High Greave
Junior School

Science Curriculum

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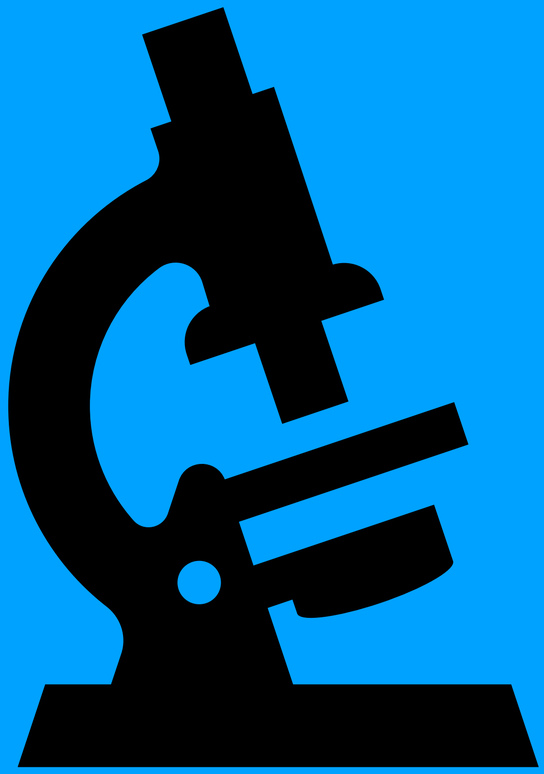


Being a

SCIENTIST

Science | Intent

Vision

The High Greave Junior School Science Curriculum aims to give all children the knowledge and skills they need to: access the subject in the next stage of their education; pursue this subject later in life; develop a passion for this subject.

Rationale

At High Greave Junior School, our Science curriculum fosters curiosity, critical thinking, and investigative skills through the study of Biology, Chemistry, and Physics in Years 3 & 4, and Conservation, Environment, and Space in Years 5 & 6. This structure ensures pupils develop a strong scientific foundation and an understanding of real-world applications.

Biology enhances knowledge of living organisms, Chemistry explores materials and reactions, and Physics develops understanding of forces and energy. Conservation and Environment encourage responsibility for the planet, while Space nurtures wonder and scientific inquiry. These disciplines build essential skills such as observation, questioning, experimentation, and analysis.

We teach Science over a whole term to allow deep engagement, hands-on experiments, and critical evaluation. Pupils explore the work of scientists such as Charles Darwin (evolution), Marie Curie (radioactivity), and Katherine Johnson (space exploration), inspiring aspirations and showing the impact of scientific discovery on the world.



Curriculum | Overview

The HGJ Curriculum is organised into two cycles: **Cycle A & Cycle B**

Each learner will go through **both cycles twice**, once at **each stage** of their junior school education.

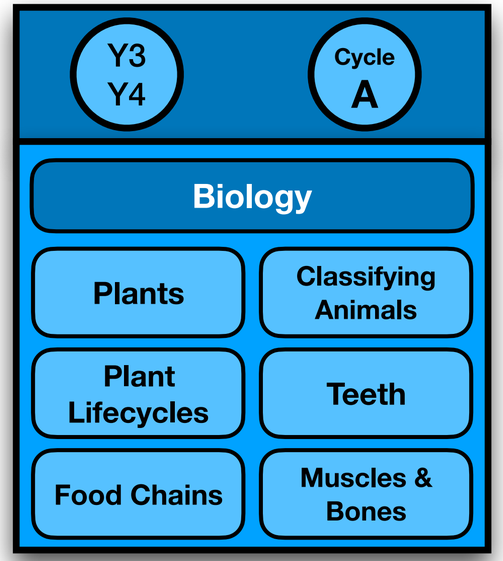
	Term 1	Term 2	Term 3	Term 4	Term 5		Term 6
Y3 Y4 Cycle A	**Science** Biology	**Art** Printing - Watercolour - Sculpture	**History** Tudors	**Design & Technology** Breakfast Wraps	**Music** Boomwhackers	**Science** Physics	**Geography** Our World
Y3 Y4 Cycle B	**Science** Chemistry	**Design & Technology** Electric Cars	**History** Roman Britain	**Art** Pastel - Photography - Pencil	**Geography** Our World	**Science** Light	**Music** Musical Theatre
Y5 Y6 Cycle A	**Science** Conservation	**Art** Charcoal - Watercolour - Sculpture	**History** Vikings & Anglo Saxons	**Design & Technology** Bridges	**Music** Bucket Drums	**Science** Forces	**Geography** Threats to Our World
Y5 Y6 Cycle B	**Science** Environment	**Design & Technology** Healthy Meal	**History** World War Two	**Art** Pencil - Photography - Digital Art	**Geography** Threats to Our World	**Science** Space	**Music** Ukuleles

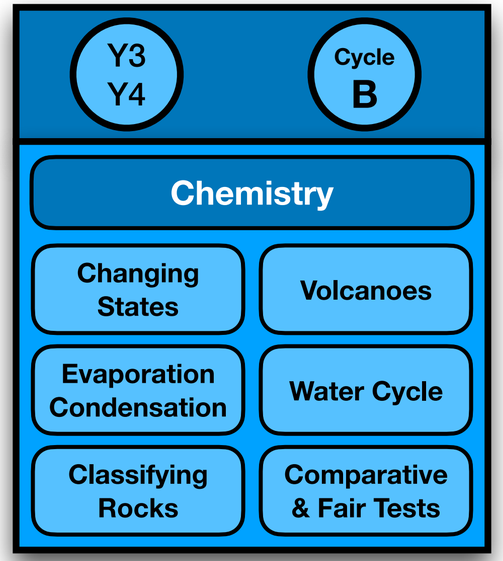
All Year	RE	Spanish	Computing
All Year	Spanish	Computing	RE
Every Year	PE		

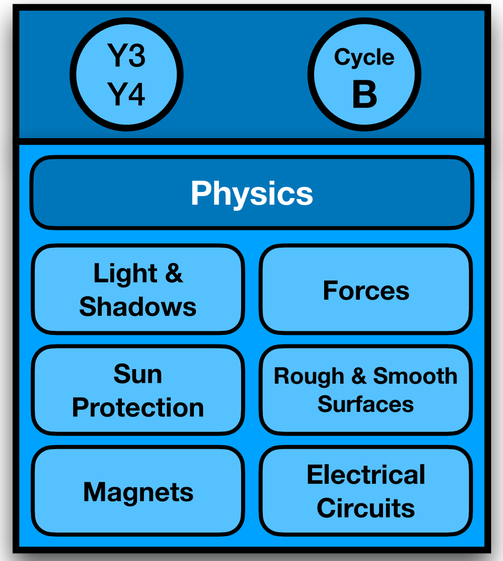
Typical routes through the HGJ curriculum:

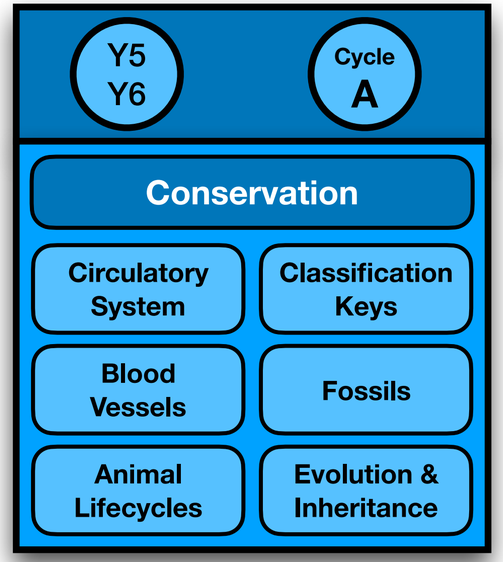
Child A *This Year*	Child B *Next Year*
Y3 Cycle A	Y3 Cycle B
↓	↓
Y4 Cycle B	Y4 Cycle A
↓	↓
Y5 Cycle A	Y5 Cycle B
↓	↓
Y6 Cycle B	Y6 Cycle A

