



	Working Scientifically	Biology	Chemistry	Physics
Year 1	<ul style="list-style-type: none"> I can use, and spell correctly, appropriate scientific vocabulary With help, I can ask some simple questions about the world around me I am beginning to understand that simple scientific questions can be answered in different ways (e.g. observing changes over time; noticing patterns; noticing relationships; asking people questions/looking for answers in books/internet (secondary sources)) With support I can carry out an observation (enquiry), observing closely, using simple equipment (hand lenses, egg timers) With support I can perform simple tests using simple equipment I am beginning to identify and classify objects by a given criteria (comparing/ sorting/grouping) With help, I am beginning to gather and record data (pictograms/bar charts) to help me answer my questions using simple scientific language With support I can talk about my observations (data) and ideas and I am beginning to use these to suggest answers to my questions 	<p><u>Plants</u></p> <ul style="list-style-type: none"> I can identify and name common wild and garden plants I am beginning to identify deciduous and evergreen varieties of trees I can identify the basic structure of flowering plants and trees (leaves, flowers (blossom), petals, fruit, roots, bulb, seed, trunk, branches, stem) <p><u>Animals (including humans)</u></p> <ul style="list-style-type: none"> I can identify, describe, name and group some common animals (fish, amphibians, reptiles, birds and mammals) I can describe and compare the structure of a variety of animals including pets (fish, amphibians, reptiles, birds and mammals) I can identify, name and group animals as carnivores, herbivores or omnivores I can identify, name, draw and label the basic parts of the human body that relate to the senses 	<p><u>Everyday Materials</u></p> <ul style="list-style-type: none"> I can distinguish between an object and the material from which it is made (e.g. spoon – metal/plastic/wood; wood – oak/pine/teak) I can identify and name a variety of everyday materials (wood, plastic, glass, metal, water, rock) I can describe the simple physical properties of everyday materials using some scientific words (e.g. hard/soft, stretchy/stiff, shiny/dull, rough/smooth, bendy/not bendy, waterproof/not waterproof, absorbent/not absorbent, opaque/transparent) I can independently compare and group together a variety of everyday materials by their simple physical properties 	<p><u>Seasonal Changes</u></p> <ul style="list-style-type: none"> I can observe how the world changes across the four seasons (Autumn, Winter, Spring, Summer) I can describe some physical changes in the environment across the four seasons (e.g. leaves falling, buds on trees, flowers develop, fruits form) I can demonstrate knowledge of a wider range of weather associated with each season e.g. winds/showers/storms/frost/drought) I can demonstrate an understanding of how the length of day varies across the four seasons



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Y e a r 2	<ul style="list-style-type: none"> I can use, and spell correctly, appropriate scientific vocabulary I can ask simple questions about the world around me I understand that simple scientific questions can be answered in different ways (e.g. observing changes over time; noticing patterns; noticing relationships; asking questions (of people and secondary sources e.g. books, computers)) I can carry out an observation (enquiry), observing closely, using simple equipment (hand lenses, egg timers) I can perform simple tests using simple equipment I can identify and classify objects by a range of different criteria (comparing/sorting/grouping) With help, I can gather and record data (pictograms/bar charts) to help me answer my questions using simple scientific language I can talk about my observations (data) and ideas and use these to suggest answers to my questions 	<p>Plants</p> <ul style="list-style-type: none"> I can describe how seeds and bulbs grow into mature plants (germination, growth and survival) I can demonstrate an understanding of what plants need to grow and stay healthy, including light, water and a suitable temperature <p>Living Things and Their Habitats</p> <ul style="list-style-type: none"> I can explore and compare living and dead things, as well as things that have never been alive I can explain my understanding of what habitats and microhabitats are (e.g. seashore, woodland, ocean, rainforest/ under log, on path, under bush) I can identify that most living things live in habitats to which they are suited I can describe how different habitats provide for the basic needs of different animals and plants I can demonstrate my understanding of how plants and animals in a habitat rely/depend on one another I can identify and name a variety of plants and animals specific to a habitat, including micro-habitats I can describe how animals obtain their food from plants and animals, using a simple food chain (e.g. grass, cow, human) I can identify and name different sources of food in a simple food chain <p>Animals (including humans)</p> <ul style="list-style-type: none"> I can demonstrate my understanding that animals, including humans, have