Materials- EYFS

New knowledge:
Children should be able to ask questions about the place they live.
Talk about why things happen and how things work.
Discuss the things they have observed such as natural and found objects.
Manipulates materials to achieve a planned effect.

				Future Knowledge Distinguish between and object and the material from which it is made. Identify and name a variety of everyday materials, including wood, metal, plastic, glass, 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 properties.
Vocabulary- Tier 3	**Vocabulary- Tier 3**	**Vocabulary- Tier 3**	**Vocabulary- Tier 3**	**Vocabulary- Tier 3** Hard, soft, stretchy, stiff, shiny, dull, rough, smooth, bendy/not bendy, waterproof/not waterproof

Animals including humans- EYFS

New knowledge: Children should be able to identify different parts of their body. Have some understanding of healthy food and the need for variety in their diets. Be able to show care and concern for living things. Know the effects exercise has on their bodies. Have some understanding of growth and change. Can talk about things they have observed including animals.						**Future Knowledge** Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. Identify and name a variety of common animals that are carnivores, herbivores and omnivores.
Vocabulary- Tier 3	**Vocabulary- Tier 3**	**Vocabulary- Tier 3**	**Vocabulary- Tier 3**	**Vocabulary- Tier 3**	**Vocabulary- Tier 3**	**Vocabulary- Tier 3** Amphibians, birds, fish, mammals, reptiles, carnivores, herbivore, omnivore,
<u>Developing</u>			**<u>Embedded</u>**			

Plants- EYFS

<table>
<tr><td colspan="4">New knowledge:
• Develop an understanding of growth.
• Shows care and concern for living things and the environment.
• Make observations of plants and explain why some things occur, and talk about changes.
• Can talk about some of the things they have observed, such as plants.</td><td rowspan="2">Future Knowledge
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.
Identify and name the roots, trunk, branches and leaves of a tree.</td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td>Vocabulary- Tier 3</td><td>Vocabulary- Tier 3</td><td>Vocabulary- Tier 3</td><td>Vocabulary- Tier 3</td><td>Vocabulary- Tier 3
Leaves, blossom, petals, roots, buds, bulb, trunk, branches, stem, evergreen, garden plants, deciduous, wild plants, seeds</td></tr>
<tr><td colspan="2">Developing</td><td colspan="3">Embedded</td></tr>
</table>

Seasonal changes - Year 1

Prior knowledge
Developing an understanding of change.
Observe and explain why certain things may occur (e.g leaves falling off trees, weather changes).
Look closely at similarities, differences, patterns and change.
Comments and questions about the place they live or the natural world.

New knowledge:

NC objectives:. Observe changes across the four seasons
Observe and describe weather associated with the seasons and how day length varies.

Key ideas: Children need to learn about how a number of things change with the seasons, including the weather, the temperature and the number of daylight hours. They do not need to know why these things change. It would be best to teach these phenomena through exploring the local environment rather than on topics to do with Earth and space.

Longitudinal Studies
Children should carry out a study of the environment over the entire year. This should be carried out in both Year 1 and 2 to embed the ideas of change. Children should draw conclusions from what they find and make suggestions for how they expect things to change. In tracking temperature and rainfall, pupils can make suggestions for why certain things happen and certain times in the year. Tipping points of temperature are vital as two degree change can impact a wide range of organisms meaning they are no longer visibly present in the local area.

E.g. How long does it take for the ground to dry after it has been raining? (Does more water take longer to dry?)
Track rainfall and temperature in different areas of the school grounds.
What would the effect on the environment be if there was too much rain? What would the effect on the environment be if there was not enough rain?)

Future Knowledge
Recognise that they need light in order to see things and that dark is the absence of light.
Notice that light is reflected from surfaces.
Recognise that light from the sun can be dangerous and that there are ways to protect their eyes.
Recognise that shadows are formed when the light from a light source is blocked by a solid object.
Find patterns in the way that the sizes of shadows change.

Materials- Year 1

Prior knowledge Children should be able to ask questions about the place they live. Talk about why things happen and how things work. Discuss the things they have observed such as natural and found objects. Manipulates materials to achieve a planned effect.	**New knowledge:** **NC objectives:** Distinguish between and object and the material from which it is made. Identify and name a variety of everyday materials, including wood, metal, plastic, glass, 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 properties. **Key ideas**: a) There are different materials b) Materials have describable properties. c) Different materials have different properties.	**Future Knowledge** 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 shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.
Recurring Vocabulary- Hard soft, stretchy, bumpy, smooth, shiny, bendy	**Vocabulary- Tier 3** Wood, rock, metal, fabric, plastic, hard, soft, shiny, dull, smooth, bendy, rigid, waterproof, absorbent, opaque, transparent, property, properties, material.	**Vocabulary- Tier 3** Waterproof, fabric, rubber, cars, rock, paper, cardboard, wood, metal, plastic, glass, brick, twisting

Animals including humans- Year 1

Prior knowledge
identify different parts of their body. Have some understanding of healthy food and the need for variety in their diets. Be able to show care and concern for living things. Know the effects exercise has on their bodies. Have some understanding of growth and change.
Can talk about things they have observed including animals.

