

Science Progression - Biology

Year 1	Term 1: The Enchanted Woodland	Term 3: Dinosaur Planet	Term 5: Paws, Claws and Whiskers
	<p style="text-align: center; color: red;">identify and name a variety of common wild and garden plants, including deciduous and evergreen trees</p> <p style="text-align: center; color: red;">identify and describe the basic structure of a variety of common flowering plants, including trees</p>	<p style="text-align: center; color: red;">identify and name a variety of common animals that are carnivores, herbivores and omnivores</p> <p style="text-align: center; color: red;">identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals</p> <p style="text-align: center; color: red;">Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets)</p>	<p style="text-align: center; color: red;">identify and name a variety of common animals that are carnivores, herbivores and omnivores</p> <p style="text-align: center; color: red;">identify, name, draw and label basic parts of the human body and say which is associated with sense</p> <p style="text-align: center; color: red;">identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals</p>
Substantive Knowledge	<p>Make Friends with a Tree</p> <p>Tree Types</p> <p>Deciduous Trees: Oak, Maple, Birch</p> <p>Evergreen Trees: Pine, Fir, Cypress</p> <p>Key Features</p> <p>Leaves: Shape, Size, Colour</p> <p>Trunk: Texture, Bark</p> <p>Flowers/Fruits: Appearance</p> <p>Habitats</p> <p>Woods, Parks, Gardens</p> <p>Endpoints</p> <ol style="list-style-type: none"> Recognising common deciduous and evergreen trees Describing key features of trees Understanding basic tree habitats Distinguishing between different tree types <p>Deciduous or Evergreen</p> <p>Deciduous Trees</p> <p>Deciduous trees are trees that shed their leaves annually.</p> <p>Examples of deciduous trees include oak, maple, and birch.</p> <p>Deciduous trees change colour and drop their leaves in the autumn.</p> <p>The trees remain bare during winter but grow new leaves in spring.</p> <p>Evergreen Trees</p> <p>Evergreen trees have leaves all year round.</p> <p>Examples of evergreen trees include pine, fir, and holly.</p> <p>Evergreen trees do not undergo significant leaf shedding like deciduous trees.</p> <p>The leaves of evergreen trees are usually thick and waxy to help them retain water.</p> <p>Endpoints</p> <ol style="list-style-type: none"> Identify deciduous and evergreen trees in their local environment. Describe the differences between deciduous and evergreen trees. Understand the importance of trees in our environment. <p>How Old?</p> <p>What is Circumference?</p> <p>Circumference is the distance around a circle. It is measured by using a flexible tape measure.</p> <p>Why Do We Measure Tree Trunk Circumference?</p> <p>Measuring tree trunk circumference helps us understand the size and age of trees. It also gives us insights into the health and growth of trees.</p> <p>Units of Measurement</p>	<p>Reptile Day</p> <p>Definition: Reptiles are cold-blooded animals that lay eggs and have scales or scutes (armoured skin).</p> <p>Common Types:</p> <ul style="list-style-type: none"> Snakes Lizards Tortoises Crocodiles <p>Habitat: Reptiles can be found in many habitats, including forests, deserts, and rivers.</p> <p>Diet: Most reptiles eat plants, insects, or other small animals.</p> <p>Movement: Reptiles can crawl, swim, or climb, depending on the species.</p> <p>Endpoints</p> <ol style="list-style-type: none"> Identify and name common reptiles. Describe the basic characteristics of reptiles (cold-blooded, scales, etc.). Explain how reptiles move, eat, and behave. Draw and label a reptile accurately, using observations and researched facts. <p>Dino Dentist</p> <p>Types of Dinosaurs</p> <p>Herbivores: These dinosaurs ate plants. Some examples are: Triceratops, Brachiosaurus</p> <p>Carnivores: These dinosaurs ate meat. Some examples are: Tyrannosaurus Rex, Velociraptor</p> <p>Dinosaur Teeth</p> <p>Dinosaur teeth were different depending on what they ate.</p> <p>Herbivores had flat teeth for grinding plants.</p> <p>Carnivores had sharp, pointed teeth for tearing meat.</p> <p>Modern Day Comparisons</p> <p>Today, animals also have different types of teeth based on their diets:</p> <p>Herbivores (like cows): Flat teeth for chewing.</p> <p>Carnivores (like lions): Sharp teeth for tearing.</p> <p>Omnivores (like humans): A mix of flat and sharp teeth.</p> <p>Learning Endpoints</p> <ol style="list-style-type: none"> Identify and name different dinosaurs. Explain the differences between herbivores and carnivores based on their teeth. Compare dinosaur teeth to the teeth of modern animals, recognising similarities and differences. 	<p>Human Body</p> <p>Head: The top part of the body which houses the brain and sensory organs.</p> <p>Eyes: Used for sight.</p> <p>Ears: Used for hearing.</p> <p>Mouth: Used for taste and speaking.</p> <p>Nose: Used for smell.</p> <p>Hands: Used for reaching and touching (associated with the sense of touch).</p> <p>Learning Endpoints</p> <ol style="list-style-type: none"> Identify and label the main parts of the human body. Describe the five senses and the body parts associated with each sense. Understand how the senses help us interact with our environment. <p>Carnivore, herbivore or omnivore?</p> <p>Types of Animals</p> <p>Mammals: Animals that are warm-blooded, have fur or hair, and usually give birth to live young (e.g., cats, dogs).</p> <p>Birds: Animals that have feathers, lay eggs, and are often able to fly (e.g., parrots, robins).</p> <p>Reptiles: Cold-blooded animals that usually have scales and lay eggs (e.g., turtles, snakes).</p> <p>Amphibians: Animals that can live both in water and on land (e.g., frogs, salamanders).</p> <p>Fish: Cold-blooded animals that live in water and have gills (e.g., goldfish, salmon).</p> <p>Food Types</p> <p>Herbivores: Animals that eat only plants (e.g., rabbits, sheep).</p> <p>Carnivores: Animals that eat only other animals (e.g., cats, dogs).</p> <p>Omnivores: Animals that eat both plants and animals (e.g., humans, bears).</p> <p>Endpoints</p> <ol style="list-style-type: none"> Identify and name different types of animals. Classify domestic small world animals based on what they eat. Create a visual representation of their classifications through drawings and labels. Articulate their reasoning for sorting animals in their chosen categories during discussions with classmates. <p>Similarities and Differences</p> <p>Key Facts About Animals</p> <p>Animals: Living creatures that can move, eat, and grow.</p> <p>Species: A group of similar animals that can breed together.</p> <p>Familiar Species:</p> <p>Dogs: Domestic pets with various breeds that differ in size and colour.</p> <p>Spiders: Arachnids with eight legs, known for spinning webs.</p> <p>Characteristics of Dogs</p> <p>Sizes: Dogs come in varying sizes—small (e.g., Chihuahuas), medium (e.g., Beagles), large (e.g., Labradors).</p> <p>Colouring: Dogs may be black, brown, white, or spotted.</p> <p>Patterns: Some dogs have unique markings, flecks, or stripes.</p> <p>Features: Ears can be floppy or pointy; tails can be long, short, or curly.</p> <p>Characteristics of Spiders</p>

We use centimetres (cm) to measure the circumference of a tree trunk.

Endpoints:

1. Measure the circumference of a tree trunk using a piece of string.
2. Compare the circumferences of different tree trunks.
3. Identify and count the rings on a tree trunk to estimate its age.
4. Compare the ages of different tree trunks based on the number of rings.

Woodland Animals

Woodland Habitat:

Woodlands are areas covered with trees and shrubs where many animals find shelter, food, and safety.

Some animals that live in woodland habitats include squirrels, deer, foxes, badgers, and owls.

Home and Local Environment:

Animals in our local environment include pets like cats and dogs, as well as birds like sparrows and pigeons.

These animals are adapted to living around houses and urban areas where they can find food and shelter.

Animals in Both Woodland and Local Environment:

Some animals, like hedgehogs and birds, can be found both in woodland habitats and in our local environment.

Endpoints

1. Identify animals that live in woodland habitats and local environments.
2. Sort pictures of animals into the correct categories based on their habitats.
3. Recognise that some animals can live in both woodland habitats and local environments.

Who am I?

Animal Characteristics:

Fur or feathers

Number of legs

Habitat

Diet

Question-Asking Skills:

What colour am I?

Do I have fur or feathers?

Do I live in water or on land?

How many legs do I have?

Endpoints

1. Identify and describe basic physical characteristics of animals.
2. Ask and answer questions to gather information about animals.
3. Make predictions based on gathered information.
4. Develop teamwork and communication skills.

Plant Parts

Parts of a Wild Flowering Plant:

Leaves: Green, flat structures that grow on the stem.

Sizes: Spiders can be tiny (like the Money Spider) to larger (like the European Garden Spider).

Colouring: Common colours include brown, black, or even bright colours in some species.

Patterns: Many spiders have distinct patterns on their backs, like stripes, spots, or geometric shapes.

Features: Spiders have eight legs and different types of body shapes, such as round or long.

Endpoints

1. Identify and name different animals, focusing on familiar species like dogs and spiders.
2. Describe similarities and differences in size, colour, patterns, and key features.
3. Communicate their observations verbally and through drawing.

Variation in Classmates

Human Body Parts: Understand the basic parts of the human body (e.g., head, arms, legs, eyes, hair).

Variation: Learn how people can have different traits (e.g., hair colour, height, eye colour) while still being human.

Common Features vs. Varied Features: Identify features that are common to all humans (e.g., having eyes) versus those that vary (e.g., eye colour).

Endpoints

1. Identify and describe key parts of the human body.
2. Recognise and explain features that vary among classmates.
3. Collect and record data using simple methods.
4. Communicate findings clearly with peers.

I know!

Types of Animals: Mammals, birds, reptiles, amphibians, fish, and invertebrates.

Body Parts: Recognising and naming parts of animals (e.g., legs, wings, fins).

Habitats: Understanding where different animals live (e.g., forests, oceans, deserts).

Endpoints

1. Identify and name common animals.
2. Describe the habitats of different animals.
3. Share facts about animals using complete sentences.
4. Compare and contrast different types of animals.

	<p>Flowers: Colourful part of the plant that often attracts insects.</p> <p>Petals: Coloured, leaf-like parts of the flower that protect the reproductive organs.</p> <p>Seeds: Small, often hard and dry structures produced by the plant for reproduction.</p> <p>Roots: Usually hidden underground, absorb water and nutrients from the soil.</p> <p>Stem: Supports the plant body and transports water and nutrients.</p> <p>Endpoints</p> <ol style="list-style-type: none"> 1. Identify and name the parts of a wild flowering plant. 2. Use a digital microscope or hand lens to observe the plant parts closely. 3. Count and compare the petals or leaves of different plants. 4. Notice and describe the shapes and patterns of the leaves and petals. <p>Planting Seeds and Bulbs</p> <p>Types of Woodland Native Seeds and Bulbs:</p> <p>Acorns Bluebells Snowdrops Daffodils Wild Garlic</p> <p>Suitable Planting Conditions:</p> <p>Moist soil Partial shade Well-draining soil Protection from strong winds</p> <p>Unsuitable Planting Locations:</p> <p>Waterlogged soil Heavy shade Areas prone to flooding</p> <p>Endpoints</p> <ol style="list-style-type: none"> 1. Identify suitable and unsuitable planting spots for UK woodland seeds and bulbs. 2. Develop observation skills by predicting and observing plant growth over time. 3. Understand the importance of selecting the right environment for plant growth. 		
<p>Disciplinary Knowledge</p>	<p>Observation Skills</p> <p>Looking closely at leaves, bark, and branches Noticing differences and similarities between tree types Classification Sorting trees into deciduous and evergreen categories Describing and categorising trees based on key features Recording Data Drawing and labelling trees Keeping a tree identification journal</p> <p>Similarities and Differences Similarity: Both deciduous and evergreen trees provide oxygen for us to breathe. Difference: Deciduous trees lose their leaves seasonally, while evergreen trees keep their leaves all year round.</p> <p>Measurement</p>	<p>Observing Reptiles</p> <p>When we observe reptiles, we can learn about: Movement: How they crawl, slither, or swim. Eating Habits: What they like to eat (e.g., insects, plants, small animals). Behaviour: How they interact with their environment and other animals.</p> <p>Exploring Care Needs</p> <p>Reptiles need specific conditions to thrive, including: Temperature: A warm environment, often needing a heat lamp. Diet: A balanced diet depending on species (e.g., insects for snakes, vegetables for tortoises). Habitat: Space to move freely, including areas to hide and bask.</p> <p>Observe and Sort: Look at images of various dinosaur teeth and sort them into two groups: meat eaters (carnivores) and plant eaters (herbivores). Create: Use clay to model either a herbivore or carnivore dinosaur tooth, explore creativity, and understand the physical properties of materials.</p>	<p>Observation: Looking carefully at the body and identifying its parts. Asking Questions: Encouraging curiosity about how our body works. Exploration: Engaging in activities to discover the senses in action.</p> <p>Classify Animals</p> <p>Sorting: Arrange animals into groups based on their food types (herbivores, carnivores, omnivores). Alternative Criteria: Create their own ways to sort animals based on different characteristics such as colour, size, or habitat. Communicate Findings</p> <p>Drawing and Labelling: Use drawings to represent their sorted animals and label them accurately. Explain Reasoning: Share their classification choices with peers and explain why they sorted the animals in that way.</p> <p>Similarities: Both dogs and spiders are animals; they both have unique features and can be found in various environments.</p>

