



**Through our Christian Values -
Friendship, Compassion, Trust
and Respect:**

**We Encourage, Build & Hope
together...no one left behind.**

Based on 1 Thessalonians 5-11



Science

Curriculum Map

1. PHILOSOPHY



Six underlying attributes at the heart of Sproatley's curriculum and lessons:

Lessons and units are **knowledge and vocabulary rich** so that pupils build on what they already know to develop powerful knowledge.

Knowledge is coherently **sequenced** and planned so that pupils know more, do more and remember more.

Our curriculum is **ambitious** and inspiring. It gives all our children the opportunity to achieve academically whilst encouraging interests and talents.

Our curriculum serves to **connect**; it addresses the physical, mental, spiritual, cultural and intellectual needs of our children in a meaningful way.

We teach a **diverse** curriculum by committing to diversity; our teachers and teaching ensure that all pupils feel positively represented and included.

Our curriculum is an **inclusive** one which addresses the needs of all pupils so that they can achieve.



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2. EYFS LINKS & KS1 UNITS



Previous links to EYFS framework:

Understanding the World
Expressive Art & Design
Physical Development
Communication and Language

KS1 Science is formed of 8 units and this is the recommended sequence:

Unit Title	Target Year Group
Animals inc. Humans (Common animals features, including humans)	Year 1
Animals inc. Humans (animal growth and basic needs)	Year 2
Living Things and their Habitat	Year 2
Seasonal changes	Year 1
Plants (Common plants and their structure)	Year 1
Materials (Everyday materials and their properties)	Year 1
Plants (Growth of a plant and basic needs to grow)	Year 2
Uses of Everyday Materials	Year 2

3. LKS2 UNITS



LKS2 Science is formed of 10 units and this is the recommended sequence:

Unit Title	Target Year Group
Rocks and soil	Year 3
Forces and Magnets	Year 3
Animals inc. Humans (Skeletal structure and nutrition)	Year 3
Plants	Year 3
Light	Year 3
Electricity	Year 4
Sound	Year 4
States of Matter	Year 4
Living Things and their Habitats	Year 4
Animals inc. Humans (Digestion and food chains)	Year 4

4. UKS2 UNITS



UKS2 Science is formed of 10 units and this is the recommended sequence:

Unit Title	Target Year Group
Earth and Space	Year 5
Forces and Magnets	Year 5
Animals inc. Humans (Human life cycle)	Year 5
Living Things and their Habitats (Life cycles and reproduction)	Year 5
Properties and Changes to Materials	Year 5
Living Things and their Habitats (classification of living things)	Year 6
Electricity	Year 6
Animals inc. Humans (Circulatory system)	Year 6
Light	Year 6
Evolution	Year 6

Unit 1 – Animals including Humans (Common animal features, including humans)

Key Vocabulary

arm, leg, hand, foot, eyes, ears, mouth, nose, see, hear, taste, smell, touch, fish, amphibian, reptile, bird and mammal, herbivore, carnivore, omnivore, parent, baby

Outcomes

- 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.
- Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets).
- Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.

Lesson One

What are the different animal groups?

Show children different photos of animals (from different classifications: Mammals, fish, birds etc). Children to compare the animals for similarities and differences.

What do children already know about the animal groups? Write on flipchart and add to during topic.

Focus on mammals and their features. Make the link that humans are also mammals. Label a mammal in science books.

Lesson Two

What are birds and fish?

Recap – [What are the different animal groups?](#)

Recap what makes an animal a mammal. How is this different to a bird?

Look at the features of a bird. Label on the board.

Use photos of different types of birds – how are they similar/different? Do they meet the bird criteria?
Do the same with fish. How are fish and birds similar/different?

Label features of a fish and bird in book.

Lesson Three

What are amphibians and reptiles?

Recap – The previous animal groups already looked at.
Which animal groups have we looked at? Which are left?

Look at different photos of reptiles and amphibians. Group them into reptile and amphibian.

Make a list of the features of a reptile and amphibian.

Children to label in their books.

Make a success criteria as a class for all animal groups

Lesson Four

What are the different parts of the human body?

Recap – all animal groups and their features. Recap mammals

Activity – Play heads, shoulders, knees and toes.

Draw around a child.
Working in groups of 5 or 6, label the different body parts using slips with the name of key body parts on. Take photos to stick in science books.

Go through together.

Lesson Five

What are our senses?

Recap –
What are the different parts of the human body?

Focus on eyes, ears, nose, mouth and skin.

Why are these body parts so important?

Introduce our senses (sight, smell, taste, hearing and touch). Which part is responsible for these?

Label in books.

Investigate: blindfold taste testing

Lesson Six

What do animals eat?

Recap – What are mammals?
What are our senses:
Activity – Show the children different foods that animals eat – which animal would eat this?

Introduce the terms:
Herbivore, Carnivore and Omnivore. Explore each of the words and show images of what the animals would eat.

Investigate:
Dissecting animal poo investigation - is it a herbivore, carnivore, omnivore
draw and label findings
Write definitions as a class



Unit 1 – Animals including Humans (Common animal features, including humans)

Assessment:

Substantive Knowledge

Animals are living things. Animals can be sorted and grouped into six main groups: fish, amphibians, reptiles, birds, invertebrates and mammals.

Humans are living things. They belong to a group of animals called mammals.

Ears are used for hearing, eyes are used to see, the nose is used to smell, the tongue is used to taste and skin gives the sense of touch..

Disciplinary knowledge

Ask simple questions and recognise that they can be answered in different ways.

Observe closely, using simple equipment.

Perform simple tests.

Identify and classify.

Use their observations and ideas to suggest answers to questions.

Gather and record data to help in answering questions.

Previous Knowledge

In EYFS, the children talked about the observations of animals and plants and explained why some things occur, and talked about changes.

This project teaches children that humans are a type of animal known as a mammal. They name and count body parts and identify similarities and differences. They learn about the senses, the body parts associated with each sense and their role in keeping us safe.

Unit 2 – Seasonal changes –

Key Vocabulary

autumn, winter, spring, summer, rain, snow, frost, wind, sun, fog, mist, clouds, temperature (warm/cold/freezing) day, night, evergreen, deciduous

Outcomes

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

Lesson One

What are the four different seasons?

Hook – Read *Tree: Seasons come, seasons go*

[What are the four different seasons?](#) List them on flipchart. What do we know about the four seasons?

How can we tell it is Autumn?

What is the weather like in these seasons? Provide the children with 4 boxes for each season. Draw an image that describes the weather for each season.

Lesson Two

What is the weather like in autumn?

Hook – Go on a nature walk. Look at the weather, plants, any animals. Take pictures

Record findings of above on flipchart.

What is the weather like in autumn?

Introduce that the weather will begin to get colder.

Investigate: how do we measure the temperature? Record the temperature over the next few weeks

Lesson Three

What are the features of autumn?

Recap findings from nature walk and get temperature reading and record.

Why are the leaves falling from the trees? Discuss different types of trees And draw and label observations on books

Look at weather app on computer and what the sunrise/sunset times are. Why is this?

Lesson Four

How can we stay safe in autumn and winter?

Recap findings from nature walk and get temperature reading and record.

Look at weather app on computer and what the sunrise/sunset times are. Why is this?

Why do we need to stay warm? How can we stay seen on dark nights?

Provide children with images of suitable and unsuitable clothing for autumn and winter – children to classify

Lesson Five

What are the features of winter?

Recap temperature recordings and types of trees.

Discuss recordings of temperatures recordings. Why could this be?

Investigate: Look at images from nature walk 3 weeks ago. Go on a nature walk. Look at the weather, plants, any animals. Has there been any changes?

Record changes on flip chart in different colour.

Lesson Six

Why are the seasons different?

Recap – What are the four seasons and why are they different?

BBC Bitesize – [What is day and night?](#)

Why do animals behave differently in each season? Look at hibernation. Animals can be nocturnal.

Record why seasons change and how this is important for animals and plants.



Unit 2 – Seasonal changes

Assessment:

Substantive Knowledge

There are four seasons.
The weather begins to change in Autumn, it begins to get colder and the sun sets later.
Some trees lose their leaves over Autumn and Winter but not all trees.
Temperature can be measured.

Disciplinary knowledge

Ask simple questions and recognise that they can be answered in different ways.

Observe closely, using simple equipment.

Perform simple tests.

Identify and classify.

Use their observations and ideas to suggest answers to questions.

Gather and record data to help in answering questions.

Previous Knowledge

In EYFS, the children talked about some natural features that they see and feel during different seasons, including different weather.

This project teaches children about the seasons, seasonal changes and typical seasonal weather and events. Children begin to learn about the science of day and night and recognise that the seasons have varying day lengths in the UK.

Unit 3 – Animals including Humans (Animal growth and basic needs)

<u>Key Vocabulary</u>		<u>Outcomes</u>			
Offspring, reproduction, growth, child, young/old stages (examples – chick/hen, baby/child/adult, caterpillar/butterfly), exercise, heartbeat, breathing, hygiene, germs, disease, food types (examples – meat, fish, vegetables, bread, rice, pasta)		• Notice that animals, including humans, have offspring which grow into adults. • Find out about and describe the basic needs of animals, including humans, for survival (water, food and air). • Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.			
Lesson One	Lesson Two	Lesson Three	Lesson Four	Lesson Five	Lesson Six
<u>What is the lifecycle of a mammal?</u> Hook – Hook – read <i>little kids first big book of pets</i> Create a barchart of pets owned by the class Class to be introduced to Misty the Rabbit. Ask the children if they know what the lifecycle of their pet is? What does that term 'lifecycle' mean? Teach the children what a life cycle is and discuss what this looks like for mammals, including that of a human. Children to then map out Misty's life cycle in their books.	<u>Why do animals have offspring?</u> Recap – What is the life cycle of a mammal? Chn to map out human life cycle Show the children 3 different infant animals (chick, calf, tadpole). What are these? How are they similar/different? Teach the children that all animals produce offspring. But why? Introduce that animals have offspring so that they can pass on their genes and keep their species going. Children to classify the offspring with the adult animal and name both their infant name (calf) to their adult name (cow).	<u>What do animals need to survive?</u> Recap – Why do animals produce offspring? Ask the children to think about what things we as people need to stay alive. Make a list of things they come up with. Ask the children to think about which of these things an animal might need. Teach the children about things an animal needs to survive and how these things are common amongst all animal groups. Record in books.	<u>Why are things important in animal survival?</u> Recap – What things are important in animal survival? Why are these things so important? Provide the children with each thing they had listed (air, water, food, shelter) and ask the children to discuss it's importance as a table team. Teach the children about why each is important. Investigate: create a tick list of what n animal needs to survive. Look around our outdoor area, could an animal survive? Tick off criteria on tick list as chn explore.	<u>How do people stay healthy?</u> Recap – What things are important to our survival? What does the term healthy mean? Discuss. How do we stay healthy as people? List all different ways as a class team. Dig deeper into each – what does exercise mean? What food groups are good for us? Why is talking to others important? What is hygiene? etc. Children to list each method that we stay healthy both physically and mentally around an outline of a human.	<u>Why is it important to look after our body?</u> Recap – What ways did we say we can stay healthy? Why is it important to look after our bodies? Teach the children ways in which health benefits the body. Task the children to create a poster which details ways to keep healthy and the importance of healthy bodies. Stick in books once finished. Quizziz questionnaire linked to this topic to assess progress.

Unit 3– Animals including Humans (Common animal features, including humans)

Assessment:

Substantive Knowledge

Animals have offspring.

Living things need to be cared for in order for them to survive. They need water, food, warmth and shelter.

Humans need to a varied diet and regular exercise to stay healthy

Disciplinary knowledge

Ask simple questions and recognise that they can be answered in different ways.

Observe closely, using simple equipment.

Perform simple tests.

Identify and classify.

Use their observations and ideas to suggest answers to questions.

Gather and record data to help in answering questions.

Previous Knowledge

In EYFS, the children talked about the observations of animals and plants and explained why some things occur, and talked about changes. Children in EYFS explored life cycles of minibeasts. In Autumn 1, the children began to understand different animal groups and the senses around us.

This project teaches children that humans are a type of animal known as a mammal. They name and count body parts and identify similarities and differences. They learn about the senses, the body parts associated with each sense and their role in keeping us safe.

Unit 5 – Living Things and their Habitats

Key Vocabulary

Living, dead, never been alive, suited, suitable, basic needs, food, food chain, shelter, move, feed, names of local habitats e.g. pond, woodland etc., names of micro-habitats e.g. under logs, in bushes etc.

Outcomes

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

Lesson One

What is the difference between living and nonliving?

Hook – Show the children a photo (e.g. photo on [BBC Bitesize](#) of the park). Ask the children to discuss what they can see in this image.

What does it mean for something to be living? What about dead? What does 'nonliving' mean? Write a definition of things which are living, dead and nonliving on the board.

Take the children on a walk around the school to pick out things which are living, dead and nonliving.

Children to sort examples of each in books.

Lesson Two

What is a habitat?

Recap – What things do animals need to survive?

