THS Knowledge, Skills and Understanding Curriculum for Science

Vision

Children will leave Thomson House scientifically literate. They will be confident in their knowledge of the world, curious, courageous and possessing the inquiry skills required to further their love of learning and discovery.

Our Principles

Children use ambitious scientific language.

Children work scientifically; independently and collaboratively.

Children's science capital is enhanced.

Children learn through hands-on experiments and investigations.

Children are challenged by aspirational expectations.

The IPC units contain some science linked to the unit title. This should be taught according to the IPC, with some adjustments when the teacher feels it is appropriate. Many of the National Curriculum objectives are covered by the IPC. However, not all are. To ensure good science coverage teachers should ensure that the NC objectives are also covered in the correct term and, where possible, taught through the IPC units. Teachers should link and relate learning to the term's unit title, however, standalone lessons may be required to cover all areas of learning.

Year R should support children in all Characteristics of Effective Learning in every term but follow the below planning as a guidance of what to emphasise and encourage in each term. These aspects should be taught through the interests of the children in each particular year group so are not split up based upon a particular topic.

	Autumn		Spring		Summer	
Year R The Natural World	**Marvellous Me** Be able to use key vocabulary: sunny, rainy, cloudy, windy, snowy, hot, cold, waterproof	**Transport** Be able to use key vocabulary: seasons, Autumn, conkers, horse	**Into the Woods** Be able to use key vocabulary: seasons, winter, snow, frost, plant, soil, water, sunlight	**Wild** Be able to use the key vocabulary: mammal, cub, fawn	**Africa** Be able to use the key vocabulary:	**Dinosaurs** Be able to use the key vocabulary:

	Be able to explore the natural world around them (outdoor area) Be able to use their senses to explore the natural world Know different types of weather (sunny, rainy, cloudy, windy, snowy, hot, cold) Know how to keep dry (wellies and raincoats) Be able to observe and interact with a boat floating on water	chestnut tree, leaves, pine cones, Be able to describe changes from summer to Autumn (leaves falling off trees) Be able to make observations of a tree in autumn Be able to explore and describe natural materials Be able to use natural materials to create a tree collage Know how to keep warm (gloves, scarf, hat)	Be able to describe changes from autumn to winter Be able to make observations of snow, ice and frost Understand that ice is frozen water (changing state) Be able to understand what a plant needs to grow Be able to make observations and drawings as a plant grows (link to Jack and the Beanstalk)	Be able to describe changes from winter to spring Be able to make observations of a tree in spring Be able to draw a picture of a tree in spring Be able to draw and label pictures of wild animals Be able to understand lifecycles of a wild animal Know similarities and differences between urban and rural environments	Be able to describe the environment in Rwanda/Ghana Be able to compare the local environment with the environment in Rwanda/Ghana Be able to describe how we care for the natural world Be able to explore a sound causing a vibration Be able to explore magnets attracting and repelling objects	Be able to describe changes from spring to summer Be able to make observations of a tree in summer Be able to draw a picture of a tree in summer Be able to observe and interact with an object casting a shadow Be able to explore melting (ice to water) and freezing (water to ice) Be able to explore a boat floating on water
ELG	• Explore the natural world around them, making observations and drawing pictures of animals and plants. • Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class. • Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.					
	Autumn 1	**Autumn 2**	**Spring 1**	**Spring 2**	**Summer 1**	**Summer 2**
Year 1	**Our World** **Plants** identify and name a variety of common wild and garden plants, including deciduous and evergreen trees identify and describe the basic structure of a variety of common flowering plants, including trees	**People of the Past** **Seasonal change** observe changes across the four seasons. observe and describe weather associated with the seasons and how day length varies. Use scientific vocabulary: **change, weather, season, autumn, spring, summer, winter,** day, night, sun, moon, light,	**The Magic Toymaker** **All Dressed Up** **Materials** **distinguish between an object and the material from which it is made** **identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock.** **describe the simple physical properties of a variety of everyday materials.** **compare and group together a variety of everyday materials on the basis of their simple physical properties**		**Science – Super Humans** **Animals including humans** **identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense**	**Live and Let Live** **Animals including humans** identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. **identify and name a variety of common animals that are carnivores, herbivores and omnivores**

