

nishkamprimaryschool

birmingham

Science Progression of Knowledge & Skills

| | Reception Science Knowledge and Skills |
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| Personal, Social and Emotional Development | <u>NST EYFS Curriculum:</u> Show some understanding that exercise, eating and sleeping habits and hygiene can affect health. <u>Early Learning Goal:</u> Manage their own basic hygiene and personal needs, including dressing, going to the toilet and understanding the im |
| Understanding the World | NST EYFS Curriculum: • Explore the natural world around them. • Describe what they see, hear and feel whilst outside. • Understand the effect of changing seasons on the natural world around them. • Recognise some environments that are different to the one in which they live. Early Learning Goal: • Explore the natural world around them, making observations and drawing pictures of animals and plants. • Know some similarities and differences between the natural world around them and contrasting environments, or been read in class. • Understand some important processes and changes in the natural world around them, including the seasons and |

mportance of healthy food choices.

s, drawing on their experiences and what has and changing states of matter.

Science – Animals, Including Humans

| | Year I Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
|---|--|--|---|---|---|
| _ | ask simple questions and recognising that they can be answered in different ways observe closely, using simple equipment perform simple tests identify and classifying use their observations and ideas to suggest answers to questions gather and record data to help in answering questions. | asking relevant questions and using dianswer them setting up simple practical enquiries, or making systematic and careful observaccurate measurements using standarincluding thermometers and data logging gathering, recording, classifying and prin answering questions recording findings using simple scientidiagrams, keys, bar charts, and tables reporting on findings from enquiries, in displays or presentations of results and using results to draw simple conclusion suggest improvements and raise furthere identifying differences, similarities or chand processes using straightforward scientific evident | comparative and fair tests vations and, where appropriate, taking ird units, using a range of equipment, gers presenting data in a variety of ways to help ific language, drawings, labelled cluding oral and written explanations, a conclusions ns, make predictions for new values, er questions hanges related to simple scientific ideas | planning different types of scientific energeognising and controlling variables taking measurements, using a range accuracy and precision, taking repect recording data and results of increasing and labels, classification keys, tables, susing test results to make predictions reporting and presenting findings from relationships and explanations of and written forms such as displays and oth Identifying scientific evidence that hat arguments. | where necessary of scientific equipment, with increasing at readings when appropriate ng complexity using scientific diagrams scatter graphs, bar and line graphs to set up further comparative and fair tests n enquiries, including conclusions, causal degree of trust in results, in oral and er presentations |
| | Know that we can ask questions about the world and that when we observe the world to answer these questions, this is science Know that we can use magnifying glasses to observe objects closely Know that we can test our questions to see if they are true Know that objects can be identified or sorted into groups based on their observable properties Know that we can write down numbers and words or draw pictures to record what we find | Know that we can test our questic Know that objects can be identified observable properties | e questions, this is science g glasses to observe objects closely | Know that in a fair test one thing is alter thing that may change as a result is mother conditions are kept the same Know how to use a range of equipment thermometers, data loggers, rulers and Know how to draw bar charts; how to information to the diagram; how to use table; how to draw a classification key an independent variable in a two-way table Know – with structured guidance - how up including an introduction, a list of edetailing of results and a conclusion Know how to precis a scientific enquiry what was found in a scientific enquiry what was found in a scientific enquiry. Know that scientific enquiries can sugprove whether a prediction is true Know that scientific enquiries, makeep conditions as consistent as possi Know that the conclusions of scientific where results can be clarified or external provement of the scientific enquiries and by the scientific enquiries are limited (and measuring equipment) and by the scientific enquiries are limited (and the scientific enquiries or scientific enquiries) and that repeating enquiries are limited (and measuring equipment) and by the scientific enquiries are limited (and the scientific enquiries) and by the scientific enquiries are limited (and the scientific enquiries) and by the scientific enquiries are limited (and the scientific enquiries) and by the scientific enduiries are limited (and the scientific enduiries) are limited (and the scientific enduiries) are limited (and the scientific enduiries). | ans that will be tested in a scientific enquiry ered (independent variable) and one heasured (dependent variable) while all ent to measure accurately, including d stopwatches label a diagram using lines to connect be a coloured key how to draw a neat y; how to show the relationship between y table; and how to label specific results in w to write a simple scientific enquiry write- equipment, a numbered method, a y write-up into a brief oral discussion of gest relationships, but that they do not he extent to which conditions can vary heasurements and taking measures to ble can improve an enquiry c enquiries can lead to further questions, ided to different contexts (e.g. effect of his work with other plants / different types from the findings of other scientists of observations that has been tested to an explanation that has not yet been |

| Cnowledge | Unit split into two Animals – Half a term. •Know that a trout is an example of an amphibian; a lizard is an example of a bird; a rabbit and a human are examples of a mammal •Know that herbivorous animals eats plants; a carnivorous animal eats other animals and plants •Know that a cat is an example of a carnivore; that a rabbit is an example of a herbivore; know that many humans are examples of omnivores (though not vegetarians) •Know that fish, amphibians, reptiles, birds and mammals are similar in that they have internal skeletons and organs; these are known as vertebrates, which means they are animals that have a backbone •Know that fish are different in having gills so that they can breathe underwater and scaly skin •Know that reptiles are different in that they begin their lives with gills but then develop lungs and breath on land •Know that reptiles are different to other animals in that they have feathers and wings •Know that mammals are different to other animals in that they have feathers and wings •Know that feet, legs, arms, hands, torso, head, skin, ears, eyes, nose, mouth and tongue are part so the body and identify them •Know that eyes are associated with sight, ears with sound, nose with smell, tongue with taste and skin with touch. | Know that animals including humans, produce offspring that grow into adults. Know that animals, including humans, need food, water and air to survive Know the basic food groups: fruit and vegetables, carbohydrates, protein, dairy, fat and sugary foods Know that more than half of our diet should be made up of carbohydrates, fruit and vegetables Know that fats and sugary foods should be eaten rarely and in small amounts Know that keeping clean, including washing and brushing teeth, is an important part of staying healthy | Know that proteins are good for growth, carbohydrates for energy and fruit and vegetables provide vitamins and minerals which help keep us healthy (e.g. calcium for healthy bones and teeth) Know that getting the right amount of each food group (including over half of the diet made up of fruit, vegetables and carbohydrates) is called a balanced diet Know that lack of a nutrient can cause ill health. Know that excess of a food group can cause ill health, such as tooth decay due to excess sugar Know that excess fat from fatty foods such as butter and cheese - and created in the body from excess calories - builds up in the body and can cause obesity Know that excess body fat can lead to heart disease and increases the strain on joints and growing bones Know that some animals (such as insects) have an exoskeleton - a solid covering on the outside of their body Know that many invertebrates (such as earthworms and slugs) have water held inside by muscles which act like a skeleton Know that some animals dup of support for muscles and protect the body; for example, the ribcage protects the vital organs in the human body Know that muscles can only contract, so they must be arranged in pairs in the body so that as one contracts the other loosens | Know that food passes through the body with the nutrients being extracted and the waste products excreted, and that this process is called digestion Know that the process of digestion involves breaking complex foodstuffs into simpler building blocks that can be absorbed by the body Know that the process of digestion begins with food being chewed in the mouth by the teeth and saliva added Know that a human has three types of teeth – incisors, canines and molars – and that these each perform different functions Know that children develop an initial set of teeth which are gradually replaced between the ages of 6 and 12 Know that food is squeezed down the esophagus towards the stomach in a wave-like action called peristalsis Know that further enzymes and bile break down the food further as it moves through the duodenum toward the small intestine Know that the large intestine adds more enzymes and then absorbs the nutrients Know that undigested food is stored in the rectum before being excreted through a muscle called the anus Know that an animal that is eaten by another is called prey, and that an animal that eats other animals is called a predator Know that the first consumer in a food chain is called a primary consumer, the second is called a secondary consumer and abore in a later is called a primary consumer the arrows in a food |
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| | | | | secondary consumer and above it is |