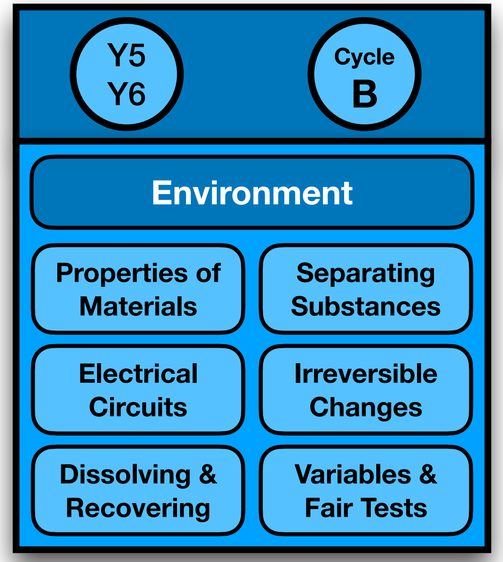
Science | Subject Overview

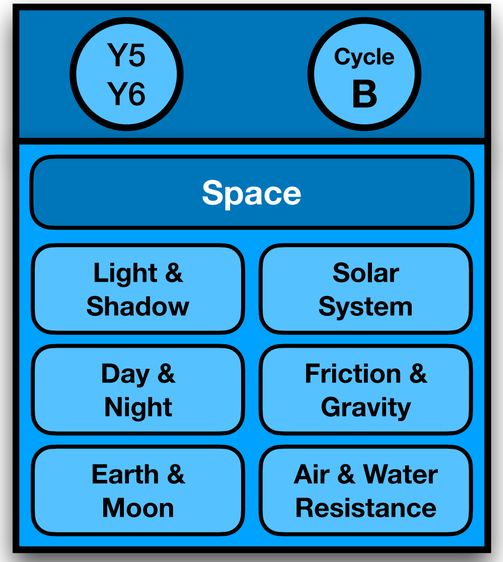




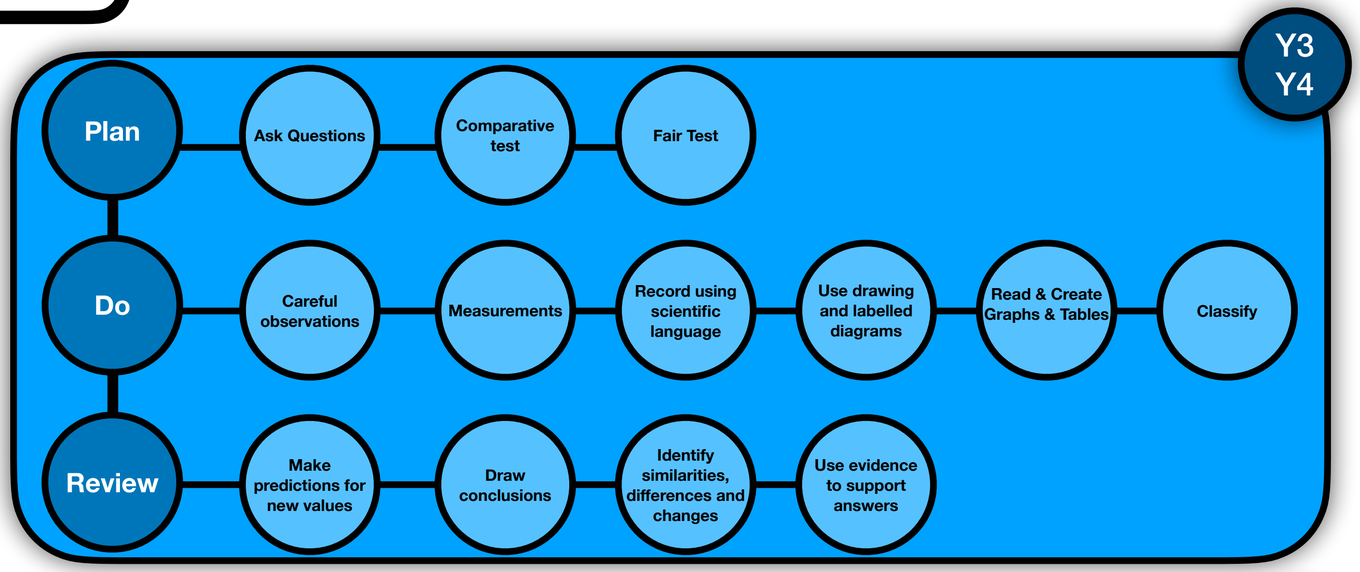


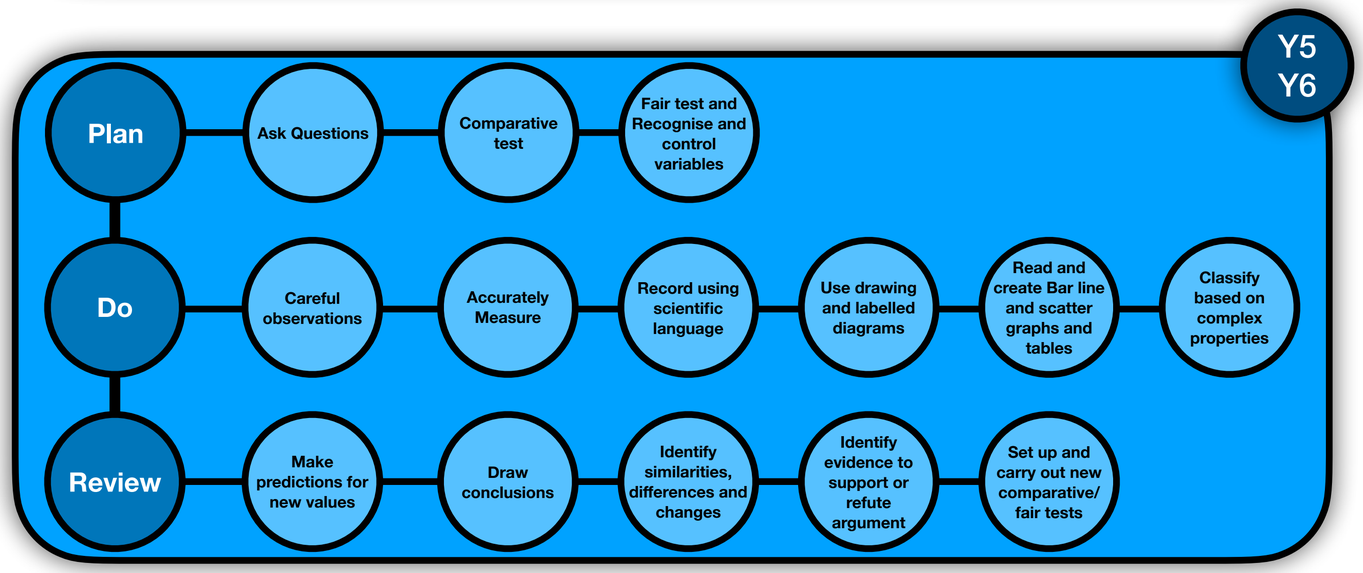


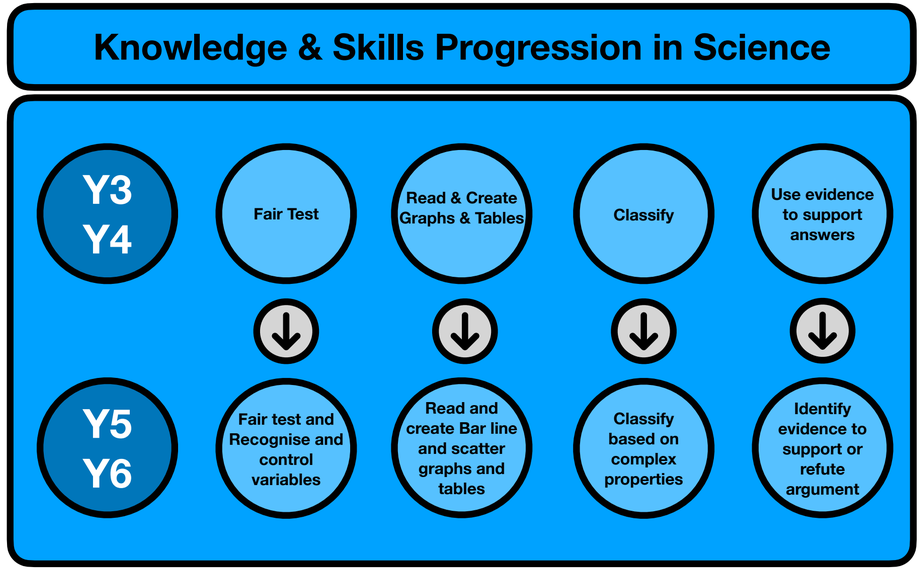




Science | Knowledge & Skills Progression







Science Knowledge Map

Section	Year 3 - Year 4	Year 5 - Year 6
Scientific Enquiry	Ask relevant questions and use different types of scientific enquiry to answer them.	Ask relevant scientific questions and select appropriate types of scientific enquiry to answer them.
	Plan and carry out simple comparative tests, recognising what makes a test comparative.	Plan and carry out comparative tests, ensuring results are reliable and relevant.
	Understand the difference between a comparative test and a fair test. Identify simple variables in a fair test.	Recognise and control independent, dependent, and control variables when carrying out fair tests.
	Make systematic and careful observations using appropriate equipment.	Take increasingly precise and repeatable observations with consideration of accuracy.
	Use measuring instruments (e.g., rulers, thermometers, measuring cylinders) with some accuracy.	Take accurate and precise measurements using a range of scientific equipment.
	Record findings using simple scientific vocabulary and structured formats.	Record findings using increasingly complex scientific vocabulary and terminology.
	Use simple labelled diagrams to explain ideas (e.g., parts of a plant, circuits).	Use detailed scientific diagrams and accurate labels to record findings.
	Gather, record, classify and present data using tables, bar charts and simple graphs.	Present data using bar, line, and scatter graphs, and more complex tables.
	Understand what is meant by classification and use simple keys to group and identify living things.	Use classification keys to classify animals based on their characteristics.
	Make simple predictions based on patterns in data.	Make complex predictions using observed trends and patterns.
	Use results to draw simple conclusions and suggest improvements.	Use results to draw conclusions and justify them with scientific evidence.
	Identify and describe differences, similarities, and changes in scientific ideas and processes.	Identify significant patterns, trends, and changes over time.
	Use evidence to answer questions and explain findings.	Identify evidence that supports or refutes scientific arguments.
	Suggest improvements to tests and investigations.	Set up and carry out new comparative or fair tests independently.
Living Things and Their Habitats	Group animals based on their diet (carnivores, herbivores, omnivores).	Use classification keys to classify animals into broader groups based on characteristics.
	Classify animals as vertebrates or invertebrates.	
	Identify characteristics of mammals, fish, amphibians, reptiles, insects, and birds.	Identify key adaptations that enable animals to survive in their environment (e.g., giraffe's long neck).
	Recognise how changing environments can affect animals (e.g., deforestation, melting ice caps, pollution).	Explain how environmental changes impact species and biodiversity over time.
	Understand what food chains are and how they work.	Understand how food chains can be impacted by environmental changes.
		Compare and describe how animal lifecycles differ (e.g., cat, butterfly, frog).
Plants	Identify and describe roots, stems, leaves, and flowers.	Understand how plants reproduce through pollination and seed dispersal.
	Recognise that plants need air, water, nutrients, light, and the right temperature to grow.	
	Understand the stages of a plant's life cycle: seed, germination, seedling, mature plant.	
	Explain how different conditions affect plant growth.	