	Use scientific vocabulary: observe, magnifying glass, change, **deciduous, evergreen, tree, plant, leaves**, flowers, blossom, petals, fruit, **roots,** bulb, seed, trunk, branches, **stem**, wild flower, garden flower Be able to pose simple scientific questions Be able to identify ways of finding out about scientific issues Be able, with help, to conduct simple investigations Know the names of parts of plants Know that plants need light to grow Know that plants need water to grow Be able to describe the conditions needed for plants to survive Know that seeds grow into plants Be able to identify the stages of germination Be able to identify and classify deciduous and evergreen trees	dark, temperature, rain, sun, cloud, wind, storm, snow, sleet, hail Know the four seasons and identify when in the year they occur Be able to observe and describe changes to trees in different seasons Be able to observe and describe weather in different seasons Be able to observe and describe days as being longer in the summer and shorter in the winter Be able to collect information to classify weather and day length Be able to observe and record daily weather Be able to present information in tables or charts to compare the seasons Be able to record and discuss simple data Be able to observe and describe changes to animals in different seasons (hibernation) Understand how animals adapt to the changing of seasons Understand how the seasons and weather affect our daily life	*DT: explore and use mechanisms [for example, levers, sliders, wheels and axles], in their products.* Use scientific vocabulary: sort, group, **material, properties**, **wood, plastic, glass, metal,** rubber, fabric, brick, paper, card, elastic, foil, waterproof, rock, hard, soft, stretchy, stiff, shiny, dull, rough, smooth, bendy, absorbent, opaque, transparent, stretch, squeeze, bend, twist Know the difference between an object and a material Be able to describe the properties of different materials Be able to sort objects based on their properties Know which materials can be bent, squashed, twisted or stretched Be able to pose simple scientific questions Be able, with help, to conduct simple investigations Be able to gather and record data Be able to observe closely, using simple equipment Be able to use their observations to suggest answers to questions Understand that some materials are more suitable than others **Seasonal change** (1x lesson in Spring 1, 2x lessons in Spring 2) **observe changes across the four seasons.** observe and describe weather associated with the seasons and how day length varies. Use scientific vocabulary: **weather**, season, autumn, spring, summer, winter, **day, night, sun, moon, hibernation,** Know the main seasonal changes that occur across the year Be able to observe seasonal change over time	Use scientific vocabulary: **taste, touch, sight, smell, hearing,** head, neck, arms, elbows, legs, knees, face, ears, eyes, hair, mouth, teeth, tongue, nose Know and name the 5 senses Know which body part is associated with each sense Be able to observe closely, using simple equipment Be able to conduct simple investigations Be able to record data in a table Understand how the eye works Understand how sound is heard Be able to describe how things taste Be able to describe how things feel Know the names of the main external body parts of humans Be able to identify parts of the human body	**describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets).** Use scientific vocabulary: compare, animal, **fish, bird, mammal, amphibian, reptile, pet, herbivore, carnivore, omnivore**, habitat, fox, deer, parakeet, badger, hawk, falcon, goose, bat, seal, toad, frog, dog, cat, goldfish, snake, wing, beak, tail, hibernation Be able to pose simple scientific questions Be able to identify and describe a variety of common animals including fish, amphibians, reptiles, birds and mammals Be able to sort and group animals according to their features Understand that animals can be grouped according to what they eat Be able to identify and name a variety of common animals that are carnivores, herbivores or omnivores

	Be able to sort plants and trees into simple groups Understand how to set up tests to discover how plants use water Understand where flowers and insects prefer to live and grow Understand how and where seeds grow		Be able to compare and contrast seasons Be able to collect information to classify weather and day length in different seasons Be able to gather and record data Be able to use their ideas to suggest answers to questions		Be able to draw and label parts of the human body **<u>Seasonal change</u>** **observe changes across the four seasons.** Know the main seasonal changes that occur across the year Be able to observe and describe days as being longer in the summer and shorter in the winter Understand how the seasons and weather affect our daily life	Be able to compare and contrast pets and wild animals Be able to record data in simple ways (Venn diagram and flow charts) Be able to describe and compare the structure of a variety of animals Understand that different locations support different living things
Year 2	**<u>The Circus is Coming to Town</u>** **<u>Use of Everyday Materials</u>** **Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses** Use scientific vocabulary: identifying, classifying,	**<u>Brainwave</u>** **<u>Animals including humans</u>** notice that animals, including humans, have offspring which grow into adults. **find out about and describe the basic needs of animals, including humans, for survival (water, food and air).** **describe the importance for humans of exercise, *eating the right amounts***	**<u>Buildings</u>** *DT: build structures, exploring how they can be made stronger, stiffer and more stable* **<u>Materials</u>** find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.	**<u>We Are What We Eat</u>** **<u>Plants</u>** **observe and describe how seeds and bulbs grow into mature plants.** find out and describe how plants need water, light and a suitable temperature to grow and stay healthy **<u>Animals including humans</u>** **Describe the importance of eating the right**	**<u>The Earth – Our Home</u>** **<u>Hooray Let's Go on Holiday</u>** **<u>Living things and their habitats</u>** **explore and compare the differences between things that are living, dead, and things that have never been alive.** 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. **identify and name a variety of plants and animals in their habitats, including micro-habitats**	

