Grimsdyke School
Knowledge and Skill Progression Map
Subject: Science

Year Group	Knowledge (Know)	Skills (Do)	Concepts (Understand)
Reception	***Plants*** • *I know basic common plants and flowers.* • *I know the names of the main parts of plants.* ***Animals including humans*** • *I know the names of the main parts of the body.* • *I know how to discuss environments and that not all are the same.* • *I know how to use my senses in the environment and make comparisons.* ***Everyday Materials*** • *I know how to observe changes over time, such as seeds > plants, including the seasons and changing states of matter.* • *I know the similarities and differences between different materials.* • *I know a variety of everyday materials, including wood, plastic, glass, metal, water, and rock.* ***Seasonal Changes*** • *I know how to make general observations about the weather.* • *I know the names of different types of weathers and link this to the seasons.* • *I know what I need to wear for the differing weather conditions.*	• *I can make observations using my senses* • *I can make simple comparisons.* • *I can ask simple questions.* • *To make observations and draw pictures of animals and plants;*	• *Light and dark.* • *Part/ whole/ structure* • *Living/ not living* • *Materials* • *Seasons* • *Change* • *Animal environments*

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	Knowledge (Know)	Skills (Do)	Concepts (Understand)
Year 1	**Plants** • I can identify and know the names of a variety of common wild and garden plants, • I know the meaning of deciduous and evergreen trees. • I know the basic structure of a variety of common flowering plants, including trees (eg leaves, flowers (blossom), petals, fruit, roots, bulb, seed, trunk, branches, stem). • I know the key differences between the trees and flowering plants. • I know how and why plants may change over time. **Animals including humans** • I can identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals • I know what carnivores, herbivores and omnivores are and can name some • I can describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets) • I can identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense **Everyday Materials** • I know the difference between an object and the material from which it is made • I can identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock	• I ask simple questions about what I notice. • I make observations using my senses & simple equipment (for example, hand lenses, egg timers). • I observe changes over a period of time and notice patterns. • I look at pictures and talk about them using my scientific vocabulary. • I label a diagram. • I make comparisons • I carry out simple explorations. • I name, sort and group • I use simple scientific vocabulary • I use my observations, ideas & everyday experience to suggest answers to questions • With help from an adult, I record simple data and talk about what I have found out.	• Part/ whole/ structure • Living/ not living • Deciduous and evergreen trees. • Material/ object • Season • Change • Carnivore/ herbivore/ omnivore • Animal types

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	• *I know and can describe the simple physical properties of a variety of everyday materials.* • *I know when to use words such as properties such as: hard/soft; stretchy/stiff; shiny/dull; rough/smooth; bendy/not bendy; waterproof/not waterproof; absorbent/not absorbent; opaque/transparent.* • *Know, compare and group together a variety of everyday materials on the basis of their simple physical properties* • *To know which materials may be best for certain objects or items e.g. umbrella, dog basket, curtains, bookshelf etc.* ***Seasonal Changes*** • *Know and observe the changes across the 4 seasons* • *Know, observe and describe weather associated with the seasons and how day length varies*		
	Knowledge (Know)	***Skills (Do)***	***Concepts (Understand)***
Year 2	***Living things and their habitats*** • *To know and compare the differences between things that are living, dead and things that have never been alive.* • *To know the basic needs of different kinds of animals and plants.* • *To know the meaning and difference between 'habitat' (a natural environment or home of a variety of plants and animals) and 'micro-habitat' (a very small habitat, for example for woodlice under stones, logs or leaf litter)* • *To know how these basic needs of animal and plants are provided for in their habitat and how they depend on each other.*	• *I can ask questions about what I notice.* • *I can recognise that these questions can be answered in different ways.* • *I can make simple predictions and say if what happened was what I expected using my test results.* • *I can make observations using simple measurements and equipment.* • *I can carry out simple comparative tests.* • *I can use books, texts and videos to find out information about a scientific topic* • *I can identify, group and classify things.* • *I can record and communicate my findings using simple scientific language.*	• *Living/ never lived* • *Need* • *Nutrition* • *Lifecycle* • *Survival* • *Force* • *Habitat/microhabitat* • *Properties of everyday materials and how these can be changed*

