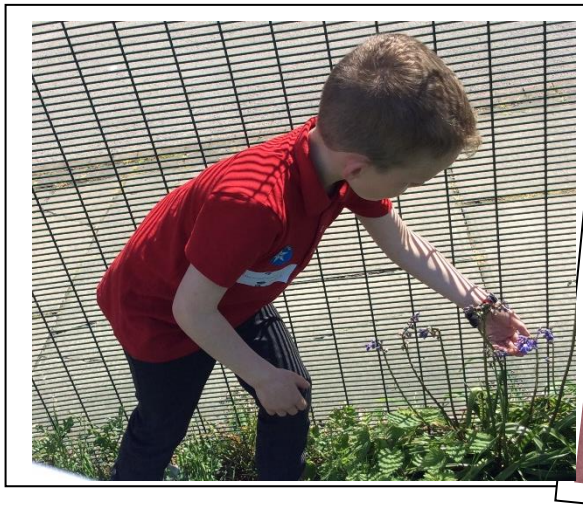
Science

Progression of conceptual knowledge, skills & vocabulary



Year 1 Everyday Materials - Knowledge Autumn 1 & 2

Children will learn:

- Objects are made from different things, called materials, including wood, plastic, metal, glass and rock.
- Materials have properties in common. They can be hard, soft, smooth, rough, stretchy, stiff, flexible (bendy), dull, shiny, waterproof, absorbent, transparent or opaque.
- There are ways of identifying the material from which an object is made, such as looking at it, touching it and tapping it.
- The material from which an object is made has to be suitable for its purpose. For example, a cup or wellies need to be waterproof and a towel needs to be absorbent.
- Materials can be sorted or grouped in line with the material from which they are made or the properties of the material.

Skills:

• Distinguish between an object and the material from which it is made.

• Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock.

• Describe the simple physical properties of a variety of everyday materials.

• Compare and group together a variety of everyday materials on the basis of their simple physical properties.

• Observe closely, using simple equipment, performing simple tests.

• Identify and classify, using their observations and ideas to suggest answers to questions.

• Ask simple questions, recognising that they can be answered in different ways.

Vocabulary

Anchor words	Goldilocks words	Step on words
soft	material	translucent
hard	bendy	transparent
water	dull	opaque
wood	rough	properties
glass	smooth	flexible
metal	stretchy	durable
plastic	fabric	waterproof
strong	shiny	absorbent

Year 1 Animals, Including Humans: Knowledge Spring 1 & 2

Children will learn:

- Animals have different body parts. The main body parts of humans are the head, neck, arms, elbows, legs, knees, face, ears, eyes, hair, mouth and teeth. Each body part has a purpose.
- Senses help us make sense of our world. Our five senses are sight (eyes), smell (nose), taste (mouth/ tongue), hearing (ears) and touch (hand/fingers).
- Animals can be classified or grouped according to features they have in common, such as whether they have wings, legs, fins, scaly skin, hair/fur, whether they lay eggs or give birth to live young and whether they live on land, in water or both. These groups are fish, amphibians, reptiles, birds and mammals.
- Humans are included in the mammal group so humans are classed as animals.
- Animals are also grouped according to what they eat. Herbivores eat plants, carnivores eat meat/ other animals (including insects) and omnivores eat plants and animals.
- Animals adapt to the environment or place in which they live. For example, camels have large feet to walk on deep sand and long eyelashes to protect their eyes from sand.

Skills:

• Identify and name a variety of common animals, such as fish, amphibians, reptiles, birds and mammals.

• Identify and name a variety of common animals that are carnivores, herbivores and omnivores.

• Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets).

• Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.

• Observe closely, using simple equipment, performing simple tests.

• Ask simple questions, recognising that they can be answered in different ways.

• Identify and classify, using their observations and ideas to suggest answers to questions, gathering and recording data to help in answering questions.

Vocabulary

Anchor words	Goldilocks words	Step on words
fish	human	carnivore
bird	sight	herbivore
arm	hearing	omnivore
leg	touch	mammal
skin	smell	reptile
ear	taste	amphibian
eye	sort	classify
nose	group	senses

Year 1 Plants - Knowledge Summer 1

Children will learn:

- Plants are living things which grow. In order for plants to grow well and be healthy, they need water, light, warmth and nutrients (from the soil).
- Plants have different parts such as a stem, leaves, roots and flowers. Trees are also plants with different parts. The trunk of a tree is like the stem of a plant.
- Wild plants, such as daisies, dandelions, buttercups and clover, are plants which grow naturally without being planted by humans.
- Deciduous trees, such as oak, beech, birch, sycamore and horse chestnut trees, lose their leaves in autumn.
- Evergreen trees, such as pine, holly and fir trees, are green all-year and do not lose their leaves.
- Trees and plants can be identified by the shape and colour of their leaves and flowers (if appropriate).

Skills:

- Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees.

- Identify and describe the basic structure of a variety of common flowering plants, including trees.

- Observe closely, using simple equipment, performing simple tests.

- Ask simple questions, recognising that they can be answered in different ways.

- Identify and classify, using their observations and ideas to suggest answers to questions, gathering and recording data to help in answering questions.