Progression of K

•Know that the life cycle of a living thing is a series of stages of

development starting with a fertilized egg in animals or a seed in many plants •Know that in most mammals (e.g. dogs) a fertilized egg develops in the womb into an embryo and is then born and fed on milk before it is weaned onto the food that is adapted to eat; it then develops to maturity in a period called adolescence after which it can reproduce and the cycle can begin

•Know that in amphibians (e.g. frogs) a fertilized egg develops into an embryo and then hatches into a tadpole; the tadpole develops adult characteristics, metamorphoses into the adult form after which it can reproduce and the cycle can begin

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again

again

•Know that in many insects (e.g. butterflies) a fertilized egg develops into wingless feeding form called a larva (caterpillar); the larva feeds then later becomes a pupa (chrysalis) with a protective cocoon; inside this cocoon, the pupa metamorphoses into the adult butterfly after which it can reproduce and the cycle can begin

•Know that in birds (e.g. robins) a fertilized egg hatches in a nest (a hatchling) and is fed by its parents until it is ready to fly (i.e. becomes a fledgling); it then leaves the nest and grows into an adult after which it can reproduce and the cycle can begin

•Know that humans go through stages of development; they begin as fertilized eggs and then develop into embryos before developing into babies; once they are born, these newborn babies become infants (roughly 2 months to 2 years) then into young children (roughly 2-12 years old); children develop into adults during adolescence (roughly 12-16 years old) at which age they become physically capable of reproduction; as adults develop into old age (roughly 55+ years old) they experience changes in their body which require them to move more carefully and rest more frequently

•Know that the heart and lungs are organs protected by the ribcage

•Know that blood travels around the body transporting nutrients that have been absorbed into the blood stream from digestion; blood also carries oxygen around the body which is used to power the body; this use of oxygen to create energy is called respiration

•Know that the heart beats, pumping blood around the body and that blood vessels carry the blood; arteries carry blood away from the heart; veins carry blood towards the heart; capillaries are tiny blood vessels that connect arteries and veins

•Know that the heart is composed of four chambers: two atria and two ventricles; the aorta is the largest artery in the body and most major arteries branch off from it

•Know that when we exercise, our heart beats more frequently so that the oxygen that is used around the body can be replenished; it returns to a resting heart rate afterwards; fitter people tend to have lower resting heart rates

•Know that drugs are chemicals that have an impact on the natural chemicals in a person's; know that drugs can be harmful or helpful, depending on what they are and how they are used; know that all drugs can be harmful if overused

•Know that paracetamol and aspirin are examples of drugs that can be helpful as a painkiller

•Know that cannabis and cocaine are examples of illegal drugs that can have serious negative effects

•Know that alcohol and tobacco are examples of drugs that are legal to adults but that can have serious negative effects, such as liver disease and lung disease, respectively Science – Materials

| | | Year I | Year 2 | Year 3 | Year 4 | Yea |
|------------------------|-----------------------------|--|---|---|---|---|
| | Progression of skills | ask simple questions and recognising that the different ways observe closely, using simple equipment perform simple tests identify and classifying use their observations and ideas to suggest ar gather and record data to help in answering of | nswers to questions | answer them setting up simple practical enquiries making systematic and careful obse accurate measurements using stand including thermometers and data la gathering, recording, classifying and help in answering questions recording findings using simple scie diagrams, keys, bar charts, and table reporting on findings from enquiries, displays or presentations of results an using results to draw simple conclusi suggest improvements and raise fur identifying differences, similarities or ideas and processes | ervations and, where appropriate, taking dard units, using a range of equipment, oggers d presenting data in a variety of ways to ntific language, drawings, labelled les including oral and written explanations, nd conclusions ons, make predictions for new values, ther questions | planning differ including reco- taking measur increasing acc appropriate recording data diagrams and line graphs using test resul fair tests reporting and causal relation oral and writte Identifying scie ideas or argum |
| Working Scientifically | Progression of Knowledge | Know that we can ask questions about the observe the world to answer these questions. Know that we can use magnifying glasses. Know that we can test our questions to see Know that objects can be identified or solutheir observable properties. Know that we can write down numbers a record what we find | ons, this is science to observe objects closely e if they are true rted into groups based on | Know that we can ask question: observe the world to answer the Know that we can use magnifyi Know that we can test our ques Know that objects can be ident observable properties | ng glasses to observe objects closely | Know that we denguiries Know how to nenguiry Know that in a one thing that while all other denguiry Know how to u thermometers, Know - with string write-up included method, a det Know how to p of what was fo Know that scie not prove whe Know that scie measurements conditions can and taking me improve an en Know that the questions, where (e.g. effect of of plants / differed Know that the to some extend been tested, being the steed, being the steed, being the steed of the steed |

| Year 5 | Year 6 | |
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| recognising and controll easurements, using a ran | c enquiries to answer questions, ing variables where necessary ge of scientific equipment, with n, taking repeat readings when | |

lata and results of increasing complexity using scientific nd labels, classification keys, tables, scatter graphs, bar and

esults to make predictions to set up further comparative and

and presenting findings from enquiries, including conclusions, tionships and explanations of and degree of trust in results, in itten forms such as displays and other presentations scientific evidence that has been used to support or refute guments.