New knowledge:

NC objectives: Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals.
Identify and name a variety of common animals that are carnivores, herbivores and omnivores.
Key ideas: a) There are many different animals with different characteristics.
b) Animals have senses to help individuals survive. When animals sense things they are able to respond.
c) Animals need food to survive.
d) Animals need a variety of food to help them grow, repair their bodies, be active and stay healthy.

Feeding for survival
Animals need food to survive; it gives them energy to move and material to grow. Animals are all different and so eat different foods, some eat other animals (carnivores) and others only eat vegetables (herbivores).

Moving for survival
Animals have to get their food so they have to move to where it is, which means they have to move in different ways depending upon where their food is. Animals that eat other animals have to hunt them (predators) animals that are hunted are prey.

Sensing for survival
Animals use their senses to detect where their food is and if there are any predators around, animals have different ways of avoiding being eaten e.g. camouflage, protection and moving away fast.

Future Knowledge
Know that animals, including humans, have offspring which grow into adults
Know the basic stages in a life cycle for animals, including humans.
Find out and describe the basic needs of animals, including humans, for survival (water, food and air).
Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.

Plants- Year 1

Prior knowledge Develop an understanding of growth. Shows care and concern for living things and the environment. Make observations of plants and explain why some things occur, and talk about changes. Can talk about some of the things they have observed, such as plants.	**New knowledge:** • 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. • Identify and name the roots, trunk, branches and leaves of a tree.				**Future Knowledge** Observe and describe how seeds and bulbs grow into mature plants. Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.
	Identify and describe the basic parts of a flower	**Identify and describe the basic parts of a tree**	**Identify common garden plants in local area-** go on tree/plant walk around the school grounds. Note similarities and differences.	**Investigation** For example: Grow some flowers, let them pollinate and show children where the seed grows. What happens to a daffodil (or other such flower) if it is left outside to form a seed and how is this different if it is cut and placed in water inside?	
Recurring Vocabulary- Tier 3-	**Vocabulary- Tier 3** Flower, petal, stem, leaves, shoot, roots	**Vocabulary- Tier 3** Tree, trunk, branches, leaves, roots, bark, blossom, fruit	**Vocabulary- Tier 3** Deciduous, evergreen **Tier 2** Classify, sort, group, identify, similar, different	**Vocabulary- Tier 3**	**Vocabulary- Tier 3** Observation, growth, compare

Living things and their habitats- Year 2 (across two half terms)

Prior knowledge

Comments and questions about the place they live or the natural world. Shows care and concern for living things and the environment. Can talk about things they have observed such as plants and animals. Notices features of objects in their environment. Comments and asks questions about their familiar world.

New knowledge:

- Explore and compare the difference 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 micro habitats.
- Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name the different sources of food.

Carnivores, herbivores, food chains
All animals get their nutrients by eating. Some animals hunt and eat other animals (predators) and some animals are hunted and eaten by other animals (prey). Animals that eat only other animals are called carnivores. Animals that only eat plants are called herbivores, and animals that eat both animals and plants are called omnivores

Adapted to survive
All animals are adapted to eat and survive (they are adapted to survive as predators and prey).
Animals have adapted many different ways to survive as predators or prey.
Plants are also adapted to survive; they have adapted to get the water and light they need and avoid being eaten or dying when chewed.

Surviving seasonal changes
The changing seasons have a dramatic effect on plants, which has an impact on the animals that feed on them. Animals have adapted ways of surviving when the seasons change and food become scarce including hibernating, storing food (fattening up), migrating.

Longitudinal study
Chn investigate animals and plants in their local environment and how their populations change through the seasons.

Future Knowledge

Living things can be divided into groups based upon their characteristics. Environmental change affects different habitats differently. Different organisms are affected differently by environmental change. Different food chains occur in different habitats. Human activity significantly affects the environment.

Recurring

Vocabulary: Tier 3

Vocabulary: Tier 3

Vocabulary: Tier 3

Vocabulary: Tier 3

Vocabulary

Animals including humans- Year 2 (loosely link to Australia)

Prior knowledge
Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals.
Identify and name a variety of common animals that are carnivores, herbivores and omnivores.

New knowledge:

NC objectives: Know that animals, including humans, have offspring which grow into adults
Know the basic stages in a life cycle for animals, including humans.
Find out and describe the basic needs of animals, including humans, for survival (water, food and air).
Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.

Key ideas: a) Animals move in order to survive.
b) Different animals move in different ways to help them survive.
c) Exercise keeps animal's bodies in good condition and increases survival chances.
d) All animals eventually die.
e) Animals reproduce new animals when they reach maturity.
f) Animals grow until maturity and then don't grow any larger.

