Woodhouse Primary School Science Curriculum

Working Scientifically objectives are taught throughout the topics shown. For Working Scientifically coverage Working Scientifically overview)

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EYFS	Y1	Y2	Y3	Y4	Y5	Y6
Growing and Planting **Essential Knowledge** **Pupils know:** - that plants need soil, water and sunlight to grow - that plants grow to different heights - fruit contains seeds - fruit is good for different parts of our bodies **Mother's day** **Pupils are introduced to the following vocabulary:** **Bulbs, plant, planting, planted, soil, sunlight, food, stem, roots, flowers, petals, cover, water, grow, growing, grown.** **Jack and the Beanstalk** **Pupils are introduced to the following vocabulary:** **Plant, bulb, seeds, soil, sunlight, water, root, stem, flower, leaves, growing, petals, life cycle, green bean, broad bean, plant, grow** **Let's plant and grow our own fruit** **Pupils are introduced to the following vocabulary:** **Fruit names, seeds, pips, stork, whole, half, quarter, skin, peel, plant, grow, sunlight, moist soil, taste, smooth, sour, citrus, ripe, fresh, zest**	**Plants** **Essential Knowledge** **Pupils can:** • identify common plants and trees, using the trees in the school grounds as examples (these include: Deciduous: sycamore, ash, cherry blossom, willow, birch. Evergreen: conifer) • explain that deciduous trees lose their leaves and evergreen trees keep them • how to name the parts of plants/trees: petal, stem, leaf, flower, root, trunk • how to describe parts of trees (including shapes of the leaves, colour of the blossom) **Objectives and key vocabulary** Sc1/2.1a identify and name a variety of common wild and garden plants, including deciduous and evergreen trees Sc1/2.1b identify and describe the basic structure of a variety of common flowering plants, including trees Pupils identify and describe plants/trees using the following vocabulary: • petals • stem • leaf • flower • seed • root • deciduous • evergreen • trunk • branch	**Plants** **Essential Knowledge** **Pupils know:** • how to explain the life cycle of a sunflower (seed, sunflower plant, flower, seeds fall) • that bulbs and seeds can grow into mature plants (narcissus bulb, sunflower seed) • what plants need to grow and stay healthy (water, light, suitable temperature) **Objectives and key vocabulary** Recapping on knowledge from Year 1, pupils revise plant parts and are introduced to their functions (petals, stem, roots, leaves, bulb) Sc2/2.2a observe and describe how seeds and bulbs grow into mature plants Pupils observe the growth of plants over time in different growth conditions (some deprived of light and water) and describing what they notice about the plants in each condition. The following vocabulary is introduced and used: • Germination • Growth Pupils explore the life cycle of a sunflower. This builds on learning about life cycles from the animals including humans topic. Pupils grow plants from seeds and bulbs and compare/observe how quickly they grow. They are briefly introduced to the concept of seed dispersal which is then built upon further in Year 3. Sc2/2.2b find out and describe how plants need water, light and a suitable temperature to grow and stay healthy. Pupils investigate how plants (cress) need water, light and a suitable temperature to grow and stay healthy.	**Plants** **Essential Knowledge** **Pupils know:** • how to identify and describe the function of different parts of plants and trees: stem – supports the plant, carries water leaves – make food for the plant flower – attract insects, produce seeds roots – anchor the plant, take in nutrients from the soil • what plants need to grow and stay healthy (air, light, water, nutrients from soil, and room to grow) • how water is transported within plants (roots absorb, travels up stem, evaporates from leaves) • how to describe the life cycle of a plant (germination, growing and flowering, pollination, fertilisation and seed formation, seed dispersal) **Objectives and key vocabulary** Sc3/2.1a identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers Building on knowledge from Y1 and Y2, pupils are now taught to describe the basic functions of the stem, leaves, flowers, roots. Photosynthesis is introduced and described as 'how the plant makes food.' Sc3/2.1b explore 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 Pupils explore the requirement of air, nutrients and room to grow during a class investigation (building on the cress investigation from Year 2). Sc3 /2.1c investigate the way in which water is transported within plants Pupils use the terms absorb, transport and evaporate to describe the process of water transportation in plants. Sc3/2.1d explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. Building on knowledge from Year 2, pupils explore the life cycle of a plant using the following vocabulary: Seed dispersal, Germination, Growing and flowering, Pollination, Fertilisation, Seed formation		Y5 cover plants within: **Living things and their habitats:** Sc5/2.1b describe the life process of reproduction in some plants and animals.	

