Progression in Science

Science Intent

At Ralph Butterfield Primary school, we provide high quality science education that develops scientific knowledge and conceptual understanding through the disciplines of biology, chemistry and physics. Our ambitious and engaging curriculum provides the children with an increasing understanding of the world around them. The progressive application of substantive and disciplinary knowledge, utilising high level scientific vocabulary, highlights the importance of science in our daily lives now and in the future.

The aims of teaching Science in our school are to:

- Build on the children's enthusiasm and curiosity about the world in which they live.
- Inspire the children's curiosity and fascination about the natural and man-made world through the teaching of how to respect and protect the environment.
- Provide a stimulating environment where children can be ambitious and work in an investigative way.
- Develop, through practical work, the skills of observation, prediction, investigation, interpretation, communication, questioning and hypothesising, and precise measurement skills.
- Encourage and enable children to offer their own suggestions, and to be creative and ambitious in their approach to science, taking lines of enquiry in ways that interest them.
- Enable children to develop their co-operation and collaboration skills when working with others.
- Encourage children to collect relevant evidence and to question outcomes.
- Encourage children to treat the living and non-living environment with respect.
- Promote the need for personal and group safety with the correct use and storage of resources.
- Encourage children to critically question the world around them.
- Equip children with the language to be able to discuss their learning and confidently explain their scientific understanding.

National Curriculum and Topic Coverage						
	Autumn 1	**Autumn 2**	**Spring 1**	**Spring 2**	**Summer 1**	**Summer 2**
EYFS Year A & B	**Marvellous Me (autumn week)**	**Let's celebrate**	**Amazing Animals (winter week)**	**Traditional tales (spring week)**	**In the garden**	**Dinosaurs (summer week)**
KS1 Year A	**Living things and their habitats (Yr2)** **Seasonal change (Autumn) ** (Yr1)**		**Everyday materials (Yr1)** **Seasonal change (Winter) ** (Yr1)**	**Uses of everyday materials (Yr2)**	* (butterfly observation / lifecycle of a plant) **Seasonal change (Spring) ** (Yr1)**	* (butterfly observation / lifecycle of a plant) **Seasonal change (Summer) ** (Yr1)**
KS1 Year B	**Animals including humans (Yr1)** **Seasonal change (Autumn) ** (Yr1)**	**Animals including humans (Yr2)**	* (materials investigation) **Seasonal change (Winter) ** (Yr1)**	* (micro-habitat investigation) **Seasonal change (Spring) ** (Yr1)**	**Plants (Yr1)**	**Plants (Yr2)** **Seasonal change (Summer) ** (Yr1)**
LKS2 Year A	**Animals including humans (Yr3)**	**Animals including humans (Yr4)**	**Rocks (Yr3)**		**Forces and magnets (Yr3)**	**Light (Yr3)**
LKS2 Year B	**States of matter (Yr4)**	**Sound (Yr4)**	**Living things and their habitats (Yr4)**	**Electricity (Yr4)**	**Plants (Yr3)**	
UKS2 Year A	**Living things and their habitats (Yr5)**	**Living things and their habitats (Yr6)**	**Light (Yr6)**	**Properties and changes of materials (Yr5)**	* (plants or magnets investigation)	**Forces (Yr5)**
UKS2 Year B	**Evolution and inheritance (Yr6)**	**Earth & Space (Yr5)**	**Electricity (Yr6)**	* (light or sound investigation)	**Animals including humans (Yr5)**	**Animals including humans (Yr6)**
Key	**Biology topic**		**Chemistry topic**		**Physics topic**	

* When no science unit is taught an investigation / observation should take place within the half term focusing on working scientifically and with either a cross curricular link or a link to a previous topic covered as a stand-alone topic in a previous key stage / year. Suggestions are in place, but these may alter depending on curriculum coverage of other subjects.

** Seasonal change half term coverage may vary due to term dates. All four seasons to be covered throughout the school year, including an overall summary of all four seasons.

