

Winterton Primary School & Nursery Science Progression



This document demonstrates the progression in knowledge, skills and vocabulary in Science from Year 1 to Year 6.

KS1 Science (Year 1-2)

This is a two-year rolling plan working from Year A in the academic year 2021 – 2022.

Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Everyday Materials - objects vs material, name materials, describe properties	Seasonal Changes - observe changes, describe weather, day length	Animals including humans - life cycles of humans and animals	Plants - identifying features of plants and trees, seeds and bulbs grow, what they need	Animals including humans - body parts and organs, senses	Rocks, sand and waves - durability of rocks, erosion, how sand is formed
Animals including humans - types of animal and classification, omnivore, carnivore, herbivore, basic needs of animals inc. humans, food chain	Uses of everyday materials - (compare suitability of materials for uses, how can the shape of objects we changed, famous scientist)	Living things and their habitats - habitats, how animals and plants are suited to them	Earth and Space - layers of the Earth, structure of the solar system, planets	Forces - pushes and pulls	Animals including humans - human importance of exercising, diet and hygiene

Year A	Autumn 1: Everyday Materials <i>Comparison</i>	Autumn 2: Seasonal Changes <i>Changes</i>
	<p>Knowledge children will learn:</p> <ul style="list-style-type: none"> • A material is what something is made from or can be made from, whereas the object is what the item is, which depends on its purpose. • The properties of materials can be described in different ways, including using the five senses - see, touch, smell, hear and taste. • Some of the scientific language used to describe the properties of materials includes: hard, soft, stretchy, rigid, bendy, stiff, floppy, waterproof, absorbent, rough, smooth, shiny, dull, opaque, transparent and translucent. • Different materials are used to make different objects, this is dependent on the purpose of the object. • Materials can be identified and sorted by knowledge of their properties and using their similarities and differences to compare. • Solid shapes can be changed by squashing, bending, twisting and stretching the; this can include with pressure, heat or a force. <p>Skills children will gain:</p> <ul style="list-style-type: none"> • Distinguish between an object and the material from which it is made. • Observe and describe materials using their senses, using specific scientific words. • Explain what material objects are made from and why certain materials might be useful for specific job. • Name some different everyday materials. • Sort materials into groups by giving criterion. • Set up a comparative test to compare how solid shapes can be changed by squashing, bending, twisting and stretching. • Use observations to compare materials, identifying own own criteria for sorting. <p>Children will build on knowledge from:</p>	<p>Knowledge children will learn:</p> <ul style="list-style-type: none"> • Weather is the way the air and the atmosphere feels • It includes the outside temperature, strength of the wind, and whether it is raining, sunny, hailing, snowing, sleeting, foggy, or cloudy • The weather changes regularly and tends to be different during different seasons and across different countries. • That as the seasons change so does our outside environment and what we wear. • There are four seasons: Spring, Summer, Autumn and Winter. • There are always 24 hours in a day and that we have night and day due to the rotation of the Earth • In the UK during winter, there are less hours of daylight compared to the summer due to the tilt of the Earth towards or away from the sun. <p>Skills children will gain:</p> <ul style="list-style-type: none"> • Observe changes across the four seasons • Name the four seasons in order • Observe and describe weather associated with the seasons • Describe how the day length varies depending on the season <p>Children will build on knowledge from:</p> <ul style="list-style-type: none"> • EYFS where they identify the changes in weather and seasons <p>Children will build on this knowledge in:</p> <ul style="list-style-type: none"> • KS2 where they will learn about the movement of the Earth and other planets relative to the sun in the solar system and how this creates the seasons and weather. In addition they will also learn about the movement of the moon relative to the Earth. <p>Children learn the following vocabulary:</p>

<ul style="list-style-type: none"> • EYFS where they investigate absorbent and waterproof materials and the suitability of different materials for different purposes. • KS1 where they find out about famous scientists who invented different uses for materials. <p>Children will build on this knowledge in:</p> <ul style="list-style-type: none"> • KS2 where they will explore states of matter and how materials can change from one state to another at different temperatures, and that this can be reversible or irreversible. They will look at real-life examples of this, such as in the water cycle. <p>Children learn the following vocabulary: object, material, properties, wood, plastic, glass, metal, water, rock, brick, paper, fabric, elastic, foil, cardboard, rubber, wool, clay, hard, soft, stretchy, stiff, bendy, floppy, waterproof, absorbent, rough, smooth, shiny, dull, comparative test</p>	<p>weather, sunny, rainy, raining, shower, windy, snowy, cloudy, hot, warm, cold, storm, thunder, lightning, hail, sleet, snow, icy, frost, puddles, rainbow, seasons, winter, summer, spring, autumn, Sun, sunrise, sunset, day length, Earth, rotation, tilt</p>
<p style="text-align: center;">Spring 1: Animals including humans (life cycles) <i>Changes, Comparison</i></p>	<p style="text-align: center;">Spring 2: Plants <i>Cause and effect</i></p>
<p>Knowledge children will learn:</p> <ul style="list-style-type: none"> • Animals (and humans) need air, food, water and shelter to survive. • Animals (and humans) grow, reproduce and have offspring which creates a life cycle. • A life cycle is the journey of a living thing from beginning to end; this includes animals, humans and plants. • A life cycle is vital process for all living creatures to ensure that animals do not become extinct. • To describe lifecycles including; egg-chick-chicken, frog spawn-tadpole-froglet-frog and egg-caterpillar-pupa-butterfly • Some species produce offspring that look similar to them, like us humans, but the young of some other species are very different from their parents and go through huge changes as they grow into adults. This is called metamorphosis. 	<p>Knowledge children will learn:</p> <ul style="list-style-type: none"> • The names of different parts of plants and trees - petal, leaf, stem, flower, seed, fruit, root, trunk, branch and bark. • How to identify different common plants and trees. • Deciduous trees lose their leaves during the autumn, whereas evergreen trees do not and keep their leaves all year. • Plants need air, water, light and the right temperature for growth and survival but light is not needed for germination. • Just like animals (and humans), plants grow, reproduce and follow a life cycle. • Marram grass has matted roots which helps to stabilise the sand dunes. <p>Skills children will gain:</p> <ul style="list-style-type: none"> • Identify plants and trees using an identification sheet. • Draw a diagram of a plant and label the different parts.

<p>Skills children will gain:</p> <ul style="list-style-type: none"> • Consider what would happen if animals (and humans) did not have one of components needed for survival. • Explore what is meant by the terms growth and reproduction and how these differ. • Ask and answer questions about life cycles. • Explain what is meant by the term extinct and the important role that a life cycle has in preventing this. • Describe and document the life cycles of chickens, frogs and butterflies. <p>Children will build on knowledge from:</p> <ul style="list-style-type: none"> • EYFS where they learn about what a life cycle is and learn the different names for animals and their offspring. • KS1 where they learn what humans need to keep them healthy. <p>Children will build on this knowledge in:</p> <ul style="list-style-type: none"> • KS2 where they will describe the changes in humans from birth to old age. <p>Children learn the following vocabulary: offspring, reproduction, growth, baby, toddler, child, teenager, adult, elderly person, names of animals and their babies (e.g. chick/chicken, kitten/cat, caterpillar/butterfly, tadpole/frog), survive, survival, water, food, air, metamorphosis, life cycle, cocoon, pupa, egg, chrysalis, change, species, extinct</p>	<ul style="list-style-type: none"> • Observe and record how seeds and bulbs germinate, and plants grow and reproduce. • Compare over time the growth of trees and the changes throughout the year. • Investigate, using a comparative test, what happens when plants do not have light and water and how this affects their survival. • Learn <p>Children will build on knowledge from:</p> <ul style="list-style-type: none"> • EYFS where they learn the names of the different parts of a plant, as well as how to plant seeds and that plants need water to grow. • KS1 where they learn about the life cycles of humans and animals, as well as how seasonal changes affect the growth of plants. <p>Children will build on this knowledge in:</p> <ul style="list-style-type: none"> • KS2 where they will learn about how plants make their own food in the process called photosynthesis. They will also learn about pollination and seed dispersal. <p>Children learn the following vocabulary: plant, leaf, stem, branch, root, bark, flower, petal, seed, berry, fruit, vegetable, bulb, plant, hole, dig, water, weed, grow, shoot, pollen, die, dead, soil, tree, bush, blossom, root, seed, trunk, bark, stalk, bud, names of trees in the local area, names of garden and wild flowering plants in the local area, light, shade, sun, warm, cool, water, space, grow, healthy, bulb, germinate, seedling, photosynthesis</p>
<p>Summer 1: Animals including humans (human body) <i>Cause and Effect</i></p>	<p>Summer 2: Rocks, sand and waves <i>Comparison, Cause and Effect</i></p>
<p>Knowledge children will learn:</p> <ul style="list-style-type: none"> • Brain - Enables the body to think, learn, create and feel emotions, as well as controlling every movement and action the body makes. • Heart - Pumps blood around the body to deliver nutrients and remove waste. 	<p>Knowledge children will learn:</p> <ul style="list-style-type: none"> • Rocks are formed in different ways over millions of years. Different types of rock have different properties, such as hard or soft, and permeable or impermeable. Granite is an example of a hard rock and chalk is an example of a soft rock.

- Lungs - Deliver oxygen from air to red blood cells.
- Kidneys - Filter the blood and removes waste to send to the bladder.
- Bladder - Stores urine until ready to leave the body.
- Liver - Cleans blood, produces an important digestive liquid called bile and stores energy in the form of a sugar called glycogen.
- Intestines - Break down (digest) food so that the body can use it for energy and move waste products through the body.
- Stomach - Food enters the stomach and starts to be digested, acid and enzymes are produced which helps to break down the food.
- Humans have five senses - touch, taste, smell, sight and hear.
- The tongue is covered in taste buds which allow different types of taste to be tasted, these are: sweet, salty, sour and bitter.
- The ability to smell is very important in being able to taste, if you cannot smell, it is hard to taste. Saliva is also very important and without saliva, taste would be reduced.

