

## Science Curriculum Plan

This document is designed to support the teaching of Science throughout school. It will demonstrate progression in teaching and ideas given as children move through school to develop their knowledge, skill and understanding of scientific concepts.

	EYFS	Y1	Y2	Y3	Y4	Y5	Y6
Programme of Study - Plants	<p>Understanding the World – The World</p> <ul style="list-style-type: none"> <li>❖ Early Learning Goal: Children know about similarities and differences in relation to places, objects, materials and living things. They talk about the features of their own immediate environment and how environments might vary from one another. They make observations of animals and plants and explain why some things occur, and talk about changes</li> </ul>	<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 different functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers</li> <li>❖ Explore the requirements of what plants need for a successful, healthy 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>	N/A	N/A	N/A
Working Scientifically – Observing Changes Over Time	<ul style="list-style-type: none"> <li>❖ Examine changes over time, e.g. bean diaries; children draw and label each stage of growth</li> </ul>	<ul style="list-style-type: none"> <li>❖ Observe and sketch the same tree once a month all year. Take photographs and write sentences to show how it changes</li> <li>❖ Create a dandelion timeline: <a href="http://www.jbprimaryscience.co.uk/dandelions">www.jbprimaryscience.co.uk/dandelions</a></li> </ul>	<ul style="list-style-type: none"> <li>❖ Plant a seed a day in a clear bag or pot where the seed can grow against the side to observe the sequence of how the seed germinates and the root, shoot, stem and leaf grow.</li> </ul>	<ul style="list-style-type: none"> <li>❖ Use food colouring to observe how water is transported in a range of plants, e.g. carnations, celery. How can we create a double colour carnation?</li> </ul>	N/A	N/A	N/A
Working Scientifically – Pattern Seeking	<ul style="list-style-type: none"> <li>❖ Encourage children to notice and discuss patterns around them,</li> </ul>	<ul style="list-style-type: none"> <li>❖ Find leaves that have the same pattern around the edge. What are the</li> </ul>	<ul style="list-style-type: none"> <li>❖ Observe different size seeds growing and see if there is a link between</li> </ul>	<ul style="list-style-type: none"> <li>❖ How are plant flowers the same? How are they different? What patterns</li> </ul>	N/A	N/A	N/A

	e.g. rubbings from different leaves and trees	number patterns on ladybirds? What are the patterns on flowers? Use leaves to print own pattern. Take children outdoors and ask them to use natural materials to make a pattern	the size of seed and time to germinate and the size of seed and size of plant. Observe seeds germinating to find out if there is a pattern in the way a seed germinates; do they all germinate in the same way every time?	can you see in the parts of the flower? Which parts are symmetrical? Is there a pattern in the amount of light a plant is given and how the plant grows, or the amount of fertiliser? E.g. the more sunlight a plant is given the taller it grows? What is the pattern in the measurements?			
Working Scientifically – Identifying and Classifying Things	❖ Ask open-ended questions encouraging children to think critically, e.g. “how can we sort...?” “what if...?”	❖ Children collect leaves from plants in the school grounds, garden or local park and sort them according to their own criteria e.g. colour, shape, size, holes  ❖ Children collect the same kind of leaves and identify the tree they belong to and then paint the shape of the tree and place the leaves on top	❖ Identify the plants in the school grounds or your school vegetable patch. Which plants do you think grow from seeds and which grow from bulbs?	❖ Collect different seeds from around the school grounds, garden or local park. Identify the seeds – which plant do they come from? Classify them according to how the seeds are dispersed, e.g. wind, water, animals, explosion, bouncing.=	N/A	N/A	N/A
Working Scientifically – Carrying Out Simple Comparative Tests  Working Scientifically – Carrying Out Fair Tests	❖ Comparative: plant two bean pots and only water one of them; children make predictions and compare what happens	❖ Comparative: put seeds into different types of material to grow and compare what happens  ❖ Fair: ask children to think about whether it is fair to put more material in one plant pot than another - encourage children to suggest how they could do it again and make it fair	❖ Comparative: grow seeds with and without water/light and compare what happens  ❖ Fair: ask children further questions about how much light and water should be used for it to be a fair test	❖ Comparative: compare plants grown with and without fertiliser  ❖ Fair: ask children e.g. which fertiliser is the best? What amount of fertiliser is best?	N/A	N/A	N/A
Working Scientifically – Finding Out Things Using Secondary Sources of Information	❖ Help children to find out about plants by talking to experts, examining photographs, leaflets and the internet	❖ Listen to a visitor showing and talking about plants in the school grounds, garden or local park  ❖ Paint picture of plant and label its parts	❖ From work on plants and also looking at seed packets, make your own seed packet with instructions to grow a seed that you know about	❖ Find out what the different parts of a plant are for using books or an internet site  ❖ Using found materials make a collage of a plant and put labels and captions explaining what	N/A	N/A	N/A

