |  | By the end of the unit most of the children will know: <ul style="list-style-type: none"><li>➤ what an electrical appliance is and identify those that are mains or battery- powered</li><li>➤ different circuit components, explain what they do and build circuits</li><li>➤ what electrical conductors and insulators are and give several examples of these</li></ul>  |  |  |

# Bingham Primary School - Science Curriculum

## Year 4 Spring 2 – Sound



| Prior Learning               |   |   |   |   |
|------------------------------|---|---|---|---|
| Scientific Tools (Hierarchy) |   | <ul style="list-style-type: none"> <li>•identify how sounds are made, associating some of them with something vibrating</li> <li>•recognise that vibrations from sounds travel through a medium to the ear</li> <li>•find patterns between the pitch of a sound and features of the object that produced it</li> <li>•find patterns between the volume of a sound and the strength of the vibrations that produced it</li> <li>•recognise that sounds get fainter as the distance from the sound source increases.</li> </ul>   |   |   |
| Week                         | To Know statement   | How to Learning Activities  | Resources   | Vocabulary  |
| 1                            | To know and explain sound sources                                 | Chn complete sound mind map to share what they already know about sound. Chn explore and discuss a range of instruments and how they make sound. Explain vibration using IWB. Chn act out vibration and feel their vocal cords vibrate as they speak. Chn work in groups to place rice on a drum and see vibrations and use a tuning fork to see vibrations through water. Chn work in groups to mark their school map the places they will visit and measure the sound level at each one and note the sound measurement at each place. Chn share descriptions of the noisiest places they visited. Chn to describe the sounds they heard at the noisiest place, and explain what was vibrating to make each sound. | <ul style="list-style-type: none"> <li>•Rice</li> <li>•Drums</li> <li>•Tuning forks</li> <li>•Bowl of water</li> <li>•School maps</li> <li>•A way to measure sound</li> </ul>   | <ul style="list-style-type: none"> <li>• <u>Parts of the ear:</u> eardrum.</li> <li>• <u>Making sound:</u> vibration, vocal cords, particles.</li> </ul>    |
| 2                            | To know and explain how different sounds travel                   | Chn discuss what is vibrating in each picture on IWB to make sound. Chn conduct a mini-investigation on IWB to find a link between the size of vibrations and the loudness of a sound. Share findings as a class. Discuss how sound travels using IWB. Chn explore the process of hearing the sound of clapping hands. Address misconceptions. Explain how the ear works and how we hear sound using the info and diagram on IWB. Chn to work in groups to create and perform a factual programme to explain how different sounds travel. Films could be recorded and shared to class/done live.  | <ul style="list-style-type: none"> <li>•Rice</li> <li>•Drums</li> <li>•iPad/camera</li> </ul>   | <ul style="list-style-type: none"> <li>• <u>Measuring sound:</u> pitch, volume, amplitude, sound wave, quiet, loud, high, low, travel, distance.</li> </ul> |
| 3                            | To know and explore ways to change the pitch of a sound           | Chn to make high and low sounds to their partner. Explain 'pitch' using IWB and watch YouTube clip to identify how different instructions make sounds. Chn to try play high and low sounds on different instruments and observe how they change pitch. Chn record their observations of the features of instruments that create different pitches. Chn talk in TP about nay patters they spotted. Chn explore and discuss how pitch can be changed on different instruments. Chn to cut straws to make each straw create a different pitch. Chn to explore how they can change pitch using activity sheet. Chn to write explanations for the different pitches.   | <ul style="list-style-type: none"> <li>•Sting, pitched percussion and wind instruments</li> <li>•Straws</li> <li>•String</li> <li>•Tape</li> <li>•<a href="#">Learning Music - Wind, String, Percussion Instruments for Kids - YouTube</a></li> </ul> | <ul style="list-style-type: none"> <li>• <u>Other:</u> soundproof, absorb sound.</li> </ul>   |
| 4                            | To know how sounds travel over distance.                          | Chn to cut and stick pictures in order to show how sound travels. Explain how distance affects the loudness of a sound as it travels using IWB – discuss as the distance from the sound source increases, the area covered by the sound waves increases too. Chn carry out class investigation explained on IWB. Chn to guess how far away they are from an alarm clock based on how loud it is. Discuss ways of making sound travel further, or making it louder so that it can be heard further away. Chn to make and use a string telephone to make sound louder so it can travel further. Chn follow instructions to construct telephones, then test them out. Chn complete their own explanations.             | <ul style="list-style-type: none"> <li>•Alarm clock</li> <li>•Measuring stick</li> <li>•Paper cups</li> <li>•Compasses or sewing needles</li> <li>•String</li> </ul>  |   |
| 5                            | To know and explore ways to absorb sound                          | Discuss with chn reasons why people may have for needing to absorb sound. Take suggestions and explain ideas on IWB. Explain context: a band have asked them to select the best material to soundproof their studio. Chn test the different materials using the method described on IWB. Chn listen and describe the loudness. Chn record their descriptions of sound and discuss which materials were good at soundproofing the studio. Chn to write a letter to the band with their conclusion, recommending the best material and explaining why it is the best choice.  | <ul style="list-style-type: none"> <li>•Small Music Player per group</li> <li>•Boxes</li> <li>•Materials to wrap boxes</li> </ul>   |   |
| 6                            | To know how to make a musical instrument to play different sounds | Chn complete Sound Q and A by interviewing classmates to gather answers. Introduce musical instrument challenge from IWB. Chn discuss first idea with partners and watch YouTube clip to support with ideas. Chn design their misical instrument and then create it using junk materials and other equipment. Chn test their instruments, explain their instrument to a partner and make different sounds. Chn evaluate their instruments and explain sound referring to vibrations, particles and the ear as well as pitch.  | <ul style="list-style-type: none"> <li>•Junk modelling materials</li> <li>•<a href="#">Weapons Of Sound "Fish Bucket" The Original Junk Percussion band - YouTube</a></li> </ul>  |   |
|                              |   | By the end of the unit most of the children will know: <ul style="list-style-type: none"> <li>➢ How sound sources vibrate to make sounds and how vibrations change when the loudness of a sound changes</li> <li>➢ how sound travels to reach our ears</li> <li>➢ the patterns between pitch of a sound and the features of the sound source.</li> </ul>  |   |   |