The model of animal life
Animals are born and can eat and breathe → they grow and develop until they can reproduce → when they can no longer reproduce they usually die

Variation between animals
Different animals live for until different ages.
Different animals reach different sizes before they can reproduce.

What do animals need to survive?

What do humans need to keep healthy?
Consider the impact of diet, exercise and hygiene on human health.

Future Knowledge
Identify that animals, including humans, need the right types and amount of nutrition, and they cannot make their own food; they get their nutrition from what they eat.
Know how nutrients, water and oxygen are transported within animals and humans.
Know about the importance of a nutritious, balanced diet.
Identify that humans and some other animals have

Materials- Year 2 (loosely link to the Victorians)

Prior knowledge
Distinguish between and object and the material from which it is made. Identify and name a variety of everyday materials, including wood, metal, plastic, glass, 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

New knowledge:

NC objectives: 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 shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.
Key ideas: Materials can be changed by physical force (twisting, bending, squashing and stretching)

Future Knowledge
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.

Plants- Year 2

Prior knowledge
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.
Identify and name the roots, trunk, branches and leaves of a tree.

New knowledge:

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

What is the purpose of a flower?
All flowering plants make seeds that can grow into new plants.

Grow flowers and let them be pollinated- see where seed grows.

Do all plants produce flowers and seeds?
E.g. Pupils choose a few plants in the school grounds and keep simple diaries of how they change over the year in order to answer the question

What happens after a plant has produced seeds? (changes over time)
E.g. Do all plants produce flowers and seeds and what happens to them after they have flowered? Pupils choose a few plants in the school grounds and keep simple diaries of how they change over the year in order to answer the question.

What do plants need to survive?
Investigate the effect of temperature, water and light on plant growth

E.g. What happens to a daffodil (or other such flower) if it is left outside to form a seed and how is this different if it is cut and placed in water inside?.

Future Knowledge
Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers.
Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.
Explain the requirements of plants for life and growth (air, light, water, nutrients from soil, room to grow) and how they vary from plant to plant.
Know the way in which water is

Animals including humans- Year 3

Prior knowledge
Know that animals, including humans, have offspring which grow into adults
Know the basic stages in a life cycle for animals, including humans.
Find out and describe the basic needs of animals, including humans, for survival (water, food and air).
Describe the importance for humans of exercise, eating the right amounts of different types

New knowledge:

NC objectives: Identify that animals, including humans, need the right types and amount of nutrition, and they cannot make their own food; they get their nutrition from what they eat.
Identify that humans and some other animals have skeletons and muscles for support, protection and movement: know about the skeletal and muscular system of a human.
Key ideas: a) Different animals are adapted to eat different foods.
b) Many animals have skeletons to support their bodies and protect vital organs.
c) Muscles are connected to bones and move them when they contract.
d) Movable joints connect bones.

What makes a healthy, balanced diet?	What do animals need to eat to survive?	What makes up the skeletal system?	Skeletons protect vital organs and support weight	How do skeletons support movement?
	Investigate different diets- compare carnivore to herbivore.	All vertebrates have internal skeletons that protect vital organs. Invertebrates have exoskeletons that protect vital organs	Skeletons support the weight of land animals. Stronger bones can support more weight	Bones are connected (but can move relative to each other) at joints. Muscles connect to bones and move them when they contract. Stronger bones can anchor stronger muscles

Future Knowledge

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

Materials Rocks - Year 3

Prior knowledge
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 shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.

New knowledge:

NC objectives: 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.
Key ideas: Fossils provide evidence that living things have changed over time.

There are different types of rock.
There are different types of soil.

E.g. Locate Soil and Rock types in school grounds. (Rock Scavenger Hunt)
Soil Detectives (How are the soils different? What characteristics are the same? Which do you think has best drainage? Which is more likely to lead to flooding?
How many soil types have we found? Where might you find more? How might the soil be different in different

What is soil made from? Soils change over time.

E.g. The Soil Factory (Why is your recipe the best for effective soil? What would grow best in your soil? Why do you think worms are important to the creation of soil? How can we use composting to make our own soil? Does it currently look like real soil? How long do you think this process will take and why?

What are fossils? How are fossils created? Why do fossils help us find out about historical events?

Future Knowledge
In Year 4:
Compare and group materials together, according to whether they are solids, liquids or gases.
Observe that some materials change state when heated or cooled, and measure and research the temperature at which this happens in degrees Celsius.
Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with

Light - Year 3

Prior knowledge
Observe changes across the four seasons
Observe and describe weather associated with the seasons and how day length varies

New knowledge:

NC objectives:. Recognise that they need light in order to see things and that dark is the absence of light.
Notice that light is reflected from surfaces.
Recognise that light from the sun can be dangerous and that there are ways to protect their eyes.
Recognise that shadows are formed when the light from a light source is blocked by a solid object.
Find patterns in the way that the sizes of shadows change.

