MARTON MANOR
PRIMARY SCHOOL

YEAR 4

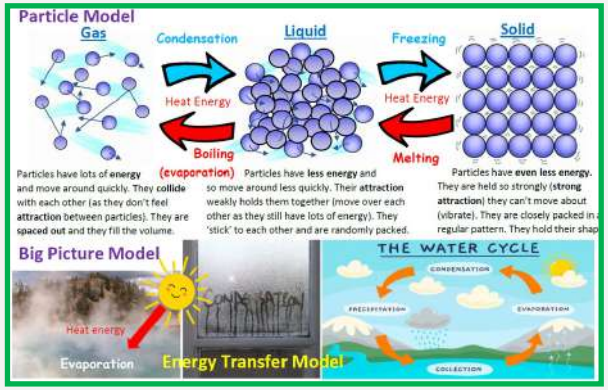
SCIENCE CURRICULUM

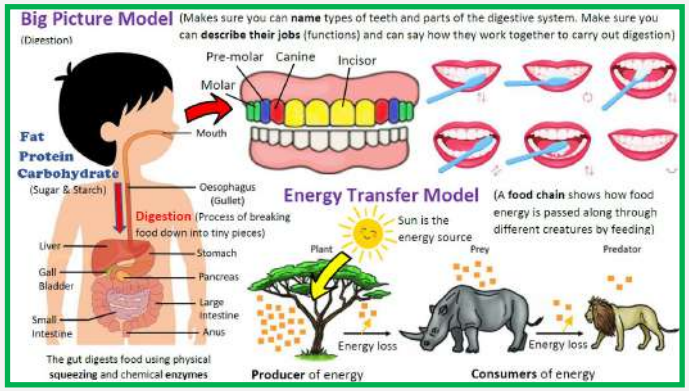
KNOW IT: YEAR 4

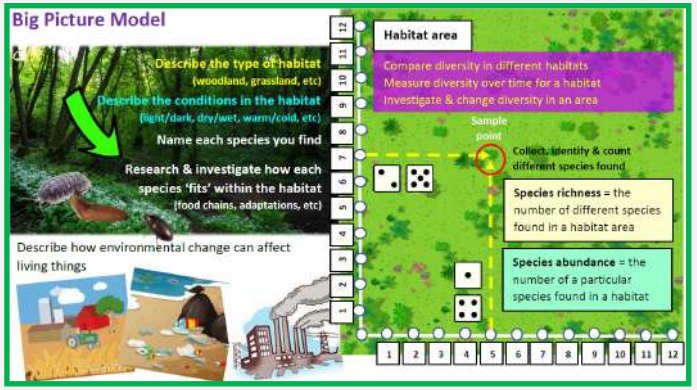
TOPICS OF STUDY FOR YEAR 4

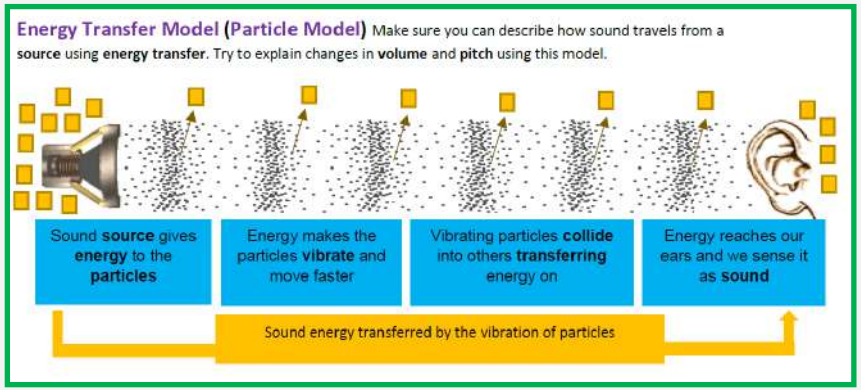
SOUND: ENERGY TRANSFER/PARTICLES **ELECTRICITY**: ENERGY TRANSFER **STATES OF MATTER:** PARTICLES
ANIMALS,INC HUMANS: KINGDOMS **LIVING THINGS AND THEIR HABITATS**: KINGDOMS

