







Science at
Balderstone




As a Balderstone Scientist I am skilled at:

- Exploring and observing
- Grouping and Classifying
- Questioning
- Researching
- Modelling
- Collaborating
- Planning and Testing
- Using Equipment and Measuring
- Communicating
- Considering the results of an investigation and writing a conclusion by
 - Describing results and looking for patterns
 - Explaining results
 - Trusting results



<p>Disciplinary knowledge - Being a Balderstone Scientist</p>	<p>As a EYFS Balderstone Scientist I am skilled at:</p> <ul style="list-style-type: none"> • Using all my senses to explore the world around me. • Asking questions to help me explore, including questions such as "What if?". • Making observations. • Talking about and describing my observations. • Recording my observations by drawing pictures. • Finding out about different environments through real life experiences and what I have talked about, read and seen through media in class. • Recognising and explaining some similarities and differences in the natural world around me and other environments. • Finding out about some important processes and changes in the natural world around me, such as the seasons and changing states of matter. 		
	 Animals including humans	 Forces	 Plants
<p>EYFS</p> <p>Books, practical resources and fieldwork experiences will thread</p>	<p>Living things grow and die.</p> <p>Talk about the life cycle of Lambs/sheep, calves/cows.</p> <p>Understand the key features of the life cycle of a plant and an animal.</p>	<p>Explore how things work.</p> <p>Explore and talk about different forces they can feel.</p> <p>Water up thrust - balloon.</p> <p>Floating and sinking</p> <p>Water safety</p>	<p>Knowledge of things found in nature: name a leaf. They know that leaves grow on trees, fall from trees, can change colour and be different shapes.</p> <p>Apples are natural and are a fruit. They have seeds, flesh and a skin.</p>



<p>throughout the EYFS curriculum.</p>	<p>Senses - Describe what they see, hear and feel whilst outside.</p>		<p>Use all their senses in hands-on exploration of natural materials.</p> <p>Plant seeds and care for growing plants. Understand the key features of the life cycle of a plant and an animal.</p> <p>Begin to understand the need to respect and care for the natural environment and all living things.</p> <p>Understand the effect of changing seasons on the natural world around them</p>
	 <p>Light and Astronomy Seasonal Change</p>	 <p>Materials and their properties</p>	
<p>EYFS</p> <p>Books, practical resources and fieldwork experiences will thread throughout the</p>	<p>Space</p> <p>What is an astronaut, rocket, explore, space station, mission control, landing?</p> <p>Exploring locality in different seasons. Explore the natural world around them. Autumn is a season. The weather is how hot, cold, wet or dry it is. We measure time in days, weeks, months and seasons. The seasons change.</p>		<p>Material is what something is made from. Explore collections of materials with similar and/or different properties. Talk about the differences between materials and changes they notice. How some objects can bend, bend/stretch and snap others can't. Some things are strong because they do not bend. Some things are soft because they can bend and change shape.</p>



Science - Knowledge Learning and Skill Progression



<p>EYFS curriculum.</p>	<p>Winter is the season that comes after Autumn. In winter, the weather gets colder. We need to start wearing coats, hats, scarves and gloves.</p> <p>Spring, sorts of weather – clothing, animals, types of weather for the season.</p> <p>Spring is the season that comes after winter. The weather starts to get warmer and it is time when we often start to see baby animals.</p> <p>Summer is the season that comes after Spring. The weather usually gets warmer and we wear clothes to help keep us cool. It is important to wear sun cream to protect our skin from the sun.</p>	<p>States of Matter</p> <p>Ice melts and turn back into water when it warms up. Water freezes when it is very cold and turns into ice. Things can change when they are hot or cold. Baking - how ingredients change, which is the best material (testing). Moon rock cakes. Sometimes we cannot get the ingredients back- changed by heating.</p> <p>Rocks</p> <p>Explore collections of materials with similar and/or different properties. Talk about what they see, using a wide vocabulary. Different types of rocks/stones/pebbles</p>
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Disciplinary
knowledge -
Being a
Balderstone
Scientist

As a KS1 Balderstone Scientist I am skilled at:

- Observing closely
- Using my observations and ideas to suggest answers to question.
- Comparing and contrasting a variety of examples linked to KS1 PoS
- Asking simple questions
- Finding things out using secondary sources of information
- Using dance, drama or a visual aid to represent science in the real world
- Interacting effectively as part of a group
- Performing simple tests
- Using simple equipment and gathering data to help in answering my question
- Reporting findings, recording data, presenting findings
- Reading, spelling and pronouncing scientific vocabulary correctly linked to the relevant unit.
- Talking about what happened / what they noticed
- Talking about what they found out
- Beginning to spot when a method is not fair