Key ideas: a) There must be light for us to see. Without light it is dark.
b) We need light to see things even shiny things.
c) Transparent materials let light through them and opaque materials don't let light through.
d) Beams of light bounce off some materials (reflection).
e) Shiny materials reflect light beams better than non-shiny materials.
f) Light comes from a source.

Light and sight

We can only see things when there is light and the light had to come from somewhere. All light

How are shadows formed?
shadows are formed when the light from a light source is blocked by a solid object.

What does light do when it hits materials?

Which materials are best at reflecting light?

When light hits an object it can do a number of things
If the object is transparent it will go through it and we will

Future Knowledge
In Year 5:
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.

Plants- Year 3

Prior knowledge	New knowledge:						Future Knowledge
Plants usually grow from seeds and bulbs. b) Plants need warmth, light and water to grow and survive. c) Flowering plants make seeds to reproduce and make more plants. Some plants die after producing seeds and others live for many generations.	● Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers. ● Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. ● Explain the requirements of plants for life and growth (air, light, water, nutrients from soil, room to grow) and how they vary from plant to plant. ● Know the way in which water is transported within plants.						Chn will study the life cycles of flowering and non-flowering plants in year 5
	Flower dissection- what is the purpose of different parts of a flower?	**Pollination** All plants look slightly different because they pollinate in different ways. Most plants use insects to pollinate and so have colourful petals and strong scents,	**Methods of seed dispersal** Plants have evolved many different ways to disperse their seeds. Seed dispersal increase the chances of the seeds germinating and growing into mature plants	**What does a seed do?** Seeds and bulbs need the right conditions to germinate. They contain a food store for the first stages of growth (i.e. until the plant is able to produce its own food through its leaves)	**What do plants need to grow and survive?** investigation	**How do plants obtain water?** Plants have roots to provide support and to draw moisture from the soil, through stems to take water to the rest of the plant.	
Recurring	Vocabulary- Tier 2		Vocabulary- Tier	Vocabulary	Vocabulary	Vocabulary	Vocabulary

Forces- Year 3

Prior knowledge
EYFS:
Children know about similarities and differences in relation to places, objects, materials and living things. They talk about the features of their own immediate environment and how environments might vary from one another. They make observations of animals and plants and explain why some things occur, and talk about changes.

New knowledge:

NC objectives:. Compare how things move on different surfaces.
Know how a simple pulley works and use making lifting an object simpler
Notice that some forces need contact between two objects, but magnetic forces can act at a distance.
Observe how magnets attract and repel each other and attract some materials and not others.
Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials.
Describe magnets as having two poles.
Predict whether two magnets with attract or repel each other, depending on which poles are facing.
Key ideas: a) Magnets exert attractive and repulsive forces on each other.
b) Magnets exert non-contact forces, which work through some materials.
c) Magnets exert attractive forces on some materials.
d) Magnet forces are affected by magnet strength, object mass, distance from object and object material.

What do magnets do?

Explore magnetic vs non-magnetic materials

Magnets don't need to touch

How far away does a magnet need to be to attract a

Magnets attract and repel

Each end of a magnet is called a pole, opposite poles are called north and south.
Magnets exert attractive forces on each other when the poles

What affects magnetic strength?

E.g. Are bigger magnets stronger?
(You could make larger magnets by putting together

Future Knowledge
.Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object and the impact of gravity on our lives.
Identify the effects of air resistance, water resistance and friction, which act between moving surfaces.
Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.
Describe the movement of the Earth, and other planets, relative to the Sun in the solar

Working Scientifically - Year 3

Prior knowledge
Fair tests, carrying out experiments, analysing results and drawing conclusions from these results.
During years 1 and 2, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

asking simple questions and recognising

New knowledge:

NC objectives:. During years 3 and 4, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

asking relevant questions and using different types of scientific enquiries to answer them
setting up simple practical enquiries, comparative and fair tests
making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers
gathering, recording, classifying and presenting data in a variety of ways to help in answering questions
recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables
reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions
using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions
identifying differences, similarities or changes related to simple scientific ideas and processes
using straightforward scientific evidence to answer questions or to support their findings.

Key ideas:
a) Use a range of enquiries to test a hypothesis and come to a conclusion
b) Gather results using various methods of recording and displaying data

Future Knowledge

Further application of working scientifically skills

Materials- Year 4

Prior knowledge
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.

New knowledge:

NC objectives: Compare and group materials together, according to whether they are solids, liquids or gases.
Observe that some materials change state when heated or cooled, and measure and research the temperature at which this happens in degrees Celsius.
Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.
Key ideas: a) Solids, liquids and gases are described by observable properties.
b) Materials can be divided into solids, liquids and gases.
c) Heating causes solids to melt into liquids and liquids evaporate into gases.
d) Cooling causes gases to condense into liquids and liquids to freeze into solids.
e) The temperature at which given substances change state are always the same.
f) When two or more substances are mixed and remain present the mixture can be separated.
g) Some changes can be reversed and some can't.
h) Materials change state by heating and cooling.