Vocabulary

Anchor words	Goldilocks words	Step on words
plant	bulb	common
tree	bud	deciduous
leaf	branches	evergreen
flower	trunk	oak
grow	stem	beech
light	roots	birch
water	petals	holly
seed	blossom	function

Year 1 Seasonal Changes - Knowledge Summer 2 (and ongoing during the year)

Children will learn:

- There are four seasons: autumn, winter, spring and summer.
- The seasons are linked to the Earth's position as it orbits the sun during the year.
- The weather and temperature changes according to the season. In autumn, it becomes cooler and there are more rainy, windy and foggy days. In winter, it becomes much colder. There may be sleet, hail, snow and ice. In spring, the weather starts to become warmer. There are rainy days but also some warm, sunny days. In summer, the weather becomes even warmer. There is less rain and we have more sunny days.
- A thermometer can be used to measure air temperature.
- Different plants grow in different seasons. Many plants start to grow in spring. Deciduous trees lose their leaves in autumn.

Skills:

• Observe changes across the 4 seasons.

• Observe and describe weather associated with the seasons and how day-length varies.

• Observe closely, using simple equipment, performing simple tests.

• Ask simple questions, recognising that they can be answered in different ways.

• Identify and classify, using their observations and ideas to suggest answers to questions, gathering and recording data to help in answering questions.

Vocabulary

Anchor words	Goldilocks words	Step on words
weather	hail	season
sun	sleet	seasonal
rain	foggy	deciduous
snow	misty	evergreen
colder	spring	temperature
hotter	summer	orbit
cooler	autumn	daylight
warmer	winter	varies

Year 2 Living Things and their Habitats (Autumn 1) - Knowledge

Children will learn:

- Objects can be classified by things that are living, dead or have never been alive
- A habitat is an environment where a plant or animal lives
- The five major habitats of the world are: aquatic, desert, forest, grassland and tundra
- A microhabitat is a smaller, different environment found within the existing habitat
- Animals are adapted to survive in their habitat
- Plants and animals depend on each other for survival with animals

Skills:

- Explore and compare the differences between things that are living, dead, and things that have never been alive
- Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other
- Identify and name a variety of plants and animals in their habitats, including microhabitats
- Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food

Vocabulary

Anchor words	Goldilocks words	Step on words
Living	Micro-habitat	Tundra
Dead	Food chain	Aquatic
Alive/Never alive	Predator	Consumer
Habitat	Prey	Producer
Food	Conditions	Carnivore
Sun	Environment	Herbivore
Forest	Desert	Omnivore
Hot/Cold	Grassland	Adaptations

Year 2 Uses of Everyday Materials (Autumn 2) - Knowledge

Children will learn:

- Everday materials include wood, plastic, metal, glass, brick, paper and cardboard
- Different everyday materials are suitable for different purposes according to their properties
- Objects made from some everyday materials can change shape by squashing, bending, stretching and twisting
- Glass is made by heating sand until it is molten and then moulding it into the chosen shape and allowing to cool
- Paper is made by turning wood into 'pulp'
- Recycling is a process enabling some everyday materials to be reused numerous times

Skills:

- Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses
- Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching

Vocabulary

Anchor words	Goldilocks words	Step on words
Hard	Absorbent	Opaque
Smooth	Non-absorbent	Transparent
Bumpy	Flexible	Translucent
See-through	Rigid	Conductor
Squashy	Waterproof	Magnetic
Soft	Brittle	Solid
Bendy	Elastic	Liquid
Shiny	Rough	Gas

Year 2 Animals including Humans (Spring 1) - Knowledge

Children will learn:

- The basic needs for animals, including humans are water, food and air
- Humans and other animals are born, grow and change as they grow up
- Animals have offspring which grow into adults
- Animal offspring have different names to their adult counterparts, for example: cats - kittens, frogs - tadpoles and dogs - puppies
- Some animals, for example butterflies, undergo the process of metamorphosis which changes their form into a completely different one
- The human stages of development are: baby, toddler, child, teenager, adult and elderly person.

Skills:

- Notice that animals, including humans, have offspring which grow into adults
- Find out about and describe the basic needs of animals, including humans, for survival (water, food and air)

Vocabulary

Anchor words	Goldilocks words	Step on words
Grow	Survival	Offspring
Adult	Movement	Reproduce
Water	Reptiles	Metamorphosis
Food	Insects	Vertebrates
Air	Development	Invertebrates
Baby	Mammal	Amphibians
Child	Toddler	Carnivore
Healthy	Elderly	Herbivore

Year 2 Animals including Humans (Spring 2)

Children will learn:

- It is important for humans to eat a balanced diet in order to stay healthy.
- A balanced meal consists mainly of fruit, vegetables and carbohydrates. It includes smaller portions of protein and dairy products and only a little portion of fat or sugar.
- Exercise is important because it helps humans to keep fit and maintain a healthy weight
- Hygiene is important because it keeps us clean and helps to prevent us from getting ill by minimising the spread of germs

Skills:

- Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene

Vocabulary

Anchor words	Goldilocks words	Step on words
Grow	Survival	Bacteria
Healthy	Movement	Hygiene
Unhealthy	Nutrition	Decay
Food	Exercise	Plaque
Air	Development	Circulation
Water	Balanced	Omnivore
Clean	Vitamins	Carnivore
Germs	Minerals	Herbivore

