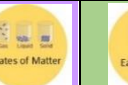
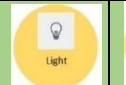


Ventrus Science Knowledge Entitlement

EYFS & KS1 THRESHOLD CONCEPTS IN SCIENCE

	Scientific Enquiry						Biology		Chemistry		Physics				
	 Checking	 Communicating	 Concluding	 Observing	 Predicting	 Recording	 Animals & Humans	 Plants	 Materials	 States of Matter	 Earth & Space	 Electric Circuits	 Forces & Magnets	Light	Sound
EYFS	Checking	Communicating	Concluding	Observing	Predicting	Recording	Animals & Humans	Plants	Materials	States of Matter	Earth & Space	Electric Circuits	Forces & Magnets	Light	Sound
Seasons															
Animals and plants															
Making things move															
Y1/2	Checking	Communicating	Concluding	Observing	Predicting	Recording	Animals & Humans	Plants	Materials	States of Matter	Earth & Space	Electric Circuits	Forces & Magnets	Light	Sound
Biology															
Plants 1 & 2															
Animals incl. Humans 1 & 2															
Investigating Living Things & Habitats 1															
Chemistry															
Everyday Materials 1															
Uses of materials 2															
Physics															
Seasonal Changes 1															

Ventrus Science Knowledge Entitlement

KS2 THRESHOLD CONCEPTS IN SCIENCE

	Scientific Enquiry						Biology		Chemistry		Physics				
	 Checking	 Communicating	 Concluding	 Observing	 Predicting	 Recording	 Animals & Humans	 Plants	 Materials	 States of Matter	 Earth & Space	 Electric Circuits	 Forces & Magnets	 Light	Sound
Y3/4	Checking	Communicating	Concluding	Observing	Predicting	Recording	Animals & Humans	Plants	Materials	States of Matter	Earth & Space	Electric Circuits	Forces & Magnets	Light	Sound
Biology															
Plants 3															
Animals incl. Humans 3 & 4															
Living Things & Habitats 4															
Chemistry															
Rocks 3															
States of Matter 4															
Physics															
Forces, Movement & Magnets 3															
Light & Seeing 3															
Sound & Hearing 4															
Electrical Circuits 4															

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Y5/6	Checking	Communicating	Concluding	Observing	Predicting	Recording	Animals & Humans	Plants	Materials	States of Matter	Earth & Space	Electric Circuits	Forces & Magnets	Light	Sound
Biology															
Animals incl. Humans 5															
Living Things & Habitats 5 & 6															
Evolution & Inheritance 6															
Chemistry															
Properties of and Changing Materials															
Physics															
Forces, Movement & Magnets 5															
Earth & its Movement in Space 5															
Light & Seeing 6															
Electrical Circuits 6															

Equality and diversity in science

Ventrus Science Knowledge Entitlement

When presenting sources and information to pupils, leaders and teachers **must** ensure that resources used across their study of science reflect diversity, equality and inclusion (e.g. race, religion, sex, disability).

THRESHOLD CONCEPTS IN SCIENCE										
 Animals & Humans	 Checking	 Communicating	 Concluding	 Earth & Space	 Electric Circuits	 Forces & Magnets	 Light			
 Materials	 Observing	 Plants	 Predicting	 Recording	 States of Matter	 Sound				
	Units of Work EYFS									
Science Threshold Concepts:	Scientific Enquiry			Biology	Chemistry		Physics			
	 Checking	 Communicating	 Concluding	 Animals & Humans	 Plants	 Materials	 States of Matter	 Earth & Space	 Forces & Magnets	 Light
	 Observing	 Predicting	 Recording					 Sound	 Electric Circuits	
Procedural Knowledge	EYFS Procedural knowledge in Science - Working scientifically									
	Procedural Knowledge MUST be covered across all units.									
Asking questions	Through exploration, show curiosity and ask questions									
Making observations and taking measurements	Make observations using their senses and simple equipment. Make direct comparisons. Use equipment to measure.									

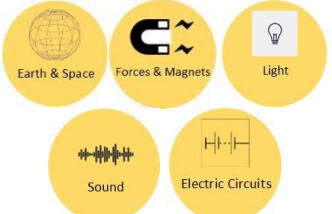
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Engaging in practical enquiry to answer questions	Identify, sort and group.
Recording and presenting evidence	Record observations by drawing, taking photos, graphs, using sorting rings or boxes and simple tick sheets.
Answering questions and concluding	Use observations to help answer questions. Talk about what has been done and what has been found out.
Evaluating and raising further questions and predictions	Not at this milestone
Communicating their findings	Not at this milestone
How does the world around us change with the seasons?  	Declarative Knowledge • There are four seasons in a year • These are spring, summer, autumn and winter • Each season lasts for 3 months (autumn – Sept, Oct, Nov/winter – December, January, February/ spring – March, April May/summer – June, July, August) • They follow a cyclical pattern each year • The worlds around us looks and feels different each season • Each season the weather changes • Each season plants and trees look different • Animals are affected by seasonal change • We wear different clothes in each season • Each season has special events (Easter, Christmas, Harvest) • We have five senses (touch, sight, taste, smell, hearing) • We can use our senses to explore the world around us
	Vocabulary