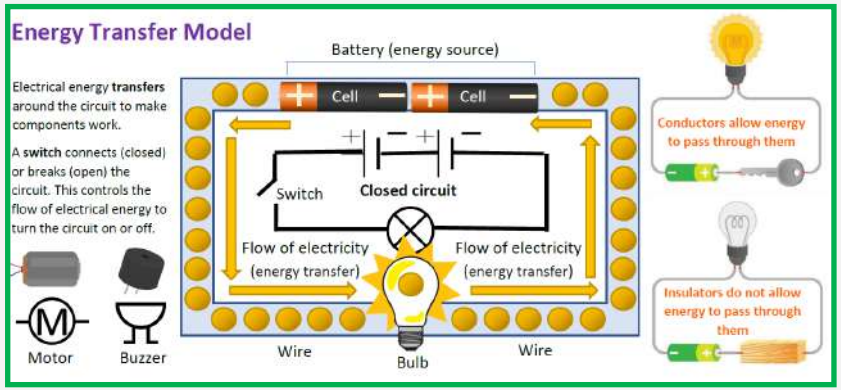
CONCEPTUAL MODELS FOR YEAR 4











DISCIPLINARY KNOWLEDGE AND SCIENTIFIC ENQUIRY:

How we 'work' and 'think' like a Scientist.

YEAR 4

EXPLAINING SCIENCE

- I show a developing knowledge and understanding of science ideas and concepts.
- I use simple science words correctly (meaning; apply).
- I use science models to describe what and where.
- I annotate diagrams to help describe and explain.
- I cluster related facts together into points (recalled).

CLASSIFICATION

- I use a range of spider keys with fine differences.
- I create appropriate groups for sorting (create criteria).
- I describe combined properties required for an application.

DESIGNING EXPERIMENTS

- I predict a trend (relationship prediction).
- I select and use suitable equipment for the task.
- I predict obvious risk and work safely (mostly).
- I plan a fair test by selecting variables to change and measure.
- I suggest a data range and interval for a variable.
- I design and write a simple ordered method (from plan).

DATA, TABLES AND GRAPHS

- I measure unmarked divisions on a number line (positive values).
- I measure/convert values in standard units (inc time).
- I construct a simple table to compare cause and effect.
- I construct bar charts correctly (inc numerical axis).
- I plot coordinates on a graph in the first quadrant.

MAKING CONCLUSIONS

- I describe simple patterns, trends and relationships in data.
- I see differences (errors) in repeated data.
- I describe trends and begin to use science to explain.
- I suggest sensible improvements to my method.

New Learning | Prior Learning

TEACH IT: States of Matter

Year 4

Key Objectives (Statutory)

- 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 parts played by evaporation and condensation in the water cycle and associate the rate of evaporation with

Key Skills Objectives

Explaining Science

⇒ Remember science words used before.
⇒ Use and apply simple science words correctly.

⇒ Begin to use knowledge of particles to describe.
⇒ Use knowledge of particles to describe what and where.

⇒ Add science labels and information to diagrams.
⇒ Annotate diagrams to help describe and explain.

Designing Experiments

⇒ Predict cause and effect.
⇒ Make a relationship prediction.

⇒ Identify obvious risk and act on safety suggestions.
⇒ Notice obvious risks and describe safe use.

⇒ Identify cause and effect in an investigation.
⇒ Plan a fair test by selecting variables to change and measure.

Vocabulary

Material, substance, solid, liquid, gas, flow, compressed, volume, density, state, particle, energy, movement, collision, attraction, heat, temperature (oC), ice, water, water vapour, melting, boiling, freezing, condensation, evaporation, speed (rate), melting point, boiling point, water cycle, run-off, rainfall (precipitation), variable, cause, effect, prediction, comparative test, fair test, pattern, method, relationship, trend, data range, data interval.

Prior Learning

Y1 Everyday Materials: Objects are made of materials; different objects are made from different materials. Awareness of common materials and their simple physical properties. Compare and group materials.

Y2 Uses of Everyday Materials: Recap common everyday materials and their basic properties. Compare the suitability of different materials for particular purposes. Investigate how the shape of solid objects can be changed by twisting, bending etc.

Y3 Rocks: Compare and group together different kinds of rocks; understand rock and fossil formation. Learn about soil.