Year 2 Scientists and Inventors (Summer 1) - Knowledge

Children will learn:

- Isaac Newton was a scientist who is famous for developing the law of gravity
- Gravity is the force that pulls objects towards the Earth's surface and stops them from floating around in the air
- Alexander Graham Bell was famous for inventing the first telephone in 1876
- Sound travels by vibrations through different materials. Smaller vibrations produce a quieter sound and larger vibrations produce a louder sound
- Thomas Edison developed and produced a longer lasting electric light bulb in 1879.
- In order for a light bulb to illuminate, a power source is needed along with a complete circuit. If the circuit is broken, the electrical current will not flow and the bulb will not light up

Skills:

- Ask simple questions and recognising that they can be answered in different ways.
- Observe closely, using simple equipment, performing simple tests.
- Identify and classify, using their observations and ideas to suggest answers to questions, gathering and recording data to help in answering questions.

Vocabulary

Anchor words	Goldilocks words	Step on words
Question	Prediction	Enquiry
Answer	Fair test	Hypothesis
Sort	Identify	Interpret
Describe	Data	Classify
Measure	Conclusion	Variables
Plan	Diagram	Observe
Results	Differences	Contrast
Equipment	Similarities	Compare

Year 2 Plants (Summer 2) - Knowledge

Children will learn:

- Plants are classified as living things
- Different seeds grow into different plants. They needed to be planted at different times and looked after in different ways
- Plants also grow from bulbs. Bulbs are larger than seeds because they contain food for the plant
- Some plants get their energy from the sun whereas others need their own source of food. This is because they start growing in the winter months when there is less sun to provide them with an energy source
- Seed dispersal is when seeds from plants are spread out to grow in different places. Some seeds are dispersed by the wind and others by animals
- Germination is when a seed starts to grow and produce shoots
- In order to grow, plants need water, oxygen and a suitable temperature. In addition, they need sunlight to produce a healthy plant
- The life cycle of a flowering plant consists of: germination, growing and flowering, pollination, fertilisation and dispersal.

Skills:

- Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy
- Observe and describe how seeds and bulbs grow into mature plants

Vocabulary

Anchor words	Goldilocks words	Step on words
Plant	Petal	Pollination
Leaf	Bulb	Germination
Root	Nutrients	Fertilize
Seed	Shoot	Deciduous
Light	Suitable	Evergreen
Water	Temperature	Reproduction
Soil	Life cycle	Seed dispersal
Stem	Function	Seed formation

Year 3 Autumn 1 Forces and Magnets - Knowledge

Children will learn:

- A force such as a push, pull, twist or turn, is caused when two objects interact with each other.
- A magnet is an object or device that attracts iron or another magnetic material.
- A magnet has two poles – a north pole and a south pole.
- A magnet can attract (pull towards) or repel (push away) different materials.
- Friction is a force between two surfaces that are sliding, or trying to slide, across each other.
- A compass is a device that aids navigation by pointing to the Earth's North and South poles.

Skills:

• Compare how things move on different surfaces.

• Notice that some forces need contact between 2 objects, but magnetic forces can act at a distance.

• Observe how magnets attract or repel each other and attract some materials and not others.

• Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials.

• Describe magnets as having 2 poles and predict whether 2 magnets will attract or repel each other, depending on which poles are facing.

• Use different types of scientific enquiries and evidence to answer questions.

• With support, set up simple practical enquiries, fair tests, make observations, and take accurate measurements using a range of equipment.

• Gather, record, classify and present data, record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables.

• Report on findings from enquiries, using results to begin to draw simple conclusions, make predictions for new values, and suggest improvements.

Vocabulary

Anchor words	Goldilocks words	Step on words
Pull	Force	Surface
Push	Attract	Compass
North	Friction	Magnetic field
South	Pole	Gravity
Metal	Repel	Iron
Twist	Magnetic	Copper
Slide	Isaac Newton	Newtons
Rub	Contact	Magnetic poles

Year 3 Autumn 2 Rocks - Knowledge

Children will learn:

- Rock is a natural material found in the Earth's crust.
- Mineral is a natural substance that makes up rock.
- Rock is made from one or more minerals.
- An Igneous rock is formed from magma (hot liquid rock).
- Sedimentary rock is made up of lots of layers e.g. limestone.
- Metamorphic rock is sedimentary rock changed by heat or pressure e.g. slate or marble.
- Fossils are the remains or impression of a prehistoric plant or animal.
- Extinct means the plant or animal is no longer alive on Earth or hasn't been seen for over 50 years.
- A palaeontologist is a fossil scientist.

Skills:

• Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties

• Describe in simple terms how fossils are formed when things that have lived are trapped within rock.

• Recognise that soils are made from rocks and organic matter.

• Use different types of scientific enquiries and evidence to answer questions.

• With support, set up simple practical enquiries, fair tests, make observations, and take accurate measurements using a range of equipment.

• Gather, record, classify and present data, record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables.

• Report on findings from enquiries, using results to begin to draw simple conclusions, make predictions for new values, and suggest improvements.