offspring that grow into adults (e.g. egg, chick, chicken; egg, caterpillar, pupae, butterfly; spawn, tadpole, frog; lamb, sheep; baby, toddler, child, teenager, adult) I can explain the basic needs of animals, including humans, for survival (e.g. water, food, air) I can describe the importance for humans of hygiene and exercise, including eating the right amounts of different types of food 	<p>Everyday Materials</p> <ul style="list-style-type: none"> I can identify and compare the uses of a variety of everyday materials (wood, metal, plastic, glass, brick, rock, paper and cardboard) I can explore the suitability of everyday materials for particular uses based on their properties, including creative use of materials (e.g. John Dunlop - tyres, Charles Macintosh – water-proofing, John McAdam - tarmac) I can describe how the shape of solids made from some materials can be changed by applying a force (e.g. bending, squashing, twisting, stretching) 	



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Year 3	<ul style="list-style-type: none"> I can use, and spell correctly, appropriate scientific vocabulary With support, I am beginning to ask relevant questions about the world around me and discuss which type of scientific enquiry I could use to answer them With support, I am beginning to use different types of scientific enquiries (observing over time, identifying/classifying, pattern seeking, research, fair testing) to answer scientific questions I am beginning to recognise when a simple fair test is necessary; talk about criteria for grouping/sorting/classifying; use simple keys I am beginning to help to set up a simple practical enquiry, comparative test or fair test I am beginning to help to decide what systematic and careful observations/ measurements should be taken accurately in standard units (using equipment including thermometers and data loggers) I am beginning to help to decide how to gather, record, classify and present data in a variety of ways to help me answer questions I am beginning to record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables I am beginning to report the results/conclusions of my enquiries (through the use of oral and written explanations, displays or presentations as appropriate for the audience), looking for differences, changes or patterns With support, I am beginning to use results to draw simple conclusions, make predictions for new values, suggest improvements to an enquiry and raise further questions With support, I am beginning to recognise when and how secondary sources might help me answer questions or support my findings 	<p>Plants</p> <ul style="list-style-type: none"> I can describe the functions associated with different parts of flowering plants e.g. roots – water/ support, stem/trunk - support, leaves – nutrition and flowers – reproduction I can describe the requirements of plants for life and growth (air, light, water, nutrients from soil, room to grow) and can compare the effect of these factors on plant growth (e.g. amount of fertiliser), exploring how these vary from plant to plant I can investigate the way water is transported in plants (e.g. use dye to show transport methods in celery/carnations) I can explore the part that flowers play in the life cycle of flowering plants (including pollination, seed formation and seed dispersal) <p>Animals (including humans)</p> <ul style="list-style-type: none"> I can explain that animals need the right types and amounts of nutrition to be healthy (carbohydrate, protein, lipid and trace elements) e.g. design a healthy meal I can explain that animals cannot make their own food and their nutrition comes from what they eat I can explain that humans and some animals have skeletons and muscles for support, protection and movement I can identify, observe, group and compare the movement of vertebrates and invertebrates I can explore what would happen if humans did not have skeletons 	<p>Rocks</p> <ul style="list-style-type: none"> I can compare and group rocks based on their appearance or physical properties (e.g. classify rocks by observing grains/crystals) I can investigate what happens when different rocks are rubbed together (scratch testing to compare or identify different rocks) or what changes occur when they are in water I am beginning to use and understand words related to rocks (e.g. sedimentary, igneous, and metamorphic) I can describe how fossils are formed when things that have lived are trapped within rocks I can explain that soils are made from rocks and organic materials I can investigate the differences and similarities between different soils and compare these to the soils in my local environment 	<p>Light</p> <ul style="list-style-type: none"> I can explain that we need light to see things and that dark is the absence of light I can describe how light is reflected from surfaces I can explain that the sun is a natural light source and can be dangerous to look at, so know how to protect my eyes I can describe how a shadow is formed when light from a light source is blocked by a solid (opaque) object I can find patterns in the way the size of a shadow changes (e.g. when the light source moves or the distance between the light source and object changes) <p>Forces and Magnets</p> <ul style="list-style-type: none"> I can investigate/compare how objects move on different surfaces (gather/record data) I can explain that some forces (e.g. push and pull) need direct contact between two objects I can explain that magnetic forces do not require direct contact - but act at a distance I can explore the strength of different magnets – comparing this in a fair way I can observe that magnets attract or repel each other and can describe how they attract some materials and not others I can explain that magnets have two poles I can predict whether two magnets will attract or repel each other depending on which poles are facing I can investigate how the properties of magnets make them useful in everyday items and suggest creative uses for magnets