# Bingham Primary School - Science Curriculum

## Year 4 Summer – Living Things and their Habitats



| Prior Learning               |   | <ul style="list-style-type: none"> <li>•explore and compare the differences between things that are living, dead, and things that have never been alive</li> <li>•Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other</li> <li>•identify and name a variety of plants and animals in their habitats, including microhabitats</li> <li>• describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food</li> </ul>   |   |   |
|------------------------------|---|--|---|---|
| Scientific Tools (Hierarchy) |   | <ul style="list-style-type: none"> <li>•recognise that living things can be grouped in a variety of ways</li> <li>•explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment</li> <li>•recognise that environments can change and that this can sometimes pose dangers to living things.</li> </ul>   |   |   |
| Week                         | To Know statement   | How to Learning Activities   | Resources   | Vocabulary  |
| 1                            | To know how to group living things in a range of ways.                              | Revisit the characteristics that are shared by all living organisms – remind chn of 'Mrs Gren'. Using IWB, demonstrate that living things can be grouped together in a number of different ways based on their similarities and differences. Chn in TP generate as many criteria for sorting animals as they can and feedback to the class. Record these for chn for next activity. Chn complete Carroll diagram and Venn diagram using their own criteria.  | •   | <ul style="list-style-type: none"> <li>• <u>Living things</u>: organisms, specimen, species.</li> <li>• <u>Grouping living things</u>: classification, classification keys, classify, characteristics.</li> <li>• <u>Names of invertebrate animals</u>: snails and slugs, worms, spiders, insects.</li> </ul>   |
| 2                            | To know how to identify vertebrates by observing their similarities and differences | Use IWB to introduce the concept of classification. Introduce vertebrate and invertebrate classifications and ask chn to give examples of each. Explain how vertebrates can be further split into: amphibians, birds, fish, mammals and reptiles. Chn to note similarities and differences of the characteristics of each. Introduce classification keys as a way of sorting animals into groups through a range of yes/no questions. Chn generate questions to sort vertebrates. Split class in half and play 20 questions to guess the animal.   | •   | <ul style="list-style-type: none"> <li>• <u>Invertebrate body parts</u>: e.g. wing case, abdomen, thorax, antenna, segments, mandible, proboscis, prolegs.</li> <li>• <u>Environmental changes</u>: environment, environmental dangers, adapt, natural changes, climate change, deforestation, pollution, urbanisation, invasive species, endangered species, extinct.</li> </ul> |
| 3                            | To know how to use evidence to identify an invertebrate.                            | Read the info on IWB to explain the different classifications of invertebrates. With a TP, chn consider the kinds of invertebrate that they may find in the local habitat, where they might be found, and how to handle them. Chn work in pairs in the local environment to find, identify and name invertebrates and records the invertebrates they have found. Support each pair to carefully capture an invertebrate specimen to take back to class for further study. After carefully examining their invertebrate, chn draw a labelled diagram, writing the invertebrate's name, and describing the characteristics that they have used in identification.  | <ul style="list-style-type: none"> <li>•Magnifying Glasses</li> <li>•Clipboards</li> <li>•Items for capturing and carrying invertebrates e.g. paint brushes, plastic spoons, plastic pots</li> <li>•Hand sanitiser</li> </ul> | <ul style="list-style-type: none"> <li>• Previously introduced vocabulary: carbon dioxide, fish, bird, mammal, amphibian, reptile, skeleton, bone, vertebrate, invertebrate, backbone, names for animal body parts, names of common plants, photosynthesis.</li> </ul>  |
| 4                            | To know how to show the characteristics of living things in a table and a key       | Revise the term 'characteristic'. Chn in TP sort descriptions of a kitten into those that are characteristics of the domestic cat and those that are not. Discuss the difference between these, explaining that the characteristics of a living thing are statements that are always or typically true of the species, not statements that apply to an individual of the species under circumstances. Chn to complete classification tables. Use IWB to explain how to construct classification keys. Working in groups, children use living things cards to construct classification keys. Chn generate appropriate questions, write them on sticky notes and organise their cards and questions into position to construct a working key. In groups, chn test and evaluate the classification key produced by other groups, checking each pathway works correctly. | •Sticky notes   |   |
| 5                            | To know and recognise positive and negative changes to the local environment        | Revise previous learning about habitats. Explain that plants and animals are unable to make big changes to their environment, and therefore are very vulnerable to changes in their habitat. Chn list the threats to local habitats that they see in the IWB images and their own ideas. Go on an outdoor visit to a suitable local habitat e.g. a local park or an area of the school grounds that will show signs of man-made changes. In pairs, children survey the local habitat and make detailed observations. Chn draw a sketch map of the habitat, drawing and labelling any environmental dangers that they see there. Back in class, chn discuss how they can have a positive effect on the local habitat. Chn draw an idea they have for helping local habitat and write a brief explanation of how it will help.   | <ul style="list-style-type: none"> <li>•Clipboards</li> <li>•Make preparations for an outdoor visit to a suitable local habitat</li> </ul>  |   |
| 6                            | To know and describe the environmental dangers to endangered species.               | Read IWB and discuss the questions on the slides to outline some of the changes, natural and man-made, that can occur in the environment, and the ways these can impact on living things. Introduce some species that have become endangered and extinct due to changes in their environment. Chn to choose an endangered animal to research from topic books/internet. Chn draw a picture of their animal, describing the animal's habitat, writing about the environmental dangers that it faces, and suggesting how the animal can be saved from extinction. Chn create a short presentation about their research and share them with the class.  | <ul style="list-style-type: none"> <li>• Topic book on endangered species</li> <li>• Internet access</li> </ul>   |   |
|                              |   | By the end of the unit most of the children will know: <ul style="list-style-type: none"> <li>➢ That living things can be grouped in a variety of ways</li> <li>➢ How to use classification keys to help group, identify and name a variety of living things</li> <li>➢ That environments can change and that this can sometimes pose dangers to living things.</li> </ul>   |   |   |