	 Animals including Humans		 Plants	
	Humans	Animals		
Year 1 & 2	<p>I am able to <u>identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.</u></p> <p>I recognise that humans are animals.</p> <p>I can compare and describe differences in my own features (eye, hair, skin colour, etc.).</p> <p>I recognise that humans have many similarities.</p> <p>I (through provision, research and cross-curricular learning) have learnt the names of the main body parts (including head, neck, arms, elbows, legs, knees, face, ears, eyes, hair, mouth, teeth) through games, actions, songs and rhymes.</p>	<p>I can <u>identify and name a variety of common animals including some fish, some amphibians, some reptiles, some birds and some mammals.</u></p> <p>I can <u>identify and name a variety of common animals that are carnivores, herbivores and omnivores (i.e. according to what they eat).</u></p> <p>I can <u>describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, and including pets).</u></p> <p>I can <u>find out and describe how animals look different to one another.</u></p> <p>I can <u>group together animals according to their different features.</u></p> <p>I can <u>recognise similarities between animals: Structure - head, body, way of moving, senses, body covering, tail.</u></p>	<p>I can <u>identify and name a variety of common wild and garden plants, including deciduous and evergreen trees.</u></p> <p>I can <u>identify and describe the basic structure of a variety of common flowering plants, including trees (at least: flower, leaf, root, stem, trunk, seed, branch and petal).</u></p> <p>I use our local environment of Balderstone throughout the year to explore and answer questions about plants growing in our habitat (through local walks, Forest School, gardening)</p> <p>I observe the growth of flowers and vegetables that I/we have planted.</p> <p>I am familiar with common names of flowers, examples of deciduous and evergreen trees, and plant structures (including leaves,</p>	<p>I can <u>observe and describe how seeds and bulbs grow into mature plants.</u></p> <p>I can <u>find out and describe how plants need water, light and a suitable temperature to grow and stay healthy (and how changing these affects the plant)</u></p> <p>I know that plants are living and eventually die</p> <p>I use our local Balderstone environment throughout the year to observe how different plants grow.</p> <p>I have been introduced to the requirements of plants for germination, growth and survival, as well as the process of reproduction and growth in plants.</p> <p>I know that seeds and bulbs need water to grow but most do</p>



	<p>Balderstone scientists work scientifically by:</p> <p>compare and contrast animals (humans) at first hand or through videos and photographs. Using my senses to compare different textures, sounds and smells.</p>	<p>I know that animals have senses to explore the world around them and to help them to survive.</p> <p>I recognise that animals need to be treated with care and sensitivity to keep them alive and healthy.</p> <p>I know animals are alive; they move, feed, grow, use their senses and reproduce.</p> <p>Balderstone scientists work scientifically by:</p> <p>Compare and contrast animals at first hand or through videos and photographs. Describing how they identify and group them. Grouping animals according to what they eat. Using their senses.</p>	<p>flowers (blossom), petals, fruit, roots, bulb, seed, trunk, branches, stem).</p> <p>Balderstone scientists work scientifically by:</p> <p>Observing closely, perhaps using magnifying glasses. Comparing and contrasting familiar plants. Describing how they were able to identify and group them, and Drawing diagrams showing the parts of different plants including trees. Keeping records of how plants have changed over time, for example the leaves falling off trees and buds opening. Comparing and contrasting what they have found out about different plants.</p>	<p>not need light; seeds and bulbs have a store of food inside them.</p> <p>Balderstone scientists work scientifically by:</p> <p>Observing and recording, with some accuracy, the growth of a variety of plants as they change over time from a seed or bulb, or Observing similar plants at different stages of growth; Setting up a comparative test to show that plants need light and water to stay healthy</p>
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	 <p>Materials and their properties</p>	 <p>Light and Astronomy Seasonal Change</p>	 <p>Animals and Health How we grow and stay healthy</p>
<p>Year 1 & 2</p>	<p>I know how to <u>distinguish between an object and the material from which it is made.</u> <u>I can identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, rock, brick, paper and cardboard.</u></p> <p>I can <u>describe the simple physical properties of a variety of everyday materials.</u></p> <p>I can <u>compare and group together a variety of everyday materials on the basis of their simple physical properties.</u></p> <p>I can explore, name, discuss and raise and answer questions about everyday materials so that I become familiar with the names of materials and properties such as: hard/soft; stretchy/stiff; shiny/dull; rough/smooth; bendy/not bendy; flexible/rigid; waterproof/not waterproof; absorbent/not absorbent; opaque and transparent.</p> <p>I can explore and experiment with a wide variety of materials, including for example: brick, paper, fabrics, elastic, foil.</p> <p><u>I can identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, water, rock, paper and cardboard for particular uses</u></p>	<p>I know how to <u>observe and describe changes across the four seasons</u> (different seasons taught each term)</p> <p>I can <u>observe and describe weather associated with the seasons and how day length and temperature varies.</u></p> <p>I can observe and talk about changes in the weather and the seasons.</p> <p>I know that it is not safe to look directly at the Sun, even when wearing dark glasses.</p> <p>Balderstone scientists work scientifically by:</p> <p>Making tables and charts about the weather and Making displays of what happens in the world around them, including day length, as the seasons change.</p>	<p>I know that humans have offspring which grow into adults.</p> <p><u>I know and can describe the basic needs of humans, for survival (water, food and air).</u></p> <p><u>I can describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.</u></p> <p>I know that medicines can be useful when we are ill but they can be harmful if not used properly.</p> <p>I know that all living things reproduce and have babies/offspring/seeds</p> <p>I know that when humans grow into adults they go through the baby, toddler, child, teenager, adult stages.</p>



