Science at St Mawes School

OUR INTENT

Science plays a key part of the curriculum through your child's entire school career, and a love of science is created through finding the awe and wonder in our world. We work hard to develop each child's scientific knowledge and understanding.

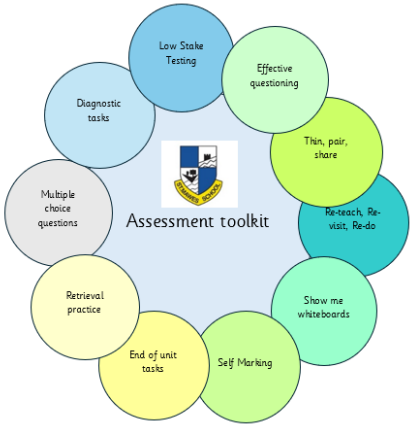
Our science curriculum will be broad and balanced and built around the principles of active discovery and experiential learning. There will be planned cross-curricular links and external partnerships to bring richness and depth to subjects supported by the arts, music, drama, design technology and maths. The planned use of ICT and technologies will support the teaching and learning of all curriculum areas.

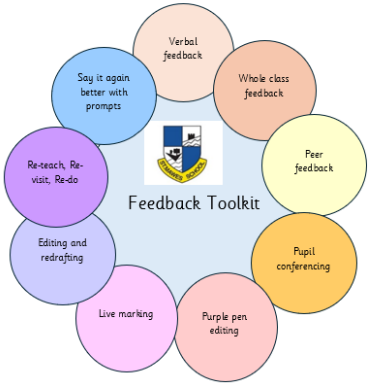
SEQUENCING

	Castle Class Year A	Castle Class Year B	Sail Class Year A	Sail Class Year B	Sail Class Year C	Sail Class Year D
Autumn 1	My senses	Animals-How are we different?	Circuits and Switches	Seeing Light	States of matter	Digestion
Autumn 2	Growing up	Identifying Plants	Light and Shadow	Changing Sound	Parts of a plant	Classifying plants
Spring	Seasonal changes	Use of everyday materials	Changes of Matter	Rocks	The water cycle	Lifecycles, reproduction and gestation
Spring 2	Everyday materials- Fabrics	Animal food chains	The heart and circulatory system	Evolution and Inheritance	Forces and magnets	Risks and dangers in the environment
Summer 1	Habitats	Growing plants	Earth and space	Classifying animals in our local environment	Insulators and conductors	Teeth in the food chain
Summer 2	Exercise and healthy diet	How objects can be moved.	Forces and gravity	Nutrition and exercise	Nutrient and water transportaion	Changing and growing- skeletons

FEEDBACK, PRACTICE AND RETRIEVAL

The purpose of feedback and assessment at St Mawes is to ensure children move forward in their learning, deepen their understanding and gain fluency. To ensure pupils make good progress, improve their confidence with a range of knowledge and skills and remember more of what they learn, regular practice and retrieval opportunities are planned for.





CROSS-CURRICULAR LINKS

Links are made between subjects to offer a creative way to develop children's knowledge, skills and understanding through a study of interconnected topics. Links are an effective way to teach children transferable problem solving skills, and to give real-world meaning to learning. Please see year group overviews for further details.

IMPACT

Children are excited about science, engaging in their learning.
Vocabulary is being implemented through both written work and discussions in science and cross-curricular.
Children are knowledgeable and interested in STEAM careers and want to continue science in Secondary school and beyond.
EYFS is fully engaged in a science curriculum focusing on exploration and wonder.
Children are curious about the world around them.
Children lead the curriculum through their own interests and personal experiences and knowledge.
There is collaboration across classes, school clusters and the Trust.

ENRICHMENT

Castle Class:

- Local nature walks
- Pond dipping, beach combing
- Truro Museum workshops

Sail Class:

- Local nature walk
- Pond dipping, beach combing
- Truro Museum workshops
- 4/5/6 residential will include a science based visit such as the Science Museum (London) and We are the Curious (Bristol)

SUPPORT

All children have access to the History curriculum at St Mawes.

Where specific support and guidance is needed, this is taken from the child's IPM or EHCP.