Year Groups	EYFS - Reception	Year 1 and Year 2	Year 3 and Year 4	Year 5 and Year 6
National Curriculum **Working Scientifically (Disciplinary Knowledge)**	**ELG: Listening, Attention and Understanding** • Make comments about what they have heard and ask questions to clarify their understanding. **ELG: Fine motor skills** • Use a range of small tools, including scissors, paint brushes and cutlery. **ELG: Building Relationships** • Work and play cooperatively and take turns with others. **ELG: Speaking** • Participate in small group, class and one-to-one discussions, offering their own ideas, using recently introduced vocabulary.	**Year 1 & 2** **Working scientifically** • Ask simple questions and recognise that they can be answered in different ways. • Observe closely, using simple equipment. • Perform simple tests. • Gather and record data to help answer questions. • Identify and classify. • Use their observations and ideas to suggest answers to questions.	**Year 3 & 4** **Working scientifically** • Ask relevant questions and use different types of scientific enquiries to answer them. • Set up simple practical enquiries, comparative and fair tests. • Make systematic and careful observations and, where appropriate, take accurate measurements using standard units, use a range of equipment, including thermometers and data loggers. • Gather, record, classify and present data in a variety of ways to help answer questions. • Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables. • Report findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. • Identify differences, similarities or changes related to simple scientific ideas and processes. • Use straightforward scientific evidence to answer questions or to support their findings. • Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.	**Year 5 & 6** **Working scientifically** • Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. • Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate. • Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. • Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations. • Identify scientific evidence that has been used to support or refute ideas or arguments. • Use test results to make predictions to set up further comparative and fair tests.

National Curriculum Substantive Knowledge	**EYFS - Reception Objectives below in topic areas.**	Year 1 Objectives below in topic areas.	Year 2 Objectives below in topic areas.	Year 3 Objectives below in topic areas.	Year 4 Objectives below in topic areas.	Year 5 Objectives below in topic areas.	Year 6 Objectives below in topic areas.

Year Groups	EYFS - Reception	Year 1 and Year 2	Year 3 and Year 4	Year 5 and Year 6
BIOLOGY				
Biology - Plants **Substantive Knowledge** **Working Scientifically (Disciplinary Knowledge)** **Key Vocabulary**	**ELG: The Natural World** • Explore the natural world around them, making observations and drawing pictures of plants and animals. • 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. **ELG: Speaking** • Participate in small group, class and one-to-one discussions, offering their own ideas, using recently introduced vocabulary. **Traditional Tales (Spring 2) / In the Garden (Summer 1)** • To plant a sunflower/bean and make simple observations about its growth over time. • To be able to talk about what a plant needs to grow (soil, water, sun, light). • To identify and name basic parts of a plant (leaf, root, stem, flower). **Seasonal Changes (Autumn, Winter, Spring)** • To know that some types of trees are affected by the seasons. • To know that trees have seeds which grow into new trees. • To know that leaves grow and decay in changing seasons. • To investigate the growth cycle of trees and when fruits are harvested. **Key vocabulary** - plant, seed, flower, beanstalk, soil, water, sunlight, leaf, root, stem, flower.	**Year 1 (Year B - Summer 1)** **Plants** • To identify and name a variety of common wild and garden plants, including deciduous and evergreen trees. • To identify and describe the basic structure of a variety of common flowering plants, including trees. • **KS1 - Working Scientifically** • To ask simple questions about how plants grow and their habitat. • To use observations to answer their questions. • To observe the growth of flowers / plants. • To identify, compare and classify flowers, plants and trees. **Key vocabulary** - plant, tree, flower, leaves, petal, root, bulb, seed, trunk, branches, stem, flowering, deciduous, evergreen. **Year 2 (Year B - Summer 2)** **Plants** • To observe and describe how seeds and bulbs grow into mature plants. • To find out and describe why plants need water, light and a suitable temperature to grow and stay healthy. **KS1 - Working Scientifically** • To observe and record how plants have grown and changed over time. • To observe and record how the height of a plant changes over time. • To perform simple comparative test to show how plants need light, water and a suitable temperature to stay healthy. • To use their observations and data to answer questions. **Key vocabulary** - recap / use vocabulary from Year 1 (plant topic), water, air, light, soil, temperature, healthy, needs germination, growth, survival.	**Year 3 (Year B - Summer 1/2)** **Plants** • To identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers. • To know the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant. • To know how water is transported within plants. • To know the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. **LKS2 - Working Scientifically** • To identify the functions of different parts of a flower and record information using diagrams, labels and written explanations. • To investigate how water is transported in plants. • To observe and record how water is transported in plants. • To use evidence to answer questions about plants. • To observe and record the different stages of a plant's lifecycle. **Key vocabulary** - recap / use vocabulary from KS1 (plant topic), function, air, nutrients, transported, life cycle, pollination, seed formation, seed dispersal, stamen, style, ovule.	