	<p><u>I have found out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching (applying a force)</u></p> <p>I know and can name some materials that can be found natural and know that others have to be made (natural, man-made, synthetic).</p> <p>I have found out about find out about people who have developed useful new materials; for example, John Dunlop, Charles Macintosh or John McAdam.</p> <p>Balderstone scientists work scientifically by:</p> <p>performing simple tests to explore questions, for example: 'What is the best material for an umbrella for Acorn the Squirrel? ...for lining a dog basket? ...for curtains in the Little Pigs' House? ...for a bookshelf? ...for a superhero cloak?'</p> <p>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);</p> <p>Observing closely,</p> <p>Identifying and classifying the uses of different materials, and</p> <p>Recording their observations.</p> <p>Thinking about unusual and creative uses for everyday materials.</p>	<p>Use data logging equipment to record temperatures/use data programs to display results</p>	<p>Balderstone scientists work scientifically by:</p> <p>Observing, through first-hand observation and measurement, how humans grow.</p> <p>Recording my findings using charts.</p> <p>Asking questions about what things animals [humans]. need for survival and what humans need to stay healthy and</p> <p>Suggesting ways to find answers to my questions.</p>
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Living things and their Habitats

Year 1 & 2

I notice that animals have offspring which grow into adults.

I can recognise growth in animals - egg, chick, chicken; egg, caterpillar, pupa, butterfly; spawn, tadpole, frog; lamb, sheep.

I can find out about and describe the basic needs of animals for survival (water, food and air).

I know how to explore and compare the differences between things that are living, dead, and things that have never been alive.

I can 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.

I am able to identify and name a variety of plants and animals in their habitats, including micro-habitats.

I can 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 know that different kinds of plants and animals live in different kinds of places.

I know (through outdoor learning and Forest school sessions) that there are different kinds of habitat near Balderstone school which need to be cared for (stream, hedgerow, field).

I know that habitats provide the preferred conditions for the animals/plants that live there (compare local habitats and less familiar examples).

I know how to observe living things in their habitats and how these change during different seasonal changes (linked to Earth in Space unit)

I know that all living things have certain characteristics that are essential for keeping them alive and healthy.

I know how to raise and answer questions about life processes that are common to all living things.



I know the difference between a 'habitat' (a natural environment or home of a variety of plants and animals) and 'micro-habitat' (a very small habitat, for example for woodlice under stones, logs or leaf litter).

I know why it is so important to look after the local environment because living things depend on each other, for example plants serving as a source of food and shelter for animals.

I can compare animals in familiar habitats with animals found in less familiar habitats, for example, on the seashore, in woodland, in the ocean, in the rainforest (linked to Geography unit of learning)

Balderstone scientists work scientifically by:

Observing, through video or first-hand observation and measurement, how different animals grow

Asking questions about what things animals need for survival **suggesting ways to find answers to their questions.**

Describing the main changes as young animal offspring grow into adults (at least: between egg and adult bird; between egg and adult insect; between baby and adult mammal)

Sorting and classifying things as to whether they are living, dead or were never alive.

Recording their findings using charts

Describing how they decided where to place things,

Exploring questions such as: 'Is a flame alive? Is a deciduous tree dead in winter?'

Talking about ways of answering their questions.

Constructing a simple food chain that includes humans (e.g. grass, cow, human);

Describing the conditions in different habitats and micro-habitats (under log, on stony path, under bushes);

Finding out how the conditions **affect** the number and type(s) of plants and animals that live there.



Disciplinary
knowledge -
Being a
Balderstone
Scientist

As a Lower KS2 Balderstone Scientist I am skilled at:

- Developing my own ideas and my understanding of the world around me.
- Comparing and contrasting a variety of examples linked to LKS2 PoS.
- Asking relevant questions.
- Finding things out using a wide range of secondary sources of information.
- Using dance, drama or a visual aid to represent science in the real world.
- Interacting effectively as part of a group.
- Making decisions about and setting up simple practical enquiries, comparative tests and fair tests.
- Making accurate measurements and gathering data.
- Reporting findings, recording data, presenting findings.
- Reading, spelling and pronouncing scientific vocabulary correctly linked to the relevant units.
- Describing my findings / results.
- Reporting on findings saying why something happened.
- Suggesting improvements for further tests.



Animals including Humans

	Animals including Humans		
	Health/Nutrition.	Skeletons & Movement	Digestion & Teeth
<p>Year 3 & 4</p>	<p>I know 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.</p> <p><u>I know that an adequate and varied diet is beneficial to health</u> (along with a good supply of air and clean water). I know that <u>regular and varied exercise from a variety of different activities is beneficial to health</u></p> <p>I know how to make informed choices about what I put onto and into my body (PSHE links).</p> <p>Balderstone scientists work scientifically by:</p> <p>Comparing and contrasting the diets of different animals (including their pets).</p>	<p><u>I can identify that humans and some other animals have skeletons and muscles for support, protection and movement.</u></p> <p>I can <u>identify animals (vertebrates) which have a skeleton which supports their body, aids movement & protects vital organs. I can name and locate the skull, backbone, ribs, bones for movement/limbs, pelvis</u> and am able to name some of the vital organs that are protected.</p> <p>I can identify animals without internal skeletons/backbones (invertebrates) and describe how they have adapted other ways to support themselves, move & protect their vital organs.</p> <p>I know how the skeletons of birds, mammals, fish, amphibians or reptiles are similar (backbone, ribs, skull, bones used for movement) and the differences in their skeletons.</p> <p>I know that muscles, which are attached to the skeleton, help animals move parts of their body.</p> <p>I can explore how humans grow bigger as they reach maturity by making comparisons linked to body proportions and skeleton growth - e.g. do people with longer legs have longer arm spans?</p>	<p>I can <u>describe the simple functions of the basic parts of the digestive system in humans.</u></p> <p>I can <u>identify the different types of teeth in humans and their simple functions.</u></p> <p>I can <u>construct and interpret a variety of food chains, identifying producers, predators and prey.</u></p> <p>I can describe how teeth and gums have to be cared for in order to keep them healthy.</p> <p>I have been introduced to the main body parts associated with the digestive system, <u>mouth, tongue, teeth, oesophagus, stomach and small and large intestine</u> and can explore questions that help me understand their special functions.</p>