# Bingham Primary School - Science Curriculum

## Year 5 Autumn – Properties and Changes of Materials



| Prior Learning               |   | • 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, and measure or research the temperature at which this happens in degrees Celsius (°C) • identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.  |  |   |
|------------------------------|---|--|--|---|
| Scientific Tools (Hierarchy) |   | •compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets •know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution •use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating •give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic •demonstrate that dissolving, mixing and changes of state are reversible changes •explain 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. |  |   |
| Week                         | To Know statement   | How to Learning Activities   | Resources  | Vocabulary  |
| 1                            | To know how to compare materials according to their properties          | Use IWB to explain what materials are - discuss the difference between natural and synthetic materials. Chn to identify materials in feely bags and think of words to describe the materials. Reveal materials and share properties. Chn to match properties of materials to materials and add some of their own. Tell the chn that they will be testing the properties of several different materials. Explain that they will test each material for magnetism, hardness, transparency, flexibility and permeability. Chn to follow the instructions and test each different material. Chn record their results. Chn to find material's properties and sort and compare materials according to their properties after tests. Ask chn to discuss and share their ideas on the possible uses for the materials they tested based on their properties.   | •Feely bags with different materials<br>•Range of materials •Magnets •Small metal nails •Goggles •Jars or beakers<br>•Elastic bands •Measuring jugs<br>•Empty trays •Water   | • <u>Properties of materials</u> : thermal conductor/insulator, magnetism, electrical resistance, transparency.                           |
| 2                            | To know thermal conductors and insulators                               | Use IWB to explain thermal conductors and insulators. Chn work in TP to solve quiz on IWB. Explain to chn that they will be completing an investigation to find the best thermal insulator for a new lunchbox. Ask chn with TP to discuss how they could test the conductivity of different materials. Explain what the variables of an investigation are using the IWB and discuss independent, dependent and controlled variables. Ask chn to identify the variables of this investigation. Chn to plan, set out and carry out their investigation and record their results. Chn to use their results to make a conclusion.  | •Containers •Thermometers<br>•Ice cubes •Stopwatches •Different materials  | • <u>Mixtures and solutions</u> : dissolving, substance, soluble, insoluble.  |
| 3                            | To know which electrical conductors make a bulb shine brightest         | Recap electrical conductors and insulators from Y4. Ask chn to use their Conductor and Insulator Cards to play a game to identify materials as conductors or insulators. Use the pictures of materials on the IWB and ask the children to hold up the correct card for each one. Use IWB to explain different conductors have different levels of resistance and therefore conduct electricity better than others. Explain that chn will be investigating the best material to use for football floodlights to make them as bright as possible. Chn set up a simple circuit with battery and bulb, and use different metals to complete the circuit. Chn to observe brightness of bulb and order the materials on the basis of their conductivity and plan their presentation to give their findings for the brightest football floodlights.   | •Batteries •Bulbs<br>•Wires •Connectors (e.g. crocodile clips) •Copper coin, iron nail, steel spoon, silver and gold jewellery.  | • <u>Changes of materials</u> : reversible change, physical change, irreversible change, chemical change, burning, new material, product. |
| 4                            | To know that some materials will dissolve in liquid to form a solution  | Explain the difference between dissolving and melting. Chn to test whether different materials are soluble or insoluble in water by following instructions on IWB. Chn to record findings in a table. Ask chn to discuss possible variables that may affect dissolving. Chn to work in TPs to choose and independent variable and dependent variable to investigate. Chn to plan, complete and record their results on a bar chart. Chn to use info to make a conclusion based on their results.   | •Materials to dissolve: sand, chalk, flour, rice, instant coffee, sugar, salt, gravy<br>•Different beakers •Different types of water •Teaspoons •Stopwatches<br>•Weighing Scales •Thermometers<br>•Different temperatures of water (cold, room temp, 40°C) | • <u>Separating</u> : sieving, filtering, magnetic attraction.  |
| 5                            | To know how to separate mixtures of materials using different processes | Play Supermarket Chaos on IWB: various goods from a supermarket have been mixed up and chn separate them. Describe the four different mixtures on IWB. Ask the Chn to how the materials have been mixed and how they could separate them. Chn use the descriptions of the different types of mixtures on IWB and match them to the images. Chn to work in 4 approx even groups and move around the classroom in their groups to try to separate each of the mixtures using the processes described. (Teacher lead the evaporation activity). Chn to record and explain each of the processes.  | •Play sand •Table salt •Water<br>•Raisins, flour and rice •Paper clips<br>•Magnets •funnels, filter paper, sieve, bowls •boiling water   | Previously introduced vocabulary: electrical conductor/insulator, bulb, translucent.  |
| 6                            | To know and explain irreversible chemical changes                       | Discuss frying an egg with chn. What happens to the egg? How does it change? Explain the chemical and irreversible change using IWB. Ask chn to sort pictures of materials changing and sort into reversible or irreversible. Chn to explain how the reversible changes can be reversed and identify the reactant and products of the irreversible changes. Chn to work in groups and carry out two irreversible chemical changes to make new materials. Chn follow IWB and mix warm milk with vinegar, then bicarb with vinegar. As they complete each activity, chn explain the new materials they have made and describe the irreversible changes and explain the new materials created.  | •Warm milk (40°C) – store in flask for ease of use •White distilled vinegar<br>•Mixing bowls/beakers •Tablespoons<br>•Bicarb Soda •Cardboard •Balloons<br>•Plastic bottles   |   |
|                              |   | By the end of the unit most of the children will know:<br>➢ that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution<br>➢ how mixtures might be separated, including through filtering, sieving and evaporating<br>➢ that changes of state can be reversible or irreversible  |  |   |

# Bingham Primary School - Science Curriculum

## Year 5 Spring 1 – Forces



| Prior Learning               |  | •compare how things move on different surfaces •notice that some forces need contact between 2 objects, but magnetic forces can act at a distance •observe how magnets attract or repel each other and attract some materials and not others •compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials •describe magnets as having 2 poles •predict whether 2 magnets will attract or repel each other, depending on which poles are facing.   |   |  |
|------------------------------|--|---|---|--|
| Scientific Tools (Hierarchy) |  | •explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object •identify the effects of air resistance, water resistance and friction, that act between moving surfaces •recognise that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect.   |   |  |
| Week                         | To Know statement  | How to Learning Activities  | Resources   | Vocabulary   |
| 1                            | To know the forces acting on objects   | Chn identify pictures on IWB as pushes or pulls. Explain forces affect the movement of an object. Chn to play 'Forces Bingo' following IWB. Chn read story about forces and highlight examples of forces in the story and write a sentence to explain the forces being applied in each example. Chn identify forces on images and draw arrows to show the direction of force and refer to the opposing forces provided.   |   | <ul style="list-style-type: none"><li>• <u>Types of forces</u>: air resistance, water resistance, buoyancy, upthrust, Earth's gravitational pull, gravity, opposing forces, driving force.</li><li>• <u>Mechanisms</u>: levers, pulleys, gears/cogs.</li><li>• <u>Measurements</u>: weight, mass, kilograms (kg), Newtons (N), scales, speed, fast, slow.</li><li>• <u>Other</u>: streamlined, Earth.</li></ul> Previously introduced vocabulary: air, heat, moon. |
| 2                            | To know and explore the effect gravity has on objects and how gravity was discovered | Drop a ball and ask chn to discuss their ideas about gravity using prompts from IWB. Chn discuss any existing knowledge they have of Isaac Newton and discuss how Isaac Newton developed his theory of gravity. Chn to answer comprehension questions on the Newton and Gravity. Explain difference between weight and mass, and how to measure them using IWB. Chn to measure the weight and mass of different objects using IWB to support. Chn to make predictions, record results and form conclusions. Chn to work with TP to conduct investigations.  | <ul style="list-style-type: none"><li>•Newton meters</li><li>•Weighing scales</li><li>•Objects to be measured</li><li>•Clear bags with handles</li></ul>  |  |
| 3                            | To know and investigate the effects of air resistance                                | Use the IWB to explain that gravity causes objects of the same size and shape but of different mass to fall at the same rate. Discuss Galileo's experiment and how it proves this. Children discuss how when a feather and a hammer fall on the Moon, they land at the same time due to no air resistance. Use IWB to explain the effects of air resistance, and how it impacts objects falling on Earth. Explain the context of the investigation using IWB. Ensure chn understand how to make their different parachutes and discuss the possible variables. They should make their own decisions about how to plan the experiment and record their choices and their prediction, then conduct their investigation and record results. Chn to use results to write their own generalisation on which type of parachute would create most air resistance for a skydiver. | <ul style="list-style-type: none"><li>•Bin/plastic bags</li><li>•Paper</li><li>•Card</li><li>•String</li><li>•Sticky tape</li><li>•Objects to attach to parachutes</li><li>•Measuring sticks</li><li>•Stopwatch</li></ul> |  |
| 4                            | To know the effects of water resistance  | Explain streamlining using the examples on the IWB. Chn work in groups to conduct the mini-investigation into streamlined shapes as described on IWB. Explain why the shapes fell at different speeds because of some shapes being more streamlined than others. Chn to complete boat races as described on IWB using junk modelling equipment to make their own boats. Chn draw and label their design and predict how well it will move through water and why. Chn then time their boats as it crosses water. Chn evaluate their boat's performance and explain their designs referring to water resistance and streamlined shapes.   | <ul style="list-style-type: none"><li>•Modelling clay</li><li>•3 identical measuring cylinders</li><li>•Junk model materials</li><li>•Large water tray</li><li>•Battery powered handheld fan</li><li>•Stopwatch</li></ul> |  |
| 5                            | To know and investigate the effects of friction                                      | Use IWB to discuss how brakes on a bicycle make use of friction. Chn use IWB to design a brake pad using different materials available. Discuss the variables with the chn, pointing out the need to keep the variables not being tested or measured the same in order to gather reliable results. Discuss how repeat readings can be useful. Chn complete their prediction then conduct the investigation. If possible, allow time to repeat for second set of results. Chn then conclude the best material and explain their choice.  | <ul style="list-style-type: none"><li>•Scooters</li><li>•5 different materials to test</li><li>•Stopwatch</li></ul>   |  |
| 6                            | To know some mechanisms allow a smaller force to have a greater effect               | Using IWB, explain what a mechanism is. Chn work in threes. Each member visit a different table to find out about a particular type of mechanism. Chn take notes of findings and take them back to their original groups. Chn identify type of mechanisms used in the objects shown. Discuss different machines on IWB. Point out that the machines use different mechanisms for different purposes. Chn design their own crazy machine that uses many different mechanisms to achieve a simple aim. Chn draw and explain their designs.  |   |  |
|                              |  | By the end of the unit most of the children will know: <ul style="list-style-type: none"><li>➢ how to explain the force of gravity acts between Earth and falling objects</li><li>➢ the effects of air resistance, water resistance and friction between moving surfaces</li><li>➢ that some mechanisms allow a smaller force to have a greater effect</li></ul>  |   |  |



