KNOWLEDGE PROGRESSION YEAR GROUP OVERVIEW – Science

Strands
• At EYFS, the knowledge progression takes full account of the Early Learning Goals of: ○ Changes in the Natural World

• At key stage 1, the knowledge progression takes full account of the national curriculum's strands of:
  ○ Biology
  ○ Chemistry
  ○ Physics
  ○ Working Scientifically

• At key stage 2, the knowledge progression takes full account of the national curriculum's strands of:
  ○ Biology
  ○ Chemistry
  ○ Physics
  ○ Working Scientifically

EYFS and National Curriculum Subject Content – End of Key Stage expectations	
Strand	**Changes in the Natural World**
EYFS	• 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, drawing on their experiences and what has been read in class • Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter
Strand	
Key Stage 1	• Experiment and observe phenomena • Be curious and ask questions about what they notice • Use different types of scientific enquiry to answer their own questions: observing changes over a period of time, noticing patterns, grouping and classifying things, carrying out simple comparative tests, and finding things out using secondary sources of information. • Use simple scientific language to talk about what they have found out • First hand personal experiences
Strand	
Key Stage 2	LKS2 • Exploring, talking about, testing and developing ideas about everyday phenomena and the relationships between living things and familiar environments • Begin to develop their ideas about functions, relationships and interactions • Ask questions about what they observe and make some decisions about which types of scientific enquiry are best to answer them • Draw simple conclusions and use some scientific language to write about what they have found out about UKS2 • Explore and talk about their ideas by asking their own questions about scientific phenomena, analysing functions, relationships and interactions more systematically. • Recognise that scientific ideas change and develop over time • Select the more appropriate ways to answer science questions using different types of scientific enquiry • Draw conclusions based on their data and observations, use evidence to justify ideas and use scientific knowledge and understanding to explain findings

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Strand	Nursery	Vocabulary	Reception	Vocabulary
Changes in the Natural World	To know how to play with small-world models such as a farm, a garage or a train track. To know how to notice features of objects in the environment To know how to all their senses in hands-on exploration of natural materials To know how to explore collections of materials with similar and/or different properties To know how to plant seeds and care for growing plants. To know the key features of the life cycle of a plant and an animal. To begin to know the need to respect and care for the natural environment and all living things. To know how to talk about what they see, using a wide vocabulary. To know how to explore and talk about different forces they can feel. To know how to talk about the differences between materials and changes they notice. To know that there are different countries in the world and talk about the differences they have experienced or seen in photos. **To know how to ask questions about aspects of my familiar world such as the place where I live or the natural world.** **To know how to talk about some of the things I have observed such as plants, animals, natural and found objects.** **To know how to talk about why things happen and how things work.** **To know how to start to develop an understanding of growth, decay and changes over time.** **To know how to show care and concern for living things and the environment**	plant animal same different changes I saw This happened record evidence day night think why test try look sort	To know how to talk about some of the things I have observed such as plants, animals, natural and found objects. To know how to talk about why things happen and how things work in simple sentences To know how to ask questions (why) about aspects of my familiar world such as the place where I live or the natural world. To know to how to describe what they see, hear and feel whilst outside in linked sentences To know how to describe our school environment To know to create representations of people, events and objects. To know how to show care and concern for living things (familiar) and the environment (familiar) To know how to show care and concern for living things and the environment To know how to describe their home environment To know how to describe our school environment To know how to recognise some environments that are different to the one in which they live. To know how to compare contrasting environments To know how to use vocabulary and events from stories To know that changes happen in autumn To know that changes happen in winter To know that changes happen in spring To know that changes happen in summer To know that changing seasons have an effect on the natural world around them. To know that a liquid can change to solid – baking To know that water changes to ice and ice to water To know how to start to develop an understanding of growth, decay and changes over time To know how to talk about why things happen and how things work **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, drawing on their experiences and what has been read in class** **Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.**	similarities differences hard runny soft It changed from/to I found out changes Pictures Series of pictures I can see season weather best worst prior learning question tests sets of tasks question compare guess

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Strand	Year 1	Year 2	Strand	Year 3	Year 4	Year 5	Year 6
Biology (All living things and their habitats)		To know that all animals have 5 things in common (all animals move, need to eat, use their senses, reproduce and grow) To know that all animals and plants live in places where they are happiest e.g. frogs live near ponds because there is food to eat, water to keep their skin damp and tadpoles are born in water and birds live in woodlands because there are twigs to make nests and worms and insects to eat. Animals that live in hot places have big feet to stop sinking into the sand and come out at night and animals that live in cold places have thick layers of fat **To know that living things live in habitats that are suited to their needs** To know that some things are alive (plants, animals and humans) To know that some things have never been alive (football, cars, clouds, watches) To know that some things used to be alive (dead animals, leave on the floor in autumn, the wood in a pencil) **To know that things that are living, dead and have never been alive and compare differences between them** To know that there are different habitats e.g.	**Biology (All living things and their habitats)**		To know that living things can be put into groups To know that all living things have characteristics that we can see e.g. legs, fur, flowers To know that the main groups of living things are plants and animals To know that you can use the characteristics to keep on dividing them up into smaller groups e.g. vertebrates are divided into mammals, birds, fish, reptiles and amphibians **To know that living things can be grouped in a variety of ways** To know that the environment are surroundings or conditions that an animal or plant lives or operates To know that humans can cause a lot of damage to the environment e.g. cutting down trees, building on fields To know that damage to the environment takes away food and shelter from plants and animals which can cause animals to become endangered or extinct To know that some people and organisations work to protect living things and their environment e.g. charities, environment activists, nature reserves **To know that environments can change and this can pose dangers to living things** To know that there are many different plants and animals that scientists need to divide them into groups to help identify them	To know that all living things go through changes during their lifetimes and these changes are their life cycle To know the life cycle of a mammal (human), bird (chicken), amphibian (frog) and insect (butterfly) To know how life cycles are different **To know that there are differences in the life cycles of a mammal, amphibian, insect and bird** To know that the life cycle of plants can be sexual or asexual **To know that plants and animals reproduce and describe the life processes of reproduction in some plants and animals**	To know the two main groups of living things are plants and animals but that there are also microorganisms To know that animals are divided into two groups – vertebrates and invertebrates To know that plants can be divided into two groups – flowering and non-flowering **To know that living things (micro-organisms, plants and animals) are classified into broad groups according to common observable characteristics and based on similarities and differences.** To know that branched keys are used to identify plants and animals To know how to give reasons for the classification given **To know plants and animals can be classified based on specific characteristics and give reasons for these**