	recording, properties, hard, soft, stretchy, stiff, shiny, dull, **rough, smooth**, bendy, **waterproof, absorbent, opaque, transparent**, brick, rubber, paper, fabric, elastic, foil, suitable, unsuitable Know that scientific enquiry involves asking questions, collecting evidence through observation and measurement Be able to pose simple scientific questions Be able to identify ways of finding out about scientific issues Be able to conduct simple comparative tests Be able to gather and record data Know the names and properties of a range of materials Know about the uses of different materials Be able to sort materials into groups according to their properties Understand which materials would make	***of different types of food,* and hygiene** Use scientific vocabulary: observation, measurement, brain, growth, **survival,** water, air, breathing, food, young, old, adult, baby, egg, hatching, grow, **offspring**, chick, kitten, calf, puppy, tadpole, froglet, frog, caterpillar, chrysalis, cocoon, butterfly, lifecycle, nutrition, **exercise, hygiene, heart, healthy** Know how the brain works Know how to record how well we are learning Know how to wake up our brain Know how to look after our brain Know how to use a growth mindset and how it helps us Be able to pose simple scientific questions Know that living things grow and reproduce Be able to describe how animals, including humans, change as they grow	Use scientific vocabulary: **Solid,** liquid, gas, **squashing, bending, twisting, stretching, pushing, pulling** Know that scientific enquiry involves asking questions, collecting evidence through observation and measurement Be able to pose simple scientific questions Be able to observe and describe changes made to materials from squashing, bending, twisting and stretching Know the differences between solids, liquids and gases Know what happens when materials are heated or cooled Understand that some materials can't change back when mixed Be able to identify ways of finding out about scientific issues Be able to conduct simple comparative tests	**amounts of different types of food** Use scientific vocabulary: observe, record, comparative test, seed, bulb, **water, light,** shade, sun, warm, cool, **temperature, growth, survival, germinate**, healthy Be able to pose simple scientific questions and recognise these can be answered in different ways Be able to identify and describe the basic structure of plants and trees Be able to make observations of seeds and bulbs Be able to describe how seeds and bulbs grow into plants Be able to describe how plants need water, light and a suitable temperature to grow Be able to conduct simple investigations Be able to gather and record data to help answer a question	**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.** Use scientific vocabulary: sorting, classifying, **living, dead, never been alive,** suitable, shelter, move, habitat, micro-habitat, environment, conditions, energy, **food chain, predator, prey,** woodland, pond, desert Living Things: Know about the basic conditions needed for living things to survive. Know that items are living, dead or never lived. Be able to sort a range of items into living, dead and never lived. Be able to identify and classify living things. Food chains: Be able to construct a food chain that starts with a plant and has arrows pointing in the correct direction. Understand how living things depend on each other. Habitats: Know a range of animals and plants that live in a habitat or micro-habitat. Know that the features of the school environment affect the types of living things found there. Be able to recognise living things in the school environment. Be able to describe the features of animals and plants which make them suitable to the habitat. Be able to explain why an animal or plant is suited to a habitat.

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	the best waterproof circus tent.	Be able to group and classify animals Know the stages of the lifecycle of different animals (frog, butterfly, chicken) including humans Be able to identify differences between adult and offspring Be able to observe changes over time Be able to describe what animals, including humans, need to survive	Be able to gather and record data Be able to use simple scientific equipment Know how to test the strength of structures. Know about materials used in structures	Be able to make observations of plants over time Be able to use their observations to suggest answers to questions Understand how some of our food grows	Know how animals are adapted to their environment. Understand that different locations support different living things (habitats) Be able to describe what the animals eat in a habitat and how the plants provide shelter for them. Be able to compare and contrast two different habitats and the animals that live there. WS: Be able to make a prediction based on scientific knowledge Be able to conduct simple investigations Be able to use their observations and ideas to suggest answers to questions Be able to gather and record data to help answer questions **Revision of KS1**	
KS1 **WS** **TAF**	• Ask their own questions about what they notice • Use different types of scientific enquiry to gather and record data, using simple equipment where appropriate, to answer questions: observing changes over time Noticing patterns Grouping and classifying things Carrying out simple comparative tests Finding things out using secondary sources of information • Communicate their ideas, what they do and what they find out in a variety of ways					
Year 3	**Chocolate** **Animals including humans** 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 **Identify that humans and some other animals have skeletons and muscles for support, protection and movement.** Know about the function and care of teeth in humans and other animal (Year 4 statement)	**Explorers and adventurers** **Light** Recognise that they need light in order to see things and that dark is the absence of light Notice that light is reflected from surfaces Recognise that light from the sun can be dangerous	**Explorers and adventurers** **Forces and magnets** Compare how things move on different surfaces **Notice that some forces need contact between two objects, but magnetic forces can act at a distance** Observe how magnets attract and repel each	**Temples, Tombs and treasures** **Rocks and Soils** **Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties**	**Temples, Tombs and treasures** **Plants** Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers **Explore the requirements of plants for life and growth (air, light, water,**