Provide the children with 3 different animals (frog, camel, penguin). What is similar between these animals? What is different? Ask the children to think about where these animals would live.

Teach the children about the different habitats that animals could live in. Use the [BBC activities](#) to support. Provide the children with different pictures of habitats and ask them to describe each.

Children to document in books and write an explanation of what a habitat is.

Lesson Three

Which animals are suited to live in a woodland or rainforest habitat?

Recap – What is a habitat?

Rainforest [habitats](#).

What animals call the woodland their habitat? Look at how these animals differ to those that live in rainforest. Teach children about microhabitats in these regions (under logs, bushes etc)

Address misconceptions and similarities. Children to sort animals into correct habitat: rain forest or woodland

Lesson Four

Which animals are suited for cold habitats?

Recap – What are the different habitats that we have looked at so far?

What does it mean for somewhere to be hot or cold? Which regions in the world are hot/cold? Link to Geography unit.

Teach children about [polar habitats](#). What these regions are like and why different animals are adapted to live in these regions.

Investigate: how can a polar bear survive in cold weather – blubber experiment

Lesson Five

Which animals are suited for hot habitats?

Recap – What are the different habitats that we have looked at so far?

What does it mean for somewhere to be hot or cold? Which regions in the world are hot/cold? Link to Geography unit.

Teach children about [rest desert habitats](#). What these regions are like and why different animals are adapted to live in these regions.

Investigate: how can a camel survive in hot weather

Lesson Six

What are food chains and how do animals find food?

Recap – What have we learnt so far this topic? Quizziz to show learning.

What else do animals need to survive besides shelter?

Teach about what a [food chain](#) is. Give examples of different food chains that could be found in each of these different habitats. Why is food important to all animals?

Children to record at least one food chain for different habitats looked at (water, woodland and one other)

Quizziz questionnaire linked to this topic to assess progress.



Unit 5– Living Things and their Habitats

Assessment:

Substantive Knowledge

Living things are those that are alive. Dead things are those that were once living but are no longer. Some things have never been alive.

Living things carry out the seven life processes: moving, breathing, using their senses, feeding, getting rid of waste, having offspring and growing.

All living things live in a habitat to which they are suited and it must provide everything they need to survive. Some animals need to adapt to their environment.

Local habitats include parks, woodland and gardens

Disciplinary knowledge

Previous Knowledge

Ask simple questions and recognise that they can be answered in different ways.

Observe closely, using simple equipment.

Perform simple tests.

Identify and classify.

Use their observations and ideas to suggest answers to questions.

Gather and record data to help in answering questions.

In EYFS children explored and observed their local habitats, as well

as looking at different animal types. And their environments. Previously, the children learnt that the local environment is a habitat for living things and can change during the seasons.

This project teaches children about habitats and what a habitat needs to provide. They explore local habitats to identify and name living things and begin to understand how they depend on one another for food and shelter.

Unit 6 – Seasonal changes –

Key Vocabulary

autumn, winter, spring, summer,, sun, clouds, temperature (warm/ hot), UV, protection day, night,

Outcomes

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

Lesson One

What are the four seasons?

Recap of previous sessions learning
Show the children images of spring and summer, what are the similarities what are the difference?

prediction :

Pose the question; If we recorded the temperature now should the results be similar to when we did it in December?

Brainstorm predictions from whole class discussions

Lesson Two

What are the features of Summer?

Hook – Go on a nature walk. Look at the weather, plants, any animals.
Take pictures

Record findings of above on flipchart.

What is the weather like in Summer?

Observe sunset and sunrise times for the week ahead.
Discuss length of daylight and compare to winter findings.

Show children 2 sets of sunset and sunrise times can they work out which is from summer?

Lesson Three

What are the features of Summer?

Recap: label pictures
From nature walk last week.

Look at previous pictures from nature walk in autumn. Why are the flowers and plants growing?

Link to previous learning re basic needs of growth.

How do we measure temperature? Record today's temperature on a table

Lesson Four

How can we protect ourselves from the sun?

Recap: ow can we tell it is Summer? Record temperature.
What is the weather like in Summer?

What is the weather like in Summer? How do we stay safe in Summer?

Discuss UV light

introduce the children to weather forecasts.

Children to create their own weather forecast including sun safety tips.

Lesson Five

ow can we stay safe in Summer?

Recap weather in Summer.
Record findings.

Look at weather app on computer and what the sunrise/sunset times are.
Why is this?

Why do we need to stay warm? How can we stay seen on dark nights?

Provide children with images of suitable and unsuitable clothing for autumn and winter – chn to classify

Lesson Six

How can we stay safe in Summer?

Recap temperature recordings.

Water safety

Colate discussion findings.
Show water safety posters and children to create their own.

Unit 6 – Seasonal changes

Assessment:

Substantive Knowledge

The weather can change daily and some weather types are more common in certain seasons, such as snow in winter.

Some ways to stay safe include staying safe in strong sunlight (sun cream, sun hat and sunglasses).

Temperature is the measure of how hot or cold something is.

A weather forecast predicts the weather.

Disciplinary knowledge

Ask simple questions and recognise that they can be answered in different ways.

Observe closely, using simple equipment.

Perform simple tests.

Identify and classify.

Use their observations and ideas to suggest answers to questions.

Gather and record data to help in answering questions.

Previous Knowledge

In EYFS, the children talked about some natural features that they see and feel during different seasons, including different weather. The children have previously explored changes in Autumn and Winter.

This project teaches children about the seasons, seasonal changes and typical seasonal weather and events. They learn about measuring the weather and the role of a meteorologist.

Unit 6 – Seasonal changes

Assessment:

Substantive Knowledge

The weather can change daily and some weather types are more common in certain seasons, such as snow in winter.

Some ways to stay safe include staying safe in strong sunlight (sun cream, sun hat and sunglasses).

Temperature is the measure of how hot or cold something is.

A weather forecast predicts the weather.

Disciplinary knowledge

Previous Knowledge

Ask simple questions and recognise that they can be answered in different ways.

Observe closely, using simple equipment.

Perform simple tests.

Identify and classify.

Use their observations and ideas to suggest answers to questions.

Gather and record data to help in answering questions.

In EYFS, the children talked about some natural features that they see and feel during different seasons, including different weather. The children have previously explored changes in Autumn and Winter.

This project teaches children about the seasons, seasonal changes and typical seasonal weather and events. They learn about measuring the weather and how to stay safe warm weather.

Unit 1 – Materials (Everyday materials and their properties)

<u>Key Vocabulary</u>	<u>Outcomes</u>
Object, material, wood, plastic, glass, metal, water, rock, brick, paper, fabric, elastic, foil, card/cardboard, rubber, wool, clay, hard, soft, stretchy, stiff, bendy, floppy, waterproof, absorbent, breaks/tears, rough, smooth, shiny, dull, see-through, not see-through, properties	- distinguish between an object and the material from which it is made - identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock - describe the simple physical properties of a variety of everyday materials - compare and group together a variety of everyday materials on the basis of their simple physical properties - Test materials to identify properties

Lesson One	Lesson Two	Lesson Three	Lesson Four	Lesson Five	Lesson Six
<u>How can we describe different materials?</u> Hook – Gather up a range of different materials and objects for the children to explore. Ask them to sort them how they feel necessary Introduce the difference between objects and materials – add to working wall Children to draw objects and label their materials Extension: children to think of adjectives to describe objects	<u>How can we sort everyday materials into groups?</u> Recap previous learning Introduce stem sentences “An object is..” “A material is” Use real objects to sort into material groups. Take photos. Introduce recycling What can be recycled? Cut and sort images into recyclable and non recyclable in books.	<u>How can we describe everyday materials?</u> Recap – Provide the children with different types of material and their name – label them. Introduce properties . Model using a material, e.g. wood. How could we describe this material? Hard, stiff, shiny, solid etc. Provide the children with different photos of materials, as well as physical examples of the materials. Children to label each material with adjectives to describe the material. Extend – how can each material be better to use for different things? E.g. use fabric vs wood.	<u>How can we name properties through testing?</u> Recap – What are different types of materials? Use a mystery bag with different things in . Introduce absorbent waterproof transparent and opaque Show to how to test for these properties Investigate: split class in half, absorbency test and transparency test. Each half to make a prediction for the other half of the class Class to feedback findings to other half of the class. Discuss observations and revisit enquiry questions and predictions.	<u>How do we know which material is best?</u> Recap –what did we test? Introduce the concept that some materials are better for different purposes. Pose a problem for the children. Mr Cherry needs to fix the EYFS outdoor shelter to keep the toys dry. Which material will be best? Discussion on what the properties will need to be. Class to make a prediction. Children to work in groups testing three different materials in water. discuss and record results. link back to prediction. Decide which material they think is best.	<u>Which material is best</u> Recap – why are some materials better? Pose a problem for the children. Mr Cherry needs to build a storage box. He only told us it needs to be strong. Which material will be best? Children to work in groups sorting materials in sorting hoops strong and not strong. Children to decide in their groups which material would be best? inform the class that Mr Cherry has now told you it needs to be strong and waterproof. Based on what they have learnt can they re sort the materials in their books using images

Unit 1 – Materials (Everyday materials and their properties)

Assessment:

Scientific enquiry: find the best material to solve Mr Cherry's problem of the best material needed to build some storage units.

Substantive Knowledge

A material is what an object is made from.

Materials are all around us, such as in the home, garden, school and park.

Everyday materials include wood, plastic, glass, metal, water, rock, brick, paper and fabric.

Materials are important because we use them to make everyday objects for example, plastic is light and stiff. It can be used for a water bottle

Disciplinary knowledge

Ask simple questions and recognise that they can be answered in different ways.

Observe closely, using simple equipment.

Perform simple tests.

Identify and classify.

Use their observations and ideas to suggest answers to questions.

Gather and record data to help in answering questions.

Previous Knowledge

In EYFS, pupils learned that different materials that can be used for different things. We talked about the similarities and differences in relation to places, objects, materials and living things. Children explored materials when expressing themselves creatively.

During this unit, we will be introduced to a range of basic materials and their properties. We will learn to name and identify a variety of materials and begin to explain that these materials can be made into many different objects. We will then progress and learn to distinguish between an object and the material from which it is made. We will investigate the properties of materials and begin to recognise that a material's properties define its use.

Unit 2 – Uses of Everyday Materials

Key Vocabulary

Names of materials – wood, metal, plastic, glass, brick, rock, paper, cardboard
 Properties of materials – as for Year 1 plus: Opaque, transparent and translucent, reflective, non-reflective, flexible, rigid, shape, push/pushing, pull/pulling, twist/twisting, squash/squashing, bend/bending, stretch/stretching

Outcomes

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

Lesson One

What uses do materials have ?

Recap prior learning
 Provide class with objects and ask them to sort based on materials.
 Record

Discuss what materials the children think they will find inside and outside
 Scientific inquiry What do they think will be the most common material?

Create a class table based on materials they believe they will see. Split the chn into groups to find the materials and record e.g. one group wood, one group plastic etc

Share findings together.
 Discuss suitability.

Lesson Two

How can the shape of a solid object be changed?

Show the children 3 different objects (e.g. cup, teddy, elastic band)

Recap describing objects – e.g. soft, transparent, opaque, hard, waterproof, absorbent.

What does it mean for something to be solid. Refer back to your 3 items, are these solid. Why? If I poured a drink into my cup, does it change shape? [How can we change the shape of a solid object?](#) (Squash, bend, twist, stretch)

Use 4 different objects, explore these different methods of changing shape. Record in table.

Lesson Three

Which material is the stretchiest?

Recap – What were the 4 different ways to change the shape of a solid?

We are going to focus on stretchiness of an object. What does this word mean? Can you think of any stretchy objects? Stretchiness is actually called elasticity. Write a definition.

Provide the children with 4 different objects (e.g. bag, paper, elastic band, piece of clothing/fabric)
 Write predictions of which they think will be elastic.
 Test different objects for elasticity.
 Record findings in books.

Lesson Four

What is the difference between raw and synthetic materials?

Recap – What were the 4 ways of changing the shape of a solid?
 recap elasticity.

Were all of the objects we saw natural (found in the environment) or made by a human?

What does it mean for an object to be man-made(Synthetic)?
 What about raw (natural)?

Show the children examples of both types of material.
 Explain in books what each means and make a list of different examples.
 Where do raw materials come from?

Lesson Five

Why do we change materials?

Recap – What does raw and synthetic mean? What is the difference between each? Recap examples of each.

Why do you think people change materials? Think of some function purposes of changed objects e.g. sand to glass.

How are objects changed e.g. heated, mixed with other raw material, chemically changed.

Teach how a raw material is changed (e.g. sand to glass).
 Children to map out the process of making glass from sand.

Lesson Six

Why do we recycle?