we can ask questions and answer them by setting up scientific

to make relevant predictions that will be tested in a scientific

- n a fair test one thing is altered (independent variable) and nat may change as a result is measured (dependent variable) ner conditions are kept the same
- to use a range of equipment to measure accurately, including ers, data loggers, rulers and stopwatches
- to draw bar charts; how to label a diagram using lines to cormation to the diagram; how to use a coloured key how to it table; how to draw a classification key; how to show the between an independent variable in a two-way table; and el specific results in a two-way table
- structured guidance how to write a simple scientific enquiry luding an introduction, a list of equipment, a numbered detailing of results and a conclusion
- o precis a scientific enquiry write-up into a brief oral discussion s found in a scientific enquiry
- cientific enquiries can suggest relationships, but that they do /hether a prediction is true
- cientific enquiries are limited by the accuracy of the
- ents (and measuring equipment) and by the extent to which can vary even, and that repeating enquiries, measurements measures to keep conditions as consistent as possible can enquiry
- he conclusions of scientific enquiries can lead to further where results can be clarified or extended to different contexts of changing sunlight on a plant – does this work with other erent types of light / etc)
- hey can draw conclusions from the findings of other scientists a theory is an explanation of observations that has been tested ent and that a hypothesis is an explanation that has not yet d, but that can be tested through a scientific enquiry

| | <u>Everyday Materials</u> •Know from observation how to | Uses of Everyday Materials •Know that materials can have | •Know that there are three kinds of | •Know that things are composed of a | Properties and Know that mater |
|----------------|--|---|--|---|--|
| | distinguish between materials made of | useful properties for a given job | rocks: igneous, sedimentary and | material in one of three states of | variety to ways bas |
| | wood, plastic, glass, metal, water, rock | (including being waterproof, strong, | metamorphic | matter: solid, liquid or gas | •Know that in son |
| | •Know that an object is made from/of a | hard, soft, flexible, rigid, light or | •Know that the Earth has a solid crust | •Know that things are made of | bonds between par |
| | material | heavy.) | made up of tectonic plates with molten | particles (tiny building blocks) and that | surrounded by a lic |
| | •Know that materials can be hard, soft, | •Know that many types of plastic | rock beneath | these are organized differently in | to absorb the solid |
| | strong, weak, absorbent, heavy, light, solid | are waterproof, that steel (a type of | •Know that granite and basalt are types | different states | solid is called a sol |
| | and runny, smooth and rough; these | metal) is strong, that rock is hard, | of igneous rock and that igneous rocks | •Know that materials can change state | solvent and the res |
| | descriptions denote the properties of a | that cotton wool is soft, that rubber | form from molten rock below the Earth's | when temperature changes | solid does dissolve |
| | material | is flexible, that rock is rigid, that | crust | •Know that there are bonds between | as being soluble in |
| | •Know that matter (stuff) is made from | polystyrene (a type of plastic) is light | •Know that limestone and sandstone | the particles (building blocks) in a solid; | water); when it car |
| | tiny building blocks | and that iron (a type of metal) is | are types of sedimentary rock which | as temperature increases, these bonds | sand in water) |
| | , . | heavy, | form when small, weathered fragments of | are somewhat overcome as the | •Know that a give |
| | | •Know that when objects move | rock or shell settle and stick together, | particles absorb energy and solids can | only absorb a certa |
| | | across a surface there is friction | often in layers | change into liquids; with a further | before no more wi |
| | | when they rub against each other and | •Know that marble and slate are types | increase in temperature, the particles | happens the liquid |
| | | that sometimes this friction is larger | of metamorphic rock which form when | become even more energetic and the | •Know that when |
| | | or smaller | rocks in Earth's crust get squashed and | bonds are overcome entirely so the | from a solution, the |
| | | •Know that applying forces to | heated in processes such as when | liquid changes into a gas | behind; the remain |
| | | objects can change their shape | tectonic plates press against each other | •Know that when solids turn into | crystals – the slow |
| | | | •Know that fossils form when a plant or | liquids, this is called melting and that | evaporates, the lar |
| | | | animal dies and is quickly covered with | the reverse process is called freezing | be formed |
| | | | silt or mud so that it cannot be rotted by | •Know that when liquids turn into | •Know how to dis |
| | | | microbes or eaten by scavenging animals; | gases, this is called evaporation and | solvent and then he |
| | | | in time layers of sediment build, | that the reverse process is called | solvent to recover |
| | | | squashing the mud and turning it to stone | condensation | •Know that a reve |
| Programian of | | | around the dead plant or animal; the | •Know that when a solid turns into a | can be reversed an |
| Progression of | | | materials in the body are replaced by | gas without passing through the liquid | are mixing, dissolvi |
| Knowledge | | | minerals that flow in water through the | state, this is called sublimation | where no chemical |
| | | | rock, leaving a rock in the shape of the | •Know that the melting point of water | •Know that an irr |
| | | | animal or plant that was once there | is 0o C and that the boiling point of | that cannot be reve of this often involve |
| | | | •Know that soil is made from tiny particles of rock broken down by the | water is 100o C | |
| | | | action of weather (weathering) | •Know that water flows around our | where a new mate (e.g. burning, boling |
| | | | action of weather (weathering) | world in a continuous process called | bicarbonate of sod |
| | | | | •Know that, along with evaporation, | •Know that filtering |
| | | | | water on the Earth's surface moves to | liquids to be separa |
| | | | | the air in a process called transpiration | allows solids made |
| | | | | in which water turns into water vapour | parts to be separat |
| | | | | (gas) on the surface of leaves on plants | •Know how to se |
| | | | | •Know that rain condenses in clouds | salt and small stone |
| | | | | and falls to earth as rain, snow or hail | the small stones), f |
| | | | | in a process called precipitation | water (so the salt i |
| | | | | •Know that water flows across the | filtering to remove |
| | | | | land in rivers and streams in a process | mixture, followed f |
| | | | | called surface run-off and under the | the water to recov |
| | | | | ground as groundwater | •Know that mater |
| | | | | | can be tested throu |
| | | | | | including testing to |
| | | | | | are magnetic, therr |
| | | | | | electrically conduct |
| | | | | | various properties |
| | | | | | make them suitable |
| | | | | | •Know how to ex |
| | | | | | the reasons why va |
| | | | | | suited or unsuited |
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Changes of Materials

rials can be sorted in a sed on their properties me solid materials the rticles break when quid; this allows the liquid d; when this happens, the lute, the liquid is called a sult is a solution; when a e in a liquid it is described that solvent (e.g. sugar in nnot it is insoluble (e.g.

en amount of solvent can ain amount of solid ill dissolve; when this is said to be saturated a solvent is evaporated be original solute is left ning solid will often form ver the solvent rger the crystals that will

ssolve and a solute in a now to evaporate the the solute

ersible change is one that and that examples of this ing and changes of state I reaction takes place reversible change is one rersed and that examples we a chemical change erial is made, often a gas og an egg, the reaction of da and acid)

ing allows solids and ated and that sieving e up of different sizes ted

eparate a mixture of sand, es by sieving (to remove followed by dissolving in is absorbed), followed by e the sand from the finally by evaporation of ver the salt.