	Use scientific vocabulary: function, movement, **muscle, bone, skull, nutrition, skeleton,** teeth, carbohydrate, protein, fat, fibre, mineral, vitamin, diets, research, **healthy** Be able to research nutrition Know and use the vocabulary carbohydrate, protein, fat, fibre, mineral, vitamin Be able to identify which food different nutrients are found in Be able to sort and compare food items Be able to carry out simple investigations Be able to record information in different ways Know the names of some bones in the human body and where they are located Understand the three functions of the skeleton (support, protection and movement) Be able to explore how muscles and joints work Know about the principles of nutrition, growth, movement and reproduction Know how to keep teeth healthy Understand that teeth have different shapes and functions Be able to compare teeth of an herbivore and carnivore Be able to prepare a simple investigation which is fair, with one changing factor Be able to predict the outcome of investigations Be able to use simple scientific equipment Understand the importance of collecting scientific evidence	and that there are ways to protect their eyes **Recognise that shadows are formed when the light from a light source is blocked by an opaque object** **Find patterns in the way that the size of shadows change** Use scientific vocabulary: **light, light source, shadow,** mirror, **reflective**, reflection, **dark**, bright, opaque, transparent, translucent, shiny, surface, sunlight, measure Know that without light you cannot see Know that dark is the absence of light Be able to carry out simple investigations Be able to prepare a simple investigation which is fair, with one changing factor Be able to predict the outcome of investigations Be able to use simple scientific equipment Be able to test ideas using evidence from observation and measurement Know that light travels from a source Understand that shiny objects reflect light and	other and attract some materials and not others 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 **Describe magnets as having two poles** Predict whether two magnets will attract or repel each other, depending on which poles are facing. Use scientific vocabulary: **magnet** (bar, ring, button, horseshoe)**, magnetic, force, contact, attract, repel,** strength, friction, **poles**, metal, iron, steel, push, pull, movement, surface, gathering, recording, data Be able to observe and describe how things move by pushing and pulling Be able to record their observations in a Venn diagram Be able to investigate how cars move on different surfaces Be able to prepare a simple investigation which is fair, with one changing factor Be able to predict the outcome of investigations	Describe in simple terms how fossils are formed when things that have lived are trapped within rock Recognise that soils are made from rocks and organic matter. Use scientific vocabulary: observing, microscope, rock, stone, pebble, fossil, soil, sedimentary, **sandstone, granite, marble, pumice, chalk, slate, crystal,** absorbent, layers, hard, soft, texture, erosion Know the names of some types of rocks and give physical features of each Be able to observe rocks closely Be able to compare and group rocks in a range of ways Be able to carry out simple investigations Be able to prepare a simple investigation which is fair, with one changing factor Be able to predict the outcome of investigations Be able to use simple scientific equipment	**nutrients from soil, and room to grow) and how they vary from plant to plant** **Investigate the way in which water is transported within plants** **Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.** Use scientific vocabulary: structure, function, **oxygen, carbon dioxide**, light, water, nutrients, soil, **reproduction, transportation, dispersal, pollination**, flower Know about ways in which plants are suited to different environments Know about the frequently occurring plants that are supported by the environment around the school Know about the effects that light, air, water and temperature have on plants Be able to investigate conditions needed for life and growth Be able to record observations and measurements in a table

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			some materials reflect light better than others Know that objects form shadows when they block the passage of light from a source Be able to identify materials that are opaque, transparent and translucent Be able to explore shadows made by different objects (opaque, transparent, translucent) Be able to investigate how moving the light source affects the shadow Understand how to protect eyes from being damaged by the sun	Be able to use simple scientific equipment Be able to record findings using diagrams, charts and tables Know that forces can have direction Know that forces can differ in size Know that a magnet attracts magnetic material Be able to observe and record how magnets work Know that magnets have two poles and know how these can attract or repel Be able to sort and classify materials Know that not all metals are magnetic Be able to devise an investigation to test the strength of magnets	Be able to test ideas using evidence from observation and measurement Know the stages of fossil formation Be able to explain how a fossil is formed Be able to record observations Understand that soils are made from rocks and also contain living/dead matter	Be able to draw simple conclusions from their data Know about the functions of parts of a plant, including leaves Be able to observe what happens to plants over time when the leaves or roots are removed Be able to investigate the rate of transportation of water in plants Know about the life cycle of plants Be able to make observations of flowers Know how seeds are dispersed Be able to classify seeds by how they are dispersed
YR 3 WS	using straightforward scientific evidence to answer questions or to support their findings setting up simple practical enquiries, comparative and fair tests (Note: this is a very good term to embed additional WS skills as the knowledge content is lesser than other topics.)	making systematic and careful observations and where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers gathers, recording, classifying and presenting data in a variety of ways to help in answering questions	recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables	reporting on findings from enquiries including oral and written explanations, displays or presentations of results and conclusions	using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions identifying differences, similarities or changes related to simple scientific ideas and processes	asking relevant questions and using different types of scientific enquiries to answer them
Year 4	**Fashion**	**Fashion** **Sound**	**Active Planet** **States of matter**		**Saving the World** **Living things and their habitats**	