Knowledge Progression	Autumn	Spring	Summer
Castle Class Year A	**My Senses** Humans have five senses. They are sight, hearing, smell, taste and touch. We have body parts to allow us to sense our surroundings. We uses these senses to help us do different things. **Key vocabulary-** sense, function, smell, taste, touch, sight, hear **Growing and Changing** All living organisms reproduce and grow. Flowering plants reproduce by making seeds or bulbs. Animals have babies. Some lay eggs (fish, amphibians, reptiles, birds, insects) but mammals have live young. Some baby animals look like small versions of their parents, while others look completely different. **Key vocabulary-**life cycle, reproduce, offspring, young, adult	**Seasonal changes** There are four seasons in a year spring, summer, autumn and winter. In the U.K summer has the longest days and the highest temperatures. Four seasons are formed in one year due to the Earth travelling around the sun. Autumn is the time when deciduous trees shed their leaves In spring the weather usually turns warmer, trees begin to grow their leaves, plants start to flower and young animals such as chicks and lambs are born. In the U.K, winter is the season with the shortest days and the lowest temperatures. **Key vocabulary-** weather, season, spring, summer, autumn, winter, rain, sun, temperature, thermometer **Everyday Materials- Fabrics** A material is something we can use to make different objects. Different materials have different properties. Some properties describe how an objects looks and feels. • There are lots of different materials around us. Materials used in clothing are called fabrics including cotton, silk and wool. Fabrics can be manmade or natural **Key vocabulary-**material, fabric, property, smooth, shiny, strong, waterproof, durable	**Identifying and classifying animals** Animals are classified by their features Mammals are animals that breathe oxygen and given birth to live young. Birds have wings and 2 legs; some birds can fly. Reptiles have scales, cold blood and live in hot places. Amphibians live in the water and out. Fish live in water and breathe through their gills. **Key vocabulary-** features, mammal, amphibian, bird, fish, reptile, reproduce, young, adult, offspring **Basic needs of humans** Humans are animals. We have many different body parts. The skeleton is the main frame of the body. We have a spine which holds us up and is the bone we can feel on our backs. Our bodies are made of muscles, organs and bones. To keep our bodies healthy, we have to eat well, drink lots of water and exercise. We have 5 senses: taste, touch, smell, hearing and sight. To survive we need food, air, water and sleep. **Key vocabulary-** survive, diet, exercise, senses, muscles, skeleton, healthy
Castle Class Year B	**Living, dead and never alive** Something that is alive follows life processes like growing and moving. Something that is dead used to be alive, it used to follow the life processes. Never been alive means something that is non-living, it never moved or grew **Key vocabulary-** movement, respiration, sensitivity, growth, reproduction, excretion, nutrition **Identify plants in our local environment.** A plant is a living thing that usually grows from the ground. Trees are plants. In order for a seed to survive and grow into a strong plant it needs, water, sunlight and nutrients (food, that it gets from the soil). Plants have a life cycle. **Key vocabulary** seeds, roots, stem. flower, leaves, petals, fruit, bulb, branches, evergreen, deciduous, healthy, mature	**Use of Everyday Materials-Building** A material is something we can use to make different objects. Different materials have different properties. Some properties describe how an objects looks and feels. • There are lots of different materials around us. Materials for building include wood, stone, metals and glass **Key vocabulary-** material, property, smooth, shiny, strong, waterproof, durable, transparent **Basic needs and food chains** Mammals are animals that breathe oxygen and given birth to live young. Birds have wings and 2 legs; some birds can fly. Reptiles have scales, cold blood and live in hot places. Amphibians live in the water and out. Fish live in water and breathe through their gills. Animals eat different things—some are herbivores, some carnivores, and some omnivores. **Key vocabulary**- mammal, amphibian, bird, fish, reptile, food chain, food web	**Growing Plants** Seeds and bulbs contain energy stored inside. Seeds need water and warmth to germinate. Plants need light for healthy growth. Shoots grow upwards from a seed towards the sunlight. Plants make their own food in their leaves using sunlight. **Key vocabulary-** germination seeds bulbs flower root light life cycle **Forces- How things move.** A force is a push or a pull. A force causes an object to start moving, stop moving, speed up, slow down or change direction. Gravity is a force that acts at a distance. Everything is pulled to the Earth by gravity. This causes unsupported objects to fall. **Key vocabulary-** force, gravity, pull, push,

Sail Class Year A

Electricity

Y3/4

Many household devices and appliances run on electricity. Some plug into the mains, and others run on batteries.

An electrical circuit consists of a cell or battery connected to a component using wires.

A switch can be added to the circuit to turn the component on and off.

Metals are good conductors, so they can be used as wires in a circuit.

Non-metallic solids are usually insulators and do not let electricity pass through them.

Y5/6

If there is a break in the circuit, a loose connection, or a short circuit, the component will not work

While most non-metallic solids are insulators, graphite (pencil lead) is a non-metal that conducts electricity.

Water, if not completely pure, also conducts electricity, which is why electrical appliances must be kept away from wet areas.

Increasing the voltage (by adding more cells or using a higher-voltage battery) pushes more electricity around the circuit. This makes bulbs shine brighter, buzzers sound louder, and motors spin faster.

Adding too much voltage to a circuit can cause a component, such as a bulb, to overheat and blow.

Scientists and engineers use recognised standard symbols instead of pictures to draw clear, simple circuit diagrams (for example, representing cells, bulbs, buzzers, motors, and open or closed switches).

Key vocabulary- appliance, insulator, conduct, circuit, component

Light and Shadow

Y3/4

We see objects because our eyes can sense light. Dark is the absence of light, which means we cannot see anything in complete darkness.

Some objects, such as the sun, light bulbs, and candles, are sources of light. Objects are easier to see when there is more light.

Some surfaces reflect light rather than making their own. Objects are easier to see when there is less light if they are made of reflective materials.

The light from the sun can damage our eyes. We should never look directly at the sun, and we can protect our eyes by wearing sunglasses or sunhats in bright light.

Shadows are formed on a surface when an opaque or translucent object blocks the light from a light source.

Shadows change size depending on the distance between the object and the light source. Moving an object closer to the light source makes the shadow larger.

Y5/6

Light appears to travel in straight lines from a light source.

We see things because light travels from light sources to our eyes, or from light sources to objects and then reflects into our eyes.

Light travels in straight lines and cannot bend around corners, shadows always have the same shape as the opaque objects that cast them

When light hits a shiny, flat surface like a mirror, it reflects off at the exact same angle that it hit the surface.

Key vocabulary- reflect, shadow, source, opaque, translucent

Properties and changes of materials

Y3/4

When different dry solids (such as sand and pebbles, or rice and flour) are mixed together, they keep their own properties and can be easily separated using a sieve or by hand.

When some solids are stirred into water, they do not disappear or mix in, and instead sink to the bottom to form a layer of sediment.

Changes of state, such as melting ice into water or freezing water back into ice, are reversible changes because no new material is made and the water can return to how it started.

Y5/6

Some soluble materials (such as salt or sugar) will dissolve when mixed into a liquid to form a clear solution. Even though the solid can no longer be seen, it is still present in the liquid.

Other materials are insoluble, meaning they will not dissolve in a liquid and will either stay suspended or settle at the bottom as sediment.