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Y e a r 4	<ul style="list-style-type: none"> I can use, and spell correctly, appropriate scientific vocabulary With support, I can ask relevant questions about the world around me and discuss which type of scientific enquiry I could use to answer them With support, I can use different types of scientific enquiries (observing over time, identifying/classifying, pattern seeking, research, fair testing) to answer scientific questions I can recognise when a simple fair test is necessary; talk about criteria for grouping/sorting/classifying; use simple keys I can help to set up a simple practical enquiry, comparative test or fair test I can help to decide what systematic and careful observations/ measurements should be taken accurately in standard units (using equipment including thermometers and data loggers) I can help to decide how to gather, record, classify and present data in a variety of ways to help me answer questions I can record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables I can report the results/conclusions of my enquiries (through the use of oral and written explanations, displays or presentations as appropriate for the audience), looking for differences, changes or patterns With support, I can use results to draw simple conclusions, make predictions for new values, suggest improvements to an enquiry and raise further questions With support, I can recognise when and how secondary sources might help me answer questions or support my findings 	<p><u>Living Things and Their Habitats</u></p> <ul style="list-style-type: none"> I can explain that living things (animals (vertebrates – fish, amphibians, reptiles, birds, mammals: invertebrates – snails, slugs, worms, spiders, insects), flowering plants (including grasses) and non-flowering plants (including ferns and mosses) can be grouped in different ways I can explore and use classification keys to help group, identify and name a variety of living things in my local and wider environment I recognise that environments can change and that this can pose dangers to living things I can describe the positive (e.g. nature reserves, parks, garden ponds) and negative (e.g. population growth, development, litter, deforestation) impact of humans on environments/habitats/microhabitats <p><u>Animals (including humans)</u></p> <ul style="list-style-type: none"> I can describe the function of basic parts of the digestive system in humans I can identify and describe the function of the different types of teeth in humans I can construct and interpret a variety of food chains that include producers, predators and prey I can identify producers, predators and prey in a food chain 	<p><u>States of Matter</u></p> <ul style="list-style-type: none"> I can compare and group materials together according to whether they are solids, liquids or gases I can explain that some materials change state when they are heated or cooled I can give a simple description of the states of matter (solid – holds its shape, liquid – forms a pool not a pile, gas – escapes from an unsealed container) I can measure or research the temperature in degrees Celsius (°C) when materials (including water) change state - when this is not a chemical change – and describe the changes I can describe the part played by evaporation and condensation in the water cycle I can explain the link between the rate of evaporation and temperature (e.g. investigate evaporation of a puddle on playground/washing on line or effect of temperature on rate of washing drying/snowman melting) 	<p><u>Sound</u></p> <ul style="list-style-type: none"> I can identify how sounds are made and associate some sounds with something vibrating I can explain that sound vibrations travel through a medium (solid, liquid and gas) to my ear I can explain the patterns between the pitch of a sound and the features of the object that produces it (e.g. different sized saucepan lids, different thicknesses of elastic bands – relate to musical instruments) I can explain the pattern between the volume of a sound and the strength of the vibration that produces it I can describe how sounds get fainter as the distance from the sound source increases I can investigate which kind of material provides the best insulation against sound <p><u>Electricity</u></p> <ul style="list-style-type: none"> I can identify common appliances that run on electricity I can construct a simple series electrical circuit and identify and name the basic parts (cells, wires, bulbs, switches, buzzers) using pictorial representations to represent the components I can identify whether or not a lamp will light in a simple series circuit (needs to be a complete loop between lamp and battery) I can explain that a switch opens and closes a circuit and associate this with whether or not a lamp will light in a simple series circuit I can identify some common conductors and insulators and associate metals as good conductors