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	• *To know the conditions of different habitats and microhabitats and how this affects the number and type of plants and animals which live there.* • *I can identify and name a variety of plants and animals.* • *To know which habitat you would find the plants and animals in, including microhabitats.* • *I know the difference between some less familiar habitats e.g. on the seashore, in woodland, in the ocean, in the rainforest.* • *I know how animals obtain their food from plants and other animals.* • *I know how simple food chains work and what they show.* • *I can name different sources of food.* ***Plants*** • *Know how plants grow.* • *I know that plants begin as seeds or bulbs, which grow into mature plants.* • *To know the difference between seeds and bulbs (Seeds and bulbs need water to grow but most do not need light; seeds and bulbs have a store of food inside them).* • *know the requirements of plants for germination, growth and survival, as well as to the processes of reproduction and growth in plants.* • *I know that plants need water, light and a suitable temperature to grow and stay healthy.* ***Animals, including humans*** • *I know that animals, including humans, have offspring, which grow into adults.* • *I know the basic needs of animals, including humans, for survival (water, food and air)*	• *I can gather and record data to help in answering questions.* • *I can make simple conclusions.*	

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	• *I know the importance of exercise, eating the right amounts of different types of food, and hygiene for humans.* ***Uses of everyday materials*** • *I know that different materials are suitable for different uses including wood, metal, plastic, glass, brick, rock, paper and cardboard.* • *I know that some materials can be used for specific uses.* • *Know that some materials are used for more than one thing (metal can be used for coins, cans, cars and table legs; wood can be used for matches, floors, and telegraph poles)* • *I know that different materials can also be used for the same thing (spoons can be made from plastic, wood, metal, but not normally from glass)* • *I know the properties of materials that make them suitable or unsuitable for particular purpose* • *I know about unusual and creative uses for everyday materials and give some real life examples inventors, creators or artists/designers have thought of in the past and in modern times (e.g. John Dunlop, Charles Macintosh or John McAdam).* • *I know how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.* • *To know the uses of everyday materials in and around the school with materials found in other places (at home, the journey to school, on visits.*		

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	Knowledge (Know)	Skills (Do)	Concepts (Understand)
Year 3	***Plants*** • *I can describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers* • *To know the role of the roots and stem in nutrition and support, leaves for nutrition and flowers for reproduction.* • *I know the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow).* • *I know some of the effects of different factors on plant growth, for example, the amount of light, the amount of fertiliser* • *I know how this varies from plant to plant and can give examples of when these are different.* • *I can know how water is transported within plants* • *I know that plants make their own food.* • *I know the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.* • *I know how seeds are formed over a period of time.* • *I know how the structure of fruits relate to how the seeds are dispersed* ***Animals, including humans*** • *I know that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat* • *To know the diets of different animals (including their pets)*	• *I can ask relevant questions* • *I can use different types of scientific enquiries to answer questions e.g. experiment or research.* • *I can make careful observations and, where appropriate, taking accurate measurements using standard units. I can sort, group and classify explaining my reasoning* • *I can identify differences and similarities related to scientific ideas and processes* • *I can gather, record, classify and present data in a variety of ways to help in answering questions* • *I can report findings from enquiries in a variety of ways (e.g. Oral and written explanations, displays or presentations of results & conclusions.)* • *I can use straight forward scientific evidence to answer questions.* • *I can use results to draw simple conclusions and make predictions for new values.* • *I can use information from texts or books to find the answer to a scientific question which I cannot investigate through experimentation.*	• *Function* • *Growth* • *Transportation* • *Support* • *Protection* • *Movement* • *Fossil* • *Organic* • *Light/ Dark* • *Transparent, opaque and translucent.* • *Reflection* • *Shadow* • *Magnetism – attract/repel*