Mixtures can be separated back into their original parts using different physical methods Large solids are separated by sieving, insoluble solids are separated from liquids by filtering, and dissolved solids are recovered from a solution by evaporation.

Some changes, such as burning wood, rusting iron, cooking food, or mixing vinegar with bicarbonate of soda, are irreversible chemical reactions. These changes cannot be undone because they result in the formation of completely new materials (such as ash, rust).

Key vocabulary- dissolve, state, reversible, formation, filter, evaporation

The Heart

Y3/4

The heart is a strong muscle that pumps blood all around the body, while the lungs bring fresh air (oxygen) into the body when we breathe in and remove waste gas (carbon dioxide) when we breathe out.

Eating a balanced diet gives our bodies the vitamins, minerals, and energy they need to grow and stay healthy.

Regular physical exercise keeps our heart and lungs strong, helps us concentrate and think clearly, and makes us feel fit and well.

Pupils learn in Science and PSHE that medicines are special drugs used safely to help us recover when we are ill, and must always be taken under adult supervision**.**

Y5/6

The heart pumps deoxygenated blood through blood vessels to the lungs, where oxygen passes into the blood and carbon dioxide is removed. The oxygen-rich blood then returns to the heart and is pumped out through blood vessels to deliver oxygen and nutrients around the entire body.

Diet, exercise, drugs, and lifestyle choices directly impact how well our bodies function, affecting how efficiently our heart and lungs work during rest and physical activity.

An unhealthy diet and lack of exercise increase the risk of conditions such as type 2 diabetes and heart disease. Specific nutritional deficiencies, such as a lack of certain vitamins or minerals, can also cause health conditions**.**

Lifestyle habits affect how we think and how fit and well we feel overall. In both Science and PSHE, pupils explore how legal and illegal drugs) can harm the heart, lungs, and brain.

Key vocabulary-vessels, oxygen, carbon dioxide, veins, arteries, deficiency

Earth and Space

Y3/4

The Sun, Earth, and Moon are all approximately spherical (ball-shaped).

The Sun is a star that gives out heat and light. It is much larger than the Earth, even though it looks small in the sky because it is so far away.

The Earth rotates (spins) on its axis once every 24 hours. As the Earth rotates, the half facing the Sun experiences daytime, while the half facing away from the Sun is in shadow and experiences night.

The Sun does not move around the Earth. Instead, as the Earth spins on its axis, the Sun appears to move across the sky during the day

Y5/6

The Sun is at the centre of our solar system, and its gravity holds eight planets (Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune) in fixed orbits around it.

Earth takes 365¼ days to complete one full orbit around the Sun.

Because of the extra quarter-day each year, an extra day is added to the calendar every four years to create a leap year.

The Moon is a natural satellite that orbits the Earth, taking approximately 28 days to complete one orbit. The Moon does not make its own light; we see it because it reflects sunlight, creating the changing lunar phases over the month.

Because the Earth is tilted on its axis as it orbits the Sun, different parts of the planet receive different amounts of sunlight throughout the year, causing the four seasons and changing the length of daylight and shadows

Key vocabulary- solar system, planet, orbit, satellite, rotate, axis

Forces

Y3/4

For many forces to act, there must be direct physical contact between two objects, such as a hand pushing or pulling to open a door, or a foot kicking a ball.

When an object moves across a surface, the texture of both the surface and the object affects how easily it moves.

Friction is a contact force created when two surfaces rub against each other. Smooth surfaces (like ice or polished wood) create less friction and help objects move faster, while rough surfaces (like carpet or gravel) create more friction and slow objects down.

Y5/6

Alongside surface friction, air resistance and water resistance are contact forces that act against moving objects as they push through air or water particles, slowing them down.

Pulleys, levers, and gears are mechanisms (also known as simple machines) that make moving or lifting heavy loads much easier by reducing the effort force required.

A mechanism is a device that allows a small input force to be increased into a larger output force, helping humans do work that would otherwise be too heavy.

The payback for increasing force with a mechanism is that it requires a greater distance of movement. The small effort force must move a long distance so that the resulting large force moves the heavy load a small distance.

Key vocabulary- force, friction, gravity, pulley, lever, gears, resistance

Sail Class
Year B

Light and sight

Y3/4

We see objects when light from them goes into our eyes.
Our eyes are the sense organs that detect light. Without light entering our eyes, we cannot see anything.
Dark is the complete absence of light. In a totally dark room, our eyes cannot see objects because there is no light to enter them
Light can come directly from a light source, or it can bounce (reflect) off surfaces.
Objects that are not fully transparent (opaque and translucent objects) block light from passing through them.
When an object blocks light from a light source, a shadow is formed behind it.

Y5/6

Light travels in straight lines, which means we can only see an object if there is an unobstructed, straight path for light to travel from that object into our eyes.
We see light sources because light travels directly in a straight line from the source into our eyes.
Most objects do not make their own light. We see them because light travels from a light source, hits the object, and reflects off it in a straight line into our eyes.
Light enters the eye through the pupil (the black circle in the centre) and hits the back of the eye, which sends signals to the brain so we can understand what we are looking at.
When an opaque object blocks the straight path of light, no light can reach the surface behind it, creating a shadow with the exact same outline shape as the blocking object.

Key vocabulary- travel, reflect, opaque, transparent, refract, spectrum, outline

Sound

Y3/4

A sound is made when an object vibrates. These vibrations travel from the sound source to our ears.
The vibrations cause parts of our body inside our ears to vibrate, allowing us to sense and hear the sound.
The volume of a sound depends on the strength (size) of the vibrations. Stronger vibrations create louder sounds, and weaker vibrations create quieter sounds.
Pitch is how high or low a sound is. Pitch is affected by the features of the object making the sound, such as smaller or tighter objects usually producing higher-pitched sounds.