Vocabulary

Anchor words	Goldilocks words	Step on words
Rock	Fossil	Mineral
Soils	Appearance	Igneous
Rough	Crystals	Metamorphic
Smooth	Magma	Sedimentary
Shiny	Extinct	Permeable
Dull	Marble	Impermeable
Sand	Granite	Mineral
Clay	Palaeontologist	Sediment

Year 3 Spring 1 Animals including humans - Knowledge

Children will learn:

- Nutrients are useful substances found in foods.
- Proteins are nutrients found in foods such as fish, and they are used in your body for growth and repair.
- Carbohydrates are nutrients found in sugary or starchy foods such as potatoes and sweets. They give your energy.
- A skeleton supports and protects the body, allowing animals to move.
- An exoskeleton is a skeleton which is outside an animal's body e.g. crabs.
- Muscles are special organs which can contract and make our bodies move.
- Joints are the part of the body where bones meet.

Skills:

• Identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat.

• Identify that humans and some other animals have skeletons and muscles for support, protection and movement.

• Use different types of scientific enquiries and evidence to answer questions.

• With support, set up simple practical enquiries, fair tests, make observations, and take accurate measurements using a range of equipment.

• Gather, record, classify and present data, record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables.

• Report on findings from enquiries, using results to begin to draw simple conclusions, make predictions for new values, and suggest improvements.

Vocabulary

Anchor words	Goldilocks words	Step on words
Healthy	Fats	Nutrients
Grow	Joints	Protein
Skeleton	Contract	Minerals
Energy	Relax	Carbohydrates
Muscles	Organs	Exoskeleton
Bones	Carnivore	Balanced diet
Water	Herbivore	Cartilage
Sugar	Omnivore	Ligaments

Year 3 Spring 2 and Summer 1 Plants - Knowledge

Children will learn:

- The main parts of a flowering plant are; roots, stem, leaves and flowers.
- Roots anchor the plant into the soil and take up water and nutrients.
- The stem holds the plant upright and supports the leaves. Stems also contain tubes that allow water to travel from the roots to the rest of the plant.
- The flower is the part of the plant where seeds are made.
- Leaves catch sunlight and use this to make food.
- Germination is when a seed starts to grow and produces a root and shoot.

Skills:

• Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers.

• Explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant.

• Investigate the way in which water is transported within plants.

• Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.

• Use different types of scientific enquiries and evidence to answer questions.

• With support, set up simple practical enquiries, fair tests, make observations, and take accurate measurements using a range of equipment.

• Gather, record, classify and present data, record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables.

• Report on findings from enquiries, using results to begin to draw simple conclusions, make predictions for new values, and suggest improvements.

Vocabulary

Anchor words	Goldilocks words	Step on words
Observe	Nutrients	Photosynthesis
Measure	Pollination	Evaporates
Enquiry	Reproduction	Ovary
Flower	Seed Dispersal	Sepals
Leaves	Seed Formation	Stamen
Root	Germination	Carpel
Stem	Absorb	Stigma
Light	Transported	Style

Year 3 Summer 2 Light - Knowledge

Children will learn:

- A light source is a place where light originates from (i.e. the sun, lightbulbs, torches etc.).
- We see objects because a light source hits them, is reflected off then travels to our eyes.
- Reflection is the change in direction of light using a shiny surface.
- A mirror is a shiny polished surface that reflects light well.
- A shadow is darkness caused by light being blocked.
- Shadows take the shape of the object being blocked, but they can change size.
- Transparent materials let most or all light through. Translucent materials let some light through. Opaque materials let no light pass through.

Skills:

• Notice that light is reflected from surfaces.

• Recognise that people need light in order to see things and that dark is the absence of light.

• Recognise that light from the sun can be dangerous and that there are ways to protect their eyes.

• Recognise that shadows are formed when the light from a light source is blocked by a solid object.

• Find patterns in the way that the size of shadows change.

• Use different types of scientific enquiries and evidence to answer questions.

• With support, set up simple practical enquiries, fair tests, make observations, and take accurate measurements using a range of equipment.

• Gather, record, classify and present data, record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables.

• Report on findings from enquiries, using results to begin to draw simple conclusions, make predictions for new values, and suggest improvements.

Vocabulary

Anchor words	Goldilocks words	Step on words
Dull	Reflected	Absence of light
Shiny	Light Source	Interpret
Mirror	Natural	Evidence
Shadow	Surface	Artificial
Light	Compare	Solid
Dark	Transparent	Scatter
Blocked	Translucent	Secondary Sources
Sunlight	Opaque	Accurate

Year 4 Autumn 1 - Living Things and their Environments

Knowledge:

Children will learn:

- A habitat is the natural home or environment of a living thing.
- An organism is the scientific name for a living thing.
- Living things move, reproduce, grow, respire, excrete, create or eat food and are sensitive.
- An invertebrate is an animal without a backbone.
- A vertebrate is an animal that has a backbone.
- Animals adapt to suit their habitats.
- Plants need air, light, warmth, water and nutrients to be healthy.
- Plants can be classified into flowering and non-flowering plants.