				<p>the different parts are and what they are for</p> <ul style="list-style-type: none"> <li>❖ Role play the life cycle of a plant from seed back to seed dispersal</li> </ul>			
<p>Living things and their habitats</p>	<p>Understanding the World – The World</p> <ul style="list-style-type: none"> <li>❖ Early Learning Goal: Children know about similarities and differences in relation to places, objects, materials and living things. They talk about the features of their own immediate environment and how environments might vary from one another. They make observations of animals and plants and explain why some things</li> </ul>	<p>N/A</p>	<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</li> </ul>	<p>N/A</p>	<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 processes 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 microorganisms, plants and animals</li> <li>❖ Give reasons for classifying plants and animals based on specific characteristics</li> </ul>

	occur, and talk about changes		<p>animals in their habitats, including microhabitats</p> <ul style="list-style-type: none"> <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>				
Working Scientifically – Observing Changes Over Time	<ul style="list-style-type: none"> <li>❖ Order caterpillars to look after in class and observe the journey of the lifecycle to a butterfly. Transfer the caterpillars into the butterfly net and release into the woodland area when ready</li> <li>❖ Children to photograph each stage</li> </ul>	N/A	<ul style="list-style-type: none"> <li>❖ Plant a range of plants which attract bees, butterflies and insects. Observe over time the insects which are attracted and how they are feeding from the plants.</li> </ul>	N/A	<ul style="list-style-type: none"> <li>❖ Plan and create a wildflower area. Make a key of the plants that grow there and research info including flowering time, to ensure you have wild flowers for most of the year. Take photos and create a calendar of wildflowers to show changes through the year</li> </ul>	<ul style="list-style-type: none"> <li>❖ Look after an animal from egg to adult, e.g. hatching and rearing chicks, butterflies etc. Observe and record changes. Research additional info, create a video or booklet to record changes over time for younger children to use</li> </ul>	<ul style="list-style-type: none"> <li>❖ Using observations create a set of different classification keys based on the same animals, e.g. eggs, young, hens, butterflies, frog and research about, for example, a swan, an adder, a mouse</li> </ul>
Working Scientifically – Pattern Seeking	<ul style="list-style-type: none"> <li>❖ Design, build and maintain minibeast hotel; what makes this a suitable environment? Search for minibeasts in different environments around school and compare conditions</li> <li>❖ Use correct terms so that, e.g. children will enjoy naming a chrysalis if the adult uses the correct name</li> </ul>	N/A	<ul style="list-style-type: none"> <li>❖ Search the different habitats in the school grounds (include tree, soil, hedge, fence, wall, under stones) for animals or evidence of animals, including birds, insects etc. Why do they live there? What do the different animals need in the different habitats to stay alive? What do the different animals have in common?</li> </ul>	N/A	<ul style="list-style-type: none"> <li>❖ Snail hunt; where are snails found in the school grounds? What is the relationship between the habitat and the number of snails? What is the reason for this? What happens if there are changes in the environment? How does the number of animals in a food chain change if one species' numbers change? E.g. what happens to ladybirds if there are a few aphids, or mice if the number of owls go up or down?</li> <li>❖ Challenge children to find as many different patterns as they can in plants and animals e.g. spirals, stripes, alternate, opposite, different kinds of symmetry e.g.</li> </ul>	<ul style="list-style-type: none"> <li>❖ Rearing chicks; is there a pattern in age and weight amongst the chick population? What is the pattern in the gestation period of animals and length and mass of body e.g. so small animals have shorter gestation periods?</li> <li>❖ Observe your own or class pet, record the different behaviour each day for a week or two. Is there a pattern in behaviour? Does the animal repeat its behaviour, for example, at the same time each day?</li> </ul>	