Y5/6

Sound vibrations must travel through a medium (a solid, liquid, or gas) to reach our ears. Sound travels at different speeds depending on the medium, moving fastest through solids where particles are packed closely together.
Sound cannot travel through a vacuum (an area completely empty of matter, such as outer space) because there are no particles to pass the vibrations along.
As sound vibrations travel through a medium, they lose strength and spread out. Therefore, sounds decrease in volume and become fainter as you move further away from the source.
A sound insulator is a material (such as foam, thick fabric, or cotton wool) that absorbs or blocks sound vibrations effectively, stopping them from passing through.

Key vocabulary- vibration, volume, pitch, vacuum, insulator

Rocks and Fossils

Y3/4

Rock is a naturally occurring material. There are different types of rock, such as sandstone, limestone, chalk, and slate, which all have different appearances and properties.
Rocks can be hard or soft, have different grain or crystal sizes, and come in many shapes and sizes. Some rocks are permeable and absorb water, while others are impermeable and do not let water pass through.
Soils are made up of tiny pieces of ground-down rock mixed with decaying plant and animal material (organic matter).
The type of rock, the size of the rock pieces, and the amount of organic matter affect the properties of the soil (such as sandy, clay, or chalky soil).
Some rocks contain fossils, which are the preserved remains or imprints of living things that lived millions of years ago

Y5/6

Rocks are grouped into three types based on how they are made. Igneous rocks form from cooled magma or lava, sedimentary rocks form from squashed layers of sediment, and metamorphic rocks are changed by intense heat and pressure underground.
When plants and animals died millions of years ago, they fell to the seabed and were quickly buried by layers of mud and sand.
As the layers of sediment built up and turned into rock, the soft parts rotted away and the remaining hard parts were slowly dissolved and replaced by minerals from the water.

Key vocabulary- igneous, sedimentary, metamorphic, magma, lava, permeable, impermeable

Evolution and Inheritance

Y3/4

All living things have offspring of the same kind, as features in the offspring are inherited from the parents.
Plants and animals have characteristics that make them suited to their environment.
If the environment changes rapidly, some variations of a species may not suit the new environment and will die.
If the environment changes slowly, animals and plants with variations that are best suited survive in pass their characteristics on to their young.
Over time, these inherited characteristics become more dominant within the population.
Fossils give us evidence of what lived on the Earth millions of year ago.
Scientists such as Darwin observed how living things adapt to different environments.

Y5/6

Living things produce offspring of the same kind, and features in the offspring are inherited from their parents. However, offspring vary and are not identical to their parents.
Over many generations, plants and animals develop characteristics that adapt them to suit their environment in specific ways.
If an environment changes slowly, individuals with variations that are best suited to the new conditions are more likely to survive, reproduce, and pass those helpful characteristics on to their young.
Over very long periods of time, these useful inherited characteristics become more dominant within the population, leading to evolution.
Fossils provide vital evidence of how living things have changed over millions of years. Scientists such as Charles Darwin and studied these patterns and observed how living things adapt to different environments.

Key vocabulary-offspring, evolution, inheritance, variations, adaptations, characteristics

Living Things and their Habitats

Y3/4

Animals can be divided into two main groups based on their skeletons. Vertebrates are animals that have a backbone, and invertebrates are animals that do not have a backbone.
Vertebrates can be divided into five smaller groups, which are fish, amphibians, reptiles, birds, and mammals.
Invertebrates make up the majority of animal species and can be divided into smaller groups, including insects, spiders, snails, and worms.
Plants can be divided broadly into two main groups. Flowering plants produce flowers and seeds (such as grasses, trees, and garden flowers), while non-flowering plants do not produce flowers (such as ferns and mosses).

Y5/6

Each of the five vertebrate groups shares specific common characteristics, such as how they breathe, regulate body temperature, reproduce, and what covers their skin (scales, feathers, fur, or moist skin).
Invertebrates are classified into distinct scientific groups based on body structure, such as arthropods (insects, arachnids, and crustaceans), molluscs (snails and slugs), and annelids (segmented worms).
Scientists classify plants in greater detail by looking at how they reproduce and transport water, separating seed-bearing flowering plants and conifers from spore-producing mosses and ferns.
Systems. Alongside plants and animals, scientists classify microorganisms (such as bacteria, fungi, and viruses) using standard taxonomy systems first developed by Carl Linnaeus.

Key vocabulary- vertebrates, invertebrates, flowering, non-flowering, bacteria, micro-organism

Animals, including Humans

Y3/4

Unlike plants, which can make their own food using sunlight, animals must eat other living things to get the nutrients they need to survive.
Food contains a range of different nutrients that the body needs to stay healthy, including carbohydrates (which include sugars), protein, fats, vitamins, minerals, water, and fibre.
Most foods do not belong to just one group, and a single piece of food will often provide a range of different nutrients.
Humans need to eat the right balance of these nutrients every day to grow, repair tissues, and stay full of energy.