	About the use of colour and reflective materials in safety clothing **<u>Electricity</u>** Identify common appliances that run on electricity Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers 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 Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit Recognise some common conductors and insulators, and associate metals with being good conductors. Use scientific vocabulary: **electricity, component, positive, negative, cell,** wire, bulb, switch, buzzer, battery, motor, **circuit,** series, conductor, insulator, metal Be able to sort common appliances in different ways Know the names of components in a circuit	**Identify how sounds are made, associating some of them with something vibrating** **Recognise that vibrations from sounds travel through a medium to the ear** **Find patterns between the pitch of a sound and features of the object that produced it** **Find patterns between the volume of a sound and the strength of the vibrations that produced it** **Recognise that sounds get fainter as the distance from the sound source increases.** Use scientific vocabulary: **sound, source, vibrate**, vibration, wave, **pitch,** high, low, **volume**, faint, loud, tone, speaker, insulation, patterns Be able to make sounds with a range of objects Be able to describe how different types of objects produce different sounds Know that a sound source vibrates to produce sound waves which travel through a medium from the source to our ears Be able to describe how sounds travel through	**Compare and group materials together, according to whether they are solids, liquids or gases** **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)** **Identify the part played by evaporation and condensation in the <u>water cycle</u> and associate the rate of evaporation with temperature.** Use scientific vocabulary: **solid, liquid, gas,** state change, **evaporation, condensation, particles,** temperature, substances, melting, freezing, heating, water cycle, observe, record Be able to carry out investigations Be able to prepare a simple investigation which is fair, with one changing factor Be able to predict the outcome of investigations Be able to use simple scientific equipment (thermometer) Be able to test ideas using evidence from observation and measurement Be able to link evidence to broader scientific knowledge and understanding Be able to use evidence to draw conclusions Be able to gather information from simple texts Know properties of solids, liquids and gases Know that some solids can be poured (e.g. rice) Be able to classify materials according to whether they are solids, liquids or gases Be able to observe closely and classify a range of solids Be able to observe closely and classify a range of liquids Know that temperature is a measure of heat Know that some changes in materials are reversible and others are irreversible Be able to give everyday examples of melting and freezing Be able to investigate how to melt ice more quickly Be able to investigate melting points of different materials (chocolate, ice, butter) Be able to explore freezing different liquids	Recognise that living things can be grouped in a variety of ways Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment **Recognise that environments can change and that this can sometimes pose dangers to living things.** Use scientific vocabulary: **classification**, classification keys, vertebrates, fish, amphibians, reptiles, birds, mammals, **invertebrates**, snail, slug, worm, spider, insect, environment, **habitat, human impact** (positive and negative), deforestation, litter, nature reserve**, migrate, hibernate** Know the difference between living and non-living things Be able to sort living things in different ways (Venn diagram) Be able to classify animals according to their features Be able to classify plants according to their features Know how to use a classification key Be able to use a classification key to name unknown living things Be able to create a simple classification key based on observable features Know about processes and conditions that have an effect on living things Know and name living things living in a range of habitats Be able to observe plants and animals in different habitats Be able to compare and contrast living things observed Know about ways in which animals and plants are suited to different environments Know about the frequently occurring animals and plants that are supported by the local environment Know about conservation Know about pollution as an environmental issue Know about deforestation as an environmental issue

	Know that some materials conduct electricity Know the names of some metals that are conductors Know the names of some materials that are insulators Know that some materials conduct heat more effectively than others Understand that different materials are suited for different purposes Be able to make electrical circuits to make devices work Be able to control a circuit using a switch Be able to describe how a switch works Be able to predict the outcome of investigations Be able to use simple scientific equipment Be able to test ideas using evidence from observation and measurement Be able to record findings as a diagram Be able to change the type or number of components in a circuit to have a different effect	different mediums such as air, water, metal Be able to change sounds by altering variables Be able to find patterns between the pitch and volume of a sound and the features of the object that produced it Be able to explain how loudness can be reduced by moving further from the sound source Be able to explain how loudness can be reduced by using a sound insulating medium Be able to prepare a simple investigation about the volume of sound which is fair, with one changing factor Be able to predict the outcome of investigations Be able to use simple scientific equipment Be able to test ideas using evidence from observation and measurement Be able to link evidence to broader scientific knowledge and understanding Understand how the strength of a vibration impacts the volume of a sound	Be able to use a thermometer to measure temperatures Be able to give everyday examples of evaporation and condensation Be able to observe and describe water evaporating and condensing Be able to describe the water cycle	Be able to use fieldwork to explore human impact on the local environment Be able to use secondary sources to find out about how environments may naturally change Be able to use secondary sources to find out about human impact, both positive and negative, on environments Understand that human actions can impact on the environment and suggest some solutions to environmental issues Understand why particular animals and plants live in the rainforest **<u>Animals including humans</u>** **Describe the simple functions of the basic parts of the digestive system in humans** **Construct and interpret a variety of food chains, identifying producers, predators and prey.** Identify the different types of teeth in humans and their simple functions. (revise as covered in Year 3 Chocolate). Use scientific vocabulary: **digestive,** mouth, tongue, teeth, **oesophagus, stomach, small intestine, large intestine**, herbivore, carnivore, **canine, incisor, molar** Know that food enters the body through the mouth and digestions starts when the teeth start to break down food Be able to sequence the main parts of the digestive system Be able to describe what happens in each part of the digestive system Be able to use diagrams to describe the journey of food through the body Be able to name producers, predators and prey within a habitat Be able to use food chains to identify producers, predators and prey within a habitat Be able to construct food chains Be able to classify animals as herbivores, carnivores or omnivores according to the type of teeth they have