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EYFS	Y1	Y2	Y3	Y4	Y5	Y6
All about me **Essential Knowledge:** Pupils know: • and can point to: head, hair, eyes, nose, mouth, ears, neck, shoulders, arms, elbows, wrists, hands, fingers, stomach, waist, hips, legs, knees, ankles, feet, toes, nails. • that people have different eye colours, hair colours and skin colours **Pupils are introduced to the following vocabulary:** **Grow, change, difference, baby, toddler, child, adult, parent, grandparent** **Funny bones** **Essential Knowledge** Pupils know: • and can point to the areas of bones, skull, muscles, ribs, humerus, hip, spine • that we need bones to help us move • that we need muscles to help us move and can point to the areas of **Pupils are introduced to the following vocabulary:** **Bones, skull, muscles, ribs, humerus, hip, spine** **Enquiry Learning question – World of Work – Jobs and Hobbies** **Essential Knowledge** Pupils know: • examples of jobs that help people (including: doctors, nurses, dentist) • that vets help animals • that people go to hospital when they are poorly • that medicine and operations help poorly people to get better • and can describe the feeling of having a tummy ache, a bruise, a cut	**Animals including humans** **Essential Knowledge** **Pupils know:** • how to classify animals into the following categories: mammals, fish, birds, reptiles • and can explain the meaning of omnivore (an animal that feeds on plants and animals), carnivore (an animal that feeds on other animals) and herbivore (an animal that feeds on plants) • animals that are herbivores (cows, bees, sheep), carnivores (lions, tigers, spiders) and omnivores (humans, most bears, most monkeys) • the five senses and can link them to the correct body part (hear - ears, smell - nose, taste - tongue, touch - skin, see – eyes) • and can identify the parts of the human body that can be seen (head, neck, arms, elbows, legs, knees, face, ears, eyes, hair, mouth, teeth) Sc1/2.2a identify and name a variety of common animals including, fish, amphibians, reptiles, birds and mammals Pupils are taught to identify birds, reptiles, birds, fish and mammals from familiar animals.	**Animals including humans** **Essential Knowledge** **Pupils know:** • the basic stages of the human life cycle (baby, toddler, child, teenager, adult, elderly) • the basic stages of the life cycle of a butterfly (egg, caterpillar, chrysalis, butterfly) • the offspring of familiar animals: dog – puppy, pig – piglet, sheep – lamb, cow – calf, horse – foal) • the basic needs for survival (air/oxygen, shelter, food, water) • our heart beats faster when we exercise and this helps us to be healthy • we need a balanced diet to keep healthy (we aim to eat 5 portions of fruit/veg per day) Sc2/2.3a notice that animals, including humans, have offspring which grow into adults Pupils explore the human lifecycle and how we change as we grow (Key vocabulary: life cycle, adults). They also learn about the life cycle of a butterfly (extension: life cycle of a moth). Pupils are taught to match adult animals to their offspring. Sc2/2.3b find out about and describe the basic needs of animals, including humans, for survival (water, food and air) Pupils describe the basic needs of animals by looking at the basic needs of humans and pets. Sc2/2.3c describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene. Pupils investigate the changes of	**Animals including humans** **Essential Knowledge** **Pupils know:** • how to name the nutrients found in food (including: carbohydrates, fats, protein, vitamins and minerals, dairy) • what a balanced diet needs and can describe a balanced meal • the names of many bones in the human body (including: skull, spine, ribs, pelvis) • that the function of a skeleton is to support, protect and aid movement) • that muscles and joints help them to move • the names of the main organs in the body (including: brain, heart, lungs, stomach, small intestine, large intestine) Sc3/2.2a 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 Building on knowledge taught in Y2 (living things and their habitats), pupils recap whether things are living/non-living. They are then introduced to the 7 life processes and expected to know that all 7 of the processes are required for something to be living. Building on the knowledge taught in Y2, pupils are taught about the 5 main food groups and begin to describe their benefits e.g. carbohydrates provide energy. Pupils focus on	**Animals including humans** **Essential Knowledge** **Pupils know:** • the process of digestion (mouth, oesophagus, stomach, small intestine, large intestine) and can label the main parts on a diagram of the human body • three different types of teeth and can talk about their shape and uses • examples of producers, prey and predators in a food chain • how to construct food chains Sc4/2.2a describe the simple functions of the basic parts of the digestive system in humans Pupils build on learning from Y3 (organs) by looking at the different parts of the digestive system (mouth, oesophagus, stomach, small intestine, large intestine) and explain the basic function of each part. Pupils describe how the digestive system works and the journey food has to go through. Sc4/2.2b identify the different types of teeth in humans and their simple functions Pupils are taught about, and research, the different types of teeth and their functions (molars, premolars, canines, incisors). They explore the structure of a tooth and how to keep teeth healthy. Pupils then explore animal teeth and discuss the uses for each type of tooth in herbivores, omnivores and carnivores (building on knowledge taught in KS1 and Y3) Sc4/2.2c construct and interpret a variety of food chains, identifying producers, predators and prey. Building on knowledge from Y2, pupils draw and label food chains using the following vocabulary: food chain, producer, predator, prey) and	**Animals including humans** (PSHCE objectives also taught in this topic – Changes to the body) **Essential Knowledge** **Pupils know:** • and can give examples of the changes that take place in boys and girls during puberty • how a baby changes physically as it grows • and can describe the human life cycle Sc5/2.2a describe the changes as humans develop to old age. Following on from life cycles of animals work in Y5 (Living things and their habitats) and building on knowledge taught in Y2, pupils learn the stages of a human's lifecycle and describe the stages. In addition to this, pupils learn about puberty and the changes to the body through adolescence.	**Animals including humans** **Essential Knowledge** **Pupils know:** • and can label the parts of the circulatory system • the functions of the parts of the circulatory system (including: heart keeps all the blood in your circulatory system flowing. Blood travels through a network of blood vessels to everywhere in your body. It carries useful materials like oxygen, water and nutrients and removes waste products like carbon dioxide.) • the effects of smoking and drugs on human bodies (including: heart attacks, yellow teeth, cancer, addiction) Sc6/2.2a identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood Building on knowledge from Y3, pupils learn the parts of the circulatory system: lungs, heart, veins and arteries. Pupils are taught about the four components of blood: red blood cells, white blood cells, platelets and plasma. Sc6/2.2b recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function Building on knowledge from Y2 and PE lessons throughout school, pupils explore how their heart rate reacts to different types of exercise. Building on learning from Y3, a healthy diet is explored by researching the different food types (carbohydrates, proteins, fats, sugars, dairy, vitamins and minerals, fibre, water) and their benefits and uses in the body. Pupils are taught the effects of smoking and drugs on their bodies. Sc6/2.2c describe the ways in which nutrients and water are transported within animals, including humans.