Year Groups	EYFS - Reception	Year 1 and Year 2	Year 3 and Year 4	Year 5 and Year 6
Biology - Animals including humans **Substantive Knowledge** **Working Scientifically (Disciplinary Knowledge)** **Key Vocabulary**	**ELG: The Natural World** • Explore the natural world around them, making observations and drawing pictures of plants and animals. • 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. **ELG: Speaking** • Participate in small group, class and one-to-one discussions, offering their own ideas, using recently introduced vocabulary. **Marvellous Me (Autumn 1)** • To name parts of a human body. • To recognise differences between facial features. • To investigate the growth of a human from baby to adult. • To know how to keep our bodies healthy through diet, exercise and oral hygiene. **Amazing Animals (Spring 1)** • To be able to identify and state simple facts about animals from different habitats (e.g. jungle, woodland, grassland, farm, desert and polar). **Traditional Tales (Spring 2)** • To be able to identify what we get from the animals (i.e. food, wool). • To know the life cycle of a lamb and chicken. **In the Garden (Summer 1)** • To be able to identify and state simple facts about ladybirds, spiders, caterpillars, butterflies, worms and snails. • To be able to identify the life cycle of a butterfly and frog. **Dinosaurs (Summer 2)** • To be able to identify and state simple facts and features about dinosaurs e.g. Stegosaurus, Tyrannosaurus Rex, Plesiosaurus & Pterodactyl. • To participate in dinosaur digs.	**Year 1 (Year B - Autumn 1)** **Animals Including Humans** • To identify, name and classify a variety of common animals including fish, amphibians, reptiles, birds and mammals. • To identify, name and classify a variety of common animals that are carnivores, herbivores and omnivores. • To describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets). • To identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. **KS1 - Working Scientifically** • To ask simple questions about the structure of common animals and recognise that they can be answered in different ways. • To Identify and classify animals sorting them into groups (e.g. Venn diagram, table). **Key vocabulary** - animals, fish, amphibians, reptiles, birds, mammals, structure, pets, carnivores, herbivores, omnivores, human body, eyes, ears, mouth, nose, neck, arms, back, stomach, hands, feet, leg, sense, see, hear, smell, touch, taste.	**Year 3 (Year A - Autumn 1)** **Animals Including Humans** • To identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat. • To identify that humans and some other animals have skeletons and muscles for support, protection and movement. **LKS2 - Working Scientifically** • To ask questions about and research different food groups for humans. • To record findings of their food group research and use simple scientific language, drawings and labels to communicate their findings (food plate). • To record and classify information about animals with / without skeletons. **Key vocabulary** - recap / use vocabulary from KS1 (animals including humans topic), balanced diet, healthy, nutrients, saturated fats, unsaturated fats, carbohydrates, protein, fibre, fats, vitamins, minerals, water, skeleton, muscles, bone, vertebrate, invertebrate, tendons, joints, contract, relay, protect, movement, support, bones - skull, ribcage, humerus, pelvis, femur, tibia, fibula, clavicle, scapula, vertebral column.	**Year 5 (Year B - Summer 1)** **Animals Including Humans** • To describe the changes as humans develop to old age. **UKS2 - Working Scientifically** • To record measurements of human growth in tables and graphs. **Key vocabulary** - recap / use vocabulary from LKS2 (animals including humans topic), fertilisation, prenatal, gestation, reproduce, asexual reproduction, sexual reproduction, lifecycle, infancy, childhood, adolescence, adulthood, puberty, life expectancy.
		Year 2 (Year B - Autumn 2) **Animals Including Humans** • To know that animals, including humans, have offspring which grow into adults. • To find out about and describe the basic needs of animals, including humans, for survival (water, food and air). • To know and describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene. **KS1 - Working Scientifically** • To identify and classify animals and different stages of growth (e.g. adult / baby) including humans.	**Year 4 (Year A - Autumn 2)** **Animals Including Humans** • To describe the simple functions of the basic parts of the digestive system in humans. • To identify the different types of teeth in humans and their simple functions. • To construct and interpret a variety of food chains, identifying producers, predators and prey. **LKS2 - Working Scientifically** • To ask questions about the digestive system and record their findings in different ways (text, diagrams, labels etc). • To make close observations about the different types of teeth and	**Year 6 (Year B - Summer 2)** **Animals Including Humans** • To identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood. • To recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function. • To describe the ways in which nutrients and water are transported within animals, including humans. **UKS2 - Working Scientifically** • To use scientific diagrams and labels to explain the circulatory system. • To plan a scientific enquiry to identify the impact of exercise on the human body, including recognising and