rials' different properties bugh acting upon them, o find whether materials mally conductive and citive; know that the of different materials e for a given function kplain orally and in writing arious materials are to a function

Science – Plants

| | Year I | Year 2 | Year 3 | Year 4 | Year |
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| Progression of skills | ask simple questions and recognis different ways observe closely, using simple equip perform simple tests identify and classifying use their observations and ideas to gather and record data to help in | oment o suggest answers to questions | answer them setting up simple practical enquir making systematic and careful of taking accurate measurements u equipment, including thermomet gathering, recording, classifying of to help in answering questions recording findings using simple so diagrams, keys, bar charts, and to reporting on findings from enquire explanations, displays or presentor using results to draw simple concl suggest improvements and raise to identifying differences, similarities ideas and processes | oservations and, where appropriate, ising standard units, using a range of ers and data loggers and presenting data in a variety of ways cientific language, drawings, labelled ables es, including oral and written ations of results and conclusions usions, make predictions for new values, | planning different including recognition increasing accompropriate recording data diagrams and luine graphs using test result fair tests reporting and causal relations oral and writter Identifying sciemed as or argument |
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Year 6

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ney can draw conclusions from the findings of other scientists theory is an explanation of observations that has been tested ent and that a hypothesis is an explanation that has not yet , but that can be tested through a scientific enquiry

| | •Know a rose bush, a sunflower and a | Know that seeds and bulbs need to | Know that different parts of plants | |
|--------------------------|---|---|---|--|
| | dandelion by sight | be buried underground in soil and that | have one or more functions (jobs) | |
| | •Know an oak tree, a birch tree and a | they will grow into adult plants under | •Know that the roots collect water | |
| | horse chestnut tree by sight | the right conditions (water, warmth) | and minerals from the soil, and hold | |
| | •Know that evergreen trees maintain | •Know that plants that are deprived | the plant firmly in the ground | |
| | their leaves throughout the year and | of light, food or air will not grow and | •Know that the stem holds up the | |
| | that deciduous trees shed their leaves | will die. | leaves so that they can gather light to | |
| | in autumn | | make food and holds up the flowers | |
| | •Know that a flowering plants consist | | so that they can receive pollen and | |
| | of roots, stem, leaves and flowers, and | | disperse their fruits; know that the | |
| | that a tree's stem is called a trunk | | stem also transports water and | |
| | | | minerals from the roots to the other | |
| | | | parts of the plant | |
| Progression of Knowledge | | | •Know that the leaves make food by | |
| | | | trapping light and using its energy to | |
| | | | turn carbon dioxide and water into | |
| | | | carbohydrates | |
| | | | •Know that the function of a flower | |
| | | | is reproduction, where flowers of the | |
| | | | same kind exchange pollen – made by | |
| | | | an anther – in a process called | |
| | | | fertilisation, and a structure in the | |
| | | | flower's ovary called an ovule | |
| | | | becomes a seed; the ovary then | |
| | | | becomes a fruit which helps the seed | |
| | | | leave the plant in a process called | |
| | | | dispersal | |
| | | | | |



Science – Living things and their habitats

| | Year I | Year 2 | Year 3 | Year 4 | Year |
|-----------------------------|---|---|--|--|--|
| Progression of skills | ask simple questions and recognisin ways observe closely, using simple equipe perform simple tests identify and classifying use their observations and ideas to gather and record data to help in | suggest answers to questions | answer them setting up simple practical enquir making systematic and careful of taking accurate measurements us equipment, including thermomet gathering, recording, classifying of to help in answering questions recording findings using simple so diagrams, keys, bar charts, and the reporting on findings from enquiri explanations, displays or presented using results to draw simple conclusuggest improvements and raise identifying differences, similarities ideas and processes | bservations and, where appropriate, using standard units, using a range of ters and data loggers and presenting data in a variety of ways cientific language, drawings, labelled ables tes, including oral and written ations of results and conclusions lusions, make predictions for new values, | planning different including recognition of the including recognition of the increasing accurate appropriate recording data diagrams and I line graphs using test result fair tests reporting and causal relations oral and writter Identifying scient ideas or argum |
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Year 6

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ults to make predictions to set up further comparative and

nd presenting findings from enquiries, including conclusions, onships and explanations of and degree of trust in results, in then forms such as displays and other presentations cientific evidence that has been used to support or refute uments.

e can ask questions and answer them by setting up scientific

make relevant predictions that will be tested in a scientific

a fair test one thing is altered (independent variable) and at may change as a result is measured (dependent variable) er conditions are kept the same

o use a range of equipment to measure accurately, including ers, data loggers, rulers and stopwatches

o draw bar charts; how to label a diagram using lines to rmation to the diagram; how to use a coloured key how to table; how to draw a classification key; how to show the between an independent variable in a two-way table; and specific results in a two-way table

structured guidance - how to write a simple scientific enquiry uding an introduction, a list of equipment, a numbered letailing of results and a conclusion

precis a scientific enquiry write-up into a brief oral discussion found in a scientific enquiry

cientific enquiries can suggest relationships, but that they do nether a prediction is true

ientific enquiries are limited by the accuracy of the

nts (and measuring equipment) and by the extent to which an vary even, and that repeating enquiries, measurements neasures to keep conditions as consistent as possible can enquiry

ne conclusions of scientific enquiries can lead to further here results can be clarified or extended to different contexts of changing sunlight on a plant – does this work with other erent types of light / etc)

ney can draw conclusions from the findings of other scientists theory is an explanation of observations that has been tested ent and that a hypothesis is an explanation that has not yet , but that can be tested through a scientific enquiry

| Unit split into two |
|------------------------------|
| Living things –(Half a term) |

• Know that living things move, grow, consume nutrients and reproduce; that dead things used to do these things, but no longer do; and that things that never lived have never done these things.

•Know that polar bears are an example of an animal adapted to its environment thick fur for warmth and oily paw pads to ensure that they don't freeze to the ice. •Know that sharks are another example - smooth skin and streamlined shape for quick swimming; and gills for breathing underwater

•Know that cacti are an example of a plant adapted to its environment - thick skin keeps a store of water safe; sharp spikes keep animals from stealing the water

•Know that pine trees have thick bark and pine cones to protect against cold winters

•Know that woodlice live under logs an example of a microhabitat - as they need somewhere dark and damp so that they do not dry out

Progression of

Knowledge

•Know that frogs can live in ponds – an example of a microhabitat - as they water in which to lay their eggs (frogspawn) •Know that plants absorb energy from the Sun; that this energy is consumed by herbivorous animals; and that carnivorous animals eat other animals. •Know that the arrows on a food chain show the direction that the energy travels

Habitats - Split into half a term term)

•Know that polar bears are an example of an animal adapted to its environment - thick fur for warmth and oily paw pads to ensure that they don't freeze to the ice