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		woodland, ocean, pond, field To know animals that live in different habitats To know that a microhabitat is a small habitat within a larger habitat e.g. a log in a woodland To know that living things come in all shapes and sizes To know that animals and plants are two different groups of living things **To know and name a variety of plants and animals in their habitats, including microhabitats** To know that plants give us (and other animals) food To know that some plants produce fruit which animals eat To know that fruits can hold the plants seeds which are needed for reproduction To know that all living things need energy to live To know that all living things get energy from food To know that animals, including humans, don't produce their own food so need to eat plants or other animals to survive To know that a food chain shows how plants and animals depend of each other for sources of food and that food chains start with the sun and end with the largest animals **To know how animals obtain their food from plants and other animals using food chains**			To know that scientists look for similarities and difference between their characteristics To know that putting things into groups is called classification To know how to use classification keys to unlock information **To know that classification keys can be used to group, identify and name a variety of living things**		

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Vocabulary		Living, dead, never been alive, suited, suitable, basic needs, food, food chain, shelter, move, feed Names of local habitats e.g. pond, woodland etc. Names of micro-habitats e.g. under logs, in bushes etc.			Classification, classification keys, environment, habitat, human impact, positive, negative, migrate, hibernate	Life cycle, reproduce, sexual, sperm, fertilises, egg, live young, metamorphosis, asexual, plantlets, runners, bulbs, cuttings	Vertebrates, fish, amphibians, reptiles, birds, mammals, invertebrates, insects, spiders, snails, worms, flowering, non-flowering
Biology (Animals, including humans)	To know that carnivores are animals that feed on other animals To know that herbivores are animals that feed on plants To know that omnivores are animals that eat meat and plants **To know that animals are carnivores, herbivores and omnivores.** To know that most humans have 5 senses To know that we hear with our ears and that important sounds can warn us of dangers To know that we taste things with our mouths and humans eat foods with different tastes but some animals eat lots of the same things To know that we smell with our noses and sometimes smells can be pleasant or unpleasant To know that we feel things with our skin and that we can feel hot or cold things and that some things can be dangerous to touch To know that we see with our eyes To know that the main parts of the body are	To know that eating the right food is really important to give us the right nutrients to keep healthy To know that we need to eat a balanced diet To know that exercise is needed to keep healthy and makes you feel good To know that good hygiene keeps us healthy by preventing illnesses, infections and diseases To know that good hygiene helps us to keep healthy and stop us from spreading germs from one person to another **To know that exercise, balanced diet and good hygiene are important for humans** To know that as we grow we get bigger To know that we all start as small babies and grow into children To know that as we grow we get taller, heavier and stronger To know that when we become adults, we stop growing To know that as we become elderly, we get weaker **To know that animals and humans have offspring that grow into adults.**	**Biology (Animals, including humans)**	To know that the right food is important for a healthy body To know that humans cannot make their own food To know that a balanced diet should include foodin different amounts from the main food groups – carbohydrates, proteins, fats, fruits and vegetables and dairy To know that carbohydrates are needed for energy, proteins for growth and repair, fats for energy, vitamins and minerals for healthy cells, fibre for digestion and water for hydration **To know that animals get nutrients from food and that they need the right amount of nutrients** To know that humans have an endoskeleton on the inside of their body To know that the skeleton protects body parts, supports the body to stand and lets the body move at joins To know that muscles and joints allow movements To know that muscles work in pairs and one contracts and the other relaxes	To know that teeth help you cut, tear and grind food before you swallow it To know that humans are omnivores and their teeth are designed to eat most types of food To know that molars are the back teeth which are used for crushing and grinding food To know that canine teeth are used for griping and tearing food To know that incisors are the front teeth used to snipping and cutting food To know that humans have two sets of teeth during their lives (milk teeth and permanent teeth) **To know that there are different types of teeth and their functions** To know that the digestive system is the system in your body where food is broken down To know that the digestive system can be broken down into parts and each part has a function – mouth, tongue, oesophagus, stomach, small intestine, large intestine, rectum and anus **To know that the digestive system parts each have a function and describe these**	To know that all living things go through changes during their lifetimes To know that humans go through a life cycle – fertilised egg, foetus, baby, child, adolescent, adult, old age, death To know that puberty is when the body develops and this happens during adolescence To know that in puberty is when the bodies of boys and girls change and know the changes that happen **To know that there are changes as humans develop to old age**	To know that the heart is an organ located in the centre of the chest To know that blood, the heart and blood vessels make up the circulatory system To know that the circulatory system is a double system as the blood passes through the heart twice per circuit To know that blood moves nutrients, water, oxygen and waste products around the body To know that blood circulates around the body through veins, arteries and capillaries To know that the heart pumps blood vessels to the lungs so that oxygens can be absorbed and then the blood returns to the heart so it can be pumped to all parts of the body with nutrients To know that waste products like carbon dioxide are removed by the blood before being breathed out **To know that humans have a circulatory system and describe the functions of the heart, blood vessels and blood** To know that a healthy diet is important to fuel the body and that an unhealthy diet can lead to health issues To know that exercise is important to keep the body health and helps the heart to work more efficiently