Year Groups	EYFS - Reception	Year 1 and Year 2	Year 3 and Year 4	Year 5 and Year 6
	• To identify which dinosaur is a meat eater or plant eater. • To explore dinosaur fossils. **Key vocabulary** - animal, human, alive, dead, extinct, body, face, life cycle, baby, adult, change, palaeontologist, facts	• To ask simple questions about simple lifecycles (e.g. chicken, frog, butterfly) and recognise that they can be answered in different ways. • To observe real life lifecycle (e.g. through video clips) closely. • To gather and record information about their real-life lifecycle observation to help answer questions. • To use their observations based on lifecycles to suggest answers to questions. • To perform simple tests (exercise based – e.g. what happens to our bodies when we do exercise). • To record information from their simple test and use this information to answer questions. **Key vocabulary** - recap / use vocabulary from Year 1 (animals including humans topic), lifecycle, adult, young, develop, offspring, reproduce, baby, toddler, child, teenager, air, water, food, diet, nutrition, dehydrate, energy, exercise, germs, disease, hygiene, exercise, heart rate, pulse.	present this information (modelling teeth, diagrams and labels). • To ask questions about what can damage teeth. • To perform a simple practical enquire (substances that damage teeth) and record their data (tables, graphs) using this to answer their questions. • To use their results to draw simple conclusions about how to look after teeth. **Key vocabulary** - recap / use vocabulary from KS1 & Year 3 (animals including humans topic), producer, predator, prey, food chain, digest, oesophagus, stomach, small intestine, large intestine, rectum, digestive system, teeth, incisor, canine, molar, premolar.	controlling variables where necessary. • To take measurements with increasing accuracy and precision, taking repeat readings when appropriate to record heartrate during exercise. • To report and present findings from their enquiry, including conclusions. • To identify scientific evidence that has been used to support or refute ideas or arguments about the relationship between diet, exercise, drugs, lifestyle and heath. **Key vocabulary** - recap / use vocabulary from LKS2 & Year 5 (animals including humans topic), circulatory system, heart, blood vessels, oxygenated blood, deoxygenated blood, arties, capillaries, veins, drugs, alcohol, lifestyle, blood, platelets, plasma, red blood cells, white blood cells.

Year Groups	EYFS - Reception	Year 1 and Year 2	Year 3 and Year 4	Year 5 and Year 6
Biology - Living things and their habitats **Substantive Knowledge** **Working Scientifically (Disciplinary Knowledge)** **Key Vocabulary**	**ELG: The Natural World** • Explore the natural world around them, making observations and drawing pictures of plants and animals. • 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. **ELG: Speaking** • Participate in small group, class and one-to-one discussions, offering their own ideas, using recently introduced vocabulary. **Amazing Animals (Spring 1)** • To recognise some environments (deserts, grasslands, jungles, woodland, polar regions) that are different to the one in which they live. **In the Garden (Summer 1)** • To be able to talk about garden habitats. • To recognise some environments that are different to the one in which they live. **Dinosaurs (Summer 2)** • To be able to talk about the habitat and be able to create a dinosaur landscape. • To identify what was the same in the habitat and what is different now (e.g. now have houses, cars, shops and people). • To recognise some environments that are different to the one in which they live. **Key vocabulary** - living, habitat, deserts, grasslands, jungles, woodland, polar regions, sky, garden, pond, soil, earth, minibeast, different.	**Year 2 (Year A - Autumn 1 & 2)** **Living Thigs and their Habitats** • To explore and compare the differences between things that are living, dead, and things that have never been alive. • To identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other. • To identify and name a variety of plants and animals in their habitats, including micro-habitats. • To describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food. **KS1 - Working Scientifically** • To sort and classify according to whether they are living, dead or have never been alive. • To ask simple questions to help them sort and classify according to whether they are living, dead or have never been alive. • To observe closely, using simple equipment (living, dead and never been alive / animals and plants in their habitats including microhabitats). • To use their observations and ideas to suggest answers to questions about habitats. **Key vocabulary** - life processes, living, dead, never alive, food chain, food sources, habitat, microhabitat, depend, survive, woodland, urban, coastal, rainforest, artic, desert, ocean, river, mountain, garden.	**Year 4 (Year B – Spring 1)** **Living Thigs and their Habitats** • To recognise that living things can be grouped in a variety of ways. • To explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment. • To recognise that environments can change and that this can sometimes pose dangers to living things. **LKS2 - Working Scientifically** • To gather and record information about habitats and present data in a variety of ways to help answer questions. • To record their findings on habitats using simple scientific language, drawings, labelled diagrams, classification keys, bar charts, and tables. **Key vocabulary** - recap / use vocabulary from KS1 (living things and their habitats topic), classification, vertebrates, invertebrates, movement, respiration, sensitivity, growth, reproduction, excretion, nutrition, endangered species, extinct.	**Year 5 (Year A - Autumn 1)** **Living Things and their Habitats** • To describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird. • To describe the life process of reproduction in some plants and animals. **UKS2 - Working Scientifically** • To observe (real life if possible or through video) and compare the life cycles of plants and animals in their local environment with other plants and animals around the world (in the rainforest, in the oceans, in desert areas or in prehistoric times). • To ask questions and suggesting reasons for similarities and differences within lifecycles. **Key vocabulary** - recap / use vocabulary from LKS2 (living things and their habitats topic), asexual reproduction, fertilise, gestation, metamorphosis, pollination, reproductions, sexual reproduction. **Year 6 (Year A - Autumn 2)** **Living Thigs and their Habitats** • To describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals. • To give reasons for classifying plants and animals based on specific characteristics. **UKS2 - Working Scientifically** • To observe animals and classify into commonly found invertebrates and vertebrates. • Identify scientific evidence to support classifications. **Key vocabulary** - fossils, inheritance, evolution, offspring, variations, characteristics, adaptation, inherited traits, adapted traits, theory of evolution, survival of the fittest, Charles Darwin, theorist, scientist.