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Pupils are introduced to the following vocabulary: Jobs, hobbies, years, over time, old, new, technology, occupation, employment, caring, healthy, safe, exercise, medicine, operation, X-ray, hospital, doctors, surgery, dentist, teeth, examination, pain, ache, injury, cut, bruise, treatment, body parts, doctor, nurse, vet, dentist. **Now I am big….** **What can I do now compared to the things I could do when I was a baby?** **(Human Growth)** **Essential Knowledge** Pupils know: - that babies grow into children and then adults - that as we grow we get taller and get adult teeth **Pupils are introduced to the following vocabulary:** **Baby, toddler, child, grow, change, difference, baby, toddler, child, similarities, differences, teenager, adult, elderly adult years, hair, teeth, skin, eyes, taller** **Healthy Bodies and Super Sports** **Essential Knowledge** Pupils know: • we need to keep healthy by exercising and eating well • we need strong bones • we need to eat fruit and vegetables **Pupils are introduced to the following vocabulary:** **Years, over time, change, Olympics, countries, World Cup, teamwork, physical activity, healthy, strong, bones, exercise, football, running, swimming, netball, gymnastics, dance, rugby plus any other sports on enquiry learning question. Fruit, vegetables, vitamins, minerals, water, heart, stomach, digestive system, teeth, muscle.**	- Mammals give birth to live young - Fish live in water - Amphibians live in water and land - Birds fly except a penguin - Reptiles have scales and lay eggs on land Sc1/2.2b identify and name a variety of common animals that are carnivores, herbivores and omnivores Pupils name pets, zoo/farm animals and describe what they eat. They begin to explain that a carnivore eats meat, herbivore eats plats and omnivores eat both meat and plants. Sc1/2.2c describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals including pets) Pupils learn that mammals are the only animals that have lungs and give birth to live young, birds have wings to fly (except a penguin). Pupils explore about where animals live – on water, on land or both. Sc1/2.2d identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. Pupils name and identify body parts including: head, elbows, legs, knees, ears, eyes, hair, mouth, teeth. Pupils link the senses to the correct feature on the body.	heart rate through a range of physical activities (Key vocabulary: exercise) Pupils are **introduced** to food groups (proteins, carbohydrates, vegetables) and give examples of food from each group. Pupils are challenged to consider which lunchbox is healthiest and why. Pupils learn about hygiene by investigating effective handwashing.	the importance of a nutritionally balanced diet and how humans get nutrition from what they eat. Sc3/2.2b identify that humans and some other animals have skeletons and muscles for support, protection and movement. Pupils learn the position and basic functions of the main organs in the human body: heart, lungs, stomach, small intestine, large intestine. This learning also introduces the idea of how oxygen and nutrients are transported around the body (built upon in Year 6). Building on this knowledge, they learn about the functions of the human skeleton (protect, support, movement) also linking this to dinosaur skeletons (CCL topic). Pupils then learn about the muscular system and use the following vocabulary: contract, relax, shorten, and lengthen. During the Dinosaur topic, pupils describe dinosaurs as herbivores, carnivores and omnivores (building on knowledge from KS1.)	look at how the environment affects the food chain.		Building on knowledge taught in Y4, pupils are taught about the parts of the digestive system and their functions (mouth, oesophagus, stomach, liver, pancreas, small intestines and large intestines).

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Owl Babies **Essential Knowledge:** Pupils know that owls: • that owls live in woodland areas • that owls sleep during the day and are awake at night **Pupils will be introduced to the following vocabulary:** **Owls, barn owl, nocturnal, hunting, trees, nests, woodland, rainforests, grassy plains and deserts. Birds of Prey, claws, front facing eyes, fly, wings, glide**. **Exploring life in the Arctic** **Polar Bears** **Essential Knowledge:** Pupils know: • that polar bears live in the Arctic • that the Arctic is at the top of the world • the Arctic is cold **Pupils will be introduced to the following vocabulary:** **Arctic, Antarctica, New York, North Pole, years, coasts, explorer, polar bear, See through fur, black skin, blubber, Arctic, camouflage, cubs, carnivore, prey, seal, swimmers, paddle, predator. Northern hemisphere, arctic circle, Northern lights, Aurora borealis.** **Exploring life in the Antarctic** **Penguins** **Essential Knowledge** Pupils know: • that penguins live in the Antarctic • that the Antarctic is at the bottom of the world • the Antarctic is cold **Pupils will be introduced to the following vocabulary:** **Arctic, Antarctica, New York, North Pole, years, coasts, explorer, bird, Antarctic, Southern hemisphere, penguin, flippers, swimmers, chick, emperor, endangered, fish, colony, feathers, hunt, squid, waddle.** **Butterfly Life Cycles/The Very Hungry Caterpillar/Tadpole life cycle** Essential Knowledge Pupils know: - - that caterpillars grow and change: egg caterpillar cocoon/chrysalis butterfly - The egg develops into a caterpillar then the caterpillar makes a cocoon - the butterfly flies around and is attracted to bright flowers and		**Living things and their habitats** **Essential Knowledge** **Pupils know:** • that things can be classified into living, non-living and no longer living and can give examples (including: living – humans, animals, plants, trees, non-living – car, stones, pen, no longer living – fallen leaves, paper) • that a habitat is a home environment for plants and animals that provides the things they need to survive (air, water, food, shelter) • examples of different habitats (including: desert, ocean, woodland) • that animals are adapted to their environment and can explain how (including: meerkats – sharp claws to dig, black patches to protect eyes, fur that camouflages) • how food chains work and can explain a simple food chain (examples include: worm → bird → cat) • that on a food chain, the arrow means 'is eaten by' Sc2/2.1a explore and compare the differences between things that are living, dead, and things that have never been alive Pupils identify everyday objects into that are living, dead and have never been alive. Some pupils begin to explain how