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Year 5	<ul style="list-style-type: none"> I can use and spell correctly appropriate scientific vocabulary I am beginning to select and plan the most appropriate type of scientific enquiry to answer a question I am beginning to explain which variables need to be controlled, where necessary, in a test (fair or comparative) and why I am beginning to choose and take measurements, using a range of scientific equipment, with increasing accuracy and precision I am beginning to recognise when it is necessary to take repeat measurements in an enquiry and do so, to increase the accuracy of my results I am beginning to record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, bar graphs and line graphs I am beginning to use fair tests to make predictions I am beginning to use my predictions to set up further comparative and fair tests I am beginning to report and present my findings from enquiries, including conclusions, causal relationships and explanations or results, in oral and written forms, including displays or other presentations I am beginning to identify scientific evidence that has been used to support or refute ideas/arguments and begin to separate fact from opinion in secondary research sources 	<p><u>Living Things and Their Habitats</u></p> <ul style="list-style-type: none"> I can describe the differences in the life cycle of a mammal, an amphibian, an insect and a bird I can describe the process of reproduction in some plants (sexual and asexual reproduction) I can explain how new plants can grow from different parts of the parent plant (e.g. seeds, stem/root cuttings, tubers, bulbs) I can describe and compare the sexual reproduction process in some animals I can explain the work of famous naturalists and animal behaviourists (e.g. David Attenborough/Jane Goodall) <p><u>Animals (including humans)</u></p> <ul style="list-style-type: none"> I can describe the physical changes as humans develop into old age I can explain the changes to a human that occur during puberty I can identify the gestation period of some animals and compare them with humans 	<p><u>Properties and Changes of Materials</u></p> <ul style="list-style-type: none"> I can compare and group everyday materials on the basis of their properties including their hardness, solubility, transparency, conductivity (electrical and thermal) and response to magnets I can use evidence from comparative and fair tests to suggest uses for everyday materials including metals, wood and plastic (e.g. Which material will make a warm jacket or stop ice cream melting?) I can investigate how chemists create new materials e.g. Spencer Silver, Ruth Benito I can explain that some materials dissolve in liquid to form a solution Can explain why dissolving is different to melting I can recover a substance from a solution I can apply my knowledge of solids, liquids and gases (Y4) to decide how mixtures can be separated by filtering, sieving or evaporating I can demonstrate that dissolving, mixing and changes of state are reversible I can explain that some changes result in the formation of new materials and these are not usually reversible: also known as irreversible or chemical changes (e.g. changes associated with burning; rusting; the action of acid on bicarbonate of soda) 	<p><u>Earth and Space</u></p> <ul style="list-style-type: none"> I can describe the movement of the Earth, and other planets, relative to the Sun in the solar system (Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune) I can explain how the ideas about the solar system have been developed by Ptolemy, Alhazen, Copernicus (geocentric to the heliocentric model) I can create an accurate model of the solar system I can describe the movement of the Moon (a celestial body) in relation to the Earth I can describe the Sun, Earth and Moon as approximately spherical bodies I can use my understanding of how Earth rotates as it orbits the Sun to explain day and night (e.g. create a sundial that tells the time/Stonehenge) <p><u>Forces</u></p> <ul style="list-style-type: none"> I can explain that an unsupported object will fall towards the Earth because of the force of gravity acting between the Earth and the falling object I can identify the effects of air resistance, water resistance and friction, that act between moving surfaces (e.g. investigate the effect of air resistance on falling objects – e.g. parachutes, sycamore seeds; the effect of water resistance by making and testing oats of different shapes; the effect of friction to slow or stop moving objects such as bikes) I can explain how some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect (e.g. investigating the effect of these on movement in simple machines) I can describe how Galileo Galilei and Isaac Newton helped to develop the theory of gravitation