Year Groups	EYFS - Reception	Year 1 and Year 2	Year 3 and Year 4	Year 5 and Year 6
Biology - Evolution and inheritance **Substantive Knowledge** **Working Scientifically (Disciplinary Knowledge)** **Key Vocabulary**				**Year 6 (Year B - Autumn 1)** **Evolution and Inheritance** • To recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents. • To identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution. **UKS2 - Working Scientifically** • To identify scientific evidence that has been used to support or refute ideas or arguments about evolution. **Key vocabulary** - evolution, fossil, natural selection, adaptive traits, inherited traits, inheritance, variations, characteristics, habitat, environment (vocabulary builds on KS1 and KS2 previous topics e.g. Rocks, living things and their habitats).

CHEMISTRY				
Year Groups	**EYFS - Reception**	**Year 1 and Year 2**	**Year 3 and Year 4**	**Year 5 and Year 6**
Chemistry - Materials (Including changing state) **Substantive Knowledge** **Working Scientifically (Disciplinary Knowledge)** **Key Vocabulary**	**ELG: The Natural World** • Understand some important processes and changes in the natural world, including the seasons and changing states of matter. **ELG: Speaking** • Participate in small group, class and one-to-one discussions, offering their own ideas, using recently introduced vocabulary. **KS1 readiness objectives** • To recognise that different everyday objects are made from different materials. • To describe how different objects look and feel. **Let's celebrate (Autumn 2)** • To cook and make salt dough decorations. • To be able to identify what happens when you add heat/cook objects (Christmas link). • To make Diwali Diva lamps out of salt dough. **Traditional Tales (Spring 2)** • To make porridge. • To bake gingerbread men. • To cook pancakes. **Easter - making Easter nests** • To look at how we need to melt the chocolate to make the nests and then how it goes hard again. **Winter** • To investigate ice outside. How does ice form, what happens when we bring it inside or the sun comes out? **Key vocabulary** - cooking, baking, mixing, change, wet, dry, hard, soft, heat, melt	**Year 1 (Year A - Spring 1)** **Everyday Materials** • To distinguish between an object and the material from which it is made. • To identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock. • To describe the simple physical properties of a variety of everyday materials. • To compare and group together a variety of everyday materials on the basis of their simple physical properties. **KS1 - Working Scientifically** • To ask questions about everyday materials. • To perform a simple test to identify the best material for a particular purpose (e.g. waterproof wellies, crash mat). • To gather and record data using appropriate charts and tables. • To use their observations about materials to answer questions. **Key vocabulary** - object, material, plastic, wood, glass, metal, water, rock, properties, hard, soft, stretchy, shiny, dull, rough, bendy, waterproof, absorbent, transparent, opaque. **Year 2 (Year A – Spring 2)** **Uses of Everyday Materials** • To identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. • To find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. **KS1 - Working Scientifically** • To perform simple tests to explore how materials can change. • To ask questions about how materials can change and use their observations to answer questions.	**Year 4 (Year B - Autumn 1)** **States of Matter** • To compare and group materials together, according to whether they are solids, liquids or gases. • To observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C). • To identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. **LKS2 - Working Scientifically** • To ask questions about solids, liquids and gases. • To perform a simple fair test, record accurate measurements and use these to draw simple conclusions. (e.g. does gas have weight? Melting speed/temperatures of different substances) • To make observations about materials and what happens when they are heated or cooled. • To record their observations and use this information to answer posed questions about heating / cooling materials. • To observe and record the effects of evaporation over a period (e.g. puddle / washing line) and explain their observations using scientific vocabulary. **Key vocabulary** - recap / use vocabulary from KS1 (everyday materials and uses of everyday materials). states of matter, change, solids, liquids, gases, water vapour, melt, melting, freeze, frozen, evaporate, evaporation, condense, condensation, precipitation, water cycle.	**Year 5 (Year A – Spring 2)** **Properties and Changes of Materials** • To compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets. • To know that some materials will dissolve in liquid to form a solution and describe how to recover a substance from a solution. • To use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating. • To give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic. • To demonstrate that dissolving, mixing and changes of state are reversible changes. • To explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda. **UKS2 - Working Scientifically** • To plan and perform a scientific enquiry. (e.g. which material would be most effective for making blackout curtains) • To use diagrams and written explanations to explain how to separate mixtures. • To record information and observations about revisable and irreversible changes using scientific vocabulary. **Key vocabulary** - recap / use vocabulary from LKS2 (states of matter). conductor, insulator, transparency, dissolving, soluble, insoluble, sieving, filtering, reversible, irreversible.