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	• *I know that humans and some other animals have skeletons and muscles for support, protection and movement.* • *I know the names of some parts of the skeletal and muscular system.* • *To know, identify and group animals with and without skeletons and know how they move differently (including id humans did not have skeletons)* ***Rocks*** • *Know, compare and group together different kinds of rocks on the basis of their appearance and simple physical properties (e.g. granite, chalk, limestone, sandstone, basalt, marble, pumice and slate).* • *Know which rocks have grains or crystals.* • *I know that fossils are formed when things that have lived are trapped within rock* • *To know how other rocks, change over time (how and why)* • *I know what happens when rocks are rubbed together or what changes occur when they are in water.* • *I know how soils are formed and know that they are made from rocks and organic matter.* • *I know that there are six main types of soil: chalky, clay, loamy, peaty, sandy and silty* • *I know the different layers of soils (Humus, top soil, sub soil, bed rock)* • *I know the terms sedimentary, permeable, igneous, metamorphic, and porous.* ***Light*** • *I know that light is needed in order to see things and that dark is the absence of light*		

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	• *I know that light is reflected from surfaces* • *I know how light behaves when reflected off different types of reflective surfaces.* • *I know that light from the sun can be dangerous and that there are ways to protect my eyes* • *I know that shadows are formed when the light from a light source is blocked by an opaque object* • *I can fine patterns in the way that the size of shadows change* ***Forces and magnets*** • *I know and can compare how things will move on different surfaces* • *I know that some forces need contact between two objects, but magnetic forces can act at a distance* • *I know that magnets attract or repel each other and attract some materials and not others* • *I can compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials* • *I know the everyday uses of different magnets (for example, bar, ring, button and horseshoe).* • *I know magnets have 2 poles.* • *I know that two magnets will attract or repel each other, depending on which poles are facing.* • *I know that magnets can have different strengths.*		

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	Knowledge (Know)	Skills (Do)	Concepts (Understand)
Year 4	***Living things and their habitats*** • *I know that living things can be grouped in a variety of ways* • *I know what a classification key is and can use one to help group, identify and name a variety of living things in their local and wider environment* • *I know that environments can change and that this can sometimes pose dangers to living things.* • *To know vertebrate animals fall into groups such as fish, amphibians, reptiles, birds, and mammals;* • *To know that invertebrates include snails and slugs, worms, spiders, and insects.* • *Know that plants can be grouped into categories such as flowering plants (including grasses) and non-flowering plants, such as ferns and mosses.* • *I know about examples of human impact (both positive and negative) on environments, for example, the positive effects of nature reserves, ecologically planned parks, or garden ponds, and the negative effects of population on a development, litter or deforestation.* • *I can use and make simple guides or keys to explore and identify plants and animals in my local area.* ***Animals, including humans*** • *I know the names and simple functions of the basic parts of the digestive system in humans* • *I know and can identify the different types of teeth in humans and their simple functions* • *I know that animals have different teeth to humans and to each other.*	• *I can ask questions and use different types of scientific enquiries to answer them* • *I can make some decisions about which types of scientific enquiry are likely to be the best ways of answering questions.* • *I can set up simple experiments which are comparative and fair tests.* • *I can make systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers* • *I can identify differences, similarities and changes related to scientific ideas and processes.* • *I can gather and record findings using scientific language, drawings, labelled diagrams, keys, bar charts and tables.* • *I can use results to draw simple conclusions and make predictions for new values, suggest improvements and raise further questions* • *I can use straight forward scientific evidence to answer questions or to support my findings* • *I can carry out research to answer scientific questions from secondary sources*	• *Environment* • *System, ecosystems* • *Digestion* • *Food chain/ food web* • *Producer, primary, secondary and tertiary consumers* • *State of matter – solid/liquid/gas* • *Water cycle* • *Evaporation/ condensation* • *Sound – volume, pitch, vibrations, waves* • *Electricity – power, current* • *Circuit* • *Insulator/conductor*