Properties of solids, liquids and gases.

Solids hold their shape unless forced to change. Liquids flow

Changing state.
Heating causes solids to melt into liquids and liquids to evaporate to gases. Cooling causes gases to

Melting, freezing, boiling and condensation temperatures.

Different substance change state at

What are mixtures?
When more than one substance are present in the same container it is called a

What does dissolving mean?

E.g. Which of the following dissolve in water: sugar, bicarbonate of

Investigate how to separate mixtures

Chn investigate different methods of

Future Knowledge
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. Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution. Use knowledge of solids, liquids, and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating.
Give reasons based

Light and sound- Year 4

Prior knowledge
In KS1:
May have some understanding that objects make different sounds.
Some understanding that they use their ears to hear sounds.
Know about their different senses.

New knowledge:

NC objectives:. Know how sound is made associating some of them with vibrating.
Know what happens to a sound as it travels from its source to our ears.
Know the correlation between the volume of a sound and the strength of the vibrations that produced it.
Know how sound travels from a source to our ears.
Know the correlation between pitch and the object producing a sound.

Key ideas: a) Sound travels from its source in all directions and we hear it when it travels to our ears.
b) Sound travel can be blocked.
c) Sound spreads out as it travels.
d) Changing the shape, size and material of an object will change the sound it produces.
e) Sound is produced when an object vibrates.
f) Sound moves through all materials by making them vibrate.
g) Changing the way an object vibrates changes it's sound.
h) Bigger vibrations produce louder sounds and smaller vibrations produce quieter sounds.
i) Faster vibrations (higher frequencies) produce higher pitched sounds.

Describing sounds
Sounds can be made in many different ways and individual sounds

How sounds are made and travel?
Sound is made when an object is made to vibrate (move

Why and how does pitch change?
Pitch and volume are determined by how the material vibrates:

Why and how does volume change?
Pitch and volume are determined by how the material vibrates:

Future Knowledge

In KS3:
frequencies of sound waves, measured in hertz (Hz); echoes, reflection and absorption of sound sound needs a medium to travel, the speed of sound in air, in water, in solids, sound produced by vibrations of objects, in loud speakers, detected by their effects on microphone diaphragm and the ear drum; sound waves are longitudinal auditory range of humans and animals.

Electricity- Year 4

Prior knowledge
In EYFS:
May have some understanding that objects need electricity to work.
May understand that a switch will turn something on or off.

New knowledge:

NC objectives:. 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 the 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.
Know the difference between a conductor and an insulator; giving examples of each.
Safety when using electricity.

Key ideas:.a) A source of electricity (mains of battery) is needed for electrical devices to work.
b) Electricity sources push electricity round a circuit.
c) More batteries will push the electricity round the circuit faster.
d) Devices work harder when more electricity goes through them.
e) A complete circuit is needed for electricity to flow and devices to work.
f) Some materials allow electricity to flow easily and these are called conductors. Materials that don't allow electricity to flow easily are called insulators.

Electrical power sources	What do batteries do?	Constructing a simple circuit	Making devices work harder	Conductors and insulators
Lots of devices	The battery's job			some materials allow

Future Knowledge
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.

Animals including humans- Year 4

Prior knowledge
Identify that animals, including humans, need the right types and amount of nutrition, and they cannot make their own food; they get their nutrition from what they eat.
Identify that humans and some other animals have skeletons and muscles for support, protection and movement:
Know about the skeletal and muscular system of a human.

New knowledge:

NC objectives: 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.
Key ideas: a) Animals have teeth to help them eat. Different types of teeth do different jobs.
b) Food is broken down by the teeth and further in the stomach and intestines where nutrients go into the blood. The blood takes nutrients around the body.
c) Nutrients produced by plants move to primary consumers then to secondary consumers through food chains.

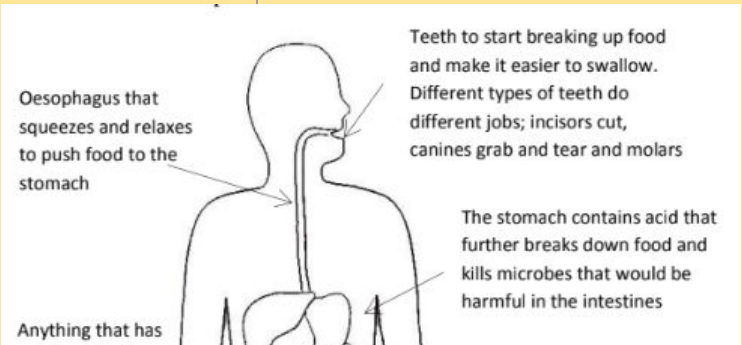
Simple food chains

Producer → prey → predator

Teeth
Identify the different types of teeth in humans and their simple functions.