					bilateral/reflective (butterflies), rotational (flowers)		
Working Scientifically – Identifying and Classifying Things	<ul style="list-style-type: none"> <li>❖ Take a trip around the school, village and local park to identify the different habitats</li> <li>❖ Encourage children to express opinions on natural and built environments and give opportunities for them to hear different points of view on the quality of the environment</li> </ul>	N/A	❖	N/A	<ul style="list-style-type: none"> <li>❖ How many different habitats are there in your school grounds or local park?</li> <li>❖ Identify the plants and animals which live in each habitat</li> <li>❖ Classify the plants and animals, using a key, into groups such as insects, mammals, birds, grasses, ferns, mosses etc.</li> </ul>	<ul style="list-style-type: none"> <li>❖ Classify plants according to how they reproduce</li> <li>❖ Grow new plants using different parts of different plants</li> <li>❖ Explain how to propagate different plants by creating a gardening video, PowerPoint or radio broadcast</li> </ul>	<ul style="list-style-type: none"> <li>❖ Children make own classification keys to use with younger children to help explain why some plants or animals are placed in one group and not another</li> <li>❖ Children create classification keys based on plants and animals in the school grounds, garden or local park for children in other year groups to use</li> </ul>
Working Scientifically – Carrying Out Simple Comparative Tests	<ul style="list-style-type: none"> <li>❖ Comparative: In groups design, build and maintain minibeast hotels made out of a range of different materials</li> </ul>	N/A	❖	N/A	<ul style="list-style-type: none"> <li>❖ Comparative: put different bird food out to find which bird eats which food</li> </ul>	<ul style="list-style-type: none"> <li>❖ Comparative: children compare how different plants grow from root cuttings, tubers, bulbs etc.</li> </ul>	❖
Working Scientifically – Carrying Out Fair Tests	<ul style="list-style-type: none"> <li>❖ Children monitor and compare bug activity in each and think about what makes the most suitable environment</li> </ul>				<ul style="list-style-type: none"> <li>❖ Fair: children colour bread using food colouring – changing one thing, keeping others fair to find out which colours birds notice more than others</li> </ul>	<ul style="list-style-type: none"> <li>❖ Fair: children ask questions about what affects growing plants from root cuttings, e.g. rooting powder, soil type</li> </ul>	
Working Scientifically – Finding Out Things Using Secondary Sources of Information	<ul style="list-style-type: none"> <li>❖ Read stories that help children to make sense of different environments</li> </ul>	N/A	<ul style="list-style-type: none"> <li>❖ Children adopt a habitat in the school grounds, e.g. under a stone, and using observations and books find out about what the habitat is like, e.g. dark, light, damp, cool and which plants and animals live there</li> <li>❖ Children create a diagram of their habitat with information labels</li> </ul>	N/A	<ul style="list-style-type: none"> <li>❖ Children research using videos information about deforestation in, e.g. Borneo Indonesia and write a letter to a government explaining the problem and suggesting alternatives <a href="http://www.bbc.co.uk/education/clips/zxtc">www.bbc.co.uk/education/clips/zxtc</a></li> </ul>	<ul style="list-style-type: none"> <li>❖ Research the work of Jane Goodall and find out how she observed animals, e.g. regular, took photos, notes etc. Spend time regularly observing an animal e.g. birds visiting the school grounds. Use the same scientific approach as Jane Goodall. Role play/create a monologue which tells about her life and work</li> </ul>	<ul style="list-style-type: none"> <li>❖ Find out about the life of Linnaeus and create a leaflet about his life, work and why classification systems are important. Create a key for people to classify animals in your school grounds or local park as an example</li> </ul>

Animals including humans	<p>Understanding the World – The World</p> <ul style="list-style-type: none"> <li>❖ Early Learning Goal: Children know about similarities and differences in relation to places, objects, materials and living things. They talk about the features of their own immediate environment and how environments might vary from one another. They make observations of animals and plants and explain why some things occur, and talk about changes</li> </ul>	<ul style="list-style-type: none"> <li>❖ Identify and name a variety of common animal 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>
Working Scientifically – Observing Changes Over Time	<ul style="list-style-type: none"> <li>❖ Encourage children to talk to older family members, e.g. grandparents about different stages of their lives</li> <li>❖ Bring in a baby to provide stimulus for discussion about growth, ageing and the different life stages</li> </ul>	<ul style="list-style-type: none"> <li>❖ Use observations to sort set of toy animals into groups, beginning with children’s own criteria and then observable features such as legs, wings etc.</li> <li>❖ Move onto pets, farm animals and wild animals, then to sorting animals according to fish, birds, reptiles etc.</li> </ul>	<ul style="list-style-type: none"> <li>❖ Observe how frogspawn develops into tadpoles and then into frogs. Draw the different stages and note similarities and differences. Annotate the changes e.g. when gills appear, legs etc.</li> </ul>	<ul style="list-style-type: none"> <li>❖ Compare skeletons of different animals at different stages of their life cycle. E.g. humans, pets, farm animals, compare with wild animals such as giraffe, elephants, snakes. Make use of local museums and BBC Bitesize Clips online</li> </ul>	<ul style="list-style-type: none"> <li>❖ Children research how food is digested and then create their own way to model a sandwich being digested using everyday materials e.g. tights, piping to show how the food is changed from beginning to end of the digestive process</li> </ul>	<ul style="list-style-type: none"> <li>❖ Children collect photographs of humans at different stages of their life; baby to child, to teenager, to adult and to senior citizen. Ask children to compare changes, such as physical skills, hearing, appearance, activities, likes, dislikes, relationships and experiences</li> </ul>	<ul style="list-style-type: none"> <li>❖ Observe the impact of exercise of the body from increased breathing, sweating etc. Take pulse readings before exercise and time how long it takes to return to resting. Doing the same exercise every day for 2 weeks; what changes are there? Why may the readings have changed?</li> </ul>
Working Scientifically – Pattern Seeking	<ul style="list-style-type: none"> <li>❖ Bring in baby photographs and try and guess which child each photo belongs to</li> <li>❖ Do they look like their parents?</li> </ul>	<ul style="list-style-type: none"> <li>❖ What do different animals have in common? How do they differ? What is the pattern of shapes in a caterpillar, worm, spider? Create</li> </ul>	<ul style="list-style-type: none"> <li>❖ Do all offspring look like their parents? Find out how they grow; are the stages always the same? Is there a pattern?</li> </ul>	<ul style="list-style-type: none"> <li>❖ Compare skeletons between different animals including humans and look at size and shape. How does the number of bones differ between</li> </ul>	<ul style="list-style-type: none"> <li>❖ Find out about the number patterns associated with food chains</li> </ul>	<ul style="list-style-type: none"> <li>❖ How do skills change as people age? Try the ruler reaction test and record data – what is the pattern in your data and what conclusions can you</li> </ul>	<ul style="list-style-type: none"> <li>❖ Using a data logger heart monitor, find out how exercise changes the heart rate. What is the pattern in your data? What conclusions can you</li> </ul>