Key Conceptual Knowledge And Understanding

States Of Matter: Particles

⇒ Everything in the universe is made up of particles.
⇒ A particle is a tiny piece of matter (anything that has weight and takes up space) which cannot be seen through the naked eye.
⇒ There are three states of matter: Solids, Liquids and Gases.
⇒ Particles are in constant motion.
⇒ They move because they have energy.
⇒ The more energy they have; the more movement and the less energy they have; the less movement.
⇒ The particles in a solid have much less energy and can only vibrate which holds their fixed position.
⇒ The particles in a liquid have more energy than a solid, they move more quickly but still pack closely together and flow over each other.
⇒ The particles in a gas have the most energy and therefore move very quickly so they collide and spread out.
⇒ Heating particles results in more energy and more movement and leads to a change of state.
⇒ Cooling particles results in less energy and less movement and also leads to a change of state.

PRIOR LEARNING LINKS

Y1 Everyday Materials: Objects are made of materials; different objects are made from different materials. Awareness of common materials and their simple physical properties. Compare and group materials. Some experience of testing the properties of materials (absorbency).

Y2 Uses of Everyday Materials: Recap common everyday materials and their basic properties. Compare the suitability of different materials for particular purposes. Investigate how the shape of solid objects can be changed by twisting, bending etc.

Y3 Rocks: Compare and group together different kinds of rocks; understand rock and fossil formation. Learn about soil.

Year 4 Science

Unit of Learning:

States of Matter

FUTURE LEARNING LINKS

Y5 Properties and Changes of materials: More complex properties such as, solubility, transparency, conductivity. Learn that mixing and changes of state can be reversible. However, some changes result in the formation of new materials, which cannot be reversed. Learn how to recover substances from solutions and separate substances from mixtures.

Teaching and Learning Sequence for this Unit

What makes something a solid, liquid or a gas?

What common solids, liquids and gases do we know?

Key Skill:
Use and apply science words correctly.

What are solids, liquids and gases made up of?
What do we already know about particles? How could we demonstrate the particles in a solid, a liquid and a gas?

Key Skill:
Begin to use knowledge of particles to describe.

Can we group materials according to whether they are solids, liquids or gases?
Can some things belong to more than one group?

Key Skill:
Use and apply science words.

What happens when a substance changes state?

What other materials can be changed by heating or cooling?

Key Skill:
Plan a fair test by selecting variables to change and measure.

What is evaporation and condensation?
How does temperature/ surface area/ substance affect the speed of evaporation? Condensation?

Key Skill:
Plan a fair test by selecting variables to change & measure.

What happens in the water cycle?
What part do evaporation and condensation play within the water cycle?

Key Skill:
Begin to use knowledge of particles/energy transfer to describe.

Key Learning Objectives:

- 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.
- Identify the part played by evaporation, and condensation in the water cycle and associate the rate of evaporation with temperature.

Key Conceptual Knowledge and Understanding – Particles

⇒ Everything in the universe is made up of particles.
⇒ A particle is a tiny piece of matter (anything that has weight and takes up space) which cannot be seen through the naked eye.
⇒ There are three states of matter: Solids, Liquids and Gases.
⇒ Particles are in constant motion; they move because they have energy.
⇒ The more energy they have; the more movement and the less energy they have; the less movement.
⇒ The particles in a solid have much less energy and can only vibrate which holds their fixed position.
⇒ The particles in a liquid have more energy than a solid, they move more quickly but still pack closely together and flow over each other.
⇒ The particles in a gas have the most energy and therefore move very quickly so they collide and spread out.
⇒ Heating particles results in more energy and more movement and leads to a change of state.
⇒ Cooling particles results in less energy and less movement and also leads to a change of state.

New Learning | Prior Learning

TEACH IT: Sound

YEAR 4

Key Objectives (Statutory)

- 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.

Key Skills Objectives

Explaining Science

⇒ Remember science words used before.
⇒ Use and apply simple science words correctly.

⇒ Begin to use knowledge of energy transfer to describe.
⇒ Use knowledge of energy transfer to describe what and where.

⇒ Add science labels and information to diagrams.
⇒ Annotate diagrams to help describe and explain.

Designing Experiments

⇒ Predict cause and effect.
⇒ Make a relationship prediction.

⇒ Identify cause and effect in an investigation.
⇒ Plan a fair test by selecting variables to change and measure.

⇒ Suggest a suitable data range for a variable.
⇒ Suggest a data range and interval for a variable.

Vocabulary

Sound, energy, transfer, source, ear, particles, solid, liquid, gas, vibration, volume, decibels, frequency, pitch, Hertz, reflected, transmitted, absorbed, fainter / louder, lower / higher, variable, cause, effect, prediction, comparative test, fair test, pattern, method, relationship, trend, data range, data interval.