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	head, elbow, arm, hand, leg, knee, foot To know that the parts of the head are hair, eyes, ears, nose, mouth, chin, cheeks, forehead **To know that the body parts have names and know the body part associated with each sense** To know that a vertebrate is an animal that has a backbone To know that a fish is a scaly skinned vertebrate that swims in water and breathes using gills To know that amphibians are vertebrates which can live on land and water when they are adults To know that reptiles are vertebrates with dry skin covered with scales or horny plates To know that birds are vertebrates with wings and feathers and that most birds can fly To know that a mammal is a vertebrate that breathes air, is warm blooded, gives birth to live young and has fur/hair **To know how to identify and name a variety of common animals (fish, amphibians, reptiles, birds and mammals)** To know that animals can be put into groups To know that differences and similarities can be used to group animals	To know that all animals need food and water to survive To know that different animals eat different types of food To know that humans and animals need air to breathe **To know how to describe the basic needs of animals, including humans for survival (water, food and air).**		**To know that the skeleton has 3 main functions (support, protection and movement)**	To know that all living things need food for energy and growth To know that plants produce their own food from sunlight, air and water but animals need to eat other living things To know that food chains show living things feeding on each other To know that plants are called producers To know that animals are consumers To know that food chains can link together to make food webs **To know how to construct and interpret a variety of food chains**		To know that smoking causes heart attacks, blocked arteries, lung cancer and breathing problems To know that drugs are chemicals or substances that change the way our bodies work e.g. alcohol, solvents, tobacco and that many drugs are addictive To know that some drugs are medicines that help people when doctors prescribe them **To know that diet, exercise, drugs and lifestyle impact on the way bodies function.** To know that the digestive system is responsible for breaking down food To know that the in the small intestine, nutrients are absorbed into the blood To know that in the large intestine, water is absorbed into the body To know that blood moves nutrients, water, oxygen and waste products around the body **To know that nutrients and water are transported within animals and describe how this happens**

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	e.g. no legs, 2 legs, 4 legs, 6 legs, more than 6 legs **To know how to describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets)**						
Vocabulary	Head, body, eyes, ears, mouth, teeth, leg, tail, wing, claw, fin, scales, feathers, fur, beak, paws, hooves • Names of animals experienced first-hand from each vertebrate group • Parts of the body • Senses – touch, see, smell, taste, hear, fingers (skin), eyes, nose, ear and tongue	Offspring, reproduction, growth, child, young/old stages (examples - chick/hen, baby/child/adult, caterpillar/butterfly), exercise, heartbeat, breathing, hygiene, germs, disease, food types (examples – meat, fish, vegetables, bread, rice, pasta)		Nutrition, nutrients, carbohydrates, sugars, protein, vitamins, minerals, fibre, fat, water, skeleton, bones, muscles, joints, support, protect, move, skull, ribs, spine	Digestive system, digestion, mouth, teeth, saliva, oesophagus, stomach, small intestine, nutrients, large intestine, rectum, anus, teeth, incisor, canine, molar, premolars, herbivore, carnivore, omnivore, producer, predator, prey, food chain		Heart, pulse, rate, pumps, blood, blood vessels, transported, lungs, oxygen, carbon dioxide, nutrients, water, muscles, cycle, circulatory system, diet, exercise, drugs, lifestyle
Biology (Plants)	To know that there are two main types of trees – deciduous (trees that shed their leaves) and evergreen (trees that have leaves/needles all year round) To know how to identify different trees (oak, silver birch, sycamore, horse chestnut) To know how to identify common wild flowers (daisy, dandelion, buttercup) To know that a wild plant seed grows where it alls and doesn't need to be planted or cared for To know how to identify common garden plants (tulip, rose, daffodil, fuchsia, sunflower)	To know that plants need water to grow To know that plants need light to grow and be healthy and that if plants don't get enough light they will become unhealthy To know that plants need to be warm enough to grow **To know that plants need water, light and a suitable temperature to grow.** To know that the flowering part of a plant makes seeds To know that seeds grow into new plants To know that different plants have different types of seeds **To know how to describe how seeds and bulbs**	**Biology (Plants)**	To know that a plant grows best if it has the right amount of light, water, air, nutrients and room to grow and if it doesn't have enough of these then it won't grow as well **To know that there are requirements for plants for life and growth (air, light, water, nutrients from the soil and room to grow) and how they vary from plant to plant** To know that each part of the plant has a job To know that flowers are needed for reproduction			