Skills:

- Recognise that living things can be grouped in a variety of ways
- Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment
- Recognise that environments can change and that this can sometimes pose dangers to living things
- Use different types of scientific enquiries and evidence to answer questions.
- Set up simple practical enquiries, comparative and fair tests, making observations and, taking accurate measurements using a range of equipment
- Gather, record, classify and present data
- Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables
- Report on findings from enquiries, using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions

Vocabulary

Anchor words	Goldilocks words	Step on words
Home	Vertebrate	Respiration
Live	Habitat	Sensitivity
Animal	Invertebrate	Reproduction
Movement	Growth	Excretion
Fish	Reptile	Nutrition
Birds	Mammal	Organism
Insect	Classify	Amphibian
Change	Produce	Adaptation

Year 4 Autumn 2 and Spring 1 - Animals, including Humans

Knowledge:

Children will learn:

- Molars, canines, incisors, premolars and wisdom teeth are all different types of teeth.
- Carnivores tend to have canines because they are good for biting into tough meats.
- Herbivores tend to have molars because they are flat and can grind well, which is what is needed for eating vegetables.
- Fluoride is a chemical that keeps your teeth strong.
- Humans digest food. They have a digestive system that allows food to travel through the body.
- Glands are organs that release fluids to be used in the body.
- Enzymes are molecules which make up cells in the body. They create a chemical reaction which breaks down food to enable it to be digested.

Skills:

- Describe the simple functions of the basic parts of the digestive system in humans
- Identify the different types of teeth in humans and their simple functions
- Construct and interpret a variety of food chains, identifying producers, predators and prey
- Use different types of scientific enquiries and evidence to answer questions
- Set up simple practical enquiries, comparative and fair tests, making observations and, taking accurate measurements using a range of equipment
- Gather, record, classify and present data
- Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables
- Report on findings from enquiries, using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions

Vocabulary

Anchor words	Goldilocks words	Step on words
Animal	Predator	Enamel
Human	Prey	Acidic
Teeth	Incisor	Decay
Tongue	Molar	Fluoride
Gum	Canine	Oesophagus
Toothbrush	Omnivore	Salivary glands
Stomach	Carnivore	Intestine
Food chain	Herbivore	Producer

Year 4 Spring 2 – Sound

Knowledge:

Children will learn:

- Sound travels through the air in waves.
- Sounds are made by air molecules shaking quickly back and forth. This shaking action is known as vibrating. The vibrations then make air molecules further away shake and this continues until the air molecules inside your ear vibrate too. This makes tiny hairs inside your ear wobble. These are connected to nerves under your skin, which send messages to your brain to tell you that you can hear a noise.
- Sounds get quieter as the distance between the sound source and your ear increases.
- Amplitude is a measure of how loud or quiet a sound is.
- Pitch is a measure of how high or low a sound is.

Skills:

- Identify how sounds are made, associating some of them with something vibrating
- Recognise that vibrations from sounds travel through a medium to the ear
- Find patterns between the pitch of a sound and features of the object that produced it
- Find patterns between the volume of a sound and the strength of the vibrations that produced it
- Recognise that sounds get fainter as the distance from the sound source increases
- Use different types of scientific enquiries and evidence to answer questions
- Set up simple practical enquiries, comparative and fair tests, making observations and, taking accurate measurements using a range of equipment
- Gather, record, classify and present data
- Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables
- Report on findings from enquiries, using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions

Vocabulary

Anchor words	Goldilocks words	Step on words
Sound	Pitch	Molecules
Ear	Energy	Particles
Shaking	Nerves	Frequency
Hear	Vibrations	Decibel
High	Volume	Dynamics
Low	Fainter	Amplitude
Loud	Waves	Supersonic
Quiet	Absorb	Detect

Year 4 Summer 1 – Electricity

Knowledge:

Children will learn:

- To use mains electricity, you need to plug an appliance into a socket. Mains electricity is produced mainly by gas, coal or nuclear power stations.
- To use battery electricity, you need to insert a battery into an appliance. They store chemicals which produce an electric current. They eventually stop working as the chemicals stop being able to produce an electric current.
- Every complete circuit must have a power supply. There must also be wires connected to both the positive and negative ends of the power supply.
- Electricity can only flow around a complete circuit that has no gaps. If a switch is open, the circuit will be incomplete.
- Materials that allow electrical charge to flow freely through them are called electrical conductors.
- Materials that do not allow electrical charge to flow freely through them are called electrical insulators.

Skills:

- Identify common appliances that run on electricity
- Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers
- Identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery
- Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit
- Recognise some common conductors and insulators, and associate metals with being good conductors

Vocabulary

Anchor words	Goldilocks words	Step on words
Battery	Appliance	Electrical charge
Mains	Cell	Nuclear
Electricity	Conductor	Electrocuted
Circuit	Insulator	Parallel
Wire	Fuse	Series
Lamp	Positive	Voltage
Switch	Negative	Wattage
Flow	Current	Electrons

Year 4 Summer 2 - States of Matter

Knowledge:

Children will learn:

- Materials in a solid state keep their shape unless a force is applied to them. Solid materials always take up the same amount of space and do not spread out or flow.
- Materials in a liquid state take the shape of the container they are in. Although liquids can change shape, they do not change their volume. Liquids can flow or be poured.
- Materials in a gaseous state can spread out to completely fill the container or room they are in. Gases can be squashed and do not keep their shape.
- Evaporation is the process of a liquid changing into a gas.
- Condensation is the process in which a gas changes into a liquid when it touches a cooler surface.
- Water evaporates in the heat of the Sun and takes the form of water vapour. Clouds are made from water vapour that has condensed to form tiny water droplets. When the water droplets get too big, they fall from the clouds. The water droplets can fall as rain, hail or snow. This process is known as the water cycle.