Science - Knowledge Learning and Skill Progression



	<p>Decide ways of grouping them according to what they eat. Researching different food groups and how they keep us healthy. Designing meals based (Create / Invent/ Design) on what they find out.</p>	<p>I recognise that animals are alive; they move, feed, grow, use their senses and reproduce.</p> <p>I know the main body parts associated with the skeleton and muscles and how different parts of the body have special functions.</p> <p>Balderstone scientists work scientifically by:</p> <p>Identifying and grouping animals with and without skeletons. Observing and comparing their movement. Exploring ideas about what would happen if humans did not have skeletons.</p>	<p>Balderstone scientists work scientifically by:</p> <p>Comparing the teeth of carnivores and herbivores. Suggesting reasons for differences [grouping & classifying]. Finding out [testing and/or researching] what damages teeth and how to look after them. Drawing and discussing their ideas about the digestive system. Comparing them with models or images.</p>
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	 <p>Plants</p>	 <p>Forces & Magnets</p>
<p>Year 3 & 4</p>	<p>I can <u>identify, locate and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers.</u></p> <p>I can <u>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.</u></p> <p>I can <u>investigate the way in which water is transported within plants.</u></p> <p>I can <u>explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.</u></p> <p>I know that:</p> <ul style="list-style-type: none"> • Roots grow downwards and anchor the plant. • Water, taken in by the roots, goes up the stem to the leaves, flowers and fruit. • Nutrients (not food) are taken in through the roots. • Stems provide support and enable the plant to grow towards the light. • Plants make their own food in the leaves using energy from the sun. • Flowers attract insects to aid pollination. • Pollination is when pollen is transferred between plants by insects, birds, other animals and the wind. • Seeds are formed after the flowers are pollinated. • Many flowers produce fruits which protect the seed and/or aid seed dispersal. • Seed dispersal, by a variety of methods, helps ensure that new plants survive. 	<p>I can compare how some things move on different surfaces.</p> <p><u>I can notice that some forces need contact between two objects but magnetic forces can act at a distance.</u></p> <p><u>I can observe how magnets attract or repel each other and attract some materials and not others.</u></p> <p><u>I can 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.</u></p> <p><u>I can describe magnets as having two poles (like and unlike poles).</u></p> <p><u>I can predict whether two magnets will attract or repel each other, depending on which poles are facing.</u></p> <p>I can explore the behaviour and everyday uses of different magnets (bar, ring, shoe and button)</p> <p>Balderstone scientists work scientifically by:</p> <p>Comparing how different things move and grouping them. Raising questions and carrying out tests to find out how far things move on different surfaces. 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.</p>



- Plants need nutrients to grow healthily (either naturally from the soil or from fertiliser added to soil).

I know that every part has a job to do.

I can explore questions that focus on the role of the roots and stem in nutrition and support, leaves for nutrition and flowers for reproduction.

Balderstone scientists work scientifically by:

Comparing the effect of different factors on plant growth, for example the amount of light, the amount of fertiliser;

Discovering (**research and modelling**) 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.

Observing how water travels up the stem to the flowers.

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.



Materials and their properties

Rocks and Soils.

States of matter

Year 3 & 4

I can compare and group together different kinds of rocks on the basis of their appearance and simple physical properties.

I can describe in simple terms how fossils are formed when things that have lived are trapped within rock.

I can find out about the work of palaeontologists such as Mary Anning.

I recognise that soils are made from rocks and organic matter

I recognise that rocks and soils can feel and look different.

I know that rocks and soils can be different in different places/environments.

I can explore different kinds of rocks and soils, including those in the local environment.

Balderstone scientists work scientifically by:

Observing rocks, including those used in buildings and gravestones.

Exploring how and why they might have changed over time.

Using (equipment) a hand lens or microscope to help them.

I can compare and group materials together, according to whether they are solids, liquids or gases.

I can 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).

I can identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.

I know that:

- Solids, liquids and gases can be identified by their observable properties.
- Solids have a fixed size and shape (the size and shape can be changed but it remains the same after the action).
- Liquids can pour and take the shape of the container in which they are put.
- Liquids form a pool not a pile.
- Solids in the form of powders can pour as if they were liquids but make a pile not a pool.
- Gases fill the container in which they are put.
- Gases escape from an unsealed container.
- Gases can be made smaller by squeezing/pressure.
- Liquids and gases can flow.