## Bingham Primary School - Science Curriculum

### Year 5 Spring 2 – Earth and Space

| Prior Learning               |  |  |   |   |
|------------------------------|--|--|---|---|
| Scientific Tools (Hierarchy) |  | •describe the movement of the Earth and other planets relative to the Sun in the solar system    •describe the movement of the Moon relative to the Earth    •describe the Sun, Earth, and Moon as approximately spherical bodies    •use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.   |   |   |
| Week                         | To Know statement  | How to Learning Activities   | Resources   | Vocabulary  |
| 1                            | To know why we know the Sun, Earth and Moon are spherical                                | Take the whole class out to the playground. What shape is the Earth? How do you know? What shape does it look like to you? Expect children to say sphere but discuss the fact that there is no evidence of that when you look around them. What does the evidence of your eyes tell you. Group chn and provide evidence cards for chn to discuss and sort evidence between Earth being flat or spherical. Chn to write a paragraph explaining the Flat Earth theory and the idea of Earth as spherical, and then write a conclusion based on the evidence. |   | <ul style="list-style-type: none"><li>• <u>Solar system</u>: star, planet.</li><li>• <u>Names of planets</u>: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Neptune, Uranus.</li><li>• <u>Shape</u>: spherical bodies, sphere.</li><li>• <u>Movement</u>: rotate, axis, orbit, satellite.</li><li>• <u>Theories</u>: geocentric model, heliocentric model, astronomer.</li><li>• <u>Day length</u>: sunrise, sunset, midday, time zone.</li></ul> <p>Previously introduced vocabulary: Sun, moon, shadow, day, night, heat, light, reflect.</p> |
| 2                            | To know and describe the features of the planets in our solar system                     | Give chn the Planetary Fact Cards. Make it clear which planets will stay sitting and which will rotate around the room. Each child/pair has 5 minutes with each of the other planets to discuss and compare facts about the planets. Using a bell/timer ensure that the sound indicates when the 5 minutes are up and they have to move. Chn cut out and order the planets in the solar system on A3 paper and create a fact poster.   | <ul style="list-style-type: none"><li>•Bell/timer</li><li>•A3 paper</li></ul>                   |   |
| 3                            | To know how planets move in our solar system   | Ask chn to discuss the difference between rotation and orbit and address misconceptions. Show chn videos of geocentric and heliocentric model of the solar system. Read the sorty of the change from geocentric to heliocentric model using resources provided. Chn to work in groups to create a film/short sketch by picking one heliocentric and one geocentric character and include the evidence they presented in their sketch.  | <ul style="list-style-type: none"><li>•iPads</li></ul>  |   |
| 4                            | To know how to explain day and night and the apparent movement of the Sun across the sky | Ask the chn to think about whether the Sun changes position over the course of the day. Question chn about their responses: How do they know? What evidence do they have for this? Display a time-lapse clip of the Sun moving across the sky to support discussion. Chn to act out the rotation of Earth from IWB. Chn to use this to and take turns to explain how day and night occurs. Chn write an explanation text about night and day.  | <ul style="list-style-type: none"><li>•iPads</li></ul>  |   |
| 5                            | To know night and day in different parts of the Earth                                    | Recap night/day learning from last lesson. Complete Night and Day investigation using Google Maps. Chn make predictions using globes of where the sun will be based on it being midday in UK. Chn to complete predictions into a table. Model how to use time zone maps to calculate times in other countries. Chn could repeat process but select a different country for it to be 12pm. Discuss answers and allow chn to write a conclusion explaining their findings.   | <ul style="list-style-type: none"><li>•Globes</li></ul>   |   |
| 6                            | To know the movement of the Moon.  | Demonstrate rotation of Earth on its axis using a globe and allow chn to model and explain this to a partner. Discuss gravity as an attracting force and the role it plays. Show video of moon orbiting the Earth. How does it move? Does it rotate? Chn to use instructions to create a Sun, Earth and Moon orbit model and then write a short explanation describing their understanding of the movement of the moon.  | <ul style="list-style-type: none"><li>•Globes</li><li>•Black card</li><li>•Split pins</li></ul> |   |
|                              |  | By the end of the unit most of the children will know: <ul style="list-style-type: none"><li>➤ The movement of Earth and the other planets relative to the Sun in the solar system</li><li>➤ That the Sun, Earth and Moon are spherical</li><li>➤ That day and night is due to the rotation of the Earth</li></ul>   |   |   |



# Bingham Primary School - Science Curriculum

## Year 5 Summer 1 – Animals including Humans



| Prior Learning               |  | •describe the simple functions of the basic parts of the digestive system in humans •identify the different types of teeth in humans and their simple functions •construct and interpret a variety of food chains, identifying producers, predators and prey.  |                           |  |
|------------------------------|--|--|---------------------------|--|
| Scientific Tools (Hierarchy) |  | •describe the changes as humans develop to old age.  |                           |  |
| Week                         | To Know statement  | How to Learning Activities   | Resources                 | Vocabulary   |
| 1                            | To know the stages of human development                      | Read and explain the differences between asexual and sexual reproduction. In groups, chn categorise asexual and sexual cards into three groups and take photo. Children will walk around the class looking at the way that other groups have categorised the cards. Discuss answers and chn to note down any changes they would make following discussion. Use IWB to explain human stages of development. Chn to then write an explanation for each of the stages.  | •iPad (camera)            | • <u>Process of reproduction</u> : gestation, asexual reproduction, sexual reproduction, sperm, egg, cells, clone.<br><br>• <u>Changes and life cycle</u> : embryo, foetus, uterus, prenatal, adolescence, puberty, menstruation, adulthood, menopause, life expectancy, old age, hormones, sweat.<br><br>• <u>Changing body parts</u> : e.g. breasts, penis, larynx, ovaries, genitalia, pubic hair.<br><br>Previously introduced vocabulary: reproduction, reproduce, types of animals and animal groups, fertilisation. |
| 2                            | To know how babies grow and develop                          | Display table showing info about the growth (height) of babies. Discuss ways of showing this data and then show a line graph and bar graph and discuss which is appropriate and why. Give chn squared paper or provide document on laptops for chn. Chn to then create at least 2 graphs presenting the data. Chn then explain which graph is better for presenting their data and why. Chn then answer questions explaining the data they have presented.   | •Squared paper or Laptops |  |
| 3                            | To know the main changes that occur during puberty           | Chn label images on IWB with the name of the stage of development. Read through info on IWB about puberty to explain main changes in this stage of development and ensure that key vocab is understood. Chn label the physical changes that occur during puberty and answer questions on similarities and differences.   |                           |  |
| 4                            | To know the changes that take place in old age               | Chn to discuss what happens to humans as they get older and share ideas as a class. List ideas on IWB and discuss whether to classify each one as physical or not. Chn classify information cards into true or false. Any they are not sure about should be left and discussed as a class. Chn to complete comprehension activity and use this to create an information poster on the changes that occur during old age.   |                           |  |
| 5                            | To know the gestation periods for animals                    | Ask chn what a gestation period is then ascertain with further questioning that it is the prenatal stage or the time between fertilisation and birth. Chn predict and compare the gestation periods of different types of vertebrates. Discuss ways to report findings. Scribe on IWB and sort them as oral or written presentations. Chn then choose the oral or written form of presentation they think is most appropriate and choose to work independently/in pairs/in groups.   |                           |  |
| 6                            | To know the gestation periods and life expectancy of animals | Show the gestation periods table. Children feed back about any patterns they have spotted in the gestation periods of different animals. Chn discuss life expectancy with TP and feedback to the class to create a definition. Read: 'animals with longer life expectancies have longer gestation periods' to chn. Chn discuss what information they would need to answer this question and how they would record their data. Show different ways of graphing 2 datasets. Chn discuss and decide which is most appropriate before graphing datasets on laptops or squared paper. Chn analyse data and report their findings. | •Squared paper or Laptops |  |
|                              |  | By the end of the unit most of the children will know: <ul style="list-style-type: none"><li>➤ The 6 stages of human development</li><li>➤ The main changes that occur during puberty</li><li>➤ The main changes that take place in old age</li></ul>  |                           |  |