Ventrus Science Knowledge Entitlement

	Seasons, autumn, winter, spring, summer, change, similar, different, colours, weather, rain, sun, wind, snow, hail, cloud, ice, frosty, thunder, rainbows, cold, warm, hot, heatwave, predict, observe Senses, sight, touch, smell, taste, hear, listen, eyes, nose, mouth, lips, tongue, ears, fingers, observe, feels, feeling, Clothing, suitable, waterproof, materials, safety, sunscreen, sunglasses, hat, gloves, scarf,
How do animals and plants grow?  	Declarative Knowledge • Plants and animals are living things • Plants and animals grow and change over time • Plants and animals all have a life cycle • Plants and animals need to be looked after to survive • Plants need water, sunlight and space to grow • Plants can grow from bulbs or seeds • Different plants grow at different times of the time of the year (snowdrops and daffodils) • Different conditions can affect how plants grow • Animals need feeding in order to survive • Some animals are kept as pets and some live in the wild or on farms • Some animals give birth to live young • Some animals lay eggs • Vets and farmers help to look after animals Vocabulary Animals, plant, change, grow, young, older, adult, lifecycle, seed, leaf, root, stem, petal, check, describe, explain, predict, environment, natural, responsibility, take care, empathy

Ventrus Science Knowledge Entitlement

How do things move?  Forces & Magnets	Declarative Knowledge • We can move objects by pushing and pulling • We can make objects move faster by pushing or pulling harder • We can make objects move slower by pushing or pulling more gently • We can change the direction that objects move in • We can change the shape some objects by twisting, bending, folding, curling, rolling • Some of these changes are reversible, some are irreversible • Some objects can float on water whilst other sink under the water • The weight and size of an object can affect how the object moves • Some materials are magnetic • Magnets can make magnetic objects move and change direction			
	Vocabulary Check, describe, explain, hypothesise, observe, predict, force, object, move, pull, push, twisting, bending, folding, curling, rolling, float, sink, heavy, light, weight, magnet, magnetic, non-magnetic, metal, material, direction, change direction, fast, slow, speed			
CURRICULUM END POINTS CQ Milestone EYFS Geography Scientific Vocabulary	Children learn about the scientific approach. • check • describe • explain • hypothesise • observe • predict	Children learn about plants and animals. • animal • plant	Children learn about materials and their properties. • material	Children learn about features of the world. • pull • push • seasons • weather
Units of Work KS1				
Science Threshold Concepts:	Scientific Enquiry 	Biology 	Chemistry 	Physics 

Ventrus Science Knowledge Entitlement

Procedural Knowledge	KS1 Procedural knowledge in Science - Working scientifically
	Procedural Knowledge MUST be covered across all units.
Asking questions	Ask questions (such as what something is, how things are similar and different, the ways things work, which alternative is better, how things change and how they happen). Use scenarios to answer questions. Use resources such as books and video clips to ask and answer questions.
Making observations and taking measurements	Explore the world around them. Make observations to support identification, comparison and noticing change. Use senses, aided by equipment such as magnifying glasses. Take measurements through comparisons and non-standard and standard units.
Engaging in practical enquiry to answer questions	Use practical resources. Carry out: tests to classify; comparative tests; pattern seeking enquiries. Make observations over time. Use observations and testing to compare objects, materials and living things. Sort and group by identifying own criteria. Use simple secondary sources (such as identification sheets) to name living things. Describe the characteristics used to identify a living thing.
Recording and presenting evidence	Record observations using photographs, videos, drawings, labelled diagrams or in writing. Record measurements e.g. using prepared tables, pictograms, tally charts and block graphs. Classify using simple prepared tables and sorting rings.
Answering questions and concluding	Use experience of the world to answers questions. Use experience to relate to evidence e.g. observations, measurements or use of secondary sources. Recognise 'biggest and smallest', 'best and worst' etc. from their data.
Evaluating and raising further	Not at this milestone

Ventrus Science Knowledge Entitlement

questions and predictions	
Communicating their findings	Not at this milestone
Biology Plants 1 & 2 	Declarative Knowledge Y1 • Name the parts of a plant: roots, stem, flower, petals, leaves, blossom, seeds, fruit • The names of some common wild and garden plants: Wild plants - dandelion, daisy, buttercup, nettles, clover, Garden plants: daffodil, sweet pea, sunflower, rose, lavender Trees: cedar, horse chestnut, oak, sycamore • Plants grow from seeds/bulbs • A wild plant seed grows where it falls. It does not need to be planted or cared for as it grows. • Garden plants are plants that people choose to grow in their gardens. • Plants need sunlight, water, correct temperature, and nutrition to grow well. • Plants are important in order for humans and other animals to survive Y2 • Flowers make seeds to make more plants (reproduce) • We can eat different parts of the plants (leaves, stems, roots, seeds, fruit) • Seed dispersal is when the seeds move away from the parent plant. They can drop to the ground in the plant's fruit or be moved by the wind or animals. • A deciduous tree loses its leaves each year and an evergreen tree keeps its green leaves all year round, even in the winter. Vocabulary: Plant, leaf, trunk, branch, root, seed, seedling, bulb, flower, stem, petal, wild, garden, evergreen, observe, grow, reproduce, compare, record, temperature, predict, measure, diagram, germinate, shoot, earth, soil, fruit, produce, warmth, sunlight, living, not living, deciduous, dispersal, water, nutrition,