I can explore a variety of everyday materials and develop simple descriptions of the states of matter (solids hold their shape; liquids form a pool not a pile; gases escape from an unsealed container).






Science - Knowledge Learning and Skill Progression






	<p>Identify and classify rocks according to whether they have grains or crystals, and whether they have fossils in them.</p> <p>Research and discuss the different kinds of living things whose fossils are found in sedimentary rock.</p> <p>Explore how fossils are formed.</p> <p>Explore different soils and ...</p> <p>Identify similarities and differences between them and <u>describe the composition of soil</u>.</p> <p>Investigate what happens when rocks are rubbed together (<u>classify according to hardness</u>) or what changes occur when they are in water.</p> <p>Raise and answer questions about the way soils are formed.</p>	<p>I can observe water as a solid, a liquid and a gas and note the changes to water when it is heated or cooled.</p> <p>Balderstone scientists work scientifically by:</p> <p>Grouping and classifying a variety of different materials.</p> <p>Exploring the effect of temperature on substances such as chocolate, butter, cream (for example, to make food such as chocolate crispy cakes).</p> <p>Researching the temperature at which materials change state, for example, when iron melts or when oxygen condenses into a liquid.</p> <p>Observing and recording evaporation over a period of time, such as a puddle in the playground or washing on a line.</p> <p>Investigating the effect of temperature on washing drying.</p> <p>Using data logging equipment to detect/measure and compare temperatures.</p>
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	 Light and Astronomy - Light, reflections and shadows	 Living things and their Habitats
<p>Year 3 & 4</p>	<p>I can recognise that I need light in order to see things and that dark is the absence of light.</p> <p>I can <u>notice that light is reflected from surfaces.</u></p> <p>I recognise that light from the sun can be dangerous and that there are ways to protect their eyes. I <u>recognise that shadows are formed when the light from a light source is blocked by a solid object.</u></p> <p>I can <u>find patterns in the way that the size of shadows can change.</u></p> <p>I can explore what happens when light reflects off a mirror or other reflective surfaces, helping me to answer questions about how light behaves.</p> <p>I have considered why it is important to protect their eyes from bright lights.</p> <p>I can <u>look for, and measure shadows and find out how they are formed and what might cause shadows to change.</u></p> <p>Balderstone scientists work scientifically by:</p> <p>Looking for patterns in what happens to shadows when the light source moves or the distance between the light source and the object changes.</p>	<p>I can <u>recognise that living things can be grouped in a variety of ways.</u></p> <p>I can <u>explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment.</u></p> <p>I can <u>recognise that environments can change and that this can sometimes pose dangers to living things.</u></p> <p>I can use and make identification keys for plants and animals.</p> <p>I can explore the local environment of Balderstone throughout the year to raise and answer questions that help me to identify and study plants and animals in their habitat.</p> <p>I can <u>identify</u> how the habitat changes throughout the year.</p> <p>I can explore possible ways of grouping a wide selection of living things that include animals and flowering plants and non-flowering plants.</p> <p>I can begin to put vertebrate animals into groups such as fish, amphibians, reptiles, birds, and mammals; and invertebrates into snails and slugs, worms, spiders, and insects.</p> <p>I can explore examples of human impact (both positive and negative) on environments, for example, the positive effects of nature reserves, ecologically planned parks or garden ponds, and the negative effects of population and development, litter or deforestation.</p> <p>Balderstone scientists work scientifically by:</p> <p>Using and making simple guides or keys [grouping & classifying] to explore and identify local plants and animals.</p> <p>Raising and answering questions based on their observations of animals and</p>



	what they have found out about other animals that they have researched .
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	 Sound	 Electricity
<p>Year 3 & 4</p>	<p>Vibrations</p> <p>I can <u>identify how sounds are made, associating some of them with something vibrating.</u></p> <p>I can <u>recognise that vibrations from sounds travel through a medium to the ear.</u></p> <p>I can <u>find patterns between the volume of a sound and the strength of the vibrations that produced it.</u></p> <p>I can <u>recognise that sounds get fainter as the distance from the sound source increases.</u></p> <p>I can <u>recognise that sounds can be made in a variety of ways (pluck, bang, shake, blow) using a variety of things (instruments, everyday materials, body).</u></p> <p>I can <u>explore the way sounds travel away from their source in all directions.</u></p> <p>I recognise that vibrations may not always be visible to the naked eye.</p> <p>Pitch</p> <p>I can <u>find patterns between the pitch of a sound and features of the object that produced it.</u></p> <p>I know that:</p> <ul style="list-style-type: none"> Sounds can be high or low pitched. 	<p>I can identify common appliances that run on electricity.</p> <p>I can <u>construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers.</u></p> <p>I can <u>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.</u></p> <p>I can <u>recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit.</u></p> <p>I can <u>recognise some common conductors and insulators, and associate metals with being good conductors.</u></p> <p>I know that:</p> <ul style="list-style-type: none"> Electricity can be dangerous. Electricity sources can be mains or battery. Batteries 'push' electricity round a circuit and can make bulbs, buzzers and motors work. Faults in circuits can be found by methodically testing connections.