## Bingham Primary School - Science Curriculum

### Year 5 Summer 2 – Living Things and their Habitats

| Prior Learning               |  | •recognise that living things can be grouped in a variety of ways •explore and 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 pose dangers to living things.  |  |   |
|------------------------------|--|---|--|---|
| Scientific Tools (Hierarchy) |  | •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  |  |   |
| Week                         | To Know statement  | How to Learning Activities  | Resources  | Vocabulary  |
| 1                            | To know how some plants reproduce  | Use IWB to explain sexual and asexual reproduction. Recap Y3 learning about parts of plants and their function using information cards. Chn use this to add information and correctly label parts of the flower. Use IWB to recap pollination and address misconceptions. Discuss the fact that plants can be pollinated by insects or by the wind. Chn sort pictures and explanations.   |  | • <u>Reproduction</u> : asexual reproduction, sexual reproduction, gestation, metamorphosis, gametes, tuber, runners/side branches, plantlet, cuttings, embryo, adolescent, penis, vagina, egg, pregnancy, gestation.<br><br>Previously introduced vocabulary: life cycle, pollination, offspring, fertilise, fertilisation, sepal, filament, anther, stamen, pollen, petal, stigma, style, ovary, carpel, ovule, stem, bulb, roots, mammal, adult, baby, sperm, cells, live young. |
| 2                            | To know how some plants reproduce  | Use the pictures and information on IWB to describe some familiar examples of plants that reproduce asexually. Chn to sort statements and decide whether they describe advantages or disadvantages of each type of reproduction. Chn to follow instructions to take cuttings from a geranium plant to demonstrate the artificial method of asexual reproduction. Any cuttings that develop roots can be planted into compost. Chn to write explaining the method of asexual reproduction.   | •Large geranium plant per group<br>•Transparent beakers/jars   |   |
| 3                            | To know and describe the life cycles of different mammals                              | Chn to recap prior learning and recall animals that are mammals and discuss the lifecycle of rabbit on IWB. Describe sexual reproduction in mammals using IWB. Discuss monotreme - mammals such as the duck-billed platypus that do not give birth to their young, but lay eggs instead. Chn to sort and order images describing reproduction in the correct order and add descriptions. Describe the three different groups of mammals (placentals, marsupials and monotremes) and discuss examples of animals in each group. Chn describe the stages of the life cycle of one of the different mammals choosing from platypus (a monotreme), a kangaroo (a marsupial) or a rabbit (a placental). Group chn who have worked on different animals and chn discuss similarities/differences between the life cycles. | •Split pins  |   |
| 4                            | To know the life process of reproduction in some plants and animals                    | Introduce Jane Goodall using IWB and describe Goodall's work with Gombe chimpanzees in Tanzania. Chn to sort statements about Goodall's work into Fact or Fiction groups. Chn can add their own. Use IWB to explain that chimpanzees are an endangered species and the threats they face in the wild. Briefly describe the work of the Jane Goodall Institute, and the way it works to protect chimpanzees in the wild. Chn work in groups to create an advert to ask for donations to the Institute. Offer the children a choice of formats for their adverts. You may wish to let them create a poster, leaflet, television advert or radio advert.   | •iPad (camera)<br>•Coloured paper                              |   |
| 5                            | To know and compare the life cycles of amphibians and insects                          | Explain metamorphosis using IWB. Chn talk about animals they know that undergo metamorphosis, using images on IWB to support. Chn complete lifecycles of amphibians and insects. Chn then discuss similarities and differences between the life cycles they have described.   |  |   |
| 6                            | To know and compare the life cycles of plants, mammals, amphibians, insects and birds. | Explain the role of the egg in a bird's lifecycle. Chn discuss parts of an egg, and crack it open to see if they can identify these parts. Identify and explain the function of the parts of an egg using the diagram on IWB. Chn see if they can spot any of the parts in their egg. Chn try to order the stages of the life cycle of a bird shown on IWB before revealing correct order and discussing the stages. Chn take on the role of wildlife presenters. Chn write a script to narrate a programme all about life cycles of different animals. Children perform their script to an audience, which maybe their group, the class, or another audience.  | •Hen's egg per pair<br>•Beaker/bowl to crack egg into per pair |   |
|                              |  | By the end of the unit most of the children will know: <ul style="list-style-type: none"><li>➢ The difference in lifecycles of a mammal, an amphibian, an insect and a bird</li><li>➢ The life process of reproduction in some animals and plants</li><li>➢ How to grow new plants other than from seed.</li></ul>  |  |   |