Skills children will gain:

- Label body parts on a diagram of the human body
- Locate organs on a diagram of the human body
- Describe the function of the different organs
- Identify the five senses and the body part associated with each
- Explore the different tastes the tastebuds can identify by tasting different solutions - sweet, salty, sour and bitter - and how this can be affected by lack of smell.

Children will build on knowledge from:

- EYFS where they learn to name parts of the human body.
- KS1 where they learn how to keep their bodies healthy.

Children will build on this knowledge in:

- KS2 where they will learn about the digestive system and the circulatory system.

- Permeable means that water can soak into a rock and impermeable means that water cannot soak into it. Sandstone is an example of a permeable rock and slate is an example of an impermeable rock.
- Beaches often have cliffs or dunes behind them which act as a natural sea defence, however the material these are made from depends how successful they are as a sea defence.
- Sand is formed when rocks are weathered and eroded over thousands, even millions, of years. The rocks are transported over time by wind and water, in a process which gradually reduces their size further. Sand can vary in colour and composition, depending on what it is made from.
- Waves are most commonly generated by the wind blowing across the surface of the sea, but they can also be caused as the result of a natural disaster such as earthquakes and volcanic eruptions.
- Constructive waves bring material onto the beach and deconstructive waves pull material away from the beach. Deconstructive waves cause coastal erosion. Coastal erosion is the wearing away of the land by the sea.

Skills children will gain:

- Describe how rocks are formed.
- Identify different types of rock using an identification guide
- Investigate if rocks are hard/soft and permeable/impermeable to find the most suitable rock for a cliff to be formed from
- Explain how sand is formed
- Explore which type of waves and wind cause the worst coastal erosion at Winterton Beach.
- Compare different local beaches (Winterton and Cromer) to identify the types of rocks found and discuss the use of natural sea defences provided by the cliffs and dunes

Children will build on knowledge from:

<p>Children learn the following vocabulary: Skeleton, skull, forehead, chin, ears, eyes, nose, mouth, lips, tongue, neck, shoulders, arms, elbows, hands, fingers, thumbs, chest, breast, abdomen, stomach, back, waist, hips, thighs, knees, ankles, feet, toes, brain, heart, lungs, kidneys, bladder, liver, small intestine, large intestine, stomach, enzymes, digest, urine, blood, oxygen, nutrients, waste</p>	<ul style="list-style-type: none"> • EYFS where they explore beaches and fossils, learn about what the seaside was like in the past and how to take care of local beaches. • KS1 where they learn about the importance of Winterton Beach and the surrounding dunes as a habitat for grey seals, little terns and natterjack toads. <p>Children will build on this knowledge in:</p> <ul style="list-style-type: none"> • KS2 where they will learn about the formation of different types of rock and how fossils are formed. <p>Children learn the following vocabulary: Rock, soft, hard, permeable, impermeable, property, granite, chalk, basalt, obsidian, slate, marble, sandstone, cliff, dunes, coastal erosion, weathered, waves, constructive, deconstructive, sand, composition, transported, wind</p>
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Year B	Autumn 1: Animals including humans (animal focus) <i>Comparison</i>	Autumn 2: Uses of everyday materials <i>Comparison</i>
<p>Knowledge children will learn:</p> <ul style="list-style-type: none"> • Animals can be classified into groups of animals with similar characteristics, these groups include: mammals, reptiles, fish, amphibians and birds. • The key characteristics of the different classifications, such as mammals have fur and live young, whereas birds have feathers and lay eggs. • The structure and body parts of common animals from each classification. • Animals may be omnivores, carnivores, or herbivores. Herbivores are plant eaters; carnivores are meat eaters and omnivores eat both plants and meat. • How a food chain is constructed to show the transfer of energy from the producer (usually a plant) to the consumer (predator and prey) and why this is essential to life on Earth. 	<p>Knowledge children will learn:</p> <ul style="list-style-type: none"> • Materials including wood, plastic, glass, metal, water, and rock have different properties. Materials may be hard or soft; stretchy or stiff; shiny or dull; rough or smooth; bendy or not bendy; waterproof or not waterproof; absorbent or not absorbent; opaque, transparent or translucent. • Certain materials are better suited for particular uses than others, this depends on the purpose of the object. • How to test different materials fairly to see which are the most stretchy and which are the most waterproof. • About Charles Macintosh who was the scientist who invented the raincoat . • About John Dunlop who was the scientist who invented the pneumatic rubber tyre. 	

<p>Skills children will gain:</p> <ul style="list-style-type: none"> • Classify animals into groups including: mammals, reptiles, fish, amphibians and birds. • Compare and sort animals according to the characteristics of different classifications. • Identify and label the structure and body parts of different animals. • Name examples of carnivores, herbivores and omnivores. • Create simple food chains. <p>Children will build on knowledge from:</p> <ul style="list-style-type: none"> • EYFS where they discuss, compare and label the features of different types of animal. • KS1 where they explore what animals need to survive and learn about different types of habitat. <p>Children will build on this knowledge in:</p> <ul style="list-style-type: none"> • KS2 where they will construct food chains, classify animals based on their observable characteristics, identify life cycles for different animals including mammals, amphibians, insects and humans. <p>Children learn the following vocabulary:</p> <ul style="list-style-type: none"> • Predator, prey, herbivore, carnivore, omnivore, producer, consumer, energy, transfer, cycle, mammal, reptile, fish, amphibian, bird, food chain, characteristics, classification, label, compare 	<p>Skills children will gain:</p> <ul style="list-style-type: none"> • Identify and label the properties of materials. • Evaluate the properties of materials and explain why different examples are suitable for different purposes. • Learn how to plan and conduct a fair test to test the stretchiness and waterproofness of different materials. • Research and collate information to create a fact file about a famous scientist. <p>Children will build on knowledge from:</p> <ul style="list-style-type: none"> • EYFS where they construct buildings from different materials and investigate how well materials float and sink. • KS1 where they have explored how materials can be sorted with regards to their properties. <p>Children will build on this knowledge in:</p> <ul style="list-style-type: none"> • KS2 where they will investigate properties of materials such hardness, solubility, transparency and conductivity (electrical and thermal). They will also explore dissolving and separating mixtures using filtering, sieving and evaporation. <p>Children learn the following vocabulary:</p> <ul style="list-style-type: none"> • Material, hard, soft, stretchy, stiff, shiny, dull, rough, smooth, bendy, waterproof, absorbent, opaque, transparent, translucent, fair test, purpose, suitable, variables, inventor, design, observe, purpose
<p>Spring 1: Living things and their habitats <i>Comparison</i></p>	<p>Spring 2: Earth and Space <i>Changes, Comparison</i></p>
<p>Knowledge children will learn:</p> <ul style="list-style-type: none"> • The main differences between things that are living, things that are dead, and things that have never been alive, are that living things demonstrate the 7 life processes - movement, respiration, sensitivity to surroundings, growth, reproduction, excretion and nutrition 	<p>Knowledge children will learn:</p> <ul style="list-style-type: none"> • The Earth is one of nine planets which make up our solar system. • The Earth is the third planet from the sun. The planets in order from the sun are: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Pluto (officially Pluto is not a planet).

- A habitat is the natural home of a living thing and living things live in habitats to which they are suited. Different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other. Micro-habitats are small habitats which differ in some way to the habitat in the surrounding area. They provide a unique habitat for animals to live in and can be home to unique species that only live there. Unfortunately micro-habitats can be at risk from destruction due to natural reasons (such as extreme weather or natural disasters) and man-made reasons (such as deforestation or pollution).
- Winterton Beach and dunes are the natural habitats for grey seals, little terns and natterjack toads. Due to this, at times beach closures are in place to protect the animals whilst they are breeding.
- Throughout the year, the grey seal colony can be seen in the sea around the Winterton area, however in November each year, thousands of pregnant female seals beach themselves on the sand ready to give birth. At the same time, the male seals join them on the land to start the mating process. When the grey seal pups are born, they are born with white fur which is not waterproof so for the first 3 weeks, they feed from their mother on the beach until they begin to lose their white fur. Once their white fur is all removed, they are waterproof and can join their mothers in the sea.
- In April, little terns, which are a small sea bird, fly from West Africa to breed on Winterton Beach. The little terns lay their 2-3 eggs in shallow nests which they scrape into the sand. The mothers feed their young on small fish, crustaceans and invertebrates found in shallow water close to the shore. Unfortunately, the little tern colony is at risk from flooding, predators, such as kestrels, as well as humans and dogs disturbing their nests. If a nest is disturbed, the adult little tern will leave the nest, leaving the babies exposed to other predators.
- The natterjack toad is an endangered species which lives on Winterton dunes, it can dig its own burrow but typically used burrows already made by rabbits, house martins and rodents. Natterjack toads like sandy habitats near to shallow water where they can lay their eggs - each

- The Earth is the only habitable planet due to its mostly temperate climate. The planets closest to the sun are extremely hot, with those further being extremely cold.
- The Earth is made up of four layers - crust, mantle, outer core and inner core.
- The outer layer (crust) is made up of large moving pieces called tectonic plates which are made of solid rock. All the Earth's land and water sits on top of these plates. Underneath the plates is a weaker layer of partially melted rock (mantle) which the tectonic plates move across.
- Millions of years ago, the movement of the tectonic plates formed mountains and it is also the cause of earthquakes and volcanoes.
- The Earth completes a full rotation on its axis once every 24 hours which is why we have day and night. When the Earth is facing the sun, it is day time and when it is facing away from the sun it is night time.
- The Earth orbits the sun once every 365 days which is why we have different seasons, when the Earth is closest to the sun it is summer and when it is furthest away from the sun it is winter.

Skills children will gain:

- Identify the nine planets and their location in our solar system.
- Explain why earth is the only habitable planet.
- Label a diagram showing the four layers of the Earth.
- Describe how the movement of tectonic plates formed mountains and causes earthquakes and volcanoes
- Justify why we have seasons and day/night by explaining the movement of the Earth.