	• *I know about the teeth of carnivores and herbivores, and know the reasons for differences* • *I know what damages teeth and how to look after them* • *I know what a food chain is and can construct and interpret a variety of food chains.* • *I can identify producers, predators and prey in a food chain* ***States of matter*** • *I know the simple descriptions of the states of matter (solids hold their shape; liquids form a pool not a pile; gases escape from an unsealed container)* • *I can compare and group materials, according to whether they are solids, liquids or gases* • *I know that some materials change state when they are heated or cooled and can measure or research the temperature at which this happens in degrees Celsius (°C) – water, metals, materials* • *I know water as a solid, a liquid and a gas and how this changes when it is heated or cooled.* • *I know the effect of temperature on substances such as chocolate, butter, cream and why this might be important to know.* • *I know the part played by evaporation and condensation in the water cycle* • *I know that the rate of evaporation is related to temperature.* ***Sound*** • *I know how sounds are made, usually by something vibrating* • *I know how sound travels differently through different mediums*		

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	• *I know that vibrations from sounds travel through a medium to the ear* • *I know that the pitch of a sound depends on features of the object that produced it e.g. the tighter the string the higher the sound* • *I know that the volume of a sound depends on the strength of the vibrations that produced it* • *I know that sounds get fainter as the distance from the sound source increases.* • *To know and identify the way sound is made through vibration in a range of different musical instruments from around the world* • *Know how the pitch and volume of sounds can be changed in a variety of ways.* • *Know about patterns in the sounds that are made by different objects such as saucepan lids of different sizes or elastic bands of different thicknesses* • *To know which materials provide the best insulation against sound (e.g. for ear muffs)* ***Electricity*** • *I know the names of common appliances that run on electricity* • *I know how to construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers* • *I know how to check whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery* • *I know that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit*		

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	• *I know the names of some common conductors and insulators.* • *I know the name of some associate metals which are good conductors.* • *I know how to draw the circuit as a pictorial representation* • *I know that bulbs get brighter if more cells are added* • *I know that metals tend to be conductors of electricity* • *I know that some materials can and some cannot be used to connect across a gap in a circuit.*		
	Knowledge (Know)	***Skills (Do)***	***Concepts (Understand)***
Year 5	***Living things and their habitats*** • *I know the life cycles of a mammal, an amphibian, an insect and a bird* • *I know the life process of reproduction in some plants and animals.* ***Animals, including humans*** • *I know the changes that happen as humans develop to old age.* • *To know the stages in the growth and development of humans* • *To learn about the changes experienced in puberty.* • *To know the gestation periods of other animals and comparing them with humans; by finding out and recording the length and mass of a baby as it grows.* ***Properties and changes of materials*** • *I can compare and group together everyday materials on the basis of their properties, including their hardness,*	• *I can plan different types of scientific enquiries to answer questions.* • *I can take measurements using a range of scientific equipment with increasing accuracy and precision* • *I can record data and results of increasing complexity using diagrams, labels classification keys tables and a range of graphs.* • *I can use test results to make further predictions or set up other tests.* • *I can research information from more than one source to find the answer to scientific questions* • *I can report and present my findings in an appropriate way.* • *I can draw a valid conclusion and evaluate my test results or research* • *I understand scientific evidence can be used to support or refute ideas or arguments.* • *I can explain and justify my reasoning using scientific vocabulary and concepts*	• *Life process* • *Reproduction* • *Development* • *Dissolve* • *Solution* • *Reversible/ irreversible* • *Space* • *Solar system* • *Planet* • *Rotation/orbit* • *Gravity* • *Mechanism – gear/ lever* *They should also begin to recognise that scientific ideas change and develop over time.*