					Know the three different types of teeth and what they are used for Be able to link evidence to broader scientific knowledge and understanding Be able to use evidence to draw conclusions	
YR 4 WS	asking relevant questions and using different types of scientific enquiries to answer them setting up simple practical enquiries, comparative and fair tests	making systematic and careful observations and where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers gathers, recording, classifying and presenting data in a variety of ways to help in answering questions	recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables	reporting on findings from enquiries including oral and written explanations, displays or presentations of results and conclusions	using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions identifying differences, similarities or changes related to simple scientific ideas and processes	using straightforward scientific evidence to answer questions or to support their findings
Year 5	**Go With the Flow** **Forces** **Explain that unsupported objects fall towards the Earth because of the force of gravity** **Identify the effects of air resistance, water resistance and friction, that act between moving surfaces** **Recognise that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect.** *DT: understand and use mechanical systems in*	**Mission to Mars** **Earth and Space** **Describe the movement of the Earth and other planets relative to the sun in the solar system** **Describe the movement of the moon relative to the Earth** Describe the sun, Earth and moon as approximately spherical bodies **Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky** Use scientific vocabulary: **Earth, sun, moon, axis, rotation, day, night,**	**The Great, The Bold, The Brave** **Properties and changes of Materials** **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** Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution **Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating** Give reasons based on evidence from comparative and fair tests for the particular uses of everyday materials, including metals, wood and plastic **Demonstrate that dissolving, mixing and changes of state are reversible changes** **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.		**Earth as an Island** **Living things and their habitats** **Describe the differences in the lifecycles of a mammal, an amphibian, an insect and a bird.** **Describe the life processes of reproduction in some plants and animals**	**Earth as an Island** **Animals, including humans** **Describe the changes as humans develop to old age.** Use scientific vocabulary: **foetus, embryo, womb, gestation,** baby, toddler, teenager, elderly, growth, **development, puberty** **Growing Up** Be able to gather evidence from a variety of sources Be able to discriminate between evidence and opinion Understand some of the effects of what they learn on people's lives

Commented [CS4]: @Jackie Sanders while we do talk about some of the skills associated with cooking in this section, it isn't obvious form the curriculum. Over last lockdown I did a lot of food science at home (bread etc)