	<p>To measure the circumference of the tree trunk accurately, we need to wrap the measuring tape around the widest part of the trunk. We then carefully read the measurement to determine the circumference. Comparison To compare the ages of different trees, we count the rings in each trunk. We can then make observations about which tree is older based on the number of rings.</p> <p>Observation & Classification: Students will observe pictures of different animals and classify them into groups based on their habitat. Classification helps us understand where different animals live and how they adapt to their surroundings. Living Things & Habitats: Students will learn that animals have specific habitats where they live and find their food. Understanding habitats helps us care for animals and protect their environments.</p> <p>Communication Skills: Students will develop questioning and listening skills. They will learn to communicate effectively to gather information. Critical Thinking: Encourages logical reasoning and deduction. Promotes problem-solving and decision-making skills.</p> <p>Skills: Observation: Look closely at the plant parts. Counting: Count the number of petals or leaves. Comparing: Identify similarities and differences. Tools: Digital Microscope: Allows for a closer look at the plant parts. Hand Lens: Helps magnify the parts for detailed observation.</p> <p>Observation and Prediction Children will predict how different planting spots will affect the growth of seeds and bulbs. Children will observe the growth and changes in plants over time. Scientific Inquiry Encourage children to ask questions, make hypotheses, and conduct experiments to understand the best planting spots.</p>	<p>Research: Investigate the teeth of modern animals such as cats (carnivores), cows (herbivores), and humans (omnivores).</p>	<p>Differences: Dogs are mammals and have fur, while spiders are arachnids and have exoskeletons. Dogs can be trained and socialised, whereas spiders are more solitary.</p> <p>Observation: Noticing and describing differences in classmates (e.g., hair texture, eye colour). Recording Data: Choosing appropriate methods to document findings (e.g., tally charts, drawings). Data Interpretation: Drawing conclusions based on gathered data. Communication: Sharing findings with classmates.</p> <p>Observations Encouraging children to observe and describe animals and plants using their senses.</p> <p>Questions and Investigations Formulating basic questions about the world around them. Conducting simple investigations to find out more.</p> <p>Classifying Grouping animals and plants based on similar characteristics. Using sorting activities to distinguish between different types of living things.</p>
<p>Useful Websites</p>	<ul style="list-style-type: none"> • Woodland Trust Nature Detectives • BBC Bitesize - Identifying Trees • Woodland Trust - Tree Guide • BBC Bitesize - Deciduous and Evergreen Trees • Woodland Trust's Tree Size Calculator • BBC Bitesize - Plants and Trees • Woodland Trust Kids • BBC Bitesize - Habitats • Woodland Trust Nature Detectives • BBC Bitesize Science - Parts of a Plant • Explorify - Plant Parts 	<ul style="list-style-type: none"> • National Geographic Kids: Reptiles • BBC Bitesize: Animals • WWF: Reptiles Facts • Science Kids: Reptiles • National Geographic Kids - Dinosaurs • BBC Bitesize - Dinosaurs • Smithsonian - Dinosaur Teeth 	<ul style="list-style-type: none"> • BBC Bitesize - The Human Body • KidsHealth - Sense Organs • National Geographic Kids - Human Body • Twinkl - Human Body Resources • Fun Kids - Learn About Your Senses • BBC Bitesize - Animals • National Geographic Kids - Animals • Twinkl - Classification Resources • BBC Bitesize: What are Animals? • National Geographic Kids: Animal Facts • Scholastic: Learn about Animals • BBC Bitesize - Animals Including Humans • National Geographic Kids - The Human Body • Primary Science - Investigating Variation

Year 2	<p align="center">Term 1&2: Beach Combers</p> <p align="center">Gather and record data to help in answering questions Identify and name a variety of plants and animals in their habitats, including microhabitats Identify and classify Explore and compare the differences between things that are living, dead, and things that have never been alive Identify and name a variety of plants and animals in their habitats, including microhabitats Find out about and describe the basic needs of animals, including humans, for survival (water, food and air) Observe closely, using simple equipment Perform simple tests</p>	<p align="center">Wriggle and Crawl</p> <p align="center">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 microhabitats Find out about and describe the basic needs of animals, including humans, for survival (water, food and air) Ask simple questions and recognise that they can be answered in different ways Observe closely, using simple equipment. Use their observations and ideas to suggest answers to questions 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. Notice that animals, including humans, have offspring which grow into adult</p>	<p align="center">Scented Garden</p> <p align="center">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 Observe closely, using simple equipment Identify and classify Gather and record data to help in answering questions Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene. Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching</p>
<p align="center">Substantive Knowledge</p>	<p>Beach Zones</p> <p>Rock Pools Living Things: Commonly found living things in rock pools include sea anemones, crabs, snails, and small fish. Non-Living Things: Rocks, shells, seaweed, and sand are examples of non-living things in rock pools.</p> <p>Sand Dunes Living Things: Insects like beetles and ants, small plants like marram grass, and certain birds can be found in sand dunes. Non-Living Things: Sand, pebbles, and driftwood are non-living elements in sand dunes.</p> <p>Other Zones of the Beach Living Things: Seagulls, jellyfish, seaweed, and various types of shells are living things found in different zones of the beach. Non-Living Things: Plastic waste, rocks, sandcastles, and beach toys are examples of non-living things on the beach.</p> <p>Endpoints</p> <ol style="list-style-type: none"> Students will be able to identify at least three living things and three non-living things in rock pools, sand dunes, and other zones of the beach. Students will complete a tally chart to record their findings during the beach exploration. Students will collaborate to create a classroom display showcasing their discoveries. <p>Grouping and Sorting</p> <p>Identifying Items at the Beach Pebbles Shells Seaweed Driftwood Old Rope Samples of Plants Crabs' Legs Mermaids' Purses</p> <p>Sorting Criteria Size Shape Texture Colour Material Living/Non-living Natural/Man-made Source (land or sea)</p> <p>Endpoints</p> <ol style="list-style-type: none"> Identify various items found at the beach. Sort items into groups based on different criteria. Explain their sorting decisions. 	<p>Habitats</p> <p>Beaches: Sand, seaweed, and rocks. Animals: Crabs, seagulls, and seals. Provides: Food, nesting sites, and shelter.</p> <p>Rainforests: Dense trees, vines, and a wet climate. Animals: Jaguars, monkeys, and an array of colourful birds. Provides: Food (fruits, nuts) and shelter.</p> <p>Deserts: Hot, dry, and sandy. Animals: Camels, lizards, and scorpions. Provides: Water sources (cacti), shelter in burrows.</p> <p>Oceans: Vast bodies of saltwater. Animals: Fish, dolphins, and whales. Provides: Food chains, habitats (coral reefs).</p> <p>Mountains: High elevations with rocky terrains. Animals: Mountain goats, eagles, and bears. Provides: Cool climate, food from vegetation.</p> <p>Endpoints</p> <ol style="list-style-type: none"> Identify and describe different local and global habitats. Explain what each habitat provides for the animals and plants living there. <p>Tree Shaking</p> <p>Types of Minibeasts: Insects (e.g., ants, ladybirds, butterflies) Arachnids (e.g., spiders, ticks) Gastropods (e.g., snails and slugs)</p> <p>Endpoints</p> <ol style="list-style-type: none"> Identify at least five different types of minibeasts found in the local environment. Successfully use a tally chart to record findings. Create a pictogram or block graph. 	<p>Growing a Pizza Garden Seeds and Bulbs: Seeds are small packets of plant life that can grow into new plants. Bulbs are underground storage organs that contain the energy needed to grow a plant. Growth Requirements: Plants need sunlight, water, air, nutrients, and space to grow. They convert sunlight into energy through a process called photosynthesis. Life Cycle of a Plant: Seeds germinate into seedlings, which grow into mature plants that can produce more seeds.</p> <p>Endpoints:</p> <ol style="list-style-type: none"> Identify at least three plants suitable for a pizza garden. Demonstrate how to follow simple planting instructions. Describe what plants need in order to grow. List daily tasks required to care for the garden. Record observations of plant growth in a garden journal. <p>Planting Sunflowers</p> <p>Lifecycle of a Sunflower Seed: The tiny seed contains all the information needed for the plant to grow. Germination: When watered and given warmth, the seed will sprout into a seedling. Seedling: Small plant starts to grow leaves. Mature Plant: The stem thickens, and the plant grows taller and develops flowers. Production of Seeds: Once flowering has occurred, the plant creates new seeds.</p> <p>Parts of a Plant Roots: Absorb water and nutrients from the soil. Stem: Supports the plant, carrying water and nutrients. Leaves: Photosynthesis occurs here; they capture sunlight to help the plant grow. Flowers: Reproductive part of the plant; can produce seeds.</p> <p>Growth Conditions Light: Sunflowers need plenty of sunlight to grow tall. Water: Regular watering is essential. Soil: Well-drained soil helps prevent root rot. Space: Need space to grow without competition from other plants.</p> <p>Endpoints</p> <ol style="list-style-type: none"> Understand the basic lifecycle of a sunflower. Measure and record the height of their sunflowers accurately. Predict and interpret their growth, using appropriate vocabulary and graphs. Discuss what conditions make for healthy plant growth. <p>Windowsill Garden</p> <p>How Do Plants Grow? Roots: Help the plant absorb water and nutrients from the soil.</p>

4. Draw a Venn diagram to visually represent sorting.

Rock Pool Habitats

What is a rock pool?

A rock pool is a small body of water that forms in the gaps and crevices of rocks along the seashore.

Rock pools are home to a variety of plants and animals that have adapted to the changing conditions of the tides.

Key Features of a Rock Pool:

Water: Rock pools contain saltwater from the sea.

Rocks: The edges and bottom of a rock pool are typically lined with rocks and pebbles.

Plants: Algae and seaweed can be found growing in rock pools.

Animals: Various types of creatures such as crabs, starfish, anemones, and small fish inhabit rock pools.

Endpoints:

1. Identify the key features of a rock pool ecosystem.
2. Describe the plants and animals that live and grow in a rock pool.
3. Understand the predator-prey relationships within a rock pool.

Shells, Shells, Shells

Mollusc Shells

Land Snails: Land snails have spiral shells with whorls. They create their shells from calcium carbonate they extract from their environment.

Mussels: Mussels have dark, elongated shells with a blue-black colour. The shells are made up of two halves, called valves.

Razor Shells: Razor shells have thin, elongated shells that resemble razors. They bury themselves in the sand or mud.

Limpets: Limpets have cone-shaped shells and cling tightly to rocks. Their shells provide protection from predators.

Clams: Clams have thick shells that can open and close like a book. They bury themselves in sand or mud.

Conch: Conch shells are large and spiral-shaped. They are mainly found in tropical waters.

Cockles: Cockles have round shells with radial ribs. They bury themselves in sand or mud.

Importance of Shells to Molluscs

Protection: Shells act as protective coverings, shielding molluscs from predators, physical damage, and drying out.

Habitat: Shells provide a secure home for the mollusc, offering stability and a place to retreat when needed.

Buoyancy: Shells help some molluscs, like mussels, float in water, aiding their feeding and movement.

Endpoints

1. Identify and name various mollusc shells.
2. Discuss the functions of mollusc shells for the creatures living inside.

Feathers!

Feather Structure:

Shaft: Hard, hollow central tube.

Barbs: Perpendicular feathery parts.

Barbules: Small interlocking structures that zip the barbs together.

Waterproof Properties:

Importance: Feathers need to be waterproof to protect birds from getting wet and cold.

Effect: When water is sprayed onto feathers, it beads up and rolls off, keeping the bird dry.

Types of Feathers:

Vaned Feathers: Found on the wings and tail for flying.

Survival

What do I eat and drink?

Butterfly: Butterflies drink nectar from flowers using their long proboscis. Some caterpillars, however, eat leaves and flowers.

Ladybird: Ladybirds feed on aphids (small plant pests) and other small insects.

Worm: Worms eat decaying leaves and organic matter in the soil. They help make the soil healthy!

Spider: Spiders catch and eat insects like flies and mosquitoes in their webs.

Snail: Snails eat leaves, flowers, and sometimes decaying plants. They have a rasping tongue called a radula.

How do I breathe?

Butterfly: Butterflies breathe through tiny holes in their bodies called spiracles.

Ladybird: Ladybirds also use spiracles to breathe, which are located along the sides of their bodies.

Worm: Worms breathe through their skin when it is moist. They take in oxygen and release carbon dioxide.

Spider: Spiders have special breathing organs called book lungs or tracheae to take in air.

Snail: Snails have a lung-like structure inside their shell that allows them to breathe air.

What do I live in or under?

Butterfly: Butterflies are often found near flowers and in gardens. They lay eggs on host plants.

Ladybird: Ladybirds can be found on plants and trees and often hide under leaves.

Worm: Worms live in the soil, helping to aerate it and create nutrient-rich compost.

Spider: Spiders make webs in the corners of rooms, in outdoor spaces, and sometimes under leaves.

Snail: Snails can be found in gardens, under stones, and in damp places to keep their bodies moist.

How do I protect myself?

Butterfly: Butterflies have colours and patterns that can help them blend into flowers to avoid being seen by predators.

Ladybird: Ladybirds can release a bitter-tasting fluid to deter predators. Their bright colours signal that they are unappetising.

Worm: Worms protect themselves by burrowing deep into the soil to hide from predators.

Spider: Spiders weave webs that can trap prey and provide protection from danger.

Snail: Snails retreat into their shells when they feel threatened to hide from predators.

Endpoints

1. Identify different types of minibeasts and their characteristics.
2. Describe what minibeasts eat, how they breathe, where they live, and how they protect themselves.
3. Present their findings in a clear and creative way, either through tables or annotated pictures.

Creating a Habitat

Shoots: Grow upwards towards the light and develop leaves for photosynthesis.

Photosynthesis:

What It Is: The process that plants use to turn sunlight into energy to grow.

Ingredients Needed: Sunlight, carbon dioxide (from the air), and water.

What Do Plants Need to Grow?

Light: Plants need sunlight to make their food.

Water: Essential for transporting nutrients and maintaining structure.

Air: Plants need carbon dioxide from the air for photosynthesis.

Nutrients: These are found in soil and help plants grow strong.

Endpoints

1. Identify what food scraps can be used to grow new plants.
2. Describe the needs of a plant for healthy growth.
3. Compare and contrast the growth of the two groups (with light/water vs without).
4. Record observations in a simple way, using drawings and notes.

Naming Plant Parts

Root: The part of the plant that grows underground. It anchors the plant in the soil and absorbs water and nutrients.

Stem: The thick structure that holds the plant upright and transports water and nutrients from the roots to the leaves.

Leaves: The green parts of the plant that are usually flat. They make food for the plant through a process called photosynthesis.

Flower Head: The colourful part of the plant that attracts pollinators. It is where seeds are produced.

Petals: The colourful parts of a flower that help to attract insects for pollination.

Buds: The small, closed parts on the plant that will grow into flowers or leaves. They are like the 'baby' parts of the plant.

Shoot: The new growth of the plant which includes the stem and leaves.

Endpoints

1. Name and describe the different parts of a plant using correct scientific vocabulary.
2. Carefully take apart a flower to observe its parts.
3. Count and compare petals and leaves in a variety of plants.
4. Record their findings through drawings or simple sentences.

Healthy Lifestyle

Exercise

Why is it important?

Helps our bodies grow and stay strong.

Keeps our hearts healthy and helps us breathe better.

Can make us feel happy and help reduce stress.

What types of exercise can we do?

Walking

Running

Dancing

Playing sports

Balanced Diet

What is a balanced diet?

Eating a variety of different foods to give our bodies the nutrients they need.

Food Groups:

Fruits and Vegetables: Help us fight illness.