Recap how materials can be changed
 Introduce how plastics can be harmful.
 together Sort waste into items that can be recycled. Think about properties and suitability. Look at examples of how waste can be reused.
 Pose the inquiry question
 Mrs Tippett would like to reuse some of the waste to benefit the school. children to create designs and present them back to the class. remind the chn that the designs must reflect the properties of materials.
 like

Unit 2– Materials (Everyday materials and their properties)

Assessment:

Create a design of reusing waste materials to benefit the school

Substantive Knowledge

Some objects and materials can be changed by squashing, bending, twisting, stretching, heating, cooling, mixing and being left to decay.

A material's physical properties make it suitable for particular purposes, such as glass for windows and brick for building walls.

Many materials are used for more than one purpose, such as metal for cutlery and cars.
Recycling is making old, used materials into new objects.

Disciplinary knowledge

Ask simple questions and recognise that they can be answered in different ways.

Observe closely, using simple equipment.

Perform simple tests.

Identify and classify.

Use their observations and ideas to suggest answers to questions.

Gather and record data to help in answering questions.

Previous Knowledge

In the previous unit, the children learnt that materials have different properties., and that these can be sorted and tested. In EYFS, children learnt that some materials are magnetic and some materials are non-magnetic.

This project teaches children about the uses of everyday materials and how materials' properties make them suitable or unsuitable for specific purposes. They begin to explore how materials can be changed.e

Unit 3– Seasonal changes –

Key Vocabulary

autumn, winter, spring, summer,, sun, clouds, temperature, wind, anemometer, pollen, hay fever day, night, meteorologist, rain gauge, rainfall

Outcomes

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

Lesson One

What are the four seasons?

Recap of previous learning. What do the children already know?

Ask the children to split the page into four to draw or write what they know about each season.

Address gaps and misconceptions.

Recap length of day and staying safe in different weather types.

Discuss what season it is now and what the upcoming season will be.

Lesson Two

What are the features of Winter?

Hook – Go on a nature walk. Look at the weather, plants, any animals. Take pictures

Record findings of above on flipchart.

What is the weather like in Winter?

Recap how weather has been measured in previous units. Introduce and recap that weather can be measured.

Lesson Three

How can we measure rainfall?

Recap: label pictures From nature walk last week.

Introduce rainfall. How can we measure? Introduce inventors and rain gauge

Children to label and draw designs to create a rain gauge

Children to make rain gauges and record findings daily over a week.

Lesson Four

How can we measure the wind?

Recap: what do the results of the rainfall show us?

introduce wind How can we measure? Introduce inventors and simple anemometers

Children to label and draw design anemometers

Children to anemometers and record findings daily over a week

Lesson Five

What season is next?

Recap: what do the results of the wind show us?

Introduce simple weather maps. Discuss sunset and sunrise timings. Discuss length of day and night Discuss temperature

Introduce spring and changes that will occur. Show last years temperatures and sunset/sunrise timings from last spring. How do they differ from winter?

Children to go back to lesson 1 task and add in purple new learning for the seasons.

Lesson Six

How can we stay safe in Spring?

Recap spring and winter. Introduce pollen and hay fever.

Children create a poster about hay fever prevention and pollen. ta

Unit 3 – Seasonal changes

Assessment:

Substantive Knowledge

The weather can change daily and some weather types are more common in certain seasons, such as snow in winter.

Pollen rises in Springtime. .

Weather can be measured in different ways

A weather forecast predicts the weather.

Disciplinary knowledge

Ask simple questions and recognise that they can be answered in different ways.

Observe closely, using simple equipment.

Perform simple tests.

Identify and classify.

Use their observations and ideas to suggest answers to questions.

Gather and record data to help in answering questions.

Previous Knowledge

In EYFS, the children talked about some natural features that they see and feel during different seasons, including different weather. Some children have previously explored changes in Autumn and Winter and Spring and Summer.

This project teaches children about the seasons, seasonal changes and typical seasonal weather and events. They learn about measuring the weather and how pollen can impact some people.

Unit 5– Plants (Common plants and their structure)

<u>Key Vocabulary</u>		<u>Outcomes</u>			
deciduous, evergreen, plant, tree, leaf, stem, flower, petals, roots		- Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees. - Identify and describe the basic structure of a variety of common flowering plants, including trees.			
Lesson One	Lesson Two	Lesson Three	Lesson Four	Lesson Five	Lesson Six
<u>What do we already know about plants?</u> Hook – Go on a nature walk around the school grounds. What do we notice about the plants around our school? Take photos of the plants and then use these in the classroom to discuss similarities and differences between them all. On flipchart, write down what we already know about plants. Add to this as the topic progresses to show new learning.	<u>What are the features of a plant?</u> BBC Bitesize – Features of a plant. Show the children some flowers. Ideally, ones that also have roots. Take the plant apart and explore the different parts. Label in science books the different functions of the parts of a plant. Make the link between a flowering plant and a tree – how they may look different, but they have the same structure. Plenary – create actions/sounds that link to the parts of a plant to remember.	<u>Do all plants have the same structure?</u> Recap – Actions/sounds that we used last lesson to remember the functions of parts of a plant.. What were the features of a plant? How were these helpful to a plant? Do all plants have the same structure? Explore with different plants – try and include a variety of garden plants. Take photos for books. Look at the difference between garden and wild plants – are they really that different?	<u>What different plants and trees can we name?</u> Recap – structure and features of plants. Activity – Provide the children with different wild flowers and garden flowers. Can they correctly name any? What is the difference between deciduous and evergreen trees? Provide the children with images of these types of trees and label if they are deciduous or evergreen. Can they name these trees in books? Name different common plants in books.	<u>How can we care for plants?</u> Recap – What does deciduous and evergreen mean? Why are these different parts of plants important? How can we care for nature around us? Make a list of ways that we can care for plants. What do plants need to survive? Challenge children to think about how plants in different environments may need different things.	<u>How are plants adapted to survive?</u> Recap – What do plants need? Go back out on a nature walk and look at those different plants that you took photos of in the first lesson. How are these plants adapted to survive in our school grounds? Do all plants live in the same environment? How are different plants adapted to live where they do? Quizziz questionnaire linked to this topic to assess progress.

Unit 5 – Plants (Growth and basic needs of a plant)

Assessment:

Substantive Knowledge

In winter, many plants and trees are dormant and have buds on their branches.

In spring, leaves and blossom appear on trees and smaller plants begin to grow and flower.

The basic plant parts include root, stem, leaf, flower, petal, fruit, seed and bulb. Trees have a woody stem called a trunk

Disciplinary knowledge

Ask simple questions and recognise that they can be answered in different ways.

Observe closely, using simple equipment.

Perform simple tests.

Identify and classify.

Use their observations and ideas to suggest answers to questions.

Gather and record data to help in answering questions.

Previous Knowledge

In EYFS, the children learnt that plants and trees are living things, and that living things change over time.

Some children will have previously looked at how plants and trees are affected in different seasons.

This project teaches children about wild and garden plants by exploring the local environment. They identify and describe the basic parts of plants and observe how they change over time.

Unit 6– Plants (Growth and basic needs of a plant)

<u>Key Vocabulary</u>		<u>Outcomes</u>			
deciduous, evergreen, plant, tree, leaf, stem, flower, petals, roots, light, shade, sun, warm, cool, water, grow, healthy, germinate		- 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.			
Lesson One	Lesson Two	Lesson Three	Lesson Four	Lesson Five	Lesson Six
<u>What do we already know about plants?</u> Hook – Show children some plant photos (flowering, trees, bushes, etc). What are these things? How are they similar? recap habitats and microhabitats. On flipchart, write down what we already know about plants. Add to this as the topic progresses to show new learning. Teach children that all plants are living things and all need basic things to survive. While they might look different, they have similar basic features. Teach these.	<u>What does a plant need to grow?</u> Show the children a bulb and a seed. What is similar between these things? Explain to the children that they are going to help plant the seed. What do you think it will need? Record findings and ask the children to help write a step-by-step guide to help plant the seed. Write on flipchart.. Provide the children with a pot per table, soil and a seed. Supervise the children to complete this step by step. Take photos throughout and stick in books.	<u>Why does a plant need certain things to grow?</u> Recap – What did we do last week? What did we learn from this? Remind children of the things they said a plant would need to survive. Go through these features one by one and discuss why this is important. Teach children of the importance of each feature. Provide children with photos of each basic need of a plant. Children to explain why each need is important and what it provides for a plant. Check on plant growth. Are its basic needs met?	<u>What are the features of a plant?</u> Show the children a fully grown plant. How is this similar/different from our growing plants? Pick out each feature of the adult plant and why each part is important in the plants overall growth. Provide children with a diagram of a flowering plant and ask them to label the features and what this provides for a plant. Challenge the children by providing them the photo of a tree and ask them to compare for similarities and differences.	<u>How do seeds and bulbs grow into a plant?</u> Recap – What are the features of a flowering plant? Remind themselves of prior learning from last week. What is the difference between a bulb and a seed? How are they the same? Teach children the life cycle of a flowering plant from both a seed/bulb to an adult plant. Recap – What are the basic needs of a plant? Will this life cycle be complete if one of these needs is not met? Record in books.	<u>Why are plants important in their habitat?</u> Recap – What have we learnt so far this topic? Quizziz to show learning. What is important to a plant? What does it need to grow? Why do you think plants are important in their habitat? Encourage children to think about animals (e.g. insects) and why they need plants. Create an information leaflet about the importance of all plants and what they provide to their habitat.

Unit 6 – Plants (Growth and basic needs of a plant)

Assessment:

Scientific inquiry: explain to the children that you are going to plant the same bulbs in 4 different pots. One pot will be placed in the dark but will have water, one will be placed in sunlight but will have no water and one will have sunlight and water. Which one do they think will survive or grow? How do they know?

Substantive Knowledge

A habitat is a place where a living thing lives. A microhabitat is a very small habitat.

Germination is the development of a plant from a seed.

Plants need water, light and a suitable temperature to grow and stay healthy. Without any one of these things, they will die.

Plants grow from seeds and bulbs. Seeds and bulbs need water and warmth to start growing (germinate). As the plant grows bigger, it develops leaves and flowers

Disciplinary knowledge

Ask simple questions and recognise that they can be answered in different ways.

Observe closely, using simple equipment.

Perform simple tests.

Identify and classify.

Use their observations and ideas to suggest answers to questions.

Gather and record data to help in answering questions.

Previous Knowledge

Previously, the children learnt that plants are living things. Common plants include the daisy, daffodil and grass. Trees are large, woody plants and are either evergreen or deciduous. All living things (plants and animals) change over time as they grow and mature.

This project teaches children about the growth of plants from seeds and bulbs. They observe the growth of plants firsthand, recording changes over time and identifying what plants need to grow and stay healthy.

Unit 1 – Rocks and Soil

Key Vocabulary

Rock, stone, pebble, boulder, grain, crystals, layers, hard, soft, texture, absorb water, soil, fossil, marble, chalk, granite, sandstone, slate, soil, peat, sandy/chalk/clay soil, sedimentary, igneous, metamorphic, permeability

Outcomes

- 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.

Lesson One

I can compare and group different rocks

Hook – Show the children different rocks and ask them to make comparisons between them.

Create a mind map in books and write down what they already know about rocks, soils and fossils.

How did you compare and group them? How would you describe the rocks? Look at different vocabulary we can use (grain, crystal, layers, rough, smooth etc. Look at rocks, pebbles, boulders.

Record findings using

Lesson Two

I can explain how rocks are formed.

Recap – how can we describe rocks?

Look at examples of the 3 types of rock. How are they the same and different? How were they made?

[Zoom into](#) the different types

Teach the children about the formation of rocks and how they can be created.

Write explanation in books.

Lesson Three

I can investigate properties of rocks

Recap – how are rocks formed?

How do the different types of rock look? How might we know which type we are looking at by making observations?

Teach permeability, hardness and buoyancy as other properties of rocks.

Chn make predictions about the different types based on their observations.

Carry out investigations.

Lesson Four

How are fossils formed?

Recap – What have we covered so far in our science topic?

Show the children the term ‘fossil’. What does this word mean?

Teach the children about how a fossil is a cast of the animal or plant that the rocks have covered.

Children to create a fossil cycle in their books.

Lesson Five

I can explain what soil is made of

Review – What have we learnt so far in our topic?

Show the children a cup of soil/mud. What is this? What is it made from?

Teach the different materials that make up soil.

Children draw and label soil.

Look at different samples of soil. Why do some look different than others?

Children make observations of the different types. Teach different names.

Lesson Six

How do rocks on our planet change?

Recap – What are rocks and fossils?

Read *Pebble in my Pocket*.

Do all rocks stay the same on the planet all the time? Where can we find rocks on our planet? Why do we find them in these places?

Show the children different pictures of rocks under different situations.

Teach the children the impact of human and weather on rocks. What about impact of the planet e.g. natural disasters. Record in books.



Unit 1 – Rocks and Soils

Assessment:

Substantive Knowledge

Sedimentary rocks are often soft, permeable, and have layers and may contain fossils.

Igneous rocks are usually hard, shiny and contain visible crystals.

Metamorphic rocks are usually very hard and often shiny.

Soils are made from tiny pieces of eroded rock, air and organic matter

Disciplinary knowledge

Ask relevant questions and use different types of scientific enquiries to answer them.