they know an object is living, non-living or never been alive. Life processes are introduced using simple vocabulary (move, breathe, grow and reproduce). Sc2/2.1b 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 Pupils explain how animals (meerkats) are adapted to their environment including its appearance, diet and habitat. Sc2/2.1c identify and name a variety of plants and animals in their habitats, including microhabitats Pupils describe different British habitats (coast, urban, woodland, pond), then match living things into their habitats and identify what		**Living things and their habitats** **Essential Knowledge** **Pupils know:** • how to group animals in different ways and come up with their own ways • examples of how an environment may change both naturally and due to human impact (current issues are discussed e.g. Australian wildfires 2019/2020) • how classification keys work and can use them to sort living things • that vertebrates are animals with a backbone and invertebrates are animals without a backbone Sc4/2.1a recognise that living things can be grouped in a variety of ways Pupils explore how animals can be grouped in different ways (including vertebrates and invertebrates.) Sc4/2.1b explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment Pupils classify animals in different ways e.g. Carroll diagrams, classification key. Sc4/2.1c recognise that environments can change and that this can sometimes pose dangers to living things. Pupils are taught how the environment can affect living things (e.g. plastic in the ocean, global warming) and what they can do to help prevent this/ improve the	**Living things and their habitats (links to plants Y1,2,3,4)** **Essential Knowledge** **Pupils know:** • examples of a range of life cycles and can identify similarities and differences between them (life cycles include: chicken, mouse, horse) • that metamorphism is a process of transformation/change • and can explain the 7 life processes: Movement, Reproduction, Sensitivity, Nutrition, Excretion, Respiration and Growth • and can identify the reproductive parts of a plant (stamen, carpel, petal, stigma, ovary) • that photosynthesis means 'how plants make food.' • Examples of naturalists and animal behaviourists (including: David Attenborough) • Examples of mammals, fish, birds, amphibians and insects and can describe their characteristics (including: mammals have hair/fur, give birth to live young) Sc5/2.1a describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird Building on knowledge taught in KS1 and lower KS2, pupils are taught the four main stages of an animals' lifecycle (birth, growth, reproduction, death). Animal lifecycles covered include: birds, insects, amphibians, reptiles, fish and mammals. Sc5/2.1b describe the life process of reproduction in some plants and animals. Building on the knowledge taught in Y3, pupils are taught the	**Living things and their habitats** **Essential Knowledge** **Pupils know:** • how Carl Linnaeus categorised animals (mammals, birds, fish, insects, amphibians) • how Aristotle classified animals (vertebrates/invertebrates) • examples of micro-organisms (including: fungi, virus, bacteria) • how to classify plants and animals based on specific characteristics and can give reasons for their choices Sc6/2.1a 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 Building on knowledge from KS1, LKS2 and Y5, pupils learn about different ways of categorising animals (different versions by Linnaeus/ Aristotle/ Whitaker and vertebrates/ invertebrates or mammals/ reptiles/ amphibians / fish / birds / insects etc.) They learn about different types of classifying micro-organism (fungi, virus, bacteria) and plants (conifer, mosses, ferns, flowering plants, grasses). Sc6/2.1b give reasons for classifying plants and animals based on specific characteristics. Building on knowledge taught previously, pupils go into more detail when classifying animals e.g. they learn about the leaves of plants and their waxy or unwaxy facets; their flowering/ non-flowering; and their ability to retain or not retain water. Pupils learn how to distinguish animals based on reproductive habits and/or warm/cold blooded circulatory system.

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feed on the nectar - how frogs grow and change: egg tadpole froglet frog **Pupils will be introduced to the following vocabulary:** **Egg, moon, leaf, Days of the week, number names, sun, cocoon, chrysalis, butterfly. Butterfly life cycle, leaf, egg, caterpillar, chrysalis, pupa, minibeast, transformation, metamorphosis.** **Egg, tadpole, legs, young frog, froglet, adult frog, frog spawn.** **What are minibeasts, where do they live and how do they survive?** **Essential Knowledge:** Pupils know: • that there are many different kinds of minibeasts • that minibeasts have different micro habitats and that they are each adapted to suit the needs of each minibeast • that minibeasts blend in well into their surroundings and that this is called camouflage **Pupils will be introduced to the following vocabulary:** **Minibeasts, caterpillars, ants, worms, spiders, ladybirds, bees.** **Micro habitat, food, water, shelter.** **Underneath, camouflage, underground, protects, predators, insects, families, vibrations, tunnels, webs, hibernate, huddle.** **Amazing Animals** **Essential Knowledge** Pupils know: • that animals live in different places around the world • and can give an example of an animal that lives in England (examples include: pig, sheep, cow) • and can give an example of an animal that lives in hotter places (examples include: lion, zebra, giraffe, elephant, cheetah) **Pupils will be introduced to the following vocabulary:** **Lion, zebra, giraffe, elephant, cheetah.**		micro habitats are found in our local habitat (under rocks, under leaves, on the soil, in bushes). Sc2/2.1d 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. Pupils are introduced to the vocabulary predator, prey, consumer and producer. When learning about a simple food chain, pupils learn that → means "is eaten by". They then identify the habitat in which the food chain would be found.		environment.	characteristics of living things/7 life processes (MRS NERG). Pupils identify the parts of a flowering plant and its reproductive organs linking to previous knowledge of life cycles from animals' topic. Building on knowledge from Y3, pupils further explain the process of seed dispersal and its influence on seed reproduction and the process of pollination. Building on the introduction of photosynthesis in Y3, pupils learn about the process of photosynthesis and how this is vital to a plant's life cycle.	