## Bingham Primary School - Science Curriculum

### Year 6 Autumn 1 – Living Things and their Habitats

| Prior Learning               |  | •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  |  |   |
|------------------------------|--|---|--|---|
| Scientific Tools (Hierarchy) |  | •describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals •give reasons for classifying plants and animals based on specific characteristics.  |  |   |
| Week                         | To Know statement  | How to Learning Activities  | Resources  | Vocabulary  |
| 1                            | To know how to and give reasons for classifying animals            | Explain classification using IWB. Chn discuss how to sort and group the snacks shown on IWB. Guide chn to split snacks into smaller and smaller groups. Chn to act as taxonomists to classify animals for a new zoo by sorting and grouping animals using different classifications. Chn discuss how they have classified the animals in groups and discuss whether and why taxonomists may use a single, standard method of classification.  |  | <ul style="list-style-type: none"><li>• <u>Classifying</u>: Carl Linnaeus, Linnaean system, flowering and non-flowering plants, variation.</li><li>• <u>Microorganisms</u>: bacteria, single-celled, microbes, microscopic, virus, fungi, fungus, mould, antibiotic, yeast, ferment, microscope, decompose.</li></ul> |
| 2                            | To know how living things are classified into groups               | Chn discuss why it is important to have a standard system of classification. Ask chn to discuss possible problems caused by not following a standard system. Explain Carl Linnaeus's work on the classification system using IWB and the Linnaean system. Chn complete a quiz on Linnaean system of classification. Go through answers as whole class and discuss. Use the diagram on IWB to show how a species can be classified at each level. Chn choose one living thing on IWB and use books/internet to research the living thing and shows how the species is classified at each level of the standard species. Chn create mnemonic to remember the order of the levels of classification system.  | •Laptops or books about classification   |   |
| 3                            | To know the characteristics of different types of animals          | Recap learning from Y4 by discussing difference between vertebrates and invertebrates. Explain that they can be split into smaller groups. Chn match the characteristics with the correct groups of animals and identify an example animal for each one. Describe the discovery of the platypus using IWB. Chn use Platypus Diagram to discuss its characteristics and the groups of animals that these characteristics are usually associated with. Point out defining characteristics of platypus using IWB and explain why it is classified as a mammal and not a reptile or bird. Chn design a new creature and accompanying fact file. Creatures must exhibit characteristics of a particular group of animals so their partner can classify it. |  |   |
| 4                            | To know and investigate helpful and harmful microorganisms         | Describe and explain microorganisms and describe the examples of microorganisms shown on the IWB. Describe the helpful and harmful uses and effects. Explain the mould investigation described on IWB. Chn decide their chosen variable, their question and prediction.   | •2 slices of bread per child •2 clear sealable plastic bags per child •locations with different conditions |   |
| 5                            | To know the characteristics of different types of microorganisms   | Chn observe their slices of bread from the mould investigation from last lesson. Chn complete their conclusion and use results to explain how to keep bread mould-free for longer. Explain how microorganisms are classified using the diagram on IWB. Explain the main difference in the structure of the cells of different microorganisms, in particular fungi and bacteria. Chn use TP to discuss cells shown in IWB and identify which is fungus cell and which is bacterium. Chn use different coloured playdough to sculpt their own single-celled microorganism in a petri dish. Chn name, classify and its uses and effects.   | •Mould investigation equipment from last lesson •Playdough in different colours •Petri dish per child      |   |
| 6                            | To know the classification of organisms found in my local habitat. | Chn to work in pairs to identify different living things in the habitat around school. Chn to list of any plants and animals they find, using ID sheets if required to identify species. Chn to create their own Field Guide to the habitat around their school. Chn to classify the organisms they found and add them to the correct area of the Field Guide. Chn to present their Field Guide to an audience, explaining why they classified organisms into each group.   | •Access to habitat around school   |   |
|                              |  | By the end of the unit most of the children will know: <ul style="list-style-type: none"><li>➤ How living things are classified into board groups according to common observable characteristics</li><li>➤ Reasons for classifying plants and animals based on specific characteristics</li><li>➤ To describe characteristics of different microorganisms</li></ul>   |  |   |



## Bingham Primary School - Science Curriculum

### Year 6 Autumn 2 – Animals including Humans

| Prior Learning               |  | •describe the changes as humans develop to old age.   |  |  |
|------------------------------|--|---|--|--|
| Scientific Tools (Hierarchy) |  | •identify and name the main 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 their bodies function •describe the ways in which nutrients and water are transported within animals, including humans.   |  |  |
| Week                         | To Know statement  | How to Learning Activities  | Resources  | Vocabulary   |
| 1                            | To know the three main parts of the circulatory system and describe the job of the heart | Recap digestive system from Y4 and introduce circulatory system. Chn discuss statements on IWB deciding if they're true or false. Chn order blood flow images to show how blood flows around the body. Chn label a heart diagram writing 3 statements about it. Chn to make a living heart model or circulatory system model with chn themselves being the blood- PE equipment can be used as other parts.  | •Hoops<br>•Skipping ropes<br>•Cones markers<br>•Stethoscopes (optional)  | • <u>Circulatory system</u> : circulation, heart, pulse, heartbeat, heart rate, lungs, breathing, blood vessels, blood, pump, transported, oxygenated blood, deoxygenated blood, oxygen, arteries, veins, capillaries, chambers, plasma, platelets, white blood cells, red blood cells.<br><br>• <u>Lifestyle</u> : drug, alcohol, smoking, disease, calorie, energy input, energy output.<br><br>• <u>Other</u> : water transportation, nutrient transportation, waste products.<br><br>Previously introduced vocabulary: carbon dioxide. |
| 2                            | To know the important jobs of the blood vessels and the blood                            | Recap circulatory system from last lesson. Look at diagram of heart and get chn to discuss what they see using prompts from IWB. Share info on IWB about how blood transports all of the things that animals need to survive around the body. Chn discuss what they remember about different blood vessels and complete cloze task. Introduce the idea that blood isn't just a red liquid and it is has 4 main parts: red blood cells, white blood cells, plasma and platelets. Go through the jobs of each. Chn to build their own blood models following instruction from IWB. Chn to draw and annotate their model.  | •Plastic containers<br>•Table tennis balls<br>•Red aqua beads<br>•Red craft foam<br>•Beaker<br>•Straws<br>•Stopwatches |  |
| 3                            | To know the importance of exercise and how it affects the heart                          | Use IWB to explain to chn what their HR is. Show chn how to find theirs on their neck and/or wrist, and not to use their thumb. Chn to set up an investigation into how exercise affects heart rate. Chn to make a prediction using prompts from IWB. Chn carry out investigation to compare their resting HR to HR after completing different exercises, recording their findings and writing a conclusion on what they have discovered.   | •PE kit<br>•Stopwatches  |  |
| 4                            | To know that regular exercise is important for a healthy body                            | Chn to recall their resting HR and discuss what happened when they exercised. Chn to note down as many sports as they can think of in 1 minute. Discuss why exercise is important. Use IWB to reinforce that exercise is good for us and share key government guidance. Chn complete survey as tally chart to discover most popular exercise. Chn pick 6 different activities and record these. Chn use their findings to write a short persuasive speech to start an exercise club in their community, explaining the benefits of exercise.  |  |  |
| 5                            | To know how diet and exercise affect the body  | Discuss 6 ways that exercise can benefit us – chn use KO for support as necessary. Show chn a variety of images regarding lifestyles. Which are necessary for a healthy lifestyle? Which aren't? Sort images. Share info on IWB about food and calories. Go through IWB which shows how energy is inputted into the body via food and outputted via exercise. Chn to answer questions regarding 4 people's calorie intake and exercise. Chn given some prompts to support them to explain the possible effects of each person's lifestyle on their body and how they could potentially make their lifestyle healthier.  |  |  |
| 6                            | To know the impact of drugs and alcohol on the way bodies function                       | Use IWB and discuss why the people need different calorie requirements. Ask chn what drugs are and show information about different types of drugs on IWB. Discuss prescription drugs, legal drugs, illegal drugs and alcohol and see what the children know about each of these terms and the effects of the different drugs. Recap circulatory system, and follow IWB to show effects of smoking and alcohol on the circulatory system. Chn to sort and record information about the effects on the body of smoking and the effects of drinking too much alcohol. Share some of the main drug and alcohol laws on IWB. Discuss these with the children and whether they think the laws go far enough and are justified. |  |  |
|                              |  | By the end of the unit most of the children will know: <ul style="list-style-type: none"><li>➢ The main parts of the human circulatory system and describe the function of the heart, blood vessels and blood</li><li>➢ The impact of diet, exercise, drugs and lifestyle on the way the body functions</li><li>➢ The ways in which nutrients are transported within humans.</li></ul>  |  |  |