Children will build on knowledge from:

- EYFS where they explore what they see when they look into the sky during the day and at night, as well as where they are located on planet Earth.

breeding season, they can lay up to 7500 eggs! Natterjack toads hibernate in the winter and emerge in April to start eating before the breeding season begins. They typically eat woodlice and other insects, sand hoppers and other marine invertebrates.

Skills children will gain:

- Compare things that are living, things that are dead and things that have never been alive, and explain the similarities and differences.
- Identify and describe different habitats and micro-habitats - local, national and worldwide.
- Explore why habitats are at risk of destruction from natural and human sources.
- Research species local to Winterton (grey seals, little terns and natterjack toads) who have their habitat in the local area.
- Observe and record using labelled photographs, the features of local habitats, which make them well suited to the needs of grey seals, little terns and natterjack toads.

Children will build on knowledge from:

- EYFS where they explore local beaches and learn about the wildlife that can be seen there.
- KS1 where they learn about food chains and to classify animals.

Children will build on this knowledge in:

- KS2 where they will learn about deforestation and other ways in which habitats can be damaged.

Children learn the following vocabulary: living, dead, never been alive, suited, suitable, basic needs, food, shelter, move, feed, water, air, survive, survival, migrate, names of local habitats (pond, river, sea, woodland, beach, dunes, field etc.), names of micro-habitats (under logs, in bushes, in the sand, in rock pools etc.), conditions, light, dark, shady, sunny, wet, damp, dry, hot, cold, names of living things in the habitats and micro-

- KS1 where they learn about the different seasons and how the length of the day changes depending on the season.

Children will build on this knowledge in:

- KS2 where they will find out about more about the Earth's rotations, the moon's rotations and the phases of the moon, as well as why we have sunset and sunrise and the positioning of the sun in the sky at these times.

Children learn the following vocabulary:

Solar system, space, planet, Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Pluto, orbit, sun, habitable, temperate, climate, layers, crust, mantle, outer/inner core, tectonic plates, formation, rotation, axis, molten

habitats (woodlice, centipedes, sea anemone, crab, sand hopper, natterjack toad, grey seal, pup, chick, little tern etc.)

Summer 1: Forces
Cause and Effect

Knowledge children will learn:

- Forces are pushes, pulls or twists in a particular direction.
- A push is when something is pushed away from you and a pull is when something is pulled towards you.
- If forces are shown on a diagram an arrow is used and the bigger the arrow, the stronger the force.
- Forces can be balanced (equal) or unbalanced (not equal) and this will affect if something moves quicker, slower or stays still.
- Friction is a force between the surface and the object which slows the object down or prevents it from moving. The rougher the surface, the greater friction it has. Friction can be a useful force to slow objects down or to prevent slipping and sliding.

Skills children will gain:

- Describe what a force is.
- Demonstrate what a force is.
- Explain how forces can speed objects up or slow objects down.
- Investigate what happens when forces are balanced and unbalanced.
- Explore what friction is and how it can be useful.
- Investigate how a knowledge of forces and friction can be used to slow down toy cars.

Children will build on knowledge from:

- EYFS where they explore movement of toys and objects and consider safety in the classroom by wearing shoes and outside on an icy day.
- KS1 where they investigate the properties of different materials.

Summer 2: Animals including humans (keeping healthy focus)
Cause and Effect

Knowledge children will learn:

- Health can relate to physical health or mental health, or a combination of them both. Physical health relates to the health of your body, and mental health relates to the health of your mind, feelings and emotions.
- Daily cardiovascular exercise will help to keep the heart, bones and muscles strong.
- Cardiovascular exercise is exercise that raises the heartbeat.
- Supporting mental health can include: learning relaxation techniques, getting outside in the fresh air, seeing friends, ensuring you have enough sleep, talking about feelings, being thankful and asking for help when you need it.
- A balanced diet is getting the right proportion of different food types in your diet, these include: protein and pulses; carbohydrate (especially slow release carbohydrates), fats (especially good fats), dairy, vitamins and minerals (including calcium).
- Carbohydrates give you energy; protein helps you to grow; calcium makes your bones strong; fruit and vegetables contain lots of vitamins, minerals and fibre to aid digestion and to support your immune system.
- To keep healthy, you must also drink lots of water and avoid sugary or caffeinated drinks.
- For good hygiene, always wash your hands with soap and water before eating or before touching food to serve to others; and after sneezing, blowing your nose or going to the toilet. Good hygiene will reduce germs (and hence diseases) spreading and making people poorly.

Skills children will gain:

- Describe the difference between physical and mental health.

Children will build on this knowledge in:

- KS2 where they will learn about friction in more depth and plan an investigation to test the friction of different surfaces using a Newton metre. Children will also learn about the forces of air resistance and water resistance.

Children learn the following vocabulary:

Force, balanced, unbalanced, equal, push, pull, twist, movement, direction, speed, surface, object, friction, rough, smooth, arrow, diagram

- Explain why it is important to exercise every day.
- Support someone with their mental health by suggesting ways to help.
- Plan a balanced meal containing all the different food groups and explain why they are important in keeping your healthy.
- Explore how germs can spread around school and plan a way to reduce the spread of germs by good hygiene practices.

Children will build on knowledge from:

- EYFS where they learn about the importance of good hygiene and keeping healthy.
- KS1 where they learn about what all living things need to survive and how this is similar with all plants, animals and humans.

Children will build on this knowledge in:

- KS2 where they will learn about how to look after teeth and what happens if teeth are not looked after. In addition, they will learn about how the cardiovascular system works and how exercise affects this.

Children learn the following vocabulary:

Health, mental, physical, water, food, nutrition, air, exercise, cardiovascular, sleep, relaxation, heartbeat, breathing, hygiene, germs, disease, protein, carbohydrate, fats, dairy, fruit, pulses, vegetables, vitamins, minerals, calcium, balanced, diet, energy, growth, protect

KS2 Science (Year 3-6)

This is a four-year rolling plan working from Year A in the academic year 2021 – 2022.

Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Magnets (Year 3)	Forces (Year 3, Year 5)	Plants (transpiration, photosynthesis, germination of seeds)	Living things and their habitats (Year 5) - Life cycles (mammal, amphibian, insect, human)	Sound (Year 4)	Electricity - conductors, insulators, brightness, volume buzzer,
States of Matter - solids, liquids, gases, changing state	Earth and Space (Year 5)	Animals including humans - Human body (skeleton, organs, circulatory system)	Plants (functions of different parts, requirements for growth, seed formation and dispersal)	Living things and their habitats (grouping and classification of animals based on observable characteristics)	Evolution and Inheritance (adaptations, natural selection, Darwin, moths etc)
Rocks (Year 3)	Light (Year 6)	Animals including humans - Food (teeth, health and nutrition, food chains)	Properties and changes in materials - (mixtures, dissolving, solutions, evaporation etc reversible)	Plants – classifying, adaptation and reproduction (Year 5)	Living things and their habitats (where they live, environments change and pose danger to living things)
Electricity - (circuits, diagrams, switches, complete / incomplete)	States of Matter - water and the water cycle, rate of evaporation and temperature	Properties and changes in materials - (irreversible, grouping materials, electrical, thermal conductors, magnets, use for objects)	Evolution and Inheritance (Offspring of same kind, inheritance)	Animals including humans - Human body, nutrients and the digestive system	Forces (Year 5)– water resistance, mechanisms, levers, pulleys, gears, small force, great effect

Year A	Autumn 1: Magnets <i>Cause and Effect</i>	Autumn 2: Forces <i>Cause and Effect</i>
	<p>Knowledge children will learn:</p> <ul style="list-style-type: none"> • Magnets create pushing and pulling forces and can exert a force on a magnetic material without touching it. • Magnets are made up of tiny magnetic particles which have all lined up in the same direction and produce a magnetic field. This invisible magnetic field is the area where the force of the magnet can work. • Magnets have two poles: north and south. The opposite poles of two magnets will attract; the same poles of two magnets will repel. Attracting is a pulling force; repelling is a pushing force. • Magnets will attract or repel each other. Magnets will attract some materials. We call these materials magnetic. All magnetic materials are metal but not all metal materials are magnetic. <p>Skills children will gain:</p> <ul style="list-style-type: none"> • Observe how magnetic forces act at a distance • Plan an investigation into the strengths of different magnets acting over a distance • Observe and predict whether magnets will attract or repel each other depending on their poles • Compare and group materials based on whether they are attracted to magnets • Conclude that not all metal materials are magnetic but that all magnetic materials are metal <p>Children will build on knowledge from:</p> <ul style="list-style-type: none"> • KS1 where they will be introduced to push and pull forces. <p>Children will build on this knowledge in:</p> <ul style="list-style-type: none"> • KS2 where they will: learn about forces such as friction, air resistance, gravity and water resistance. <p>Children learn the following vocabulary:</p>	<p>Knowledge children will learn:</p> <ul style="list-style-type: none"> • A force can make an object move faster, slower, change direction or shape. Every force has a reaction force in the opposite direction. If two balanced forces act on an object, the object will not change its motion: the object will continue to be stationing if it was stationary or the object will continue to move in the way it was moving. Unbalanced forces change the way something is moving. • Friction is a force that occurs between two surfaces that are trying to move across each other. Friction always works in the direction opposite the object's movement. Friction slows an object down. • Gravity is the force which makes objects fall to the ground. • Weight is an object's mass multiplied by the force of gravity (9.81m/s^2). Weight is measured in Newtons. • When a weight (N) is pulled to the ground by gravity, air resistance acts upwards against the falling object. Air resistance pushes on different objects with different force depending on the shape and surface area. If we take away the air, in a vacuum, a bowling ball and feather will fall at the same rate. <p>Skills children will gain:</p> <ul style="list-style-type: none"> • Identify and label forces on diagrams. • Describe the effects of friction. • Plan an investigation into how much friction different surfaces create. • Design parachutes to investigate the effects of air resistance. • Explain the findings of Galileo and apply this to scenarios including in a vacuum. <p>Children will build on knowledge from:</p> <ul style="list-style-type: none"> • KS1 where they will be introduced to push and pull forces. <p>Children will build on this knowledge in:</p>