Year Groups	EYFS - Reception	Year 1 and Year 2	Year 3 and Year 4	Year 5 and Year 6
		• To gather and record data based on how materials change using appropriate charts and tables. **Key vocabulary** - recap / use vocabulary from Year 1 everyday material topic. suitability, solid, changed, squashing, bending, twisting, stretching.		
Chemistry - Rocks **Substantive Knowledge** **Working Scientifically (Disciplinary Knowledge)** **Key Vocabulary**			**Year 3 (Year A - Spring 1 & 2)** **Rocks** • To identify natural and man-made rocks. • To compare and group together different kinds of rocks based on their appearance. • To compare and group together different kinds of rocks based on simple physical properties. • To understand the rock cycle (how rocks are formed). • To describe in simple terms how fossils are formed when things that have lived are trapped within rock. • To recognise that soils are made from rocks and organic matter. **LKS2 - Working Scientifically** • To record and present information about the three types of rock. • To make observations about the appearance of rocks. • To compare and group / categorise rocks according to their appearance and physical properties. • To record information using scientific vocabulary explaining what a fossil is and how fossils are formed. • To ask and answer questions about how fossils are formed. • To ask and answer questions about how soil is formed. • To record and present information about soil and how it is made. **Key vocabulary** - rock, grains, igneous rock, sedimentary rock, metamorphic rock, magma, lava, volcanic, sediment, permeable, impermeable, fossilisation, erosion, palaeontology, soil, natural rock, man-made rock and a variety of rock names e.g. granite, basalt, chalk, limestone, marble, slate, brick, concrete.	

PHYSICS				
Year Groups	**EYFS - Reception**	**Year 1 and Year 2**	**Year 3 and Year 4**	**Year 5 and Year 6**
Physics - Electricity **Substantive Knowledge** **Working Scientifically (Disciplinary Knowledge)** **Key Vocabulary**			**Year 4 (Year B – Spring 2/Summer 1)** **Electricity** • To identify common appliances that run on electricity. • To construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers. • To identify 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. • To recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit. • To recognise some common conductors and insulators, and associate metals with being good conductors. **LKS2 - Working Scientifically** • To present information using a variety of media about how electricity is generated. • To present information using a variety of media about how to stay safe when using electricity. • To categorise common appliances and sources of electricity. • To draw accurate diagrams of electrical circuits and label them using scientific vocabulary. • To ask questions about electrical circuits and use their knowledge of circuits to work out if a circuit will work effectively. • To perform an investigation to find out which materials are good conductors. • To record their findings using appropriate tables and charts and use the results to check a prediction or write a conclusion. • To use their findings about conductors and insulators to write a conclusion. **Key vocabulary** - electricity, generate, renewable, non-renewable, appliances, circuit, symbol, battery/cell, wire, bulb, switch.	**Year 6 (Year B - Spring 1)** **Electricity** • 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 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. • To use recognised symbols when representing a simple circuit in a diagram. **UKS2 - Working Scientifically** • To present information using a variety of media about how to stay safe when using electricity. • To plan a scientific enquire to answer a question about how the brightness of a bulb changes. • To plan a scientific enquire to answer a question about how the volume of a buzzer changes. • To record the results of their investigations using suitable charts, tables and graphs and use scientific diagrams / electrical symbols to explain their results. • To form a conclusion that includes a detailed explanation and the relationship between the voltage/number of cells and the brightness of the bulb / volume of the buzzer. • To use the knowledge gained and results of one experiment (e.g. light bulb brightness) to inform the planning of a further investigation (e.g. volume of buzzer). **Key vocabulary** - recap / use vocabulary from LKS2 (electricity topic), current, amps, voltage, resistance, electrons, series circuit.