Carbohydrates: Give us energy (like bread, rice, and pasta).

Proteins: Help build our muscles (like meat, fish, beans, and eggs).

Dairy: Good for our bones and teeth (like milk, cheese, and yoghurt).

Fats: Needed in small amounts (like oils and nuts).

Good Quality Sleep

Why is it important?

Helps our bodies recover and grow.

Downy Feathers: Soft, fluffy feathers found underneath the outer feathers for insulation

Endpoints

1. Identify the main parts of a feather – shaft, barbs, and barbules.
2. Explain why feathers need to be waterproof.

Suitable Minibeast Homes:

For Snails: Moist environments like a shallow container with soil and decaying leaves.

For Spiders: Small terrariums with places to spin webs, like sticks and leaves.

For Worms: A compost bin with organic material and damp soil.

For Slugs: Cool, shaded areas with plenty of leaves and moisture.

Endpoints

1. Create a suitable home for a variety of minibeasts.
2. Observe and document behaviours and characteristics of selected minibeasts.
3. Formulate and answer questions based on your observations and research.
4. Conduct simple experiments to test your ideas about minibeasts.

Food Preferences

Butterfly Diet

Butterflies primarily feed on nectar from flowers but they also enjoy ripe fruits.

Common fruits that butterflies may prefer include:

Bananas

Apples

Oranges

Strawberries

Sugar can be added to enhance the flavour, attracting more butterflies.

What are Food Chains?

A food chain shows how energy and nutrients flow from one organism to another.

It starts with a producer (like plants) and includes various consumers (like animals).

Example: Plant → Butterfly → Bird.

Endpoints

1. Identify which fruits attract butterflies.
2. Accurately observe and record butterfly visits.
3. Understand the concept of food chains and the roles of different organisms in the ecosystem.
4. Present findings in a clear, organised way.

Camouflage and Warning Colours

What is Camouflage?

Definition: Camouflage is a way animals blend into their surroundings to avoid being seen by predators (animals that want to eat them).

Purpose: It helps them stay safe and survive in the wild.

Examples of Camouflaged Minibeasts

1. Peppered Moth

Appearance: The peppered moth has a mottled grey and black pattern that resembles tree bark.

Camouflage Strategy: When resting on bark, it is hard to see, making it less likely to be eaten by birds.

2. Stick Insect

Appearance: These insects are long and thin, resembling twigs or branches.

Camouflage Strategy: They stay very still and blend in with twigs and plants, tricking predators into thinking they are just part of the plant.

Improves our concentration and mood.

How much sleep do we need?

Children of Year 2 age typically need about 9-11 hours of sleep each night.

Personal Hygiene

Why is it important?

Helps prevent sickness and keeps us feeling good.

Key Personal Hygiene Practices:

Washing hands regularly, especially before meals and after using the toilet.

Brushing teeth twice a day.

Bathing or showering regularly.

Endpoints

1. Describe the benefits of exercise, a balanced diet, good sleep, and personal hygiene.
2. Identify ways to incorporate healthy choices into their daily lives.
3. Understand the importance of these habits for their overall wellbeing.

Changes

Types of Changes

Physical Changes: Changes that do not alter the chemical composition of a material.

Examples:

Melting ice into water

Cutting paper

Chemical Changes: Changes that transform one substance into a different substance.

Examples:

Baking bread

Rusting iron

Desirable Changes

Definition: Changes that are beneficial or useful.

Examples:

Melting chocolate to make a cake.

Cutting wood to create furniture.

Undesirable Changes

Definition: Changes that result in damage or waste.

Examples:

Spoiling food.

Rusting metal tools

Endpoints

1. Identify and describe different materials and their properties.
2. Explain physical and chemical changes with examples.
3. Discuss which changes are desirable or undesirable and explain why.

3. Shield Bug

Appearance: Shield bugs often have green or brown colours which match leaves and plants.

Camouflage Strategy: Their flat, shield-like shape and colours help them hide among leaves.

Endpoints

1. Identify different minibeasts and describe their features.
2. Explain how the appearance of certain minibeasts helps them avoid predators.
3. Compare and contrast the survival strategies of camouflaged and brightly-coloured creatures.
4. Use scientific vocabulary accurately (e.g., camouflage, predator, adaptation).

Whose Baby?

Life Cycles of Favourite Minibeasts

Ladybird Life Cycle

Eggs: Laid on leaves.

Larvae: Hatch from eggs; look somewhat different from adults.

Pupa: Formed after larval stage, undergoes metamorphosis.

Adult: Emerges with wings and a distinctive shell.

Worm Life Cycle

Eggs: Laid in cocoons in the soil.

Young Worms: Hatch from the cocoon looking like small adult worms.

Adult: Grows larger and reproduces.

Earwig Life Cycle

Eggs: Laid in nests.

Nymphs: Hatch and resemble smaller earwigs.

Adult: Develop fully with wings.

Moth Life Cycle

Eggs: Laid on leaves.

Caterpillar (Larvae): Hatches, eats leaves.

Pupa (Chrysalis): Undergoes metamorphosis.

Adult Moth: Emerges with wings.

Woodlice Life Cycle

Eggs: Laid in a pouch on the mother's body.

Young Woodlice: Hatch looking like small, softer versions of adults.

Adult: Develops to get a hard shell.

Spider Life Cycle

Eggs: Laid in silk sacs.

Spiderlings: Hatch looking like miniature spiders.

Adult: Grows larger and reproduces.

Endpoints

1. Match pictures of baby minibeasts with their adult counterparts.
2. Understand the different stages of a minibeast's life cycle.

Explain why some minibeasts have different life cycles.

<p>Disciplinary Knowledge</p>	<p>Observing and Recording: Using tally marks to record data Classifying findings into living and non-living categories Comparing and Contrasting: Identifying similarities and differences between living and non-living things Understanding how each contributes to the beach ecosystem Creating a Classroom Display: Presenting findings through visuals, labels, and descriptions Engaging peers in the research process and conclusions</p> <p>Sorting into Groups By Shape: Items can be grouped based on their shapes, such as round, oval, or irregular. By Texture: Items can be grouped based on how they feel, such as smooth, rough, or bumpy. By Colour: Objects can be grouped based on their colours, for example, items that are white, brown, or green. By Material: Sorting items based on whether they are natural (e.g. shells) or man-made (e.g. old rope) materials. By Source: Grouping items based on whether they come from the land (e.g. pebbles) or the sea (e.g. seaweed). Why Sorting is Important Helps in understanding the characteristics of objects. Develops observational skills. Encourages critical thinking and reasoning.</p> <p>Food Chains in a Rock Pool: Producer: Algae and seaweed are primary producers that use sunlight to make their own food through photosynthesis. Consumer: Animals like crabs, anemones, starfish, and mussels are consumers that eat other organisms for energy. Predator-Prey Relationships: Predators such as crabs and starfish feed on prey like mussels and barnacles. Adapting to the Environment: Camouflage: Many rock pool organisms have colours and patterns that help them blend in with the rocks to avoid predators. Shell Protection: Mussels and barnacles have hard shells that protect them from predators and desiccation.</p> <p>Observing Mollusc Shells Using Hand Lenses or Digital Microscopes: These tools magnify the details of the shells, allowing for closer examination of their shape, texture, and patterns. Drawing or Sketching Shells: Encourages observational skills and helps children document their observations accurately. Comparing Similarities and Differences: Children will analyse the shells to identify common features and unique characteristics of each type.</p> <p>Observation Using Digital Microscope: Use a digital microscope to closely examine feathers. Sketch or take pictures of the shaft, barbs, and barbules. Waterproof Test: Mist water onto feathers and observe what happens. Discuss how the water beads up and rolls off due to the waterproof properties of feathers. Comparison: Compare vaned and downy feathers for their waterproof properties. Encourage students to discuss why different feathers have different functions</p>	<p>Observing and Recording Learn to identify different plants and animals in various habitats. Use pictures or drawings to record observations.</p> <p>Comparing Habitats Understand the differences and similarities between local and global habitats. Discuss what can be found in each habitat based on their environments.</p> <p>Understanding Interdependence Learn how different organisms depend on one another and their environment to survive. For example, plants provide oxygen and food, animals spread seeds and pollinate.</p> <p>Scientific Inquiry Investigating: Holding a white cotton sheet under bushes or small trees helps us collect minibeasts by shaking them down. Collecting Data: Use spoons, pooters (small hand-held vacuums for collecting minibeasts), or fingers to gather the creatures. Recording Findings: Create a tally chart to systematically record the types and number of minibeasts collected.</p> <p>Classification Using Keys: Simple keys or pictures help us identify the minibeasts we found. Keys might involve questions about colour, size, or shape. Tally Charts: A tally chart helps us organise our data by marking each type of minibeast multiple times for easy counting.</p> <p>Data Handling Transfer Data: Enter your tally data into a simple data handling program (e.g., Microsoft Excel or Google Sheets). Calculating Totals: Sum the counts for each type of minibeast and prepare for graphing. Graphing: Create pictograms or block graphs to visually represent our findings, making comparisons easier.</p> <p>Observe: Students should learn to observe minibeasts in their environment, noting their behaviours and habitats. Classify: Understanding how to classify minibeasts based on characteristics (e.g., type of diet, habitat). Record: Keeping a record of findings through drawings, tables, and notes to develop communication skills.</p> <p>Scientific Inquiry Asking Questions: Develop questions based on observations and curiosity. Making Predictions: Hypothesize what you think will happen based on your knowledge. Conducting Investigations: Test ideas and gather evidence through careful observation and experimentation.</p> <p>Investigative Skills Planning the Experiment: Prepare a variety of ripe fruits mixed with water and sugar. Place the fruit in shallow bowls in sunny locations where butterflies are commonly found. Observing: Take turns with your classmates to watch the bowls. Record your observations using a tally chart. Recording Data: Use a tally chart to track how many butterflies (and other insects) visit the bowls.</p>	<p>Listening and Following Instructions Listen carefully to verbal instructions when planting seeds. Follow written instructions that explain how to plant seeds and bulbs. Work together as a team to ensure the planting is done correctly.</p> <p>Measurement Skills Using a Ruler: Measure the height of your sunflower in centimetres. Recording Data: Keep a class chart to record the height of each sunflower weekly. Graphing: Plot the growth data on a graph to visualise how much they grow over time. Predictions Final Height: Predict the final height of the seedlings (typical sunflower heights can be between 1.5 to 3.5 metres, depending on the variety). Observations Keep a diary to note the changes in your plants each week. Discuss the differences in growth and how changing conditions might affect them.</p> <p>Setting Up an Experiment Purpose: To observe how food scraps grow when given the essentials (light, water, air) versus when they are not. Hypothesis: If food scraps receive light and water, they will grow roots and shoots. If they don't, they will not grow.</p> <p>Control and Variable Control Group: Scraps placed in a dark cupboard without water. Experimental Group: Scraps placed in sunlight with water. Making Observations What to Observe: Growth of roots and shoots over time. Changes in colour and texture of the scraps. How long it takes for growth to begin.</p> <p>Scientific Vocabulary Identify: To recognise and name something (e.g., identifying parts of a plant). Compare: To look at two or more things to see how they are similar or different (e.g., comparing different flowers). Measure: To find out the size, length, or amount of something using standard units (e.g., measuring the height of a plant). Observe: To look carefully and take note of details (e.g., observing the structure of a flower).</p> <p>Skills Development Using Tools: Handle scissors carefully to take apart the parts of a flower or plant. Recording Observations: Make notes or drawings of what you see. Group Work: Work with friends to explore and discuss different plants.</p> <p>Observing and Reporting How can we observe healthy habits? Keep a diary of what we eat, how much sleep we get, and the exercises we do. Reporting Observations: Share findings with classmates to encourage each other.</p> <p>Asking Questions Key Questions: Why do we need to eat different types of food? How does exercise affect our mood? What happens to our bodies when we don't get enough sleep?</p> <p>Scientific Skills Observation: Noticing the properties of materials before and after a change. Investigation: Carrying out experiments to see how materials change.</p>
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Useful Websites	<ul style="list-style-type: none"> • BBC Bitesize - Living Things and Their Habitats • National Geographic Kids - Rock Pool Creatures • The Wildlife Trusts - Exploring Sand Dunes • BBC Bitesize - Sorting and Using Materials • Topmarks - Sorting and Matching Games • Science Kids - Classification Games • BBC Bitesize - Seashore Animals • The Wildlife Trusts - Guide to Rock Pooling • National Geographic Kids - Molluscs • BBC Bitesize - Molluscs • RSPB Feathers Information • National Geographic Kids - Feathers 	<ul style="list-style-type: none"> • BBC Bitesize - Habitats • National Geographic Kids - Habitats • Nature Detectives - Habitats • National Geographic Kids - Minibeasts • BBC Nature - Minibeasts • Classroom Resources for Primary Science • The Big Bug Hunt • Field Studies Council - Outdoor Learning Activities • BBC Bitesize - Minibeasts • RSPB - Discover the Minibeasts • National Geographic Kids - Minibeasts • Butterfly Conservation: Butterflies - The Facts • Wildlife Trusts: What Do Butterflies Eat? • BBC Bitesize: Food Chains • BBC Bitesize: Life Cycle of Minibeasts • British Bugs: Ladybirds • UK Moths: Moths in the UK • Minibeasts - National Geographic Kids 	<ul style="list-style-type: none"> • BBC Bitesize: What Plants Need • Royal Horticultural Society: Growing Vegetables • Gardening with Children • BBC Bitesize - Life Cycle of a Plant • Royal Horticultural Society - Sunflower Growing Guide • Let's Grow - Sunflower Resources for Schools • BBC Bitesize - What are plants? • National Geographic Kids - Plants • Learning about Plants - Plant Life Cycles • KidZone - Plant Parts Worksheet • NHS - Change4Life • Kids Health - Nutrition • Public Health England • Healthy Schools • BBC Bitesize - Changes and Properties • Primary Science - Changes of State • National Geographic Kids - Materials • Science Kids - Chemical and Physical Changes