<ul style="list-style-type: none"> • Push, pull, force, exert, apply, attract, repel, north pole, south pole, magnetic field, particles, invisible, 	<ul style="list-style-type: none"> • KS2 where they will: study the effects of water resistance and mechanisms such as levers, pulleys and gears. <p>Children learn the following vocabulary:</p> <ul style="list-style-type: none"> • Push, pull, force, exert, twist, balance, unbalanced, applied, reaction, equal, opposite, stationary, friction, opposing, gravity, Newtons, mass, vacuum, Galileo, gravitational, free fall, reduce, streamlined,
<p style="text-align: center;">Spring 1: Plants <i>Changes, Cause and Effect</i></p>	<p style="text-align: center;">Spring 2: Living things and their habitats (life cycles) <i>Comparison, Changes</i></p>
<p>Knowledge children will learn:</p> <ul style="list-style-type: none"> • Water travels around a plant in a process called transpiration. Water travels from the roots around the plant until eventually it evaporates out of the leaves (from small pores in the leaves called stomata). Plants use capillary action to pull water from their roots. • In the cells of leaves there are chloroplasts which contain chlorophyll. This green pigment absorbs light energy. Leaves absorb carbon dioxide through stomata and water through their roots. Together the carbon dioxide and water, with the energy from the sunlight, creates the food. This food is called glucose. This chemical reaction also creates oxygen which exits the leaves through the stomata. • The life cycle of a flowering plant follows the order: germination, plant growth, pollination, fertilisation, seed formation and seed dispersal. When seeds have the correct growing conditions, it will begin to grow roots and shoots. This is called germination. • Plants can make other plants – reproduce – in two different ways: asexual reproduction or pollination and fertilisation. Pollen from one plant meets the stigma of another when an insect collects nectar. The pollen then travels down the style to the ovary where it meets and fertilises the ovules. <p>Skills children will gain:</p> <ul style="list-style-type: none"> • Match the parts of flowering plants to their functions. • Order the events of water transportation in plants. • Use food dye to observe the transpiration of water in carnations. • Explain how plants create their own food using photosynthesis. 	<p>Knowledge children will learn:</p> <ul style="list-style-type: none"> • Some animals that are born as babies are smaller, similar, versions of the adult that will grow into adults. However, insects can have life cycles that involve either complete or incomplete metamorphosis. • Bees go through a complete metamorphosis from egg to bee. A dragonfly only goes through an incomplete metamorphosis from egg to nymph to adult. • Amphibians require water to complete their life cycle. Some amphibians, like frogs, go through a full metamorphosis; however, others like the axolotl keeps its external gills and fish-like tail for its whole life. • Birds lay eggs. When the chicks are born, they are helpless and need constant feeding. Chicks will grow feathers and then be ready to fly. Some birds migrate to warmer climates in autumn. • Most mammals are placental, where the baby grows inside the female, however some are monotremes (eggs are laid and hatch) and others are marsupials (young are born incomplete and further develop whilst being carried and fed in pouches). • The human life cycle: developing from a baby to old age. <p>Skills children will gain:</p> <ul style="list-style-type: none"> • Describe the life cycle of insects and compare the life cycles of insects which go through complete and incomplete metamorphosis. • Describe the life cycle of an amphibian. • Describe the life cycle of birds.

<ul style="list-style-type: none"> Plant broad beans and observe how they germinate. Identify the process of pollination and fertilisation between flowering plants. <p>Children will build on knowledge from:</p> <ul style="list-style-type: none"> KS1 where they will identify features of plants and trees and learn about what plants need to survive. <p>Children will build on this knowledge in:</p> <ul style="list-style-type: none"> KS2 where they will: learn about the functions of different parts of the plant (including sexual and asexual reproduction), seed formation and dispersal and classifying plants. <p>Children learn the following vocabulary:</p> <ul style="list-style-type: none"> Capillaries, transpiration, absorb, gravity, evaporates, stomata, cells, oxygen, chlorophyll, chloroplasts, chemical reaction, photosynthesis, carbon dioxide, light energy, glucose, germination, pollination, fertilisation, reproduction, asexual, stigma, stamen, anther, filament, sepal, carpel, style, ovary, dispersal 	<ul style="list-style-type: none"> Compare the life cycles of mammals, marsupials and monotremes. Describe the changes as humans develop to old age. <p>Children will build on knowledge from:</p> <ul style="list-style-type: none"> KS1 where they identify habitats and how animals and plants are suited to them. <p>Children will build on this knowledge in:</p> <ul style="list-style-type: none"> KS2 where they will: classify animals based on their common observable characteristics, identify how animals are adapted to the environments they live in and how changing environments pose a threat to living things. <p>Children learn the following vocabulary:</p> <ul style="list-style-type: none"> Vertebrates, invertebrates, complete metamorphism, incomplete metamorphism, mammal, monotreme, marsupial, amphibian, reptile, insect, sexual reproduction, pollination, fertilisation, gestation, breed, migrate, habitats, chrysalis, nymph, exoskeleton, moulting, placental, pupa, larvae, cocoon, predators, tadpoles, gills, lungs, froglet, breeding, pouch,
<p>Summer 1: Sound <i>Comparison, Cause and Effect</i></p>	<p>Summer 2: Electricity <i>Comparison</i></p>
<p>Knowledge children will learn:</p> <ul style="list-style-type: none"> Sounds are made when objects vibrate. The vibration makes the air particles around the object vibrate and move air particles until the vibrations reach the ear. The pitch of a sound tells us if it is a high or low sound. The faster the vibrations of the air particles, the higher the pitch of the sound, the slower the vibrations, the lower the pitch of the sound. Sound can travel through solids and liquids as well as gases. Sound needs a medium to travel though. Sound travels quickest through a solid. This is because of the particle structure of solids. Sound needs a medium to move; therefore, sound cannot travel in space or vacuums. 	<p>Knowledge children will learn:</p> <ul style="list-style-type: none"> Electric current is the flow of electrons from atom to atom. Atoms are made up of a nucleus (protons and neutrons) and electrons which move around the centre of an atom. Metal wires create a path for electrons to follow and the electric current to move along. Electrical current can flow through some materials but not all materials. Materials which electricity can flow through are called conductors and materials which electricity cannot flow through are called insulators. Current is the steady flow of electrons. This is measured in amps. Voltage measures the “push” of electrical current and is measured in volts (V). The greater the voltage, the more the current will flow. The

- Sound gets quieter as the distance between a source and the ear increases. This is because the vibrations have further to travel and as they spread out the vibrations become smaller and smaller thus the sound becomes quieter and quieter.
- Amplitude is the measurement of how loud or quiet a sound is. Sound is measured in decibels. The louder the sound, the greater the volume, the stronger the vibrations that are produced.

Skills children will gain:

- Use instruments to explain how sounds are made and travel.
- Label how sounds are made through vibrating parts.
- Investigate patterns between features of an object and pitch.
- Make pan pipes and use glass jars to create different pitches.
- Explore how sound travels through solids, liquids, and gases.
- Investigate and understand why sounds grow fainter as distance increases. Demonstrate that sound travels quickest through a solid using string telephones.
- Find patterns between the volume of a sound and the strength of the vibrations that it produced.

Children will build on knowledge from:

- KS1 where they will use musical instruments to explore sound, pitch, tempo and volume.

Children will build on this knowledge in:

- KS2 where they will: learn about the states of matter and vacuums (Earth and Space).

Children learn the following vocabulary:

- Decibel, pitch, volume, sound wave, vibrate, amplitude, molecules, particles, solid, liquid, gas, space, vacuum, absorb, tuning, medium,

higher the voltage in a circuit, the brighter the bulb will be.

Skills children will gain:

- Build and draw simple circuits using wires, cells, switches, buzzers, bulbs, and motors.
- Explore whether different materials will work as part of a circuit and conclude which materials are conductors or insulators of electricity.
- Investigate what happens when more voltage or more appliances are added to a simple circuit. Make conclusions about the voltage of a circuit and the brightness of a bulb.

Children will build on knowledge from:

- KS1 where they learn how to keep safe around electrical appliances.

Children will build on this knowledge in:

- KS2 where they will: draw circuit diagrams, investigate switches, complete and incomplete circuits.