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Becoming experimenting experts/ Predicting, experimenting, testing and findings **Essential Knowledge:** Pupils know: • water freezes and turns to ice when it is cold • ice melts when it gets warmer • that objects can float or sink **Pupils will be introduced to the following vocabulary:** **Temperature, freezing, thermometer, degrees Celsius, frozen, melt, cold, colder, warmer, water, ice, frost, float, sink, water, air, bottom, top, slow, fast, predict, text, experiment, explore.**	**Everyday materials** **Essential Knowledge** **Pupils know:** • that objects can be made from different materials (including examples such as: spoons can be made from plastic, metal or wood) • how to name a variety of materials a variety of everyday objects is made from (including: window, chair, book, spoon) • that materials can be described by their properties and use the following vocabulary to describe: smooth, rough, hard, soft, strong, stiff, bendy, floppy, shiny, dull, transparent, opaque, waterproof Sc1/3.1a distinguish between an object and the material from which it is made Pupils are taught to identify the materials that an object is made from. Eg. Peg – Wood Sc1/3.1b identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock Pupils explore everyday objects and say which material they are made from. Sc1/3.1c describe the simple physical properties of a variety of everyday materials Pupils explore everyday items and begin to explain	**Uses of everyday materials** **Essential Knowledge** **Pupils know:** • that objects are made from different materials that are chosen specifically because they have suitable properties (examples include: suitable materials for wrapping paper and umbrella) • how to name an object, say what material it is made from, identify its properties and say why they are suitable e.g. bike tyre – rubber – strong, flexible) • that Charles Macintosh invented waterproof fabric and the 'Macintosh' • that some objects can be changed in shape by being squashed, bent, twisted or stretched) Sc2/3.1a identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for different uses Building on knowledge taught in Y1, pupils explore a range of materials and explain their suitability for different uses using a more complex vocabulary such as: physical properties, suitable, waterproof, strong, rigid, opaque, flexible, strong, transparent, weak, rigid, absorbent, waterproof, translucent.) They are introduced to the vocabulary natural and manmade. When learning about the suitability of materials, pupils learn about famous scientist Macintosh. Sc2/3.1b compare how things move on different surfaces. Pupils explore a range of objects and how they move on a range of different surfaces. They discuss why there might be differences. Sc2/3.1c find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching Pupils investigate how everyday objects can be changed (squash, bend, twist, stretch).		**States of Matter** **Essential Knowledge** **Pupils know:** • the properties of solids, liquids and gases (including: solids hold their shape, liquids can be poured easily, gases are often invisible and do not have a fixed shape) • how to group materials into solids, liquids and gases • everyday examples of melting and freezing (including water → ice, butter melting) • how the water cycle works and can explain using the vocabulary: precipitation, evaporation, condensation) • that water boils at 100°C and freezes at 0°C Sc4/3.1a compare and group materials together, according to whether they are solids, liquids or gases Recapping knowledge from KS1, pupils share ideas about how different materials can be grouped. They are then taught about the properties of solids, liquids and gases. They group materials based on whether they are solid, liquid or gas and explain how they know by describing their properties. Sc4/3.1b 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) Pupils investigate changes of state by exploring melting and cooling (they learn how reversible changes are affected by temperature.) Using thermometers, pupils record temperature using degrees Celsius. They also learn about the temperature of which liquids freeze/boil. Sc4/3.1c identify the part played	**Properties and changes of materials** **Essential Knowledge** **Pupils know:** • how to use their understanding of properties to explain everyday uses of materials (examples include: how bricks, wood, glass and metals are used in buildings) • that materials can be sorted in different ways and describe this by explaining how objects are recycled • what dissolving means and can give examples (examples include: coffee granules) • that materials can be recovered from solutions or mixtures by evaporation, filtering or sieving • examples of reversible and non-reversible changes (including: baking a cake, burning wood, dissolving salt) Sc5/3.1a 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 Building on knowledge taught in KS1 and LKS2, pupils learn about how materials can be sorted into different categories by linking it to recycling. They discuss the qualities materials have and group materials into a range of categories (hardness, solubility, transparency, conductivity (electrical and thermal), and magnetism) and explain how these materials could be suitable for different purposes. Pupils build on learning from KS1 by choosing suitable materials for different scenarios using the vocabulary listed above. Sc5/3.1b know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution Linking to previous learning in Y4, pupils recap the states of matter and properties of materials. Sc5/3.1c use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating Building on learning from Y4, pupils investigate separating a range of mixtures using filter paper, a sieve and evaporation. Sc5/3.1d give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic Building on learning from KS1, pupils investigate the	

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	the suitability of their material. Eg. Scissors are made from metal as it is strong. Canvas is a good material for a tent because it is waterproof. Sc1/3.1d compare and group together a variety of everyday materials on the basis of their simple physical properties Pupils explore everyday objects and group them together based on a common property. E.g Waterproof/not waterproof (object, material, senses, wood, plastic, metal, water, rock, solid, rough, smooth, transparent and opaque.)			by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. Pupils are taught how the water cycle works and discuss key processes (evaporation, condensation, precipitation) They are introduced to particles and what happens to them when they are heated and cooled. This is then linked to the water cycle.	properties of materials and explain why they are suitable for a range of uses in everyday life. Vocabulary used includes: absorbent, conductor, durable, flexible, magnetic, permeable, soluble, transparent. Sc5/3.1e demonstrate that dissolving, mixing and changes of state are reversible changes Building on learning about changing states in Y4, pupils reverse the experiment for separating materials to see that the items can be changed back to their original form. Sc5/3.1f 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. Pupils research a range of materials and explain why they cannot be separated back to their original forms.	