# Bingham Primary School - Science Curriculum

## Year 6 Spring – Electricity



| Prior Learning               |  | •identify common appliances that run on electricity •construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers •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 •recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit •recognise some common conductors and insulators, and associate metals with being good conductors. |   |   |
|------------------------------|--|---|---|---|
| Scientific Tools (Hierarchy) |  | •associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit; •compare and 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.  |   |   |
| Week                         | To Know statement  | How to Learning Activities  | Resources   | Vocabulary  |
| 1                            | To know and explain the importance of the major discoveries in electricity | Chn complete an electricity quiz recapping the key concepts they learnt in Electricity in Y4. Use as opportunity to address misconceptions/plug gaps in knowledge. Chn read and answer questions on History of Electricity comprehension sheet. Chn to focus on the main historical discoveries made in the field of electricity.   |   | • <u>Flow and measure of electricity:</u> voltage, amps, resistance, electrons, volts (V), current.<br><br>• <u>Circuits:</u> symbol, circuit diagram, component, function, filament.<br><br>• <u>Variations:</u> dimmer, brighter, louder, quieter.<br><br>• <u>Types of electricity:</u> natural electricity, human-made electricity, solar panels, power station.<br><br>• <u>Other:</u> positive, negative. |
| 2                            | To know and explain the effects of differing volts in a circuit            | Ask chn to draw a circuit containing a bulb on a whiteboard. Reveal a correct circuit diagram addressing any misconceptions that arise. Explain that there are different drawings for battery and cell and highlight the difference between them. Chn to label parts of circuits and convert circuit diagrams using informal pictures into a circuit diagram using scientific circuit symbols.  |   |   |
| 3                            | To know and explain the effects of differing volts in a circuit            | Use IWB to explain what current and voltage are. Allow children to examine a range of different batteries and check the number of volts each one supplies. Show chn a circuit diagram with the volts labelled. Discuss the location of the label and how to label a battery containing multiple cells, as opposed to a single cell. Chn predict what happens to a bulb, motor or buzzer depending on the voltage of the cell or battery. Chn to work in TP and use the appropriate equipment and record their observations and circuit drawings.  | • Electrical wires with crocodile clips •Bulbs and holders •Batteries and holders •Buzzers •Motors •Switches  |   |
| 4                            | To know variations in how components function                              | Chn to discuss whether wire length affects how components work in a circuit. Chn to plan investigation – outline scientific enquiries they can choose from. Chn select a type of enquiry and plan their investigation. Chn swap investigations with a TP and quality assure each other's, and discuss improvements that can be made.  | •Electrical wires with crocodile clips (differing lengths) •Bulbs and holders •Batteries (with different voltages) and holders •Buzzers •Motors •Switches |   |
| 5                            | To know variations in how components function                              | Chn re-read their investigation plan from previous lesson. Define 'degrees of trust' and discuss the different criteria. Chn to create a table and record their results before conducting the investigation. Chn report their results and evaluate how well they established degrees of trust in their results. Chn participate in a whole class discussion and then decide on which ways of establishing a higher degree of trust are appropriate and which are not, giving reasons why.   | •Electrical wires with crocodile clips (differing lengths) •Bulbs and holders •Batteries and holders •Buzzers •Motors •Switches                           |   |
| 6                            | To know variations in how components function                              | Chn to look at results from last lesson and share them in a class discussion. Show chn how to make a further prediction based on their test results. Chn to create a new question, make new predictions and explain how they are related to their results, and add the variables and equipment. Chn conduct their new investigation, evaluate how well they established degrees of trust in their results, and present their results to the class.  | •Electrical wires with crocodile clips (differing lengths) •Bulbs and holders •Batteries and holders •Buzzers •Motors •Switches                           |   |
|                              |  | By the end of the unit most of the children will know:<br>➤ How the voltage of cells used in the circuit impacts components<br>➤ Compare and give reasons for variations in how components function<br>➤ The recognised symbols when representing a simple circuit in a diagram.  |   |   |

# Bingham Primary School - Science Curriculum

## Year 6 Summer 1 – Evolution and Inheritance



| Prior Learning               |   |  |               |            |
|------------------------------|---|--|---------------|------------|
| Scientific Tools (Hierarchy) |   | •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, but normally offspring vary and are not identical to their parents •identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.  |               |            |
| Week                         | To Know statement   | How to Learning Activities   | Resources     | Vocabulary |
| 1                            | To know the scientific concept of inheritance                           | Give simple explanations of cells, chromosomes, DNA and genes. Discuss with chn what variation means. Introduce chn to the ideas of how inherited genes can change a species over many generations. Explain inheritance and what inherited characteristics are. Chn match parents and offspring on IWB. Explain how inherited characteristics lead to both similarities and differences between biological parents and offspring. Chn sort Inherited Characteristics Cards on whether they are inherited characteristics or not.   |               |            |
| 2                            | To know the scientific meaning of adaptation                            | Recap how variation can occur from Lesson 1 and introduce the idea of adaptation. Chn discuss understanding of environments and habitats before feeding back to the whole class. Show examples on the IWB. What Does Adapted Mean? Chn read and discuss meanings of adapted and decide which are correct or incorrect. Read through the scientific definition of adaptation. Accidental Adaptations: Explain how most mutations occur in DNA and how this leads to the development of adaptive traits. Chn to identify a pair of adaptive traits.  |               |            |
| 3                            | To know the key ideas of the theory of evolution                        | Chn reread their definitions for adaptation and evolution from lesson 1. Introduce Theory of Evolution. Chn sit on chairs in a circle. Read the Theory of Evolution Teacher Sheet while children enact and read out the ideas of different theorists and scientists using the Theory of Evolution Pupil Sheet and Theory of Evolution Scientist Masks. Chn to sort Evolutionary Cards into categories and then write a brief paragraph summarising how the ideas changed over time for each of the categories.   | •Lolly sticks |            |
| 4                            | To know and identify evidence for evolution from fossil records         | Chn to review their understanding of the fossilisation process using fossilisation process cards. Chn order the pictures, assign key words to the pictures and rehearse the describing the process with their partner. Explain Darwin's views on the evidence fossil records could provide for the theory of evolution. State the advantages and disadvantages of observing fossil records. Give chn a copy of the Evolution Timeline while explaining why some living things have more fossils than others. Chn write a paragraph describing the similarities and differences between fossil evidence and living relatives.   |               |            |
| 5                            | To know how human beings have evolved                                   | Explain why the idea of human evolution was a controversial idea and how it was received. Highlight the main sources of evidence that supports the idea of human evolution. Explain the classification categories of biological taxonomy that will be referred to in the lesson. Chn sort images into three categories based on physical features. Explain the current understanding of how humans evolved. Address the fact that this is a field of study where new discoveries are common and there are competing theories e.g. whether Homo Neanderthalensis is a different species and where our genetic inheritance comes from. Chn compare modern humans with Homo Neanderthalensis, and Australopithecus Afarensis. |               |            |
| 6                            | To know how adaptations can result in both advantages and disadvantages | Explain the conditions for adaptation by natural selection leading to evolution. Living Fossils: Read through the information about what constitutes a living fossil and how some living things have remained virtually unchanged. Show examples of how an adaptation can have both advantages and disadvantages. Children match the advantages and disadvantages of adaptive traits in living things. Extension: Children write down own examples of advantages and disadvantages of bipedalism. Explain how humans have affected the evolutionary process through selective breeding of plants and animals.  |               |            |
|                              |   | By the end of the unit most of the children will know: <ul style="list-style-type: none"><li>➢ That living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago</li><li>➢ that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents</li><li>➢ how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.</li></ul>   |               |            |