Prior Learning

Y3 Light: Learn about different types of artificial and natural light sources. Understand that different sources transfer different quantities of light energy. Explore materials that reflect light and use a sensor to measure reflected light. Know the terms opaque, translucent and transparent and how the transfer of light energy differs when it is transmitted through materials with these different properties. Learn and investigate shadows. Understand how to protect eyes and skin from light.

Y4 States of Matter: Learn about other states of matter, as well as solids e.g. liquids and gases. Learn about the particles within them and their energy levels. Know about the effects of heating and cooling on particles and how changes of can occur. Evaporation and the Water cycle.

Key Conceptual Knowledge And Understanding

Energy Transfer/Particles

⇒ Everything in the universe is made up of particles.
⇒ Particles are in constant motion.
⇒ They move because they have energy.
⇒ Light energy travels from a source through a medium (solids, liquids or gas) to your eye.
⇒ Sound energy/vibrations travel from a source through a medium (solids, liquids and gas) to the ear.
⇒ Sound energy causes particles to vibrate which collide with others, transferring their energy across.
⇒ Energy is lost at each collision.
⇒ The volume of sound is linked to the strength of the vibrations (sound energy) that produce it.
⇒ The pitch of a sound is linked to the frequency of the vibrations (sound energy) that produce it.

PRIOR LEARNING LINKS

Y3 Light: Learn about different types of artificial and natural light sources. Understand that different sources transfer different quantities of light energy. Know the terms opaque, translucent and transparent and how the transfer of light energy differs when it is transmitted through materials with these different properties

Y4 States of Matter: Learn about other states of matter, as well as solids e.g. liquids and gases. Learn about the particles within them and their energy levels.

Year 4 Science

Unit of Learning:

Sound

FUTURE LEARNING LINKS

Y6 Light: Develop further understanding of how light travels and be able to describe the process in terms of reflected light energy, absorbed light energy and transmitted light energy. Experiment with light intensity and use data loggers to measure, describing patterns and drawing conclusions.

Teaching and Learning Sequence for this Unit.

What is a sound?
How can we make sounds using these different instruments?
How are these sounds made? How do we know? (water ripples)

Key Skill:
Use knowledge of energy transfer to describe.

How does a sound travel to our ears?

How can we suggest the route sound takes to get to the ear? Source-through medium-to ear.

Key Skill:
Use knowledge of energy transfer to describe.

How does the length/type of string affect the volume of sound we hear?

Key Skill:
Plan a fair test by selecting variables to change and measure.

How can we change the volume of a sound?

What happens when we move further away from a sound source?

Key Skill:
Suggest a data range and variable for the cause variable.

How can we change the pitch of a sound?

How does the tension/ thickness/length of an elastic band affect the pitch of sound?

Key Skill:
Plan a fair test by selecting variables to change and measure.

Key Learning Objectives:

- 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 a 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.

Key Conceptual Knowledge and Understanding-

⇒ Everything in the universe is made up of particles.
⇒ Particles are in constant motion.
⇒ They move because they have energy.
⇒ Light energy travels from a source through a medium (solids, liquids or gas) to your eye.
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New Learning | Prior Learning

TEACH IT: Animals, including Humans

YEAR 4

KEY OBJECTIVES (STATUTORY)

- 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 SKILLS OBJECTIVES

EXPLAINING SCIENCE

⇒ Remember science words used before;
⇒ Use and apply simple science words correctly.
⇒ Begin to use knowledge of energy transfer to describe;
⇒ Use knowledge of animals including humans, to describe what and where.
⇒ Add science labels and information to diagrams;
⇒ Annotate diagrams to help describe and explain.

MAKING CONCLUSIONS

⇒ Describe simple patterns in data, charts and graphs.
⇒ Describe patterns, trends and relationships.
⇒ Describe results by linking cause and effect.
⇒ Describe trends and begin to use science to explain.

VOCABULARY

Teeth, incisor, canine, molar, pre-molar, acid, bacteria, plaque, enamel, digestion, mouth, gullet (oesophagus), stomach, small intestine, large intestine, anus, liver, pancreas, food chain, producer, consumer, predator, prey, carnivores, herbivores, omnivores

PRIOR LEARNING

Y1 Animals including Humans: There are different parts to the body which all have a function and some are associated with a sense. There are different types of animals and these groups of animals have key characteristics. Animals feed in different ways and can be classified as carnivores, herbivores or omnivores accordingly.