Children learn the following vocabulary:

- Series, circuit, parallel, motor, buzzer, bulb, switches, current, voltage, cells, batteries, symbols, brightness, components, electrons, atoms, protons, nucleus, neutrons, insulation,

Year B	Autumn 1: States of Matter <i>Comparison, Changes,</i>	Autumn 2: Earth and Space <i>Changes, Cause and Effect</i>
	<p>Knowledge children will learn:</p> <ul style="list-style-type: none"> • There are three key states of matter: solids, liquids, and gases. The differences between solids, liquids and gases are determined by the position of the particles and strength of the bonds in a substance. • Some solids can turn into a liquid if they are heated. This process is called melting. Not all solids melt: some solids will turn straight into a gases state in a process called sublimation. Some liquids can turn into a solid if we cool them. This process is called freezing (but this does not have to happen at a sub-zero temperature). Some solids can be turned into liquids and then back into solids: this is a reversible change. • A liquid can become a gas by being heated too. This process is called evaporation. Similarly, a gas can become a liquid by being cooled. This process is called condensation. This too can be a reversible change. • We can describe liquids in terms of their viscosity. Some liquids flow easily and have a low viscosity; other liquids are thick and have a high viscosity. Some materials, like oobleck, are classified as a non-Newtonian liquid. • Particles in a substance stay the same even during a change of state; this means the mass of a substance stays the same during a change of state. Atoms and particles are not destroyed during a change of state; this is called the conservation of mass. As a result, it does not matter if a substance melts, freezes, evaporates, condenses, or sublimates, the mass will not change. <p>Skills children will gain:</p> <ul style="list-style-type: none"> • Compare and classify materials into solids, liquids and gases • Describe, using diagrams, the particle structure of solids, liquids and gases • Observe and explain how melting and cooling can turn solids into liquids which can be a reversible change • Plan an investigation into the viscosity of different liquids. 	<p>Knowledge children will learn:</p> <ul style="list-style-type: none"> • The Earth’s anti-clockwise rotation on its axis creates day and night; the tilt of the Earth’s axis creates the four seasons in the northern and southern hemispheres. The Sun doesn’t move; the Earth spins on its axis which makes it appear to move. • Since the Earth spins on its axis, light from the Sun falls on different parts of the Earth causing day and night. Because the Earth is roughly spherical, half of the planet is in sunlight at any one time. A day on earth lasts 24 hours because that is the amount of time it takes for the earth to rotate once around its axis. Different planets in our solar system spin at different rates therefore the length of their days differ. • Different parts of Earth experience daylight at different times, this is the reason we have time zones; throughout the year we also experience a different amount of daylight hours. Because of the Earth’s tilt, the poles experience 24 hours daylight in the summer and very few hours daylight in the winter. • The Sun is the biggest body in the solar system; it is approximately 100 times bigger than the Earth. The sun is a star. It is the nearest start to Earth and the only one visible during the day. The Earth rotates around the sun along a circular path known as its orbit. This takes the earth one year, or 365 $\frac{1}{4}$ days, to complete. • The moon is a natural satellite and celestial body which orbits the Earth. It takes 28 days for the moon to orbit Earth completely. The moon is not a source of light: the sun lights up the side of the moon which it faces towards. How much of the light side we can see depends on the angle at which we view the moon; the angle changes as the moon orbits the Earth so the moon changes over 28 days. • The planets, starting with the one closest to the Sun: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus then Neptune. Pluto is not a planet. <p>Skills children will gain:</p> <ul style="list-style-type: none"> • Identify and describe planets within our solar system

<ul style="list-style-type: none"> Explore the conservation of mass. <p>Children will build on knowledge from:</p> <ul style="list-style-type: none"> KS1 where they investigated the properties and uses of everyday materials. <p>Children will build on this knowledge in:</p> <ul style="list-style-type: none"> KS2 where they will: apply their knowledge of states of matter to learn about the water cycle; study liquids further and investigate dissolving; and compare reversible and irreversible changes. <p>Children learn the following vocabulary:</p> <ul style="list-style-type: none"> Solid, liquid, gas, particles, bonds, substance, non-Newtonian liquid, force, gravity, random, vibrate, reversible, sublimation, melting, freezing, reversible, irreversible, evaporation, condensing, vapour, viscosity, conservation, mass, viscous, 	<ul style="list-style-type: none"> Compare orbits, rotations and lengths of days and years on planets Describe the movement of the Earth and planets, relative to the Sun Explain day, night and the movement of the sun across the sky Investigate how the sun’s movement changes shadows Describe the moon’s movement, relative to the Earth Understand why the moon appears differently throughout a month <p>Children will build on knowledge from:</p> <ul style="list-style-type: none"> KS1 where they studied planet earth and the introduction to the solar system. <p>Children will build on this knowledge in:</p> <ul style="list-style-type: none"> KS2 where they will: learn about shadows and light. <p>Children learn the following vocabulary:</p> <ul style="list-style-type: none"> Axis, rotation, tilt, planet, orbit, hemispheres, spherical, satellite, celestial body, angle, new moon, waxing crescent, first quarter, waxing gibbous, full moon, waning gibbous, third quarter, waning crescent, matter, phase
<p>Spring 1: Animals including humans <i>Cause and Effect</i></p>	<p>Spring 2: Plants <i>Comparison</i></p>
<p>Knowledge children will learn:</p> <ul style="list-style-type: none"> Humans are vertebrates with endoskeletons; we have spines and our skeleton grows with our body. The bones of our skeleton meet at places called joints. Without joints, and muscles, we wouldn’t be able to move or bend. There are four types of joint: pivot joints, hinge joints, ball and socket joints and gliding joints. The body has several organ systems: nervous system, respiratory system, circulatory system, digestive system etc. The major organs of the body are: brain, lungs, liver, stomach, kidneys, heart, skin. The circulatory system is made up of the heart, lungs and blood vessels. There are three types of blood vessel: arteries, veins and capillaries. The lungs 	<p>Knowledge children will learn:</p> <ul style="list-style-type: none"> The two main groups of plants are flowering and non-flowering. Flowering plants all have roots, a stem or trunk, leaves and grow flowers or fruit. Each part of the plant has its own role for survival. To grow, plants need the right surroundings. Most plants need air, light, water, nutrients from soil, oxygen from the air, the correct temperature and room to grow sufficiently. Flowering plants have both the male and female parts required for sexual reproduction, or pollination and fertilisation: petals, stigma, ovary, style, anther, filament, ovary. A seed contains everything a new plant needs to start growing. It contains a young plant embryo and a store of food (because until the plant as sprouted it cannot use photosynthesis to produce its own

- The heart is a muscular organ that pumps blood around the circulatory system and is made up of four chambers: the right atrium, the right ventricle, the left atrium and the left ventricle. The atria (right and left atrium) collect blood and pump them into the ventricles below. The ventricles then pump the blood to the body. Humans have a double circulatory system which means blood passes through the heart twice on each loop around the body: it travels from the heart to the lungs to the heart to the rest of the body before returning to the heart.
- Arteries carry oxygenated blood away from the heart to the rest of the body straight after it has been pumped; veins carry deoxygenated blood back to the heart where it will be pumped to the lungs.
- Carbon dioxide and oxygen (as well as nutrients) are exchanged through capillaries. Capillaries are tiny blood vessels which carry oxygen and glucose to the cells in your body.

Skills children will gain:

- Describe the different types of joints found in the human body.
- Name the major organs of the body and describe their functions.
- Identify the parts of the circulatory system.
- Describe how the circulatory system sends blood and oxygen around the body.

Children will build on knowledge from:

- KS1 where they will identify organs of the body.

Children will build on this knowledge in:

- KS2 where they will: learn about teeth, nutrients and the digestive system.

Children learn the following vocabulary:

- Vertebrates, endoskeleton, joints, pivot, gliding, ball and socket, gliding, organs, circulatory, oxygenated, deoxygenated, veins, blood vessels, capillaries, nutrients, oxygen, carbon dioxide, exchange, pumped, atrium, ventricle, muscular,

food). After a plant has been pollinated, a new seed will start to develop from the ovule in the ovary. At this point, the flower usually starts to die and the petals fall off leaving behind a fruit with the new seeds inside.

- For seeds to have the best chance of growing, they need to be transported away from the plant that produced it, otherwise it will be in competition with the original plant for light, water and nutrients. This is called seed dispersal.
- Seeds can be dispersed in several ways. Some seeds, like conkers, just fall to the ground due to gravity. Other seeds are transported by the wind. These seeds are shaped to float or glide through the air easily. Some plants produce fruits to enclose their seeds. These fruits attract animals to eat them. The seeds cannot be digested: once digested, the seeds return to the ground. Other plants produce fruits or seeds which get easily caught on passing animals and are dispersed on an animal's journey. Some seed pods dry out and then burst open on hot days firing the seeds out into the environment. Some plants use water to disperse their seeds and they travel hundreds of miles.

Skills children will gain:

- Identify and compare the requirements of plants for life and growth
- Investigate the requirements of growth for a plant
- Describe the functions of different parts of flowering plants
- Explain how seeds are formed
- Identify different ways seeds can be dispersed by plants

Children will build on knowledge from:

- KS1 where they will identify features of plants and trees and learn about what plants need to survive.

Children will build on this knowledge in:

- KS2 where they will: learn about sexual and asexual reproduction in plants, understand the processes of transpiration, photosynthesis and germination in plants, and classify different plants.

	<p>Children learn the following vocabulary:</p> <ul style="list-style-type: none"> Requirements, light, temperature, carbon dioxide, oxygen, survival, nutrients, photosynthesis, petals, stigma, ovary, style, anther, filament, ovary, germination, fertilisation, formation, dispersal,
<p>Summer 1: Living things and their habitats <i>Comparison</i></p>	<p>Summer 2: Evolution and Inheritance <i>Changes, Comparison</i></p>
<p>Knowledge children will learn:</p> <ul style="list-style-type: none"> All living things, or organisms, must do 7 life processes to stay alive: movement, respiration, sensitivity, growth, reproduction, excretion, and nutrition. Animals are grouped by the similar characteristics. The basic classification is between vertebrates and invertebrates. Vertebrates have a backbone and spinal column and invertebrates do not. All vertebrates have an endoskeleton. Vertebrates have a hard skeleton made of bone that holds their body up and gives them shape. Mammals: warm blooded, young drink mother's milk, have hair or fur, give birth to live young. Amphibians: live on land or in water, lay eggs, have moist skin, webbed feet, cold blooded, have gills. Reptiles: live on land and in water, scales no fur, ear holes instead of ears, dry skin, cold blooded, have lungs and breathe air. Fish: live in water, fins not legs, gills instead of lungs, breathe underwater, lay eggs in water, cold blooded. Birds: have beaks, wings, feathers, 2 legs, warm blooded. The invertebrates are classified into 6 groups: annelids, cnidaria, echinoderms, molluscs, and arthropods. <p>Skills children will gain:</p> <ul style="list-style-type: none"> Identify the seven life processes of all living things. Identify similarities and differences between living things, micro-organisms, plants and animals Group living things in a variety of ways; classify animals into different groups Use classification keys to sort living things Create classification keys to identify living things based on their characteristics 	<p>Knowledge children will learn:</p> <ul style="list-style-type: none"> Living things are adapted to their habitats. This means they have special features to help them in their survival. An elephant has large ears to cool themselves down in the African heat; a polar bear has thick fur and a layer of fat to keep them warm. Since life on Earth began, tiny organisms, plants and animals have been changing slowly over millions of years because of evolution. Evolution is the process of adaptation over a long period of time. This process, where certain inherited and adaptive traits allow animals to live whilst others become extinct is called natural selection. Over many generations, a species will adapt to its environment because the animals with the most successful characteristics are more likely to survive and pass on traits. No living thing changes deliberately to adapt to an environment. We only see animals (for example, the fish) as it is now, not those similar with adaptations that made it harder to live because they have become extinct. Evolution is a gradual change over time caused by natural selection. Examples with camouflage frogs; the peppered moths during industrial revolution and Darwin's finches. Charles Darwin was one of the first scientists to realise that animals who looked slightly different had descended from a common ancestor. He called it the principle of evolution. Darwin's great 'eureka moment' came from observing different species of birds in the Galapagos Islands. The birds all looked slightly different and had slightly different adaptations because the environments on each island were slightly different. <p>Skills children will gain:</p> <ul style="list-style-type: none"> Identify how animals are adapted to suit their environments