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	To know that names of common plants and trees (list of these) To know that most plants are made up of different parts – flowers, stem, leaves, roots, fruit To know that trees have a trunk, branches, leaves and seeds **To know that plants and trees have a structure and describe this**	**grow into mature plants.**		as this is how new seeds are formed To know that leaves create food for the plant using light, water and carbon dioxide To know that the stem/trunk supports the plant to grow upwards and carries water and minerals to each part of the plant from the roots To know that the roots anchor the plant in the ground and absorb water and minerals from the soil **To know that the parts of a flowering plant have a function and describe these** To know that a plant won't live forever so it has to make new plants To know that the role of making new plants is done by the flowers To know that pollination is when pollen is spread by insects or the wind To know that after pollination new seeds are created To know that the new seeds are spread through seed dispersal and there are three main ways this is done (wind, animals and explosion) **To know that flowers play an important part in the life cycle of plant** To know that the roots absorb the water from soil and then the water moves up the stem To know that all parts of the plant need water			

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				To know that water is transported in plants through the stem			
Vocabulary	Leaf, flower, blossom, petal, fruit, berry, root, seed, trunk, branch, stem, bark, stalk, bud Names of trees in the local area (see list above) Names of garden and wild flowering plants in the local area	Light, shade, sun, warm, cool, water, grow, healthy		Photosynthesis, pollen, insect/wind pollination, seed formation, seed dispersal (wind dispersal, animal dispersal, water dispersal)			
Biology (Evolution and Inheritance)			**Biology (Evolution and Inheritance)**				To know that living things change over time To know that living things that are best adapted to their habitat are more likely to survive To know that over time more of the animals will have features that make them well adapted to their habitat To know that fossils show how loving things have changed over time To know that the process of things changing over time is called evolution To know that the plants and animals that were around millions of years ago looked different to the plants and animals that are around today because they have evolved **To know that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago** To know that animals and plants produce offspring (babies) that are similar to them To know that offspring look like their parents because

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							parents pass on characteristics to their offspring To know that offspring look like their parents because they inherit some features from their parents To know that animals and plants have some features that are different to their parents and each other **To know that living things produce offspring of the same kind but offspring are not identical to their parents** To know that most plants and animals can only live in certain environments To know that animals are adapted to their habitat To know that living things can develop special adaptations to suit the place they live e.g. animals living in the desert of arctic **To know that animals and plants are adapted to suit their environment**
Vocabulary							Offspring, sexual reproduction, vary, characteristics, suited, adapted, environment, inherited, species, fossils
Chemistry (Everyday Materials)	To know that everyday materials are the materials that most objects are made from e.g. wood, plastic, glass, stone, metal **To know that a variety of everyday materials – wood, plastic, glass, metal, water and rock**	To know that materials like clay, plasticine and play dough can be changed by squashing, stretching, pulling, pushing and twisting. To know that squashing, stretching, pulling, pushing and twisting can be reversed and are not permanent To know that some changes are permanent e.g. clay hardens when it dries and cannot be changed	**Chemistry (Everyday Materials)**				

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	To know that an object is something that can be seen or touched To know that you can name the materials that an object is made from To know that an object can be made from more than one material **To know how to distinguish between an object and the material it is made from.** To know that a property of a material is a characteristic that we can measure, see or feel and can help us decide what is useful To know that materials have different properties e.g. hard, soft, stretchy, bendy, waterproof, rough, smooth, elastic, shiny, reflective **To know how to describe the simple physical properties of everyday materials.** To know that materials can be grouped together based on their physical properties To know that some materials have more than one property To know that some materials have the same and different properties **To know how to compare and group a variety of everyday materials on the basis of their simple physical properties**	**To know that the shapes of solid objects can be changed by squashing, bending, twisting and stretching.** To know that suitability means being right for purpose To know that some materials are waterproof, stiff, bendy, transparent, opaque, hard, stretchy, To know that some materials are suitable for some things but not others e.g. glass is good to see though because it is transparent but it is fragile **To know that everyday materials (wood, metal, plastic, glass, brick, rock, paper and carboard) can be identified and compared based on their suitability for particular uses.**					

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Vocabulary	Object, material, wood, plastic, glass, metal, water, rock, brick, paper, fabric, elastic, foil, card/cardboard, rubber, wool, clay, hard, soft, stretchy, stiff, bendy, floppy, waterproof, absorbent, breaks/tears, rough, smooth, shiny, dull, see-through, not see-through	Names of materials – wood, metal, plastic, glass, brick, rock, paper, cardboard Properties of materials – as for Year 1 plus opaque, transparent and translucent, reflective, non-reflective, flexible, rigid Shape, push/pushing, pull/pulling, twist/twisting, squash/squashing, bend/bending, stretch/stretching					
Chemistry (Rocks)			**Chemistry (Rocks)**	To know that soil covers most of the world's land and we need it to gorw crops Soil is made from 4 things – worn down rock, organic matter (dead leaves and things that used to be alive, water and air To know that not all soils are the same as the type of rock contained in soil makes them different **To know that that soils are made from rocks and organic matter** To know that rocks are all around us – underground, on beaches, in garden, buildings, walls, quarries and cemeteries To know that rocks are all different and not the same To know the properties of some rocks – hard/soft, permeable/impermeable **To know how to compare and group together different kinds of rocks on the basis of their**			

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				appearance and simple physical properties To know that some rocks contain fossils To know that fossils are the remains of living things from illions of years ago To know that fossils tell us about animals and plants and how they have changed over time To know that over millions of years the mud, sand and soil gets compressed, hardens and forms layers of rock and that dead plants and animals get trapped in between these layers with the soft parts decomposing and the hard parts are left behind as an imprint **To know how to describe how fossils are formed when things that have lived are trapped within rock.**			
Vocabulary				Rock, stone, pebble, boulder, grain, crystals, layers, hard, soft, texture, absorb water, soil, fossil, marble, chalk, granite, sandstone, slate, soil, peat, sandy/chalk/clay soil			
Chemistry (States of Matter)			**Chemistry (States of Matter)**		To know that water boils at 100°C and freezes at 0°C To know that when heated to high enough temperatures most liquids will evaporate and turn into a gas To know that when heated to high enough temperatures solids will turn into liquids To know that the freezing point is the temperature at which a liquid turns into a		