Ventrus Science Knowledge Entitlement

Biology Animals and Humans 1 & 2 	Declarative Knowledge Y1 • Animals need food to survive. • Animals need a variety of food to help them grow, repair their bodies, be active and stay healthy. • Animals that mostly eat other animals (meat) are carnivores. • Animals that only eat plants are herbivores. • Animals that eat both plants and other animals are omnivores. • Amphibians live in the water as babies and on land as they grow older. They have smooth, slimy skin. • All birds have a beak, two legs, feathers and wings • Fish live and breathe under water. They have scaly skin, fins to help them swim and they breathe through gills. • Mammals are animals that breathe air, grow hair or fur and feed on their mother's milk as a baby. • All reptiles breathe air. They have scales on their skin. • Animals have senses to help individuals survive: sight, hearing, touch, taste and smell Y2 • Some animals give birth to live young • Some animals lay eggs which the young hatch from • Both of these types of young then develop into adults • Some offspring look like their adult when they are born • Some adults do not look like their offspring when they are born • All young animals change as they go through the different stages of their life cycle and grow into adults • Know the human life cycle and a frog life cycle • All young animals change as they go through the different stages of their life cycle and grow into adults • To stay alive all animals have 3 basic needs for survival-air, water food • To grow into a healthy adult we must eat the right types on the right amount and exercise • Being active and exercising keeps our bodies and minds health • To stop germs from spreading it is important to be hygienic Vocabulary
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Ventrus Science Knowledge Entitlement

	Y1 Birds, fish, mammal, reptile, herbivore, carnivore, omnivore, head, ear, mouth, shoulder, hand, fingers, leg, foot, eye, nose, teeth, elbow, thumb, knee, sight, hearing, touch, taste, smell Y2: Adult, develop, life cycle, offspring, young, live young, diet, exercise, germs, hygiene, nutrition, air, water, food, carbohydrates, fruit, vegetables, protein, dairy,
Biology Living Things & Their Habitats  	Declarative Knowledge • These are the things that all living things do . They move, breathe, sense, grow, make babies, get rid of waste and get their energy from food. • Things that are living that all have all of the life processes. • Things that are dead were once living. They did have all of the life processes but don't now. • Things made out of metal, plastic, or rock were never living. They never had the life processes. • A food chain shows how each animal gets its food. Food chains are one of the ways that living things depend on each other to stay live. • A food source is the place a living things' food comes from. • A habitat is the natural place something lives. Habitats: woodland, urban, coastal, coastal, rainforest, arctic, desert, ocean, river, mountain • A habitat provides living things with everything they need to survive such as food, shelter and water. • A micro habitat is a very small habitat in places like under a rock, under leaves, or on a branch. Micro-habitats: short grass, flowers, inside rotting wood, under leaves, in and on soil • Minibeasts live in micro-habitats. The micro habitats have everything they need to survive. • Many living things in a habitat depend on each other. This means they need each other for different things. Vocabulary: survive, depend, microhabitat, habitat, food sources, food chain, dead, living, life processes, never living

Ventrus Science Knowledge Entitlement

Chemistry Investigating Materials 1 & 2 	Declarative Knowledge Y1 Everyday materials • Materials are what an object is made from. • There are many different materials including water, wood, glass, metal, plastic, brick, fabric, stone and paper. • Materials have different properties. Some properties include hard, soft, stretchy, shiny, smooth, dull and rough. • Smooth objects have no lumps or bumps. • Bendy things can be bent easily into a curved or folded shape. • If something is waterproof it keeps water out, it keeps things dry. • If something is absorbent, it does not soak up liquid. • Transparent objects can be seen through. • Opaque objects can't be seen through. Y2 Uses of materials • Some materials are found naturally in the environment such as water, rock, wood. • Manmade materials have been made by people. • Materials that have similar properties are grouped into metals, rocks, fabrics, wood, plastic and ceramics (including glass). • The properties of a material determine whether they are suitable for a purpose. • Suitability means having the properties which are right for a specific purpose • This is what a material is like and how it behaves • Materials can be changed by using physical force such as twisting, bending, squashing and stretching. Vocabulary Y1 Object, hard, soft, stretchy, stiff, shiny, dull, rough, smooth, bendy/not bendy, waterproof/not waterproof, absorbent, transparent, opaque, fabric, rubber, cars, rock, paper, cardboard, wood, metal, plastic, glass, brick, twist, squash, bend, stretch, matches, cans, spoons. Y2 Properties, suitability, strong, weak, flexible, lightweight, hard-wearing, warm, elastic, materials, natural, man-made, manufactured, change, magnetic, clay, sand
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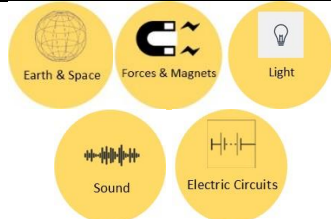
Ventrus Science Knowledge Entitlement

