

BAINES ENDOWED 2020 – Topic Coverage - Science

Bold – Knowledge
Italics – Skills

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
EYFS (Possible scientific topics)	<p align="center"><u>Seasons</u></p> <p>- Explore the seasons throughout the year. Discuss and describe changes we see including the weather. Experience the process of freezing and melting in Winter</p> <p align="center"><u>Plants</u></p> <p>- Observe a range of plants growing. Experience and observe what a plant needs to grow</p> <p align="center"><u>Animals</u></p> <p>- Experience, observe and talk about animals including humans. Discuss life cycles and use vocabulary to describe different body parts. Explore a range of habitats in which many animals/mini-beasts may live</p> <p align="center"><u>Space</u></p> <p>- Find out and discuss Earth and other planets. Discuss land/water on earth and how the sun helps us to live on earth.</p> <p align="center"><u>Senses</u></p> <p>- Explore the main senses through a range of topics; food tasting, describing texture in Art or animal topics, exploring different sights, smells and sounds in different places. Listen and use vocabulary which describes our senses.</p>					
Year 1	<p align="center"><u>Plants</u></p> <p>- identify and name a variety of common wild and garden plants including deciduous and evergreen trees.</p> <p>- Identify and describe the basic structure of a variety of common flowering plants including trees.</p> <ul style="list-style-type: none"> • <i>observing closely, perhaps using magnifying glasses,</i> • <i>comparing and contrasting familiar plants;</i> • <i>describing how they were able to identify and group them, and</i> • <i>drawing diagrams showing the parts of different plants including trees.</i> • <i>keeping records of how plants have changed over time, for example the leaves falling off trees and buds opening; and</i> • <i>comparing and contrasting what they have found out about different plants.</i> 	<p align="center"><u>Animals Including Humans</u></p> <p>- identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.</p> <ul style="list-style-type: none"> • <i>using their observations to compare and contrast animals [humans] at first hand or through videos and photographs,</i> • <i>using their senses to compare different textures, sounds and smells.</i> 	<p align="center"><u>Everyday Materials</u></p> <p>- distinguish between an object and the material from which it is made</p> <p>- identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock</p> <p>- describe the simple physical properties of a variety of everyday materials</p> <p>- compare and group together a variety of everyday materials on the basis of their simple physical properties</p> <ul style="list-style-type: none"> • <i>performing simple tests to explore questions, for example: 'What is the best material for an umbrella? ...for lining a dog basket? ...for curtains? ...for a bookshelf? ...for a gymnast's leotard?'</i> 	<p align="center"><u>Animals</u></p> <p>- identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals</p> <p>- identify and name a variety of common animals that are carnivores, herbivores and omnivores</p> <p>- describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, and including pets)</p> <ul style="list-style-type: none"> • <i>using their observations to compare and contrast animals at first hand or through videos and photographs,</i> • <i>describing how they identify and group them;</i> • <i>grouping animals according to what they eat,</i> • <i>using their sense</i> 	<p align="center"><u>Plants</u></p> <p>- identify and name a variety of common wild and garden plants including deciduous and evergreen trees.</p> <p>- Identify and describe the basic structure of a variety of common flowering plants including trees.</p> <ul style="list-style-type: none"> • <i>observing closely, perhaps using magnifying glasses,</i> • <i>comparing and contrasting familiar plants;</i> • <i>describing how they were able to identify and group them, and</i> • <i>drawing diagrams showing the parts of different plants including trees.</i> • <i>keeping records of how plants have changed over time, for example the leaves falling off trees and buds opening; and</i> <ul style="list-style-type: none"> • <i>comparing and contrasting what they have found out about different plants.</i> 	
	<p align="center"><u>Seasonal Changes</u></p> <p>- observe changes across the four seasons</p> <p>- observe and describe weather associated with the seasons and how day length varies.</p>			<ul style="list-style-type: none"> • <i>making tables and charts about the weather and</i> • <i>making displays of what happens in the world around them, including day length, as the seasons change.</i> 		