Skills:

- Compare and group materials together, according to whether they are solids, liquids or gases
- Observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C)
- Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature

Vocabulary

Anchor words	Goldilocks words	Step on words
Solid	Evaporation	Mass
Liquid	Condensation	Solidify
Gas	Precipitation	Permanent
Change	Water vapour	Reversible
State	Thermometer	Irreversible
Boil	Matter	Solution
Melt	Weight	Soluble
Freeze	Volume	Insoluble

Year 5 – Autumn 1 – Living things and their habitats

Knowledge:

Children will learn:

- A plant has many different parts including the petals, sepals and carpels.
- Pollination is the transfer of pollen from a male part of a plant to a female part of a plant, later enabling fertilisation and the production of seeds, most often by an animal or by wind.
- All animals, including humans, are born, they get older and bigger and some will go on to have children. In the end, all animals die. We call this a life cycle.
- Some animals have long life cycles and others have short lifecycles.
- Sexual reproduction is a type of reproduction where new individuals come from the joining of sex cells from two parents, one male and one female.
- In asexual reproduction, there is only one parent, instead of two, and that parent makes more of itself by dividing into pieces or splitting parts of itself off and growing new pieces.

Skills:

- Sc5/2.1a describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird
- Sc5/2.1b describe the life process of reproduction in some plants and animals.
- Sc5/1.1 planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
- Sc5/1.2 taking measurements, using a range of scientific equipment, with increasing accuracy and precision
- Sc5/1.3 recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, and bar and line graphs
- Sc5/1.4 using test results to make predictions to set up further comparative and fair tests
- Sc5/1.5 reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of results, in oral and written forms such as displays and other presentations
- Sc5/1.6 identifying scientific evidence that has been used to support or refute ideas or arguments.

Vocabulary

Anchor words	Goldilocks words	Step on words
Insect	Life Cycles	Life Processes
Bird	Amphibians	Excretion
Movement	Reptile	Respiration
Growth	Sensitive	Sexual
Plants	Reproduction	Asexual
Animals	Nutrition	Anther
Mammal	Extinction	Stamen
Zoo	Environment	Style

Year 5 – Autumn 2 – Properties and changes of material

Knowledge:

Children will learn:

- 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 liquid called a solution.
- If something is soluble it can be dissolved. Sugar that dissolves into water so it becomes a part of it is an example of something that is soluble.
- Any changes which can be reversed or are a temporary conversion are known as reversible changes.
- A change is called irreversible if it cannot be changed back again.
- In an irreversible change, new materials are always formed. Sometimes these new materials are useful to us.
- A magnet is a rock or a piece of metal that can pull certain types of metal toward itself. The force of magnets, called magnetism, is a basic force of nature, like electricity and gravity.
- Evaporation is a process where liquids change to a gas or vapor. In condensation, matter changes from a gas to a liquid.

Skills:

- Sc5/3.1a compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets
- Sc5/3.1b know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution
- Sc5/3.1c use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating
- Sc5/3.1d give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic
- Sc5/3.1e demonstrate that dissolving, mixing and changes of state are reversible changes
- Sc5/3.1f explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda.

Vocabulary

Anchor words	Goldilocks words	Step on words
Soft	Properties	Solubility
Hard	Conductor	Transparency
Rust	Insulator	Irreversible change
Burn	Electricity	Reversible change
Solid	Separating	Solute
Liquid	Thermal	Dissolve
Gas	Sieving	Conductivity
Magnets	Filtering	Quantitative

Year 5 – Spring 1 – Earth and Space

Knowledge:

Children will learn:

- There are 8 planets in our Solar System: Mercury, Venus, Mars, Jupiter, Saturn, Uranus, Neptune and of course Earth!
- The Sun is at the centre of our solar system and all the planets orbit the Sun.
- The Sun, Moon and Earth (as well as the other planets) are spherical objects in our Solar System.
- The Earth takes 365 ¼ (one year) days to orbit the Sun and The Moon takes 28 days to orbit the Earth.
- There are 8 phases of the moon, these are: New moon, Waxing Crescent, First Quarter, Waxing Gibbous, Full moon, Waning Gibbous, Third Quarter and Waning Crescent.
- A shadow is a dark (real image) area where light from a light source is blocked by an opaque object.
- An opaque object does not let light pass through; a translucent object lets some light pass through; and a transparent object allows light to pass through.

Skills:

- Sc5/4.1a describe the movement of the Earth, and other planets, relative to the Sun in the solar system
- Sc5/4.1b describe the movement of the Moon relative to the Earth
- Sc5/4.1c describe the Sun, Earth and Moon as approximately spherical bodies
- Sc5/4.1d use the idea of the Earth's rotation to explain day and night, and the apparent movement of the sun across the sky.
- Sc5/1.1 planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
- Sc5/1.2 taking measurements, using a range of scientific equipment, with increasing accuracy and precision
- Sc5/1.3 recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, and bar and line graphs
- Sc5/1.4 using test results to make predictions to set up further comparative and fair tests
- Sc5/1.5 reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of results, in oral and written forms such as displays and other presentations
- Sc5/1.6 identifying scientific evidence that has been used to support or refute ideas or arguments.