Physics Seasonal Changes 	Declarative Knowledge Y1 • In the UK there are 4 seasons each year, autumn, winter, spring and summer • In autumn, the weather begins to get colder, the leaves start to fall from the trees. The amount of daylight becomes less. this means the day times are shorter and the night times are longer. • Winter-the weather is much cold. Sometimes it is cold enough to freeze, leaving frost and ice on the ground. It sometimes snows. Many trees have bare branches s all their leaves have fallen off. The day times are the shortest in the year and the night times are the longest. • The weather includes the temperature outside, The wind direction and strength, as well as rain, cloud, snow and sun. • Daylight is when it is light outside. The amount of daylight changes with each season. • In spring the weather starts to get warmer. The leaves begin to grow on the trees and some trees may blossom (have flowers). Plants begin to grow and you may see baby animals like lambs around. The day times start to get longer. • In summer, the weather gest hotter. The daytime is long and the nights are short. Summer has the longest days. The trees are full of leaves and there are lots of flowers, bees, butterflies and other insects. Vocabulary: seasons, autumn, winter, summer, spring, daylight, weather
CURRICULUM END POINTS CQ Milestone 1	Scientific Enquiry • Ask simple questions. • Observe closely, using simple equipment. • Perform simple tests. • Identify and classify. • Use observations and ideas to suggest answers to questions. • Gather and record data to help in answering questions.
	Biology Plants • Identify and name a variety of common plants, including garden plants, wild plants and trees and those classified as deciduous and evergreen. • Identify and describe the basic structure of a variety of common flowering plants, including roots, stem/trunk, leaves and flowers. • 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. Animals including Humans • Identify and name a variety of common animals that are birds, fish, amphibians, reptiles, mammals and invertebrates • Identify and name a variety of common animals that are carnivores, herbivores and omnivores.

Ventrus Science Knowledge Entitlement

	- Describe and compare the structure of a variety of common animals (birds, fish, amphibians, reptiles, mammals and invertebrates, including pets). - Identify name, draw and label the basic parts of the human body and say which part of the body is associated with each sense - Notice that animals, including humans, have offspring which grow into adults - Investigate 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 of different types of food and hygiene. Living Things and Their Habitats - Explore and compare the differences between things that are living, that are dead and 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 - 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.
CURRICULUM END POINTS CQ Milestone 1	Chemistry 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. - Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. - Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick/rock, and paper/cardboard for particular uses. Physics Movement, forces and magnets - Notice and describe how things move, using simple comparisons such as faster and slower. - Compare how different things move. Understanding the Earth's movement in space - Observe the apparent movement of the Sun during the day. - Observe changes across the four seasons.

Ventrus Science Knowledge Entitlement

	Observe and describe weather associated with the seasons and how day length varies.			
	Units of Work LKS2			
Science Threshold Concepts:	Scientific Enquiry	Biology	Chemistry	Physics
				
Procedural Knowledge	LKS2 Procedural knowledge in Science - Working scientifically			
	Procedural Knowledge MUST be covered across all units.			
Asking questions	Use prior knowledge when asking questions. Independently use a range of question stems. Use a range of resources, to gather evidence to answer questions. Use secondary sources to answer questions that cannot be answered through practical work. Recognise a fair test.			
Making observations and taking measurements	Make systematic and careful observations. Use a range of equipment for measuring length, time, temperature and capacity. Use standard units for their measurements.			
Engaging in practical enquiry to answer questions	Select practical resources to gather evidence to answer questions . Follow plans to carry out: observations and tests to classify; comparative and simple fair tests; observations over time; and pattern seeking.			

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Recording and presenting evidence	Make decisions on how to record and present evidence. Record observations e.g. using photographs, videos, pictures, labelled diagrams or writing. Record measurements e.g. using tables, tally charts and bar charts Record classifications using tables, Venn diagrams and Carroll diagrams. Present the same data in different ways in order to answer questions Use results to draw simple conclusions. Make predictions for new values.
Answering questions and concluding	Answer questions based on observations, measurements or information from secondary sources. Interpret data to generate simple comparative statements based on evidence. Identify naturally occurring patterns and causal relationships. Draw conclusions based on evidence and current subject knowledge.
Evaluating and raising further questions and predictions	Use results to draw simple conclusions . Make predictions for new values. Suggest improvements and raise further questions Identify ways in which a method is adapted Suggest changes if the enquiry was repeated Suggest improvements. Suggest values for different items tested using the same method. Ask further questions which can be answered by extending the same enquiry.
Communicating their findings	Communicate findings both orally and in writing, using appropriate scientific vocabulary. · Use written explanations, displays or presentations of results and conclusions

Ventrus Science Knowledge Entitlement

Biology Plants 3 	Declarative Knowledge - Plants are called producers as they make their own food. - Their leaves absorb sunlight and carbon dioxide and use it to make food and this is called photosynthesis - The roots absorb water from the soil. The stem transports water to the leaves. Water evaporates from the leaves. This evaporation causes more water to be sucked up the stem. - Know the Life Cycle of a Flowering Plant: Pollination: Pollen from the anther lands on the stigma and travels down the style. Fertilisation and Seed Formation: The pollen joins with an ovule and a seed starts to form. Seed dispersal improves the chances of creating a new plant by moving seeds away from the parent plant. The types of seed dispersal are water, wind, explosion, animals (eating and carrying) Germination: The seed starts to grow. Seeds/bulbs require water and warmth to germinate and grow. They then require light, nutrients, water and space. Seeds contain enough food for the plant's initial growth Growing and Flowering: The plant grows bigger and forms a flower. Vocabulary Nutrients, pollination, dispersal, transportation, energy, seedling, carbon dioxide, oxygen, photosynthesis, roots, stem/trunk, leaves and flowers, pollen, ovule, seed, sugar (carbohydrates)
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Ventrus Science Knowledge Entitlement