<p>Children will build on knowledge from:</p> <ul style="list-style-type: none"> • KS1 where they grouped animals based on their features and habitats and identified the senses. <p>Children will build on this knowledge in:</p> <ul style="list-style-type: none"> • KS2 where they will: identify life cycles for humans, mammals (including marsupials and monotremes), amphibians, insects; identify an animals adaptations and suitability to different habitats; learn about Darwin’s theory of evolution and natural selection. <p>Children learn the following vocabulary:</p> <ul style="list-style-type: none"> • Living thing, organism, life process, respiration, excretion, movement, sensitivity, nutrition, reproduction, similarities, differences, classify, vertebrates, invertebrates, spinal column, skeleton, annelids, cnidaria, echinoderms, molluscs, arthropods, mammals, reptiles, fish, birds, amphibians, gills, 	<ul style="list-style-type: none"> • Identify selective pressures and favourable traits in habitats • Understand that evolution is the process of adaptation over a long period of time • Describe how environmental pressures can cause natural selection • Explain Darwin’s theory of evolution <p>Children will build on knowledge from:</p> <ul style="list-style-type: none"> • KS1 where they grouped animals based on their features <p>Children will build on this knowledge in:</p> <ul style="list-style-type: none"> • KS2 where they will: evolution of man, inheritance, and inherited characteristics <p>Children learn the following vocabulary:</p> <ul style="list-style-type: none"> • Adapt, adaptive, trait, characteristic, habitat, survival, evolution, environment, extinct, gradual, natural selection, selective pressure, camouflage, suitable, environmental change, principle of evolution, favourable trait, development, descended, observable
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Year C	Autumn 1: Rocks <i>Comparison, Cause and Effect</i>	Autumn 2: Light <i>Changes</i>
	<p>Knowledge children will learn:</p> <ul style="list-style-type: none"> • There are three types of rock: sedimentary, igneous, and metamorphic rock which can be distinguished by their properties. • Sedimentary rocks are formed by pieces of stone, grains, sand, and sediment being compressed over time. Rivers transport sediment until it ends up at the bottom of the sea – deposition. Deposited rock builds up in layers in a process called sedimentation. Over time the weight of the layers puts more pressure on the sediment, and it is compacted together. As the pressure builds up, water is squeezed out from between the pieces of rocks and cementation occurs. This process eventually makes sedimentary rock over millions of years. The layers in sedimentary rock are called strata. Sedimentary rock can also tell us about the Earth’s surface millions of years ago: sedimentary rock in the Rocky Mountains tells us that millions of years ago the area was submerged by water. • All rocks on earth were originally igneous in nature: all rock originates from cooling lava. Igneous rocks form as lava cools. There are many type of igneous rocks depending on the way the lava cools. All rocks are made from one or more mineral. In a rock, the minerals are solid; however, in magma they have melted but remain stick together. When magma cools, the minerals start to form solid pieces of crystal. The slower the magma cools, the larger the crystals. There are two types of igneous rock: intrusive and extrusive. Intrusive igneous rocks form underground where magma intrudes, or pushes, into other rocks. These rocks have larger crystals. Extrusive igneous rocks are rocks which form when the pressure pushes magma out of the earth’s surface and the lava cools quickly. These rocks have smaller crystals. • Metamorphic is formed from sedimentary or igneous rock. It forms deep within the earth when heat or pressure changes the structure of a rock. Rocks are constantly turning from one type of rock to another in an endless loop known as the rock cycle. 	<p>Knowledge children will learn:</p> <ul style="list-style-type: none"> • The sun, fires, lamps and torches are all sources of light – this means they produce their own light. Other materials reflect light. Mirrors, glass, smooth shiny surfaces and polished metal reflect light. The moon is not a source of light; the moon reflects light. • Light waves travel out from sources of light in straight lines which we call rays or beams of light. Rays of light reflect off an object and then travel into our eyes. These reflections allow us to see. • Reflection is when light bounces off a surface. When a ray of light reflects off a surface it changes direction. A light ray that hits an object is called the incident ray and the light ray that bounces off the object is called the reflected ray. The law of reflection says that the angle of incidence is always equal to the angle of reflection. • Light travels at different speeds when the beams go through transparent materials such as water and glass. This causes the light to change direction and bend. Refraction creates illusions which is why a straw in a glass of water will look broken or distorted. • In 1666, Sir Isaac Newton made a discovery about light that led him to develop his theory of colour. When he put a prism in front of a ray of light, the light refracts, and colours are visible. This is called the visible spectrum. Although it looks like it is white, light is made up of all colours of the rainbow. Each colour has a different wavelength so when the white light passes through the prism the colours refract at different angles to separate. Red has the shortest wavelength; violet has the longest wavelength. When a ray of white light shines on an object it absorbs some of the colours and reflects others. • Shadows are formed when opaque objects block a ray of light. A shadow is always the same shape as the object that casts it. This is because an object is in the path of the light rays and blocks only the light rays, they meet the object. <p>Skills children will gain:</p>

<p>Skills children will gain:</p> <ul style="list-style-type: none"> • Observe, classify, and test the properties of different rocks • Create examples of sedimentary rocks to identify the processes of sedimentation, compaction, cementation and create strata. • Describe how different types of igneous rocks are formed. Identify different igneous rocks based on their properties. • Explain how metamorphic rocks are formed. • Describe the processes of the rock cycle. <p>Children will build on knowledge from:</p> <ul style="list-style-type: none"> • KS1 where they will describe the properties of different rocks in science and learn about mountains formation and volcanoes in geography. <p>Children learn the following vocabulary:</p> <ul style="list-style-type: none"> • Sedimentary, igneous, metamorphic, stone, grains, crystal, geologist, sediment, deposition, strata, pressure, deposition, sedimentation, cementation, mineral, submerged, magma, lava, intrusive, extrusive, 	<ul style="list-style-type: none"> • Explain how light is necessary for our eyes to see. • Investigate, using materials and torches, how light travels through materials and creates shadows • Explore how light can be refracted to distort images. • Draw diagrams to show incident and reflected rays of light • Use prisms to create the visible spectrum • Investigate the properties of shadows by completing a fair test <p>Children will build on knowledge from:</p> <ul style="list-style-type: none"> • KS1 where they identified properties of materials including transparency, translucency and if a material was opaque. • KS2 where they studied space, the sun, stars and the moon. <p>Children learn the following vocabulary:</p> <ul style="list-style-type: none"> • Source, reflect, refract, rays, beams, shadow, incident, reflected, illusion, transparent, opaque, translucent, distorted, colours, visible spectrum, wavelength, shadows,
<p>Spring 1: Animals including humans (Food) <i>Cause and Effect</i></p>	<p>Spring 2: Properties and changes in materials <i>Changes, Cause and Effect</i></p>
<p>Knowledge children will learn:</p> <ul style="list-style-type: none"> • Humans have different types of teeth: incisors, canines and molars. Incisors are shovel shaped and help you bite off and chew pieces of food. Canines are used to tear or rip food. Molars help you crush and grind food. Humans have 8 incisors, 4 in the upper jaw and 4 in the lower jaw. Children lose their milk, or baby teeth, and they are replaced with adult teeth. Wisdom teeth come through later. • When we eat and drink, a substance called plaque builds up on our teeth. This used food and drink to make acid which attacks the outer layers of dentine and enamel on our teeth. Over time, cavities can form. Many common drinks can damage the enamel of our teeth. 	<p>Knowledge children will learn:</p> <ul style="list-style-type: none"> • Some substances dissolve when you mix them with water. When a substance dissolves, it might look like it has disappeared, but in fact it has just mixed with the water to make a transparent (see-through) liquid called a solution. Substances that dissolve in water are called soluble substances. When you mix sugar with water, the sugar dissolves to make a transparent solution. We call the liquid the solvent, the substance the solute and the combination the solution. • Substances that do not dissolve in water are called insoluble substances. When you mix sand or flour with water, they do not dissolve. • If we add an insoluble solid to a liquid, it becomes a suspension. The solid is suspended in the liquid and cannot dissolve.

- Animals that only eat plants are called herbivores; animals that eat only meat are called carnivores; animals that eat both meat and plants are called omnivores.
- A food chain shows a group of plants and animals that are connected because they are eaten by each other. Food chains show how animals depend on each other to stay alive.
- The arrows in a food chain show the transfer of energy. Food chains begin with a green plant called a producer. Plants are called producers because they produce their own food through photosynthesis and get their energy from the sun. Animals are consumers because they consume their food by eating plants or animals. Animals that eat each other are called predators. The animals that they eat are called prey.
- Food chains have producers, primary consumers, secondary consumers and tertiary consumers (quaternary consumers, etc); a food web is a series of food chains all connected to each other.
- Scavengers are animals that eat the dead or rotting flesh of animals; detritivores are organisms that eat non-living plant and animal remains; decomposers are organisms which turn organic waste into nutrient rich soil.