	their products [for example, gears, pulleys, cams, levers and linkages] Use scientific vocabulary: **air resistance, water resistance, friction, gravity, Isaac Newton,** Galileo Galilei, gears, pulleys, levers, springs, parachute, faster, slower, movement, fair test **Mission to Mars** Be able to conduct scientific investigations posing scientific questions Be able to choose an appropriate way to investigate a scientific issue Be able to make systematic and accurate measurements from their observations Be able to explain and justify their predictions,	sundial, phases of the moon, star, constellation, solar system, Mercury, Venus, Mars, Jupiter, Saturn, Uranus, Neptune, Ptolemy, Alhazen, Copernicus **Mission to Mars** Be able to record and communicate their findings accurately using the most appropriate medium and the appropriate scientific vocabulary and conventions Be able to gather evidence from a variety of sources Be able to discriminate between evidence and opinion Understand the importance of using evidence to test scientific ideas Understand some of the effects of what they learn on people's lives Know about the relationship between the Earth and the rest of the solar system Know that day and night are related to the Earth spinning on its axis Know about the time taken for the Earth to orbit the sun and for the moon to orbit the Earth Know about the effects caused by the Earth moving	*DT: apply their understanding of how to strengthen, stiffen and reinforce more complex structures* Use scientific vocabulary: hardness, **solubility, transparency, conductivity, magnetic**, reversible, evaporation, filtering, **dissolving, mixing,** sieving, burning, rusting, chemists, Spencer Silver (invented the glue for sticky notes), Ruth Benerito (invented wrinkle free cotton), effective **Making New Materials** Be able to conduct scientific investigations posing scientific questions Be able to choose an appropriate way to investigate a scientific issue Be able to make systematic and accurate measurements from their observations Be able to explain and justify their predictions, investigations, findings and conclusions Be able to record and communicate their findings accurately using the most appropriate medium and the appropriate scientific vocabulary and conventions Know the distinctive properties of materials Know about the principles of materials acting as thermal insulators Know what happens when materials are heated and cooled Know about differences between metals and other materials Know that matter is made up of particles Know about the different arrangements of particles in solids, liquids and gases Be able to group and classify materials according to their properties Be able to identify changes that are reversible or irreversible Be able to separate simple mixtures Be able to recover dissolved solids through evaporation Know that heat can move from one object to another by conduction	Use scientific vocabulary: **mammal, reproduction, insect, amphibian, bird, offspring, lifecycle,** sexual, asexual, gamete, stamen, stigma, carpel, pistil, pollination, naturalist, animal behaviourist (David Attenborough, Jane Goodall) Be able to dissect and label the parts of a flowering plant, including male and female structures Know the lifecycle and reproduction of a flowering plant Know about the process of natural and artificial asexual reproduction in plants Be able to describe the life processes of reproduction in some plants and animals Be able to plan a scientific enquiry to answer questions	Understand the relationship between living things and the environment in which they live Know about the structure of the human body Know the functions of the major internal and external parts of the human body Know about similarities and differences between humans and other creatures Know about the ways in which humans and other animals reproduce Know that some characteristics of humans and other animals are inherited from their parents

	investigations, findings and conclusions Know that matter is made up of particles Know about the nature and effect of gravitational force Be able to identify the effects of physical forces Be able to measure forces Be able to identify the direction of forces		Understand what happens when we dissolve or melt things		Be able to identify scientific evidence that supports or refutes ideas Be able to describe the differences in life cycles of a mammal, an amphibian, an insect and a bird Be able to record data and results using scientific diagrams and labels Be able to report and present findings, including conclusions Be able to take measurements, using a range of scientific equipment	
YR 5 WS	planning different types of scientific enquiries to answer questions, including recognising and controlling variables	taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate	recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatters graphs, bar and line graphs	using test results to make predictions to set up further comparative and fair tests	reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations	identifying scientific evidence that has been used to support or refute ideas or arguments

Year 6	**Time Tunnel** **No Science content** **Electricity** Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit 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 Use recognised symbols when representing a simple circuit in a diagram ***Use simple apparatus to construct and control a series circuit, and describe how the circuit may be affected when changes are made to it; and use recognised symbols to represent simple series circuit diagrams*** *DT: understand and use electrical systems in their products [for example, series circuits incorporating switches, bulbs, buzzers and motors]* Use scientific vocabulary: component, cell, wire, bulb, **switch**, motor, buzzer, battery, circuit, **series, conductor, insulator, amp, voltage,** brightness, volume, danger, safety, symbols Know about the differences between metals and other materials Be able to group and classify materials according to their properties Know that heat is often produced as a by-product when one form of energy is converted to another Know that heat can move from one object to another by conduction Be able to represent electrical circuits in drawings using conventional symbols Be able to construct circuits on the basis of drawings using conventional symbols Be able to vary an electrical circuit to change its effect	**The Holiday Show** **No Science Content** **Evolution and Inheritance** 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 Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution ***Use the basic ideas of inheritance, variation and adaption to describe how living things have changed over time and evolved; and provide evidence for evolution*** Use scientific vocabulary: **fossil, adaptation, evolution, characteristic,** reproduction**, genetics, variation, inherit,** advantage, disadvantage, identical, not identical, offspring, Charles Darwin, Mary Anning, Alfred Wallace **Out of Africa** Know that the study of science is concerned with investigating and understanding the animate and inanimate world around them Be able to conduct scientific investigations posing scientific questions Be able to choose an appropriate way to investigate a scientific issue Be able to make systematic and accurate measurements from their observations Be able to explain and justify their predictions, investigations, findings and conclusions Be able to record and communicate their findings accurately using the most appropriate medium and the appropriate scientific vocabulary and conventions Be able to discriminate between evidence and opinion Understand the importance of using evidence to test scientific ideas	**Climate Control** Be able to conduct scientific investigations posing scientific questions Be able to choose an appropriate way to investigate a scientific issue Be able to make systematic and accurate measurements from their observations Be able to explain and justify their predictions, investigations, findings and conclusions Be able to record and communicate their findings accurately using the most appropriate medium and the appropriate scientific vocabulary and conventions Know the distinctive properties of different materials Know about the major sources of energy Know how energy sources occur Know how energy sources are obtained Know how energy sources are used Know the basic principles of renewable and sustainable energy Understand how our use of energy contributes to the greenhouse effect Understand how we can reduce our use of energy **Animals, including humans** **Identify and name the main parts of the human circulatory system,** and describe the function of the heart, blood vessels and blood **Recognise the effects of diet, exercise, drugs and lifestyle on the way their bodies function** Describe the ways in which nutrients and water are transported within animals, including humans Use scientific vocabulary: **circulatory**, internal organs, skeletal, muscular, digestive, heart, **pulse,** rate, pumps, blood, blood vessel, transported, lungs, oxygen, carbon dioxide, nutrients, water, muscle, cycle, circulatory system, diet, **vein, artery, oxygenated, deoxygenated**, valve, exercise, respiration, lifestyle, healthy, damaged Know that the heart pumps blood in the blood vessels around to the lungs