Biology Animals including Humans 3 & 4 	Declarative Knowledge • Plants can make their own food, but animals cannot • To stay healthy, humans need to exercise, eat a healthy diet and be hygienic • To know the different food groups which provide our bodies with nutrients and how these support a healthy diet ○ Carbohydrates – provide energy ○ Protein – helps growth and repair ○ Fibre - helps you to digest the food the food you have eaten ○ Fats – provide energy ○ Vitamins – keep you healthy ○ Minerals – keep you healthy • Water – moves nutrients around your body and helps to get rid of waste • The blood takes nutrients around the body • Many animals (including humans) have skeletons to support their bodies and protect vital organs • Animals have muscles for support, protection and movement, they are connected to bones and move them when they contract • Moveable joints connect bones • Different types of teeth do different jobs: incisors, canines, molars and premolars. The former are used to break food apart and the latter for chewing • Food is broken down by the teeth and then further in the stomach and intestines where nutrients go into the blood; material that body cannot digest is excreted Vocabulary Nutrients, nutrition, carbohydrates, protein, fats, vitamins, minerals, water, fibre, skeleton, bones, joints, muscles, contract, relax, digestive system, tongue, mouth, teeth, oesophagus, stomach, small intestine, large intestine, tooth, canine, incisor, molar, premolar, blood.
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Ventrus Science Knowledge Entitlement

Biology Living Things & Their Habitats  	Declarative Knowledge • Scientists have different ways of grouping living things based on their characteristics • Classification keys can be used to sort groups of animals and plants • Living things can be grouped into plant and animals • Plants can be grouped into flowering and non-flowering • Animals can be grouped into vertebrates (backbone) and invertebrates (no backbone) • Food chains are made up of producers, predators and prey • Nutrients produced by plants move to primary consumers then to secondary consumers through food chains • Living things are adapted to their own habitats • Recognise that environments can change and this can pose dangers to living things • Natural: earthquakes, storms, floods, droughts, wildfires, the seasons • Human made: Deforestation, pollution, urbanisation, the introduction of new animal or plant species to an environment, creating new nature reserves Vocabulary Environment, flowering, nonflowering, vertebrates, fish, amphibians, reptiles, mammals, invertebrate, human impact, nature reserves, deforestation, pollution, urbanisation, classification, characteristics, predators, producers, prey
Chemistry Rocks 	Declarative Knowledge • Name the three naturally occurring rocks: ○ Igneous rock - Rock that has been formed from magma or lava. ○ Sedimentary rock - Rock that has been formed by layers of sediment being pressed down hard and sticking together. You can see the layers of sediment in the rock. ○ Metamorphic rock - Rock that started out as igneous or sedimentary rock but changed due to being exposed to extreme heat or pressure. • Use these words to discuss the properties of rocks: hard, soft, permeable, impermeable, durable (meaning resistant to weathering), high density, low density. Density measures how 'bulky' the rock is (how tightly packed the molecules are). • Physical properties of some rocks are as a result of their formation • Soils are made from rocks and organic matter • Fossils are formed when things that have lived are trapped within sedimentary rock • Fossils provide evidence that living things have changed over time Vocabulary

Ventrus Science Knowledge Entitlement

	Rocks, igneous, metamorphic, sedimentary, permeable, impermeable, organic matter, magma, lava, sediment
Chemistry States of Matter 	Declarative Knowledge • Materials can be divided into solids, liquids and gases • Solids, liquids and gases are described by observable properties. ○ Solids are materials that keep their shape unless a force is applied to them. They can be hard, soft or even squashy. Solids take up the same amount of space no matter what has happened to them. ○ Liquids take the shape of their container. They can change shape but do not change the amount of space they take up. They can flow or be poured. ○ Gases can spread out to completely fill the container or room they are in. They do not have any fixed shape but they do have a mass. • All material is made of particles – changing the temperature changes the movement of the particles • Materials change state when they are heated or cooled (°C) • Heating causes solids to melt into liquids and liquids evaporate into gases. • Cooling causes gases to condense into liquids and liquids to freeze into solids • The temperature at which given substances change state are always the same. • Evaporation occurs when water turns in to water vapour • Condensation is where water vapour cools down and turns in to water. • Evaporation and condensation occur in the water cycle
	Vocabulary Solid, liquid, gas, particles, state, materials, properties, matter, melt, freeze, water, ice, temperature, process, condensation, evaporation, water vapour, energy, precipitation, collection
Physics Forces, Movement and Magnets 	Declarative Knowledge • A force is a push or a pull • The movement of the object on a surface is affected by the texture of that surface eg ice leads to more movement • A magnet attracts magnetic material such as iron and nickel • A magnet has two poles (north and south) which are the strongest part of magnet • Bringing two like poles together (eg north pole and north pole) causes the magnets to repel each other bringing to opposite poles (eg north and south pole) together causes them to attract • The force of magnetism is a non-contact force (ie the magnet does not need to touch the object it attracts) • Many other forces are contact forces (eg pushing open a door)