Animals including Humans	Understand how our skeleton provides protection, support, and movement.	Explain the functions of the components of the circulatory system (blood, blood vessels, heart, and lungs)
		Understand the functions of arteries, veins, and capillaries.
		Explain how the heart pumps blood around the body by contracting and relaxing and describe the basic components of the heart.
	Recognise how muscles help us move.	Explain how muscles work in pairs to create movement.
	Recognise the functions of human teeth (incisors, molars, canines).	
	Explain how teeth can decay and the importance of dental care.	
	Understand basic digestion processes.	
		Describe stages of human lifecycle: foetus, baby, childhood, adolescence, adulthood, old age.
		Understand the importance of a healthy lifestyle (exercise, diet, sleep, medicine use).
Materials & States of Matter	Recognise differences in particle structure between solids, liquids, and gases.	Explain changes of state using particle models and irreversible changes.
	Understand what happens to particles when substances freeze, melt, condense, or evaporate.	Explain how irreversible changes occur through cooking, burning, and mixing.
		Identify and compare materials based on complex properties (e.g., conductor/insulator, magnetic/repellent, strong/weak, soluble/insoluble, transparent/opaque).
		Recognise that the properties of materials make them suitable for specific uses (e.g., bricks for building, glass for windows, metal for coins).
		Explain how scientists separate mixtures by sieving, filtering, and evaporating.
		Explain how scientists can dissolve and recover substances using evaporation.
		Explain how scientists use materials and electricity to benefit the environment (e.g., recycling, solar power).
	Recognise how water changes state in the water cycle (evaporation, condensation, precipitation).	
Rocks & Fossils	Identify igneous, sedimentary, and metamorphic rocks.	
	Classify rocks based on their properties.	
	Understand the components of soil.	
	Understand how volcanoes produce igneous rocks. Identify parts of a volcano (magma chamber, conduit, vent, lava).	
	Understand how fossils are formed over time.	Explain how fossils provide evidence of evolution and past environments.
		Explain how the Earth's surface has changed over time based on fossil evidence.
Electricity	Understand what is meant by a complete circuit.	Identify circuit symbols and explain how different components affect circuit function.
	Identify basic circuit components.	Identify and use circuit symbols including battery/cell, wire, bulb, switch, buzzer, motor.
	Understand how a switch affects a simple circuit.	Explain how materials are chosen for electrical applications based on properties.
		Understand how more/less cells or bulbs can affect the brightness of a bulb in a simple circuit.
Light	Recognise how light is important for sight.	Explain how light travels and enables us to see.
	Understand how shadows are formed and change in size.	
	Recognise how to protect ourselves from harmful effects of the sun.	
Forces & Magnets	Identify materials that are magnetic.	
	Understand how magnets attract and repel using north and south poles.	
	Understand that forces are pushes or pulls.	Explain how gravity acts as a pulling force and how mass affects gravitational pull.
	Recognise how rough or smooth surfaces affect movement.	Explain how friction affects objects in different scenarios.
		Recognise how friction, air resistance, and water resistance affect movement.
Earth & Space		Compare how the planets move and describe their orbits.
		Explain how the tilt of the Earth affects seasons.
		Identify the eight planets in the solar system.
		Explain why the Earth experiences day and night.
		Understand why the Moon appears to change shape.