Y2 Animals including Humans: Learn about vertebrates and invertebrates. Describe all the things that animals can do (MRS GREN). Understand that all humans and animals grow and change. Learn that food, water and air are essential for survival and that healthy eating, exercise and hygiene are important lifestyle choices.

Y3 Animals including Humans: Effect of different nutrients on the body. The main food groups and what constitutes a balanced diet (food pyramid). Skeletal systems including the bones and their functions. Animal skeleton types. The position of the muscles, their functions, different types of muscles and how they enable movement.

KEY CONCEPTUAL KNOWLEDGE AND UNDERSTANDING

ANIMALS, INCLUDING HUMANS: KINGDOMS

⇒ Food is a balance of nutrients that the body needs.
⇒ There are a number of essential nutrients that have different functions: water-vital for life; vitamins, minerals and fibre-keep us healthy; carbohydrates-give us energy; proteins-help us to grow; fats-gives us energy, absorbs vitamins and helps nerves and brains. A small amount of fat is an essential part of a healthy diet.
⇒ The human body has different systems to survive.
⇒ The skeleton is a system, which acts as a frame to support and protect the body and allow movement.
⇒ Bones are alive and blood runs through them.
⇒ Muscles are a system. There are three main muscle types in the body: skeletal muscle, cardiac muscle and smooth muscle.
⇒ Muscles work in pairs to cause movement. Muscles move bones using forces.
⇒ There are four different types of tooth: incisors-cutters; canines-grippers and tearers; pre-molars and molars-crushers and grinders.
⇒ There is a digestive system , which has different parts to it that help the body to digest food and liquids. The mouth: food is chewed by the teeth and mixed with saliva. The oesophagus: the tube that carries food (bolus) from the mouth to the stomach. The stomach: the organ that starts to digest food using acids and enzymes. The small intestine: absorbs products from digestion into the bloodstream. The large intestine: anything left is collected and passed on its way out of the body.
⇒ A food chain shows the link between living things.
⇒ It shows how food energy is passed along through different creatures by feeding.
⇒ Some animals belong to more that one food chain.
⇒ In a food chain arrows show the direction in which the food energy flows.
⇒ A predator is an animal that naturally hunts, kills and eats other living things.
⇒ Prey is an animal that is hunted and killed by another for food.
⇒ Producers produce their own food from soil, water and air. No animal can produce their own food.
⇒ Consumers are animals that eat other living things.

PRIOR LEARNING LINKS

Y3 Animals including Humans: Effect of different nutrients on the body. The main food groups and what constitutes a balanced diet (food pyramid). Skeletal systems including the bones and their functions. Animal skeleton types. The position of the muscles, their functions, different types of muscles and how they enable movement.

Year 4 Science

Unit of Learning:

Animals, including Humans

FUTURE LEARNING LINKS

Y5 Animals including Humans: Learn about the human lifecycle and its different stages. Learn more about growth. Understand the process of gestation and puberty. Compare lifespans of humans with some different animals.

Teaching and Learning Sequence for this Unit.

What teeth do humans have?

What do they do?

Key Skill:
Use simple science words correctly.

What do fizzy drinks do to our teeth?

Which other foods contain acid?

Key Skill:
Describe patterns, trends and relationship.

What is digestion?

How do our teeth and mouth help digestion?

Key Skill:
Use and apply science words correctly.

What are the parts of the digestive system?

How does this process work?

Key Skill:
Use and apply science words correctly.

What is a food chain?

What does a food chain show?

Key Skill:
Use and apply science words correctly.

How do I construct and interpret a food chain?

What can I find out from these food chains?
What is the difference between a food chain and a food web?

Key Skill:
Use and apply science words correctly.

Key Learning 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 Conceptual Knowledge and Understanding-Animals including Humans

⇒ There are four different types of tooth: incisors-cutters; canines-grippers and tearers; pre-molars and molars-crushers and grinders.
⇒ There is a digestive system , which has different parts to it that help the body to digest food and liquids. The mouth: food is chewed by the teeth and mixed with saliva. The oesophagus: the tube that carries food (bolus) from the mouth to the stomach. The stomach: the organ that starts to digest food using acids and enzymes. The small intestine: absorbs products from digestion into the bloodstream. The large intestine: anything left is collected and passes on its way out of the body.
⇒ A food chain shows the link between living things.
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⇒ In a food chain, arrows show the direction in which the food energy flows.
⇒ A predator is an animal that naturally hunts, kills and eats other living things.
⇒ Prey is an animal that is hunted and killed by another for food.
⇒ Producers produce their own food from soil, water and air. No animal can produce their own food.
⇒ Consumers are animals that eat other living things.