Set up simple practical enquiries, comparative and fair tests.

Make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.

Gather, record, classify and present data in a variety of ways to help in answering questions.

Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.

Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.

Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.

Identify differences, similarities or changes related to simple scientific ideas and processes.

Use straightforward scientific evidence to answer questions or to support their findings.

Previous Knowledge

In KS1 the children learnt that a material's physical properties make it suitable for particular purposes and that many materials are used for more than one purpose.

This project teaches children about the properties of different types of rocks and how to categorise them. The children are introduced to fossils and soils and how rocks can change.

Unit 2 – Forces and Magnets

Key Vocabulary

magnet, magnetic, poles, north pole, south pole, magnetic force, attract, repel, metals, friction, force, meter

Outcomes

- Compare how things move on different surfaces.
- Notice that some forces need contact between two objects, but magnetic forces can act at a distance.
- Observe how magnets attract or repel each other and attract some materials and not others.
- Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials.
- Describe magnets as having two poles.
- Predict whether two magnets will attract or repel each other, depending on which poles are facing.

Lesson One

What is a force?

Create a mind map of what they already know about forces and magnets

Lesson Two

How do magnets work?

Hook – Show the children three different images of magnets (round magnet, red and blue bar, wand) ask them to spot the difference. Discuss after that they are all magnets.

Ask the children what a magnet is and how it works.

Teach the children that magnets attract other magnetic objects and use forces to either pull or push them.

Children to record their findings in books.

Lesson Three

How can we tell if a material is magnetic or not?

How do magnets work? What do the terms 'attract' and 'repel' mean?

Provide the children with different materials and ask them to organise them into magnetic and non-magnetic objects. Discuss their ideas.

Test using different magnets to see if their initial ideas were correct.

Record findings in books.

Lesson Four

What are non-contact forces?

Recap – what's a force?

Teach the children about 2 different types of force. Which do you think a magnetic force would come under? Look at examples of contact forces (frictional, spring and muscular). Then, compare with non-contact (magnetic, gravitational, electrostatic).

Record findings in books and explain the difference between types of force.

Lesson Five

What is friction?

Recap – What are the two types of force?

What does the term 'friction' mean?

Teach the children about what friction is and how it works.

Explore friction using different materials (e.g. moving objects on the table and if they have any resistance, as well as rubbing hands together and creating heat).

Record in books. Explain that we will be doing an experiment next week to test friction further.

Lesson Six

How do objects move on different surfaces?

Recap – what is friction? How does friction work?

Look over their learning from last week. Show the children the different surfaces that they will be exploring (table, carpet, cardboard and playground). They are going to roll a toy car across each of these surfaces. In books, make predictions of what they think will happen.

Teach the children about fair test and how we can make this fair. Test the different surfaces. Record findings in books.



Unit 2 – Forces and Magnets

Assessment:

Scientific inquiry: explain to the children that you are going to plant the same bulbs in 4 different pots. One pot will be placed in the dark but will have water, one will be placed in sunlight but will have no water and one will have sunlight and water. Which one do they think will survive or grow? How do they know?

Substantive Knowledge

Forces cause objects to move, change speed or change shape.

Forces need contact between two objects, but magnetic forces can act at a distance.

Magnets have two poles (north and south).

Magnets have invisible magnetic fields that can be seen using iron filing

Disciplinary knowledge

Ask relevant questions and use different types of scientific enquiries to answer them.

Set up simple practical enquiries, comparative and fair tests.

Make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.

Gather, record, classify and present data in a variety of ways to help in answering questions.

Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.

Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.

Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.

Identify differences, similarities or changes related to simple scientific ideas and processes.

Use straightforward scientific evidence to answer questions or to support their finding

Previous Knowledge

Previously, the children learnt that objects can move. They learnt that objects that float are typically light or hollow and objects that sink are typically heavy or dense.

This project teaches children about contact and non-contact forces, including friction and magnetism. They investigate frictional and magnetic forces, and identify parts of a magnet and magnetic materials.

Unit 3– Animals including Humans (Skeletal structure and nutrition)

Key Vocabulary

Nutrition, nutrients, carbohydrates, sugars, protein, vitamins, minerals, fibre, fat, water, skeleton, bones, muscles, joints, support, protect, move, skull, ribs, spine

Outcomes

- Identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat.
- Identify that humans and some other animals have skeletons and muscles for support, protection and movement.

Lesson One

What are nutrients?

Hook – Show children a mixture of different food items, What are these and why do we eat different foods?

Ask the children what nutrients are. Why do we have different nutrients?

Provide the children with photos of different foods and ask them to group the foods together for what nutrients these foods provide.

Children to write a definition of the word nutrient and why we need nutrients.

Lesson Two

What different nutrients do we get from food?

Recap – What are nutrients?
Can we name and nutrients?

Look at different types of nutrients and what they give to humans and animals.
Look at example foods that provide different nutrients.

Why do animals and humans need to eat different foods?

Children to record in books.

Lesson Three

What is a balanced diet?

Recap – What are the different nutrients that we get from food?

Why do animals and humans need to eat different foods?

Ask the children to write a definition of what a balanced diet is. Look at different foods and how they can help make a balanced diet?
Compare with fast food items.

Children to create a daily balanced diet and explain why these foods are healthy for humans.

Lesson Four

Why do we have a skeleton?

Recap – Why do we need nutrients?
Which foods are good for our bones?

Show the children the skeleton model. What is this and why do we have it?

Teach children about the function of a skeleton and why it is needed.

Children to label major bones in the body and why we have it.
Plenary – Ask the children if someone has longer legs, does it mean they are faster?

Lesson Five

Which animals have an endoskeleton?

Recap – Why do we have a skeleton?

Look at the term 'endoskeleton'. What does this mean?
Endo – means internal.

Which animals have a skeleton inside their body?
Show the children different animals and ask them to group if they have an internal or external skeleton.

Children to write a definition for endo- and exoskeleton. Then, children to create a table with examples of both.

Lesson Six

What is the difference between vertebrate and invertebrate?

Starter – Children to write a definition of endo- and exoskeleton and give 2 examples of each.

Show the children the terms 'vertebrate and invertebrate'. What do you think these words mean?

Teach children the difference.

Children to record what the words mean. Then compare examples of these animals for similarities and differences.

Unit 3 – Animals including Humans (Skeletal structure and nutrition)

Assessment:

Substantive Knowledge

Muscles are soft tissues made up of many stretchy fibres. They allow humans to move, breathe and digest food.

There are three main types of muscle in the human body: smooth muscle, skeletal muscle and cardiac muscle.

Major muscle groups in the human body include the biceps, triceps, and abdominals.

Disciplinary knowledge

Ask relevant questions and use different types of scientific enquiries to answer them.

Set up simple practical enquiries, comparative and fair tests.

Make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.

Gather, record, classify and present data in a variety of ways to help in answering questions.

Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.

Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.

Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.

Identify differences, similarities or changes related to simple scientific ideas and processes.

Use straightforward scientific evidence to answer questions or to support their findings.

Previous Knowledge

In KS1, children learnt about the growth in animals by exploring the life cycles of some familiar animals. They built on learning about the survival of humans by identifying the basic needs of animals for survival, including food, water, air and shelter. Pupils learnt about the importance of exercise, and that we must eat the right amounts of different types of food, and have good hygiene.

This project teaches children further about the importance of nutrition for humans and other animals. They learn about the role of a skeleton and muscles and identify animals with different types of skeletons.

Unit 5 – Plants

Key Vocabulary

nutrients, photosynthesis, function, pollination, pollen, insect/wind pollination, seed formation, seed dispersal (wind dispersal, animal dispersal, water dispersal)

Outcomes

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

Lesson One

What are the parts and functions of a plant?

Hook – Show the children a plant. What is this? What are plants?
Children to create a mind map and write down prior knowledge.

Look back at the plant and discuss what the different parts of each are. Label the parts on the plant.

Children to be given a diagram of a plant and they label each part and its function in books.

Lesson Two

What is similar and different between a flower and a tree?

Recap – What are the parts of a plant? Why are these parts important?

Look back at the flower head. Why is this important?

Look closely at the individual parts of a flower and then look at the parts of a tree. What is similar and what is different?

Compare in books.

Link to next lesson – What does the flower head have to do with pollination? What is pollination?

Lesson Three

How does a seed grow?

Recap – What is the function of a flower head?

Show the children a seed. How is this created? How does it grow?

Teach the children about the importance of pollen. How does pollen transport?

Show the children an insect, wind and water. What do these have in common? Teach that they all help to transport pollen to other plants to help create the seed.

Record pollination processes in books.

Lesson Four

How does a plant adapt to different conditions?

Recap – How does a seed grow?

What does a plant need to grow (light, water, air, nutrients).

Children to help plant seeds and place them in different areas within the classroom (light, dark, no water).

Children to make predictions in books to say how they think each plant will grow in each condition.

Lesson Five

What is the plant life cycle?

Recap – What did we do last week?

Let's look and see if the plants have grown in each condition that we set out last week. Discuss.

What is the life cycle of a plant? How does a plant start life? Discuss each stage of a flowering plant and a tree.

Children record the plant life cycle in their books.

What does photosynthesis mean? Teach and record findings in books.

Lesson Six

How is water transported in a plant?

Recap – What is photosynthesis? How is this important to a plant?

If photosynthesis is how a plant creates food and energy for itself to grow, how does a plant get water?

Show the children different celery sticks in coloured water – discuss how this has absorbed the water. Explain that roots **do not** suck up the water. That water evaporates from the leaves, which encourages water to be moved up through the stem. Record in books.

Unit 4 – Plants

Assessment:

Substantive Knowledge

Plants require air, light, water and nutrients for life and grow.

Water is transported in plants from the roots, through the stem and to the leaves, through tiny tubes called xylem.

The processes of a plant's life cycle include germination, flower production, pollination, seed formation and seed dispersal.

The parts of a flower include the sepal, petal, stamen and carpel.

Disciplinary knowledge

Ask relevant questions and use different types of scientific enquiries to answer them.

Set up simple practical enquiries, comparative and fair tests.

Make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.

Gather, record, classify and present data in a variety of ways to help in answering questions.

Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.

Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.

Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.

Identify differences, similarities or changes related to simple scientific ideas and processes.

Use straightforward scientific evidence to answer questions or to support their findings.

Previous Knowledge

In KS1, the children learnt that plants grow from seeds and bulbs. They learnt that plants need water, light and a suitable temperature to grow and stay healthy.

This project teaches children about the requirements of plants for growth and survival. They describe the parts of flowering plants and relate structure to function, including the roots and stem for transporting water, leaves for making food and the flower for reproduction.

Unit 6 – Light

Key Vocabulary

Light, light source, dark, absence of light, transparent, translucent, opaque, shiny, matt, surface, shadow, reflect, mirror, sunlight, dangerous

Outcomes

- Recognise that they need light in order to see things and that the 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 size of shadows changes.

Lesson One

What is light?

Hook – Ask the children to look around them. What can you see? Ask them to think why they can see these things.

Create a mind map of what they already know about light and shadows.

What is light and how is it created?
Show the children a range of different objects (sun, moon, torch, floor, sea etc) classify which are sources of light and which reflect light.

What is the difference between light and dark.
Write definition in books.

Lesson Two

How can we see objects?

Recap – What is the difference between light and dark?

How does light help us to see different objects?
Which of our senses is used?
Teach the children about how light reflects off of different objects and then into our eyes. Our eyes have receptors inside then which are activated when light reflects into our eyes.

Teach of the dangers of looking directly into a light source.

Draw diagram of how we see an object in books.

Lesson Three

What is the difference between night and day?

Recap – What is light and how does it differ to dark?

Teach the children about how the earth rotates on an axis. This helps to create night and day.
When is day? When is night?

Using a torch and a ball, recreate Earth's axis and rotation to create night and day.

Children to be given a diagram and label how night and day is created.

Lesson Four

Which materials are reflective?

Recap – How do we see different objects? How do our eyes detect light?

Show the children a range of different materials.
What do you notice about these different objects?
What does reflective mean?

Teach the children what reflective and non-reflective means. Look back at the items and organise them. Write predictions in books.

Test to see which are reflective and not. Record findings in books.

Lesson Five

How are shadows formed?

Recap – What is light? How is it created? Which different objects can create light?

Go outside. What do you notice when we are stood on the playground. If sunny, children should notice shadows are made. How are these created?

Back inside, teach the children that shadows are made when an object blocks the light and casts darkness behind it. Look at different objects and create shadows with them. Use transparent and opaque objects. What happens with these?

Lesson Six

How can you change the size of a shadow?

Recap – What is a shadow? How are these created?

Go outside – look at our shadows again. Children to draw around their shadows. How can we change our shadows?

Back inside – How can we change shadows?
Transparent objects allow light through. Opaque do not allow light to pass through and create shadows.
Teach that the closer an object is to the light source, the larger it is. Create a puppet show.



Unit 6 – Light

Assessment:

Substantive Knowledge

A light source produces light. A reflector reflects light.

Light sources and reflectors can be natural, such as the Sun and Moon, or artificial, such as a light bulb or bike reflector.