Y5/6

Diet, regular exercise, drugs, and daily lifestyle habits all have a major impact on the way our bodies function.
Healthy habits help our heart and lungs work efficiently, whereas poor diet, lack of exercise, or harmful substances can damage the circulatory and respiratory systems.
What we eat and how active we are affect how clearly we think, how well we concentrate, and how fit and well we feel overall.
An unhealthy lifestyle can increase the risk of developing conditions such as type 2 diabetes, while specific deficiencies in our diet (such as a lack of certain vitamins or minerals) can cause illness.
In both Science and PSHE, pupils learn that while some drugs are helpful medicines prescribed to treat illness, other drugs (including alcohol, nicotine, and illegal substances) can harm the body and brain**.**

Key vocabulary- nutrients, deficiency , proteins, vitamins, carbohydrates, minerals, fibre, fats, sugars

Sail Class
Year C

States of Matter

Y3/4

Solids. A solid keeps its own shape and has a fixed volume.
A liquid has a fixed volume, but it changes shape to fit the container it is in. Liquids can be poured and always keep a level, horizontal surface.
A gas fills all available space in a container or room, meaning it has no fixed shape or volume.
Melting is a change of state from a solid to a liquid when heated.
Freezing is a change of state from a liquid to a solid when cooled, and the freezing point of water is 0°C.
Boiling is a change of state from a liquid to a gas that happens when a liquid is heated to a specific temperature. Water boils when it is heated to 100°C.

Y5/6

Materials have different practical uses depending on their state (solid, liquid, or gas) and their specific properties.
Engineers and designers test materials for hardness (resistance to scratching or denting) and transparency (whether light passes through them) when choosing materials for windows, tools, or buildings.
Materials are tested to see if they conduct heat (thermal conductivity) or electricity (electrical conductivity), or if they act as insulators to keep things warm or safe.
Some materials, particularly metals containing iron, nickel, or cobalt, show an attraction to magnets, which allows them to be separated from other materials or used in devices.
Key vocabulary- hardness, transparency, conductivity, attraction, solid, liquid, gas. boiling point, freezing point

Plants

Y3/4

Many plants, though not all, have roots, stems or trunks, leaves, and flowers or blossom.
The roots absorb water and nutrients from the soil and anchor the plant firmly in the ground.
The stem transports water and nutrients around the plant and holds the leaves and flowers up toward the light and air.
The leaves use sunlight, air, and water to produce food for the plant so it can grow.
Flowers attract insects and produce seeds, which are sometimes protected inside berries or fruits and are scattered (dispersed) to grow new plants.

Y5/6

By holding leaves and flowers up in the air, the stem maximises exposure to sunlight for food production and makes it easier for wind or insects to reach the flowers for reproduction.
Leaves act as food factories through a process called photosynthesis, using energy from sunlight to turn water from the roots and carbon dioxide from the air into glucose (sugar) and oxygen.
Pollen, which is produced by the male part of the flower (the anther), is transferred by wind or insects to the female part of another flower (the stigma) in a process called pollination.
Once pollinated, fertilisation takes place and seeds form inside fruits or berries. Plants have evolved different seed dispersal adaptations (such as wind, water, animals, or explosion) so young plants grow away from the parent plant without competing for light and water.
Key vocabulary- nutrient, photosynthesis, pollen, pollination, reproduce, dispersal

The Water Cycle

Y3/4

Water freezes into ice at 0°C and boils into steam at 100°C.
Water at the surface of seas, rivers, and puddles warms up and evaporates into an invisible gas called water vapour, which rises into the air.
As water vapour rises high into the sky, it cools down and condenses back into tiny liquid water droplets, forming clouds.
When too much water has condensed, the water droplets in the clouds get too heavy and fall back to Earth as rain, snow, sleet, or hail.
Precipitation drains back into rivers, lakes, and seas, allowing the water cycle to repeat continuously.

Y5/6

Boiling happens rapidly throughout a liquid when it reaches a specific temperature (100°C for water), creating visible bubbles of gas inside the liquid. Evaporation is the same state change from liquid to gas, but it happens slowly at lower temperatures and only at the surface of the liquid.
Evaporation happens much more quickly when the surrounding temperature is higher, when the liquid is spread out over a larger surface area, or when it is windy.
Condensation is the exact reverse of evaporation, changing water vapour gas back into a liquid when it loses heat energy against a cooler surface or cold air.
All stages of the water cycle (melting, freezing, evaporation, and condensation) are reversible physical changes because no new materials are made and the water can return to its original state.
Key vocabulary-cycle, evaporation, precipitation, condensation.

Forces and Magnets

Y3/4

A magnet attracts magnetic materials. Metals such as iron and nickel, as well as materials containing them like stainless steel, are magnetic, while most other materials (such as plastic, wood, and aluminium) are non-magnetic.
The strongest parts of a magnet are the ends, which are called poles. Every magnet has two poles, a north pole and a south pole.
If two opposite (unlike) poles are brought together, such as a north pole and a south pole, they will pull toward each other and attract. If two matching (like) poles are brought together, such as two north poles or two south poles, they will push away from each other and repel.

Y5/6

Unlike pushes, pulls, and friction, which need direct physical contact to work, magnetism is a non-contact force that can act at a distance. A magnet does not need to touch an object in order to attract or repel it.
Every magnet is surrounded by an invisible magnetic field where its magnetic force is active, which is why magnetic objects are pulled toward the magnet once they enter this area.
The Earth itself acts like a giant magnet with its own magnetic field, which allows a magnetic compass needle to always point north for navigation.
Because magnetism only affects specific metals like iron and nickel, magnetic attraction is used in science and recycling centres to separate magnetic materials from non-magnetic mixtures.
Key vocabulary- magnet, magnetic field, repel, attract, poles

Electricity

Y3/4

Electricity can only flow around a circuit if there is a complete, unbroken loop connecting the cell (or battery) to the components with wires.
Turning a switch off (opening the switch) creates a break in the circuit. Because the circuit is no longer complete, electricity cannot flow around it.
When a switch is open and electricity stops flowing, any bulbs, motors, or buzzers connected to that circuit will turn off as well. Closing the switch completes the loop and turns them back on.