Vocabulary

Anchor words	Goldilocks words	Step on words
Planet	Axis	Gibbous
Moon	Rotation	Translucent
Sun	Orbit	Waxing
Earth	Crescent	Waning
Night/Day	Phases	Transparent
New Moon	Light source	Opaque
Full Moon	Blocked	First Quarter
shadow	Solar system	Third Quarter

Year 5 – Spring 2 – Forces

Knowledge:

Children will learn:

- Gravity is the force that attracts a body towards the centre of the earth, or towards any other physical body having mass.
- Air resistance is a frictional force that air pushes against a moving object. It is also known as drag. Air resistance always tries to slow a moving object down.
- Water resistance is a force acting on an object moving through or floating on water. Objects which float do so due to water resistance.
- Friction is a force between two surfaces that are sliding, or trying to slide, across each other. For example, when you try to push a book along the floor, friction makes this difficult.
- A lever is a simple machine consisting of a beam or rigid rod pivoted at a fixed hinge, or fulcrum.
- A pulley a simple machine consisting of a wheel with a groove in which a rope can run to change the direction or point of application of a force applied to the rope.

Skills:

- Sc5/4.2a explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object.
- Sc5/4.2b identify the effects of air resistance, water resistance and friction that act between moving surfaces.
- Sc5/4.2c recognise that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect.
- Sc5/1.1 planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
- Sc5/1.2 taking measurements, using a range of scientific equipment, with increasing accuracy and precision
- Sc5/1.3 recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, and bar and line graphs
- Sc5/1.4 using test results to make predictions to set up further comparative and fair tests
- Sc5/1.5 reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of results, in oral and written forms such as displays and other presentations
- Sc5/1.6 identifying scientific evidence that has been used to support or refute ideas or arguments.

Vocabulary

Anchor words	Goldilocks words	Step on words
Push	Gravity	Resistance
Pull	Air resistance	Mechanism
Direction	Surface	Up thrust
Speed	Friction	Buoyancy
Force	Levers	Gear
Fall	Pulley	Mass
Fast	Balanced	Decelerate
Slow	Unbalanced	Accelerate

Year 5 – Summer 1 and 2 – Animals, including humans

Knowledge:

Children will learn:

- A human goes through various stages in their lives: Prenatal, Infancy, Childhood, Adolescence, Early Adulthood, Middle Adulthood, Old Age and death.
- During adolescence, humans go through a process called puberty. These cause changes to both boys and girls.
- During puberty, boys grow hair on their faces; the testicles, scrotum and penis develop; and the larynx develops causing a deeper voice.
- During puberty, girls develop breasts and start menstruation (periods)
- During puberty, both boys and girls develop oiler skin, grow pubic and underarm hair, grow hair on the legs and arms and grow taller.
- During old age, skin tends to become thinner and wrinkled; hearing decreases especially the ability to hear high pitched sounds; and eye sight starts to deteriorate. It is important to have a healthy diet and exercise in old age.
- Life expectancy is the average amount of time a person or animal lives. This varies depending on the species.

Skills:

- Sc5/2.2a describe the changes as humans develop to old age.
- Sc5/1.1 planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
- Sc5/1.2 taking measurements, using a range of scientific equipment, with increasing accuracy and precision
- Sc5/1.3 recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, and bar and line graphs
- Sc5/1.4 using test results to make predictions to set up further comparative and fair tests
- Sc5/1.5 reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of results, in oral and written forms such as displays and other presentations
- Sc5/1.6 identifying scientific evidence that has been used to support or refute ideas or arguments.

Vocabulary

Anchor words	Goldilocks words	Step on words
Change	**Puberty**	**Adolescence**
Birth	**Developing**	**Menstruation**
Stages	**Life Expectancy**	**Gestation**
Growth	**Infancy**	**Pre Natal**
Adult	**Pubic**	**Genitals**
Childhood	**Healthy Diet**	**Geriatric**
Teenager	**Life cycle**	**Larynx**
death	**Pensioner**	**Deteriorate**

Year 6: Autumn 1 – Electricity

Knowledge:

Children will learn:

- A circuit a pathway through which electricity can flow.
- There must be a source of electricity within the circuit e.g. a battery.
- There must be conductors within a circuit in order for electricity to flow around it. These conductors should be linked to the positive and negative ends of the battery.
- In a closed circuit, the current of electricity can flow to generate energy for the appliance.
- In an open (or broken) circuit, there is a break in the electricity and the current stops.
- Circuits can be used to provide electrical energy for appliances such as light bulbs or buzzers.

Skills:

- Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit.
- Compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches.
- Use recognised symbols when representing a simple circuit in a diagram.
- Plan different types of scientific enquiries including recognising and controlling variables, taking measurements and repeat readings when considered appropriate.
- Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.
- Use test results to make predictions to set up further comparative and fair tests.
- Report and present findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results.