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Year 6	<ul style="list-style-type: none"> I can use and spell correctly appropriate scientific vocabulary I can select and plan the most appropriate type of scientific enquiry to answer a question I can explain which variables need to be controlled, where necessary, in a test (fair or comparative) and why I can choose and take measurements, using a range of scientific equipment, with increasing accuracy and precision I can recognise when it is necessary to take repeat measurements in an enquiry and do so, to increase the accuracy of my results I can record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, bar graphs and line graphs I can use fair tests to make predictions I can use my predictions to set up further comparative and fair tests I can report and present my findings from enquiries, including conclusions, causal relationships and explanations or results, in oral and written forms, including displays or other presentations I can identify scientific evidence that has been used to support or refute ideas/arguments and begin to separate fact from opinion in secondary research sources 	<p><u>Living Things and Their Habitats</u></p> <ul style="list-style-type: none"> I can describe how Carl Linnaeus developed the idea that living things can be classified into broad groups (micro-organisms, plants and animals) according to common observable characteristics I can describe how broad classification groupings such as animals can be sub-divided based on similarities and differences (vertebrates and invertebrates) I can use direct observation to classify animals into sub-groups including vertebrates (insects, spiders, snails, worms) and vertebrates (reptiles, fish, amphibians, birds and mammals) and can create a key to show this I can give reasons for classifying plants and animals into a specific group based on specific characteristics and use a classification system for unknown plants/animals <p><u>Animals (including humans)</u></p> <ul style="list-style-type: none"> I can identify and name the main parts of the human circulatory system I can describe the function of the heart, blood vessels and blood I can explain the impact of diet, exercise, drugs and lifestyle choices on the way my body functions I can describe the ways in which nutrients and water are transported within animals, including humans <p><u>Evolution and Inheritance</u></p> <ul style="list-style-type: none"> I can explain how living things have changed over time (e.g. different dog breeds) I can explain how fossils provide information about living things that inhabited the Earth millions of years ago and how this developed our understanding of evolution I can explain that living things produce offspring of the same kind, but these vary and are not identical to their parents I can explain how variation can make an animal more or less able to survive in a particular environment (e.g. exploring how the giraffes neck got longer, or the development of insulating fur on the arctic fox) I can describe how animals and plants (cactuses, penguins, camels) have adapted to their environment and that adaption (two feet v four feet; long v short beak; gills v lungs; bright flowers) may lead to evolution I can explain how scientists developed our understanding of evolution (e.g. Mary Anning, Charles Darwin or Alfred Wallace) 		<p><u>Light</u></p> <ul style="list-style-type: none"> I can explain that light appears to travel in straight lines I can explain that objects are seen because they give out or reflect light into the eye I can describe how humans see objects (light travels from light sources to objects and then to our eyes) I can explain why shadows have the same shape as the objects that cast them (light travels in straight lines) I am beginning to understand light further (e.g. by investigating colours on soap bubbles, rainbows, objects looking bent in water, coloured filters) <p><u>Electricity</u></p> <ul style="list-style-type: none"> I can explain why the volume of a buzzer or brightness of a lamp, depends on the number and voltage of cells used in the circuit I can compare and give reasons for variations in how components function (brightness of bulbs/loudness of buzzers/ on/off position of switches) I can use recognised symbols when representing a simple circuit in a diagram (switches, bulbs, buzzers, motors) I can use my understanding to build a circuit that performs a useful function (e.g. drive a tank, create light for a tank (WWI topic))



	<p><u>The Five Types of Scientific Enquiry</u></p> <p>Observing over time – children observe or measure how one variable changes over time</p> <p>Identifying and Classifying – children identify features or tests that help them distinguish between different things</p> <p>Pattern seeking – children observe and record phenomena, carry out surveys or collect data from secondary sources and then identify relationships between data in their findings</p> <p>Research – children use secondary sources of evidence</p> <p>Fair Testing – children identify the effect of changing one variable on another whilst attempting to keep other variables constant</p>			
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