Protection from the Sun includes sun cream, sun hats, sunglasses and staying indoors or in the shade.

A shadow is made when an object blocks the passage of light from a light source.

Disciplinary knowledge

Ask relevant questions and use different types of scientific enquiries to answer them.

Set up simple practical enquiries, comparative and fair tests.

Make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.

Gather, record, classify and present data in a variety of ways to help in answering questions.

Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.

Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.

Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.

Identify differences, similarities or changes related to simple scientific ideas and processes.

Use straightforward scientific evidence to answer questions or to support their findings.

Previous Knowledge

Previously, the children learnt that daylight varies through the year.

This project teaches children about light and dark. They investigate the phenomena of reflections and shadows, looking for patterns in collected data. The risks associated with the Sun are also explored.

B1. LKS2 UNIT BREAKDOWNS



Unit 1– Electricity

Key Vocabulary

Electricity, electrical appliance/device, mains, plug, electrical circuit, complete circuit, component, cell, battery, positive, negative, connect/connections, loose connection, short circuit, crocodile clip, bulb, switch, buzzer, motor, conductor, insulator, metal, non-metal, symbol

Outcomes

- 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.

Lesson One

What appliances run on electricity?

Hook – Show the children a range of different electrical items. What do these all have in common?

Create a mind map of what they already know about electricity.

How do we know if something is [electrical](#)? Teach that all electrical items have a circuit inside which allows the electrical energy to pass through.

Provide the children with different photos to organise into electrical and non-electrical appliances. Explain how they know.

Lesson Two

How does an electrical circuit work?

Recap – Can you name some electrical appliances?

How do these appliances work? Teach the children about electrical circuits and how these work.

Show the children different parts of a circuit – can they correctly name these parts? Give the children an opportunity to make a simple circuit with a bulb.

Draw their circuit in their books and label the different parts. Explain how the circuit works.

Lesson Three

Will the lamp work in this circuit?

Recap – What are the different parts of a circuit?

How can we be [safe around electricity](#)?

How do we know that a circuit is going to work? Provide the children with different photos of circuits and ask them to discuss with partners if this would work or not. Explain how they know.

Children to be given diagrams of these circuits to label in their books and how to correct.

Lesson Four

Which role does a switch play in a circuit?

Recap – How does a circuit work?

Show the children a circuit with a switch in it. Ask them what this component does. Ask children to think of different appliances that use a switch (lights, kettle, oven, lamp, torch etc). Teach the children what a switch does and how it works.

Children to construct a circuit which uses a switch. Draw a diagram in their books and explain what a switch does in a circuit.

Lesson Five

What is a conductor and how is it different to an insulator?

Recap – How does a circuit work? Can you recall the different components in a circuit?

Recap safety around electricity. Think of things that might be dangerous around electricity. (liquids, metals etc). Explain that these things are called conductors. What do you think this word means? [Teach children what a conductor is](#) and how it works. Show examples. Compare to insulators. Children to write explanation of each and classify different items into each category.

Lesson Six

How can you change a circuit?

Recap – What are circuit components? What are conductors and insulators.

Explore circuits using different items to see if they are conductors or insulators.

How can we [change a circuit](#)? What would happen to the circuit if we added an extra battery? What about an extra bulb? Explore by making the circuits.

Children to record their findings in books.

Unit 1– Electricity

Assessment:

Substantive Knowledge

A series circuit has a single path for an electric current to flow through.

A series circuit must be a complete loop to work and have a source of power from a battery or cell.

Electrical components include cells, wires, lamps, motors, switches and buzzers. Switches open and close a circuit and provide control.

Disciplinary knowledge

Ask relevant questions and use different types of scientific enquiries to answer them.

Set up simple practical enquiries, comparative and fair tests.

Make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.

Gather, record, classify and present data in a variety of ways to help in answering questions.

Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.

Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.

Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.

Identify differences, similarities or changes related to simple scientific ideas and processes.

Use straightforward scientific evidence to answer questions or to support their findings.

Previous Knowledge

Previously, the children learnt that materials have different properties. Some materials have magnetic properties and magnetic materials are attracted to magnets.

This project teaches children about further properties of materials. They learn about electrical appliances and safety. They construct simple series circuits and name their parts and functions, including switches, wires and cells. They investigate electrical conductors and insulators and identify common features of conductors. It also teaches children about programmable devices. They combine their learning to design and make a nightlight.

Unit 2 – Animals including Humans

Key Vocabulary

Digestive system, digestion, mouth, teeth, saliva, oesophagus, stomach, small intestine, nutrients, large intestine, rectum, anus, teeth, incisor, canine, molar, premolars, herbivore, carnivore, omnivore, producer, predator, prey, food chain

Outcomes

- 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.

Lesson One

How do our teeth work?

Hook – Provide the children with a biscuit. Ask the children what happens when we eat this and afterwards? Children to map out on piece of paper. Then eat the biscuit.

Create a mind map of what they already know about the digestive system and teeth.

Explain to the children that we are going to follow the biscuits journey. Where do we start?

[Teach the children about the teeth we have](#), how they grow and their different functions. Record in books..

Lesson Two

What are organs and why do we need them?

Recap – What is the digestive system?

Review the digestive system and how it works.

Why do we have different organs in this system? What purpose do they serve?

Look at some of the major organs we have (brain, heart, stomach, intestines, lungs). Why do we need these organs? Label these organs and explain their functions. Which of these are involved in the digestive system? Explain their role.

Lesson Three

How do we digest food?

Recap – What did we look at last week? Recap function of teeth and organs.

What will happen to the biscuit after we have chewed and swallowed?

[Teach the children about the stages of the digestive system](#).

Map out the different stages with the children.

Label diagram in books.

Complete the [digestive system experiment](#).

Lesson Four

What is a food chain?

Recap – What have we looked at so far in our topic?

Recap the digestive system. Are humans the only animals with a digestive system? Why do animals need to eat? Share ideas and write them down.

What is a food chain? Recap learning in KS1.

Map out the food chain of animals in woodland. Then in sea.

Children to draw 3 comparative food chains in books.

Lesson Five

What role do different organisms play in a food chain?

Recap – What is a food chain?

Show the children an animal from the food chain. What role does this creature play in the food chain? Then show the children a producer (grass) and ask them what this does. What happens if you take one of these out of the food chain?

Teach the children about [producers, prey and predators](#).

Children to write explanation of each and then label in food chain.

Lesson Six

What is an omnivore?

Recap – What role does a producer play in a food chain?

Remind children about the role that different animals play in a food chain. Show them an example with a rabbit in the food chain. What would you classify this animal as? Herbivore, carnivore or omnivore?

Write an explanation of each on the board. Then show the children different images of animals and classify them into each category. Children to categorise animals in books and write explanation of each.

Unit 2 – Animals including Humans

Assessment:

Substantive Knowledge

An ecosystem is a community of living organisms and their environments that interact with each other.

The digestive system is responsible for digesting food and absorbing nutrients and water.

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

There are four different types of teeth: incisors, canines, premolars and molars.

Disciplinary knowledge

Ask relevant questions and use different types of scientific enquiries to answer them.

Set up simple practical enquiries, comparative and fair tests.

Make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.

Gather, record, classify and present data in a variety of ways to help in answering questions.

Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.

Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.

Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.

Identify differences, similarities or changes related to simple scientific ideas and processes.

Use straightforward scientific evidence to answer questions or to support their findings.

Previous Knowledge

Children have learnt that humans have a skeleton and muscles for movement, support and protecting organs. The children learnt that animals, including humans, need the right types and amounts of nutrition, and that they cannot make their own food.

This project teaches children about the human digestive system. They explore the main parts, starting with the mouth and teeth, identifying teeth types and their functions. They link this learning to animals' diets and construct food chains to show the flow of energy.

Unit 3– States of Matter

Key Vocabulary

Solid, liquid, gas, state change, melting, freezing, melting point, boiling point, evaporation, temperature, water cycle

Outcomes

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

Lesson One

What are the properties of solids, liquids and gases?

Hook – Show the children the [explorify video](#). Ask the children to describe what is happening.

Create a mind map of what they already know about states of matter.

Teach children that all matter on earth comes in 3 states. Ask if they know what these are. Teach children about [solids](#), [liquids and gases](#). Look at properties of each.

Children to create a fact card in for each state. Challenge each other with fact cards to embed facts.

Lesson Two

How do particles behave inside solids, liquids and gases?

Recap – What are the three states of matter?

What are the properties that we discussed for each state in last lesson? Model changing states with an ice cube and adding heat. Ask the children what they think happens in each state? Teach children what a particle is and how particles movement of each state.

Draw diagram of each in books and then provide example objects and describe particles in each.

Lesson Three

What happens when you heat or cool each state of matter?

Recap – What do the particles look like in each state?

How can we change each state? Children to match the states by describing the process needed to change them e.g. solid to liquid by melting. Teach children about heating and how particles have more energy and substance expands. Teach about cooling, particles slow and substance contracts.

Discuss practical example and children to draw diagram in books.

Lesson Four

What are changes of state and why do they take place?

Recap – What are the properties of each state and [how can we change states](#)?

Review what happens to each state when you heat/cool them. Draw diagrams to help consolidate these facts. Teach vocab “melting, boiling, condensing, freezing”. Teach alongside understanding of particles gaining/losing energy. Look at [water cycle](#) and how it links to changing states.

Draw diagram of water cycle in book. Annotate.

Lesson Five

What are melting and boiling points?

Recap – What happens when you heat or cool an object?

Show the children a range of different objects. Ask them to classify into solid, liquid and gas. Look at 2 of the objects (e.g. butter and cloud). What does this look like in each of the other states?

Teach about methods to measure temperature and water’s melting/boiling point. What happens when a substance is melted? What about boiled? Explore different melting and boiling points.

Lesson Six

How can you change the size of a shadow?

Recap – What is melting and boiling and how can we measure it?

Provide the children with a cup of sand. What does this feel like? What does it look like? Is it a solid or liquid or gas? Discuss why it acts like solid and liquid.

Teach children about non-newtonian fluids and how they act different when force is applied. Explore by mixing cornflour and water.

Children to explain how non-newtonian fluids act and how they differ to other substances.

Unit 3 – States of matter

Assessment:

Substantive Knowledge

Water changes state from solid (ice) $\rightleftharpoons$ liquid (water) at 0°C and from liquid (water) $\rightleftharpoons$ gas (water vapour) at 100°C.

The process of changing from a solid to liquid is called melting.

The reverse process of changing from a liquid to a solid is called freezing.

The process of changing from a liquid to a gas is called evaporation.

The reverse process of changing from a gas to a liquid is called condensation..

Disciplinary knowledge

Ask relevant questions and use different types of scientific enquiries to answer them.

Set up simple practical enquiries, comparative and fair tests.

Make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.

Gather, record, classify and present data in a variety of ways to help in answering questions.

Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.

Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.

Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.

Identify differences, similarities or changes related to simple scientific ideas and processes.

Use straightforward scientific evidence to answer questions or to support their findings.

Previous Knowledge

Children learnt about materials such as rocks and minerals. They explored the process of dissolving in relation to fossils and sediments.

This project teaches children about solids, liquids and gases and their characteristic properties. They observe how materials change state as they are heated and cooled, and learn key terminology associated with these processes.

Unit 5– Sound

Key Vocabulary

Sound, source, vibrate, vibration, travel, pitch (high, low), volume, faint, loud, insulation

Outcomes

- 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.

Lesson One

What is sound?

Hook – Play children a song. Ask them how they could hear the song. What is a sound?

Create a mind map of what they already know about sound.

Teach children what a sound is and [how it is created](#).

Teach children about how [sounds are heard and detected](#). Model by children creating sound and detecting it outside from different distances.

Children write definition in books and explain sound is made/detected.

Lesson Two

How are different sounds produced?

Recap – What is a sound and how is it detected?

Review how a sound is made and discuss that sound is made from waves.

Teach the children about how sound travels in waves. Use instruments to demonstrate this by seeing the skin of a drum move in vibrations which create sound waves.

Teach children that sound should be used safely and incorrect use can damage our ears.

Draw storyboard in books

Lesson Three

What are pitch and frequency?

Recap – How is sound created and how is it detected? Recap sound waves and how they travel.

What does the word [pitch](#) mean? Teach the children the meaning.
What does the word frequency mean? Embed this by looking at animal sounds and which category these fall into (high pitch and frequency or low). Explain how sound is measured (Hertz) and higher measure = higher pitch/frequency.

Make own instruments and explore pitch. Record in books.

Lesson Four

What do we mean by amplitude of sound?

Recap – Show the children different waves and ask if this is high or low pitch/frequency?

Show children different objects that make sound and ask if it is loud or quiet. Explain that [amplitude means volume of a sound](#). Teach that high force = high amplitude and low force = low amplitude. We measure volume in decibels. The smaller the measure the lower the amplitude.

Explore making sounds using instruments. Record in books.

Lesson Five

What is acoustics?

Recap – Recap what pitch, frequency and amplitude mean.