	solubility, transparency, conductivity (electrical and thermal), and response to magnets. • *I know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution* • *I can use my knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating* • *To know about reversible changes, including, evaporating, filtering, sieving, melting and dissolving* • *Know that melting and dissolving are different processes* • *To know about changes that are difficult to reverse, for example, burning, rusting and other reactions, for example, vinegar with bicarbonate of soda* • *I can give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic* • *I know that dissolving, mixing and changes of state are reversible changes* • *I know that some changes result in the formation of new materials, and that this kind of change is not usually reversible* • *I know some of the changes which can occur as a result of burning and the action of acid on bicarbonate of soda and can link this to how these are used in the everyday world (e.g. fire safety, fire doors, cooking etc.)* • *To know about some of the changes that take place, for example, when burning different materials or baking bread or cakes* • *To know how chemists create new materials (e.g. Spencer Silver, who invented the glue for sticky notes or Ruth Benerito, who invented wrinkle-free cotton)*		*Pupils should draw conclusions based on their data and observations, use evidence to justify their ideas, and use their scientific knowledge and understanding to explain their findings.*

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	• *To know how chemical changes, have an impact on our lives, for example, cooking, and discuss the creative use of new materials such as polymers, super-sticky and super-thin materials.* ***Earth and Space*** • *I know how the Earth, and other planets, move relative to the Sun in the solar system* • *I know how Moon moves relative to the Earth* • *I know that the Sun, Earth and Moon are approximately spherical bodies* • *I know about the other planets in our solar system and can compare them to Earth.* • *know that the Sun is a star at the centre of our solar system and that it has eight planets: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune (Pluto was reclassified as a 'dwarf planet' in 2006)* • *know that a moon is a celestial body that orbits a planet (Earth has one moon; Jupiter has four large moons and numerous smaller ones)* • *I know that the Earth's rotation explains day and night and the apparent movement of the sun across the sky.* • *I know where world time is recorded from (GMT).* • *To know how to find out the time of day at different places on the Earth – longitude, latitude, GMT etc.* • *Know what AM and PM mean* • *I know that the time of sunrise and sunset varies according to the season and can explain why this happens.* • *Know about some of the ideas about the solar system and how they have developed, understanding how the geocentric model of the solar system gave way to the*		

	heliocentric model by considering the work of scientists such as Ptolemy, Alhazen and Copernicus. • *To know why some people think that structures such as Stonehenge might have been used as astronomical clocks* • *To know how people used shadow clocks and sundials to track time in the past* ***Forces*** • *know forces that make things begin to move, get faster or slow down* • *know what causes an object to remain stationery* • *I know that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object* • *I know the effects of forces such as air resistance, water resistance and friction, that act between moving surfaces* • *To know how different objects such as parachutes and sycamore seeds fall* • *I know how objects can be streamlined (air and water) and how this may also appear in the natural world (e.g. animals)* • *I know that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.* • *know what cause a moving object to slow down or increase in speed.* • *Know the effects of friction on movement and find out how it slows or stops moving objects* • *Know how Galileo Galilei and Isaac Newton helped to develop the theory of gravitation*		