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					solid when cooled, the melting point is the temperature at which a solid will melt and the boiling point is the temperature at which a liquid boils and turns to vapour **To know that that some materials change state when they are heated and cooled and the temperature at which this happens in °C.** To know that water can exist in 3 forms – solid (ice), liquid and gas (water vapour) To know that there are 3 main parts to the water cycle (evaporation, condensation, precipitation) To know that the water cycle continues and never ends To know that the greater the temperature of the liquid and its surroundings the quicker the process of evaporation **To know that the part that evaporation and condensation play in the water cycle and associate the rate of evaporation with temperature.** To know that materials can be solids, liquids or gases and these are the 3 states of matter To know examples of solids, liquids and gases To know that the shape and volume of a solid does not change, they can be cut and shaped and particles in a solid are tightly packed together To know that the shape of a liquid can change but the volume does not. Liquids can be poured. Particles in a liquid are bonded but further apart than in a solid		

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					To know that gases have the same shape and volume of the container they are in and are mainly invisible. Gases not in containers spread further apart as the particles are widely spaced and have weak bonds **To know that materials can be grouped together and compared according to whether they are solids, liquids or gases.**		
Vocabulary					Solid, liquid, gas, state change, melting, freezing, melting point, boiling point, evaporation, temperature, water cycle		
Chemistry (Properties and Changes of Materials)			**Chemistry (Properties and Changes of Materials)**			To know that soluble is something that can be dissolved and insoluble is something that cannot be dissolved To know that when a solid is dissolved in a liquid it akes a solution To know that you can tells that a solid has dissolved when you cannot see it anymore To know that sugar, salt and coffee are examples of materials that dissolve in water To know that through evaporating the water in a solution the solid material is left behind **To know that that some materials will dissolve in a liquid and describe how to recover a substance from a solution.** To know that some materials are better than others based on test results e.g. plastic rather than paper for an umbrella	

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						To know how to give reasons for the uses of everyday materials based on evidence from fair tests. To know that an irreversible change is not reversible and is permanent and results in a material changing into a completely new material e.g. baking flour, yeast and water to make bead or baking clay to make a pot To know that mixing some solids and liquids creates irreversible changes e.g. mixing vinegar with bicarbonate of soda creates carbon dioxide **To know that that some changes result in the formation of new materials and that this change is not usually reversible.** To know that materials can be grouped and sorted accr=ording to hardness, solubility, transparency, conductivity (electrical and thermal) and magnetism To know that hard materials are used to make things that need to be tough and robust To know the meaning of transparent, translucent, soluble, insoluble, thermal conductor, thermal insulators, electrical conductors, electrical insulators, magentic **To know how to compare and group together everyday materials on the basis of their properties.** To know that most materials can be mixed together	

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						To know that mixtures can be separated using sieving, filtering and evaporating and know how to do this **To know how to decide how mixtures might be separated (filtering, sieving, and evaporating)** To know that some changes in state are reversible e.g. ic3, melting chocolate To know that a reversible change is when a material turns into something that looks or feels different but the change is not permanent e.g. ice melting to form a liquid To know that heating a solid can turn it into a liquid (melting), cooling a liquid can turn it into a solid (freezing) To know that freezing and melting are reversible changes To know that evaporation and condensation are reversible changes To know that dissolving is a reversible change **To know how to demonstrate that dissolving, mixing and changes of state are reversible changes.**	
Vocabulary						Thermal/electrical insulator/conductor, change of state, mixture, dissolve, solution, soluble, insoluble, filter, sieve, reversible/non-reversible change, burning, rusting, new material	

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Physics (Seasonal Changes)	To know the different weathers To know the 4 seasons To know that day length changes throughout the year **To know that weather associated with the different seasons** To know that day length varies through the year To know that in the summer the days are longer as the sun shines for more time To know that in the winter the days are shorter as the sun shines for less time **To know that day length varies** To know that there are 4 seasons To know how to identify things related to each season: • Autumn (Sept, Oct, Nov) – getting colder, leaves change colour and drop • Winter (Dec, Jan, Feb) – cold, snow • Spring (Mar, Apr, May) – things start to grow, blossom • Summer (June, July, Aug) – warmer weather, sun **To know how to observe changes across the four seasons and explain the weather in each season.**						

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Vocabulary	Weather (sunny, rainy, windy, snowy etc.) Seasons (winter, summer, spring, autumn) Sun, sunrise, sunset, day length						
Physics (Forces)			**Physics (Forces)**	To know that most forces need contact between two objects. To know that magnetic forces can act at a distance. To know that non-contact force attracts and repels between magnets **To know that that some forces need contact between two objects but magnetic forces act at a distance.** To know that magnets have a north and south pole To know that either end of a magnet will attract magnetic materials **To know that that magnets have two poles.** To know that objects move differently on different surfaces To know that friction is a force that slows objects down To know that friction occurs when two surfaces move across each other To know that rough surfaces create a lot of friction and smooth surfaces create less friction To know that objects slow down more on rough		To know that gravity pulls objects towards the centre of the Earth To know that gravity pulls you down whether you're in the air, in water or standing on the ground To know that unsupported objects fall towards the Earth because the force of gravity is acting between the object and the Earth To know that the size of the gravitational force is pretty much the same all over the Earth **To know that unsupported objects fall towards Earth because of the force of gravity** To know air and water resistance are contact forces caused by air or water and the object moving through it To know that air and water resistance slows down objects as they move through it and to travel faster things need to be streamlined To know that air resistance acts in the opposite direction to which the object is moving To know that the larger the surface area, the slower the object will travel **To know how to identify the effects of air resistance, water resistance and friction that act on moving surfaces.**	