Show the children different images of rooms (church, classroom, cupboard, theatre). Which room would need more amplitude to hear?

Teach what acoustics means and how this differs depending on the size and closure of a room.

Design a classroom with criteria. Children work in pairs to create this and then present their designs.

Lesson Six

How can we make a string telephone?

Recap – What have we covered in this topic so far? Quizziz test to assess learning.

We are going to complete an experiment and make a string telephone. What things would we need?

Write step by step instructions on how to make it. Children to follow these and make the string phone. Test to see if it works.

Discuss the mechanisms and how it works.

Assess and review.



Unit 5 – Sound

Assessment:

Substantive Knowledge

When vibrations stop, the sound stops.

The volume of sound is measured in decibels (dB).

The more energy put into a sound source, the larger the vibrations and the larger the sound waves.

Pitch is how high or low a sound is.

Disciplinary knowledge

Ask relevant questions and use different types of scientific enquiries to answer them.

Set up simple practical enquiries, comparative and fair tests.

Make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.

Gather, record, classify and present data in a variety of ways to help in answering questions.

Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.

Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.

Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.

Identify differences, similarities or changes related to simple scientific ideas and processes.

Use straightforward scientific evidence to answer questions or to support their findings.

Previous Knowledge

In EYFS and KS1, children learnt that ears are used for hearing. Different body parts are used for different things.

This project teaches children about sound, how sound is made and how sound travels as vibrations through a medium to the ear. They learn about pitch and volume and find out how both can be changed.

Unit 6 – Living Things and their Habitat

Key Vocabulary

Classification, classification keys, environment, habitat, human impact, positive, negative, migrate, hibernate

Outcomes

- 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.

Lesson One

I can explain what a living thing is.

Hook – We are going to go on a nature walk. How many living things can you spot on the walk?

Create a mind map of what they already know about living things and the habitats they live in.

What living things did you spot? Were they living in their natural habitat?

What classifies as a living thing? Show the children different objects and animals. Classify them into living and non-living things.
Record in books.

Lesson Two

I can group living things in different ways.

Recap – What is a living thing?

Provide the children with a range of different animals. Ask them to classify the animals into different groups of their choice. Look at their categories.

Look back over the animals and have another go at classifying the animals into more scientific ways.

What about invertebrates?

Record in books.

Lesson Three

I can explore and use classification keys

Recap – what are the different groups of animals?

Teach the children about [different ways that we can classify animals](#). What [tools will we need to help classify](#) animals?

Lesson Four

I can explain how animals are suited to their habitat

Recap – What is a habitat?
Recap learning from KS1.

What is an environment?
Teach children that animals have adaptations that make them more suited to an environment. Ask children if a polar bear could live in the desert?

Show different photos of biomes. What are the features?

How is a food chain important to an animal's survival? Discuss what would happen if an animal was removed from their habitat.

Lesson Five

I can describe how environments change and the impact this has on animals

Recap – What is an environment?
How might an environment change? Discuss seasonal changes, as well as global warming changes. Look at ways that an [environment might change](#).

Discuss the [impact that humans are having on the environment](#) and why this is important.

Look closely at deforestation and the impact this has. Is this good or bad for animals?

Lesson Six

i can explain how humans can have a positive impact on the environment

Recap – How are environments changing? Recount different ways that things are changing and whether this is good or bad. Create a list of pros and cons. Do the pros outweigh the cons?

What does the term renewable mean? Look at what [renewable energy is](#). Discuss the positives that renewable energy has, but discuss the negatives.

Create a poster in books about the impact humans have on environment and ways this can be improved.

Unit 6 – Living Things and their Habitat

Assessment:

Substantive Knowledge

living things can be grouped in a variety of ways

classification keys can help group, identify and name a variety of living things in our local and wider environment

environments can change and that this can sometimes pose dangers to living things

Disciplinary knowledge

Ask relevant questions and use different types of scientific enquiries to answer them.

Set up simple practical enquiries, comparative and fair tests.

Make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.

Gather, record, classify and present data in a variety of ways to help in answering questions.

Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.

Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.

Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.

Identify differences, similarities or changes related to simple scientific ideas and processes.

Use straightforward scientific evidence to answer questions or to support their findings.

Previous Knowledge

In KS1 the children learnt that animals can be classified into different groups and these animals have different characteristics. The children also learnt about habitats and microhabitats.

In this unit, the children explore how the environment can be changed and the impact humans this has on animals.

7. UKS2 UNIT BREAKDOWNS



Unit 1 – Forces

Key Vocabulary

gravity, air resistance, water resistance, mechanism, machine, lever, pulley, gears, work, friction

Outcomes

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

Lesson One

What are forces?

Mind map what the children already know about forces and gravity..

Hook – [What is a force?](#)

Review magnetism, push and pull. How this creates a force. A force causes an object to move, stop moving, speed up, slow down or change direction.

Use different sized magnets and explore what happens with different materials. Encourage the children to use language of push and pull and why other materials are not magnetised.

Lesson Two

What is gravity?

Recap – What did we learn about Space? What were the different planets in our solar system?

Why do we all not drift out into space? Introduce the concept of [gravity](#).

Teach about how [gravity](#) pulls objects towards the centre of the earth; the force which keeps objects and all living things on earth. How when certain objects get close enough to earth's orbit, they may fall to the surface of earth, being pulled by gravity.

Record their learning in science books.

Lesson Three

Can we speed up and slow down objects?

Question – If a car rolls down a hill will it ever slow down?

Explore this question using toy cars and different materials as the road.

Teach the children about [fraction](#) and how this works.

[BBC Teach](#)

Children to make initial predictions and then test using different materials.

Children to draw a diagram in books to represent these facts. Ensure they accurately describe friction.

Lesson Four

What are contact and non-contact forces?

Recap – what is friction? How does this work?

How might different things affect friction and forces? For example, when it rains, how does this affect a car? What about if it is windy?

Teach children about contact (when two objects touch and create friction) and non-contact forces (gravity and magnetism). Look at [water and air resistance](#).

Explore these concepts using different investigations and record findings in science books..

Lesson Five

How can we measure forces?

Who is Isaac Newton? [BBC Bitesize](#)

Look at how a newton meter works and how this can be used to measure force. Look at the difference between mass (kg) and weight (newtons).

Measure different object's mass and weight using newton meters and scales.

Explore measuring friction with newton meters.

Record findings in a table in science books.

Lesson Six

What impact do gears, pulleys and levers have on forces?

Can link this lesson to a DT activity.

Recap – Explore different inventions that use pulleys, levers and gears. How have these inventions been helpful in day-to-day activities?

[Link these objects to forces](#) – levers need effort and load (e.g. seesaw) Pulleys use string and a wheel (e.g. crane) Gears use spokes that interconnect (e.g. clock).

Children use diagrams in books to label and explain how these can aid and how they impact a force.



Unit 1 – Forces

Assessment:

Substantive Knowledge

Gravity is a non-contact, pulling force which attracts two objects that have mass.

A force meter can be used to measure an object's mass in grams (g) or kilograms (kg) and its weight in newtons (N).

Friction, air resistance and water resistance are forces that oppose motion and slow down moving objects.

Mechanisms, such as levers, pulleys and gears, give us a mechanical advantage.

Disciplinary knowledge

Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.

Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.

Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.

Use test results to make predictions to set up further comparative and fair tests.

Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.

Identify scientific evidence that has been used to support or refute ideas or arguments.

Previous Knowledge

Previously, children learnt an object will not move unless a pushing or pulling force is applied and that magnetic forces do not require contact.

This project teaches children about the forces of gravity, air resistance, water resistance and friction, with children exploring their effects. They learn about mechanisms, their uses and how they allow a smaller effort to have a greater effect.

7. UKS2 UNIT BREAKDOWNS



Unit 2– Properties and Changes to Materials

Key Vocabulary

Thermal/electrical insulator/conductor, change of state, mixture, dissolve, solution, soluble, insoluble, filter, sieve, burning, rusting, reversible/non-reversible change, new material

Outcomes

- 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 metals, wood 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 that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda.

Lesson One

How can we group and compare materials?

Hook – Provide the children with a range of different materials. What do you notice about them? Ask the children to group these materials. How many different groups can you make with these materials? Explore and encourage scientific discussion. Photograph the children as they do this. Share their ideas as a class.

Explain to the children what their new science topic is. Create a mind map in books with prior knowledge in to add to throughout the topic.

Lesson Two

What is a mixture?

Show the children 3 different substances in cups (e.g. water, dilute juice, salt water). Which do you think is a mixture? Discuss.

Teach the children about a mixture and what this means. Look back at the different cups and ask the children to think again about which is a mixture.

Show the children different photographs of mixtures and ask them compare.

Record their findings and write a definition of mixture in their books.

Lesson Three

How can we separate a mixture?

Recap – What is a mixture and how are these created?

Show the children different photographs of a mixture on the board. Ask them how they might separate these mixtures. Write down predictions and put into working wall.

Provide the children with different mixtures on their tables and work around each one and separate them using different methods (e.g. magnets, sieve, filtration).

Record results in books.

Lesson Four

What does insoluble mean?

Recap – How can we separate a mixture? What did we look at last week?

Show the children a cup of salt water with sand. Explain what is in this mixture. How might we separate these things?

Will filtration work to separate each substance?

What does insoluble mean? Teach children meaning of both soluble and insoluble.

Review – how might we separate? Test. Record the test in their books.

Lesson Five

What is a reversible change?

Recap – What does soluble and insoluble mean?

Show the children a piece of toast. How have I changed this? How did I make this? Can I get the piece of bread back to its original form?

Teach the difference between a reversible and irreversible change.

Show the children different examples of each and classify them into irreversible and reversible.

Record findings in books.

Lesson Six

Are chemical reactions reversible?

Recap – What does reversible and irreversible mean? Why are some changes irreversible?

Show the children the reaction between bicarb and vinegar. If I mixed these two substances together, what might happen? Then mix. Can I reverse this change and get the bicarb back? Why/why not?

Teach the children that some reactions create a new material or a permanent change e.g. burning.

Record in books.

Unit 2 – Properties and Changes to Materials

Assessment:

Substantive Knowledge

Reversible changes include heating, cooling, melting, dissolving and evaporating.

Irreversible changes include burning, rusting, decaying and chemical reactions.

Irreversible changes are usually accompanied by one or more of these signs: a gas is produced; light is produced; a smell is produced or the smell changes; the colour changes; sound is produced, or the temperature changes.

Disciplinary knowledge

Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.

Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.

Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.

Use test results to make predictions to set up further comparative and fair tests.

Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.

Identify scientific evidence that has been used to support or refute ideas or arguments.

Previous Knowledge

Children learnt that electrical conductors allow electricity to flow through them, whereas insulators do not. They learnt that common electrical conductors are metals and that common insulators include wood, glass, plastic and rubber. In Year 3, children learnt that some materials have magnetic properties and that magnetic materials are attracted to magnets. They learnt that all magnetic materials are metals but not all metals are magnetic (iron is a magnetic metal). In Year 2, children learnt that a material's physical properties make it suitable for particular purposes and that many materials are used for more than one purpose. In Year 1, children learnt that materials have different properties.

This project teaches children about the wider properties of materials and their uses. They learn about mixtures and how they can be separated using sieving, filtration and evaporation. They study reversible and irreversible changes, and use common indicators to identify irreversible changes

7. UKS2 UNIT BREAKDOWNS



Unit 3 – Living Things and their Habitats (Life cycles and reproduction)

Key Vocabulary

life cycle, reproduction, pollination, fertilisation, asexual reproduction, seed dispersal, fruit, stigma, anther, ovary, ovule, pollen, nectar

Outcomes

- 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.

Lesson One

How do plants reproduce?

Hook – Show the children different seeds and bulbs. What are these? How are they similar?

How does a plant reproduce?
Teach the children about sexual reproduction of plants through the use of a pollinator.
Use a diagram of a plant to show the sexual organs of a plant.

Use the wotsit experiment to demonstrate reproduction in plants (cut out of a bee, wotsits crushed on a plate, pick up and then fly to another plate that has double sided tape and lands on. What happens?).

Label diagram in book.

Lesson Two

How do plants reproduce?

Recap – What happens when a plant sexually reproduces?

Recap sexual reproduction of a plant.

Teach about asexual reproduction.
What this means and how a plant asexually reproduces.

Which plants sexually and asexually reproduce? Look at examples.

Children to create a table in books that outlines the difference between both reproduction strategies of a plant.

Which do you think would be the most successful for a plant to use?

Lesson Three

What is the lifecycle of a mammal?

Recap – [What is the human life cycle?](#)

Revisit the features of a mammal (e.g. warm blooded, give birth to live young, feed offspring milk etc)

Do all mammals have the same life cycle?

Compare the life cycle of a human and other examples of mammals – e.g. lion, giraffe, elephant, dog, cat.

Children to draw diagrams in books of at least 3 different mammal life cycles.

Lesson Four

How does the life cycle of an insect compare to an amphibian?

Revisit – features of an insect and an amphibian.

Teach about how animals [reproduce sexually](#).