Science | Core Knowledge

High Greave Junior School

Y3 Y4 Science Knowledge Organiser — Cycle A

What is important when being a scientist?

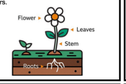
What are the functions of the parts of a plant?

Roots: take up water and nutrients from the soil. They keep the plant upright.

Stem: Takes water and nutrients to the flower.

Leaves: Use light from the sun to make food.

Flower: Produces seeds to make new flowers.



What is the lifecycle of a plant?



Seed: planted in soil

Germination: the sprouting of a seed

Seedling: young plant emerges from the seed

Mature plant: the plant grows to its full height

What are carnivores, omnivores, herbivores?



HERBIVORES animals that eat only plants

OMNIVORES animals that eat plants and meat

CARNIVORES animals that eat only meat



How do our muscles and skeleton help us move?

Muscles: muscles contract and relax causing our body parts to move.



Skeleton: used for protection, support and movement.

Protection: bones like your skull and rib cage protect vital organs from damage.

Support: bones in your legs, back and neck keep you upright.

Movement: muscles use your bones to move them.

What are the different animal groups?

Mammals
- Warm-blooded
- Have fur
- Live young

Fish
- Cold-blooded
- Have scales & gills
- Lay eggs

Amphibians
- Cold-blooded
- Breathe through skin
- Lay spawn

Reptiles
- Cold-blooded
- Have scales
- Lay eggs

Birds
- Warm-blooded
- Have feathers
- Lay eggs

Insects
- Cold-blooded
- Has an exoskeleton
- Live young & lay eggs

What does a plant need to grow?



Plants need these five things to grow.

Without them, they will turn brown and wilt.

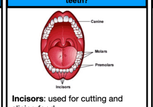
What is a food chain?

Food chains show how different organisms eat each other.

Food chains show how energy is passed up through the food chain.



Why do we have different kinds of teeth?



Incisors: used for cutting and slicing food

Canines: used for tearing up food

Molars: used for chewing and grinding up food

What are vertebrates and invertebrates?

Vertebrates: animals with a spine (backbone) in their body.



Invertebrates: animals without a spine (backbone) in their body



How do changing environments affect animals?

Melting ice caps: animal environments get smaller when polar ice caps melt.

Deforestation: cutting trees down destroys habitats

Human population: humans pose a danger to animals when building houses

Plastic pollution: fish can eat or get caught up in plastic which can cause them to die

A SCIENTIST … → **ASKS QUESTIONS** → **CLASSIFY GROUPS** → **INVESTIGATE** → **CONCLUDE FINDINGS**

Y3 Y4 Science Knowledge Organiser — Cycle B

What is important when being a scientist?

How do scientists classify rocks?



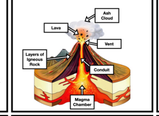
Formed from the cooling of molten rock.

Formed from sediment settling into layers after being transported by a river.

Formed after another rock has been under pressure or extreme heat.

How do volcanoes produce igneous rock?

When a volcano erupts, lava travels up the conduit and spills out of its vent. **The lava cools quickly and forms igneous rock.**



How are fossils formed?

An animal **dies** and is **buried** in sand/mud.

↓

The skeleton produces an **imprint** in the sand/mud.

↓

The sand/mud turns to **rock**, and the imprint becomes the **fossil**.

What is soil?

Soil is made up out of four components:



What are the differences between solids, liquids and gases?

Solid
Particles are **rigid** with a **fixed shape.**
Particles can't be squashed.

Liquid
Particles are **not rigid** with **no fixed shape.**
Particles can't be squashed.

Gas
Particles are **not rigid** with **no fixed shape.**
Particles can be squashed.

What is evaporation & condensation?



Evaporation occurs when liquid has reached 100°C (boiling) and turns into a gas by rising up into the air.

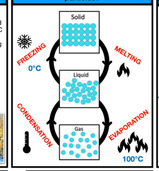
EVAPORATION

Condensation occurs when a gas such as water vapour hits a cool surface and immediately turns back into a liquid.

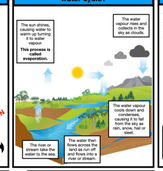
CONDENSATION



What causes changes of state within particles?



How does water change state in the water cycle?



What is meant by classifying?

Classifying means **putting things into groups.**
Scientists classify a wide range of things from rocks, plants, animals and materials.



What is the difference between a comparative and fair test?

Comparative Tests
These tests compare one variable with another variable.

Scientists look for differences

Variable A ↔ Variable B

Scientists look for relationships

Fair Tests
These tests compare multiple variables with another fixed variable.

Variable A
Variable B, Variable C, Variable D, Variable E

A SCIENTIST … → **ASKS QUESTIONS** → **CLASSIFY GROUPS** → **INVESTIGATE** → **CONCLUDE FINDINGS**

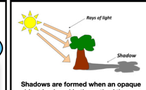
Y3 Y4 Science Knowledge Organiser — Cycle B

What is important when being a scientist?

How important is light to humans?



How are shadows formed?



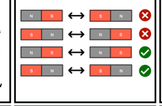
Shadows are formed when an opaque object is placed in the path of the rays of light.

The opaque object does not let the light pass through it.

The rays of light will pass over the edges of the object and form a shadow in the shape of the object.

When will magnets attract each other?

Magnets will attract if the **north** and **south** poles are facing each other.



What is a force?

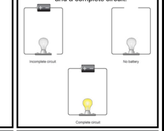
Forces are just pushes and pulls in a particular direction



What does a complete circuit mean?

Circuits

The bulb will only light if there is a battery and a complete circuit.



What can we do to protect ourselves against the sun?



How do shadows change in size?

If the light source is **close** to the object, the shadow will be **bigger.**



If the light source is **further away** from the object, the shadow will be **smaller.**

What materials do magnets attract?

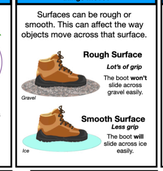


Magnetic materials are **always** made of metal.

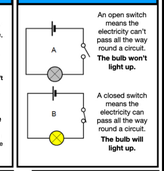
However, **not all** metals are magnetic.

How do surfaces affect the way things move?

Surfaces can be rough or smooth. This can affect the way objects move across that surface.



How does a switch work in a circuit?



An open switch means the electricity can't pass all the way round a circuit. **The bulb won't light up.**

A closed switch means the electricity can pass all the way round a circuit. **The bulb will light up.**

A SCIENTIST … → **ASKS QUESTIONS** → **CLASSIFY GROUPS** → **INVESTIGATE** → **CONCLUDE FINDINGS**

Y5 Y6 Science Knowledge Organiser — Cycle A

What is important when being a scientist?

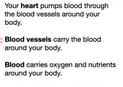
How does the circulatory system work?

Your **heart** pumps blood through the blood vessels around your body.

Blood vessels carry the blood around your body.

Blood carries oxygen and nutrients around your body.

Blood is returned to the **lungs** to pick up oxygen.



What are the functions of the blood vessels?

Arteries: carry oxygenated blood away from the heart

Veins: carry deoxygenated blood back to the heart

Capillaries: transfer oxygen to your muscles and tissue

What can we do or avoid to stay healthy?

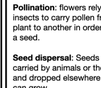
DO
- Exercise (60 mins)
- Healthy Diet
- 8 Hours of Sleep
- Drugs (medical)

DON'T
- No Exercise
- Unhealthy Diet
- Little Sleep
- Drugs (alcohol & smoking)

How do plants reproduce?