# Bingham Primary School - Science Curriculum

## Year 6 Summer 2 – Light



| Prior Learning               |   | <ul style="list-style-type: none"> <li>• recognise that they need light in order to see things and that dark is the absence of light</li> <li>• notice that light is reflected from surfaces</li> <li>• recognise that light from the sun can be dangerous and that there are ways to protect their eyes</li> <li>• recognise that shadows are formed when the light from a light source is blocked by an opaque object</li> <li>• find patterns in the way that the size of shadows change. (Y3)</li> </ul>  |   |   |
|------------------------------|---|---|---|---|
| Scientific Tools (Hierarchy) |   | <ul style="list-style-type: none"> <li>• recognise that light appears to travel in straight lines;</li> <li>• use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye</li> <li>• explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes</li> <li>• use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.</li> </ul>   |   |   |
| Week                         | To Know statement   | How to Learning Activities  | Resources   | Vocabulary  |
| 1                            | To know and explain that light travels in straight lines from a light source to our eyes, and from light sources to objects and then to our eyes. | Ask chn to recap understanding of light from Y3. Use IWB to explain what light is, and how it travels. Explain how light rays travel in a straight line from a light source, reflect off an object and into our eyes, enabling us to see the object. Address any misconceptions. Chn to describe how light is travelling to enable them to see some objects around them. Chn to work in groups to make human model of how light enables us to see – use yellow wool to enable be ray of light. Chn to work in groups to create an educational programme for chn all about how light makes us see. Chn to present their 'show' to the rest of the class/record them on iPad if possible.   | <ul style="list-style-type: none"> <li>• Yellow wool</li> <li>• Colouring pencils</li> </ul>  | <ul style="list-style-type: none"> <li>• <u>Reflection</u>: periscope.</li> <li>• <u>Seeing light</u>: visible spectrum, prism.</li> <li>• <u>How light travels</u>: light waves, wavelength, straight line, refraction.</li> </ul> <p>Previously introduced vocabulary: names and properties of materials, absorb.</p> |
| 2                            | To know and understand how mirrors reflect light, and how they can help us see.   | Put 4 reflection examples around the room. Explain that 1 is accurate. Chn to vote which they believe is correct. Reveal answer on IWB and address misconceptions. Use IWB to explain what the angles of incidence and reflection are, and that they are always equal. Chn to prove this law by carrying out the activity on IWB. Then use IWB to explain how a mirror enables us to see an image. Chn to follow instructions and make a periscope using cereal boxes and 2 mirrors. Allow chn opportunity to test periscopes by looking over or around objects. Chn to explain how their periscope works.  | <ul style="list-style-type: none"> <li>• Modelling clay</li> <li>• Mirrors</li> <li>• White paper</li> <li>• Small pieces of card</li> <li>• Torches</li> <li>• Protractors</li> <li>• Cereal boxes</li> <li>• Sticky tape</li> </ul>                               |   |
| 3                            | To know that refraction changes the direction in which light travels.   | Show chn image of straw in glass of water on IWB. Chn to discuss what is happening. Chn to discuss which explanation on IWB they agree with and why. Show chn video examples of refraction and then explain refraction using IWB. Explain to chn they will be carrying out 2 investigations to explore refraction. <b>Amazing Arrow</b> : Chn to draw a horizontal line on paper and hold it behind glass of water. Chn to make prediction of outcome before and record their observations and make a conclusion explaining why it happened. <b>Incredible Images</b> : Chn draw a small picture and place glass on and then watch through the side of the glass as they fill glass with water. Again, predict first then record observations and make a conclusion explaining why it happened. Share findings and explain how refraction caused the effects seen in each investigation using IWB.  | <ul style="list-style-type: none"> <li>• Small pieces pf paper</li> <li>• Cups of water</li> <li>• Jugs</li> <li>• Saucers</li> <li>• Video of refraction</li> </ul>  |   |
| 4                            | To know how a prism changes a ray of light.   | Put coloured paper around the room. Ask chn to vote with their feet and stand by the colour they believe light to be. Come back to this at the end of lesson. Explain who Isaac Newton is and introduce his investigation using a prism to alter light on IWB. Ask chn to recall earlier work on refraction, and explain that a prism refracts light which causes it to bend. In pairs, chn use a torch to shine a ray of light through a prism, holding a piece of white card in front of the refracted ray of light as it leaves the prism. They should see the light ray split into the colours of the spectrum. Chn record observations. Use IWB to explain how their prism split the ray of light into the colours of the spectrum and how these colours merge together to what looks white to our eyes. Chn to make a colour wheel following instructions. Before spinning, they should predict what will happen. Afterwards, they should describe what they observed and explain why it happened. Ask chn to reflect on starter task and ask them again. Sort chn into equal groups at each colour and explain that it represents light being made up of all these colours, and they discovered this using a prism to refract the white light. | <ul style="list-style-type: none"> <li>• 7 pieces of paper in the colours of rainbow and one white piece stuck around room</li> <li>• Cardboard</li> <li>• Colouring pencils</li> <li>• 1m String or yarn per child</li> <li>• prisms</li> <li>• torches</li> </ul> |   |
| 5                            | To know how light enables us to see colours   | Chn to read fact box on about Newton's discovery. Introduce filtering activity to chn using IWB. Ask them to predict what they will see when they look at the coloured sweets through the different coloured filters. Chn to look at results and see if they can spot anything interesting when forming their conclusion. Explain how we see colours and how filters work using the information and diagrams on IWB. Address any misconceptions. Ask the children to look again at their results, and discuss reliability and ways to check any ambiguous results. Introduce secret message to chn on IWB. Chn to follow instructions to create their own message, then swap with partners. Chn to use filters to read each other's messages and explain how it worked.   | <ul style="list-style-type: none"> <li>• Coloured sweets (e.g. Skittles) If not poss then coloured cubes</li> <li>• Different coloured cellophane squares</li> <li>• Colouring pencils</li> </ul>   |   |
| 6                            | To know and explain why shadows have the same shape as the object that casts them.  | Chn play interactive bingo. Ask chn to discuss whether shadows are the same shape as the object that casts them. Demonstrate on IWB. Chn to work in groups to perform a shadow puppet show using the differentiated Experiments and Enemies Script, about the dispute between Isaac Newton and Robert Hooke over Newton's theory of light and colour. Chn create shadow puppets of the scientists, as well as any props. Use IWB to discuss ideas. Chn to use cardboard and straws or craft sticks to make their shadow puppets. Encourage the children to use their shadow puppets creatively, tilting them or changing their distance from the light source. If possible, allow the groups time to perform their shadow puppet shows to the rest of the class.  | <ul style="list-style-type: none"> <li>• Sticky tape</li> <li>• Card</li> <li>• Straws/craft sticks</li> <li>• Tissue Paper</li> <li>• Tracing paper</li> <li>• Screen (white sheet)</li> <li>• Projector or other light source.</li> </ul>                         |   |

## Bingham Primary School - Science Curriculum



By the end of the unit most of the children will know:

- How we can see different objects and be able to explain why.
- That shadows have the same shape as objects that cast them and why.
- That refraction changes the direction that light travels.