Year 3	<p style="text-align: center;">Blue Abyss</p> <p style="text-align: center;">Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature Recognise that living things can be grouped in a variety of ways</p> <p style="text-align: center;">Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment Ask relevant questions and using different types of scientific enquiries to answer them.</p> <p style="text-align: center;">Recognise that environments can change and that this can sometimes pose dangers to living things Construct and interpret a variety of food chains, identifying producers, predators and prey.</p> <p style="text-align: center;">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, keys, bar charts, and tables</p>
Substantive Knowledge	<p>Earth</p> <p>Key Processes in the Water Cycle</p> <p>Evaporation Evaporation is the process where water changes from a liquid to a gas. This happens when the sun heats up the water in rivers, lakes, and oceans. As the water heats up, it turns into water vapour and rises into the atmosphere.</p> <p>Condensation Condensation is the process where water vapour cools down and changes back into liquid water. This often happens when the air cools at higher altitudes, forming tiny water droplets. These droplets group together to form clouds.</p> <p>Precipitation When the clouds get heavy with water droplets, they release water as rain, snow, sleet, or hail. This is known as precipitation, and it returns water back to the Earth.</p> <p>Collection When precipitation falls, it collects in rivers, lakes, oceans, and the ground. From here, it can start the cycle all over again through evaporation.</p> <p>Endpoints</p> <ol style="list-style-type: none"> 1. Describe the stages of the water cycle using key vocabulary. 2. Explain what happens during evaporation and condensation. 3. Illustrate the water cycle with a diagram and label its parts. <p>Sorting and Grouping</p> <p>Types of Living Things in an Aquarium</p> <p>Fish Examples: Goldfish, clownfish, angelfish Characteristics: Gills, fins, scales</p> <p>Invertebrates Examples: Jellyfish, octopus, sea star, shrimp Characteristics: No backbone, some have shells</p> <p>Plants Examples: Seagrass, algae, kelp Characteristics: Photosynthesis, provide oxygen</p> <p>Microorganisms Examples: Plankton, bacteria Characteristics: Microscopic, essential for ecosystems</p> <p>Grouping Strategies By Type: Fish, invertebrates, plants By Habitat: Coral reef, deep sea, freshwater By Colour: Red fish, blue invertebrates, green plants By Size: Small (shrimp), medium (clownfish), large (shark) By Diet: Herbivores (plant-eaters), carnivores (meat-eaters), omnivores (eats both)</p> <p>Endpoints</p> <ol style="list-style-type: none"> 1. Identify and classify various living things found in an aquarium. 2. Use multiple grouping strategies to sort images effectively. 3. Create a digital presentation that clearly represents their findings with appropriate labels and titles. <p>Classifying Creatures</p> <p>Classification Groups</p> <p>Cnidarian</p>

Examples: Jellyfish, Corals

Characteristics: Soft-bodied, tentacles with stinging cells (nematocysts), radial symmetry.

Mollusc

Examples: Squid, Octopuses, Snails

Characteristics: Soft-bodied with a mantle, many have a hard shell, often have a foot for movement.

Fish

Examples: Salmon, Shark, Clownfish

Characteristics: Cold-blooded, have gills for breathing underwater, fins to swim, usually covered in scales.

Mammal

Examples: Dolphins, Whales, Seals

Characteristics: Warm-blooded, have lungs for breathing air, usually give birth to live young, have fur or blubber.

Arthropod

Examples: Crabs, Lobsters, Shrimp

Characteristics: Exoskeleton, jointed legs, segmented body.

Annelid

Examples: Earthworms, Leeches

Characteristics: Soft-bodied, segmented worms, live in water and soil.

Reptile

Examples: Sea Turtles, Snakes

Characteristics: Cold-blooded, have scales, lay eggs.

Echinoderm

Examples: Starfish, Sea Urchins, Sea Cucumbers

Characteristics: Hard, spiny skin, radial symmetry, able to regenerate parts of their body.

Endpoints

1. Identify and classify various sea creatures using a classification key.
2. Describe key features and behaviours of different groups of sea creatures.
3. Understand the importance of biodiversity in marine environments.

A Great Threat

What does the Crown-of-Thorns Starfish Eat?

Diet: The crown-of-thorns starfish loves to eat coral! It mainly feeds on the soft tissue of hard corals, which provides essential nutrients for its growth.

Feeding Method: It uses its tiny, tube-like feet to attach to coral and then pushes its stomach out through its mouth to digest the coral tissues.

Predators of the Crown-of-Thorns Starfish

The crown-of-thorns starfish does have some natural predators:

Giant Triton (a type of sea snail): This is one of the starfish's main predators and is well-known for eating them.

Some species of fish: Certain fish are known to nibble at their thorny skin.

Why is it a Threat to the Great Barrier Reef?

Population Boom: Often, when there is too much nutrients in the water, such as from farming or pollution, the starfish population can grow rapidly.

Coral Damage: When these starfish eat too much coral, it can lead to large areas of the reef becoming damaged or even dead.

Impact on Ecosystem: Coral reefs are home to many marine species, so damage to the reef can affect fish and other sea creatures that rely on coral for shelter and food.

Endpoints

1. Identify crown-of-thorns starfish and understand their role in the marine ecosystem.
2. Explain the impact of their feeding habits on coral reefs like the Great Barrier Reef.
3. Recognise the natural and human-induced factors that contribute to their population explosion.
4. Discuss measures being taken to control their populations and protect coral reefs.

Monsters of the Deep

Deep-sea Environment:

Extremely dark with very low temperatures.

High pressure and limited food resources.

Different zones include the twilight zone and the abyssal zone.

Adaptations:

Bioluminescence: Some creatures can produce their own light to attract prey or communicate.

Camouflage: Many animals have colours or patterns that blend in with the dark surroundings.

Body Shape: Some creatures have elongated bodies or large mouths to capture prey more easily.

Special Senses: Enhanced smell and hearing to find food in the dark.

Examples of Deep-Sea Creatures:

Anglerfish: Uses a glowing lure to attract prey.

Gulper Eel: Has a large mouth to swallow prey whole.

Dumbo Octopus: Has fins resembling ears for movement and can change colour for camouflage.

	<p>Endpoints</p> <ol style="list-style-type: none"> 1. Have a clear understanding of the adaptations of deep-sea creatures. 2. Create a unique deep-sea monster. 3. Present their monster to the class, explaining its features and survival strategies. <p>Oceanic Food Chains</p> <p>What is a Food Chain? A food chain shows how energy and nutrients flow through an ecosystem. It starts with producers and moves up to various levels of consumers.</p> <p>Key Terms Producers: Organisms that create their own food through photosynthesis (e.g., seaweed, phytoplankton). Primary Consumers: Animals that eat producers (e.g., small fish, zooplankton). Secondary Consumers: Animals that eat primary consumers (e.g., larger fish). Predators: Animals that hunt and eat other animals. Prey: Animals that are hunted and eaten by predators.</p> <p>Endpoints</p> <ol style="list-style-type: none"> 1. Create and explain their own food chain for a chosen sea creature. 2. Identify and describe the roles of various organisms in their food chain. 3. Discuss the interconnections in the ecosystem and the potential consequences of changes.
<p>Disciplinary Knowledge</p>	<p>Observation and Description: Students will learn to observe and describe the different stages of the water cycle, recognised through weather changes. Scientific Vocabulary: Important terms include evaporation, condensation, precipitation, and collection. Diagram Skills: Drawing and labelling diagrams effectively enhances understanding and representation of the water cycle. Critical Thinking: Understanding how the water cycle impacts weather and life on Earth.</p> <p>Observation: Noting details about each creature. Classification: Understanding systematic grouping of various organisms. Critical Thinking: Evaluating different ways to sort and group data.</p> <p>Observation: Carefully watching films and documentaries can help us notice the features and behaviours of different sea creatures. Identification: Using classification keys to name and group creatures based on their physical characteristics. Recording Data: Keeping notes or a scrapbook about the creatures we study, including their habitats.</p> <p>Researching the Issue Observation: Investigating how many starfish are in a particular area and how fast they are eating coral. Data Collection: Collecting information on coral health before and after starfish feeding events. Problem-Solving: Finding ways to reduce starfish populations without harming the environment. Presenting Findings Group Work: Collaborate with your classmates to present your research findings. Creative Presentation: Use visuals such as posters or slides to explain what you learned about the crown-of-thorns starfish.</p> <p>Observation: Noticing features and behaviours of real deep-sea creatures. Comparison: Looking at similarities and differences between various species. Hypothesis: Making educated guesses about how and why creatures adapt.</p> <p>Scientific Inquiry: Investigating marine food chains through observation, diagrams, and models. Critical Thinking: Evaluating what might happen if one part of the food chain changes. Communication: Explaining findings clearly using diagrams and verbal descriptions.</p>
<p>Useful Websites</p>	<ul style="list-style-type: none"> • BBC Bitesize - The Water Cycle • National Geographic Kids - Water Cycle • NASA - The Water Cycle • Twinkl - Water Cycle Resources • National Geographic Kids: Oceans • BBC Bitesize: Living things • Seas4Life: Aquarium Animals • BBC Bitesize - Classification • National Geographic Kids - Ocean Life

- [Animal Planet - Oceans](#)
- [Ocean Literacy | Public Understanding of the Ocean](#)
- [Australian Government - Great Barrier Reef](#)
- [Coral Triangle Initiative](#)
- [National Geographic - Crown-of-Thorns Starfish](#)
- [National Geographic Kids - Ocean Life](#)
- [BBC Bitesize - Living Things and Their Habitats](#)
- [Monsters of the Deep - Science News for Students](#)
- [BBC Bitesize - Food Chains](#)
- [National Geographic Kids - Marine Food Webs](#)
- [Whale and Dolphin Conservation - Food Chains](#)

<p>Year 4</p>	<p style="text-align: center;">Term 1 Burps, Bottom and Bile</p> <p style="text-align: center;">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, keys, bar charts, and tables. Identify the different types of teeth in humans and their simple functions Set up simple practical enquiries, comparative and fair tests Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions. Use straightforward scientific evidence to answer questions or to support their findings. Describe the simple functions of the basic parts of the digestive system in humans. Compare and group materials together, according to whether they are solids, liquids or gases. Observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C).</p>	<p style="text-align: center;">Term 3 Predator</p> <p style="text-align: center;">Identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat Identify that humans and some other animals have skeletons and muscles for support, protection and movement Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers. Make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers. Identify differences, similarities or changes related to simple scientific ideas and processes. Investigate the way in which water is transported within plants. 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, keys, bar charts, and tables Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers</p>
<p>Substantive Knowledge</p>	<p>Types of Teeth</p> <p>Incisors: Characteristics: Flat, thin, sharp edges Function: Cutting and chopping food</p> <p>Canines: Characteristics: Pointed, sharp Function: Piercing and tearing food</p> <p>Premolars: Characteristics: Flat surface, two or three roots Function: Crushing and grinding food</p> <p>Molars: Characteristics: Large surface area, multiple roots Function: Grinding and chewing food</p> <p>Endpoints:</p> <ol style="list-style-type: none"> Identify and describe the four main types of teeth. Understand the structure and functions of each type of tooth. Explain the importance of different teeth in the chewing process <p>Investigating Tooth Decay</p> <p>The enamel on our teeth protects them from decay. Different drinks can affect our teeth in different ways. Acidic drinks like fruit juice and fizzy drinks can harm tooth enamel. Milk and water are healthier options for teeth. Coffee and tea can stain teeth but are less damaging than sugary drinks.</p> <p>Endpoints:</p> <ol style="list-style-type: none"> Identify and record any visible changes in the eggshells. Compare the effects of the different liquids on the eggshells. Draw conclusions about the potential impact of these liquids on dental health. <p>Effective Teeth Brushing</p> <p>Oral Hygiene and Plaque Plaque is a sticky film of bacteria that can harm teeth and gums. Good oral hygiene, including regular brushing, helps remove plaque.</p> <p>Importance of Toothbrushing: Toothbrushing is essential for maintaining good oral hygiene. It helps prevent cavities, gum disease, and bad breath. Proper toothbrushing removes plaque and food debris from teeth.</p> <p>Effective Brushing Techniques: Brush teeth twice a day for two minutes each time.</p>	<p>Scientific Terminology</p> <p>Carnivore Definition: Animals that primarily eat other animals. Examples: Lions, sharks, eagles.</p> <p>Herbivore Definition: Animals that primarily eat plants. Examples: Cows, rabbits, giraffes.</p> <p>Omnivore Definition: Animals that eat both plants and animals. Examples: Humans, bears, pigs.</p> <p>Producer Definition: Organisms that produce their own food, usually through photosynthesis. Examples: Plants, algae, some bacteria.</p> <p>Consumer Definition: Organisms that cannot produce their own food and must eat other organisms. Types: Primary Consumer: Herbivores that eat producers. Secondary Consumer: Carnivores that eat primary consumers. Tertiary Consumer: Carnivores that eat secondary consumers.</p> <p>Apex Predator Definition: The top predator in an ecosystem with no natural predators. Examples: Great white sharks, tigers, polar bears.</p> <p>Decomposer Definition: Organisms that break down dead materials and recycle nutrients back into the soil. Examples: Fungi, bacteria, earthworms.</p> <p>Endpoints</p> <ol style="list-style-type: none"> Define and explain the different categories of living organisms. Sort various organisms into the correct categories. Compare and contrast the physical features of different groups. Understand the role of each group in the ecosystem and the interconnectedness of life. <p>Why do we have a skeleton?</p> <p>Key Bones in the Skeleton Skull: Protects the brain; structure of the face. Ribs: Protect vital organs like the heart and lungs; allow for expansion during breathing. Spine (Vertebrae): Supports the body; protects the spinal cord; allows for movement and flexibility. Pelvis: Supports the weight of the upper body; protects reproductive organs and bladder. Femur: The thigh bone; the longest bone in the body; supports walking and running.</p>

Use a pea-sized amount of fluoride toothpaste.
Brush in circular motions to clean all tooth surfaces.
Remember to brush the gum line and the back teeth.

Endpoints

1. Identify and demonstrate proper brushing techniques.
2. Understand the role of brushing in maintaining oral health.
3. Evaluate personal brushing effectiveness using plaque disclosing tablets.

Human Body/ Digestive Organs

The digestive system is a group of organs working together to convert food into energy and basic nutrients to feed the entire body.

The main parts of the digestive system are the mouth, oesophagus, stomach, small intestine, large intestine, and anus.

Each part of the digestive system has a specific function in breaking down food and absorbing nutrients to be used by the body.

1. Mouth

Chews and breaks down food into smaller pieces.

Mixes food with saliva to make it easier to swallow.

2. Oesophagus

Transports food from the mouth to the stomach using muscle contractions.

3. Stomach

Digests food using stomach acid and enzymes.

Breaks down food into a liquid form called chyme.

4. Small Intestine

Absorbs nutrients from the digested food.

Consists of three parts: Duodenum, Jejunum, and Ileum.

5. Large Intestine (Colon)

Absorbs water from undigested food.

Forms waste products (faeces) for excretion.

6. Liver

Produces bile to help digest fats.

Filters toxins from the blood.