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EYFS	Y1	Y2	Y3	Y4	Y5	Y6
			Rocks **Essential Knowledge** **Pupils know:** • the names of some types of rock and can give examples of their physical features (including: sandstone, marble, limestone) • how a fossil is formed (see below) • that soils are formed from rocks and living/dead matter • that the Earth is made from rocks and minerals and can label crust, mantle, inner core, outer core • that there are different types of rock: igneous, sedimentary and metamorphic Sc3/3.1a compare and group together different kinds of rocks on the basis of their appearance and simple physical properties Pupils compare and group rocks based on physical properties such as: hard, soft, shiny, dull, absorbent, non-absorbent, rough, and smooth. Sc3/3.1b describe in simple terms how fossils are formed when things that have lived are trapped within rock Pupils are taught about how the structure of the Earth is made from rocks and minerals (crust, mantle, inner core, outer core). This knowledge is built upon in Year 4 as part of the Volcanoes CCL topic). They are then taught the following vocabulary for each rock type: Igneous – magma, liquid rock, granite. Sedimentary – sediment, layers, sea bed. Metamorphic – change, pressure Pupils also learn about fossil formation in simple terms (links to Dinosaur CCL topic): 1. Swimming, dies. 2. Sinks, ocean floor. 3. Flesh rots, leaves skeleton. 4. Buried, mud and sand, layers. 5. Rock rises. 6. Worn away, exposed, discovered. Sc3/3.1c recognise that soils are made from rocks and organic matter. Pupils are taught how soil is formed in layers and use the following vocabulary to explain what soil is made of: water, minerals, air (organic matter).			**Evolution and Inheritance** **Essential Knowledge** **Pupils know:** • that the Earth and living things have changed over time • the process of evolution (natural selection - how the strongest or best adapted are most likely to survive and pass their genes on to youngsters) • examples of how plants/animals have evolved over time (including: horses, elephants, birds) • how a fossil is created (see below) • that characteristics are inherited from parents but also that offspring are not identical to their parents • about the life and work of Mary Anning (palaeontologist) Sc6/2.3a recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago Pupils recap on knowledge taught in Y3 by revising how **fossils** are created (quickly buried in sand/mud; over thousands of years the bones are replaced with minerals and the sediment crushes the form). Building on knowledge from Y3, pupils are taught how to retrieve information from fossils (what food it ate/ how it died / where it died etc.) Sc6/2.3b recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents Building on knowledge from Y5 (animals including humans), pupils recap how living things produce offspring and are taught about twins and how features or characteristics are inherited from the parents. They then relate this to animals. Sc6/2.3c identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution. Pupils learn about natural selection and how the strongest or best adapted are most likely to survive and pass their genes on to youngsters. This over time could lead to evolution. Building on from Y2 (living things and their habitats), pupils learn about helpful features that plants have that help them survive in certain environments.