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				surfaces than smooth surfaces. **To know how to compare how things move on different surfaces.** To know that if the north and the south pole of a magnet face one another, the magnets will attract To know that if the same poles face one another, they will repel each other To know that magnets exert a force on other magnetic materials (e.g., iron) To know that magnets don't exert a force on non- magnetic materials (e.g., silver) **To know how to observe how magnets attract or repel each other.** To know that only some materials are attracted to magnets To know that only metal objects are magnetic, but not all metal objects are magnetic **To know how to compare and group together a variety of everyday materials on whether they are magnetic.** To know that magnets can attract or repel each other To know that you can predict whether they will attract or repel depending		To know that simple mechanisms which include levers, pulleys and gears turn small forces into bigger forces. To know that a pulley is a rope running over a wheel and that when the rope is pulled it lifts the heavy object on the other end To know that gears are wheels with teeth that fit together and when one wheel is turned the other adjoining wheel turns too To know that if the gears are different sizes they can be used to increase the power of a turning force **To know how to recognise that some mechanisms (levers, pulleys and gears) allow a smaller force to have a greater effect.**	

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				on the way the poles are facing **To know how to predict whether two magnets will attract or repel each other.**			
Vocabulary				Force, push, pull, twist, contact force, non-contact force, magnetic force, magnet, strength, bar magnet, ring magnet, button magnet, horseshoe magnet, attract, repel, magnetic material, metal, iron, steel, poles, north pole, south pole		Force, gravity, Earth, air resistance, water resistance, friction, mechanisms, simple machines, levers, pulleys, gears	
Physics (Light)			**Physics (Light)**	To know that light is needed to see things To know you can see because light enters your eyes To know that it is dark when there isn't any light To know that you can't see anything when there is no light To know that light sources give out light **To know that light is needed in order to see things and that dark is the absence of light.** To know that some objects seem bright but that they are reflecting light from elsewhere To know that reflecting meanings the light bounces off an object **To know that light is reflected from surfaces.**			To know that light travels in straight lines from a source To know that **To know that light appears to travel in straight lines** To know that we see things when light enters our eyes To know that light may come directly from the source to your eyes (when you look at a light) To know that light can also reflect off objects and into your eyes (when you look at a hi-viz jacket) **To know that we see things because light travels from light sources to our eyes or from light source to object and then to our eyes** To know that light bounces off some materials better than others which enables them to be seen

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				To know that bright lights can harm your eyes To know that light from the sun can damage our eyes To know that you can protect your eyes by wearing dark glasses or a sunhat/cap **To know that light from the sun can be dangerous and that there are ways to protect their eyes.** To know that light can pass through some materials (transparent or translucent materials) To know that light cannot pass through opaque materials (brick wall) To know that if an opaque material blocks the light from travelling, then a shadow will be formed **To know how to recognise that shadows are formed when a light source is blocked by an opaque object.** To know that the more directly over head the light source is, the shorter the shadow will be To know that the lower the light source is, the longer the shadow will be To know that the closer the light source is to the object, the larger the shadow will be **To know how to find patterns in the way**			To know that mirrors and shiny objects reflect almost all of the light that falls on them To know that light bounces off reflective objects and into your eyes To know that if you put a mirror in the right place you can see around corners To know that periscopes use a pair of mirrors to allow you to see round objects easily **To know how to use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye.** To know that shadows are the same shape as the objects that create them because light travels in straight lines **To know how to explain why shadows have the same shape as the objects that cast them**.

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				that the size of shadows change			
Vocabulary				Light, light source, dark, absence of light, transparent, translucent, opaque, shiny, matt, surface, shadow, reflect, mirror, sunlight, dangerous			straight lines, light rays
Physics (Electricity)			**Physics (Electricity)**		To know that smaller electrical appliances can be moved from place to place To know that batteries eventually run down and need to be replaced or recharged To know that some appliances run on battery, mains or both **To know that common appliances that run on electricity.** To know that a switch fills in a gap in a circuit To know that switches control the flow of electricity in a circuit **To know that that a switch opens and closes a circuit.** To know that materials are either conductors or insulators To know that electrical conductors allow electricity to pass through them To know that metals are good conductors of electricity To know electrical inulators do not allow electricity to pass through them		To know that circuit diagrams use symbols instead of pictures To know that symbols are easier to draw and more recognisable To know that symbols provide a universal approach to drawing circuits **To know that the recognised symbols when representing a simple circuit in a diagram.** To know that when more batteries are added to a circuit, the buld gets brighter To know that when more batteries are added to a circuit, the buzzer gets louder and motor spins faster **To know how to associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit.** To know that wires must be connected to both ends of a battery