7. Pancreas

Produces digestive enzymes to further break down food in the small intestine.

Endpoints:

1. Explain the purpose of the digestive system.
2. Identify and describe the main parts of the digestive system.
3. Understand the function of each part in the digestion process.

Identification and Classification

Solids:

Defined shape and volume

Particles are closely packed

Examples: wood, metal, plastic

Liquids:

Defined volume but take the shape of their container

Particles are loosely packed

Examples: water, milk, juice

Gases:

No defined shape or volume

Tibia: The shinbone; bears weight; supports mobility.

Humerus: The bone of the upper arm; important for lifting and reaching.

Ulna and Radius: The two bones in the forearm; allow for the rotation of the hand.

Joints

Ball-and-socket joints: Allow for a wide range of movement (e.g., shoulder and hip).

Hinge joints: Allow for movement in one direction (e.g., knee and elbow).

Pivot joints: Allow rotational movement (e.g., neck).

Importance of the Skeleton

Support: Provides a framework for the body.

Protection: Shields important organs from injury.

Movement: Enables movement by working with muscles.

Blood Production: Bone marrow produces red and white blood cells.

Endpoints

1. Identify and name the main bones in both human and animal skeletons.
2. Understand the purpose of the skeleton.
3. Draw and label a scientific diagram of a chosen terrestrial predator, identifying key adaptations.
4. Discuss how bones and joints work together to enable movement.

Parts and Functions

Roots

Definition: The roots are the underground parts of the plant.

Functions:

Anchorage: Roots secure the plant in the soil, preventing it from toppling over.

Absorption: They absorb water and minerals from the soil, essential for the plant's growth.

Storage: Some roots store nutrients and energy for the plant to use when needed.

Stem

Definition: The stem is the main support structure of the plant.

Functions:

Support: The stem holds up the leaves and flowers, enabling them to receive sunlight efficiently.

Transport: It contains vascular tissue (xylem and phloem), which transports water, minerals, and food throughout the plant.

Growth: The stem allows the plant to grow taller, reaching sunlight.

Leaves

Definition: Leaves are the flat, green parts of the plant where photosynthesis occurs.

Functions:

Photosynthesis: Leaves capture sunlight and convert carbon dioxide and water into glucose and oxygen.

Respiration: They take in carbon dioxide and release oxygen, contributing to the plant's respiration process.

Transpiration: Leaves lose water vapour through tiny openings called stomata, helping to regulate temperature and transport nutrients.

Flowers

Definition: Flowers are the reproductive structures of flowering plants.

Functions:

Reproduction: Flowers contain male (stamens) and female (pistils) parts that facilitate pollination and fertilisation.

Attraction: They attract pollinators like bees and butterflies with their colours and scents to help in the process of reproduction.

Seed Formation: After pollination, flowers develop into fruits containing seeds, enabling the plant to reproduce.

Endpoints

1. Identify and label the parts of a flowering plant.

Particles are spread out and move freely

Examples: air, helium, oxygen

Endpoints

1. Describe the properties of solids, liquids, and gases.
2. Identify examples of each state of matter.
3. Classify materials into solids, liquids, or gases based on their properties.

Changes Lesson

Definitions:

State of Matter: The physical form in which a substance exists, such as solid, liquid, or gas.

Change of State: When a substance transitions from one state of matter to another, such as melting, freezing, evaporating, or condensing.

Key Concepts:

Heating and Cooling: Heating causes most substances to change from solid to liquid to gas, while cooling causes the reverse.

Temperature: The measure of how hot or cold a substance is.

Degrees Celsius (°C): A unit used to measure temperature.

Examples of Materials Changing State:

Ice (solid) → Water (liquid) → Steam (gas) - Transition through heating and cooling.

Wax (solid) → Melted wax (liquid) - Transition through heating.

Water (liquid) → Ice (solid) - Transition through cooling.

Endpoints

1. Identify different states of matter and their transitions.
2. Understand the concept of temperature and measure it in degrees Celsius.
3. Conduct simple experiments to observe materials changing state through heating and cooling.

2. Describe the functions of roots, stems, leaves, and flowers.
3. Explain the process of photosynthesis and its importance.

Parasitic Plants

What are Xylem Vessels?

Definition: Xylem vessels are specialised tube-like structures found in plants that transport water and dissolved minerals from the roots to other parts of the plant.

Structure:

Xylem vessels are made up of dead cells, allowing water to move freely.

They have thick, lignified walls that provide support.

Function:

Xylem helps in the process of transpiration, where water evaporates from the leaves, creating a pull that draws more water upwards from the roots.

The Movement of Water

Process of Water Movement:

Water is absorbed by the roots from the soil.

It enters the xylem vessels and travels upwards through capillary action.

Water reaches the leaves, where it is either used in photosynthesis or lost to the atmosphere.

Types of Parasitic Plants

Mistletoe

Description: Mistletoe has green leaves and yellowish berries and is often found growing on trees.

How it works: It uses structures called haustoria to attach itself to a host plant and extract water and nutrients.

Yellow Rattle

Description: A wildflower with pale yellow flowers and hollow seeds.

How it works: It parasitises the roots of grasses, stealing their nutrients and inhibiting their growth.

Eyebright

Description: A small flowering plant that can be found in meadows and grasslands.

How it works: Eyebright attaches to the roots of other plants, drawing out nutrients from them.

Endpoints

1. Identify the function and structure of xylem vessels.
2. Explain how water moves through plants.
3. Recognise different types of parasitic plants and describe how they obtain nutrients.

Carnivorous Plants

Venus Flytrap

Description: A well-known carnivorous plant with modified leaves that snap shut when trigger hairs are brushed.

Sundew

Description: Features glandular hairs that produce a sticky substance to lure and trap prey.

Butterwort

Description: Has flat, sticky leaves that catch insects; they are then digested by enzymes.

Pitcher Plants

Description: Funnel-shaped leaves filled with liquid that trap insects that slip in and cannot escape.

Endpoints

1. Identify and explain the function of parts of a carnivorous plant.
2. Compare and contrast with non-predatory plants.
3. Describe the evolutionary reasons for predatory adaptations.
4. Communicate findings using a format of their choice.

		<p>Consequences</p> <p>What are Predatory Birds? Predatory birds, also known as birds of prey, include eagles, hawks, falcons, owls, and vultures. They have keen eyesight, sharp talons, and strong beaks designed for catching and eating their prey.</p> <p>Why Do Predators Kill and Eat Other Animals? Survival: Predatory birds need to eat to live. They obtain energy and nutrients from their prey. Role in Ecosystem: By controlling the population of prey species, they help maintain a balanced ecosystem. Feeding Young: Adult predatory birds need to feed their chicks to help them grow and survive.</p> <p>What Happens If Food Becomes Scarce? Starvation: Birds may not be able to find enough food, leading to malnutrition or death. Competition: Predators may compete with each other for limited food resources, sometimes attacking one another. Population Decline: Reduced food availability can lead to a decline in bird populations.</p> <p>Endpoints</p> <ol style="list-style-type: none"> 1. Identify different predatory birds and their prey. 2. Understand the role of predatory birds in the ecosystem. 3. Explain what happens when food becomes scarce for these birds. 4. Construct a simple food chain using a chosen bird of prey. <p>Deadly 60!</p> <p>Key Characteristics of Aquatic Predators</p> <p>Size: Aquatic predators can vary greatly in size, from small fish to enormous sharks and whales. Speed: Many aquatic predators are built for speed to catch their prey. Speed can be a significant factor in their hunting success. Weapons: Predators have various adaptations for hunting, including sharp teeth, strong jaws, and agile bodies. Danger: The danger posed by these animals to other species (including humans) can vary substantially. Some may pose little threat, while others may be highly dangerous.</p> <p>Endpoints</p> <ol style="list-style-type: none"> 1. Identify a variety of aquatic predators. 2. Conduct basic research to gather information about an aquatic predator. 3. Create and perform a concise presentation about their predator, demonstrating knowledge in the categories of size, speed, weapons, and danger.
<p>Disciplinary Knowledge</p>	<p>Diagrams Include labels and captions to describe shapes, sizes, parts, and functions of each tooth type Tooth Cross-Section Parts: Pulp, enamel, blood vessels, nerve, dentine Draw and label these parts in a clear cross-section diagram</p> <p>Science Skills: Observation: Noting changes in the eggs/shells. Recording: Keeping a detailed photographic diary of observations. Comparison: Contrasting the effects of different liquids on the eggs/shells. Drawing Conclusions: Inferring the impact of various drinks on tooth enamel. Understanding of Variables: Independent Variable: Type of liquid (fruit juice, full sugar fizzy drinks, sugar-free fizzy drinks, milk, water, coffee, tea). Dependent Variable: Changes in the eggs/shells. Controlled Variables: Size of eggs/shells, duration of immersion, temperature.</p> <p>Observations Use plaque disclosing tablets to identify areas of plaque on teeth. Note the coloured areas where plaque remains after brushing. Improvements</p>	<p>Scientific Inquiry: Observing and analysing organisms, making classification decisions based on characteristics. Data Presentation: Using charts, tables, or visual aids to present information effectively. Critical Thinking: Evaluating different organisms' roles and adapting classifications as new information is gained.</p> <p>Scientific Diagrams Use clear lines and labels to identify bones and joints. Understand how to represent the skeleton accurately. Use colours to differentiate between parts of the skeleton.</p> <p>Observational Skills Recognise the role of each bone in the body. Compare the skeletons of different animals and humans to understand adaptations.</p> <p>Research Skills Use books and trusted websites to gather information about different types of skeletons. Learn about how different animals adapt their skeletons for survival.</p> <p>Scientific Concepts Photosynthesis: Understanding the importance of light, water, and carbon dioxide in energy production. Transpiration: Recognising the process of water movement within the plant and its significance in nutrient transport.</p> <p>Scientific Inquiry Observation: Students can observe different plants and identify their parts.</p>

	<p>Brush teeth in small circular motions to ensure all surfaces are cleaned. Reach all areas, including the back teeth and along the gumline.</p> <p>Biology: Understanding the structure and function of different digestive organs Relating the organs to the process of digestion and nutrient absorption Anatomy: Learning about the location and importance of each organ in the digestive system Understanding how the organs work together to process food</p> <p>Classification of Materials Materials can be classified into solids, liquids, and gases based on their properties. Properties include shape, volume, and how particles are arranged. By observing how materials behave, we can determine their classification.</p> <p>Scientific Investigations: Observation: Noting changes in materials when heated or cooled. Measurement: Use of thermometers to measure temperature changes. Experimentation: Role of Heat: Applying heat sources like Bunsen burners or water baths. Recording Data: Documenting temperatures before and after state changes.</p>	<p>Experimentation: Conduct simple experiments to explore how plants respond to various amounts of light and water.</p> <p>Scientific Processes Observation: Use magnifying glasses to examine xylem structures in plant stems and leaves. Experimentation: Conduct an experiment to observe water movement in plants using food colouring in water.</p> <p>Skills Development Inquiries: Ask questions about how plants adapt to their environments, particularly how parasitic plants survive. Data Collection: Record observations and results in a journal during experiments.</p> <p>Environmental Awareness Impact of Parasitic Plants: Discuss how these plants can affect the health of their host plants and the overall ecosystem.</p> <p>Research Skills: Learning how to gather information from documentaries and articles. Analysis: Comparing the adaptations of carnivorous and non-predatory plants. Creativity: Producing diagrams and presentations based on findings.</p> <p>Observing Behaviour Watch documentaries to see how these birds hunt, such as: Tactics they use to catch prey (e.g. stealth, speed). How they consume their prey (e.g. tearing flesh, swallowing whole).</p> <p>Predicting Outcomes Discuss what might happen to bird populations if environmental changes occur, such as deforestation or urbanisation.</p> <p>Research Skills Use books and online resources to gather information. Take notes on key facts about your chosen predator. Find out about their habitat, diet, and unique features.</p> <p>Collaboration Skills Work together as a group to combine information. Use group discussions to formulate ideas about your predator. Collaborate on creating a clear and exciting presentation.</p>
Useful Websites	<ul style="list-style-type: none"> • NHS: Teeth and Mouth • Kid's Health: Mouth and Teeth • BBC Bitesize: Teeth and Gums • NHS Dental Health • The British Dental Association • BBC BiteSize Science • National Curriculum - Science • BBC Bitesize - The Digestive System • National Geographic Kids - Digestive System • KidsHealth - The Digestive System • Science for Kids - The Digestive System 	<ul style="list-style-type: none"> • BBC Bitesize - Ecosystems • National Geographic Kids - Food Chains • Science Learning Hub - Food Webs • National Geographic Kids • BBC Bitesize - Science • The British Geological Survey • HowStuffWorks - Human Skeleton • BBC Bitesize - Parts of a Plant • National Geographic Kids - Flowers • Science Kids - Plants • BBC Bitesize - Plant Structures • Science Museum - Plants • National Geographic Kids - Plants • Royal Horticultural Society - Plant Life • Royal Horticultural Society - Carnivorous Plants • BBC Nature - Carnivorous Plants • National Geographic - Venus Flytrap • Kew Gardens - Plants • BBC Bitesize - Animals and Their Habitats • National Geographic Kids - Birds of Prey • RSPB - Birds of Prey • Nature Detectives - Identify Different Birds