		their patterns using geometrical shapes		different animals? Survey children to find out who has broken a bone; what age, gender? Look for any patterns. Can conclusions be drawn?		draw? Watch <a href="http://www.youtube.com/watch?v=yn6WRm6TiPk">www.youtube.com/watch?v=yn6WRm6TiPk</a> and how you can do this safely with different people in school	draw? What happens to breathing during different kinds of exercise? Find out why this happens
Working Scientifically – Identifying and Classifying Things	❖ Think about how humans differ to other animals	❖ Group animals depending on what they eat	❖ Look at food packaging and group the food stuffs (including by food groups)	❖	❖	❖	❖ Group dogs according to characteristics
Working Scientifically – Carrying Out Simple Comparative Tests  Working Scientifically – Carrying Out Fair Tests	❖ Comparative: When thinking about what humans need to live a healthy life, during a P.E. lesson compare pulse rate of resting and straight after physical activity	❖	❖	❖	❖ Comparative: model tooth decay by placing a hard-boiled egg in its shell in vinegar, orange juice, water, coke etc. and compare what happens over, for example, 2 weeks  ❖ Fair: children investigate how the amount of juice in water affects tooth decay (boiled egg)	❖	❖ Comparative: children learn how to find pulse rate and calculate beats per minute – compare their own pulse rate before and after exercise with other members of their group to find whether pulse rate in humans is always the same  ❖ Fair: children carry out fair tests to find out the effect of exercise on pulse rate within their group
Working Scientifically – Finding Out Things Using Secondary Sources of Information	❖ Visit from health experts, e.g. Change for Life, to discuss how to live a healthy life  ❖ Write a letter to 'Grubby Graham' our very unhealthy friend explaining how he can improve his health	❖ Make a concertina book and on each page put an example of different kind of animal, e.g. fish, amphibian  ❖ Find out what the animal looks like and draw it, and find out something that you did not know about it and write a sentence about it	❖ Adopt an animal e.g. a chicken, frog, gerbil, class pet and find out using books what the animal needs to stay healthy and how it changes when it grows  ❖ Write a set of instructions on how to look after the animal for someone else to use	❖ Find out from posters about healthy meals and lifestyle, and then on a paper plate design your own healthy meal with things that you would like to eat or make your own poster	❖ Research using the internet and books how the digestive system works  ❖ Using recyclable materials create a model of the digestive system	❖ Research lifecycles of different animals and create a PowerPoint presentation with only 6 slides to explain how gestation periods differ from animal to animal and the links between gestation period and size	❖ Research using the internet and books how the human circulatory system works  ❖ Using recyclable materials create a model  ❖ Research early pioneers in heart transplants such as Christian Barnard and take part in a hot seating activity about his life and work

Materials/ Rocks/ States of Matter/ Evolution and Inheritance	<p>Understanding the World – The World</p> <ul style="list-style-type: none"> <li>❖ Early Learning Goal: Children know about similarities and differences in relation to places, objects, materials and living things. They talk about the features of their own immediate environment and how environments might vary</li> </ul>	<p>Everyday Materials</p> <ul style="list-style-type: none"> <li>❖ Distinguish between an object and the materials 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</li> </ul>	<p>Uses of everyday materials</p> <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</li> </ul>	<p>Rocks</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</li> </ul>	<p>States of matter</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</li> </ul>	<p>Properties and changes of materials</p> <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</li> </ul>	<p>Evolution and inheritance</p> <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</li> </ul>



	<p>from one another. They make observations of animals and plants and explain why some things occur, and talk about changes</p>	<p>materials</p> <ul style="list-style-type: none"> <li>❖ Compare and group together a variety of everyday materials on the basis of their simple physical properties</li> </ul>	<p>stretching</p>	<p>made from rocks and organic matter</p>	<ul style="list-style-type: none"> <li>❖ Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature</li> </ul>	<p>liquid to form a solution, and describe how to recover a substance from a solution</p> <ul style="list-style-type: none"> <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>	<p>and are not identical to their parents</p> <ul style="list-style-type: none"> <li>❖ Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution</li> </ul>
<p>Working Scientifically – Observing Changes Over Time</p>	<ul style="list-style-type: none"> <li>❖ Examine change over time and change that may be reversed, e.g. freezing and melting ice</li> <li>❖ Put large ice cubes into tuff spot tray and allow children to explore, e.g. blowing on, pouring water over the top – does this speed up the process?</li> </ul>	<ul style="list-style-type: none"> <li>❖ Make coat shapes from different materials e.g. plastic, paper, card, fabric and fix to a fence and observe how they change over a period of time</li> </ul>	<ul style="list-style-type: none"> <li>❖ Give children a range of materials and challenge them to think of a new way to use it, e.g. a plastic cup, a cardboard box</li> </ul>	<ul style="list-style-type: none"> <li>❖ Children add water to different kinds of soil e.g. sandy, clay, compost until it can't hold any more water (saturated), then leave to dry out – photograph and describe changes</li> </ul>	<ul style="list-style-type: none"> <li>❖ (Egg allergy dependant). Children observe changes between raw eggs and cooked eggs, e.g. soft and hard boiled, poached, scrambled, omelette – and taste similarities and differences</li> </ul>	<ul style="list-style-type: none"> <li>❖ What do children know about rust? Which materials rust? Why do they rust? Test nails in different liquids e.g. water, distilled water, cooking oil, tea. How do the nails change? Do they all rust/take the same time to rust? How could you stop or slow down rusting? How can you communicate the changes</li> </ul>	<ul style="list-style-type: none"> <li>❖</li> </ul>