Y5/6

Adding more cells to a complete circuit, or using a battery with a higher voltage, pushes more electrical energy around the circuit. This makes a bulb shine brighter, a motor spin faster, or a buzzer make a louder sound.
Adding more bulbs to a single loop (series circuit) shares the electrical energy between them, which makes each bulb less bright.
In the same way, adding more motors or buzzers to a circuit causes each motor to spin more slowly and each buzzer to sound quieter.
Instead of drawing realistic pictures of wires and batteries, scientists use recognised standard circuit symbols to draw clear, simple circuit diagrams.
Key vocabulary-circuit, symbols, cell/battery, voltage, amps, current, resistance

The Circulatory System

Y3/4

Muscles and other parts of the body need oxygen, water, and nutrients from food to move, grow, and stay healthy.
Blood acts as the body's delivery system, carrying water, nutrients, and oxygen to wherever they are needed.
Nutrients and water absorbed from the digestive system pass into the bloodstream, while oxygen breathed into the lungs is also picked up by the blood.
As the muscles and organs use up oxygen and nutrients to create energy, they produce carbon dioxide and other waste products

Y5/6

The human circulatory system is made up of three main parts: the heart (a muscular pump), blood vessels (tubes called arteries, veins, and capillaries), and blood.
The heart pumps oxygen-rich (oxygenated) blood away from the heart through arteries to deliver nutrients, water, and oxygen to the muscles and organs.
Once the body uses these supplies, it produces carbon dioxide and waste. Deoxygenated blood carries this carbon dioxide back to the heart through veins.
The heart then pumps this blood to the lungs, where carbon dioxide is removed when we breathe out and fresh oxygen is absorbed when we breathe in. The oxygen-rich blood returns to the heart, and the continuous cycle starts again
Key vocabulary- circulatory, nutrients, oxygenated, deoxygenated, carbon dioxide,

Sail Class
Year D

Animals including humans

Y3/4

Humans have four types of teeth, each with a specific job. Incisors are at the front for cutting and biting, canines are pointed for tearing and ripping, and premolars and molars are flat at the back for grinding and chewing food.

Food enters the body through the mouth, where the teeth start breaking it down. Saliva is added to soften the food, and the tongue rolls it into a ball before swallowing.

Swallowed food passes down a muscular tube called the oesophagus into the stomach. In the stomach, the food is churned around and mixed with digestive juices to break it down further.

Food moves into the small intestine, where nutrients are absorbed into the body. The remaining waste passes into the large intestine, where water is removed, and the solid waste is stored in the rectum until it leaves the body through the anus.

Y5/6

Beyond physical chewing and churning, digestion relies on biological chemicals (such as stomach acid and digestive enzymes in saliva and the intestines) to break large food molecules down into tiny, soluble nutrients.

Inside the small intestine, useful nutrients pass through the intestinal walls directly into the bloodstream. The circulatory system then transports these nutrients and water (absorbed in the large intestine) to muscles and organs across the body.

Scientists compare the teeth of different animals to identify their diets, carnivores have sharp canines for tearing meat, herbivores have broad molars for grinding plants, and omnivores have a mix of both.

Producers, predators, and prey are connected in complex food webs. Any change to one population (such as disease or habitat loss) affects the survival of other living things in that ecosystem.

Key vocabulary- classified, digestion, saliva, oesophagus, intestine, rectum, molars, incisors, canine

Living things and their habitats

Y3/4

Living things can be sorted into main groups based on their characteristics. Plants can make their own food using sunlight, whereas animals cannot make their own food and must eat plants or other animals.

Plants can be divided broadly into two main groups. Flowering plants produce flowers and seeds to reproduce,

Non-flowering plants do not produce flowers, and instead reproduce in other ways, such as using spores or cones

Y5/6

Scientists group all living things according to shared characteristics, using classification systems developed by scientists like Carl Linnaeus.

Plants and animals are two main kingdoms of living things, there are other living organisms that do not fit into either group because they have very different structures and ways of getting energy.

Organisms such as toadstools, mushrooms, and mould belong to their own separate group (fungi). Unlike plants, they cannot make their own food from sunlight and absorb nutrients from dead or decaying matter.

Microorganisms are tiny living things that are usually too small to see without a microscope, such as bacteria Some microorganisms are helpful while others can cause illness or decay.

Key vocabulary- characteristics, microorganisms, bacteria, classification, species, kingdom.

Living things and their habitats

Y3/4

Living things can be classified in different ways according to their features, such as whether they have legs, wings, shells, or leaves.

Every living thing lives in a habitat that provides the shelter, food, and environment to which it is suited.

Environments change naturally with the seasons. Because of changes in temperature, daylight, and food availability, different living things can be found in a habitat at different times of the year

Habitats can also change suddenly due to natural events, such as flooding, wildfires, droughts, or earthquakes,

Humans also cause environments to change. This can be in a positive way, such as setting up nature reserves, planting trees, and creating garden ponds, or in a negative way, such as littering, cutting down trees, and polluting rivers.

Y5/6

Scientists use detailed classification keys and shared biological characteristics to group and identify living things across different habitats,

Living things within a habitat rely on each other for food and shelter, a natural disaster or human change to one part of the environment can disrupt the entire ecosystem and affect many different species.

Activities such as deforestation, urbanisation, intensive farming, and climate change cause long-term habitat loss, which can endanger species or force them to adapt or relocate.

Scientists, governments, and communities work to protect biodiversity through positive conservation strategies, including rewilding projects, protecting endangered species, reducing carbon emissions, and restoring damaged habitats.

Key vocabulary-environment, biodiversity, impact, habitat, reserves.

Living things in their habitats

Y3/4

As part of their life cycle, all plants and animals reproduce to create new offspring that eventually grow into adults.

In humans and most mammals, offspring develop inside the mother and are born live, such as human babies, kittens, or puppies, before growing into adults.