Look at comparisons between the life cycle of an [insect](#) (egg, larva, pupa, adult) and an amphibian (e.g. [frog](#)).

Why are these life cycles so different?

Children to map the life cycle of both insect and amphibian – drawing direct comparisons between both.

Have frogspawn if possible to watch the growth over time.

Lesson Five

How does the life cycle of a fish compare to a bird?

Revisit – features of both a bird and fish.

Recap – How animals reproduce sexually.

Show the children images of fish and bird eggs.
Which animal laid these?
Make direct comparisons.

Follow the life cycle of a young [fish](#) and [bird](#).

Map the life cycle of a fish and a bird. Make direct comparisons between both.

Link back to life cycles of mammals, insect and amphibians – why are they all different?
Children record answers.

Lesson Six

How are food chains different between animals?

.Recap – Life cycles of all animals.

What is a life cycle? In order for animals to survive, what do they need? Link to nutrients and [food chains](#).

Show the children [a food chain](#) without the predator. Who would eat this prey? [Show different ones](#).

Provide the children with cut outs of animals for them to create logical food chains. Mix up the habitats for them to link to different food chains. Children map different food chains for different environments.

Unit 3 – Living Things and their Habitats (Life cycles and reproduction)

Assessment:

Substantive Knowledge

A mammal is a vertebrate, which means it has a backbone.

The five key mammalian characteristics of mammals are that they produce milk to feed their young, are warm blooded, give birth to live young, have fur or hair and breathe air with lungs.

Reproduction is the process of producing offspring and is essential for the continued survival of a species.

Disciplinary knowledge

Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.

Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.

Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.

Use test results to make predictions to set up further comparative and fair tests.

Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.

Identify scientific evidence that has been used to support or refute ideas or arguments.

Previous Knowledge

In lower KS2, children learnt that animals have offspring that grow into adults and that different animals have different stages of growth. In EYFS, children learnt about the life cycle of the butterfly and frog.

This project teaches children about animal life cycles, including the human life cycle. They explore human growth and development to old age, including the changes experienced during puberty and human reproduction.

7. UKS2 UNIT BREAKDOWNS



Unit 4– Earth and Space

Key Vocabulary

solar system, orbit, sphere, Earth's axis, planets (Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune) gas giant, terrestrial planet, meteor, star, crater, Sun, Moon, rotate

Outcomes

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

Lesson One

What is the solar system?

Recap – Name all of the planets in our solar system.

Mind map what the children already know about the sun, moon and solar system.

Hook – [How did the solar system form?](#)

Use different sized balls, or similar, to represent the sun, earth and moon. Then, expand to the planets in the solar system.

Record what the role of the sun is to our solar system, how the earth travels around the sun and the moon around the earth.

Lesson Two

How do planets in our solar system differ?

Recap – How are the sun, moon and earth different?

In what order do the planets go from closest to furthest from the sun?

How do the planets differ? Compare. Come up with actions or a mnemonic to remember this.

Why are the planets different from each other? Recognise that distance from the sun changes conditions on each planet. Record their findings in books. Draw/label planets movement and direction around sun.

Lesson Three

How does earth move in space?

Question – Does the sun actually move in the sky?

Look at how earth travels around the sun, making one full orbit of the sun in 365 days.

Teach about earth's axis and how this links to day and night. One full rotation on this axis takes 24 hours.

[BBC Bitesize](#)

Children to draw a diagram in books to represent these facts.

Lesson Four

Why do we have day and night?

Question – Would you rather have permanent day or night?

How is day formed? Why do we have night? How are the sun and moon linked to this?

[BBC Teach](#)
[BBC Bitesize](#)

Look at how the earth's rotation whilst orbiting the sun causes day and night.

Challenge children to look at why different countries have different lengths of daylight. Also, why we have more daylight at different times of year.

Lesson Five

What are lunar/solar eclipses?

Recap – Order of planets from sun.

[What is an eclipse?](#) Dictionary definition. Explore this concept and what it means.

Compare lunar eclipse to [solar eclipse](#)

Model a solar eclipse – Can use a lamp and a ball to demonstrate.

Children to write STEM sentences that describe both eclipses and draw diagrams and label in books.

Lesson Six

Why does the moon look different in the sky?

Can link this lesson to an art activity.

Recap – How does earth travel around space? How does the moon travel in space?

Children to recognise that the moon orbits the planet and its position in relation to earth and the sun causes it to look different.

Show children the phases of the moon diagram. Oreo experiment?

Children to draw and label the phases of the moon in sketchbooks.

Unit 4– Earth and Space

Assessment:

Substantive Knowledge

The Solar System is made up of the Sun and everything that orbits around it.

The Sun's force of gravity, created by its huge mass, keeps the planets in orbit.

There are eight planets in our Solar System: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune.

Earth orbits around the Sun and a year (365.25 days) is the length of time it takes for Earth to complete a full orbit.
Earth's rotation takes 24 hours, giving us day and night and the appearance of the Sun moving across the sky.

Disciplinary knowledge

Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.

Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.

Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.

Use test results to make predictions to set up further comparative and fair tests.

Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.

Identify scientific evidence that has been used to support or refute ideas or arguments.

Previous Knowledge

In Year 3, children learnt that light from the Sun is damaging for vision and the skin and that shadows change shape and size when the light source moves. In Year 2, the children learnt that the Earth is spherical and is covered in water and land. When it is daytime in one location, it is night time on the other side of the world. In EYFS, the children learnt that daylight hours vary throughout the year, according to the season

This project teaches children about our Solar System and its spherical celestial bodies. They describe the movements of the Earth and the other planets relative to the Sun, the Moon relative to Earth, and the Earth's rotation to explain day and night.

7. UKS2 UNIT BREAKDOWNS



Unit 6 – Animals including Humans (Human life cycle)

Key Vocabulary

puberty, life-cycle, reproduce

Outcomes

- Describe the changes as humans develop to old age.

Lesson One

What is the life cycle of a human?

Hook – Ask children to bring in a baby photo of themselves. How have you changed from then to now?

Ask children to image what they might look like in another 10 years time.

Map out the basic [life cycle of a human](#) from infant, toddler, child, teenager, young adult, adult, OAP.

Photocopy baby photo with side-by-side photo of child now and drawn image of themselves in 10 years. Annotate and describe physical changes.

Lesson Two

What happens during puberty?

Recap – What changes happen to a human throughout their lifetime?

Recap prior learning about puberty.

When and why does this happen to a human?

Record and list different changes that happen to both sexes throughout puberty.

Provide children with silhouette outlines of human development from baby to elderly adult. Children to record physical changes and document what puberty is.

Lesson Three

How does puberty affect our emotions?

Recap – physical changes during puberty.

How might someone feel during puberty? .

Discuss emotional changes during puberty. Link this to testosterone and oestrogen and how the chemical changes can cause physical and emotional changes in humans.

Children to draw a diagram in books for both male and female changes during puberty. Record scientific physical and emotional changes.

Lesson Four

What happens to a human as they enter old age?

Question – At what age is someone classed as old? Explore children's rational for their answers. Recap the lifecycle of a human – Focus on the difference between a young adult, adult and OAP.

[Brown sisters](#) – What is happening in this video? Why are they changing? Give the children different scenarios – e.g. age a woman has a baby, age a man can have a baby, buy house, retire, menopause etc. Ask the children to give an age this should happen. Children to label a photo of a person and describe the changes – document ages that above things happen.

Lesson Five

Will I look like my parent?

Recap – If possible, as children to bring their baby photo in along with a photo of parent as a baby. Do you look like your parent?

Teach the children that humans, as mammals, reproduce by finding a mate and having a child which shares genes with their parent. Introduce the concept of genes and that we have genes from both parents which means we will share some similarities as our parents.

Provide the children with a photo of a child and its parents – label the genetic similarities that can be shared with parent and offspring.

Lesson Six

What happens to a human as it goes through life?

Recap – What is the human lifecycle?

What things happen to a human as they go through life?

Review the learning and consolidate. Address any misconceptions.

Quizziz assessment of topic to assess progress.

Unit 6– Animals including Humans (Human life cycle)

Assessment:

Substantive Knowledge

Reproduction is the process of producing offspring and is essential for the continued survival of a species.

As humans age, many of the body's systems gradually decline, leading to the changes seen in older people.

Disciplinary knowledge

Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.

Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.

Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.

Use test results to make predictions to set up further comparative and fair tests.

Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.

Identify scientific evidence that has been used to support or refute ideas or arguments.

Previous Knowledge

Previously, children learnt that animals have offspring that grow into adults and that different animals have different stages of growth. In EYFS, children learnt about the life cycle of the butterfly and frog.

This project teaches children about animal life cycles, including the human life cycle. They explore human growth and development to old age, including the changes experienced during puberty and human reproduction.

7. UKS2 UNIT BREAKDOWNS



Unit 1 – Living Things and their Habitat

Key Vocabulary

Vertebrates, Fish, Amphibians, Reptiles, Birds, Mammals, Invertebrates, Insects, Spiders, Snails, Worms, Flowering, Non-flowering, microorganism, germ, microbe, Characteristic, Linnaean system

Outcomes

- Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants and animals.
- Give reasons for classifying plants and animals based on specific characteristics.

Lesson One

What are keys and classification?

Hook – Provide the children with a range of different animals/living things. What do they notice?
Children to work in groups to classify the different living things into groups of their choosing. How many different ways can they do this?

Teach children what classification means and look at different ways they can group things based on appearance, order, group etc. Model creating a classification system with key.
Children to then create at least one of their own in books.

Lesson Two

Why do we use classification systems?

Recap what classification means.

Look back over their classifications from the previous lesson. Why did they group these animals in this way?

Why do we classify animals? Explain the purpose behind classification.

Create another classification group and write an explanation as to why they have classified this group. Repeat.

Lesson Three

What are microorganisms?

Recap – What does classification mean?

[Zoom in and zoom out](#) – What is this? .

Teach children about [microorganisms](#) – both good and bad.

Explore microorganisms in different settings – e.g. plankton in the sea, fungi, germs etc.

Record in books.

Lesson Four

What role do microorganisms play in the environment?

Recap – What is a microorganism?

Are microorganisms good or bad? Children to debate positives and negatives that microorganisms can play in our environment

Investigation – bread in different conditions.

Write up experiment in books and observe changes over next week.

Lesson Five

What is a reversible change?

Recap – What was our investigation looking at?

Observe the changes to the bread in the different conditions. Why did this happen? What differences can you see in these conditions?
Is this change reversible?

Teach the difference between a reversible and irreversible change.

Review the experiments and discuss.

Record findings in books.

Lesson Six

Create own investigation.

Children to apply their learning over the topic and create an investigation which explores microorganisms.

Unit 1 – Living Things and their Habitat

Assessment:

Substantive Knowledge

Classification keys help us identify living things based on their physical characteristics.

An adaptation is a physical or behavioural trait that allows a living thing to survive and fill an ecological niche.

Adaptations evolve by natural selection.

Favourable traits help an organism survive and pass on their genes to subsequent generations.

Disciplinary knowledge

Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.

Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.

Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.

Use test results to make predictions to set up further comparative and fair tests.

Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.

Identify scientific evidence that has been used to support or refute ideas or arguments.

Previous Knowledge

In Year 5, children group and sort plants by how they reproduce. In Year 2, children identified and named a variety of plants and animals in a range of habitats and Microhabitats. In Year 1, children identified, compared, grouped and sorted a variety of common wild and garden plants, including deciduous and evergreen trees, based on observable features.

This project teaches the children that classification is the grouping of living and non-living things with similar characteristics. They learn how to sort and group using existing classification keys and observe how a key can be produced

7. UKS2 UNIT BREAKDOWNS



Unit 2 – Electricity

Key Vocabulary

Cell, Voltage, Component, Circuit diagram, Symbols, Circuit, Complete circuit, Bulb, Buzzer, Motor, Switch

Outcomes

- 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.

Lesson One

How do we draw and making basic circuits?

Hook – Show the children a complete circuit. What is this? How does it work?

Model drawing a basic circuit on the board. Compare with using correct symbols for circuits. Play a game with the children to try and figure out what each symbol means in a circuit.

Allow children time to create different circuits using equipment and then draw/label the circuits in their books using correct circuit symbols.

Lesson Two

How can we increase the brightness of a bulb?

Recap – quiz children on different symbols of a circuit and they correctly label them (bingo?).

Look at a basic circuit. Is this the brightest that we can make the bulb? Ask children to discuss what they can do to try and make the bulb brighter.

Children to explore the differences they can create in a circuit to make the bulb brighter/dimmer (adding batteries/bulbs to the circuit)..

Record their findings in books.

Lesson Three

How do we increase the volume of a buzzer?

Recap – What did we find out last week? How could we change the brightness of the bulb?

Show the children the symbol for a buzzer. What is this? What role does this have in a circuit? Look at different examples of real application of a buzzer in circuits.

Children to explore the use of a buzzer in the circuit. Then explore how to increase the volume of the buzzer.

Record results in books.

Lesson Four

What role does a switch have in a circuit?

Recap – Quiz children about circuit symbols.