						and scientific explanation?	
Working Scientifically – Pattern Seeking	<ul style="list-style-type: none"> <li>❖ Examine a range of different materials, e.g. wool, paper, card, slate, rocks, cotton wool etc. using magnifying glasses</li> <li>❖ Record children comparing, grouping and describing similarities and differences</li> <li>❖ Help children notice and discuss patterns around them, e.g. rubbings from bricks, wood, grates etc.</li> </ul>	<ul style="list-style-type: none"> <li>❖ Use a microscope to look at different materials. What patterns do you see? Do waterproof materials have big holes? Do materials that let water through have holes?</li> </ul>	<ul style="list-style-type: none"> <li>❖ Which materials can be squashed/ stretched? Find out what the pattern is when you continue to add sand to a sock. Each time more sand is added measure the length of the sock. What is the pattern in your results? Write down your conclusion, e.g. the more sand added, the more it stretches and the longer it gets</li> </ul>	<ul style="list-style-type: none"> <li>❖ What kind of patterns can you see in different rocks? Sketch the patterns. Use a hand magnifying glass or observe patterns using a microscope</li> </ul>	<ul style="list-style-type: none"> <li>❖ Do different solids melt differently at different temperatures? Do they melt in different ways? Do different kinds of chocolate melt in the same amount of time?</li> </ul>	<ul style="list-style-type: none"> <li>❖ What is the pattern in the data when you test 'How the amount of water affects the time it takes for sugar to dissolve?'</li> </ul>	
Working Scientifically – Identifying and Classifying Things	<ul style="list-style-type: none"> <li>❖ Challenge children to design and build homes for toy animals both indoors and outside; which materials are best suited to which environment and why?</li> </ul>	<ul style="list-style-type: none"> <li>❖ Give the children a shopping basket and a label or card with a material stuck to it (e.g. paper, wood plastic) and ask the children to identify the material then go around the classroom and/or outside to collect as many items made from the same material as they can</li> </ul>	<ul style="list-style-type: none"> <li>❖ Give children access to both natural and made materials and challenge them to make a shelter for a Lego person, doll or teddy bear to keep them dry outside</li> <li>❖ Children photograph the shelter and identify materials used and why</li> </ul>	<ul style="list-style-type: none"> <li>❖ Children group rocks according to their own criteria, e.g. colour, speckled, texture, hardness</li> <li>❖ Do the rocks bubble when they are put in water?</li> <li>❖ Do rocks make a mark on paper?</li> </ul>	<ul style="list-style-type: none"> <li>❖ Take children outside into the school grounds to take photographs of different examples of solids, liquids or gases, e.g. leaf, twig, concrete, metal, puddle, snail, grass</li> </ul>	<ul style="list-style-type: none"> <li>❖ Carry out a materials trail around the school to identify and classify materials according to their properties e.g. plug – opaque, electrical conductor and insulator, window pane – transparent, wooden fence post – hard, opaque, insulator</li> </ul>	
Working Scientifically – Carrying Out Simple Comparative Tests  Working Scientifically – Carrying Out Fair Tests	<ul style="list-style-type: none"> <li>❖ Comparative: children compare different shelters used to protect toy animals; which are most suited to which environment and why?</li> </ul>	<ul style="list-style-type: none"> <li>❖ Comparative: children compare different materials to find out which is waterproof and which is not by taking them outside and then using a watering can to pour water over them</li> <li>❖ Fair: children apply what they know about waterproof materials choosing, for example, 3 from a selection to test to find out which is the best for Teddy's Raincoat</li> </ul>	<ul style="list-style-type: none"> <li>❖ Comparative: children test a range of different materials to find out which hold the most water, e.g. different types of paper towel/cloth</li> <li>❖ Fair: fair test different materials, e.g. which is the most stretchy, strongest, most absorbent?</li> </ul>	<ul style="list-style-type: none"> <li>❖ Comparative: children compare rocks and soil samples to find out if their soils or rocks can hold water, by placing them in a tank of water, weighing them before and after, watching bubbles emerge. Supporting children's understanding of porous and not porous</li> <li>❖ Fair: children carry out a fair test to find out which soil lets water through the fastest. Children keep amount of soil and water the same, change the type</li> </ul>	<ul style="list-style-type: none"> <li>❖ Comparative: children compare different substances poured on ice to find out if they speed up or slow down melting, e.g. salt, coffee, grit, soil</li> <li>❖ Fair: children plan a fair test to find out how does salt affect the melting point of ice? (Us data logging – temperature probes)</li> </ul>	<ul style="list-style-type: none"> <li>❖ Comparative: children compare vinegar and other substances such as cooking oil, water, coke on bicarbonate of soda to find out what happens</li> <li>❖ Fair: children carry out a fair test to find out how the amount of vinegar/bicarb affects the reaction. Children are challenged to find a way of measuring the reaction</li> </ul>	