	<ul style="list-style-type: none"> • The pitch of a sound can be altered. • Pitch can be altered either by changing the material, tension, thickness or length of vibrating objects or changing the length of a vibrating air column. <p>Muffling/blocking sounds</p> <p><u>I recognise that vibrations from sounds travel through a medium to the ear.</u></p> <p>I know that:</p> <ul style="list-style-type: none"> • Sounds are heard when they enter our ears. • Sounds can travel through solids, liquids and air/gas by making the materials vibrate. • Sound travel can be reduced by changing the material that the vibrations travel through. • Sound travel can be blocked. <p>Balderstone scientists work scientifically by:</p> <p>Finding patterns in the sounds that are made by different objects such as elastic bands of different thicknesses.</p> <p>Making [create/invent/design] and play their own instruments by using what they have found out about pitch and volume.</p>	<p>I can construct simple series circuits, trying different components, for example, bulbs, buzzers and motors, and including switches, and use my circuits to create simple devices.</p> <p>I can draw the circuit as a pictorial representation.</p> <p>Balderstone scientists work scientifically by:</p> <p>Observing/noticing 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>
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Disciplinary
knowledge -
Being a
Balderstone
Scientist

As an Upper KS2 Balderstone Scientist I am skilled at:

- Developing a deeper understanding of a wide range of scientific ideas and encountering more abstract ideas
- Comparing and contrasting a variety of examples linked to UKS2 PoS
- Asking my own questions about scientific phenomena
- Summarising research from a wide variety of sources and recognising that scientific ideas change and develop over time
- Using dance, drama or a visual aid to represent science in the real world
- Interacting effectively as part of a group
- Using different types of scientific enquiry making decisions about and explaining choices for testing
- Increasing complexity and increasing accuracy and precision
- Making my own decisions about the data to collect
- Reporting findings, recording data, presenting findings
- Reading, spelling and pronouncing scientific vocabulary correctly linked to the relevant units
- Looking for patterns analysing functions, relationships and interactions more systematically
- Drawing conclusions based on / supported by evidence
- Commenting on how reliable the data is



Animals including Humans.

Exercise, Health & Circulatory system

Human Life Cycles

Year 5 & 6

I can identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood.

I can recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function (in the long term and short term).

I can describe the ways in which nutrients and water are transported within animals, including humans.

I know that:

- The heart is a major organ and is made of muscle.
- The heart pumps blood around the body through vessels and this can be felt as a pulse.
- The heart pumps blood through the lungs in order to obtain a supply of oxygen.
- Blood carries oxygen/essential materials to different parts of the body.
- During exercise muscles need more oxygen so the heart beats faster and our breathing and pulse rates increase.

- Animals are alive; they move, feed, grow, use their senses, reproduce, breathe/respire and excrete.
- An adequate, varied and balanced diet is needed to help us grow and repair our bodies (proteins), provide us with energy (fats and carbohydrates) and maintain good health (vitamins and minerals).
- Tobacco, alcohol and other 'drugs' can be harmful.
- All medicines are drugs, not all drugs are medicines.

I can describe the changes as humans develop to old age.

I recognise that animals are alive; they move, feed, grow, use their senses, reproduce, breathe/respire and excrete.

I can draw a timeline to indicate stages in the growth and development of human and have found out about the changes experienced in puberty.

Balderstone scientists work scientifically by:

Researching the gestation periods other animals and **comparing** them with humans. By **finding out** and **recording** the length and mass of a baby as it grows.



Science - Knowledge Learning and Skill Progression



	<p>I have continued to learn about the main body parts and internal organs (skeletal, muscular and digestive system) to explore and answer questions that help me to understand how the circulatory system enables the body to function.</p> <p>I have learnt how to keep my body healthy and how my body might be damaged - including how some drugs and other substances can be harmful to the human body.</p> <p>Balderstone scientists work scientifically by:</p> <p>Exploring the work of scientists and Scientific research about the relationship between diet, exercise, drugs, lifestyle and health.</p> <p>Observing/Measuring changes to breathing, heart beat and or pulse rates after exercise.</p>	
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Living Things and their Habitats

	Living Things and their Habitats		
	Observing Life Cycles	Classification	Evolution and Inheritance
<p>Year 5 & 6</p>	<p>I can <u>describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird.</u></p> <p>I can <u>describe the life process of reproduction in some plants and animals.</u></p> <p>I can <u>name, locate and describe the functions of the main parts of reproductive system of plants (stigma, stamen, petal, sepal, pollen, ovary)</u></p> <p>I can observe, study and raise questions about my local environment of Balderstone throughout the year.</p> <p>I can observe life-cycle changes in a variety of living things, for example plants in the vegetable garden or flower border, and animals in our local environment.</p> <p>I have found out about different types of reproduction, including sexual and asexual reproduction in plants and sexual reproduction in animals.</p> <p>I have explored the work of the naturalist David Attenborough.</p>	<p>I can <u>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.</u></p> <p>I can give reasons for classifying plants and animals based on specific characteristics.</p> <p>I know that:</p> <ul style="list-style-type: none"> • Living things can be grouped into micro-organisms, plants and animals. • Vertebrates can be grouped as fish, amphibians, reptiles, birds and mammals. • Invertebrates can be grouped as snails and slugs, worms, spiders and insects. • Plants can be grouped as flowering plants (incl. trees and grasses) and non-flowering plants (such as ferns and mosses). <p>I know that broad groupings, such as micro-organisms, plants and animals can be subdivided.</p>	<p>I can <u>recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago.</u></p> <p>I can <u>recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents.</u></p> <p>I can <u>identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.</u></p> <p>I know that:</p> <ul style="list-style-type: none"> • characteristics are passed from parents to their offspring, for instance by considering different breeds of dogs, and what happens when, for example, labradors are crossed with poodles. • variation in offspring over time can make animals more or less able to survive in particular environments, for example by exploring how giraffes' necks got longer, or the development of insulating fur on the arctic fox.