Year Groups	EYFS - Reception	Year 1 and Year 2	Year 3 and Year 4	Year 5 and Year 6
Physics - Motion and forces **Substantive Knowledge** **Working Scientifically (Disciplinary Knowledge)** **Key Vocabulary**			**Year 3 (Year A - Summer 1)** **Forces and Magnets** • To compare how things move on different surfaces. • To notice that some forces need contact between two objects, but magnetic forces can act at a distance. • To observe how magnets attract or repel each other and attract some materials and not others. • To compare and group together a variety of everyday materials based on whether they are attracted to a magnet and identify some magnetic materials. • To describe magnets as having two poles. • To predict whether two magnets will attract or repel each other, depending on which poles are facing. **LKS2 - Working Scientifically** • To ask relevant questions about how things move (push / pull) and how the surface affected this. • To set up a practical investigation into how things move on different surfaces (car ramp). • To record findings from an investigation (car ramp) and use suitable tables, diagrams and graphs to present the data. • To classify everyday materials into categories (magnetic and non-magnetic). (magnetic field / iron filings). • To make careful observations and identify patterns about how magnets behave (e.g. strength of a magnetic investigation). • To use their knowledge of magnets to make predictions about whether they will repel or attract each other (poles) **Key vocabulary** - force, motion, move, movement, speed, surface, distance, friction, magnet, magnetic, push, pull, attract, repel, North, South, magnetic field.	**Year 5 (Year A - Summer 2)** **Forces** • To explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. • To identify the effects of air resistance, water resistance and friction, that act between moving surfaces. • To recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect. **UKS2 - Working Scientifically** • To ask questions about how objects fall. • To observe how different objects fall. • To observe the effects of friction on objects in a real-life situation. • To use scientific evidence to answer questions or to support their findings (Sir Isaac Newton's theory). • To plan and perform a scientific enquire, based on gravity and or friction where variables need to be recognised and controlled (e.g. parachute) • To take and record measurements accurately using appropriate units of measure and equipment. • To report / present the finding of their scientific enquiry using their results to form a conclusion. • To observe how leavers, pullies and gears work. • To present finding of how leavers, pullies and gears work using diagrams and labels (presentation & models). **Key vocabulary** - recap / use vocabulary from LKS2 (forces and magnets topic), gravity, theory, Sir Isaac Newton, weight, mass, friction, air resistance, water resistance, surface, mechanism, levers, pulleys, gears, variables, newtons, streamlined, buoyancy.

Year Groups	EYFS - Reception	Year 1 and Year 2	Year 3 and Year 4	Year 5 and Year 6
Physics - The Earth (Seasonal Change) **Substantive Knowledge** **Working Scientifically (Disciplinary Knowledge)** **Key Vocabulary**	**ELG: The Natural World** • Understand some important processes and changes in the natural world, including the seasons and changing states of matter. **ELG: Speaking** • Participate in small group, class and one-to-one discussions, offering their own ideas, using recently introduced vocabulary. **KS1 readiness objectives** • To know about different types of weather. • To observe changes in trees and plants as the seasons progress. **Ongoing throughout the year:** **The children will have 4 dedicated season weeks.** • To explore the natural world around them. • To describe what they see, hear and feel whilst outside. • To understand the effect of changing seasons on the natural world around them. **Key vocabulary** - autumn, winter, spring, summer	**Year 1 (Year A & B throughout the year)** **Seasonal Change** • To observe changes across the four seasons. • To observe and describe/know weather associated with the seasons and how day length varies. **KS1 - Working Scientifically** • To ask questions about the season and how things change. • To make observations about the four season. • To gather information from their observations and personal experience to answer questions about the seasons. • To identify different types of weather and link these to the corresponding season. **Key vocabulary -** night, day, week, month, year, length, sunlight, weather, season, Autumn, Winter, Spring, Summer, weather, cold, freezing, frosty, snow, hail, rain, wind, breezy, showers, sunshine, warm, hot, changes.		**Year 5 (Year B - Autumn 2)** **Earth and Space** • To describe the movement of the Earth, and other planets, relative to the Sun in the solar system. • To describe the movement of the Moon relative to the Earth. • To describe the Sun, Earth and Moon as approximately spherical bodies. • To use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky. **UKS2 - Working Scientifically** • To present knowledge about the solar system (poster). • To use measurements to create scaled scientific drawings (or model) of the relative sizes of the earth, sun and moon. • To use models to present information about the movement of the Earth relative to the sun / moon relative to the Earth. • To identify scientific evidence that has been used to support or refute ideas or arguments - geocentric & heliocentric. • To record data based on the length of the day at different times of the year using an appropriate graph. • To use scientific diagrams / vocabulary, drawings and written explanations to explain how day and night occurs. **Key vocabulary** - solar system, sphere, space, star, sun, moon (waxing crescent, waning crescent, new moon, first quarter, last quarter, waning gibbous, waxing gibbous, full moon), planet, dwarf planet (Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune, Pluto), celestial body, geocentric, heliocentric, orbit, rotate, axis.