				of soil and measure amount of water through the soils in a set time – children could graph results			
<p>Working Scientifically – Finding Out Things Using Secondary Sources of Information</p>	<ul style="list-style-type: none"> <li>❖ Use the internet to find out about where different materials come from and/or how they are made</li> </ul>	<ul style="list-style-type: none"> <li>❖ Carry out interactive activities to apply and find out about <u>materials</u> e.g. <a href="http://www.bbc.co.uk/schools/scienceclips/ages/5_6/sorting_using_materials.shtml">www.bbc.co.uk/schools/scienceclips/ages/5_6/sorting_using_materials.shtml</a></li> </ul>	<ul style="list-style-type: none"> <li>❖ Find out using books as many different things that can be made from glass, wood, metal etc. and make lists</li> <li>❖ At home ask people about John Dunlop, Charles Macintosh and John McAdam. Bring two things you have found out about one or more of them to share</li> </ul>	<ul style="list-style-type: none"> <li>❖ Some rocks are used by people every day; find out how chalk is used, sand, coal, diamonds, clay. Choose one and tell the story from rock to home or rock to shop</li> <li>❖ Find out about different types of fossils/dinosaurs and fossils to display with information cards</li> </ul>	<ul style="list-style-type: none"> <li>❖ Children watch the video about chocolate being made, make notes, and then create their own video making, for example, their own chocolate bars or crispy cakes, explaining changes of state and other interesting information</li> <li>❖ <a href="http://stem.org.uk/rxbrv">stem.org.uk/rxbrv</a></li> </ul>	<ul style="list-style-type: none"> <li>❖ Research how burning occurs and then fire-fighters put out different kinds of fires and the science behind it</li> <li>❖ Create an escape map in the case of a fire in your school or home</li> <li>❖ Find out the fire precautions taken in your school</li> </ul>	<ul style="list-style-type: none"> <li>❖ Research how scientists and farmers create different plants, e.g. bigger tomatoes, new fruits and vegetables. Using their knowledge of inheritance, children create own new fruit or vegetable, what inherited characteristics will it have – flavour, colour, juiciness, crispness, longer lasting etc.? What will you call it? Write a newspaper article about it</li> </ul>

Seasonal Changes/ Light/ Sound/ Earth and Space	<p>Understanding the World – The World</p> <ul style="list-style-type: none"> <li>❖ Early Learning Goal: Children know about similarities and differences in relation to places, objects, materials and living things. They talk about the features of their own immediate environment and how environments might vary from one another. They make observations of animals and plants and explain why some things occur, and talk about changes</li> </ul>	<p>Seasonal changes</p> <ul style="list-style-type: none"> <li>❖ Observe changes across the four seasons</li> <li>❖ Observe and describe weather associated with the seasons and how day length varies</li> </ul>	N/A	<p>Light</p> <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 a solid object</li> <li>❖ Find patterns in the way that the size of shadows change</li> </ul>	<p>Sound</p> <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>	<p>Earth and space</p> <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>	<p>Light</p> <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>
Working Scientifically – Observing Changes Over Time	<ul style="list-style-type: none"> <li>❖ Observe our trees in the woodland area at different points during the year and photograph to compare changes</li> </ul>	<ul style="list-style-type: none"> <li>❖ Observe and record changes in a tree over the year. Observe how the length of day changes and how it affects what we do. Record (or research) sunrise and sunset times. Record (using photography) the position of the sun at noon during the year, how does it change?</li> </ul>	N/A	<ul style="list-style-type: none"> <li>❖ How do shadows change over a day? Draw around a shadow on the playground every hour using different coloured chalks. How has the size and shape of the shadow changed? Why do you think that this happens? Take photographs. Is this the same in winter as it is in summer?</li> </ul>	<ul style="list-style-type: none"> <li>❖ How do voices change as people age? Record voices of babies, toddlers, primary children, adults, older people. What do you notice? Take photos of the people and make a match the voice game</li> </ul>	<ul style="list-style-type: none"> <li>❖ Model and explain day and night to show changes over 24 hours. Keep a 'phases of the Moon over a lunar month' diary</li> </ul>	<ul style="list-style-type: none"> <li>❖ Observe how colours change on bubbles. Do the colours stay the same for the life of a bubble?</li> </ul>
Working Scientifically – Pattern Seeking	<ul style="list-style-type: none"> <li>❖ Make a season Big Book to be completed by the</li> </ul>	<ul style="list-style-type: none"> <li>❖ Observe the weather and link clouds/ rainfall and</li> </ul>	N/A	<ul style="list-style-type: none"> <li>❖ How can you change the size of shadows? What</li> </ul>	<ul style="list-style-type: none"> <li>❖ Compare how different sounds are made. Do</li> </ul>	<ul style="list-style-type: none"> <li>❖ Measure shadows over the course of a day. What</li> </ul>	<ul style="list-style-type: none"> <li>❖ Find out how using a mirror to reflect light can</li> </ul>