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	<u>Living things and their habitats</u> **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** Give reasons for classifying plants and animals based on specific characteristics Use scientific vocabulary: **classification, vertebrates, invertebrates, micro-organism**, amphibian, reptile, mammal, insect, plants, animals, subdivided, observation, Carl Linnaeus (pioneer of classification) **<u>Existing, Endangered, Extinct unit</u>** Know that the study of science is concerned with investigating and understanding the animate and inanimate world around them Be able to conduct scientific investigations posing scientific questions Be able to choose an appropriate way to investigate a scientific issue Be able to make systematic and accurate measurements from their observations Be able to explain and justify their predictions, investigations, findings and conclusions Be able to record and communicate their findings accurately using the most appropriate medium and the appropriate scientific vocabulary and conventions Be able to discriminate between evidence and opinion Understand the importance of using evidence to test scientific ideas Know about the major classifications of living things Know about the effects of food chains in a variety of environments Know that changes in the environment have effects on living things Know about the nature, functions and effects of micro-organisms Be able to recognise and name the major plants and animals in Europe	Know about the effect of drug misuse on the human body Know about ways in which humans and other animals reproduce Know that some characteristics of humans and other animals are inherited from their parents Know that some characteristics of humans are influenced by their environment Understand the importance of an appropriate diet for the health of humans and other animals Know that some characteristics of plants are inherited from their parents Know that life began in the sea then came out of the sea Know how fossils provide information about living things from the past Know why the dinosaurs died out Understand ow living things evolve and change over time Understand how plants and animals are adapted to their environment Understand how adaptation leads to evolution	Know that oxygen goes into the blood and carbon dioxide is removed Know that blood goes back to the heart and is then pumped around the body Be able to describe how nutrients, water and oxygen are transported in the blood to the muscles and other parts of the body Be able to create labelled diagrams of the circulatory system Be able to describe the positive and negative effects of diet, exercise, drugs and lifestyle on the way bodies function Be able to plan and carry out an investigation on pulse rate Be able to observe pulse rate over time and take measurements using scientific equipment Be able to record data in scatter and line graphs Be able to report and present their findings **<u>Light</u>** Recognise that light appears to travel in straight lines 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 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 **Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them** Use scientific vocabulary: light, light source, dark, **transparent, translucent, opaque,** shiny, matt, surface, shadow, **refraction, reflection, spectrum**, rainbow, colour, prediction, periscope Know that light appears to travel in straight lines and we see objects when light from them goes into our eyes Know that we see things when light from them enters our eyes

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	Be able to classify locally occurring plants and animals according to their features Understand the relationship between living things and the environment in which they live Know about the structure of the human body Know about similarities and differences between humans and other creatures Know about the functions of the major parts of a plant Know about the factors that affect the growth of plants Know about the function of roots in anchoring and feeding plants Know about the ways in which plants reproduce Know about the effects of seed dispersal Know about the conditions needed for germination				Be able to use labelled diagrams to describe how light travels Know that objects that block light will cause shadows Know that light can be reflected, refracted or absorbed Know that light travels through some materials and not through others Be able to observe objects in different lighting conditions – using light from sources that can be moved, reflected and blocked Be able to observe shadows of different objects as the object and the light source are moved	
YR 6 WS	planning different types of scientific enquiries to answer questions, including recognising and controlling variables	taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate	recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatters graphs, bar and line graphs	using test results to make predictions to set up further comparative and fair tests	reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations	identifying scientific evidence that has been used to support or refute ideas or arguments
KS2 WS TAF	• Describe and evaluate their own and others' scientific ideas related to topics in the national curriculum (including ideas that have changed over time), using evidence from a range of sources • Ask their own questions about the scientific phenomena that they are studying, and select the most appropriate ways to answer these questions, recognising and controlling variables where necessary (I.e. observing changes over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests, and finding things out using a wide range of secondary sources • Use a range of scientific equipment to take accurate and precise measurements or readings, with repeat readings where appropriate • Record data and results using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs • Draw conclusions, explain and evaluate their methods and findings, communicating these in a variety of ways • Raise further questions that could be investigated, based on their data and observations					