Year Groups	EYFS - Reception	Year 1 and Year 2	Year 3 and Year 4	Year 5 and Year 6
Physics - Light **Substantive Knowledge** **Working Scientifically (Disciplinary Knowledge)** **Key Vocabulary**			**Year 3 (Year A - Summer 2)** **Light** • To recognise that they need light in order to see things and that dark is the absence of light. • To notice that light is reflected from surfaces. • To recognise that light from the sun can be dangerous and that there are ways to protect their eyes. • To recognise that shadows are formed when the light from a light source is blocked by an opaque object. • To find patterns in the way that the size of shadows change. **LKS2 - Working Scientifically** • To accurately label a diagram using scientific vocabulary (eye). • To form and ask questions about light and how we see objects. • To perform a practical enquire showing how light is reflected from different surfaces. • To record observation about the reflection of light using drawings and scientific language. • To use the results of their observations to draw a conclusion about how light is reflected in relation to the surface. • To perform a practical enquire linking to shadows length and how they are formed. • To make observations about shadows. • To take accurate measurements of shadows using standard units and appropriate equipment. • To record finding using tables / charts or diagrams and identify patterns of how the size of shadows change. **Key vocabulary** - light source, light, dark, reflection, reflect, reflective, ray, protect, shadow, see/sight, opaque, translucent, transparent, eye, pupil, retina.	**Year 6 (Year A - Spring 1)** **Light** • To know that light appears to travel in straight lines. • 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 explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes. • To use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them. **UKS2 - Working Scientifically** • To draw and label diagrams to show how light travels in straight lines and how it is reflected (angles and rays). • To observe different phenomena e.g. rainbows, objects looking bent in water, coloured filters etc. • To draw and label diagrams to show how light travels and how light is reflected into our eyes, for us to see objects (reflection and refraction). • To plan and perform a scientific enquire, with variables, into the shape of shadows (the same as the object) and how light travels. • To accurately take measurements. • To record date and present findings. • To use findings to draw conclusions that relate back to their own prediction. **Key vocabulary** - recap / use vocabulary from LKS2 (light topic), incident ray, reflected ray, reflected, refraction.

Year Groups	EYFS - Reception	Year 1 and Year 2	Year 3 and Year 4	Year 5 and Year 6
Physics - Sound **Substantive Knowledge** **Working Scientifically (Disciplinary Knowledge)** **Key Vocabulary**			**Year 4 (Year B - Autumn 1)** **Sound** • To know and identify how sounds are made, associating some of them with something vibrating. • To recognise that vibrations from sounds travel through a medium to the ear. • To find patterns between the pitch of a sound and features of the object that produced it. • To find patterns between the volume of a sound and the strength of the vibrations that produced it. • To recognise that sounds get fainter as the distance from the sound source increases. **LKS2 - Working Scientifically** • To ask questions about the sounds that can be heard, how sounds are made and how they travel. • To find patterns and give explanations about links between the amount of noise and time of day in school (survey). • To accurately label a diagram using scientific vocabulary (ear). • To perform comparative and fair tests that involves the pitch of sounds and the volume of sound (e.g. sound proofing materials) • To find patterns between the pitch of a sound and the features of the object that produced it and the vibrations it produces. • To find difference and similarities between sounds that are made and how they can be changed e.g. different thicknesses of elastic bands. • To take accurate measurements (data loggers) and record findings using charts and tables. • To report findings in writing and form a conclusion. **Key vocabulary** - sound, vibration, pitch, volume, wave, wavelength, amplitude, fainter, louder, quieter, decibels, ear, eardrum, particles.	