<p>Year 2</p>	<p><u>Use of Everyday Materials</u></p> <ul style="list-style-type: none"> - 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 • <i>comparing the uses of everyday materials in and around the school with materials found in other places (at home, the journey to school, on visits, and in stories, rhymes and songs);</i> • <i>observing closely,</i> • <i>identifying and classifying the uses of different materials, and</i> • <i>recording their observations.</i> • <i>thinking about unusual and creative uses for everyday materials.</i> 		<p><u>Health – Animals including humans</u></p> <ul style="list-style-type: none"> - 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) 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. • <i>observing, through video or first-hand observation and measurement, how different animals grow;</i> • <i>asking questions about what things animals need for survival suggesting ways to find answers to their questions.</i> • <i>observing, through video or first-hand observation and measurement, how humans grow;</i> • <i>recording their findings using charts</i> • <i>asking questions about what things animals [humans] need for survival and what humans need to stay healthy; and</i> • <i>suggesting ways to find answers to their questions.</i> 		<p><u>Plants</u></p> <ul style="list-style-type: none"> - 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. • <i>observing and recording, with some accuracy, the growth of a variety of plants as they change over time from a seed or bulb, or</i> • <i>observing similar plants at different stages of growth;</i> • <i>setting up a comparative test to show that plants need light and water to stay healthy.</i> 	<p><u>Living Things and their habitats</u></p> <ul style="list-style-type: none"> - explore and compare the differences between things that are living, dead, and things that have never been alive. - 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 - identify and name a variety of plants and animals in their habitats, including micro-habitats - 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. • <i>sorting and classifying things according to whether they are living, dead or were never alive, and</i> • <i>recording their findings using charts</i> • <i>describing how they decided where to place things,</i> • <i>exploring questions such as: 'Is a flame alive? Is a deciduous tree dead in winter?' and</i> • <i>talking about ways of answering their questions.</i> • <i>constructing a simple food chain that includes humans (e.g. grass, cow, human);</i> • <i>describing the conditions in different habitats and micro-habitats (under log, on stony path, under bushes);</i> • <i>finding out how the conditions affect the number and type(s) of plants and animals that live there</i>
<p>Year 3</p>	<p><u>Light and Astronomy</u></p> <ul style="list-style-type: none"> - recognise that they need light in order to see things and that dark is the absence of light - notice that light is reflected from surfaces - recognise that light from the sun can be dangerous and that there are ways to protect their eyes - recognise that shadows are formed when the light from a light source is blocked by a solid object - find patterns in the way that the size of shadows change. - <i>looking for patterns in what happens to shadows when the light source moves or the distance between the light source and the object changes.</i> 	<p><u>Rocks</u></p> <ul style="list-style-type: none"> - 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. • <i>observing rocks, including those used in buildings and gravestones, and</i> • <i>exploring how and why they might have changed over time;</i> • <i>using a hand lens or microscope to help them</i> • <i>identify and classify rocks according to whether they have</i> 	<p><u>Forces and Magnets</u></p> <ul style="list-style-type: none"> -compare how some things move on different surfaces - notice that some forces need contact between two 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 two poles - predict whether two magnets will attract or repel each other, depending on which poles are facing. • <i>comparing how different things move and grouping them</i> • <i>raising questions and carrying out tests to</i> 	<p><u>Animals including humans</u></p> <ul style="list-style-type: none"> - 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 • <i>comparing and contrasting the diets of different animals (including their pets) and</i> • <i>decide ways of grouping them according to what they eat.</i> • <i>researching different food groups and how they keep us healthy and</i> • <i>designing meals based on what they find out.</i> 	<p><u>Plants</u></p> <ul style="list-style-type: none"> - 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. • <i>comparing the effect of different factors on plant growth, for example the amount of light, the amount of fertiliser;</i> 	<p><u>Health- animals including humans</u></p> <ul style="list-style-type: none"> - identify that humans and some other animals have skeletons and muscles for support, protection and movement. • <i>identifying and grouping animals with and without skeletons and</i> • <i>observing and comparing their movement;</i> • <i>exploring ideas about what would happen if humans did not have skeletons.</i>