In other animals, such as birds (like chickens), reptiles (like snakes), and fish, females lay eggs that hatch into young before growing into adults.

Some young animals look completely different from their parents when they hatch and undergo a dramatic body change before becoming adults, such as a caterpillar changing into a butterfly or a tadpole into a frog. This process is called metamorphosis.

Y5/6

Most animals reproduce sexually, which requires two parents (a male and a female) to create offspring that inherit features from both parents.

During sexual reproduction, a male sex cell (sperm) joins with and fertilises a female sex cell (egg) to begin the development of a new organism.

In mammals, birds, and reptiles, fertilisation happens inside the female's body before live birth or egg-laying. In most amphibians and fish, eggs are laid in water and fertilised externally.

Scientists compare different types of metamorphosis across animal groups, such as the complete metamorphosis of insects (egg, larva, pupa, adult) and the aquatic-to-land metamorphosis of amphibians (egg, tadpole, froglet, adult).

Key vocabulary- gestation, pregnancy, lifecycle, sexual reproduction, non-sexual reproduction, metamorphosis.

Animals, including humans-

Y3/4

Humans have four types of teeth, and each type has a specific job when we eat.

Incisors are flat, sharp teeth at the front of the mouth used for cutting and biting food. Canines are pointed teeth next to the incisors used for tearing and ripping food.

Premolars and molars are large, flat teeth at the back of the mouth used for grinding and chewing food into smaller pieces before swallowing.

Living things can be classified according to their place in a food chain.

Animals that hunt and eat other animals are called predators, while the animals that get hunted and eaten are called prey.

Y5/6

Scientists study the skulls and teeth of animals to work out their diets.

Herbivores (plant-eaters) have wide, flat molars for grinding tough plants, carnivores (meat-eaters) have long, sharp canines for catching and tearing prey, and omnivores (like humans) have a mixture of all four tooth types.

Sugary and acidic foods encourage bacteria to produce acid that damages tooth enamel, linking dental hygiene to overall human health.

In nature, most animals eat more than one type of food, meaning simple food chains link together to form complex food webs.

Arrows in a food chain or food web show the direction of energy transfer from producers to consumers. If one predator or prey population increases or decreases rapidly due to disease or human impact, it affects the survival of all other living things connected to it in the web.

Key vocabulary-incisors, canines, molars, premolars, grinding, chewing, producers, consumers, predators and prey

Animals, including humans-

Y3/4

Humans and some other animals (vertebrates) have internal skeletons made of bones. The skeleton has three main jobs: it supports the body so we can stand upright, protects vital organs (such as the skull protecting the brain and ribs protecting the heart and lungs), and helps us move.

Some animals do not have a backbone or internal skeleton (invertebrates). Some have hard outer shells for protection (exoskeletons, like crabs and insects), while others have no hard skeleton at all (hydrostatic skeletons, like worms and jellyfish).

Muscles are attached to bones and pull on them to make the body move. When a muscle contracts (works), it becomes shorter and thicker. When a muscle relaxes, it stretches out and becomes longer and thinner.

Muscles work in pairs across joints. To bend the arm at the elbow joint, the biceps muscle at the front contracts and pulls the lower arm up, while the triceps muscle at the back relaxes. To straighten the arm, the triceps contracts and the biceps relaxes.

Y5/6

Muscles can only pull on bones and cannot push, they must work in opposing pairs called antagonistic pairs. As one muscle contracts to pull a bone in one direction, its partner must relax to allow the movement.

Bones meet at joints to allow smooth movement. Tough bands called tendons attach muscles to bones, while ligaments hold bones together at the joints.

Contracting muscles require energy to move. During exercise, the heart beats faster and breathing rates increase so the circulatory system can deliver extra oxygen, water, and nutrients in the blood to the working muscles and remove carbon dioxide waste.

Key vocabulary-skeleton, muscles, joints, contract, protection, support

Working scientifically	Skills Progression
EYFS	Ask questions about how and why things change Ask questions about how and why things are similar or different Ask questions about how things are and the way they work Ask questions to find out what people do and how things work Ask questions about why and how things are linked Decide what to observe to identify or sort things Sort objects by observable and behavioural features Use simple books and electronic media to find things out Begin to use scientific language to talk about what you have found out Begin to use scientific language to talk about how things are similar or different Use vocabulary related to the topic
Year 1	With help identify changes to observe and measure and suggest how to do it Identify simple changes and talk about them Make comparisons between simple features of objects, materials or living things With help notice links between cause and effect With help identify simple variables to change and measure Identify similarities and differences and talk about them With help make suggestions about how to find things out Record my sorting in sorting circles or tables Record in words and pictures what you find out Record observations in words or pictures or simple tables With help decide what patterns to observe and measure and suggest how to do it. Identify simple patterns and talk about them Make links between two sets of observations
Year 2	Use non-standard units and simple equipment to record changes Sequence the changes Use non-standard units and simple equipment to record data Suggest ways in which a test can be carried out Suggest ways in which to record tests Understand why a test should be fair Use my records to help sort or identify other things Talk about whether the information source was useful Record in words or pictures or in simple prepared formats such as tables and / or charts Record in words or pictures or in simple prepared formats such as tables, tally charts and maps Begin to use scientific language to talk about patterns Talk about whether the pattern was as expected Use non-standard units and simple equipment to record events that might be related
Year 3 and 4	Asks relevant questions and uses past knowledge when considering new investigation Can set up simple practical enquiries and understand a fair test. Can understand that changing only one variable is the best method for testing. Can make careful observations using notes and simple tables and drawing. In drawing can consider scale and detail. Can take accurate measurements using standard units of length, time and heat. Use mm and cm. Use negative numbers. labelled diagrams neatly, use keys, bar charts, and simple tables. Use headings to clarify what information is being collected. Draw simple conclusions, make predictions for new values, suggest improvements and raise further questions Use scientific evidence to answer questions or to support their findings relate the results to scientific knowledge Use independent research including secondary sources to help them to answer questions Know how to use a microscope, magnifying lens, thermometer