Pollination: flowers rely on insects to carry pollen from one plant to another in order to make a seed.

Seed dispersal: Seeds are carried by animals or the wind and dropped elsewhere so they can grow.



What do fossils tell us about animals in the past?

Fossils give scientists clues about animals that lived a long time ago.

They help to show how **evolution** has occurred.

They provide evidence about how the **Earth's surface** has changed over time.

Fossils provide evidence for **past environments** such as **weather** & **climate**.

What does the heart do?

The heart **fills up** with blood and supplies it with **oxygen**.

The heart **contracts** to pump blood around the body.

The heart **relaxes** to fill up with blood.



What are the stages of the human lifecycle?

0-9 months	**Foetus**: the baby is growing inside the womb
0-1 years	**Baby**: a baby is born after nine months in the womb
1-13 years	**Childhood**: child learns to walk and talk
13-19 years	**Adolescence**: body develops into an adult through puberty
19-60 years	**Adulthood**: the body is fully developed
60+ years	**Old age**: the last stage in the lifecycle of a human

How do animal lifecycles differ from each other?

Lifecycles in animals have four stages:

Birth > Growth > Reproduction > Death

Foetus - Kitten - Adolescence - Adult

Egg - Caterpillar - Cocoon - Butterfly

Spawn - Tadpole - Froglet - Frog

How are animals classified?

Classification keys are a set of questions about the characteristics of a living thing.

The questions are answered and narrowed down until only one animal remains.



How has evolution and adaption helped animals to survive?

Animals compete for food and mates to survive.

Animals suited to the environment survive & reproduce.

Animals not suited to the environment die out.



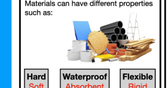
A SCIENTIST … → **ASKS QUESTIONS** → **CLASSIFY GROUPS** → **INVESTIGATE** → **CONCLUDE FINDINGS**

Y5 Y6 Science Knowledge Organiser — Cycle B

What is important when being a scientist?

What are the properties of materials?

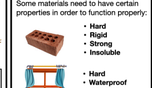
Materials can have different properties such as:



Hard / Soft
Waterproof / Absorbent
Flexible / Rigid
Conductor / Insulator
Magnetic / Repellent
Strong / Weak
Soluble / Insoluble
Transparent / Opaque

How do properties of materials affect the suitability of everyday objects?

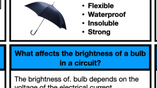
Some materials need to have certain properties in order to function properly:



- **Hard**
- **Rigid**
- **Strong**
- **Insoluble**



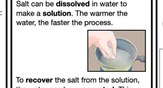
- **Hard**
- **Waterproof**
- **Insulator**
- **Transparent**



- **Flexible**
- **Waterproof**
- **Insulator**
- **Strong**

How can we dissolve and recover substances?

Salt can be **dissolved** in water to make a **solution**. The warmer the water, the faster the process.



To **recover** the salt from the solution, the water can be **evaporated**. This leaves the salt crystals behind.



How can we separate substances?

SIEVING
A mixture of different solid particles can be separated using a sieve.



FILTERING
Filters can be used to separate out an insoluble solid from water.

The water passes through whilst the solid is left behind.

EVAPORATING
Salt can be separated from water by boiling the water.

The water evaporates and the salt is left behind.

How are new materials formed through irreversible changes?

Irreversible changes cannot be changed back to their **original state.** Examples of irreversible changes are:

Cooking
A cooked egg can't be turned back to a raw egg.

Burning
Burning creates a chemical reaction that can't be changed back.

Mixing
Vinegar and bicarbonate of soda mixes and creates a chemical reaction.

What are the circuit symbols and how do they make a circuit?

What affects the brightness of a bulb in a circuit?

The brightness of bulb depends on the voltage of the electrical current.

How can scientists use materials & electricity to benefit the environment?

Scientists use materials to benefit the environment by ensuring they can be recycled and reused.

Scientists use electricity to benefit the environment by using it to power cars and homes.

What are independent, dependent and control variables?

INDEPENDENT VARIABLE
What I change

DEPENDENT VARIABLE
What I observe

CONTROL VARIABLE
What I keep the same

How do scientists carry out a fair test?

1. Ask questions & set an argument
2. Set variables
3. Gather Equipment
4. Predict the outcome
5. Carry out the experiment
6. Repeat the experiment
7. Conclude from findings
8. Support or refute the argument

A SCIENTIST … → **ASKS QUESTIONS** → **CLASSIFY GROUPS** → **INVESTIGATE** → **CONCLUDE FINDINGS**

Y5 Y6 Science Knowledge Organiser — Cycle B

What is important when being a scientist?

How do we see?

Why do we have day and night?

Light travels in a straight line from the sun.

As the Earth rotates, half of the planet is in day.

The other half in darkness is night.

What are the names of the planets in our solar system?

How does friction affect the way things move?

Friction is a force that always works in the direction **opposite** to the direction in which the object is moving, or trying to move.

What is the effect of friction?

Friction always **slows** a moving object down.

Smooth surfaces have low friction.
Less force is required to move the object.

Rough surfaces have high friction.
More force is required to move the object.

Why do shadows have different shapes?

Light travels in **straight lines** from a light source.

The outline of an opaque object is then cast as a shadow.

Why does the moon appear to change shape?

Light travels in a straight line from the sun.

Light reflects off the surface of the moon.

As the moon rotates around Earth, we can see different parts of the moon reflection at night.

How do the planets move in the solar system?

All planets **orbit** around the sun in a near circular motion.

This is due to its **gravitational pull.**

How does gravity affect objects?

What is air resistance and water resistance?

Air Resistance
A kind of friction that occurs between air and another object

Water Resistance
A kind of friction that occurs between water and another object

A SCIENTIST … → **ASKS QUESTIONS** → **CLASSIFY GROUPS** → **INVESTIGATE** → **CONCLUDE FINDINGS**

Y3
Y4

Science Knowledge Organiser

Cycle
A

BIOLOGY

What is important when being a scientist?

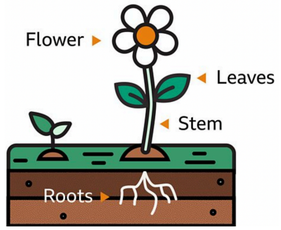
What are the functions of the parts of a plant?

Roots: take up water and nutrients from the soil. They keep the plant upright.

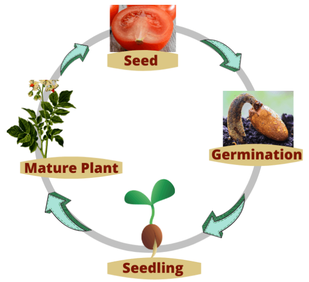
Stem: Takes water and nutrients to the flower.

Leaves: Use light from the sun to make food.

Flower: Produces seeds to make new flowers.



What is the lifecycle of a plant?



Seed: planted in soil

Germination: the sprouting of a seed

Seedling: young plant emerges from the seed

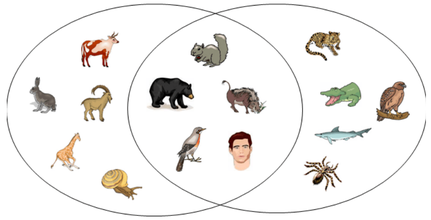
Mature plant: the plant grows to its full height

What are carnivores, omnivores, herbivores?

HERBIVORES animals that eat only plants

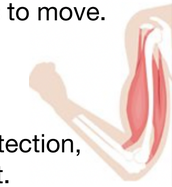
OMNIVORES animals that eat plants and meat

CARNIVORES animals that eat only meat



How do our muscles and skeleton help us move?