	<p>end of the school year. Look at how our clothing changes linked with the weather type etc.</p>	<p>temperature with time of year. Look at how the length of day changes – is there a pattern? Record (or research) sunrise and sunset times. Record (using photography) the position of the sun at noon during the year; how does that affect temperature? What kind of changes are there in the school grounds/ garden/ local park? What things stay the same and what changes e.g. birds</p>		<p>are the patterns in your data e.g. the closer the light source is to the teddy bear, the ... the shadow</p>	<p>different types of vibration lead to particular types of sound? Is there a pattern, for example, the bigger the vibration the louder the sound? Use data loggers to record how loud or quiet a sound is</p>	<p>is the pattern in the data? Find a new object and using those patterns predict where the shadow will move during the day. Mark prediction using chalk. How accurate was prediction? Compare orbit v rotation, distance v temperature of planets; what is the pattern? Using that pattern, if you discovered a new planet between two planets or beyond the last planet in our solar system what do you think the planet would be like?</p>	<p>change the angle of the ray of light. What is the pattern? Use what you know about pattern to make a light maze. Watch <a href="http://www.youtube.com/watch?v=4TK2VLj_61c">www.youtube.com/watch?v=4TK2VLj_61c</a></p>
<p>Working Scientifically – Identifying and Classifying Things</p>	<ul style="list-style-type: none"> <li>❖ Sorting different types of plants, e.g. bluebells, sunflower, Christmas tree, and different types of animal/minibeast, e.g. robin, bee, butterfly into seasonal categories of which we might see at what point in the year</li> </ul>	<ul style="list-style-type: none"> <li>❖ Make a seasonal change class Big Book which includes children grouping and identifying plants which are deciduous/evergreen</li> <li>❖ Group animals according to whether they hibernate during winter</li> <li>❖ Sort fabrics into those which keep us warm/cool during the summer</li> </ul>	<p>N/A</p>	<ul style="list-style-type: none"> <li>❖ Children make a collection of materials that reflect light</li> </ul>	<ul style="list-style-type: none"> <li>❖ Children classify objects or musical instruments according to how the sound is made e.g. shake, blow, hit, pluck</li> </ul>	<ul style="list-style-type: none"> <li>❖ Children identify the different planets in the solar system according to their physical characteristics</li> <li>❖ Children create their own mnemonic to identify, in order, the planets in our solar system</li> </ul>	
<p>Working Scientifically – Carrying Out Simple Comparative Tests</p> <p>Working Scientifically – Carrying Out Fair Tests</p>	<ul style="list-style-type: none"> <li>❖ Encourage children to think about the seasonal weather change and to compare materials to find out which are the most suitable to be used as coats during each season</li> </ul>	<ul style="list-style-type: none"> <li>❖ Comparative: children compare different materials to find out which are waterproof, move in the wind etc.</li> <li>❖ Fair: children make flags using different materials but same amount of fabric, shape etc. and decide which one is best, e.g. moves in the same way as leaves on tree</li> </ul>	<p>N/A</p>	<ul style="list-style-type: none"> <li>❖ Comparative: children go into a dark room or a dark area and using a torch compare which materials they can see</li> <li>❖ Fair: what makes a difference to how easily you can be seen in the dark? Children test different coloured fabric to find out which is seen best in the dark or reflective material – which is the best of keeping safe when</li> </ul>	<ul style="list-style-type: none"> <li>❖ Comparative: children try on different ear phones and mufflers comparing which they think keeps sounds away from their ears</li> <li>❖ Fair: children carry out a fair test to find out which material is the best sound insulator. Children use a sound data logger</li> </ul>	<ul style="list-style-type: none"> <li>❖ Comparative: children are given a space mission to design and build a vehicle that will protect your Eggstronaut from the dangers of landing on a planet. The objective is for the Eggstronaut to survive the fall without a crack <a href="http://www.nationalstemcentre.org.uk/elibrary/resource/218/eggnaut">www.nationalstemcentre.org.uk/elibrary/resource/218/eggnaut</a></li> <li>❖ Fair: children fair test elements of the landing</li> </ul>	<ul style="list-style-type: none"> <li>❖ Comparative: why do footballers have more than one shadow when playing a floodlit game? Children explore with torches and Lego people. Compare how many shadows they can make for one person</li> <li>❖ Fair: how does the angle of the ray of light affect the size of the shadow</li> </ul>