Skills children will gain:

- Identify the types and uses of different teeth.
- Devise a fair test to identify the liquids which cause the most damage to tooth enamel.
- Understand how to keep teeth healthy.
- Identify examples of nutritious and unhealthy food chains for humans.
- Construct food chains and webs identifying producers, consumers, and the transfer of energy.

Children will build on knowledge from:

- KS1 where they classified animals as herbivores, omnivores and carnivores and constructed simple examples of food chains.

- A solution is when a solute has dissolved in a liquid; for example, sea water and a cup of tea are solutions. We can recover the solute using evaporation; other filtration methods will not work for solutions.
- In hot water, molecules are moving around more, so there are more collisions between the water molecules and a solid therefore it is a better solvent for dissolving.
- Mixtures can be separated by methods like sieving, filtering and evaporating. A mixture is a substance in which two or more substances are mixed but not chemically joined together. A mixture made of solid particles of different sizes, for example sand and gravel, can be separated by sieving. You can separate a mixture of sand and water by passing it through a piece of filter paper. You can separate a solute from the water again by boiling the solution or leaving it for the water to evaporate. We can separate magnetic objects from a mixture using magnetism.

Skills children will gain:

- Observe the effects of different materials being added to a solute to create solutions and suspensions
- Make predictions about the solubility of different materials
- Investigate if temperature effects rates of dissolving
- Use evaporation to recover dissolved substances
- Use sieving, magnetism, filtration to separate mixtures.

Children will build on knowledge from:

- KS1 where they will study the properties of different materials.

Children will build on this knowledge in:

- KS2 where they will: identify reversible and irreversible changes, group materials based on their properties, choose materials based on their suitability; identify solids, liquids and gases and changes in state; learn about the processes of the water cycle and investigate evaporation

Children learn the following vocabulary:

<p>Children will build on this knowledge in:</p> <ul style="list-style-type: none"> • KS2 where they will: group and classify different animals based on their observable characteristics, learn about the human digestive system and how nutrients are transported around the body, photosynthesis in plants <p>Children learn the following vocabulary:</p> <ul style="list-style-type: none"> • Incisors, canines, molars, milk teeth, wisdom teeth, enamel, dentine, erosion, cavities, plaque, carnivores, omnivores, herbivores, producer, consumer, primary, secondary, tertiary, food chain, food web, transfer, organism, scavenger, detritivore, decomposer, 	<ul style="list-style-type: none"> • Substance, solid, liquid, solution, dissolve, suspension, solute, solvent, insoluble, soluble, filtration, reversible, evaporation, sieving, magnetism, boiling, solubility, mixture, chemically joined, molecules
<p>Summer 1: Plants <i>Comparison</i></p>	<p>Summer 2: Living things and their habitats <i>Changes</i></p>
<p>Knowledge children will learn:</p> <ul style="list-style-type: none"> • Plants can be sorted into four categories: those with seeds, those without seeds, those which flower, conifers, ferns and mosses. Flowering plants use flowers to reproduce and make baby versions of themselves. Trees are flowering plants too: they make fruit in the same way that small flowers do. Other plants which have seeds are conifers; however, these do not flower. Instead of leaves, conifers have needles and they keep their seeds safe inside a hard cone. There are also some plants that don't produce seeds: ferns and mosses. These plants produce spores instead. Mosses don't look like flowering plants; they don't have a stem, or roots of leaves. • Plants have evolved with some ingenious ways of surviving and thriving in the habitats where they grow. Plants have adapted to survive in mountainous climates, rainforests, deserts and areas of permafrost. Unlike other prey, plants can't defend themselves by running away if a creature wants to eat it; but, there are adaptations that plants have developed to defend themselves. • Plants can make other plants – reproduce – in two different ways. Asexual reproduction, also called cloning – where exact replica plants are made -, or pollination can occur (sexual reproduction). Because there is only one parent plant there is no fusion of male and female 	<p>Knowledge children will learn:</p> <ul style="list-style-type: none"> • An environment is the surroundings of any living thing, including plants, animals and people; animals live in different habitats around the world. Our environments are always changing. Sometimes these changes are natural and can't be avoided, but humans are also causing some changes that aren't good for the planet. • Melting ice caps mean less hunting for polar bears, busy beaches and littering mean unsafe hatching environments for baby turtles and more extreme weather patterns change temperatures for hibernation. • Deforestation occurs when trees are cut down across a wide area which is then permanently cleared for another use. Every 20 minutes, an area of rainforest the size of 20 football pitches is cut down. If this rate continues, there will be no rainforests in 100 years. • Urbanisation means that there are more and more people living in urban areas, rather than in rural areas. This means that more houses and roads are being built on land that was once untouched. • The world is getting warmer because we are burning more fossil fuels releasing greenhouse gases. This is also called climate change. Polar bears hunt from the sea ice, less sea ice means a smaller area for hunting. There are approximately only 20000 left in the wild.

gametes; therefore, there is no mixing of genetic information. The new plants are identical to the parent plant - they are clones.

- Plants that use asexual reproduction produce side branches or runners with new plantlets on. The roots of each plantlet will grow down to form new plants that are identical to the parent.
- For sexual reproduction of plants, a plant is pollinated and subsequently fertilised. There are a few ways in which this pollination can occur the most prominent being by insects. Insects don't pollinate on purpose; it just happens as they fly around collecting nectar from flowers. Pollen, from the anther of a flowering plant, travels from an insect to the stigma and down the style of a flower. Here it meets and fertilises the ovules.
- The bird's foot trefoil and bee orchid grow in our local area. And are the food source for the cinnabar moth.

Skills children will gain:

- Identify and sort plants into different categories based on their characteristics
- Recognise ways in which plants have adapted to their habitats
- Describe ways plants have adapted to defend themselves
- Identify the parts and functions of flowering plants
- Understand how plants use pollination for sexual reproduction
- Describe how plants can use asexual reproduction to create new plants

Children will build on knowledge from:

- KS1 where they identify the features of plants and trees

Children will build on this knowledge in:

- KS2 where they will: understand the processes of transpiration, germination, photosynthesis, seed formation and dispersal in plants, learn about adaptations and evolution in animals.

Children learn the following vocabulary:

- Farming is getting more and more intense as the demand for food by a growing population increase. Wildflowers are important for the natural cycle of bees. These pollinators encourage a diversity of plants which provide food and homes for many insects, birds and animals.
- As these habitats change, animals are becoming endangered or extinct because of their habitats being destroyed. A fall in one animal's population can have an impact on every part of a food chain or web.
- The little tern's local habitat can be damaged by visitors to the beach in the local area.

Skills children will gain:

- Identify the habitats of animals, including endangered animals, around the world.
- Recognise why habitats are changing
- Understand how changing habitats can pose dangers to living things
- Identify ways which humans can conserve environments for living things

Children will build on knowledge from:

- KS1 where they will group animals based on their characteristics and identify how animals and plants are suited to their habitats

Children will build on this knowledge in:

- KS2 where they will: classify animals based on their observable characteristics, construct food chains and webs and identify life cycles of different animals.

Children learn the following vocabulary:

- Environment, habitat, adapt, hibernation, deforestation, urbanisation, climate change, greenhouse gases, population, diversity, extinct, endangered, conserve, conservation

	<ul style="list-style-type: none"> • Seeds, flower, conifers, ferns, mosses, flowering, reproduce, spores, habitats, evolving, adaptation, prey, defence, climates, cloning, asexual, sexual, exact replica, pollination, fertilisation, anther, stigma, stamen, filament, carpel, roots, petals, style, ovary, ovules, 	
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Year D	Autumn 1: Electricity <i>Cause and Effect</i>	Autumn 2: States of Matter <i>Changes, Cause and Effect</i>
	<p>Knowledge children will learn:</p> <ul style="list-style-type: none"> • Electric current can move around a circuit and do many things: it can make things light up, heat up, move or make a noise. To create a circuit you need a power source, wires and an appliance. • Batteries or cells (a battery is a scientific name for a collection of cells) convert electrical energy into mechanical energy. Electrons flow out of the negative terminal of the battery and around the electrical circuit, allowing the other components to function. • Wires consist of two parts - a metal core and an outer coating. The inner core is made of metal wire, which conducts electricity, while the coating is made from an insulating material such as plastic. • When electricity passes through the filament, energy is released in the form of light (and heat). The filament is covered by a transparent glass bulb, which allows the light to pass through it. • Motors convert electrical power into mechanical power (movement). They work by using electromagnets (magnets which are powered by electricity) to move a magnetic rotor around an axis. • To build a circuit that works it must be complete. A complete circuit must have a power supply (this could be mains or battery). Electric current will only flow around a complete circuit with no gaps. For a circuit to be complete there must be wires connected to both the positive and negative ends of the power supply. If this is not the case the circuit is referred to as incomplete. • There are several practical problems with using complete circuits in everyday life. Switches allow a circuit to be opened or closed. They work by bridging a gap in the circuit. When the switch is open, electricity cannot flow around the circuit and the components cannot function. When the switch is closed, the circuit is completed, and 	<p>Knowledge children will learn:</p> <ul style="list-style-type: none"> • Water is a liquid which flows around the world in a continuous process known as the water cycle. It is recycled again and again; this process is called the water cycle. • The particles in a liquid are arranged in a random order, close together. Unlike a solid, the particles in a liquid can move over and around each other. In a solid, the particles are arranged in neat rows and can only vibrate on the spot. In a gas, the particles have weak bonds and can spread out. • A liquid can become a gas by being heated too. This process is called evaporation. Similarly, a gas can become a liquid by being cooled. This process is called condensation. • Water can be a solid, liquid or a gas. It can be frozen to a solid, ice, and evaporated to a gas, water vapour. When we freeze water, the particles are cooled and move slower and slower until they are arranged in neat rows and can only vibrate on the spot. • Water evaporates into the air. The sun heats up water on land, in rivers, lakes and seas and turns it into water vapour – this happens on the surface – and the water vapour rises into the air. When the sun heats up the water, the particles begin with move over each other quicker and quicker until they can break free. The liquid is now a gas. • Water vapour condenses into clouds. In the air, the water vapour cools down and changes back into tiny drops of liquid water, forming clouds. As the water vapour cools, the particles in the gas begin to slow down until they are closer together and can only move over each other. The gas is now a liquid. • When the clouds get heavy enough the water falls back to the ground in the form of precipitation (rain, snow, sleet).