Muscles: muscles contract and relax causing our body parts to move.



Skeleton: used for protection, support and movement.

Protection: bones like your skull and rib cage protect vital organs from damage.

Support: bones in your legs, back and neck keep you upright.

Movement: muscles use your bones to move them.

What are the different animal groups?

Mammals
- Warm-blooded
- Have fur
- Live young

Fish
- Cold-blooded
- Have scales & gills
- Lay eggs

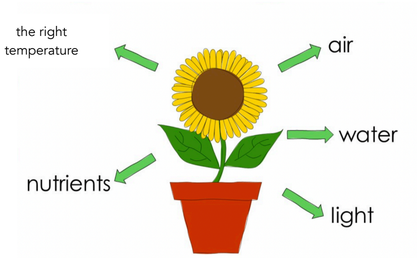
Amphibians
- Cold-blooded
- Breathe through skin
- Lay spawn

Reptiles
- Cold-blooded
- Have scales
- Lay eggs

Birds
- Warm-blooded
- Have feathers
- Lay eggs

Insects
- Cold-blooded
- Has an exoskeleton
- Live young & lay eggs

What does a plant need to grow?



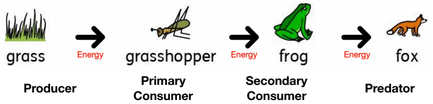
Plants need these five things to grow.

Without them, they will turn brown and wilt.

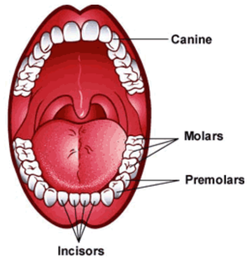
What is a food chain?

Food chains show how different organisms eat each other.

Food chains show how energy is passed up through the food chain.



Why do we have different kinds of teeth?



Incisors: used for cutting and slicing food

Canines: used for tearing up food

Molars: used for chewing and grinding up food

What are vertebrates and invertebrates?

Vertebrates: animals with a spine (backbone) in their body.



Invertebrates: animals without a spine (backbone) in their body



How do changing environments affect animals?

Melting ice caps: animal environments get smaller when polar ice caps melt.

Deforestation: cutting trees down destroys habitats

Human population: humans pose a danger to animals when building houses

Plastic pollution: fish can eat or get caught up in plastic which can cause them to die

A SCIENTIST … → **ASKS QUESTIONS** → **CLASSIFY GROUPS** → **INVESTIGATE** → **CONCLUDE FINDINGS**

Y3
Y4

Science Knowledge Organiser

Cycle
B

CHEMISTRY

What is important when being a scientist?

How do scientists classify rocks?



Igneous

Formed from the cooling of molten rock.



Sedimentary

Formed from sediment settling into layers after being transported by a river.

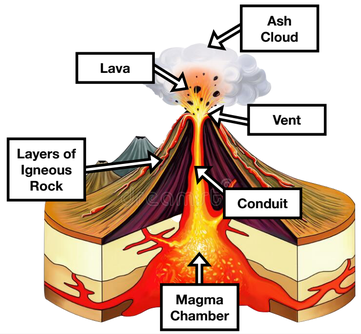


Metamorphic

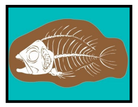
Formed after another rock has been under pressure or extreme heat.

How do volcanoes produce igneous rock?

When a volcano erupts, lava travels up the conduit and spills out of its vent. **The lava cools quickly and forms igneous rock.**



How are fossils formed?



An animal **dies** and is **buried** in sand/mud.



The skeleton produces an **imprint** in the sand/mud.



The sand/mud turns to **rock**, and the imprint becomes the **fossil**.

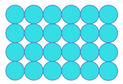
What is soil?

Soil is made up out of four components:



What are the differences between solids, liquids and gases?

Solid



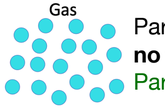
Particles are **rigid** with a **fixed shape**.
Particles can't be squashed.

Liquid



Particles are **not rigid** with **no fixed shape**.
Particles can't be squashed.

Gas



Particles are **not rigid** with **no fixed shape**.
Particles can be squashed.

What is evaporation & condensation?



EVAPORATION

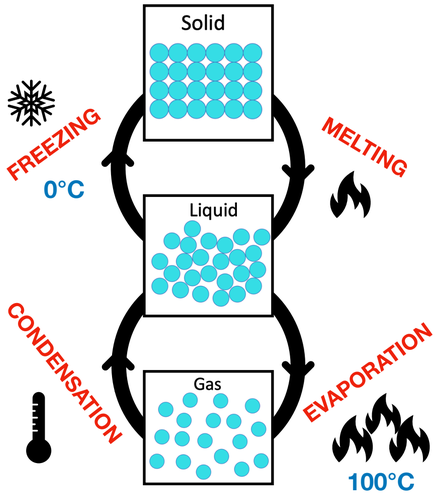
Evaporation occurs when liquid has reached 100°C (boiling) and turns into a gas by rising up into the air.

CONDENSATION

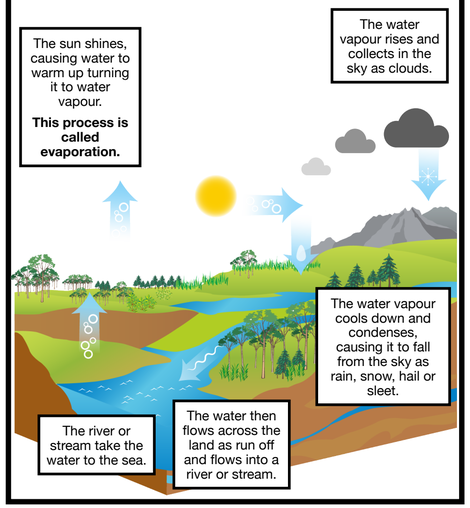


Condensation occurs when a gas such as water vapour hits a cool surface and immediately turns back into a liquid.

What causes changes of state within particles?



How does water change state in the water cycle?



What is meant by classifying?

Classifying means **putting things into groups.**
Scientists classify a wide range of things from rocks, plants, animals and materials.

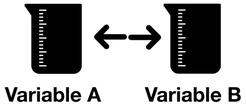


Igneous	Sedimentary	Metamorphic

What is the difference between a comparative and fair test?

Comparative Tests
These tests compare one variable with another variable.

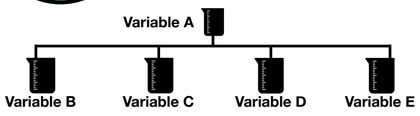
Scientists look for differences!



Variable A ↔ Variable B

Scientists look for relationships!

Fair Tests
These tests compare multiple variables with another fixed variable.



A SCIENTIST … → **ASKS QUESTIONS** → **CLASSIFY GROUPS** → **INVESTIGATE** → **CONCLUDE FINDINGS**

Y3
Y4

Science Knowledge Organiser

Cycle
B

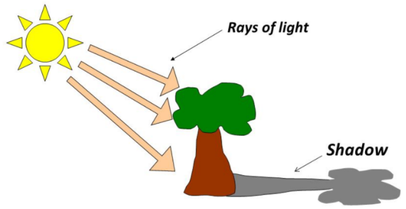
PHYSICS

What is important when being a scientist?

How important is light to humans?



How are shadows formed?