				walking or cycling in the dark?		craft and Eggstronaut space suite	
Working Scientifically – Finding Out Things Using Secondary Sources of Information	<ul style="list-style-type: none"> <li>Use fiction and non-fiction books to learn about the 4 seasons and to think about activities that may take place during each</li> </ul>	<ul style="list-style-type: none"> <li>Watch a video about changing seasons and discuss findings</li> </ul>	N/A	<ul style="list-style-type: none"> <li>Sunglasses are used to protect eyes from the sun. Many people wear glasses for protection at work; find out who they are, what kind of glasses they wear and why?</li> <li>Create a book in the shape of a pair of glasses to record findings</li> </ul>	<ul style="list-style-type: none"> <li>Find out about a musical instrument from a different country; how is it made and what sounds does it make? Can we make our own?</li> <li>When it is finished play the instrument and explain how it works</li> </ul>	<ul style="list-style-type: none"> <li>Become an expert in a planet, moon, sun, star etc. As a home – school activity, research to find out as much as you can by using books, internet etc.</li> <li>Take place in a hot seating activity in class</li> </ul>	<ul style="list-style-type: none"> <li>Find out who invented, for example, telescope, periscope, microscope and apply your subject knowledge on how the equipment works</li> <li>Make own telescope or periscope and create a 2 minute video presentation</li> </ul>
Forces and Magnets/ Electricity	<p>Understanding the World – The World</p> <ul style="list-style-type: none"> <li>Early Learning Goal: Children know about similarities and differences in relation to places, objects, materials and living things. They talk about the features of their own immediate environment and how environments might vary from one another. They make observations of</li> </ul>	N/A	N/A	<p>Forces and magnets</p> <ul style="list-style-type: none"> <li>Compare how things move on different surfaces</li> <li>Notice that some forces need contact between two 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</li> </ul>	<p>Electricity</p> <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</li> </ul>	<p>Forces</p> <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</li> </ul>	<p>Electricity</p> <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> </ul>

	animals and plants and explain why some things occur, and talk about changes			<p>together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials</p> <ul style="list-style-type: none"> <li>❖ Describe magnets as having two poles</li> <li>❖ Predict whether two magnets will attract or repel each other, depending on which poles are facing</li> </ul>	<p>the lamp is part of a complete loop with a battery</p> <ul style="list-style-type: none"> <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>	<p>levers, pulleys and gears, allow a smaller force to have a greater effect</p>	<ul style="list-style-type: none"> <li>❖ Use recognised symbols when representing a simple circuit in a diagram</li> </ul>
Working Scientifically – Observing Changes Over Time	N/A	N/A	N/A	❖	❖ How does the movement of a motor or brightness of a bulb change over time if left on? Is it the same with different batteries?	❖	❖
Working Scientifically – Pattern Seeking	N/A	N/A	N/A	❖ Using iron filings in a sealed transparent container, what patterns can you see when you put a magnet near the iron filing?	❖ Make a pattern of lights for a celebration tree using cells, wires, bulbs and switches	❖ Build a trebuchet and find the pattern in the data when you change the angle of the trebuchet, angle of launch and distance	❖ What is the sequence in traffic lights? Design a set of working traffic lights using switches which model the sequence of changes in traffic lights on roads
Working Scientifically – Identifying and Classifying Things	N/A	N/A	N/A	❖ Children sort objects into magnetic and non-magnetic and use the appropriate objects to create a magnet man on a metal tin	❖ Sort conductors and insulators by setting up a circuit and placing different conductors and insulators in the circuit to see if the bulb lights	❖ Children identify forces in action using an interactive game <a href="http://www.topmarks.co.uk/interactive.aspx?cat=67">www.topmarks.co.uk/interactive.aspx?cat=67</a>	❖
Working Scientifically – Carrying Out Simple Comparative Tests  Working Scientifically – Carrying Out Fair Tests	N/A	N/A	N/A	<ul style="list-style-type: none"> <li>❖ Comparative: children compare how many paper clips different magnets pick up</li> <li>❖ Fair: children investigate fair test to find out which is the strongest magnet and measure, e.g. using a ruler and moving a magnet towards a paper clip, pulling weights</li> </ul>	<ul style="list-style-type: none"> <li>❖ Comparative: compare how changing the number of bulbs or batteries in the circuit changes the brightness of the bulbs</li> <li>❖ Fair:</li> </ul>	<ul style="list-style-type: none"> <li>❖ Comparative: blowing different shaped boats down a length of guttering on the playground and comparing how they move through the water</li> <li>❖ Fair: carry out fair test using repeated readings to find out which shape boat is the fastest, which</li> </ul>	❖

						sail for a boat is the fastest, how does the size of the sail affect the speed, how does the position of the sail affect the speed etc.	
Working Scientifically – Finding Out Things Using Secondary Sources of Information	N/A	N/A	N/A	<ul style="list-style-type: none"> <li>❖ Find out how magnets are made and how they are used in daily life</li> <li>❖ Create a strip cartoon recording of what you have found out</li> </ul>	<ul style="list-style-type: none"> <li>❖ Research famous scientists such as Volta, Franklin, Faraday or Edison</li> <li>❖ Write a play or create a newspaper article on the work of one of the scientists</li> </ul>	<ul style="list-style-type: none"> <li>❖ Find out how leavers and pulleys were used by the Egyptians</li> </ul>	<ul style="list-style-type: none"> <li>❖ Research how a burglar alarm works and then create your own for someone to buy</li> <li>❖ Produce instructions, a box and advert</li> </ul>