Ventrus Science Knowledge Entitlement

	Vocabulary Attracts, repel, magnet, pole, surface, contact/non-contact force, magnetism
Physics Light and seeing 	Declarative Knowledge • There must be light for us to see. • Without light it is dark. • Light from the sun can be dangerous • Transparent materials let light travel through them • Opaque materials don't let light through. • Beams of light bounce off surfaces (reflection). • Shiny materials reflect light beams better than non-shiny materials • Light comes from a source • shadows are formed when the light from a light source is blocked by an opaque object • A shadow is larger when an object is closer to the light source because it blocks more of the light
	Key Vocabulary Light source, reflect, ray, mirror, bounce, visible, beam, glare, travel, straight, opaque, shadow, block, transparent, translucent
Physics Sound and hearing 	Declarative Knowledge • Sound travels from its source in all directions and we hear it when it travels to our ears. • Sound travel can be blocked. • Sound is produced when an object vibrates. • Sound moves through all materials by making them vibrate. • Changing the way an object vibrates changes its sound. • Bigger vibrations produce louder sounds • Smaller vibrations produce quieter sounds. • Faster vibrations (higher frequencies) produce higher pitched sounds
	Vocabulary Volume, vibration, pitch, high, low, sound wave, source

Ventrus Science Knowledge Entitlement

Physics Electrical Circuits  Electric Circuits	Declarative Knowledge • A source of electricity (mains or battery) is needed for electrical devices to work. • Electricity sources push electricity round a circuit. • More batteries will push the electricity round the circuit faster. • Devices work harder when more electricity goes through them. • A complete circuit is needed for electricity to flow and devices to work. • Some materials allow electricity to flow easily, and these are called conductors. • Materials that don't allow electricity to flow easily are called insulators Vocabulary Electricity, electric current, appliances, mains, crocodile clips, wires, bulb, battery cell, battery holder, motor, buzzer, switch, conductor, electrical insulator, component.
CURRICULUM END POINTS CQ Milestone 2	Scientific Enquiry Milestone 2 • Ask relevant questions. • Set up simple, practical enquiries and comparative and fair tests. • Make accurate measurements using standard units, using a range of equipment, e.g. thermometers and data loggers. Gather, record, classify and present data in a variety of ways to help in answering questions. • Record findings using simple scientific language, drawings, labelled diagrams, bar charts and tables. • Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. • Use results to draw simple conclusions and suggest improvements, new questions and predictions for setting up further tests. • Identify differences, similarities or changes related to simple, scientific ideas and processes. • Use straightforward, scientific evidence to answer questions or to support their findings. Biology Plants • Identify and describe the functions of different parts of flowering plants: roots, stem, leaves and flowers. • 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. • Investigate the way in which water is transported within plants. • Explore the role of flowers in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. Animals including humans • Identify that animals, including humans, need the right types and amounts of nutrition, that they cannot make their own food and they get nutrition from what they eat.

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	• Construct and interpret a variety of food chains, identifying producers, predators and prey. • Identify that humans and some animals have skeletons and muscles for support, protection and movement. • Describe the simple functions of the basic parts of the digestive system in humans. • Identify the different types of teeth in humans and their simple functions. Living Things & Their Habitats • Recognise that living things can be grouped in a variety of ways. • Explore and use classification keys. • Recognise that environments can change and that this can sometimes pose dangers to specific habitats.
CURRICULUM END POINTS CQ Milestone 2	Chemistry Materials Rocks • Compare and group together different kinds of rocks on the basis of their simple, physical properties. • Relate the simple physical properties of some rocks to their formation (igneous or sedimentary). • Describe in simple terms how fossils are formed when things that have lived are trapped within sedimentary rock. • Recognise that soils are made from rocks and organic matter. States of matter • 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 the temperature at which this happens in degrees Celsius (°C), building on their teaching in mathematics. • Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. Physics Understanding movement, 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 or repel each 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. • Understanding light and seeing • Recognise that they need light in order to see things and that dark is the absence of light

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- Notice that light is reflected from surfaces.
- Recognise that light from the sun can be dangerous and that there are ways to protect their eyes.
- Recognise that shadows are formed when the light from a light source is blocked by a solid object.
- Find patterns in the way that the size of shadows change.

Understanding sound and hearing

- Identify how sounds are made, associating some of them with something vibrating.
- Recognise that vibrations from sounds travel through a medium to the ear.

Understanding electrical circuits

- 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.

Understanding the Earth's movement in space

- Describe the movement of the Earth relative to the Sun in the solar system.
- Describe the movement of the Moon relative to the Earth.

Units of Work UKS2				
Science Threshold Concepts:	Scientific Enquiry	Biology	Chemistry	Physics
	 Checking  Communicating  Concluding  Observing  Predicting  Recording	 Animals & Humans  Plants	 Materials  States of Matter	 Earth & Space  Forces & Magnets  Light  Sound  Electric Circuits
Procedural Knowledge	UKS2 Procedural knowledge in Science - Working scientifically			
	Procedural Knowledge MUST be covered across all units.			

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Asking questions	Independently ask scientific questions. Independently gather evidence to answer a scientific question. Select a type of enquiry to carry out. Plan an independent enquiry involving a fair test and controlled variables. Use secondary sources to answer questions that cannot be answered through practical work.
Making observations and taking measurements	Select measuring equipment to give the most precise results e.g. ruler, tape measure or trundle wheel, force meter with a suitable scale. Make decisions during scientific enquiry e.g. decide to: take repeat readings (fair testing); increase the sample size (pattern seeking); adjust the observation period and frequency (observing over time); or check further secondary sources (researching); in order to get accurate data (closer to the true value).
Engaging in practical enquiry to answer questions	Select practical resources to gather evidence to answer questions. Plan and carry out fair tests, recognising and controlling variables. Decide what observations or measurements to make over time and for how long. Look for patterns and relationships using a suitable sample.
Recording and presenting evidence	Decide how to record and present evidence. T Record observations e.g. using annotated photographs, videos, labelled diagrams, observational drawings, labelled scientific diagrams or writing. Record measurements e.g. using tables, tally charts, bar charts, line graphs and scatter graphs. Record classifications e.g. using tables, Venn diagrams, Carroll diagrams and classification keys. Present the same data in different ways in order to answer the question.
Answering questions and concluding	Answer questions based on observations, measurements or information from secondary sources. Discuss evidence from other groups, secondary sources and their scientific understanding. Decide whether evidence supports or refutes an argument. Discuss how scientific ideas change due to new evidence gathered. Discuss how new discoveries change scientific understanding. Identify causal relationships and patterns in the natural world from evidence Identify results that do not fit the overall pattern Explain findings using subject knowledge.