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	Knowledge (Know)	Skills (Do)	Concepts (Understand)
Year 6	***Living things and their habitats*** • *I know that living things are classified into broad groups according to common observable characteristics* • *To know that they are based on similarities and differences, including micro-organisms, plants and animals* • *Know the classification system in more detail* • *Know that broad groupings, such as micro-organisms, plants and animals can be subdivided* • *To know about the significance of the work of scientists such as Carl Linnaeus, a pioneer of classification.* • *I know the basic structure of scientific (Linnaean) taxonomy e.g. Kingdom, Phylum, Class, Order, Family, Genus, Species* • *I can give reasons for classifying plants and animals based on specific characteristics* • *To know how to classify animals into commonly found invertebrates (such as insects, spiders, snails, worms) and vertebrates (fish, amphibians, reptiles, birds and mammals).* • *To know reasons why living things are placed in one group and not another.* • *To use classification systems and keys to identify some animals and plants in the immediate environment.* • *To know about some unfamiliar animals and plants from a broad range of other habitats and decide where they belong in the classification system.* ***Animals, including humans***	• *I can plan different types of scientific enquiries to answer questions including recognising and controlling variables where necessary* • *I can take measurements using a range of scientific equipment with increasing accuracy and precision taking repeat readings when appropriate.* • *I can record data and results of increasing complexity using scientific diagrams, labels classification keys, tables and a range of graphs including scatter graphs, bar and line.* • *I can use test results to make predictions to set up further comparative and fair tests* • *I can use and evaluate a range of sources evidence (including texts, the internet and the reports of other people's experiments) that I use to carry out scientific research.* • *I can report and present findings from enquiries including conclusions, causal relationships and explanations of and degree off trust in results, in oral and written form such as displays and other presentations.* • *I can identify scientific evidence that has been used to support or refute ideas or arguments.*	• *Taxonomy* • *Circulation* • *Lifestyle* • *Inheritance* • *Evolution* • *Adaptation* • *Refraction/reflection* • *Light travels in straight lines* • *Power – voltage* • *Resistance* • *Series circuits*

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	• *To know about the main body parts and internal organs (skeletal, muscular and digestive system)* • *To know how the circulatory system enables the body to function and supports the other systems in the body e.g. skeletal, muscular, nervous, respiratory, digestive etc.* • *I know the main parts of the human circulatory system* • *To know about the structure of the heart (main chambers and main ventricles and direction of blood flow).* • *To know the function of the heart and how blood moves through the heart, lungs and around the body* • *To know about the structure of lungs and how they function* • *To know about the function of different types of cells found in blood.* • *To know about the 3 different types of blood vessels in the human body* • *To know how oxygen and deoxygenated blood moves through the body and gets to different parts of the body and vital organs.* • *I can describe the ways in which nutrients and water are transported within animals, including humans.* • *To know how to keep their bodies healthy and how their bodies might be damaged – including how some drugs and other substances can be harmful to the human body.* • *To know the impact of diet, exercise, drugs and lifestyle on the way their bodies function* ***Evolution and inheritance*** • *I know that living things have changed over time* • *To know that fossils provide information about living things that inhabited the Earth millions of years ago*		

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	• *To know how different types of fossils are formed.* • *To know that characteristics are passed from parents to their offspring* • *I know that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents* • *Know that variation in offspring over time can make animals more or less able to survive in particular environment (for example, by exploring how giraffes' necks got longer, or the development of insulating fur on the arctic fox).* • *I know how animals and plants are adapted to suit their environment in different ways* • *Know how some living things are adapted to survive in extreme conditions, for example, cactuses, penguins and camels.* • *To know about some of the advantages and disadvantages of specific adaptations, such as being on two feet rather than four, having a long or a short beak, having gills or lungs, tendrils on climbing plants, brightly coloured and scented flowers.* • *To know that adaptation may lead to evolution.* • *Know about the work of palaeontologists such as Mary Anning.* • *To know about how Charles Darwin and Alfred Wallace developed their ideas on evolution.* ***Light*** • *I recognise that light appears to travel in straight lines* • *Know the way that light behaves, including light sources, reflection and shadows.* • *I know that objects are seen because they give out or reflect light into the eye*		

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	• *I know that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes* • *I can explain how shadows are formed and why they have the same shape as the objects that cast them but can vary in size* • *To know the relationship between light sources, objects and shadows by using shadow puppets* • *To know a range of phenomena including rainbows, colours on soap bubbles, objects looking bent in water and coloured filters exist* ***Electricity*** • *I know that the brightness of a lamp or the volume of a buzzer relates to the number and voltage of cells used in the circuit* • *I know the reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches and that these can depend on resistance and circuit structure as well as the voltage available* • *I know the meaning of current and voltage* • *I know the precautions for working safely with electricity.* • *I know how to stay safe at home and in public in relation to electrical safety (railways, underground, pylons etc.)* • *I know the internationally recognised symbols when representing a simple circuit in a diagram.*		