New Learning | Prior Learning

TEACH IT: Living Things & Habitats

YEAR 4

KEY OBJECTIVES (STATUTORY)

- 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.

KEY SKILLS OBJECTIVES

CLASSIFICATION

⇒ Create groups for sorting.

⇒ Create appropriate groups for sorting (create criteria).

⇒ Use classification keys with obvious differences.

⇒ Use classification keys with fine differences.

⇒ Combine properties required for application with help.

⇒ Describe combined properties required for an application.

DATA, TABLES & GRAPHS

⇒ Use a frame to construct a simple table of results.

⇒ Construct a simple table to compare cause and effect.

⇒ Use a frame to construct a bar chart with help.

⇒ Construct bar charts correctly (including numerical axes).

⇒ Draw bars on a bar chart .

⇒ Plot coordinates on a graph in the first quadrant.

VOCABULARY

Spores, seed cones, organism, Micro-organism, biodiversity, ecosystem, environment, habitat, micro-habitat, key, classification, animal, vertebrate, fish, amphibian, reptile, bird, mammal, invertebrate, snails, slugs, spiders, woodlice, insects, worms, plants, trees, flowering plants (grasses, etc), non-flowering plants (conifers, ferns, mosses)

PRIOR LEARNING

Y2 Living Things and Their Habitats: Learn about the characteristics of living things and things that are living, dead and not living. Introduce to habitats and why specific plants and animals may live in a particular habitat. Introduced to food chains and explore the impact of a part being taken away.

KEY CONCEPTUAL KNOWLEDGE AND UNDERSTANDING

⇒ Something that was once alive used to be able to do these things; something that has never been alive can't do these things.

⇒ Most organisms (a single living thing) live in habitats; they are a natural place for animals and plants to live, grow and feed.

⇒ Different animals and plants are more suited to a particular habitat than others.

⇒ Different include: polar, oceanic, woodland, rainforest, urban, desert, coastal and pond. Micro-habitats are smaller in scale e.g. rockpools.

⇒ Woodland habitats are green and shady and are part of our local environment.

⇒ All animals and plants need food to live and they are all part of a food chain.

⇒ All living things need energy. They get this energy from food. A food chain shows how energy is passed between plants and animals. Humans are part of a food chain too.

⇒ If one part of a food chain is taken away, it will affect all other creatures in the chain

⇒ Plants make food using energy from the sun. They are called **producers**.

⇒ Animals are called **consumers** because they eat plants and other animals; animals that eat other animals are called **predators.**

⇒ Animals that are eaten are called **prey.**

⇒ Animals with backbones are called vertebrates; animals without backbones are called invertebrates.

⇒ Living things can be divided or sorted into different groups using a classification key.

⇒ A classification key is a series of questions used to identify living things and can unlock the identity of them.

⇒ Animals with backbones are called vertebrates; mammals, reptiles, amphibians, birds and fish are all vertebrates.

⇒ Animals without backbones are called invertebrates; insects, worms, jellyfish, snails and sea sponges are all invertebrates.

⇒ Animals can be divided into vertebrates and invertebrates and plants can be divided into flowering or non-flowering in order to classify them.

⇒ Flowering plants reproduce using flowers to make seeds; non-flowering plants reproduce using spores and seed cones. Spores are minute organisms that do not need fertilisation to grow into a new individual.

⇒ A community of **animals**, **plants** and **microorganisms**, together with their **habitat** is called an **ecosystem**.

⇒ If one part of an ecosystem is changed, this may affect other living things in the ecosystem.

PRIOR LEARNING LINKS

Y2 Living Things and Their Habitats: Learn about the characteristics of living things and things that are living, dead and not living. Introduce to habitats and why specific plants and animals may live in a particular habitat. Introduced to food chains and explore the impact of a part being taken away.

Year 4 Science

Unit of Learning:

Living Things & Their Habitats

FUTURE LEARNING LINKS

Y5 Living Things and their Habitats: Learn more about the differences between living things in terms of lifecycles and reproduction.