•Know that sharks are another example - smooth skin and streamlined shape for quick swimming; and gills for breathing underwater

•Know that cacti are an example of a plant adapted to its environment - thick skin keeps a store of water safe; sharp spikes keep animals from stealing the water

•Know that pine trees have thick bark and pine cones to protect against cold winters

• Know that animals can be grouped based on their physical characteristics (e.g. vertebrates and invertebrates) and based on their behaviour (e.g. herbivores, carnivores and omnivores) •Know that living things are divided into kingdoms: the animal kingdom, plants, fungi, bacteria, and single-celled organisms

•Know that a species is a group of living things have many similarities that can reproduce together produce offspring

•Know that a classification key uses questions to sort and identify different living things

•Know how to use a classification key to identify living things

•Know how to create a classification key to sort plants/ animals •Know that changes to the environment can make it more difficult for animals to survive and reproduce;

in extreme cases this leads to extinction, where an entire species dies

•Know that human activity - such as climate change caused by pollution can change the environment for many living things, endangering their existence

•Know that the polar bear is a famous example of climate change endangering the existence of a species; as the climate changes and gets warmer, the sea ice on which polar bears live reduces in amount making it harder for them to survive and reproduce

thing is a series of stages of development starting with a fertilized egg in animals or a seed in many plants •Know that in most mammals (e.g. dogs) a fertilized egg develops in the womb into an embryo and is then born and fed on milk before it is weaned onto the food that is adapted to eat; it then develops to maturity in a period called adolescence after which it can reproduce and the cycle can begin again •Know that in amphibians (e.g. frogs) a fertilized egg develops into an embryo and then hatches into a tadpole; the tadpole develops adult characteristics, metamorphoses into the adult form after which it can reproduce and the cycle can begin again •Know that in many insects (e.g. butterflies) a fertilized egg develops

again

again

• Know that the life cycle of a living

into wingless feeding form called a larva (caterpillar); the larva feeds then later becomes a pupa (chrysalis) with a protective cocoon; inside this cocoon, the pupa metamorphoses into the adult butterfly after which it can reproduce and the cycle can begin

•Know that in birds (e.g. robins) a fertilized egg hatches in a nest (a hatchling) and is fed by its parents until it is ready to fly (i.e. becomes a fledgling); it then leaves the nest and grows into an adult after which it can reproduce and the cycle can begin

• Know that there are three types of micro-organism: viruses, fungi and bacteria; of these three, viruses are often not really considered to be alive by many scientists mainly because they don't have the 'machinery' to reproduce inside them

•Know that germs are disease-causing bacteria

•Know that an arthoropod is an invertebrate with a hard . external skeleton and jointed limbs

•Know that insects are a type of arthropod; their bodies consist of six legs, a head, a thorax and an abdomen; most insects also have a pair of antennae and a pair of wings

•Know that an arachnid (e.g. spider) is a type of arthropod with eight legs and no antennae or wings

•Know that a crustacean is a type of arthropod with two pairs of antennae (e.g. woodlouse)

•Know that a myriapod is an arthropod with a flat and long or cylindrical body and many legs (e.g. centipede)

Science – Year 1 Seasonal Changes, Year 5 Earth and Space, Year 6 Evolution and inheritance

| | Year I | Year 2 | Year 3 | Year 4 | Year |
|-----------------------------|--|--|--|--|--|
| Progression of skills | ask simple questions and recognisin different ways observe closely, using simple equipr perform simple tests identify and classifying use their observations and ideas to gather and record data to help in c | nent suggest answers to questions | answer them setting up simple practical enquire making systematic and careful ob taking accurate measurements us equipment, including thermomete gathering, recording, classifying at to help in answering questions recording findings using simple sci diagrams, keys, bar charts, and ta reporting on findings from enquire explanations, displays or presentat using results to draw simple conclu suggest improvements and raise fu identifying differences, similarities of ideas and processes | eservations and, where appropriate, sing standard units, using a range of ers and data loggers nd presenting data in a variety of ways ientific language, drawings, labelled bles es, including oral and written tions of results and conclusions usions, make predictions for new values, urther questions | planning differen including recogn taking measurer increasing accur appropriate recording data c diagrams and lat line graphs using test results fair tests reporting and pr causal relationshi oral and written f Identifying scient ideas or argumer |
| Progression of Knowledge | observe the world to answer the Know that we can use magnify Know that we can test our ques Know that objects can be identified their observable properties | ing glasses to observe objects closely | Know that we can ask question observe the world to answer the Know that we can use magnifies. Know that we can test our question. Know that objects can be identified their observable properties. | fying glasses to observe objects closely | Know that we call enquiries Know how to mall enquiry Know that in a fall one thing that more than a set the mometers, determine the set of the mometers, determine the set of the mometers, determine the set of the s |

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Year 6

rent types of scientific enquiries to answer questions, ognising and controlling variables where necessary rements, using a range of scientific equipment, with curacy and precision, taking repeat readings when

a and results of increasing complexity using scientific labels, classification keys, tables, scatter graphs, bar and

Its to make predictions to set up further comparative and

I presenting findings from enquiries, including conclusions, nships and explanations of and degree of trust in results, in en forms such as displays and other presentations entific evidence that has been used to support or refute nents.

can ask questions and answer them by setting up scientific

make relevant predictions that will be tested in a scientific

a fair test one thing is altered (independent variable) and may change as a result is measured (dependent variable) conditions are kept the same

use a range of equipment to measure accurately, including , data loggers, rulers and stopwatches

draw bar charts; how to label a diagram using lines to nation to the diagram; how to use a coloured key how to able; how to draw a classification key; how to show the etween an independent variable in a two-way table; and pecific results in a two-way table

tructured guidance - how to write a simple scientific enquiry ding an introduction, a list of equipment, a numbered tailing of results and a conclusion

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s (and measuring equipment) and by the extent to which n vary even, and that repeating enquiries, measurements easures to keep conditions as consistent as possible can inquiry

conclusions of scientific enquiries can lead to further ere results can be clarified or extended to different contexts changing sunlight on a plant – does this work with other ent types of light / etc)

y can draw conclusions from the findings of other scientists neory is an explanation of observations that has been tested and that a hypothesis is an explanation that has not yet but that can be tested through a scientific enquiry

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clipse occurs when the Sun and the w on the Earth; a when the Earth is the Moon, casting a

Evolution and inheritance

•Know that all life on Earth began from a single point around 4.5 billion years ago

•Know that living things changes over time and that this gradual change is called evolution

•Know that natural selection is the cause of this change; natural selection works as across a species there is natural variation within a species; there is also competition to survive and reproduce and that members of a species with advantageous characteristics survive and reproduce - these characteristics are passed down to their offspring; members of a species with less advantageous characteristics do not survive and reproduce – these characteristics are