Main parts of the digestive system
Identify the organs and their basic function

How humans digest food- how does the digestive system work?



Future Knowledge

Know the life cycle of different living things, e.g. Mammal, amphibian, insect bird.
Know the differences between different life cycles.
Know the process of reproduction in plants.
Know the process of reproduction in animals.

Living things and their habitats- Year 4

Prior knowledge	**New knowledge:** 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 danger to living things.						Future Knowledge
a) Some things are living, ome were once living but now dead and some things never lived. b) There is variation between living things. c) Different animals and plants live in different places. d) Living things are adapted to survive in different habitats. e) Environmental change can affect plants and animals that live there.	**Classification of animals** Explore grouping of animals in different ways. Investigate groupings of animals in local/school environment.	**Classification keys** Chn learn to interpret classification keys and create their own to classify animals and plants.	**Classification of plants** Explore grouping of plants in different ways. Investigate groupings of plants in local/school environment.	**Environmental change affects organisms and habitats.** E.g. climate change	**Human activity affects organisms and habitats.** E.g. deforestation	**Longitudinal study-** Investigate how environmental change (the seasons, human activity, climate change) affects different organisms within their environment differently and therefore different habitats differently because all organisms in a habitat are interdependent.	Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird. Describe the life process of reproduction in some plants and animals.
Recurring	**Vocabulary-**	**Vocabulary-**	**Vocabulary-**	**Vocabulary-**	**Vocabulary-**	**Vocabulary- Tier**	**Vocabulary-**

Living things and their habitats- Year 5

Prior knowledge	New knowledge- Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird. Describe the life process of reproduction in some plants and animals.					Future Knowledge
Living things can be divided into groups based upon their characteristics. Environmental change affects different habitats differently. Different organisms are affected differently by environmental change. Different food chains occur in different habitats. Human activity significantly affects the environment.	**Mammal life cycles** Understand the key stages in a mammalian life cycle. Investigate differences in gestation period between different mammals.	**Other animal life cycles** Bird, amphibian, insect (complete vs incomplete metamorphosis). Compare and contrast between life cycles.	**Plant life cycles (sexual)** Review key parts of a plant from year 3 and how this links to a flowering plant's life cycle.	**Plant life cycles (asexual)- how do bulbs reproduce?**	**Study/observing changes over time** might try to grow new plants from different parts of the parent plant, for example, seeds, stem and root cuttings, tubers, bulbs. They might observe changes in an animal over a period of time (for example, by hatching and rearing chicks), comparing how different animals reproduce and grow.	Classify living things into broad groups according to observable characteristics. Give reasons for classifying plants and animals based on specific characteristics. Know how animals and plants are adapted to suit their environment.
Recurring Vocabulary- Tier 3- Vertebrate, invertebrate, classification key,	**Vocabulary- Tier 3** Sexual reproduction, mammal, life cycle, embryo	**Vocabulary- Tier 3** Sexual reproduction, mammal, life cycle, embryo	**Vocabulary- Tier 3** Sexual, flowering plant, germination, seed, pollination, pollinator, seed dispersal, root	**Vocabulary- Tier 3** Bulb, asexual reproduction	**Vocabulary- Tier 3**	**Vocabulary- Tier 3** Inheritance, offspring, progeny, Linnaean

Forces- Year 5

Prior knowledge
Compare how things move on different surfaces.
Know how a simple pulley works and use making lifting an object simpler
Notice that some forces need contact between two objects, but magnetic forces can act at a distance.
Observe how magnets attract and repel each other and attract some materials and not others.
Compare and group together

New knowledge:

NC objectives:.Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object and the impact of gravity on our lives.
Identify the effects of air resistance, water resistance and friction, which act between moving surfaces.
Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.

Key ideas: a) Air resistance and water resistance are forces against motion caused by objects having to move air and water out of their way.
b) Friction is a force against motion caused by two surfaces rubbing against each other.
c) Some objects require large forces to make them move; gears, pulley and levers can reduce the force needed to make things move.

Friction

Friction is a force against motion caused by two surfaces rubbing against each other. It occurs because no

Water resistance

When objects move through water they have to push it out of the way. The water and pushes back with a force

Gravity
Gravity is a force of attraction between any two things that have mass and bigger masses exert bigger forces.

Air resistance

When objects move through air they have to push it out of the way. The air pushes back with a force called air resistance. The

Managing forces
Some objects require large forces to make them move; gears, pulley and levers can reduce the force needed to make things move.

To be addressed

Future Knowledge
Describe the movement of the Earth, and other planets, relative to the Sun in the solar system
Describe the movement of the Moon relative to the Earth
Describe the Sun, Earth and Moon as approximately spherical bodies
Describe the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.