Y6 Evolution and Inheritance: Learn about how living things adapt to their environment and how this has caused species to evolve over time.

Teaching and Learning Sequence for this Unit.

Can we remember the 7 characteristics of living things?
Which of these things are living/ non-living?
Can we prove it?
Key Skill: Show a developing K&U of science.

How is the animal kingdom classified?
Which animals are vertebrates/ invertebrates?
Which of these are warm-blooded/ cold-blooded?
Key Skill: Use classification keys with fine differences.

What groups can plants be classified into?
Do all plants reproduce in the same way?
Key Skill: Use classification keys with fine differences.

What living things can we find in a local woodland habitat?
How can we identify and record what we find?
Key Skill: Construct a table and bar chart.

What is an ecosystem?
What are the features of a healthy ecosystem?
Is the amazon rainforest a healthy ecosystem?
Key Skill: Show a developing K&U of science concepts.

What negative effects can humans have on ecosystems and their habitats?
What can we do to prevent this?
Key Skill: Show a developing K&U of science concepts.

Key Learning Objectives:

- 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.

Key Conceptual Knowledge and Understanding-

Refer to TEACH IT page for further prior knowledge

⇒ Living things can be divided or sorted into different groups using a classification key.
⇒ A classification key is a series of questions to identify a living things and can unlock the identity of it.
⇒ Animals can be divided into vertebrates and invertebrates and plants including trees, can be divided into flowering or non-flowering, in order to classify them.
⇒ Animals with backbones are called vertebrates; mammals, reptiles, amphibians, birds and fish are all vertebrates.
⇒ Animals without backbones are called invertebrates; insects, worms, jellyfish, snails and sea sponges are all invertebrates.
⇒ Flowering plants reproduce using flowers to make seeds; non-flowering plants reproduce using spores or seed cones. Spores are minute organisms that do not need fertilisation to grow into a new individual.
⇒ A community of **animals**, **plants** and **microorganisms**, together with their **habitat** is called an **ecosystem**.
⇒ If one part of an ecosystem is changed, this may affect other living things in the ecosystem.

New Learning | Prior Learning

TEACH IT: Electricity

YEAR 4

KEY OBJECTIVES (STATUTORY)

- 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.

KEY SKILLS OBJECTIVES

EXPLAINING SCIENCE

⇒ Remember science words used before.
⇒ Use and apply simple science words correctly.

⇒ Begin to use knowledge of energy transfer to describe.
⇒ Use knowledge of energy transfer to describe what and where.

⇒ Add science labels and information to diagrams.
⇒ Annotate diagrams to help describe and explain.

MAKING CONCLUSIONS

⇒ Describe simple patterns in data.
⇒ Describe simple patterns, trends and relationships in data.

⇒ Describe results by linking cause and effect.
⇒ Use science words to explain trends.

VOCABULARY

Electric (electricity), source, energy, transfer, flow, closed / open circuits, series, cell, battery, positive, negative, wire, bulb, buzzer, motor, switch, clip, light, sound, conductor, insulator, metal, copper, iron, steel, non-metals, plastic, wood, glass, rubber, pattern, trend, relationship, conclusion, valid (validity).

PRIOR LEARNING

Y2 Uses of Everyday Materials: Recap common everyday materials and their basic properties. Compare the suitability of different materials for particular purposes. Investigate how the shape of solid objects can be changed by twisting, bending etc.

KEY CONCEPTUAL KNOWLEDGE AND UNDERSTANDING

ELECTRICITY-ENERGY TRANSFER

⇒ Some appliances need electrical energy to work.
⇒ Electricity comes from a source (battery, power stations, solar/wind).
⇒ There are risks associated with the use of electricity therefore it must be used safely.
⇒ Conductors allow electrical energy to pass through them.
⇒ Insulators do not allow electrical energy to pass through them.
⇒ Resistance measures how well a material or object conducts electricity.
⇒ Electrical energy transfers around a circuit to make components work.
⇒ Electrical energy is transferred from the battery to the bulb along the wire.
⇒ Energy is lost at the bulb as light/heat energy.
⇒ The surplus electrical energy from the bulb flows back to the battery.
⇒ A switch connects (closed) or breaks (open) the circuit. This controls of electrical energy to turn the circuit on or off.
⇒ Voltage is a measure of the amount of energy transferred.