•Know that offspring are vary and

are not identical to their parents •Know that Charles Darwin posited this theory of evolution by natural selection

•Know that the gradual change of species over millions of years can be observed by looking at examples of fossil

Science – Year 1 Seasonal Changes, Year 4 Sound, Light (Year 3 and Year 6)

| | Year I | Year 2 | Year 3 | Year 4 | Year 5 |
|-----------------------------|---|---------------------------------------|--|---|--|
| Progression of skills | ways observe closely, using simple equipmediate perform simple tests identify and classifying use their observations and ideas to see their and record data to help in a set of the set | suggest answers to questions | answer them setting up simple practical enquiries making systematic and careful obse accurate measurements using standincluding thermometers and data la gathering, recording, classifying and help in answering questions recording findings using simple scie diagrams, keys, bar charts, and tab reporting on findings from enquiries, displays or presentations of results a using results to draw simple conclusi suggest improvements and raise fur identifying differences, similarities or ideas and processes using straightforward scientific evide | ervations and, where appropriate, taking dard units, using a range of equipment, oggers d presenting data in a variety of ways to entific language, drawings, labelled eles , including oral and written explanations, ind conclusions ions, make predictions for new values, ther questions | planning different typ recognising and confi taking measurement accuracy and precisi recording data and r and labels, classificat using test results to m tests reporting and preser causal relationships a and written forms suc Identifying scientific e or arguments. |
| Progression of Knowledge | observe the world to answer the Know that we can use magnifyi Know that we can test our ques Know that objects can be ident observable properties Know that we can write down r record what we find | ng glasses to observe objects closely | observe the world to answer the Know that we can use magnify Know that we can test our ques Know that objects can be iden observable properties | ing glasses to observe objects closely | Know that we can as enquiries Know how to make reenquiry Know that in a fair test thing that may chang all other conditions an Know how to use a rot thermometers, data let Know how to draw be information to the dia table; how to draw a between an indepen specific results in a tw Know how to precise of what was found in a second that scientific end that the conclutions can vary end that the conclutions can vary end that the conclutions where result (e.g. effect of chang) / different types of lig Know that they can complex that a theory is some extent and that they can complex that a theory is some extent and that they can be that that can that they can be that that can that they can complex that the conclust that the conclust that the can be that they can complex that the conclust that the conclust that the conclust the conclust the conclust the conclust that the conclust the con |

Year 6

- types of scientific enquiries to answer questions, including ontrolling variables where necessary
- ents, using a range of scientific equipment, with increasing cision, taking repeat readings when appropriate
- nd results of increasing complexity using scientific diagrams cation keys, tables, scatter graphs, bar and line graphs o make predictions to set up further comparative and fair
- senting findings from enquiries, including conclusions, as and explanations of and degree of trust in results, in oral such as displays and other presentations
- c evidence that has been used to support or refute ideas

ask questions and answer them by setting up scientific

- relevant predictions that will be tested in a scientific
- test one thing is altered (independent variable) and one ange as a result is measured (dependent variable) while s are kept the same
- a range of equipment to measure accurately, including to loggers, rulers and stopwatches
- v bar charts; how to label a diagram using lines to connect diagram; how to use a coloured key how to draw a neat v a classification key; how to show the relationship
- pendent variable in a two-way table; and how to label two-way table
- ured guidance how to write a simple scientific enquiry an introduction, a list of equipment, a numbered method, Its and a conclusion
- is a scientific enquiry write-up into a brief oral discussion of a scientific enquiry
- c enquiries can suggest relationships, but that they do not prediction is true
- enquiries are limited by the accuracy of the
- nd measuring equipment) and by the extent to which ry even, and that repeating enquiries, measurements and b keep conditions as consistent as possible can improve an
- clusions of scientific enquiries can lead to further
- esults can be clarified or extended to different contexts nging sunlight on a plant – does this work with other plants light / etc)
- n draw conclusions from the findings of other scientists y is an explanation of observations that has been tested to hat a hypothesis is an explanation that has not yet been in be tested through a scientific enquiry

| | Seasonal Changes | <u> </u> | Light_ | Sound |
|-------------|--|----------|--|--|
| | •Know that days are longer in the | • | Know that light is a form of energy | •Know that sound is generated when an |
| | summer and shorter in winter | • | Know that energy comes in different | object vibrates; some of the energy from |
| | •Know that weather changes through | fo | orms and can be neither created nor | the vibrating object is transferred to the |
| | the year, getting hotter in the summer | de | estroyed, only changed from one form | air, making the air particles move |
| | and colder in the winter | to | o another | •Know that energy comes in different |
| | •Know that the winter is likely to bring | • | Know that we need light to see things | forms and can be neither created nor |
| | ice on the ground when water freezes | an | nd that darkness is the absence of light | destroyed, only changed from one form |
| | due to the cold | • | Know that light travels in straight lines | to another |
| | Know that the Earth orbits the Sun with | • | Know that light is reflected when it | •Know that sound is a form of energy |
| | one orbit constituting a year of 365/366 | tra | ravels from a light source and then | that transfers in a longitudinal wave - like |
| | days | ʻba | oounces' off an object | that seen in a slinky - not a transverse |
| | | • | Know that everything that we can see | wave - like that seen in water ripples |
| | | is | either a light source or something that | •Know that sound travels through a |
| | | is | reflecting light from a light source into | medium (e.g. particles in the air) and thus |
| | | ou | ur eyes | sounds does not travel through a vacuum |
| | | | Know that the Sun is a light source, but | which has no particles in it at all |
| | | | hat the Moon is not and is merely | •Know that longitudinal sound waves are |
| | | | eflecting light from the Sun | detected in the ear by humans and that |
| | | | Know that many light sources give off | the brain interprets this as the sounds we |
| | | | ght and heat | hear |
| | | | Know that the Sun gives off light and | •Know that sound travels at different |
| Progression | | | eat when hydrogen turns into helium | speeds through different objects; it |
| of | | | Know that filaments in traditional bulbs | travels at around 340 metres per second |
| Knowledge | | | eat up until they glow, giving off light and | in air, much slower than light travels; this is why we often hear thunder after we |
| | | | eat | see lightning as the light reaches our eye |
| | | | Know that fluorescent bulbs glow when | before the sound reaches our ears |
| | | | lectricity adds energy to a gas within the | •Know that pitch is how high or low a |
| | | | ulb | sound is and that this is determined by |
| | | | Know that sunglasses can protect eyes | how many vibrations per second are |
| | | | om sunlight but looking at the Sun | being made by the vibrating object; the |
| | | | irectly – even with sunglasses – can | number of vibrations per second is called |
| | | | amage the eyes | frequency |
| | | | •Know that opaque objects block light | •Know that volume is how loud or quiet |
| | | | reating shadows and that light passes | a sound is and that this is determined by |
| | | | hrough transparent objects | the amount of energy in the wave (e.g. |
| | | | Know that opacity/transparency and | from how hard or soft a percussion |
| | | | eflectiveness are properties of a material | instrument is hit) |
| | | | Know that as objects move towards a | •Know that the volume of a sound is |
| | | | ght source, the size of the shadow | quieter if the listener is further away |
| | | | | from the object |
| | | | •Know how to show the changing of | |
| | | | hadow size by drawing a diagram with traight lines representing light | |
| | | | | |
| | | | •Know that a data logger can keep track f light levels and that this can be plotted | |
| | | | n a graph to show how this changes | |
| | | | | |
| | | ov | ver the course of a day | |

<u>Light</u>

•Know that translucent objects allow some light to pass through, but some of the light changes direction as it passes through the object; this means that an something seen through a translucent object is not clearly defined

•Know that when light passes from one medium to another (e.g. from air to water), it changes direction; this is called refraction; this happens because light travels at different speeds in different media.