Year 5 and 6	Asks relevant questions and uses past knowledge when considering new investigation Can set up simple practical enquiries and understand a fair test. Can understand that changing only one variable is the best method for testing. Can make careful observations using notes and simple tables and drawing. In drawing can consider scale and detail. Can take accurate measurements using standard units of length, time and heat. Use mm and cm. Use negative numbers. labelled diagrams neatly, use keys, bar charts, and simple tables. Use headings to clarify what information is being collected. Draw simple conclusions, make predictions for new values, suggest improvements and raise further questions Use scientific evidence to answer questions or to support their findings relate the results to scientific knowledge Use independent research including secondary sources to help them to answer questions Know how to use a microscope, magnifying lens, thermometer
Plants	**Skills Progression**
EYFS	Make observations of plants and talk about changes
Year 1	Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees in the local environment and other biomes Identify and describe the basic structure of a variety of common flowering plants, including trees.
Year 2	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
Year 3 and 4	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. Know that plants make their own food (produce glucose)
Year 5 and 6	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. Know that plants make their own food (produce glucose)

Animals including humans	**Skills Progression**
EYFS	Make observations of animals and talk about changes
Year 1	Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals and invertebrates Identify and name a variety of common animals that are carnivores, herbivores and omnivores and understand how teeth can be used to recognise these animals Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets and invertebrates) Identify, name, draw and label the basic parts of the human body (eyes, ears, mouth, nose, skin, ankle, elbow, wrist, hip, waist,) and say which part of the body is associated with each sense.
Year 2	Notice that animals, including humans, have offspring which grow into adults including lifecycles for tadpoles, caterpillars etc 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 of different types of food, and hygiene
Year 3 and 4	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 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. Incisors, molars, canines Construct and interpret a variety of food chains, identifying producers, predators and prey.
Year 5 and 6	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 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. Incisors, molars, canines

	Construct and interpret a variety of food chains, identifying producers, predators and prey
Every day materials	**Skills Progression**
EYFS	Talk about the similarities and differences in relation to materials
Year 1	Distinguish between an object and the material from which it is made including manmade or natural 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.
Year 2	Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.
Forces and magnets	**Skills Progression**
Year 3 and 4	Compare how things move on different surfaces and understand friction 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 Identify some magnetic materials Describe magnets as having two poles
Year 5 and 6	Compare how things move on different surfaces and understand friction 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 Identify some magnetic materials Describe magnets as having two poles
States of Matter	**Skills Progression**
Year 3 and 4	Compare and group materials together, according to whether they are solids, liquids or gases including states of water 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 water cycle and associate the rate of evaporation with temperature.
Year 5 and 6	Compare and group materials together, according to whether they are solids, liquids or gases including states of water 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 water cycle and associate the rate of evaporation with temperature.
Seasonal changes	**Skills Progression**
EYFS	Talk about the features of their own environment and how environments vary from one another
Year 1	Observe changes across the four seasons and relate to our local environment and other countries of the world Observe and describe weather associated with the seasons and how day length varies and relate to our local environment and other countries of the world Recognise the difference between weather and climate
Year 2	Observe changes across the four seasons and relate to our local environment and other countries of the world Observe and describe weather associated with the seasons and how day length varies and relate to our local environment and other countries of the world Recognise the difference between weather and climate
Light	**Skills Progression**
Year 3 and 4	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 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. Know the term translucent, opaque and transparent
Year 5 and 6	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 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. Know the term translucent, opaque and transparent
Sound	**Skills Progression**
Year 3 and 4	Identify how sounds are made, associating some of them with something vibrating Recognise that vibrations from sounds travel through a medium to the ear Recognise the difference between pitch, and volume
Year 5 and 6	Identify how sounds are made, associating some of them with something vibrating Recognise that vibrations from sounds travel through a medium to the ear Recognise the difference between pitch, and volume
Electricity	**Skills Progression**
Year 3 and 4	Identify common appliances that run on electricity Construct a simple series circuit, identifying/naming its basic parts, including cell, wire, bulb, switch and buzzer Draw the circuit as a pictorial representation including lamp and buzzer Precautions for working safely with electricity. Recognise that a switch opens and closes a circuit Recognise some common conductors and insulators, and associate metals with being good conductors.
Year 5 and 6	Identify common appliances that run on electricity Construct a simple series circuit, identifying/naming its basic parts, including cell, wire, bulb, switch and buzzer Draw the circuit as a pictorial representation including lamp and buzzer Precautions for working safely with electricity. Recognise that a switch opens and closes a circuit Recognise some common conductors and insulators, and associate metals with being good conductors.
Living things and their habitats	**Skills Progression**
EYFS	Know about the similarities and differences in relation to living things
Year 1	Know about the similarities and differences in relation to living things Explore and compare the differences between things that are living, dead, and things that have never been alive and relate to manmade or natural
Year 2	Explore and compare the differences between things that are living, dead, and things that have never been alive and relate to manmade or natural Identify that most living things live in habitats to which they are suited 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 Understand a simple food chain, and identify and name different sources of food.
Year 3 and 4	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. Know the groups Vertebrates Amphibians, reptiles, birds, fish and mammals. Invertebrates insects, molluscs and arachnids
Year 5 and 6	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.

	Know the groups Vertebrates Amphibians, reptiles, birds, fish and mammals. Invertebrates insects, molluscs and arachnids