	<p>Balderstone scientists work scientifically by:</p> <p>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).</p> <p>Asking pertinent questions.</p> <p>Suggesting reasons for similarities and differences [grouping and classifying].</p> <p>Comparing how different animals reproduce and grow.</p> <p>Exploring by growing new plants from different parts of the parent plant, for e.g., seeds, stem and root cuttings, tubers, bulbs.</p>	<p>I have observed that should classify animals into commonly found invertebrates (e.g. insects, spiders, snails, worms) and vertebrates (fish, amphibians, reptiles, birds and mammals).</p> <p>I can discuss reasons why living things are placed in one group and not another.</p> <p>I have found out about the significance of the work of scientists such as Carl Linnaeus, a pioneer of classification.</p> <p>Balderstone scientists work scientifically by:</p> <p><u>Using classification systems and keys.</u></p> <p>Identifying [grouping and classifying] some animals and plants in the immediate environment.</p> <p>Researching unfamiliar animals and plants from a broad range of other habitats and decide where they belong in the classification system [grouping and classifying].</p>	<p>I can explore how scientists such as Charles Darwin and Alfred Wallace developed their ideas on evolution.</p> <p>Balderstone scientists work scientifically by:</p> <p>Observing and raising questions about local animals and how they are adapted to the environment.</p> <p>Comparing how some living things adapt to survive in extreme conditions, e.g. cactuses, penguins and camels.</p> <p>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.</p>
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Materials and their properties

	Materials and their properties		
	Testing material properties.	Reversible changes.	Irreversible changes
<p>Year 5 & 6</p>	<p>I can <u>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.</u></p> <p>I can <u>give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic (advantages and disadvantages).</u></p> <p>I can compare a variety of materials and measure their effectiveness (e.g. hardness, strength, flexibility, solubility, transparency, thermal conductivity, electrical conductivity).</p> <p>Temperature and Thermal Insulation I know that:</p> <ul style="list-style-type: none"> • Heat always moves from hot to cold. • Some materials (insulators) are better at slowing down the movement of heat than others. • Objects/liquids will warm up or cool down until they reach the temperature of their surroundings. 	<p>I <u>know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution.</u></p> <p>I can <u>use my knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating.</u></p> <p>I can <u>demonstrate that dissolving, mixing and changes of state are reversible changes.</u></p> <p>I know that</p> <ul style="list-style-type: none"> • Changes can occur when different materials are mixed. • Some material changes can be reversed and some cannot. • Recognise that dissolving is a reversible change and <u>recognise everyday situations where dissolving occurs.</u> • Distinguish between melting and dissolving. • Mixtures of solids (of different particle size) can be separated by sieving. • Mixtures of solids and liquids can be separated by filtering if the solid is insoluble (un-dissolved). 	<p>I can <u>explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible,</u> including changes associated with burning, and the action of acid on bicarbonate of soda (producing a gas / fizzing).</p> <p>I can explore changes that are difficult to reverse, for example, burning, rusting and other reactions, for example vinegar with bicarbonate of soda.</p> <p>I recognise that chemists create new materials, for example Spencer Silver, who invented the glue for sticky notes or Ruth Benerito, who invented wrinkle-free cotton.</p> <p>Balderstone scientists work scientifically by:</p> <p>Observing and comparing the changes that take place, for example, when burning different materials or baking bread or cakes.</p>



	<p>I can explore and compare the properties of a broad range of materials and relating these to what I have learnt about magnetism in Year 3 and about electricity in Year 4.</p> <p>Balderstone scientists work scientifically by:</p> <p>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?'</p> <p>Compare materials in order to make a switch in a circuit.</p>	<ul style="list-style-type: none"> • Evaporation helps us separate soluble materials from water. • Changes to materials can happen at different rates (factors affecting dissolving, factors affecting evaporation - amount of liquid, temperature, wind speed, etc). • Freezing, melting and boiling changes can be reversed (revision from YR4). <p>I can explore reversible changes including evaporating, filtering, sieving, melting and dissolving, recognising that melting and dissolving are different processes.</p> <p>Balderstone scientists work scientifically by:</p> <p>Observing and comparing the changes that take place. <u>Recognising and describing everyday situations where dissolving occurs.</u> <u>Explaining how they know when a change is reversible</u></p>	<p>Researching and discussing how chemical changes have an impact on our lives, for example cooking. <u>Explain how they know when a change is reversible or irreversible</u></p>
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Light and Astronomy

Earth in Space

How light travels

Year 5 & 6

I can describe the movement of the Earth, and other planets, relative to the Sun and each other in the solar system.

I can describe the movement of the Moon relative to the Earth.