Forces- Year 5 (Earth and Space)

Prior knowledge
Year 5 forces: Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object and the impact of gravity on our lives. Identify the effects of air resistance, water resistance and friction, which act between moving surfaces. Recognise that some mechanisms, including

New knowledge:

NC objectives:.Describe the movement of the Earth, and other planets, relative to the Sun in the solar system
Describe the movement of the Moon relative to the Earth
Describe the Sun, Earth and Moon as approximately spherical bodies
Describe the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.

Key ideas: a) Stars, planets and moons have so much mass they attract other things, including each other due to a force called gravity. Gravity works over distance.
b) Objects with larger masses exert bigger gravitational forces.
c) Objects like planets, moons and stars spin.
d) Smaller mass objects like planets orbit large mass objects like stars.
e) Stars produce vast amounts of heat and light. All other objects are lumps of rock, metal or ice and can be seen because they reflect the light of stars.

Where is the Earth in space and how does it move around the sun?	**The Moon.**	**The Sun**	**The solar system**	**The solar system**
Why do we have day and night?	How does it move relative to Earth? E.g. Phases of the moon. Lunar eclipses?	The sun is a star. It is at the centre of our solar system. Planets orbit the sun (heliocentric model)	Terrestrial planets (Mercury, Venus, Earth, Mars) E.g. Predict and explain how the temperature of	Outer/giant planets: Jupiter, Saturn, Uranus, Neptune

Future Knowledge
Motions and forces: describing motion, pressure in fluids, balanced forces, forces and motions

Materials- Year 5

Prior knowledge
Compare and group materials together, according to whether they are solids, liquids or gases. Observe that some materials change state when heated or cooled, and measure and research the temperature at which this happens in degrees Celsius. Identify the part played by evaporation and condensation in the water cycle and associate

New knowledge:

NC objectives: 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.
Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution.
Use knowledge of solids, liquids, and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating.
Give reasons based on evidence from comparative and fair tests, for the particular uses of everyday materials, including wood, metals and plastic.
Demonstrate that dissolving, mixing and changes of state are reversible changes.
Explain that some changes result in the formation of new materials, and this kind of change is usually not reversible, including changes associated with burning and the action of acid on bicarbonate of soda.
Key ideas: a) All matter (including gas) has mass.
b) Sometimes mixed substances react to make a new substance. These changes are usually irreversible.
c) Heating can sometimes cause materials to change permanently. When this happens, a new substance is made. These changes are not reversible.

Classifying materials
How can we sort and classify materials according to their properties?

Insulators vs conductors

Investigate different types of

Reversible changes

Dissolving, mixing, change of state

Irreversible changes

Some changes are irreversible and result in the formation of new materials.

Future Knowledge
the concept of a pure substance
Mixtures, including dissolving
diffusion in terms of the particle model, simple techniques for separating mixtures: filtration, evaporation, distillation and chromatography
the identification of pure substances

Animals including humans- Year 5

Prior knowledge 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.	**New knowledge:** **NC objectives:** describe the changes as humans develop to old age. (link to SCARF curriculum) **Key ideas:** Different animals mature at different rates and live to different ages.			**Future Knowledge** 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.
	What do humans look like? humans have characteristics that are similar. There are differences amongst people	How do humans change? Humans are smaller versions of their adult self. Humans have different stages of life. The stages last for different periods until they are adult.	What changes do humans undergo during puberty? **See SCARF curriculum**	
Recurring Vocabulary- Tier 3-	**Vocabulary- Tier 2** Similarities, differences, characteristics, traits,	**Vocabulary- Tier 3** Embryo, baby, toddler, child,	**Vocabulary- Tier 3** **See SCARF curriculum** Puberty, menstrual cycle, adolescence, period	**Vocabulary- Tier 3** Oxygenated,

Living things and their habitats- Year 6

Prior knowledge	**New knowledge-** Classify living things into broad groups according to observable characteristics and based on similarities and differences. Give reasons for classifying plants and animals based on specific characteristics.						**Future Knowledge**
Some organisms reproduce sexually where offspring inherit information from both parents. Some organisms reproduce asexually by making a copy of a single parent. Environmental change can affect how well an organism is suited to its environment. Different types of organisms have different life cycles.	**Classification of animals and plants.** Build on from Year 4 work on classification keys. Introduce work of Carl Linnaeus.	**Variation between habitats environment**	**Variation between species/broader animal groups**	**Variation between offspring of the same parents**	**Animals adapt to fit their habitat**	**Animals that are best adapted to their habitat survive.**	Structure and function of living organisms, reproduction. Photosynthesis. Relationships in an ecosystem (interdependence of organisms, food webs)

Evolution and inheritance- Year 6

Prior knowledge

NA

New knowledge:

NC objectives: Know about evolution and can explain what it is.
Know how fossils can be used to find out about the past.
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- recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago.
Key ideas: a) Life cycles have evolved to help organisms survive to adulthood.
b) Over time the characteristics that are most suited to the environment become increasingly common.
NB: The following could be duplicated in Year 6 Living things and their habitats.
c) Organisms best suited to their environment are more likely to survive long enough to reproduce.
d) Organisms are best adapted to reproduce are more likely to do so.
e) Organisms reproduce and offspring have similar characteristic patterns.
f) Variation exists within a population (and between offspring of some plants)
g) Competition exists for resources and mates.