Vocabulary

Anchor words	Goldilocks words	Step on words
Battery/cells	Circuits	Series
Bulb	Symbol	Parallel
Wires	Charge	Insulator
Switch	Current	Conductor
Power	Power Source	Component
Flow	Brightness	Voltage
Motor	Variable	Wattage
Electricity	Electrical	Input/Output

Year 6: Autumn 2 – Light

Knowledge:

Children will learn:

- The difference between natural and artificial light sources.
- That shadows are created when a solid object blocks a light source.
- That shadows can change size and are the same shape as the object that casts them.
- How light enables us to see an object reflected in a mirror
- That refraction is the bending of light as can be seen when it travels through glass or water.
- There are different colours of light on the visible spectrum (range) which have different wavelengths.
- That Sir Isaac Newton used proof to support his ideas about light and colour.

Skills:

- Recognise that light appears to travel in straight lines.
- Use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye.
- Explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes.
- Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.
- Plan different types of scientific enquiries including recognising and controlling variables, taking measurements and repeat readings when considered appropriate.
- Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.
- Use test results to make predictions to set up further comparative and fair tests.
- Report and present findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results.

Vocabulary

Anchor words	Goldilocks words	Step on words
Source	Reflection	Refraction
Shadow	Translucent	spectrum
Reflect	Transparent	incidence
Mirror	Opaque	Retina
Bounce	Image	Optic Nerve
Straight	Lens	Refraction
Darkness	Pupil	Convex

Year 6: Spring 1 – Evolution and Inheritance

Knowledge:

Children will learn:

- Evolution is the process by which living things have gradually developed from earlier more primitive forms.
- To understand the development of evolutionary ideas and evolutionary theories over time.
- Evolutionary theories were developed by Charles Darwin.
- Evolution does not happen in all living things at the same rate.
- Selective breeding is when humans develop animals and plants (organisms) with desirable characteristics or traits.
- Cross-breeding is when two organisms are bred to create a new organism.

Skills:

- Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago.
- Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents.
- Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.
- Plan different types of scientific enquiries including recognising and controlling variables, taking measurements and repeat readings when considered appropriate.
- Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.
- Use test results to make predictions to set up further comparative and fair tests.
- Report and present findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results.

Vocabulary

Anchor words	Goldilocks words	Step on words
Comparisons	Genes	Organisms
Similarities	Characteristics	Species
Offspring	Inheritance / inherit	Naturalist
Sibling	Evolution	Neanderthal
Environment	Adaptation	Classification
Identical	Traits	Mannerisms
Variation	Advantageous	Disparity
Reproduce	Disadvantageous	Descendants

Year 6: Spring 2 and Summer 1 – Animals and Living Organisms: Classification

Knowledge:

Children will learn:

- Classification is the arranging of living organisms (plants and animals) in groups according to their similarities.
- Animals can be classified into vertebrates (animals with backbones) and invertebrates (animals without backbones)
- Plants can be classified according to characteristics such as whether they flower, if they are edible, the plants leaf type, etc.
- Carl Linnaeus was a Swedish botanist who created a system for classification of all living organisms.
- Carl Linnaeus' classification system forms the basis for the classification system we still use today.
- Microbes are a form of living organism.

Skills:

- Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals.
- Give reasons for classifying plants and animals based on specific characteristics.
- Plan different types of scientific enquiries including recognising and controlling variables, taking measurements and repeat readings when considered appropriate.
- Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.
- Use test results to make predictions to set up further comparative and fair tests.
- Report and present findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results.

Vocabulary

Anchor words	Goldilocks words	Step on words
Variety	Vertebrate	Mollusc
Order	Invertebrate	Crustacean
Kingdom	Amphibian	Taxonomy
Division	Micro-organism	Biodiversity
Reptile	Bacteria	Genus
Species	Classification	Hybrid
Virus	Subspecies	Fungi
Class	Domain	Immunity

Year 6: Summer 2 – Animals, including humans

Knowledge:

Children will learn:

- The main organs in the human body are the brain, the heart, the lungs, the liver, the kidney, the bladder, the stomach and the intestines.
- The heart is a muscle responsible for pumping blood around the body.
- The heart is split into four chambers known as the right atrium, left atrium, the right ventricle and the left ventricle.
- The left side of the heart pumps blood that contains oxygen (oxygenated blood) to the organs; the right side of the heart pumps blood without oxygen (deoxygenated blood) to the lungs).
- The importance of a healthy diet and the major food groups.
- How to determine whether food is healthy from the packaging.

Skills:

- Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood.
- Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function.
- Describe the ways in which nutrients and water are transported within animals, including humans.
- Plan different types of scientific enquiries including recognising and controlling variables, taking measurements and repeat readings when considered appropriate.
- Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.
- Use test results to make predictions to set up further comparative and fair tests.
- Report and present findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results.

Vocabulary

Anchor words	Goldilocks words	Step on words
Organ	Chamber	Cardiovascular
Heart	Ventricle	Cardiac
Lungs	Atrium	Coronary Heart Disease
Liver	Oxygenated	Pathologic
Kidney	Deoxygenated	Diaphragm
Vital	Circulatory systems	Respiratory
Brain	Blood vessels	Pulmonary
Intestines	Nutrition	Asphyxia