		<p>grains or crystals, and whether they have fossils in them.</p> <ul style="list-style-type: none"> • research and discuss the different kinds of living things whose fossils are found in sedimentary rock and • explore how fossils are formed • explore different soils and • identify similarities and differences between them and • investigate what happens when rocks are rubbed together or what changes occur when they are in water • raise and answer questions about the way soils are formed. 	<p>find out how far things move on different surfaces and</p> <ul style="list-style-type: none"> • gathering and recording data to find answers to their questions • exploring the strengths of different magnets and finding a fair way to compare them; • sorting materials into those that are magnetic and those that are not • looking for patterns in the way that magnets behave in relation to each other and what might affect this, for example, the strength of the magnet or which pole faces another; • identifying how these properties make magnets useful in everyday items and suggesting creative uses for different magnets. 		<ul style="list-style-type: none"> • discovering how seeds are formed by • observing the different stages of plant cycles over a period of time; • looking for patterns in the structure of fruits that relate to how the seeds are dispersed. • observing how water is transported in plants, for example, by putting cut, white carnations into coloured water and • observing how water travels up the stem to the flowers. 	
Year 4	<p><u>Electricity</u></p> <ul style="list-style-type: none"> - 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. <ul style="list-style-type: none"> • observing patterns, for example, that bulbs get brighter if more cells are added, that metals tend to be conductors of electricity, and that some materials can and some cannot be used to connect across a gap in a circuit. 	<p><u>Sound</u></p> <ul style="list-style-type: none"> - identify how sounds are made, associating some of them with something vibrating - recognise that vibrations from sounds travel through a medium to the ear - find patterns between the pitch of a sound and features of the object that produced it - find patterns between the volume of a sound and the strength of the vibrations that produced it. - recognise that sounds get fainter as the distance from the sound source increases. • finding patterns in the sounds that are made by different objects such as saucepan lids of different sizes or elastic bands of different thicknesses • they might make ear muffs from a variety of different materials to investigate which provides the best insulation against sound • they could make and play their own instruments by using what they have found out about pitch and volume 	<p><u>Animals including humans</u></p> <ul style="list-style-type: none"> - 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 <ul style="list-style-type: none"> • comparing the teeth of carnivores and herbivores, and • suggesting reasons for differences; • finding out what damages teeth and how to look after the • drawing and discussing their ideas about the digestive system and • comparing them with • models or images. 	<p><u>States of Matter</u></p> <ul style="list-style-type: none"> - 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. • grouping and classifying a variety of different materials; • exploring the effect of temperature on substances such as chocolate, butter, cream (for example, to make food such as chocolate crispy cakes and ice-cream for a party). • researching the temperature at which materials change state, for example, when iron melts or when oxygen condenses into a liquid. • observing and recording evaporation over a period of time, such as a puddle in the playground or washing on a line, and • investigating the effect of temperature on washing drying or snowmen melting. 	<p><u>Living things and their habitats</u></p> <ul style="list-style-type: none"> - 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. <ul style="list-style-type: none"> • using and making simple guides or keys [sorting, grouping, comparing, classifying] to explore and identify local plants and animals; • making a guide [sorting, grouping, comparing, classifying] to local living things • raising and answering questions based on their observations of animals and • what they have found out about other animals that they have researched. 	