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					To know non-metallic solids are electrical insulators (wood, plastic, glass, rubber) **To know that some common conductors and insulators.** To know that electricity can only travel if there is a complete circuit To know that electricity travels from the power source around a series of conductors back to the power source To know that cells provide the electricity, wires allow the electricity to flow, bulbs light up when electricity is flowing, motors turn when electricity is flowing To know that a closed switch allows the electricity to continue to flow through the circuit and an open switch stops the electricity from flowing **To know how to construct a simple series circuit and name basic parts.** To know that simple circuits can be set up using components To know that for a circuit to work the batteries and components must be set up accurately To know that for a circuit to work there must not be any breaks **To know how to identify whether a lamp will light in a simple series circuit.**		To know that breaks in a circuit will prevent it from working To know that switches must be closed for a circuit to be complete **To know how to compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches**

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Vocabulary					Electricity, electrical appliance/device, mains, plug, electrical circuit, complete circuit, component, cell, battery, positive, negative, connect/connections, loose connection, short circuit, crocodile clip, bulb, switch, buzzer, motor, conductor, insulator, metal, non-metal, symbol		Circuit, complete circuit, circuit diagram, circuit symbol, cell, battery, bulb, buzzer, motor, switch, voltage
Physics (Sound)			**Physics (Sound)**		To know that sound happens when something vibrates To know that it is not always obvious what is vibrating to make a noise (e.g. air in a bottle) To know that we hear sound when vibrating air hits our ear drums and makes them vibrate To know that vibrations in ear drums are transmitted to our brains **To know how sounds are made and associate sound with vibrations** To know that sounds are vibrations which are transmitted through air or other medium To know that a vibrating object makes the air or medium, such as liquids and solids vibrate as well To know that sounds cannot travel through a vacuum because there is nothing to transmit the vibrations **To know that vibrations from sounds travel through a medium to the ear.** To know that volume decreases when you get further away from the source of the sound		

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					To know that volume increase when you get closer to the source of the sound To know that found vibrations lose energy as they travel further To know that is something is making a lot of noise but it is far away then it will sound quiet To know that insulation of sound makes it quieter **To know that that sounds get fainter as the distance from the source increases.** To know that the pitch of a sound is how high or low a note is To know how to explore altering the pitch of objects (length o a guitar string, amount of water in bottles, size of tuning forks) and relate this to a pattern **To know how to find patterns between the pitch of a sound and features of the object that produced it.** To know that vibrations with lots of energy make loud sounds To know that vibrations with less energy make quieter sounds To know that the harder you hit something, the louder the sound and the softer you hit something, the quieter the sound **To know how to find patterns between the volume of a sound and the strength of the vibrations that produced it.**		

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Vocabulary					Sound, source, vibrate, vibration, travel, pitch (high, low), volume, faint, loud, insulation		
Physics (Earth and Space)			**Physics (Earth and Space)**			To know that there are 8 planets in the solar system To know that the Sun is a star at the centre of the solar system To know that Earth is one of the 8 planets in the solar system To know that the Earth and planets move around the Sun in roughly circular paths called orbits To know that it takes the Earth 365 and ¼ days to orbit the sun **To know that the movement of the Earth and planets relative to the Sun.** To know that the Moon orbits the Earth To know that it takes about 28 days for the Moon to orbit the Earth To know that the Moon looks bright because it reflects light from the Sun To know that the moon appears to change shape To know that from the Earth we see different parts of the Moon lit up as it moves around us **To know that the movement of the Moon relative to the Earth.** To know that the sun, Earth and Moon are approximately spherical To know that the Earth's axis is an imaginary line through the centre of the Earth from the North to South pole	

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						To know that the Sun, Earth and Moon are approximately spherical. To know that the Earth rotates (spins) on it's own axis To know that the Earth's axis is slightly tilted To know that the Earth takes 24 hours to rotate on it's own axis and that 24 hours is 1 day To know that when the side of the Earth facing the sun is lit up it is daytime and that when the side of the Earth that is facing away from the sun it is in darkness and that is night time To know that as the Earth is rotating, the Sun appears to move across the sky as the day goes on **To know how to explain day and night and the movement of the sun across the sky**	
Vocabulary						Earth, Sun, Moon, (Mercury, Jupiter, Saturn, Venus, Mars, Uranus, Neptune), spherical, solar system, rotates, star, orbit, planets	
Working Scientifically (Concluding)	**To know that what they have found out and how they found it out** **To know how to show they understand what happened in their investigation**	**To know that how to interpret results to understand any surprise in the results or not** **To know that scientists reflect on what they have learnt** **To know how to understand and explain/expand on what their results show** **To know how to share their new knowledge**	**Working Scientifically (Concluding)**	**To know that results are used to draw simple conclusions and raise further questions** **To know that scientific evidence is used to answer questions or to support findings** **To know how to use results to draw conclusions** **To know how to use my conclusion to ask further questions**	**To know that conclusions can be drawn from patterns, similarities and differences** **To know how to use the change in patterns, similarities and differences I have seen to help draw conclusions** **To know how to report on findings from enquiries through oral and written explanations, displays or presentations**	**To know how to report and present findings from enquiries – including conclusions, causal relationships and explanations and degree of trust in results** **To know how to identify relationships within results**	**To know how to draw conclusions based on data and observations and use evidence to justify ideas using scientific knowledge and language** **To know how to select appropriate data to justify conclusions** **To know how to identify anomalies within results and use these to inform my conclusions**
Vocabulary	Answers	New knowledge, results		Conclusion, scientific evidence, findings	Changes, similarities, differences	Relationships	Anomalies, justify