Year 5	<p style="text-align: center;">Term 2: Frozen Kingdom</p> <p style="text-align: center;">Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary</p> <p style="text-align: center;">Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate</p> <p style="text-align: center;">Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution</p> <p style="text-align: center;">Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.</p> <p style="text-align: center;">Use test results to make predictions to set up further comparative and fair tests.</p> <p style="text-align: center;">Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations</p> <p style="text-align: center;">Identify scientific evidence that has been used to support or refute ideas or arguments.</p> <p style="text-align: center;">Give reasons for classifying plants and animals based on specific characteristics</p>	<p style="text-align: center;">Term 3: Blood Heart</p> <p style="text-align: center;">Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs</p> <p style="text-align: center;">Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood.</p> <p style="text-align: center;">Describe the ways in which nutrients and water are transported within animals, including humans</p> <p style="text-align: center;">Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function</p> <p style="text-align: center;">Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate</p>	<p style="text-align: center;">Term 6: Darwin's Delight</p> <p style="text-align: center;">Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals</p> <p style="text-align: center;">Give reasons for classifying plants and animals based on specific characteristics.</p> <p style="text-align: center;">Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution</p> <p style="text-align: center;">Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs</p> <p style="text-align: center;">Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago</p> <p style="text-align: center;">Use test results to make predictions to set up further comparative and fair tests.</p> <p style="text-align: center;">Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.</p> <p style="text-align: center;">Identify scientific evidence that has been used to support or refute ideas or arguments.</p> <p style="text-align: center;">Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents</p> <p style="text-align: center;">Describe the changes as humans develop to old age</p>
<p style="text-align: center;">Substantive Knowledge</p>	<p>Giant Icebergs</p> <p>Icebergs: Large pieces of freshwater ice that have broken off from glaciers or ice shelves and float in open water.</p> <p>Density: The mass of an object divided by its volume, affecting whether it sinks or floats.</p> <p>Buoyancy: The ability of an object to float in a fluid; relates to the density of the object and the fluid.</p> <p>States of Matter: The form that matter takes; solid (ice), liquid (water), and gas (water vapour).</p> <p>Melting: The process of a solid turning into a liquid, which occurs at a specific temperature (0°C for ice).</p> <p>Saltwater: Water that has salt dissolved in it, affecting the freezing point and density.</p> <p>Endpoints</p> <ol style="list-style-type: none"> 1. Explain why icebergs float and discuss density. 2. Describe how temperature affects the melting of ice. 3. Investigate how adding salt affects the melting rate and density of water. 4. Present their findings through observations and compare individual icebergs. 5. Develop and record further questions to encourage continued inquiry. <p>Polar Adaptations</p> <p>1. Introduction to Polar Regions</p> <p>Definition: Refers to the Arctic (North Pole) and Antarctic (South Pole) regions, characterised by extreme cold, ice, and unique ecosystems.</p> <p>Climate: Very cold temperatures, long winters, and short summers with varying sunlight.</p> <p>2. Choosing an Animal</p> <p>Examples of Polar Animals:</p> <p>Arctic: Polar bear, Arctic fox, walrus, narwhal</p> <p>Antarctic: Emperor penguin, leopard seal, Antarctic krill, Weddell seal</p> <p>3. Animal Adaptations</p> <p>Physical Adaptations:</p> <p>Insulating layers of fat (blubber).</p>	<p>Heart Dissection</p> <p>What is the Heart?</p> <p>The heart is a muscular organ that pumps blood throughout the body. It is about the size of a fist and is located in the thoracic cavity.</p> <p>External Features of the Sheep Heart</p> <p>Aorta: The largest artery that carries oxygen-rich blood from the heart to the body.</p> <p>Vena Cava: The large vein that carries deoxygenated blood back to the heart.</p> <p>Pulmonary Arteries and Veins: Carry blood to and from the lungs.</p> <p>Coronary Arteries: Supply blood to the heart muscle itself.</p> <p>Structure of the Blood Vessels</p> <p>Aorta: Thick, tough walls to withstand high pressure.</p> <p>Vena Cava: Thinner walls compared to the aorta; more flexible.</p> <p>Texture: Feel robust and strong, especially the aorta, which is more rigid due to its thicker wall.</p> <p>Blood Flow through the Heart</p> <p>Blood enters through the vena cava.</p> <p>It moves to the right atrium, passes to the right ventricle.</p> <p>The right ventricle pumps blood to the lungs via the pulmonary arteries.</p> <p>Blood returns from the lungs via pulmonary veins to the left atrium.</p> <p>Finally, it moves into the left ventricle, which pumps it out through the aorta.</p> <p>Endpoints</p> <ol style="list-style-type: none"> 1. Identify and name the main external features of the sheep heart and blood vessels. 2. Describe the differences in texture and thickness of the aorta and vena cava. 3. Record observations through diagrams and notes. <p>Parts of the Circulatory System</p> <p>Major Components of the Circulatory System</p> <p>1. The Heart</p> <p>Structure: The heart is a muscular organ, about the size of a fist, located in the chest between the lungs. It has four chambers: two atria (upper chambers) and two ventricles (lower chambers).</p>	<p>Unique Creatures</p> <p>Key Features of the Galápagos Islands:</p> <p>Diverse Ecosystems: The islands have various ecosystems, including coastal areas, lush forests, and volcanic landscapes.</p> <p>Isolation: The remoteness of the islands allows unique species to evolve with little or no competition from other animals.</p> <p>Volcanic Origin: The islands are formed from volcanic activity, creating unique habitats for various species.</p> <p>Organisms of Interest</p> <p>Marine Iguana</p> <p>Adaptations:</p> <p>Specialised Diet: Marine iguanas primarily eat algae, making them adapted to life in the sea.</p> <p>Swimming Ability: They have strong limbs and a slender body shape that allows them to dive for food.</p> <p>Dark Colouration: Their dark colour helps them absorb heat from the sun after swimming in the cold ocean.</p> <p>Blue-footed Booby</p> <p>Adaptations:</p> <p>Bright Blue Feet: The colour of their feet plays a role in mating rituals, attracting partners with their vibrant colour.</p> <p>Diving Skills: Excellent divers, they can plunge into the sea from great heights to catch fish.</p> <p>Webbed Feet: Their feet are webbed, aiding in swimming but also providing balance when nesting.</p> <p>Giant Tortoise</p> <p>Adaptations:</p> <p>Large Size: Their size helps protect them from predators and allows for longer lifespans.</p> <p>Lifespan: Giant tortoises can live over 100 years, allowing them to survive in a challenging environment.</p> <p>Diet: They're herbivores with the ability to eat tough plants and cacti found in their environment.</p> <p>Galápagos Penguin</p> <p>Adaptations:</p> <p>Size: The smaller size helps conserve energy while swimming.</p> <p>Insulation: They have dense feathers that provide insulation in cooler waters.</p> <p>Behaviour: Unlike most penguin species, Galápagos penguins can tolerate warmer weather, allowing them to thrive in the equatorial region.</p> <p>Frigatebird</p> <p>Adaptations:</p> <p>Large Wingspan: Their wingspan can reach up to 2.3 meters, allowing them to glide long distances without flapping.</p>

Thick fur or feathers to provide warmth (e.g., Polar Bear's fur).
Camouflage colouration for protection (e.g., Arctic fox turns white in winter).

Behavioural Adaptations:

Migration patterns to find food and suitable habitats.

Hibernation or reduced activity during extreme cold.

Social behaviours, such as hunting in groups (e.g., wolves).

4. Environmental Threats

Climate Change: Melting ice caps impacting habitat and food sources.

Pollution: Chemicals affecting animal health and food chains.

Human Activity: Overfishing, shipping routes through ice, and tourism.

5. Future Adaptations

Potential for altered migration patterns or behaviours due to changing climates.

Evolutionary changes might occur, leading to new survival strategies.

Endpoints

1. Identify a polar animal and describe its key adaptations for survival in its habitat.
2. Explain the human and environmental threats facing polar regions.
3. Discuss how your chosen animal may need to adapt in the future.

Food Chains and Webs

Definitions

Energy Source: The origin of energy that fuels the ecosystem, primarily the Sun for plants.

Autotroph / Primary Producer: Organisms that produce their own food, typically through photosynthesis (e.g., Arctic moss).

Herbivore / Primary Consumer: Animals that eat plants (e.g., Arctic hare).

Secondary Consumer: Animals that eat primary consumers (e.g., Arctic fox).

Top / Apex Predator: The highest level of the food chain, with no natural predators (e.g., polar bear).

Key Frozen Animals and Plants

Primary Producer:

Arctic Moss: A small, resilient plant that survives in harsh conditions and provides energy for herbivores.

Primary Consumer:

Arctic Hare: A herbivore that feeds on Arctic moss and other vegetation.

Secondary Consumer:

Arctic Fox: A predator that feeds on Arctic hares and other small mammals.

Apex Predator:

Polar Bear: The top predator that hunts seals but is also reliant on the health of the entire ecosystem.

Endpoints

1. Construct food chains and food webs related to frozen land biomes.
2. Describe the roles of different organisms within these chains and webs using scientific vocabulary.
3. Analyse the potential effects of removing a species from a food chain or web.

Function: The heart pumps blood throughout the body. It contracts and relaxes in a rhythm, allowing it to push oxygen-rich blood to the tissues and return oxygen-poor blood to the lungs.

2. Arteries

Structure: Arteries are thick-walled blood vessels that carry blood away from the heart. The walls are made of elastic tissue and muscle to withstand high pressure.

Function: They transport oxygen-rich blood from the heart to all parts of the body, except for the pulmonary artery, which carries deoxygenated blood to the lungs.

3. Veins

Structure: Veins are thinner-walled blood vessels than arteries, equipped with valves to prevent backflow. They carry blood towards the heart.

Function: Veins transport deoxygenated blood from various body parts back to the heart, except for the pulmonary veins, which carry oxygenated blood from the lungs.

4. Capillaries

Structure: Capillaries are the smallest blood vessels, with walls just one cell thick, allowing for easy exchange of substances.

Function: They connect arteries and veins and facilitate the exchange of oxygen, carbon dioxide, nutrients, and waste between the blood and surrounding tissues.

5. Blood

Structure: Blood is a liquid connective tissue made up of red blood cells, white blood cells, platelets, and plasma.

Function: Red blood cells transport oxygen, white blood cells are part of the immune system, platelets help with clotting, and plasma carries nutrients, hormones, and waste products.

6. Lungs

Structure: The lungs are two sponge-like organs in the chest which expand and contract to facilitate breathing.

Function: The lungs allow for gas exchange; they take in oxygen from the air and expel carbon dioxide from the blood. Scatter Graphs

Endpoints

1. Identify and label the main parts of the human circulatory system.
2. Explain the structure and function of the heart, arteries, veins, capillaries, blood, and lungs.
3. Use models and diagrams to demonstrate their understanding.
4. Demonstrate the flow of blood through the circulatory system verbally or in written form.

Components of Blood

What is Blood?

Blood is a vital fluid in the human body that performs multiple essential functions such as transporting oxygen, nutrients, hormones, and waste products. It has several components each playing a crucial role.

Components of Blood

Plasma

Description: The liquid part of blood, comprising about 55% of its volume.

Function:

Transports nutrients, hormones, and proteins to the parts of the body that need it.

Carries waste products to kidneys for excretion.

Pouch: The red pouch is used in mating displays and helps attract partners.
Feeding: They often steal food from other birds (kleptoparasitism) to survive in a competitive environment.

Lava Lizard

Adaptations:

Camouflage: Their colouration allows them to blend in with volcanic rocks and the sandy ground.

Territorial Behaviour: Males are territorial and display vibrant colours to ward off rivals while attracting mates.

Diet: They are omnivores and can feed on insects as well as plant material.

Endpoints

1. Explain the concept of adaptation and evolution using examples from the Galápagos Islands.
2. Describe specific adaptations related to the six organisms studied.
3. Present their findings in a structured format, either as a written report or oral presentation.

Studying Fossils

What are Fossils?

Fossils are the remains or traces of living organisms from the past, often preserved in sedimentary rock.

They provide vital evidence of Earth's history and the evolution of life.

Key Fossil Types

Ammonite

Appearance: Coiled shell, often ribbed or smooth.

Similarity to living creatures: Similar to nautilus and octopus, which both have coiled shells.

Crinoid

Appearance: Stem-like structure with feathery arms used for feeding.

Similarity: Resemble living sea lilies and some modern starfish.

Trilobite

Appearance: Three-lobed body, segmented shell.

Difference: Have hard exoskeletons; they are more like modern horseshoe crabs than any contemporary insect.

Fish

Appearance: Includes body shapes similar to modern fish, often with bony or cartilaginous skeletons.

Similarity: Direct ancestors to modern fish, having similar body structures and fin arrangements.

Ferns

Appearance: Leafy structures, often with fine details that reflect swampy conditions.

Similarity: Similar to modern ferns, showing hardly any differences.

Coprolites

Appearance: Fossilised droppings, varying shapes and sizes.

Similarity: May differ significantly due to the diets of ancient creatures compared to today's animals.

End Points

1. Be able to identify and name a variety of fossils, including ammonites, crinoids, trilobites, fish, ferns, and coprolites.
2. Explain how these fossils are similar to or different from living organisms today.
3. Use classification keys effectively for identifying fossils.
4. Achieve a basic understanding of how fossils are formed and preserved over time.

Inheritance!

What is Inheritance?

Definition: Inheritance is the process by which traits and characteristics are passed from parents to their offspring through genes.

Biodiversity – Classification

What is Biodiversity?

The range of different species of plants, animals, and microorganisms in an environment.

Important for ecosystem health, resilience, and human survival.

Biodiversity in the Arctic

Location: Northern Hemisphere, surrounding the North Pole.

Climate: Cold, icy environment; temperatures can reach as low as -50°C.

Key Species: Polar bears, seals, narwhals, and various migratory birds.

Plant Life: Limited due to harsh climate; includes mosses, lichens, and short growing season shrubs.

Biodiversity in the Southern Ocean

Location: Surrounding the continent of Antarctica in the Southern Hemisphere.

Climate: Extremely cold; temperatures can drop below -60°C.

Key Species: Penguins, seals, krill, and many types of whales.

Plant Life: Richer than the Arctic due to more sunlight; includes phytoplankton and seaweed.

Endpoints

1. Be able to explain what biodiversity is and its importance.
2. Compare and contrast the Arctic and Southern Ocean ecosystems.
3. Share detailed information about the Emperor Penguin in a visually appealing manner.

Helps maintain blood pressure and blood volume.

Red Blood Cells (Erythrocytes)

Description: Biconcave discs that contain a protein called haemoglobin.

Function:

Transport oxygen from the lungs to the body tissues.

Carry carbon dioxide back from the tissues to the lungs.

White Blood Cells (Leukocytes)

Description: Cells of the immune system that are involved in protecting the body against infections.

Function:

Fight off infections by identifying and destroying pathogens.

Produce antibodies that help to build immunity.

Platelets (Thrombocytes)

Description: Small cell fragments that play a critical role in blood clotting.

Function:

Help stop bleeding by clumping and clotting blood vessel injuries.

Release chemicals that help the blood to clot.

End Points

1. Identify and describe the main components of blood.
2. Explain the functions of each component.
3. Conduct a basic investigation of an artificial blood sample.
4. Collaborate and communicate findings clearly with peers.
5. Demonstrate an understanding of how blood maintains health and supports bodily functions.

Unhealthy Substances

What is Smoking?

Smoking involves inhaling the smoke of burning tobacco, which contains harmful chemicals.

It can lead to serious health problems, including lung cancer, heart disease, and respiratory issues.

What is Alcohol?

Alcohol is a legal drink that can impair judgment and coordination.

Consuming too much alcohol can lead to addiction, liver problems, and affect mental health.

What are Drugs?

Drugs can be legal (like prescription medications) or illegal (like heroin or cocaine).