We can earn about living (extant) and extinct species through the fossil record.
Over the last many millions

Living things produce offspring of the same kind which vary.

How does evolution happen?

Overview of

How can adaptation lead to evolution?

Look at examples of how plants and animals have adapted to their

Future Knowledge

Inheritance, chromosomes, DNA and genes

Light - Year 6

Prior knowledge
In Year 3:
Recognise that they need light in order to see things and that dark is the absence of light.
Notice that light is reflected from surfaces.
Recognise that light from the sun can be dangerous and that there are ways to protect their eyes.
Recognise that shadows are formed when the light from a light source is blocked by a solid object.
Find patterns in the way that

New knowledge:

NC objectives:. 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.
Know how simple optical instruments work, e.g. periscope, telescope, binoculars, mirror, magnifying glass etc.

Key ideas: a) Animals see light sources when light travels from the source into their eyes.
b) Animals see objects when light is reflected off that object and enters their eyes.
c) Light reflects off all objects (unless they are black). Non shiny surfaces scatter the light so we don't see the beam.
d) Light travels in straight lines.

How does light travel?
When light is emitted from a light source it travels in straight lines until it hits an object. This can be represented by an

What happens when light hits a transparent object?

What happens when it hits a translucent object?

What happens when light hits a mirrored surface?

E.g. How does the amount aluminium foil is scrunched affect how much light is scattered?
How does the amount of polishing affect how well a

How do we see?
Animals see objects when
light is reflected off the object and enters the eye through the pupil. The pupil changes its size to allow enough, but not too much light into the eye

Future Knowledge
In KS3:
the similarities and differences between light waves and waves in matter
light waves travelling through a vacuum; speed of light
the transmission of light through materials: absorption, diffuse scattering and specular reflection at a surface
Science
use of ray model to explain imaging in mirrors, the pinhole camera, the refraction of light and action of convex lens in focusing (qualitative); the human eye
light transferring

Electricity- Year 6

Prior knowledge
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.

New knowledge:

NC objectives:. 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.

Key ideas: a) Batteries are a store of energy. This energy pushes electricity around the circuit. When the battery's energy is gone it stops pushing. Voltage measures the 'push.'
b) The greater the current flowing through a device the harder it works.
c) Current is how much electricity is flowing round a circuit.
d) When current flows through wires heat is released. The greater the current, the more heat is released.

Pushing electrical current
The power supply pushes the current round the circuit. The voltage of the power supply is a measure of this push. Batteries have a limited store of energy, when it is gone they no longer

Electrical current makes a device work

When current goes through a device it makes it work, the greater the current the harder the device works. Introduce to circuit diagram and symbols for electrical components.

All devices resist current
When any device is placed in the circuit it makes it harder for current to flow (resistance). The more devices the greater the resistance and the lower the current.

E.g. How does the length of a wire affect how bright a bulb is?

Electrical current has a heating effect
As current goes through a conductor it heats it up. The greater the current flowing the greater the heating effect. This can be useful in electrical heaters but can be hazardous and cause fires

Future Knowledge
In KS3:
Electric current, measured in amperes, in circuits, series and parallel circuits, currents add where branches meet and current as flow of charge
Potential difference, measured in volts, battery and bulb ratings; resistance, measured in ohms, as the ratio of potential difference (p.d.) to current
Differences in resistance between conducting and insulating components (quantitative).
Separation of positive or negative charges when objects are rubbed

Animals including humans- Year 6

Prior knowledge

describe the changes as humans develop to old age.

New knowledge:

NC objectives: 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.
Key ideas: a) The heart pumps blood around the body.
b) Oxygen is breathed into the lungs where it is absorbed by the blood.
c) Muscles need oxygen to release energy from food to do work. (Oxygen is taken into the blood in the lungs; the heart pumps the blood through blood vessels to the muscles; the muscles take oxygen and nutrients from the blood.)

Getting oxygen into the blood	**Blood and blood vessels**	**The structure of the heart and the circulatory system**	**Transporting water and nutrients**	**How does exercise affect our body's functions?**	**How do drugs and diet affect our body's functions?**
All animals need oxygen to survive. Air is breathed into the lungs where the oxygen in the air is passed into the blood. Every part of animals bodies need oxygen, especially muscles. Muscles need a supply of oxygen and sugar to make them work, they are supplied this by the blood.	-key components of blood What is the function of the blood vessels?			Link to SCARF curriculum	Link to SCARF curriculum

Future Knowledge
Structure and function of living organisms: Cells and organisation, the skeletal and muscular system, nutrition and digestion, gas exchange systems, reproduction, health