I can describe Sun/Earth/Moon as approximately spherical bodies.

I can use the idea of the Earth's rotation to explain day and night.

I know that:

- The Earth spins once around its own axis in 24 hours, giving day and night.
- The Earth orbits the Sun in one year.
- We can see the Moon because the Sun's light reflects off it.
- The Moon orbits the Earth in approximately 28 days and changes to the appearance of the moon are evidence of this.

I can use the Earth's movement in space to explain the apparent movement of the sun across the sky.

I know that:

- The Sun appears to move across the sky from East to West and this causes shadows to change during the day.
- Changes to shadow length over a day or changes to sunrise and sunset times over a year are evidence supporting the movement of the Earth.

I can recognise that light appears to travel in straight lines.

I can 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.

I can 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 (and represent this in simple diagrammatic form).

I can use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.



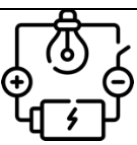
I have explored the way that light behaves, including light sources, reflection and shadows and talked about what happens and made predictions.

Balderstone scientists work scientifically by:



	<ul style="list-style-type: none"> • Sun is a star at the centre of our solar system and that it has eight planets: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune (Pluto was reclassified as a 'dwarf planet' in 2006). • A moon is a celestial body that orbits a planet (Earth has one moon; Jupiter has four large moons and numerous smaller ones). • I know that it is not safe to look directly at the Sun, even when wearing dark glasses. • I have explored the way that ideas about the solar system have developed, understanding how the geocentric model of the solar system gave way to the heliocentric model by considering the work of scientists such as Ptolemy, Alhazen and Copernicus. <p>Balderstone scientists work scientifically by:</p> <p>Comparing the time of day at different places on the Earth through internet links and direct communication.</p> <p>Creating simple models of the solar system.</p> <p>Constructing simple shadow clocks and sundials, calibrated to show midday and the start and end of the school day.</p> <p>Finding out why some people think that structures such as Stonehenge might have been used as astronomical clocks.</p>	<p>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).</p>
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	 Forces	 Electricity
<p>Year 5 & 6</p>	<p>I can <u>explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object.</u></p> <p>I can <u>identify the effects of air resistance, water resistance and friction that act between moving surfaces</u> (causing things to slow down).</p> <p>I can <u>recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.</u></p> <p><u>I know that:</u></p> <ul style="list-style-type: none"> • <u>There are different types of forces</u> (push, pull, <u>friction, air resistance, water resistance, magnetic forces, gravity</u>) <u>which have different effects on objects</u> • <u>Gravity can act without direct contact between the Earth and an object.</u> • Friction, air resistance and water resistance can be useful or unwanted. • The effects of friction, air resistance and water resistance can be reduced or increased for a preferred effect. • More than one force can act on an object simultaneously (either reinforcing or opposing each other). <p>I can explore falling objects and raise questions about the effects of air resistance.</p> <p>I can explore the effects of air resistance by observing how different objects such as parachutes and sycamore seeds fall.</p> <p>I can experience forces that make things begin to move, get faster or slow down.</p> <p>I can explore the effects of friction on movement and find out how it slows or stops moving objects, for example, by observing the effects of a brake on a bicycle wheel.</p>	<p>I can <u>associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit.</u></p> <p>I can <u>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.</u></p> <p>I can <u>use recognised symbols (at least: cells, wires, switches, bulbs, buzzers and motors) when representing a simple circuit in a diagram.</u></p> <p>I can <u>use/interpret circuit diagrams</u> to construct a variety of more complex circuits predicting whether they will 'work'.</p> <p>I know how to represent a simple circuit in a diagram using recognised symbols.</p> <p>I know the necessary precautions I need to take for working safely with electricity.</p> <p>Balderstone scientists work scientifically by:</p> <p>Systematically identifying [testing] the effect of changing one [thing] component at a time in a circuit.</p>











Science - Knowledge Learning and Skill Progression



	<p>I can explore the effects of levers, pulleys and simple machines on movement.</p> <p>I have found out how scientists such as Galileo Galilei and Isaac Newton helped to develop the theory of gravitation.</p> <p>Balderstone scientists work scientifically by:</p> <p>Exploring falling paper cones or cup-cake cases.</p> <p>Designing and making [exploring] a variety of parachutes.</p> <p>Carrying out fair tests to determine which designs are the most effective.</p> <p>Exploring resistance in water by making and testing boats of different shapes.</p> <p>Design and make [create/invent/design] artefacts that use simple levers, pulleys, gears and/or springs and explore their effects.</p>	<p>Designing and making [Create / Invent / Design] a set of traffic lights, a burglar alarm or some other useful circuit.</p>
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Substantive knowledge	
	Animals including humans
	Living things and their habitats
	Plants
	Materials
	Rocks
	Forces
	Electricity
	Sound






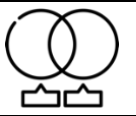




Science - Knowledge Learning and Skill Progression



	Light and Astronomy
	Evolution and Inheritance



Being a Balderstone Scientist (disciplinary knowledge)	
	Planning and Testing
	Using equipment & measures
	Communicating
	Considering results
	Exploring/observing
	Grouping and Classifying
	Questioning
	Research



Science - Knowledge Learning and Skill Progression



	Modelling
	Collaborating