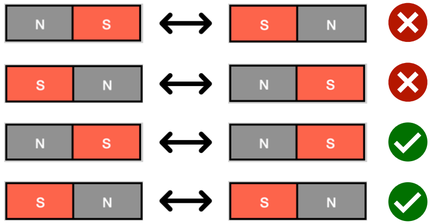
Shadows are formed when an opaque object is placed in the path of the rays of light.

The opaque object does not let the light pass through it.

The rays of light will pass over the edges of the object and form a shadow in the shape of the object.

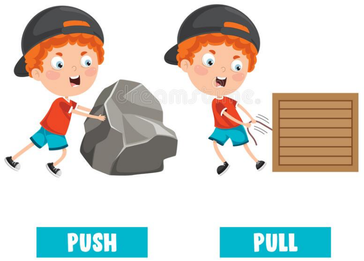
When will magnets attract each other?

Magnets will attract if the **north** and **south** poles are facing each other.



What is a force?

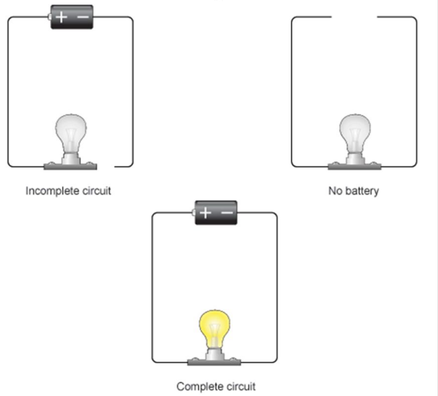
Forces are just pushes and pulls in a particular direction



What does a complete circuit mean?

<u>Circuits</u>

The bulb will only light if there is a battery and a complete circuit.

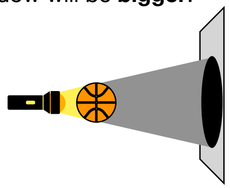


What can we do to protect ourselves against the sun?

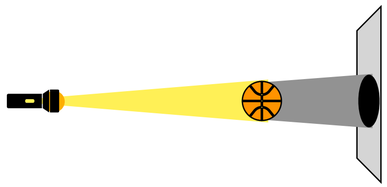


How do shadows change in size?

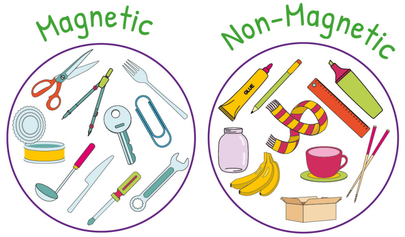
If the light source is **close** to the object, the shadow will be **bigger**.



If the light source is **further away** from the object, the shadow will be **smaller**.



What materials do magnets attract?



Magnetic materials are **always** made of metal.

However, **not all** metals are magnetic.

How do surfaces affect the way things move?

Surfaces can be rough or smooth. This can affect the way objects move across that surface.



Gravel

Rough Surface

Lot's of grip

The boot **won't** slide across gravel easily.



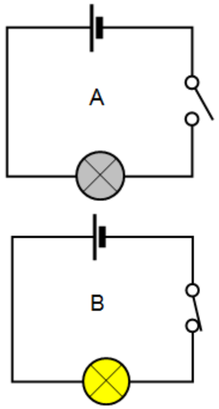
Ice

Smooth Surface

Less grip

The boot **will** slide across ice easily.

How does a switch work in a circuit?



An open switch means the electricity can't pass all the way round a circuit.

The bulb won't light up.

A closed switch means the electricity can pass all the way round a circuit.

The bulb will light up.

A SCIENTIST … → **ASKS QUESTIONS** → **CLASSIFY GROUPS** → **INVESTIGATE** → **CONCLUDE FINDINGS**

Y5
Y6

Science Knowledge Organiser

Cycle
A

CONSERVATION

What is important when being a scientist?

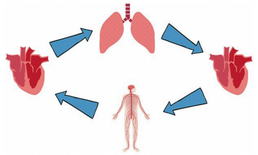
How does the circulatory system work?

Your **heart** pumps blood through the blood vessels around your body.

Blood vessels carry the blood around your body.

Blood carries oxygen and nutrients around your body.

Blood is returned to the **lungs** to pick up oxygen.



What are the functions of the blood vessels?

Arteries: carry oxygenated blood away from the heart

Veins: carry deoxygenated blood back to the heart

Capillaries: transfer oxygen to your muscles and tissue

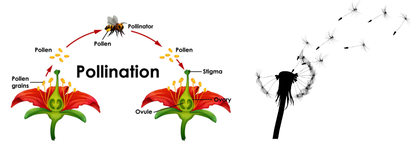
What can we do or avoid to stay healthy?

DO	DON'T
Exercise (60 mins)	No Exercise
Healthy Diet	Unhealthy Diet
8 Hours of Sleep	Little Sleep
Drugs (medical)	Drugs (alcohol & smoking)

How do plants reproduce?

Pollination: flowers rely on insects to carry pollen from one plant to another in order to make a seed.

Seed dispersal: Seeds are carried by animals or the wind and dropped elsewhere so they can grow.



What do fossils tell us about animals in the past?



Fossils give scientists clues about animals that lived a long time ago.

They help to show how **evolution** has occurred.

They provide evidence about how the **Earth's surface** has changed over time.

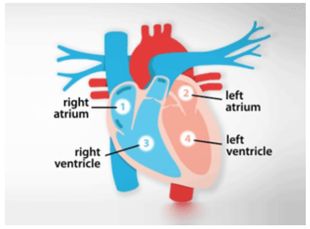
Fossils provide evidence for **past environments** such as **weather** & **climate**.

What does the heart do?

The heart **fills up** with blood and supplies it with **oxygen**.

The heart **contracts** to pump blood around the body.

The heart **relaxes** to fill up with blood.



What are the stages of the human lifecycle?

0-9 months	**Foetus**: the baby is growing inside the womb
0-1 years	**Baby**: a baby is born after nine months in the womb
1-13 years	**Childhood**: child learns to walk and talk
13-19 years	**Adolescence**: body develops into an adult through puberty
19-60 years	**Adulthood**: the body is fully developed
60+ years	**Old age**: the last stage in the lifecycle of a human

How do animal lifecycles differ from each other?

Lifecycles in animals have four stages:

Birth > Growth > Reproduction > Death



Foetus - Kitten - Adolescence - Adult



Egg - Caterpillar - Cocoon - Butterfly

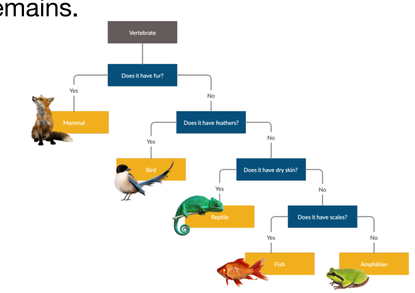


Spawn - Tadpole - Froglet - Frog

How are animals classified?

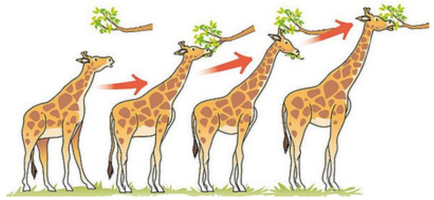
Classification keys are a set of questions about the characteristics of a living thing.

The questions are answered and narrowed down until only one animal remains.



How has evolution and adaption helped animals to survive?

Animals compete for food and mates to survive. → Animals suited to the environment survive & reproduce. → Animals not suited to the environment die out.



A SCIENTIST ... → ASKS QUESTIONS → CLASSIFY GROUPS → INVESTIGATE → CONCLUDE FINDINGS

Y5
Y6

Science Knowledge Organiser

ENVIRONMENT

What is important when being a scientist?