•Know that white light comprises all the colours of light

•Know that white light refracted by two surfaces in a prism will spread out so that all of its constituent colours can be seen; this array of colours is called a spectrum; it happens because the different colours of that constitute white light travel at different speeds.

•Know how to draw a diagram to show why the shape of a shadow will match the shape of an object

•Know that when light reflects off an object, the angle of incidence is equal to the angle of reflection

•Know that a periscope takes advantage of the predictable angles of incidence and reflection to allow an image to be shown to a viewer

Science – Forces (Year 3 and Year 5)

| | Year I | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
|-----------------------------|--|---|--|--|---|---|
| Progression of skills | ask simple questions and recogn ways observe closely, using simple equiperform simple tests identify and classifying use their observations and ideas gather and record data to help | to suggest answers to questions | asking relevant questions and using difanswer them setting up simple practical enquiries, commaking systematic and careful observant accurate measurements using standar including thermometers and data logg gathering, recording, classifying and phelp in answering questions recording findings using simple scientific diagrams, keys, bar charts, and tables reporting on findings from enquiries, inclusing results to draw simple conclusions suggest improvements and raise furthe identifying differences, similarities or charts independent of the processes | omparative and fair tests ations and, where appropriate, taking d units, using a range of equipment, gers resenting data in a variety of ways to ic language, drawings, labelled cluding oral and written explanations, conclusions s, make predictions for new values, r questions anges related to simple scientific | recognising and controlling variable taking measurements, using a range increasing accuracy and precision appropriate recording data and results of increadiagrams and labels, classification graphs using test results to make prediction tests reporting and presenting findings ficausal relationships and explanatic and written forms such as displays of the set of | e of scientific equipment, with taking repeat readings when asing complexity using scientific keys, tables, scatter graphs, bar and line ns to set up further comparative and fair rom enquiries, including conclusions, ns of and degree of trust in results, in oral |
| Progression of Knowledge | observe the world to answer Know that we can use magr Know that we can test our q Know that objects can be id observable properties | tions about the world and that when we r these questions, this is science nifying glasses to observe objects closely questions to see if they are true dentified or sorted into groups based on their vn numbers and words or draw pictures to | Know that we can ask questions all observe the world to answer these Know that we can use magnifying Know that we can test our questio Know that objects can be identified observable properties Know that we can write down number of the second what we find | questions, this is science glasses to observe objects closely ns to see if they are true d or sorted into groups based on their | thing that may change as a result is all other conditions are kept the sar Know how to use a range of equipt thermometers, data loggers, rulers Know how to draw bar charts; how connect information to the diagrar draw a neat table; how to draw a relationship between an independent to label specific results in a two-war Know – with structured guidance - I write-up including an introduction, method, a detailing of results and c Know that scientific enquiries can si prove whether a prediction is true Know that scientific enquiries are lim measurements (and measuring equiptions can vary even, and that taking measures to keep conditions an enquiry Know that the conclusions of scient questions, where results can be cla (e.g. effect of changing sunlight or plants / different types of light / etc. Know that a theory is an explanatic | tions that will be tested in a scientific altered (independent variable) and one is measured (dependent variable) while me ment to measure accurately, including and stopwatches to label a diagram using lines to n; how to use a coloured key how to classification key; how to show the ent variable in a two-way table; and how y table now to write a simple scientific enquiry a list of equipment, a numbered a conclusion uiry write-up into a brief oral discussion of iry uggest relationships, but that they do not nited by the accuracy of the upment) and by the extent to which repeating enquiries, measurements and is as consistent as possible can improve ific enquiries can lead to further rified or extended to different contexts a plant – does this work with other) ons from the findings of other scientists on of observations that has been tested sis is an explanation that has not yet |

Forces and Magnets

•Know that a force can be thought of as a push or a pull

•Know that there are three types of contact force: impact forces (when two surfaces collide), frictional forces (when two surfaces are already in contact) and strain forces (when an elastic material is stretched or squashed).

•Know that objects move differently on rough and smooth surfaces; objects resist movement more on rough surfaces because there is higher friction as the object moves

•Know that there are also non-contact forces that can act between objects without them touching and that magnetism is an example of a noncontact force

•Know that magnets have two poles called north and south

•Know that like poles (south-south and north-north) of two magnets repel each other and that opposite poles of two magnets (north-south) attract each other •Know that there is a magnetic field around a magnet which is strongest at each pole

•Know that some materials are magnetic, meaning that they are attracted to a magnet, while other materials are non-magnetic

Forces

called Newtons, named after a British scientist called Sir Isaac Newton who discovered lots about gravity and how planets move

•Know that pull forces can be measured using a device called a force meter •Know that the amount of matter (stuff) in an object is its mass

•Know that gravity is a force that acts between all objects in the universe, but that it acts much more strongly between objects that have more mass and that are close together

•Know that unsupported objects are pulled towards the Earth by the force of gravity

•Know that acceleration is a change in speed and that unbalanced forces acting on an object cause it to accelerate •Know that air resistance is a force felt by an object as it moves through the air; it is caused by the object bumping into the gas particles that make up air; the quicker an object moves, the more gas particles it bumps into and the more air resistance it experiences

•Know that a falling object will accelerate until its air resistance matches the gravitational force pulling it down; at this point, the object will continue to move at this speed (called its terminal velocity) without getting any quicker or slowing down

•Know that a parachute's shape increases the air resistance that a falling object experiences, giving it a much lower terminal velocity

•Know that water resistance is a force felt by an object as it moves through water; it is caused by the object bumping into the water particles

•Know that the shape of an object determines how much air resistance or water resistance it experiences; shapes of object that experience little air resistance or water resistance are described as streamlined

•Know how to draw a force diagram with arrows representing the different forces acting on an object •Know that a lever is a rigid length pivoting around a fulcrum •Know that a pulley is a wheel with a fulcrum that supports a moving cable or belt