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EYFS	Y1	Y2	Y3	Y4	Y5	Y6
Seasons – Autumn **Essential Knowledge:** Pupils know: • that hibernating means animals sleep/rest through the winter • examples of animals that hibernate (including: hedgehogs, dormice, bats) **Pupils will be introduced to the following vocabulary:** **Autumn, hedgehogs, dormice, bats, red squirrels, badgers.** **Hibernate, adaptation, storing, month names, woodland, storing**	**Seasonal Changes** **Essential Knowledge** **Pupils know:** • the four seasons and can identify when in the year they occur • the weather that can be expected in each season (including: colder weather in winter and warmer weather in summer) • that we have more hours of daylight in summer and less in winter • and can describe how trees change across the seasons Sc1/4.1a observe changes across the 4 seasons Pupils observe a tree in the KS1 playground to see the change over the four seasons, recording changes throughout the year. Sc1/4.1b observe and describe weather associated with the seasons and how day length varies. Pupils discuss the weather daily and are taught to describe typical weather from each season. Vocabulary used includes: rain, sun, cloud, snow, hail, windy, hot, cold, cool, warm, seasons, Spring, Summer, Autumn, Winter.	(See Geography overview – weather)	**Light** **Essential Knowledge** **Pupils know:** • that dark is the absence of light • how we can see objects in light and can label diagrams to explain • that it is dangerous to look directly at the sun as it can damage your eyes • that we need to protect our skin from the sun using sun cream, clothes and shade • the definition of transparent (allow light to pass through), translucent (allow some light to pass through) and opaque (blocks light) • how shadows are formed when objects block light, giving examples from their investigations Sc3/4.1a recognise that they need light in order to see things and that dark is the absence of light Pupils experiment with torches and discuss scenarios in order to communicate that light is needed in order to see things. Sc3/4.1b notice that light is reflected from surfaces Through experimentation, pupils learn about reflection. They are taught the following vocabulary to explain reflection: reflect, light source. They are introduced to the idea that light reflects from a surface to the eye. Sc3/4.1c recognise that light from the sun can be dangerous and that there are ways to protect their eyes Pupils are taught the following vocabulary: UV rays, protection, sun burn. This objective is taught in the PSHCE topic 'Be Safe' (TGFG week). Sc3/4.1d recognise that shadows are formed when the light from a light source is blocked by a solid object Building on knowledge from Y1, pupils use 'transparent,' 'opaque' and 'translucent' to describe shadows. They are taught that shadows are formed when a solid object partially blocks the light rays from a light source. Sc3/4.1e find patterns in the way that the size of shadows change. Pupils use mathematical skills (e.g. measuring) to investigate the size of shadows by moving the light source closer and further away from an	**Sound** **Essential Knowledge** **Pupils know:** • that sounds are made when objects vibrate • that sounds travel from a source to our ears in waves • that sound can travel through different mediums (air, water, metal) • examples of how you can change the volume of a sound e.g. I can hit the drum harder to make bigger vibrations and therefore a louder sound • that sounds get weaker as the distance from the sound source increases • that pitch can be changed (using their elastic band investigation to support their explanation) Sc4/4.1a identify how sounds are made, associating some of them with something vibrating Pupils listen to and identify a variety of sounds – describing them using the following vocabulary: pitch, volume. Through investigation, they learn how different sound sources make sound (vibration) by: moving string, moving air, hitting things. Sc4/4.1b recognise that vibrations from sounds travel through a medium to the ear Through discussion and investigation, pupils explore how sound travels through a medium to reach the ear and how sound can travel through a solid as well as air. Sc4/4.1c find patterns between the pitch of a sound and features of the object that produced it Pupils learn about pitch by investigating using different sized elastic bands. They give explanations for their findings. Sc4/4.1d find patterns between the volume of a sound and the strength of the vibrations that	**Earth and Space** **Essential Knowledge** **Pupils know:** • the Earth is part of the Solar System • the sun is a star at the centre of the solar system • there are 8 planets and 5 dwarf planets that orbit the sun • The moon orbits the Earth • The Earth rotates on its axis every 24 hours, causing day and night as different parts of the planet face the sun • The sun, moon and Earth are roughly spherical Sc5/4.1a describe the movement of the Earth, and other planets, relative to the Sun in the solar system Pupils are taught the planets in the solar system, their distance from the sun and the time take to orbit the sun. They learn how planets **orbit** the sun and conduct research into a specific planet from the solar system. Sc5/4.1b describe the movement of the Moon relative to the Earth Pupils study solar and lunar eclipses and how this is affected by planets movement. They explain how solar and lunar eclipses happen and further focus on the different phases of the moon depending on its position when orbiting earth. Sc5/4.1c describe the Sun, Earth and Moon as approximately spherical bodies Pupils describe the approximate shape of planets in the solar system. Sc5/4.1d use the idea of the Earth's rotation to explain day and night, and the apparent movement of the sun across the sky. Pupils study how the earth orbits the sun and the direction in which the earth does orbit the sun. Pupils explain how this happens and how	**Light** **Essential Knowledge** **Pupils know:** • that light appears to travel in straight lines • that light may come directly from light sources or some light must be reflected from the object into our eyes in order for it to be seen (they can demonstrate this on diagrams) • that shadows are the shape of the object because light travels in straight lines • the basic biology of an eye and can label: lens, iris, pupil and retina Sc6/4.1a recognise that light appears to travel in straight lines Through investigation, pupils deepen their understanding of knowledge taught in Y3 of how light reflects from a surface into the eye. After recapping how shadows are formed (previously taught in Y3), pupils investigate why some shadows are darker than others, referring to objects which are transparent, translucent and opaque. Sc6/4.1b 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 Through investigation, pupils prove that light travels in a straight line. They use mirrors and the idea of reflection to see objects around corners or behind cupboards. Sc6/4.1c 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 Pupils are introduced to the biology of the eye and how this helps us see objects. The key vocabulary includes: lens, iris, pupil and retina. Pupils explore a variety of optical illusions and discuss the reflection of light 'tricking' the eye.

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			object.	produced it. Through investigation, pupils compare and explain volume linking it to the strength of vibrations and how volume is recorded/what it can look like. Sc4/4.1e recognise that sounds get fainter as the distance from the sound source increases Through investigation and discussion, pupils learn that sounds get fainter and the distance from the sound increases.	long it takes the earth to orbit the sun, and further how this causes day and night.	Sc6/4.1d use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them Pupils use torches to investigate how different shadows are formed and focus on the shape of the object. Building on from knowledge taught in Year 3, pupils carry out their own investigation into how the height of the light source affects the length of the shadow or the position of the light source affect the size of the shadow. This also links to work on the sun from Year 5.