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Evaluating and raising further questions and predictions	Report and present findings from enquiries · Include conclusions, causal relationships and explanations of and degree of trust in results Use oral and written forms such as displays and other presentations · Evaluate the choice of method used, the control of variables, the precision and accuracy of measurements and the credibility of secondary sources used. · Identify limitations that reduce the trust. Make predictions to investigate using comparative and fair tests.
Communicating their findings	Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results. Communicate findings using relevant scientific language and illustrations through oral and written forms, displays and presentations.
Biology Animals and Humans 5 & 6 	Year Declarative Knowledge Y 5 • Different animals mature at different rates and live to different ages: fertilisation — prenatal — infancy — childhood — adolescence — adulthood (early, middle & late). • Hormones control puberty changes which can be physical and/or emotional: ○ Emotional Changes: development of stronger feelings and emotions, mood swings, change in temperament, growing independence. ○ Physical changes: body growth, hair growth, sweat glands develop, voice box changes, skin becomes oilier and sexual organs develop. • Puberty is something we all go through, a process which prepares our bodies for being adults, and reproduction. Y6 • The heart pumps blood around the body. • Oxygen is breathed through the lungs where it is absorbed into the blood. • Muscles need oxygen to release energy from food to do work: oxygen is taken into the blood in the lungs — the heart pumps the blood through blood vessels to the muscles — the muscles take oxygen and nutrients from the blood. Vocabulary Y5 Foetus, embryo, womb, gestation, growth, development, puberty, hormone, physical, emotional, baby, adults, adolescent Y6 Oxygenated, deoxygenated, valve, exercise, respiration, circulatory system, heart, lungs, blood, vessels, arteries, veins, pulmonary, alveoli, capillary, digestive, transport, gas exchange, villi, nutrients, water, oxygen

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Biology Investigating Living Things 5 & 6 	Declarative Knowledge Y5 • Living things have different life cycles. • Different animals mature at different rates and live to different ages. • Vertebrates are separated into mammals, fish, birds, reptiles and amphibians. • Invertebrates can be grouped into insects, spiders, worms, molluscs (snail & slugs). • The process of reproduction in plants is called pollination, where pollen reaches the new flower and travels to the ovary where it fertilises egg cells (ovules) to make seeds. • During sexual reproduction between a male and a female, a sperm from the male joins with an egg from the female – this is called fertilisation. • After fertilisation, females will either lay eggs or carry their growing embryo until developed enough to be born. • Some organisms reproduce sexually, where offspring inherit information from both parents. • Some organisms reproduce asexually, making a copy of a single parent. • Environmental change can affect how well an organism is suited to its environment. Y6 • Variation exists within a population (and between offspring of some plants). • Organisms best suited to their environment are more likely to survive long enough to reproduce. • Organisms which are best adapted to reproduce are more likely to survive as a species. • Organisms reproduce and offspring have similar characteristic patterns. • Competition exists for resources and mates. Vocabulary Y5 Male, female, pregnancy, young, mammal, metamorphosis, amphibian, insect, egg, embryo, bird, organism, reproduction, sexual, asexual, pollination, dispersal, cell, fertilisation, pollination Y6 Variation, population, classification, characteristics, animals, vertebrates, fish, reptiles, invertebrates, human impact, nature reserves, deforestation, compare, bacteria, micro-organism, Linnaean, environment
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Biology Evolution and Inheritance 	Declarative Knowledge • Life cycles have evolved to help organisms survive to reproduce. • Over time the characteristics that are most suited to the environment become increasingly common N.B: The following could be duplicated in Year 6: Investigating Living Things • Organisms best suited to their environment are more likely to survive long enough to reproduce. • Organisms which are best adapted to reproduce are more likely to survive as a species. • Organisms reproduce and offspring have similar characteristic patterns. • Competition exists for resources and mates. Vocabulary Fossils, adaptation, evolution, characteristics, reproduction, genetics, variation, inherited, environmental, mutation, competition, natural selection, evidence, organism
Chemistry Properties and Changes of Materials 	Declarative Knowledge • Sometimes mixed substances react to make a new substance. These changes are usually irreversible. • Heating can sometimes cause materials to change permanently. When this happens, a new substance is made. These changes are not reversible. • Indicators that something new has been made are: The properties of the material are different (colour, state, texture, hardness, smell, temperature) • If it is not possible to get the material back easily it is likely that it is not there anymore and something new has been made (irreversible change) • When two or more substances are mixed and remain present the mixture can be separated. • Some changes can be reversed, and some cannot. • Materials change state by heating and cooling. • All matter (including gas) has mass.