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Working Scientifically (Interpreting and Recording Data)	**To know that there are many ways to record learning** **To know how to record data in a simple table**	**To know that that there are standard units of measure which can be used to take recordings – g, kg, m, cm** **To know that that data is recorded in a table** **To know how to record data in a table using tallies** **To know how to present data using a pictogram**	**Working Scientifically (Interpreting and Recording Data)**	**To know that that standard units of measure can be used to take recordings – g, kg, m, cm, mm, l, ml** **To know how to measure using standard units of measure (g, kg, m, cm, mm, l, ml)** **To know how to represent data in a bar graph**	**To know that that results are recorded in different ways – measurements, tallies, drawings, labelled diagram, tables/charts, pictures** **To know how to record data appropriately using measurements, tallies, drawings, labelled diagrams, tables/charts and pictures** **To know how to interpret data using measurements, tallies, drawings, labelled diagrams, tables/charts and pictures**	**To know how to record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs** **To know how to choose specific/appropriate methods of recording**	**To know that how to recognise and remove outliers from a set of data** **To know that what discrete and continuous data is** **To know how to justify the removal of outliers from a set of data**
Vocabulary	Record, table	Data, measure, tables, tallies		Standard units of measure	Present, interpret	Method	Outliers
Working Scientifically (Observing)	**To know how to use simple equipment e.g. magnifying glasses, microscopes** **To know that that there are ways to observe things closely – looking with magnifying glasses, microscopes**	**To know how to use simple equipment e.g. magnifying glasses, microscopes** **To know that that there are ways to observe things closely – looking with magnifying glasses, microscopes**	**Working Scientifically (Observing)**	**To know that that observations can depend on conditions for scientific enquiry** **To know how to identify the conditions that change when carrying out scientific enquiry**	**To know that that observations for scientific enquiries are limited by the accuracy of the measurements and use of equipment** **To know how to make systematic observations** **To know how to take accurate measurements in standard units**	**To know that that keeping observations as consistent as possible can improve enquiry** **To know how to take accurate measurements with increasing accuracy and precision**	**To know that how and when to repeat observations for scientific enquiries to vary conditions and make improvements** **To know how to take accurate measurements and take repeated readings when necessary**
Vocabulary	Observe, look closely, equipment	Over time, equipment, ruler, metre stick		Depend	Enquiry, systematic, accurate	Consistent, precision	Repeat, conditions
Working Scientifically (Predicting)	**To know that a prediction is saying what we think will happen using prior knowledge from the world** **To know how to suggest what might happen using some prior understanding**	**To know that we can give evidence to make our prediction stronger** **To know how to suggest what might happen using prior understanding and a causal conjunction (because)**	**Working Scientifically (Predicting)**	**To know that a prediction can be used to explain the effect something has** **To know how to predict cause and effect using a causal conjunction (because)**	**To know how to predict a trend (relationship prediction) using a causal conjunction (because)** **To know that a prediction can be used to explain the trend (relationship) between two things**	**To know how to use prior knowledge to make a relationship prediction and explain it using scientific knowledge** **To know that scientific knowledge can be used to explain a prediction** **To know how to use test results to make predictions for further tests**	**To know that predictions can be justified using scientific knowledge** **To know how to use prior knowledge to make a hypothesis about a relationship between two things and justify it using scientific knowledge** **To know how to use test results to make predictions for further comparative and fair tests**
Vocabulary	Prediction, suggest	Evidence		Explain, cause, effect	Trend	Scientific knowledge	Hypothesis, justify

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Working Scientifically (Questioning)	**To know that scientists ask questions about the world** **To know how to ask questions about the world around us**	**To know that questions can be tested to be answered** **To know how to ask questions which can be tested**	**Working Scientifically (Questioning)**	**To know that questions can be asked and answered by carrying out scientific enquiry** **To know how to ask questions which can be answered by carrying out scientific enquiry**	**To know how to ask relevant scientific questions to be answered by carrying out scientific enquiry** **To know that that relevant scientific questions need to be asked and answered through different types of scientific enquiries**	**To know that how to plan for different types of scientific enquiries to answer questions - including recognizing and controlling variables when necessary** **To know how to think of own question about scientific phenomena, analyse functions, relationships and interactions more systematically**	**To know that how and when to repeat different types of scientific enquires to answer questions** **To know how to repeat different types of scientific enquiries**
Vocabulary	World around, why, how, why	Answered, tested		Scientific enquiry	Relevant	Variables, control	Repeat, attribute, check, organise
Working Scientifically (Testing)	**To know that that there are tests to find answers to questions** **To know how to carry out tests to answer questions**	**To know that there are different ways to perform a test using simple equipment** **To know how to use simple equipment to perform a test (jugs, beakers, timers)**	**Working Scientifically (Testing)**	**To know that that how to measure tests using a range of equipment** **To know how to measure tests using a range of equipment with increasing accuracy (data loggers)**	**To know that that in a fair test one variable is changed and one variable is measured while all other conditions are kept the same.** **To know how to choose and alter appropriate variables whilst all other conditions are kept the same** **To know how to measure tests using a range of equipment with increasing accuracy (thermometers and data loggers)**	**To know that how to accurately use further test measuring devices, including digital and analogue scales, measuring cylinders and beakers** **To know that how and when to repeat tests and measurements** **To know how to use digital and analogue scales, measuring cylinders and beakers** **To know how to justify the necessity to change elements**	**To know that which testing equipment to choose to carry out a scientific enquiry** **To know that how to identify conditions that were imperfectly controlled and explain how these might affect results** **To know how to choose appropriate equipment** **To know how to control variables**
Vocabulary	Find answers to questions	Equipment, perform a test		Measure, range of equipment, suitable	Variable, conditions, alter	Accurate, repeat tests	Controlled, control test