•Know that a gear is a rotating wheel with cut teeth that mesh with the teeth of another gear so that turning one gear turns an adjacent gear in the opposite direction

Progression of Knowledge •Know that a force is measured in a unit

Science – Electricity (Year 4 and Year 6)

| | Year I | Year 2 | Year 3 | Year 4 | Year 5 |
|-----------------------------|---|--------------------------------------|---|--|---|
| Progression of skills | ask simple questions and recognising different ways observe closely, using simple equipm perform simple tests identify and classifying use their observations and ideas to su gather and record data to help in ar | ent uggest answers to questions | answer them setting up simple practical enquiri making systematic and careful ob taking accurate measurements u equipment, including thermometed gathering, recording, classifying of help in answering questions recording findings using simple so diagrams, keys, bar charts, and to reporting on findings from enquiried displays or presentations of results using results to draw simple conclu- suggest improvements and raise f identifying differences, similarities ideas and processes using straightforward scientific evit | bservations and, where appropriate, using standard units, using a range of ters and data loggers and presenting data in a variety of ways to cientific language, drawings, labelled ables es, including oral and written explanations, s and conclusions lusions, make predictions for new values, | planning different types of recognising and controlling taking measurements, usir increasing accuracy and p appropriate recording data and results diagrams and labels, class graphs using test results to make p tests reporting and presenting f causal relationships and ex oral and written forms such Identifying scientific evider or arguments. |
| Progression of Knowledge | observe the world to answer the Know that we can use magnifyin Know that we can test our quest Know that objects can be identify their observable properties | g glasses to observe objects closely | observe the world to answer the Know that we can use magnition to the Know that we can test our quitable Know that objects can be identified their observable properties | ons about the world and that when we these questions, this is science ifying glasses to observe objects closely justions to see if they are true entified or sorted into groups based on n numbers and words or draw pictures to | Know that we can ask queeenquiries Know how to make relevaneenquiry Know that in a fair test onee thing that may change as all other conditions are kepe. Know how to use a range of thermometers, data logge Know how to draw bar chac connect information to the draw a neat table; how to relationship between an in how to label specific result Know how to precis a scien of what was found in a scien of what scientific enquirin not prove whether a predi Know that scientific enquiring measurements (and measing of the scientific scientific enquiring that was found in a scien of taking measures to ke improve an enquiry Know that the conclusions questions, where results can (e.g. effect of changing su plants / different types of line. Know that a theory is an ext o some extent and that a been tested, but that can |

Working Scientifically

| fear 6 | | | | | |
|--|--|--|--|--|--|
| pes of scientific enquiries to answer questions, including | | | | | |
| trolling variables where necessary | | | | | |
| e of scientific equipment, with | | | | | |
| taking repeat readings when | | | | | |
| | | | | | |

results of increasing complexity using scientific , classification keys, tables, scatter graphs, bar and line

nake predictions to set up further comparative and fair

nting findings from enquiries, including conclusions, and explanations of and degree of trust in results, in as such as displays and other presentations evidence that has been used to support or refute ideas

sk questions and answer them by setting up scientific

elevant predictions that will be tested in a scientific

st one thing is altered (independent variable) and one ge as a result is measured (dependent variable) while ire kept the same

ange of equipment to measure accurately, including loggers, rulers and stopwatches

ar charts; how to label a diagram using lines to to the diagram; how to use a coloured key how to ow to draw a classification key; how to show the an independent variable in a two-way table; and results in a two-way table

ed guidance - how to write a simple scientific enquiry in introduction, a list of equipment, a numbered of results and a conclusion

a scientific enquiry write-up into a brief oral discussion a scientific enquiry

enquiries can suggest relationships, but that they do prediction is true

enquiries are limited by the accuracy of the

measuring equipment) and by the extent to which even, and that repeating enquiries, measurements to keep conditions as consistent as possible can

usions of scientific enquiries can lead to further ults can be clarified or extended to different contexts ging sunlight on a plant – does this work with other es of light / etc)

draw conclusions from the findings of other scientists s an explanation of observations that has been tested that a hypothesis is an explanation that has not yet t can be tested through a scientific enquiry

| | | | |
|-----|----------|------|---|
| | | | • Know that electrical energy is one of |
| | | | many forms of energy |
| | | | •Know that static electricity is an |
| | | | imbalance of charged particles on a |
| | | | material; it does not operate by flowing |
| | | | around a complete circuit |
| | | | •Know that current electricity is the |
| | | | flow of charged particles called electrons |
| | | | around a circuit |
| | | | •Know that electrical current flows well |
| | | | through some materials, called electrical |
| | | | conductors, and poorly through other |
| | | | materials, called electrical insulators |
| | | | •Know that conductors have free |
| | | | electrons and that when electrical |
| | | | current flows around a conductor the |
| | | | electrons move |
| | | | •Know that electrical conductivity (how |
| | | | well a material conducts electricity) is an example of a property |
| | | | |
| Pro | gression | | •Know that metals are good electrical conductors |
| 110 | of | | •Know that a chemical reaction inside a |
| K | | | |
| Kno | owledge | | cell produces the charged particles that can flow around a circuit |
| | | | •Know that more than one cell lined up |
| | | | to work together is called a battery |
| | | | •Know that electrical current can flow if |
| | | | there is a complete circuit |
| | | | •Know that wires – which contain a |
| | | | conductor inside them, usually made of |
| | | | metal – can allow electrical current to |
| | | | flow around a circuit |
| | | | •Know that when electrical current |
| | | | flows through a circuit components |
| | | | within that circuit – such as buzzers |
| | | | which make a noise and bulbs which emit |
| | | | light – begin to work |
| | | | •Know that a switch functions by |
| | | | completing or breaking a complete |
| | | | circuit |
| | | | •Know how to construct a simple |
| | | | circuit using components |
| | | | •Know that exposure to high levels of |
| | | | electrical current can be dangerous |

• Know that voltage is a measure of the power of a cell to produce electricity; it is a measure of the 'push' of electric current, not the size of the electric current

•Know that as the number and voltage of cells in a circuit increases, the brightness of a bulb or the volume of a buzzer will increase (though too high a voltage may 'blow' the bulb or buzzer) •Know how to draw simple circuit diagrams

•Know the recognized symbols for a battery, bulb, motor, buzzer and wire •Know how to predict whether

components will function in a given circuit, depending on whether or not the circuit is complete; whether or not a switch is in an on or off position; and whether or not there is a cell to provide electrical current to the circuit

•Know that two bulbs in a circuit can be wired up to create a series circuit or a parallel circuit; if one bulb blows in a series circuit the other will not shine as the circuit has been broken; in contrast, if one bulb blows in a parallel circuit, there will still be a complete circuit for the other bulb so it will continue to shine; use this knowledge to explain the advantages of using parallel circuits (e.g. in the lighting in homes)