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	Vocabulary Conditions, air, oxygen, carbon dioxide, dissolve, solution, separate, filter, transparency, conductivity, insoluble, suspension, chemical, physical, irreversible, reversible, insulator, permeable, soluble
Physics Forces  Forces & Magnets	Declarative Knowledge • Gravity is a pulling force exerted by the Earth (or anything else which has mass) • Weight is how strongly gravity is pulling an object down. It is measured in Newtons. • Isaac Newton is famously thought to have developed his theory of gravity when he saw an apple fall to the ground from an apple tree • Air resistance and water resistance are forces against motion caused by objects having to move air and water out of their way. • Friction is a force against motion caused by two surfaces rubbing against each other. • Some objects require large forces to make them move; gears, pulley and levers can reduce the force needed to make things move
	Vocabulary Air resistance, water resistance, friction, gravity, Newton meter, gears, pulleys, force, push, pull, opposing, streamline, brake, mechanism, lever, cog, machine, pulley, mass
Physics Earth and space  Earth & Space	Declarative Knowledge • The Earth, Moon and Sun are all approximate spherical bodies. • The Sun is a star at the centre of the solar system, and it has 8 planets that orbit it. Mercury, Venus, Earth and Mars are rocky planets (mostly made up of metal and rock); Jupiter, Saturn, Uranus and Neptune are mostly made up of gases (helium and hydrogen). • The Earth rotates (spins) on its axis. It does a full rotation once in every 24 hours. • Daytime occurs when the side of the Earth is facing towards the Sun. Night occurs when the side of Earth is facing away from the Sun. It appears to us that the Sun moves across the sky during the day, but the Sun does not move at all. It seems to us that the Sun moves because of the movement of the Earth. • At the same time that Earth is rotating, it is orbiting around the Sun. It takes a little more than 365 days for the Earth to orbit the Sun. • The Moon orbits Earth in an oval shaped path whilst spinning on its axis. At various times in the month, the Moon appears to be different shapes. This is because as the Moon rotates around the Earth the Sun lights up different parts of it.
	Vocabulary Earth, sun, moon, sphere, revolve, orbit, rotate, axis, sunrise, sunset, north, south, east, west, light source, shadow, phase, constellation, waxing, waning, crescent, gibbous, solar system, geocentric, heliocentric

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Physics Light 	Declarative Knowledge • Light travels in straight lines. • Animals see light sources when light travels from the source into their eyes. • Animals see objects when light is reflected from that object and enters their eyes. • Light reflects off all objects (unless they are black). Non shiny surfaces scatter the light, so we do not see the beam. • A shadow is always the same shape as the object that casts it • Shadows can be elongated or shortened depending on the angle of the light source. Vocabulary Light, beam, reflect, reflection, opaque, mirror, source, reflected, travel, block, ray, bounce, visible, straight, shadow, transparent, translucent, absorb, emit, scatter, refraction
Physics Electricity 	Declarative Knowledge • An electronic circuit is composed of individual components such as: lamp/bulb, wire, motor, buzzer, switch, cell, battery. • Circuit symbols are used in circuit diagrams to represent electronic components. • A cell and batteries are stores of energy. Energy pushes electricity round the circuit. When the battery or cell's energy is gone it stops pushing. • Voltage measures the 'push.' The greater the current flowing through a device the harder it works (for example a bulb will become brighter or a buzzer will become louder) • Current is how much electricity is flowing round a circuit. When current flows through wires heat is released. The greater the current, the more heat is released. • Lengthening or shortening the wires in a circuit will affect the level of resistance electrons have to flow through (this will impact the brightness of a bulb or volume of a buzzer). Vocabulary Circuit, conductor, insulator, symbol, electricity, component, voltage, neutrons, protons, electrons, atom, nucleus, current, crocodile clips, wires, bulb, battery, cell, motor, buzzer, switch
CURRICULUM END POINTS	Scientific Enquiry • Plan enquiries, including recognising and controlling variables where necessary. • Use appropriate techniques, apparatus, and materials during fieldwork and laboratory work. • Take measurements, using a range of scientific equipment, with increasing accuracy and precision.

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CQ Milestone 3

- Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, bar and line graphs, and models.
- Report findings from enquiries, including oral and written explanations of results, explanations involving causal relationships, and conclusions.
- Present findings in written form, displays and other presentations.
- Use test results to make predictions to set up further comparative and fair tests.
- Use simple models to describe scientific ideas, identifying scientific evidence that has been used to support or refute ideas or arguments.

Biology

Plants

- Relate knowledge of plants to studies of evolution and inheritance.
- Relate knowledge of plants to studies of all living things.

Animals and living things

- Describe the changes as humans develop to old age.
- Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood.
- Recognise the importance of diet, exercise, drugs and lifestyle on the way the human body functions.
- Describe the ways in which nutrients and water are transported within animals, including humans.

Investigating living things

- Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird.
- Describe the life process of reproduction in some plants and animals.
- Describe how living things are classified into broad groups according to common observable characteristics.
- Give reasons for classifying plants and animals based on specific characteristics.

Understanding 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.

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CURRICULUM END POINTS	Chemistry Milestones 3 Materials • Compare and group together everyday materials based on evidence from comparative and fair tests, including their hardness, solubility, conductivity (electrical and thermal), and response to magnets. • Understand how 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, oxidation and the action of acid on bicarbonate of soda.
	Physics • THESE ARE MISSING
CQ Milestone 3	