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EYFS	Y1	Y2	Y3	Y4	Y5	Y6
			Forces and Magnets **Essential Knowledge** **Pupils know:** • examples of forces in everyday life (friction and magnetism) • examples of how objects move differently on different surfaces (e.g. the toy car on wood/carpet) • that magnets have two poles – north and south • if magnets will attract or repel depending on their position • examples of everyday materials that are attracted to magnets • examples of everyday materials that are not attracted to magnets Sc3/4.2a compare how things move on different surfaces Building on knowledge taught in Y2, pupils investigate how a range of objects move on different surfaces, exploring friction and the force used to make the objects move. E.g. toy car. Sc3/4.2b notice that some forces need contact between 2 objects, but magnetic forces can act at a distance Pupils are introduced to friction as a force between two surfaces that are sliding, or trying to slide, across each other. They are taught that friction works in the opposite direction to the moving object. Sc3/4.2c observe how magnets attract or repel each other and attract some materials and not others Pupils spend time investigating magnets, describing what they notice using 'attract,' 'repel' and 'magnetic force.' Sc3/4.2d compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials Through investigations, pupils compare and group everyday objects based on whether or not they are magnetic. Sc3/4.2e describe magnets as having 2 poles Pupils are taught that magnets have 2 poles and investigate them using a range of magnets. Sc3/4.2f predict whether 2 magnets will attract or repel each other, depending on which poles are facing. Pupils predict whether 2 magnets will attract or repel based on what they have discovered during investigations.		**Forces** **Essential Knowledge** **Pupils know:** • what gravity is (The force that pulls things to the ground on Earth (and other planets)) • how to demonstrate the effect of gravity on an unsupported object and can describe the process • examples of water resistance (including: swimming, a boat) • examples of air resistance (including: aeroplane) • how leavers, pulleys and gears allow a smaller force for a greater effect • that Isaac Newton discovered gravity Sc5/4.2a explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object Pupils study the theories of Galileo and Isaac Newton with regards to gravity and forces. Pupils study how Isaac Newton discovered gravity, and further conduct a scientific experiment dropping bottles of different mass and size from a platform testing gravitational pull. This learning links to the Y5 'Earth and Space' topic. Sc5/4.2b identify the effects of air resistance, water resistance and friction, that act between moving surfaces Building on knowledge taught in Year 3, pupils are taught and then explain what friction, air resistance and water resistance are. In addition to this they create their own scientific experiments to test the above forces. Pupils test the force of friction by testing an item with a Newton metre across a range of surfaces, seeing how the surface can affect the speed of this. Pupils test air resistance by using a variety of materials and running across the playground. Pupils test water resistance by dropping materials of different mass and size into a water container. Sc5/4.2c recognise that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect Pupils investigate and test the use of levers, gears and pulleys using equipment and learn about the differences between them. This learning links to the Y4 DT topic – levers.	

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EYFS	Y1	Y2	Y3	Y4	Y5	Y6
				Electricity **Essential Knowledge** **Pupils know:** • examples of objects that require electricity to function and that some plug into the mains and some run on batteries (examples include: TV, tablet, fridge, mobile phone) • how to construct a simple circuit (a cell or battery connected to a component using wires) • how to identify and name components in a circuit (wires, bulbs, batteries, motors, cells, switches and buzzers) • if there is a break in the circuit, the circuit will not work • the function of a switch in a circuit (turning the flow of electricity on or off) • the difference between a conductor and an insulator and can give examples (including: metal and water, rubber and wood) Pupils are taught the symbols for the following components and use them to draw diagrams of simple circuits: wire, bulb, battery, cell, motor, switch. Sc4/4.2a identify common appliances that run on electricity Pupils group appliances based on whether they run on battery, electricity or both. Sc4/4.2b construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers Pupils learn about **electrical circuits**, how they work and what would happen if a circuit is broken. They identify and name key components wire, bulb, single cell (battery), double cell (battery), buzzer and switch. Pupils construct circuits and are encouraged to explore ways to add more components e.g. buzzer, switch. Sc4/4.2c 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 Through investigation, pupils identify whether or not a lamp will light in a simple series circuit then they discuss their findings and reasons for these findings. Sc4/4.2d recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit Through investigation, pupils explore switches then they discuss their findings and reasons for these findings. Sc4/4.2e recognise some common conductors and insulators, and associate metals with being good conductors. Pupils are introduced to the following vocabulary: conductors, insulators. They predict which materials they think will conduct/ insulate and why. Pupils test different materials to prove or disprove their predictions. They also explore the common properties of materials which conduct and insulate electricity.		**Electricity** **Essential Knowledge** **Pupils know:** • how to draw circuit diagrams using correct symbols • that adding more cells to a complete circuit will make bulbs brighter, motors spin faster or buzzers louder • that the above also happens if you use a battery with a higher voltage • that adding more bulbs to a circuit will make bulbs dimmer (also motors slower and buzzers quieter) • that a break in a circuit (e.g. turning off a switch) stops the electricity from flowing and therefore the circuit will not work Sc6/4.2a associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit Building on learning from Year 4, pupils carry out their own investigation to answer the questions: how does the number of batteries affect the brightness of a bulb? How does the number of bulbs affect the brightness of the original bulb? How does the length of wire affect the brightness of a bulb? Sc6/4.2b 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 Building on learning from Year 4, pupils look a variety of different circuits and, using their knowledge of symbols, identify which circuits would not work. They explain the fault and identify how the circuit could be repaired. Sc6/4.2c use recognised symbols when representing a simple circuit in a diagram. Recapping learning from Year 4, throughout all investigations and experiments, pupils draw their own circuits using recognised symbols for each component when drawing a simple circuit. The symbols the pupils know and use are: wire, bulb, single cell (battery), double cell (battery), buzzer and switch.