They affect the brain and body, leading to changes in mood, perception, and behaviour.

The Effects on the Body

Effects of Smoking on the Heart:

Increases heart rate and blood pressure.

Narrows blood vessels, which can lead to heart attacks.

Effects of Alcohol on the Body:

Dehydration and disrupts normal bodily functions.

Genes and DNA: Genes are segments of DNA that determine specific traits such as eye colour, height, and certain abilities.

Types of Characteristics

Inherited Characteristics: Traits you receive from your parents (e.g., hair colour, skin tone, and height).

Environmental Characteristics: Traits that are influenced by the environment (e.g., language spoken, hobbies, and skills).

Examples of Inherited Characteristics

Physical Traits:

Eye colour (blue, green, brown)

Hair texture (curly, straight)

Height (tall, short)

Other Traits:

Blood type (A, B, AB, O)

Certain talents (musical ability, athleticism)

Endpoints

1. Understand the basics of inheritance and where traits come from.
2. Identify and describe characteristics inherited from parents or grandparents.
3. Explain how siblings may share some characteristics while being different.
4. Conduct simple observations and recordings of trait variations within families.

Living Things

Human Growth Stages: Understand the different stages of human growth from birth to old age.

Physical Changes: Recognise the physical changes that occur at various stages of life.

Emotional and Social Development: Identify how emotional and social capacities develop over time.

Life Cycle: Explore the concept of a life cycle including stages like infancy, childhood, adolescence, adulthood, and old age.

Stages of Development:

Infancy (0-2 years)

Rapid physical growth

Development of motor skills (sitting, crawling, walking)

Attachment to caregivers

Childhood (3-12 years)

Continued physical growth

Development of communication and social skills

Beginning of independence

Adolescence (13-19 years)

Puberty: physical changes (growth spurts, development of sexual characteristics)

Developing identity and emotional independence

Increasing cognitive skills, ability for abstract thinking

Adulthood (20-64 years)

Peak physical condition in early adulthood

Establishment of career and family

Responsibilities and life choices

Old Age (65 years and above)

Physical decline (decreased mobility, health issues)

Changes in lifestyle (retirement, changes in family roles)

Importance of mental well-being and social connections

Endpoints

1. Describe the main stages of human development from birth to old age.
2. Identify key physical, social, and emotional changes that occur at each stage.
3. Appreciate the importance of health and wellbeing throughout life.

Long-term effects can damage organs, especially the liver and heart.

Effects of Illegal Drugs on the Body:

Can cause hallucinations, heart problems, and mood swings.

Risk of overdose, which can be fatal.

Endpoints

1. Understand the risks of smoking, alcohol, and drugs.
2. Be able to articulate how these substances can impact the human body and interpersonal relationships.

Heart Healthy Foods

1. Fruits and Vegetables

Importance: Rich in vitamins, minerals, and fibre. They help reduce cholesterol and maintain a healthy weight.

Examples: Apples, carrots, broccoli, spinach, berries.

2. Whole Grains

Importance: Provide energy and help maintain a healthy digestive system. They are beneficial for heart health.

Examples: Brown rice, whole wheat pasta, oats, quinoa.

3. Lean Proteins

Importance: Essential for growth and repair of tissues, while being low in saturated fats.

Examples: Chicken breast, fish (like salmon), beans, lentils.

4. Healthy Fats

Importance: Necessary for cell growth and overall health, unsaturated fats are heart-healthy when consumed in moderation.

Examples: Avocados, nuts, seeds, olive oil.

5. Dairy or Dairy Alternatives

Importance: Provide calcium and vitamin D, important for bone health. Choose low-fat options when possible.

Examples: Low-fat milk, yoghurt, cheese, plant-based alternatives like almond milk.

Endpoints

1. Identify and classify foods into their respective groups.
2. Understand the health benefits of a balanced diet for heart health.
3. Prepare a simple three-course heart-healthy meal by following recipes.
4. Demonstrate safe cooking practices and understand basic cooking techniques.

Acceleration and Deceleration

What is Heart Rate?

Definition: Heart rate is the number of times your heart beats in one minute (bpm).

Importance: It reflects how hard your heart is working and can indicate your fitness level.

Factors Affecting Heart Rate

Exercise: Physical activity increases heart rate to supply more oxygen to your muscles.

Anxiety: Stressful situations can lead to a rise in heart rate due to adrenaline.

4. Compare the characteristics of different age groups and understand the concept of the life cycle.

		<p>Relaxation: Activities like deep breathing can lower heart rate, promoting calmness.</p> <p>Normal Resting Heart Rate</p> <p>Definition: The heart rate when you are at rest, not engaged in any physical activity.</p> <p>Average for Children (Age 5–12): Typically between 70–120 bpm.</p> <p>Endpoint</p> <ol style="list-style-type: none"> 1. Describe what heart rate is and how it can change. 2. Conduct an experiment measuring heart rates under different conditions. 3. Analyse and present data in a clear and organised manner. 4. Reflect on personal experiences and how they relate to scientific concepts. 	
<p>Disciplinary Knowledge</p>	<p>Scientific Method</p> <p>Questioning: Formulate a question based on observations of the iceberg (e.g., "What happens if we add salt to the iceberg?").</p> <p>Hypothesis: Make predictions about what will happen during the experiment.</p> <p>Experimentation: Carry out the investigation using the giant iceberg and smaller individual icebergs.</p> <p>Observation: Record changes in the icebergs' behaviour as they melt and interact with the water and salt.</p> <p>Analysis: Compare the observations and evidence gathered to evaluate the hypotheses.</p> <p>Scientific Inquiry</p> <p>Questions to Explore: Create questions about your animal. For example, "How does climate change affect the polar bear's hunting grounds?"</p> <p>Investigative Methods: Discuss ways to gather information—books, documentaries, interviews with scientists.</p> <p>Data Collection</p> <p>Observations: How to document your findings with sketches, tables, or graphs related to your chosen animal.</p> <p>Comparisons: Compare your animal with others from the same habitat in terms of adaptations and survival strategies.</p> <p>Environmental Awareness</p> <p>Human Impact: Explore how pollution, climate change, and habitat destruction affect polar animals.</p> <p>Conservation Efforts: What can be done to help protect these animals and their environment?</p> <p>Predicting and Discussing Outcomes</p> <p>Students can predict outcomes by discussing:</p> <p>What happens to the primary consumers if there are too many secondary consumers?</p> <p>How would the removal of primary producers affect the entire food web?</p> <p>Similarities</p> <p>Both regions are home to unique and specially adapted species. Both support a crucial food web that begins with phytoplankton. Marine mammals are prominent in both ecosystems, showcasing adaptation to cold waters.</p> <p>Differences</p> <p>The Arctic contains more land mammals (like polar bears), whereas the Southern Ocean has a variety of marine mammals like seals and whales.</p>	<p>Scientific Skills</p> <p>Observation: Carefully examining the heart's structure and observing the blood vessels.</p> <p>Identification: Recognising and naming the different parts of the heart.</p> <p>Comparative Analysis: Comparing the thickness and toughness of different blood vessels.</p> <p>Safety Procedures</p> <p>Always wear gloves when handling specimens.</p> <p>Use dissection tools responsibly under the supervision of an adult.</p> <p>Ensure a clean workspace before and after the dissection.</p> <p>Recording Observations</p> <p>Use diagrams to label the external features of the heart.</p> <p>Take notes on the texture and thickness of the blood vessels.</p> <p>Skills and Techniques</p> <p>Using Models and Diagrams: Create and use models (both physical and digital) to represent the heart and the blood vessels, helping to understand their structure and function.</p> <p>Interactive Software: Engage with interactive simulations to visualise blood circulation and the exchange of gases in the lungs.</p> <p>Inquiry and Research</p> <p>Questions to Explore:</p> <p>How does exercise affect the circulatory system?</p> <p>What happens to blood as it travels through the body?</p> <p>Why is the heart sometimes called a 'double pump'?</p> <p>Scientific Investigation</p> <p>Examine an Artificial Blood Sample: In this activity, you will look at an artificial blood sample using a microscope or similar tools. You will observe and identify its layers.</p> <p>Counting and Identifying Layers: You will learn to layer the blood components while discussing their functions and understanding how to distinguish each type.</p> <p>Communication and Collaboration</p> <p>Talking to the School Nurse: Engaging with healthcare professionals can provide additional insights about blood and its significance.</p> <p>Group Discussions and Presentations: Work with classmates to discuss what you've learned and share findings from your research and observations.</p> <p>Scientific Processes</p> <p>Investigating impact: Conduct simple tests, observe, and present findings on the effects of substances.</p>	<p>Observation: Learning to observe and identify adaptations in living organisms.</p> <p>Comparison: Evaluating the similarities and differences between species to understand evolutionary relationships.</p> <p>Research Skills: Using various methods to gather information about the adaptations of different species.</p> <p>Methods of Studying Fossils</p> <p>Fieldwork: Collecting samples and identifying them in situ.</p> <p>Laboratory Study: Examining fossils under microscopes to identify minute details.</p> <p>Research: Utilising resources such as books, scientific journals, and reputable websites to deepen understanding.</p> <p>How to Study Inheritance</p> <p>Observation: Look at family traits by comparing characteristics among family members.</p> <p>Data Collection: Create a family tree or chart to trace inherited traits across generations.</p> <p>Experimentation: Conduct simple experiments to observe traits (e.g., looking at plants in different environments).</p> <p>Scientific Understanding:</p> <p>The Human Body: Knowledge of key systems (e.g., muscular, skeletal, nervous) and their role in development.</p> <p>Health and Wellbeing: Understanding the importance of nutrition, exercise, and mental health at different life stages.</p> <p>Developmental Milestones: Recognising common physical, social, and emotional milestones for different ages.</p> <p>Skills Development:</p> <p>Observation: Learn to observe and record changes in human growth and development.</p> <p>Communication: Discuss and present findings related to growth and changes.</p> <p>Critical Thinking: Reflect on how societal changes (e.g., technology, lifestyles) impact human development.</p>

	<p>The Southern Ocean has a more stable nutrient supply, leading to bigger populations of krill, which are fundamental to the food chain. Seasonal changes are more drastic in the Arctic due to polar day and night cycles compared to the Southern Ocean.</p>	<p>Critical Thinking: Assess the evidence regarding the risks associated with smoking, drinking, and drug use. Discussion and Debating: Engage in discussions about making healthy choices and peer pressure.</p> <p>Food Preparation Skills Understanding how to follow recipes helps to improve cooking skills and builds confidence in the kitchen: Measuring Ingredients: Importance of accuracy in cooking. Chopping and Slicing: Safety skills for using knives. Cooking Techniques: Boiling, steaming, baking instead of frying.</p> <p>Recipe Development Designing a balanced three-course meal using heart-healthy ingredients involves: Combining flavours and textures. Ensuring proper nutritional balance across courses.</p> <p>Scientific Method Steps Question: How does heart rate change due to different activities? Hypothesis: Form a prediction about which activity will cause the greatest heart rate change. Experiment: Measure resting heart rate. Conduct activities (exercise, anxiety-inducing situations, relaxation techniques). Record heart rate using data loggers or pulse points. Analyse Data: Display results in tables, graphs, or charts. Conclusion: Determine which activity caused the biggest change in heart rate and how quickly the heart rate returns to resting level.</p>	
Useful Websites	<ul style="list-style-type: none"> • National Geographic Kids – Icebergs • NASA – The Science of Icebergs • BBC Bitesize – States of Matter • National Geographic Kids – Polar Animals • BBC Bitesize – Polar Regions • World Wildlife Fund (WWF) – Polar Bears • NASA Climate Change – Effects on Polar Regions • BBC Bitesize – Food Chains • National Geographic – Arctic Ecosystem • Woodland Trust – Food Chains in Nature • BBC Nature – Orca • National Geographic – Arctic Ecosystem • Ocean Explorer – Southern Ocean 	<ul style="list-style-type: none"> • BBC Bitesize – The Heart • National Geographic – How the Heart Works • Science Kids – The Heart • BBC Bitesize – The Circulatory System • National Geographic Kids – The Heart • How Stuff Works – How Your Heart Works • Scholastic – Circulatory System Facts • NHS – Blood Components • BBC Bitesize – The Heart and Blood • National Geographic Kids – The Human Body • Khan Academy – Blood • NHS Smoking, Drinking, and Drugs • Understanding Alcohol • Drugs Information • Health Risks of Smoking • NHS Eat Well • British Nutrition Foundation • Change4Life Recipes • Food a Fact of Life • Science Buddies: What is Pulse? 	<ul style="list-style-type: none"> • BBC Nature – Galápagos Islands • National Geographic – Galápagos Islands • Smithsonian National Zoo – Animals of the Galápagos • National Geographic: Fossils • BBC Bitesize – Fossils • The Natural History Museum – Fossils • Smithsonian National Museum of Natural History – Fossils • BBC Bitesize – Inheritance and Evolution • National Geographic Kids – Genetics • Science Kids – Inheritance • BBC Bitesize – Human Development • National Health Service (NHS) – Stages of Life • The World Health Organization (WHO) – Life Stages

Year 6

Term 6: Allotment

Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.
Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate
Use test results to make predictions to set up further comparative and fair tests.
Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations
Identify scientific evidence that has been used to support or refute ideas or arguments.
Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs
Describe the life process of reproduction in some plants and animals.
Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird.

Substantive
Knowledge

Composting

What is Compost?

Definition: Compost is decomposed organic matter, used as a fertiliser in gardening and agriculture.

Types of Compost and Their Components

Traditional Compost:

Ingredients: Grass clippings, leaves, fruit and vegetable scraps, eggshells, and coffee grounds.

Texture: Dark, crumbly, and earthy.

Smell: Pleasant, earthy aroma when well-maintained.

Commercial Compost:

Ingredients: May include peat, composted green waste, and additives like nutrients or biochar.

Texture: Fine and even, may contain small chunks.

Smell: Usually a neutral smell, sometimes with a hint of organic odour.

Worm Compost (Vermicompost):

Ingredients: Produced by worms from kitchen scraps and organic materials.

Texture: Rich, dark, and moist.

Smell: Earthy and sweet, indicating healthy decomposition.

Biodegradable Materials

Definition: Biodegradable materials can break down naturally through the action of living organisms such as bacteria and fungi.

Common Biodegradable Items:

Biodegradable:

Apple cores

Banana skins

Newspaper

Bread

Non-Biodegradable:

Crisp packets

Socks (depending on material)

Toy car (plastic)

Endpoints

1. Identify and describe different types of compost and their components.
2. Recognise which materials are biodegradable and explain the processes involved.
3. Record and analyse information from experimental investigations.
4. Discuss the importance of composting in reducing waste and promoting sustainability.