<p>electricity can flow around it. We use switches to turn devices on and off. A circuit with a switch is not the same as an incomplete circuit. In an incomplete circuit, the electrical current is unable to flow at all.</p> <p>Skills children will gain:</p> <ul style="list-style-type: none"> • Construct complete and incomplete circuits. • Identify complete and incomplete circuits. • Use circuit symbols to draw accurate diagrams. • Create and use switches to build different circuits. • Make predictions about whether appliances will work based on the location of switches. <p>Children will build on knowledge from:</p> <ul style="list-style-type: none"> • KS1 where they will identify common, household appliances that run on electricity. <p>Children will build on this knowledge in:</p> <ul style="list-style-type: none"> • KS2 where they will: understand the flow of electricity, identify conductors and insulators of electricity, investigate how to alter the brightness of a bulb or the volume of a buzzer. <p>Children learn the following vocabulary:</p> <ul style="list-style-type: none"> • Series, circuit, parallel, motor, buzzer, bulb, switches, current, voltage, cells, batteries, symbols, brightness, components, electrons, atoms, protons, nucleus, neutrons, switch, open, close, complete, incomplete, appliance, 	<ul style="list-style-type: none"> • Rainwater runs over the land and collects in lakes or rivers which take it back to the sea and the cycle starts all over again. <p>Skills children will gain:</p> <ul style="list-style-type: none"> • Describe the processes of evaporation and condensation. • Identify and order the processes of the water cycle. • Devise a fair test to investigate if temperature effects the rate of evaporation. • Devise a fair test to investigate if surface area effects the rate of evaporation. • Investigate whether the mass of a block of ice effects how long it takes to melt. <p>Children will build on knowledge from:</p> <ul style="list-style-type: none"> • KS1 where they will observe and study seasonal changes, including water melting, evaporating and turning to snow and ice. <p>Children will build on this knowledge in:</p> <ul style="list-style-type: none"> • KS2 where they will: identify solids, liquids and gases, describe the particle structure of solids, liquids and gases and determine ways of changing state. <p>Children learn the following vocabulary:</p> <ul style="list-style-type: none"> • Solid, liquid, gas, water vapour, water cycle, evaporation, precipitation, rate, particles, vibrate, condenses, climate change, melting, effect,
<p>Spring 1: Properties and changes in materials <i>Comparison</i></p>	<p>Spring 2: Evolution and Inheritance <i>Changes, Cause and Effect</i></p>
<p>Knowledge children will learn:</p> <ul style="list-style-type: none"> • Materials and objects have different properties, and this means that they are suitable or unsuitable for different purposes. Materials can differ in their hardness, solubility, transparency, electrical and thermal conductivity, and their response to magnets. • Heat does not pass through some material such as plastic, oven glove, thermal underwear, cork board and wood. These materials are called 	<p>Knowledge children will learn:</p> <ul style="list-style-type: none"> • Over millions of years, early humans, hominids, have evolved. Homo Sapiens evolved approximately 200,000 years ago and still live today; we are Homo Sapiens. Before them, 200,000 to 35,000 years ago lived the Homo Neanderthals – these people lived through ice ages and the size of their brains tells us they were intelligent.

thermal insulators. Heat loves to travel and will travel from a warmer material to a colder material. The heat will only travel from hot things to colder things and never the other way around. Thermal conductors are materials which allow heat to travel through: metal is a good example. Similarly, electrical conductors allow electric current to pass through; however, electrical insulators do not.

- Some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda.

Skills children will gain:

- Group objects based on their properties and choose appropriate objects for the uses of everyday materials based on their properties.
- Design and complete comparative and fair tests for the uses of everyday materials
- Understand how heat travels through solids, liquids and gases.
- Devise a test to investigate the best thermal conductors
- Identify reversible and irreversible changes
- Use everyday materials to complete reactions and form new materials.

Children will build on knowledge from:

- KS1 where they investigate the suitability of different materials, describe the properties of different materials

Children will build on this knowledge in:

- KS2 where they will: create mixtures, solutions, and suspensions; identify reversible changes and separate mixtures and solutions, identify conductors of electricity, investigate which materials respond to a magnet

Children learn the following vocabulary:

- hardness, solubility, transparency, electrical, thermal, conductivity, conductor, insulator, reversible, irreversible, chemical, reactions,

- Inheritance is where parents pass on characteristics to their offspring. You inherit (are given) key characteristics from your parents such as eye colour, skin colour, height. These characteristics, or traits, are passed down by genes.
- Examples of inherited traits are hair colour, eye colour, blood type, being able to roll your tongue, ear lobe attached/not attached, mouth shape, nose shape, your second toe being longer than your big toe.
- Variation occurs in a species from generation to generation. Although an offspring will have some similar characteristics to its parents, it will also have many different characteristics. This is called variation.
- This is the same for all animals which have two parents. If a Labrador and a Poodle had a litter of puppies, they would be labradoodles and share some characteristics of the mother and some of the father – they will have inherited them.
- But not everything we get from our parents – inheritance refers only to the genes that are passed on.

Skills children will gain:

- Understand the evolution of humans and identify key early humans
- Identify examples of inherited characteristics
- Identify examples of and non-inherited characteristics
- Create family trees to show variation and inherited characteristics

Children will build on knowledge from:

- KS1 where they will look at the life cycle of humans.

Children will build on this knowledge in:

- KS2 where they will: study examples of evolution, Darwin's theory of natural selection and how animals are adapted to their environments, sexual and asexual reproduction of plants and cloning

Children learn the following vocabulary:

- Early human, evolution, hominids, Homo Sapiens, Homo Erectus, Homo Neanderthals, Homo Habilis, cradle of civilisation, inheritance, characteristic, inherited, variation, genes, genetic, environmental

Summer 1: Animals including humans (digestive system)*Cause and Effect***Knowledge children will learn:**

- Nutrients are absorbed into the blood in the small intestine. There are tiny hair-like villi that help the process. Nutrients are then carried around the body to where they are needed by blood cells. From the food we eat, our body absorbs: carbohydrates, proteins and fat. Our food also has fibre, which cannot be broken down or absorbed into the body, and water, minerals and vitamins which are small enough to be absorbed without being digested.
- Digestion is the scientific way our body breaks down food; it describes everything that happens to food once it enters our mouth. The digestive system includes: mouth, salivary glands, oesophagus, stomach, intestines, gall bladder, pancreas, liver, duodenum, rectum and anus.
- Carbohydrates are digested in the mouth, stomach and small intestine. The enzyme carbohydrase breaks starch molecules into sugar molecules. Proteins are digested in the stomach and small intestine. They are broken down by protease into amino acids. Lipase break down fat into fatty acids and glycerol. Bile from the liver helps to break down fat to make it easier for the lipase.

Skills children will gain:

- Identify, name, and describe, the parts of the digestive system
- Describe the process of the digestive system in humans
- Understand how enzymes break down food.
- Describe the nutrients in different food sources and how they are transported in the body

Children will build on knowledge from:

- KS1 where they will identify the organs of the body

Children will build on this knowledge in:

- KS2 where they will: identify human teeth, their differences and uses; identify healthy and unhealthy choices and create food chains;

Summer 2: Forces*Cause and Effect, Challenge***Knowledge children will learn:**

- Whenever an object moves through water it experiences water resistance. This force pushes objects travelling through water back and makes it hard for them to move through the body of water. Just like air resistance, if you go swimming there is friction between you and the water particles. We call it water resistance. In water, long thin objects travel faster because their shape creates less water resistance. A shark is a perfect shape to travel through water!
- In science, machines are anything that can change the size or direction of a force. A simple machine is called a lever. A lever has a fulcrum (pivot) and a bar or a beam. What is needed to be lifted (the load) is on one side and the force needed to do so is placed on the other side. For a lever to work, the beam rotates (turns) along the fulcrum. Levers are useful because they allow humans to lift heavy masses by applying a smaller force. In our body, our joints are levers which can change the direction or strength of a force.
- The measurement from the fulcrum to the weight, multiplied by the mass is known as a moment. If these moments are equal then the beam will be balanced.
- Gears are wheels with teeth which fit together; when gears move a large gear can turn a smaller gear with less force.

Skills children will gain:

- Understand that water resistance is a force which acts, in water, between two moving surfaces
- Describe the effect of water resistance
- Children design and test different shaped objects to observe the effect of water resistance and create a streamlined shape
- Recognise that levers allow for a smaller force to have a greater effect
- Investigate how to balance a beam using moments.

Children will build on knowledge from:

<p>identify the organs of the human body and their purposes</p> <p>Children learn the following vocabulary:</p> <ul style="list-style-type: none">• Nutrients, absorbed, intestines, mouth, salivary glands, oesophagus, stomach, gall bladder, pancreas, liver, duodenum, rectum, anus, enzymes, digested, transported	<ul style="list-style-type: none">• KS1 where they will be introduced to the concepts of push and pull forces. <p>Children will build on this knowledge in:</p> <ul style="list-style-type: none">• KS2 where they will: have learnt about the joints in the human body, studied magnets, forces, friction and air resistance. <p>Children learn the following vocabulary:</p> <ul style="list-style-type: none">• Force, friction, water resistance, streamlined, aerodynamic, lever, fulcrum, rotates, machine, mass, load, weight, Newtons, moment, balance
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