Show the children different examples of circuits for them to pick out the fault in the circuit. Explain to their partners how to correct the circuits.

Show the children the symbol for a switch – what does this do? Show children different examples of switches.

Teach children the [function of a switch](#).

Write explanation in books.

Lesson Five

How does a switch work in a circuit?

Recap – What does a switch do?

Model creating a circuit with a switch in. Demonstrate the function.

Why are switches useful? What would happen in a circuit without a switch?

Children to create circuits in groups with switch incorporated. Draw the circuit in books.

Write in books the role of a switch and the benefits it has in a circuit.

Lesson Six

DT block – light up cards

Recap – What is a circuit and the role of the different components.

Children to design a christmas card for a relative. The card will have a light up element. Children to incorporate the light up element in their designs.

Children to then draw the circuit that they will use for the card.

Make and create their light up cards. Review their designs for positives and ways it can be improved next time.

Unit 2 – Electricity

Assessment:

Substantive Knowledge

An electric current is the flow of electric charge around a circuit.

The electric current flows from the cell through all the components and back to the cell.

Electric current is measured using an ammeter.

The force that pushes electric charge around a circuit, called the voltage, is measured using a voltmeter.

Disciplinary knowledge

Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.

Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.

Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.

Use test results to make predictions to set up further comparative and fair tests.

Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.

Identify scientific evidence that has been used to support or refute ideas or arguments.

Previous Knowledge

In lower KS2, children learnt that a series circuit is a simple loop with only one path for the electricity to flow. They learnt that a series circuit must be a complete loop to work and have a source of power from a battery or cell. In Year 3/4, children learnt that switches open and close a circuit and provide control.

This project teaches children about electrical circuits, their components and how they function. They recognise how the voltage of cells affects the output of a circuit and record circuits using standard symbols. It also teaches children about programmable devices, sensors and monitoring. They combine their learning to design and make programmable home devices..

7. UKS2 UNIT BREAKDOWNS



Unit 3 – Animals including Humans (Circulatory Systems)

Key Vocabulary

Heart, Blood, Lungs, Oxygenated, Deoxygenated, Plasma, Platelets, Red and white blood cells, Plasma Blood vessels, Veins, Arteries, Pulse, Rate, Pumps, Transported, Oxygen, Carbon dioxide, Nutrients, Water, Muscles, Cycle, Circulatory system, Diet, Exercise, Drugs, Lifestyle

Outcomes

- 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

Lesson One

What do you already know about the human body?

Hook – Using the [Human Anatomy Explorer](#), investigate different parts of the human body.

Explain to the children what their new science topic is. Create a mind map in books with prior knowledge in to add to throughout the topic.

Group children and get them to label an outline of the human body for organs, body parts, skeletal system etc.

Lesson Two

What is the function of heart?

Recap – Can children name and locate different organs in the body. What are their functions?

Focus on [the heart](#) – What does it do? How does it work? What does the heart do that helps the rest of our body?

Explore [interactive heart](#) diagram.

Children to label a diagram of the heart in their books and write a paragraph explaining the function of the heart.

Lesson Three

What are capillaries arteries and veins?

Recap – What does the heart do and how does it work?

Ask children how the heart gets blood around the body. What do we have in our bodies which helps to pass this around the body?

Use the diagram of the [cardiovascular system](#) to show children the different [blood vessels](#) in the body.

Explore pulse from wrist and neck. What is this measuring?

Children to explain function of each blood vessel type in books.

Lesson Four

Is the human heart different to other living creatures hearts?

Recap – What is the function of the heart and blood vessels?

Do animals and humans have different hearts?

Show the children a real heart. Explore the structure of the heart, valves, vessels and chambers.

Look at photos of different animal hearts and compare. Do they do different jobs or the same?

Record findings in books.

Lesson Five

Blood – what is it doing?

Recap – What is the function of the heart and blood vessels?

What is the main purpose of these structures? What does the circulatory system do?

[What is blood?](#) Explore the purpose of blood and what this does for all living creatures.

Create an example of blood in a bottle to explore the different components of blood (red/white blood cells, platelets, plasma).

In books, describe the different function of blood components and the role of blood in the body.

Lesson Six

What things affect the circulatory system?

Recap – What is blood? How is blood transported around the body? What is the difference between oxygenated and deoxygenated blood?

What things might affect the circulatory system? Make a list. Explore with exercise. Take children outside and do 1 minute of exercise. Feel pulse, what is happening? Look at photos of blood vessels affected by food. What has happened here? Explore the negative effects of substances.

Children to create a leaflet that explains the circulatory system and effects of different factors on this.

Unit 3 – Animals including Humans (Circulatory Systems)

Assessment:

Substantive Knowledge

The circulatory system includes the heart, blood vessels and blood.

There are three types of blood vessels: arteries, veins and capillaries. They each have a different-sized hole (lumen) and walls.

The heart has four chambers: the right atrium, left atrium, right ventricle and left ventricle.

Blood is made up of four different components: plasma, platelets, red blood cells and white blood cells.

Disciplinary knowledge

Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.

Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.

Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.

Use test results to make predictions to set up further comparative and fair tests.

Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.

Identify scientific evidence that has been used to support or refute ideas or arguments.

Previous Knowledge

The children learned about human reproduction. In Year 3/4, the children learned that the digestive system is responsible for digesting food and absorbing nutrients and water. They learned that there are different types of teeth in humans and about their simple functions. The children learnt that for sound to reach the ear, sound waves travel through a medium, such as air or water. In Year 3/4, children learned that humans have a skeleton and muscles for movement, support and protecting organs. They learned that humans need the right types and amount of nutrition, and that they cannot make their own food. In Year 1/2, children learned that human offspring go through different stages as they grow to become adults. They learnt that it is important that humans exercise, eat the right amounts of different types of food, and have good hygiene.

This project teaches children about the transport role of the human circulatory system, its main parts and primary functions. They learn about healthy lifestyle choices and the effects of harmful substances on the body.

7. UKS2 UNIT BREAKDOWNS



Unit 5– Light

Key Vocabulary

Light, light source, dark, absence of light, transparent, translucent, opaque, shiny, matt, surface, shadow, reflect, mirror, sunlight, dangerous, Straight lines, Light rays, Prism, Periscope

Outcomes

- 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. Notice how light can be split into different colours using a prism.

Lesson One

What is light and where does it come from?

Hook – As the children to list as many different sources of light that they can think of. Encourage them to think of natural and manmade sources.

Explain to the children what their new science topic is. Create a mind map in books with prior knowledge in to add to throughout the topic.

Look at some of the examples that they had come up with and look at alternatives. Explain to children what light is.

Lesson Two

How do we see?

Recap – What is light and how is it created?

Which sense do we use to see? How does the eye work? Ask children to write down what they already know on post-its to splat on Working Wall.

Teach children how the eye works and detects light. Teach about reflection and how light rays enter the eye and how our brains make sense of what we see.

Draw diagrams in books and label explaining the function of the eye.

Lesson Three

How does light travel?

Recap – What is the function of the eye?

Look at the structure of the eye and refresh memories of how the eye works.

Does light travel directly into our eyes? Explain to children that light rays reflect off of different surfaces and our eyes detect this to understand and make sense of the world around us.

Explore light using torches and spaghetti to see that light travels in straight lines. Use mirrors to reflect light.

Draw diagrams in books.

Lesson Four

What is reflection? – Making periscopes.

Recap – What does reflection mean? How does this work to help us see?

Teach children how light reflects on different surfaces (reflective and non).

Explain to children that they are going to create a tool that uses reflection to help see. Teach what a periscope is.

Children to design and make their periscopes. Test to see if effective.

Children to explain how reflection works – discuss on different surfaces.

Lesson Five

How shadows are formed?

Recap – How does light travel?

What happens when something blocks light?

Recap from Yr3 how shadows are formed.

Model creating shadows using different objects and a torch. How shadow is same shape as object. Children to then have a go themselves at making shadows.

Bring children back and discuss how shadows differ when the object is moved/light source moves.

Draw diagrams in books and explain how shadows are formed.

Lesson Six

Investigating light.

Recap – What have we learnt over this topic? Update mindmap.

Complete quiz on light and content from the topic.

What is diffraction? Teach children about what diffraction is and how this is created. Children to then explore using prisms.

Explore using colouring and soap bubbles. How do we see the different colours? Shine light into bubble – what happens to the light rays? The severity of the colour?

Unit 5 – light

Assessment:

Substantive Knowledge

Light travels in waves in straight lines.

Light sources give out light. They can be natural or artificial.

The angle at which light hits a reflective surface is the same angle at which it is reflected.

Refraction is the bending of light as it passes from one transparent material to another.

Disciplinary knowledge

Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.

Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.

Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.

Use test results to make predictions to set up further comparative and fair tests.

Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.

Identify scientific evidence that has been used to support or refute ideas or arguments.

Previous Knowledge

children learnt that light from the Sun is damaging for vision and the skin. Shadows change shape and size when the light source moves. Children noticed that light is reflected from surfaces and that we need light in order to see things and that dark is the absence of light. Children recognised that shadows are formed when the light from a light source is blocked by an opaque object and find patterns in the way that the size of shadows change. In Year 1/2, children learnt that plants need water, light and a suitable temperature to grow and stay healthy.

This project teaches children about the way that light behaves, travelling in straight lines from a source or reflector, into the eye. They explore how we see light and colours, and phenomena associated with light, including shadows, reflections and refraction.

7. UKS2 UNIT BREAKDOWNS



Unit 6– Evolution

Key Vocabulary

Offspring, Characteristic, Adaptation, Natural selection, Identical, Genes, Charles Darwin, Sexual reproduction, Vary, Suited, Adapted, Environment, Inherited, Species, Fossils

Outcomes

- Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago.
- Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents.
- Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.

Lesson One

How are fossils formed?

Hook – Show children different photos/examples of fossils. What are they and how were they formed?

Explain to the children what their new science topic is. Create a mind map in books with prior knowledge in to add to throughout the topic.

Review from Yr3 – What are fossils and how are they formed. Teach children the process of fossilisation.

Label the fossilisation process in books.

How is this helpful for scientists? Explain and write in books.

Lesson Two

How have living things changed over time?

Read 'When Whales Walked'.

Show children 3 different animals – do you think these have always looked like this?

Track the process of change for different species (e.g. whales) and how they look different from ancestors. What is this process called?

Teach children about evolution and adaptation – what these words mean and how animals, including humans, have adapted over time.

Lesson Three

What does inheritance mean?

Recap – How have some creatures changed over time?

Invite children to bring in photos of them as a baby and their parents as a baby. Look at these photos and ask them what they notice.

What does the word inheritance mean? Teach children the meaning and how offspring inherit genes from parents.

Look at different animals, offspring and their parents, and look at similarities and differences.

Record in books.

Lesson Four

How have plants and animals adapted to their environment?

Recap – What is inheritance? What does offspring mean?

[Who is Charles Darwin](#) and what did he do?

How are plants and animals adapted to live in their environment? Look at an example of a cactus, seal and fox. Look at their adaptations.

Using [Darwin's Finches](#), explore the research he did to show how they were adapted to live in their environment. Concept of natural selection.

Record the test in their books.

Lesson Five

How have plants and animals adapted – continued?

Research
Recap – Who was Charles Darwin? What did he do?

Recap the adaptations seen in Darwin's Finches. What they found and what this helps scientists to understand.

Children to research the adaptations of one plant and one animal of their choosing. Looking at the anatomy and environment of each, how is this living thing suited to live in its environment,

Children to create a fact file for each of their living thing in their books to show their findings.

Lesson Six

Art – design animal and how it is adapted.

Recap – What is adaptation? What is inheritance? Recap learning from this topic.

Explain to children that they are going to design and create their own animal that has adapted over time to live in its environment. The children must think carefully about the animals adaptations and how this helps it to survive.

Design and then describe their animal, its habitat, adaptations and how this makes it successful.

Record in books.

Unit 6 – Evolution

Assessment:

Substantive Knowledge

There are five kingdoms: animals, plants, fungi, protists and monerans.

Scientists compare fossilised remains from the past to living species that exist today to hypothesise how living things have evolved over time.

The theory of evolution was developed in the 19th century by the naturalists Charles Darwin and Alfred Russel Wallace. It states that: all life on Earth has evolved from simple life forms to more complex ones over time.

Inheritance is when living things pass on characteristics following sexual reproduction, such as height, skin colour and eye colour.

Disciplinary knowledge

Previous Knowledge

Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.

Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.

Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.

Use test results to make predictions to set up further comparative and fair tests.

Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.

Identify scientific evidence that has been used to support or refute ideas or arguments.

children learnt that Humans reproduce sexually, which involves two parents (one female and one male) and produces offspring that are different from the parents. In Year 3/4, children learnt that fossils form over millions of years and are the remains of a once-living organism, preserved as rock. In Year 1/2, children learnt that human offspring go through different stages as they grow to become adults.

This project teaches children how living things on Earth have changed over time and how fossils provide evidence for this. They learn how characteristics are passed from parents to their offspring and how variation in offspring can affect their survival, with changes (adaptations) possibly leading to the evolution of a species.