What affects germination?

What is Germination?

Definition: Germination is the process by which a seed develops into a new plant, beginning with the seed absorbing water and ending with the seedling breaking through the soil.

Key Factors: Germination requires water, oxygen, warmth, and sometimes light.

Conditions for the Experiment

Low Temperature (4°C): Simulating winter conditions; may slow down metabolic processes.

Room Temperature (21°C): Ideal temperature for most seeds; mimics spring conditions.

In the Light: Light can enhance germination for some seeds that require light but may inhibit others.

In the Dark: Darkness is necessary for seeds that do not require light to germinate.

Scientific Method Steps

Ask a Question: How does temperature and light affect the rate of seed germination?

Make Predictions: Formulate hypotheses about which conditions will lead to the quickest and slowest germination.

Plan the Experiment: Identify variables (independent, dependent, and control variables).

Conduct the Experiment: Place seeds in each condition and monitor growth.

Record Observations: Take notes on germination rates over a specified period.

Analyse Results: Compare outcomes to predictions and discuss why they occurred.

Endpoints

1. Clearly explain the germination process and its requirements.
2. Understand the significance of different environmental factors on seed germination.
3. Conduct a simple experiment following the scientific method.
4. Record and interpret data effectively.
5. Articulate their findings and conclusions through discussion and written reflection.

Caring for our Plants

Plant Growth: The process by which seeds germinate and develop into mature plants.

Photosynthesis: The method by which plants convert sunlight into energy, helping them to grow and thrive.

Seeds, Bulbs, and Saplings: Different stages of plant development; seeds germinate, bulbs sprout, and saplings are young trees.

Key Vocabulary

Germination: The process of seeds sprouting and beginning to grow.

Photosynthesis: The process by which plants use sunlight to make food from carbon dioxide and water.

Weeding: The act of removing unwanted plants that compete for resources.

Fertiliser: A substance added to soil to improve plant growth.

Pests: Organisms that can harm plants, such as aphids or slugs.

Disease: Illness in plants caused by pathogens like bacteria, fungi, or viruses.

Plant Growth Stages

Seed Stage: The dormant period, where the seed contains all it needs to begin growth.

Germination: The seed absorbs water and swells, the radicle (root) emerges first.

Seedling Stage: The young plant develops leaves and grows stem.

Sapling Stage: A young tree that has developed from a seed or bulb and continues to grow into maturity.

Endpoints

1. Identify and describe the life cycle stages of a plant.
2. Demonstrate proper techniques for watering, weeding, and feeding plants.
3. Maintain a comprehensive class plant diary documenting growth and care practices.
4. Develop and present a scientific report based on their observations and analyses of the plants.

Dissecting Flowers

Key Parts of a Flowering Plant

Carpel: The female reproductive part, consisting of the stigma, style, and ovary.

Stigma: The sticky top part that receives pollen.

Style: The tube that connects the stigma to the ovary.

Ovary: Contains the ovules, which develop into seeds after fertilisation.

Stamen: The male reproductive part, consisting of the anther and filament.

Anther: Produces pollen grains containing male gametes (sperm cells).

Filament: A slender stalk that supports the anther.

Types of Pollination

Self-pollination: Pollen from the same flower fertilises the ovules.

Cross-pollination: Pollen from one flower fertilises the ovules of another, promoting genetic diversity.

Fertilisation Process

Pollination occurs when pollen lands on the stigma.

Pollen tube grows down the style to reach the ovary.

Sperm cells travel down the pollen tube to fertilise an ovule.

Fertilised ovule develops into a seed, and the surrounding ovary develops into fruit.

Endpoint Expectations

1. Accurately identify and label the key parts of a flowering plant.
2. Explain the function of each part involved in sexual reproduction.
3. Demonstrate understanding of how fertilisation occurs in plants.

Sequencing Stages

What is Seed Dispersal?

Seed dispersal is the process by which seeds are spread away from the parent plant to reduce competition for resources and to increase the chances of survival. Different plants have developed various methods for dispersing their seeds.

Why is Seed Dispersal Important?

Reduces Competition: By spreading their seeds, plants minimise competition for light, space, and nutrients.

Colonisation of New Areas: Dispersal allows plants to colonise new habitats, which can be crucial for their survival.

Genetic Diversity: It promotes genetic mixing, enabling populations to adapt to changing environments and resist diseases.

Methods of Seed Dispersal

Wind Dispersal

Seeds are lightweight and may have wings or parachutes (e.g., dandelion seeds).

Examples: Sycamore, Milkweed.

Water Dispersal

Seeds float on water and are carried away to new locations.

Examples: Coconut, Water lily.

Animal Dispersal

Seeds can cling to animal fur or be eaten and later excreted.

Examples: Burdock (clinging seeds), berries (eaten and scattered).

Mechanical Dispersal

Seeds can be forcibly expelled from the parent plant, often through a pod that bursts open.

Examples: Peas, Touch-me-not (Impatiens).

Gravity Dispersal

Seeds fall directly from the parent plant to the ground.

Examples: Acorns from oak trees.

Endpoints

1. Explain what seed dispersal is and why it is essential for plant populations.
2. Identify various seed dispersal methods and give examples.

Pollinator Life Cycles

Overview of the Bee

Bees are vital pollinators known for their role in pollinating crops and wild plants.

Scientific Terminology

Pollination: The transfer of pollen grains from the male anther of a flower to the female stigma.

Metamorphosis: A process of transformation that some insects undergo from larva to adult.

Life Cycle Stages

Egg: The adult female bee lays eggs in a hexagonal cell. An egg can be fertilised (becomes a worker bee or queen) or unfertilised (becomes a drone).

Larva: After about three days, the egg hatches into a larva. The larva is fed by worker bees with pollen and nectar.

Pupa: The larva eventually forms a cocoon and enters the pupal stage, where it transforms into an adult bee.

Adult Bee: After about 10–14 days, the adult bee emerges from the cocoon ready to start its new life.

Endpoints:

1. Identify the stages of the life cycle of their chosen pollinator.
2. Use scientific terminology to describe the life cycle.
3. Compare and contrast the life cycles of at least two pollinators.
4. Appreciate the importance of pollinators in the ecosystem.

Human Body

Key Terms

Fertilisation: The process where a sperm cell from the male merges with an egg cell from the female.

Sperm: Male reproductive cell produced in the testes.

Egg (Ovum): Female reproductive cell produced in the ovaries.

Zygote: The fertilised egg that develops into an embryo.

Embryo: An early stage of development post-fertilisation.

Gestation: The period during which the embryo/fetus develops in the uterus.

Uterus: The organ where the embryo develops in a female.

3. The Human Reproductive System

Male Reproductive System:

Testes: Produce sperm and testosterone.

Penis: Organ that delivers sperm to the female reproductive system.

Seminal Vesicles and Prostate Gland: Produce fluids that nourish and transport sperm.

Female Reproductive System:

Ovaries: Produce eggs and hormones (oestrogen and progesterone).

Fallopian Tubes: Transport eggs from the ovaries to the uterus and the site of fertilisation.

Uterus: The site where a fertilised egg implants and develops.

Vagina: The passage leading from the external genitals to the uterus.

Endpoints

1. Describe the male and female reproductive systems and their functions.
2. Explain the process of fertilisation and the stages of human development from zygote to embryo.
3. Identify and describe key terms related to human reproduction.
4. Demonstrate an understanding of the importance of health education in relation to reproduction.

Healthy Lifestyle

What is Puberty?

Definition: Puberty is the stage of life when your body changes from a child into an adult.

Age Range: Generally occurs between ages 9–14 for girls and 10–15 for boys.

Changes During Puberty

Physical Changes:

Growth spurts

Development of secondary sexual characteristics (e.g., breasts for girls, facial hair for boys)

Increased oil and sweat production

Emotional Changes:

Mood swings

Increased self-consciousness

Desire for independence

Importance of Personal Hygiene

Health Reasons:

Reduces the risk of skin infections (e.g., acne, fungal infections) caused by sweat and bacteria.

Prevents the spread of germs and illnesses (e.g., colds, flu).

Social Reasons:

Affects relationships with peers and friends.

Builds self-esteem and confidence.

Hygiene Practices:

Daily Bathing/Showering: Keeps skin clean and removes sweat.

Use of Deodorants: Helps manage body odour.

Dental Hygiene: Brushing and flossing teeth to prevent bad breath and cavities.

Menstrual Hygiene: For girls, using pads or tampons and understanding the menstrual cycle.

Endpoints

1. Explain the physical changes that occur during puberty.
2. Identify key personal hygiene practices that can help manage these changes.
3. Discuss the positive effects of good hygiene on self-esteem and confidence.
4. Understand the relationship between personal hygiene and health.

Habitats

Types of Farming Practices

Arable Farming

Focuses on growing crops such as wheat, barley, and vegetables.

Seasonal planting and harvesting are crucial.

Livestock Farming

Involves raising animals like cows, sheep, pigs, and poultry.

Can be extensive (animals roam freely) or intensive (animals are kept in close confinement).

Mixed Farming

Combines arable and livestock farming on the same farm.

Diversifies income sources and can enhance soil fertility through crop rotation.

Organic Farming

Avoids synthetic fertilisers and pesticides, focusing on natural methods.

Promotes biodiversity and soil health.

Sustainable Farming

Aims to balance the needs of food production with environmental impact.

Uses techniques like crop rotation, cover cropping, and reduced reliance on chemicals.

Positive Effects of Farming on Natural Habitats

Biodiversity Enhancement: Organic and sustainable farming can support a diverse range of species.

Soil Health Improvement: Techniques like crop rotation enhance soil fertility and structure.

Habitat Creation: Certain farming practices, like creating hedgerows or maintaining ponds, provide habitats for wildlife.

Pollinator Support: Flowering crops and field margins can support pollinator populations, essential for food production.

Negative Effects of Farming on Natural Habitats

Habitat Destruction: Land clearing for agriculture can lead to loss of forests and meadows.

Pesticide Use: Chemicals can harm non-target species, including beneficial insects and water quality.

Soil Erosion: Over-grazing and intensive ploughing can strip away vital topsoil.

Water Pollution: Runoff from chemicals and fertilizers can contaminate water bodies, affecting aquatic wildlife.

Endpoints

1. Identify and describe different farming practices used in the UK.
2. Discuss the positive and negative effects of these practices on natural habitats.
3. Suggest improvements or alternative practices that could enhance sustainability in farming.

Disciplinary Knowledge**Scientific Inquiry**

Observation: Encourage detailed observation of textures, smells, and changes in buried items over time.

Hypothesis: Formulate sensible predictions about biodegradation based on prior knowledge.

Data Collection: Record changes in materials weekly, noting decomposition signs (e.g., size reduction, texture change, smell).

Working Scientifically Skills

Comparative Analysis: Compare the textures and smells of different compost types.

Investigative Skills: Conduct a fair test when burying items to ensure consistent conditions (same depth, location, moisture).

Variables in the Experiment

Independent Variable: The condition in which the seeds are kept (temperature and light).

Dependent Variable: The number of seeds that successfully germinate within a set timeframe.

Control Variables: Type of seed, soil type, amount of water, and container size.

Making Predictions

Encourage students to think critically:

Predict which condition will yield the highest germination rate and why.

Consider factors such as temperature impacts on metabolic rates and the role of light in photosynthesis.

Observations and Record Keeping

Use of Tables: Create a table to record daily observations of how many seeds germinate in each condition.

Date and Time Stamps: Keep a log for clarity on the timeline of germination.

Descriptive Language: Describe any changes noticed in seed appearance, growth, and behaviour in each condition.

Explaining Results

Students will be encouraged to:

Discuss how the conditions affected germination.

Reflect on whether their predictions were correct and what might account for any differences.

Consider real-world applications, such as how farmers choose when to plant crops based on temperature and light.

Scientific Inquiry

Observation Skills: Focus on carefully watching changes in plant growth over time.

Experimentation: Comparing the growth of plants under different conditions (e.g., water, light, soil type).

Data Collection: Use measurements to track growth, document findings, and make predictions.

Practical Skills

Plant Care: Understanding watering, weeding, and providing nutrients to promote healthy growth.

Recordkeeping: Keeping a plant diary to regularly note observations and changes.

Scientific Inquiry

Asking Questions: What are the functions of different flower parts? How do flowering plants reproduce?

Conducting Investigations: Dissect a flowering plant to observe and identify the structures involved in reproduction.

Data Collection and Analysis

Collect data on the stages of a flower's life cycle and document observations during dissection.

Compare and contrast the features of different flowering plants.

Communication of Findings

Create diagrams to illustrate findings.

Present conclusions about the role of each part in reproduction.

Skills Development

Observation: Examine various seeds and their dispersal structures.

Data Collection: Record findings on the effectiveness of different dispersal methods.

Analysis: Compare results and discuss which methods might work best in certain environments.

Inquiry and Research Skills

Observation: Visiting farms or local ecosystems to observe farming practices and their effects.

	<p>Data Collection: Gathering information through surveys or interviews with local farmers. Analysis: Comparing different farming practices and their ecological impacts.</p> <p>Critical Thinking Assessing the balance between agricultural productivity and environmental sustainability. Evaluating the effectiveness of various farming methods based on ecological outcomes.</p> <p>Communication Presenting findings through reports, presentations, or posters to share with classmates. Engaging in discussions about sustainable practices and their importance for the future.</p>
Useful Websites	<ul style="list-style-type: none"> • Royal Horticultural Society (RHS) - Composting • The Composting Association • National Geographic - Biodegradable vs Non-biodegradable • BBC Bitesize - Decomposition • Royal Horticultural Society • Science Buddies - Seed Germination • Royal Horticultural Society (RHS) • BBC Bitesize: Plant Growth • National Geographic for Kids: Plants • Gardening with Kids • BBC Bitesize - Plant Reproduction • National Geographic - Flowering Plants • Science Learning Hub - Plant Reproduction • BBC Bitesize - Seed Dispersal • Royal Horticultural Society - Plants and Seed Dispersal • Science Kids - Transport of Seeds • National Geographic - Seed Dispersal • Royal Society for the Protection of Birds (RSPB) • The Bumblebee Conservation Trust • Wildlife Trusts • UK Pollinator Monitoring Scheme • NHS Live Well - Personal Hygiene • UK Government - Young People and Your Body • KidsHealth - Hygiene • Department for Environment, Food & Rural Affairs (DEFRA) • The Farming Community Network • RSPB (Royal Society for the Protection of Birds) • Soil Association (Organic Farming) • Natural England