Use the local environment throughout the year to identify, study and observe changes of plants and animals in their habitat

Year 5

Living things and their habitats (Incl Life Cycles)

- 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
- *observing and comparing the life cycles of plants and animals in their local environment with other plants and animals around the world (in the rainforest, in the oceans, in desert areas and in prehistoric times),*
- *asking pertinent questions and suggesting reasons for similarities & differences*
- *they might try to grow new plants from different parts of the parent plant, for example, seeds, stem and root cuttings, tubers, bulbs.*
- *observe changes in an animal over a period of time (for example, by hatching and rearing chicks),*
- *comparing how different animals reproduce and grow*
- *researching the gestation periods other animals and comparing them with humans;*

Earth and Space

- 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.
- *comparing the time of day at different places on the Earth through internet links and direct communication;*
- *creating simple models of the solar system;*
- *constructing simple shadow clocks and sundials, calibrated to show midday and the start and end of the school day;*
- *finding out why some people think that structures such as Stonehenge might have been used as astronomical clocks. [research]*

Forces

- 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.
- *exploring falling paper cones or cup-cake cases and*
- *designing and making [exploring] a variety of parachutes and*
- *carrying out fair tests to determine which designs are the most effective.*
- *exploring resistance in water by*
- *making and testing boats of different shapes.*
- *design and make artefacts that use simple levers, pulleys, gears and/or springs and explore their effects.*

Properties and changes of materials (testing properties)

- 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 - give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic
- *carry out tests to answer questions such as 'Which materials would be the most effective for making a warm jacket, for wrapping ice cream to stop it melting, or for making blackout curtains?'*
- *compare materials in order to make a switch in a circuit.*

Properties and changes of materials (reversible changes)

- 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
- demonstrate that dissolving, mixing and changes of state are reversible changes
- *observing and*
- *comparing the changes that take place, for example, when burning different materials or baking bread or cakes.*
- *researching and discussing how chemical changes have an impact on our lives, for example cooking, and discuss [research] the creative use of new materials such as polymers, super-sticky and super-thin materials.*

Properties and changes of materials (irreversible 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.
- *observing and*
- *comparing the changes that take place, for example, when burning different materials or baking bread or cakes.*
- *researching and discussing how chemical changes have an impact on our lives, for example cooking, and discuss [research] the creative use of new materials such as polymers, super-sticky and super-thin materials.*

Observe life cycles of plants and animals in the local environment throughout the year

- describe the changes as humans develop to old age
- *by finding out and recording the length and mass of a baby as it grows.*

Year 6

Evolution and Inheritance

- 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.

• observing and raising questions about local animals and how they are adapted to the environment; • comparing how some living things are adapted to survive in extreme conditions, for example cactuses, penguins & camels.

• analysing the advantages and disadvantages of specific adaptations, such as being on two feet rather than four, having a long or a short beak, having gills or lungs, tendrils on climbing plants, brightly coloured and scented flowers.

Living things and their habitats

- describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants and animals
- give reasons for classifying plants and animals based on specific characteristics.

• using classification systems and keys to
• identifying some animals and plants in the immediate environment
• researching unfamiliar animals and plants from a broad range of other habitats and decide where they belong in the classification system.

Animals including humans

- 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.

• exploring the work of scientists and scientific research about the relationship between diet, exercise, drugs, lifestyle and health.

Light and Astronomy

- recognise that light appears to travel in straight lines
- 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
- explain that we see things because the light that travels from light sources to our eyes or from light sources to objects and then to our eyes
- use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.

• deciding [observe/explore] where to place rear-view mirrors on cars;
• designing and making a periscope and using the idea that light appears to travel in straight lines to explain how it works. •

investigating the relationship between light sources, objects and shadows by using shadow puppets
• extend their experience [explore and observe] of light by looking at a range of phenomena including rainbows, colours on soap bubbles, objects looking bent in water and coloured filters (they do not need to explain why these phenomena occur).

Electricity

- 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.

• systematically identifying the effect of changing one [thing] component at a time in a circuit; • designing and making a set of traffic lights, a burglar alarm or some other useful circuit.