PRIOR LEARNING LINKS

Y2 Uses of Everyday Materials: Recap common everyday materials and their basic properties. Compare the suitability of different materials for particular purposes. Investigate how the shape of solid objects can be changed by twisting, bending etc.

Y3: Forces and Magnets: Learnt about contact and non-contact forces. Introduced to the use of labels and arrows to identify the type of force and its size and direction. Used a Newton meter to measure the size of a force. Learnt about the concept of gravity and carried out investigations. Learnt about magnetic forces-attract /repel and the two poles on magnets. Explored magnetic and non -magnetic materials.

Year 4 Science

Unit of Learning:

Electricity

FUTURE LEARNING LINKS

Y6 Electricity: Create series circuits and explore cells, voltage and energy transfer around a circuit. Learn about energy transfer and electrical resistance through practical use of circuits and electrical components such as wires, bulbs, buzzers and cells.

Teaching and Learning Sequence for this Unit.

How do we use electricity in our homes?

Where does electricity come from and how does it get to our homes?

Key Skill:

Remember and use science words correctly.

Key Skill:

Use knowledge of energy transfer to describe.

What is a simple series circuit?

What components can it have and what are their functions?

Can we explain and label a simple series circuit diagram?

Key Skill:

Use knowledge of energy transfer to describe.

Key Skill:

Use knowledge of energy transfer to describe.

Can we make a working series circuit?

Which components can we use? Can we explain and draw circuit diagrams?

Key Skill:

Use knowledge of energy transfer to describe.

Key Skill:

Plan a fair test by selecting variables to change and

How does a switch work?

Can we explore the types of switches that different devices have?

Can we make our own switch using a paperclip or pins?

Key Skill:

Use knowledge of energy transfer to describe.

What are electrical conductors and insulators?

Which materials allow electrical energy to flow?

Which metals are the best conductors? How do we know?

Key Skill:

Describe trends and use energy transfer model to explain.

Key Learning Objectives:

- Identify common appliances that run on electricity.
- Construct a simple series of electrical circuits, 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 conductor.

Key Conceptual Knowledge and Understanding-

- Appliances need electrical energy to work.
- Electricity comes from a source (battery, power stations, solar/wind).
- There are risks associated with the use of electricity therefore it must be used safely.
- Conductors allow electrical energy to pass through them.
- Insulators do not allow electrical energy to pass through them.
- Electrical energy transfers around a circuit to make components work.
- Electrical energy is transferred from the battery to the bulb along the wire.
- Energy is lost at the bulb as light/heat energy.
- The surplus electrical energy from the bulb flows back to the battery.
- A switch connects (closed) or breaks (open) the circuit. This controls of electrical energy to turn the circuit on or off.
- Voltage is a measure of the amount of energy transferred.

New Learning | Prior Learning

APPLY IT: Working Scientifically

Year 4

Children should be supported to develop their understanding of scientific ideas by using different types of scientific enquiry throughout all teaching.

Working Scientifically

During Years 3 and 4, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programmes 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.

Possible Scientific Investigations:

Sound:

- What happens to the sound as we increase the length of the wire/width of the drum/ volume of the bottle?
- What happens to vibrations when we move away from the sound source?
- What are the best materials for muffling sound?
- Through which type of solid does sound travel best?
- What happens to the height of rice bouncing on a speaker when we alter the volume?
- How does the tension/thickness/ length of an elastic band affect the pitch of the sound?

Electricity

- Which materials allow electrical energy to flow?

States of Matter

- Which type of sponge holds the most air?
- How many drops of liquid can you add to a penny? Does the type of liquid effect the number of drops added?
- What is the best way to melt ice cubes?
- How can we make chocolate melt faster?
- Which materials dry the fastest?
- How does the temperature/ surface area/substance effect the speed of evaporation (salt water, ink)?

Animals, including humans:

- What happens if we don't clean our teeth?
- What do fizzy drinks do to our teeth? Chicken bones in vinegar, water, air. Action of acid. Explore acidic foods/drinks using litmus paper.
- Does surface area of food affect the speed of digestion in the stomach? Cut jelly babies and dissolve in white vinegar. Time taken to dissolve.

Living Things & Habitats

- Explore habitats over time. Tally/chart species & number counts. Compare habitats. Use number lines (tape measure) to sample an area with a quadrat. Collect data. Compare habitats.