What are the properties of materials?

Materials can have different properties such as:



Hard Soft

Waterproof Absorbent

Flexible Rigid

Conductor Insulator

Magnetic Repellent

Strong Weak

Soluble Insoluble

Transparent Opaque

How do properties of materials affect the suitability of everyday objects?

Some materials need to have certain properties in order to function properly:



- **Hard**
- **Rigid**
- **Strong**
- **Insoluble**



- **Hard**
- **Waterproof**
- **Insulator**
- **Transparent**



- **Flexible**
- **Waterproof**
- **Insoluble**
- **Strong**

How can we dissolve and recover substances?

Salt can be **dissolved** in water to make a **solution**. The warmer the water, the faster the process.



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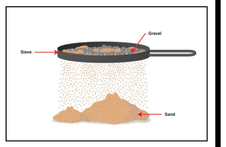
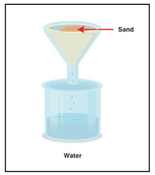
SIEVING
A mixture of different solid particles can be separated using a sieve.



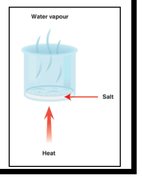


FILTERING
Filters can be used to separate out an insoluble solid from water.

The water passes through whilst the solid is left behind.

EVAPORATING
Salt can be separated from water by boiling the water.

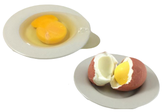
The water evaporates and the salt is left behind.



How are new materials formed through irreversible changes?

Irreversible changes cannot be changed back to their **original state**. Examples of irreversible changes are:

Cooking
A cooked egg can't be turned back to a raw egg.



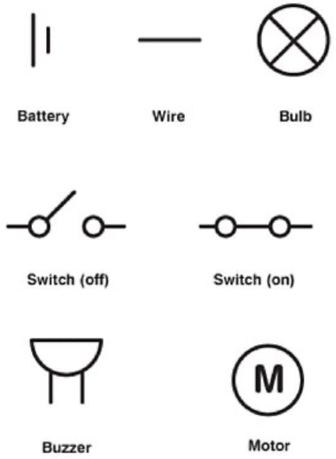
Burning
Burning creates a chemical reaction that can't be changed back.



Mixing
Vinegar and bicarbonate of soda mixes and creates a chemical reaction.

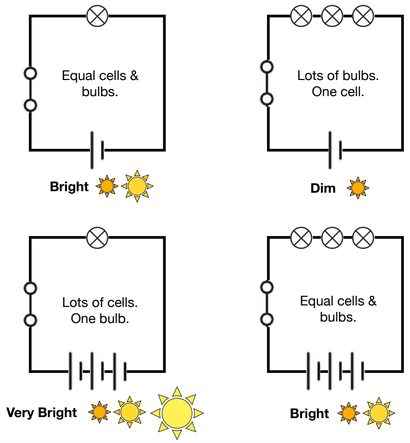


What are the circuit symbols and how do they make a circuit?



What affects the brightness of a bulb in a circuit?

The brightness of. bulb depends on the voltage of the electrical current.



How can scientists use materials & electricity to benefit the environment?

Scientists use materials to benefit the environment by ensuring they can be recycled and reused.



Scientists use electricity to benefit the environment by using it to power cars and homes.



What are independent, dependent and control variables?

INDEPENDENT VARIABLE
What I change

DEPENDENT VARIABLE
What I observe

CONTROL VARIABLE
What I keep the same

How do scientists carry out a fair test?

1. Ask questions & set an argument
2. Set variables
3. Gather Equipment
4. Predict the outcome
5. Carry out the experiment
6. Repeat the experiment
7. Conclude from findings
8. Support or refute the argument

A SCIENTIST … → **ASKS QUESTIONS** → **CLASSIFY GROUPS** → **INVESTIGATE** → **CONCLUDE FINDINGS**

Cycle B

Y5
Y6

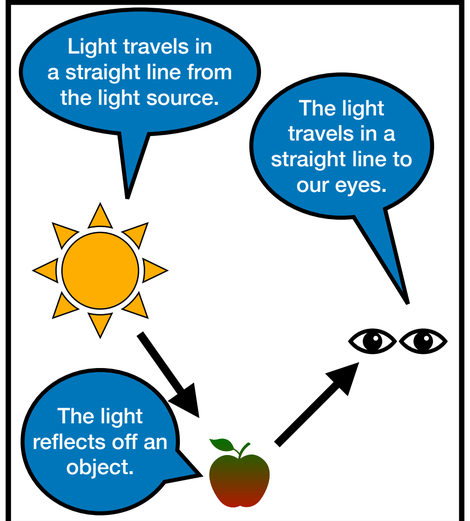
Science Knowledge Organiser

Cycle
B

SPACE X

What is important when being a scientist?

How do we see?

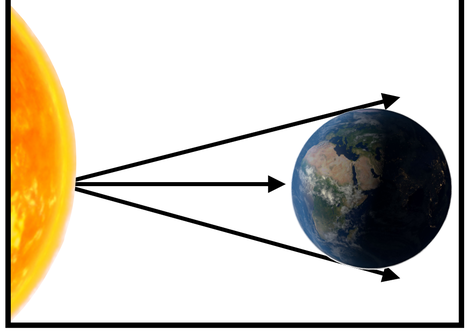


Why do we have day and night?

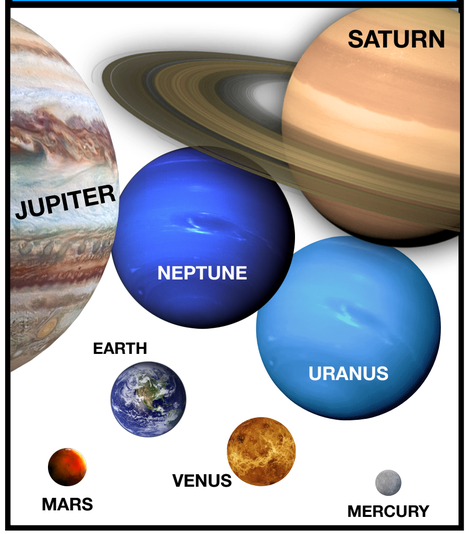
Light travels in a straight line from the sun.

As the Earth rotates, half of the planet is in day.

The other half in darkness is night.

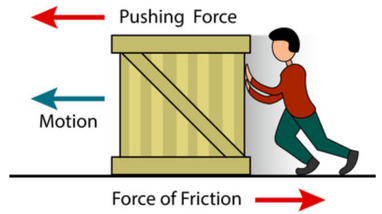


What are the names of the planets in our solar system?



How does friction affect the way things move?

Friction is a force that always works in the direction **opposite** to the direction in which the object is moving, or trying to move.

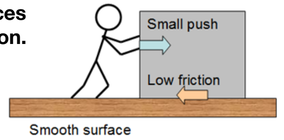


What is the effect of friction?

Friction always **slows** a moving object down.

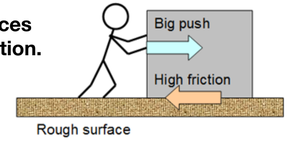
Smooth surfaces have low friction.

Less force is required to move the object.



Rough surfaces have high friction.

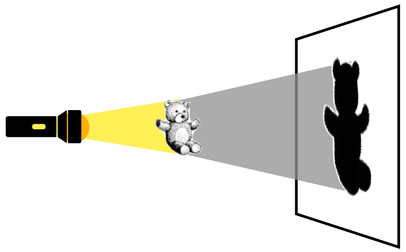
More force is required to move the object.



Why do shadows have different shapes?

Light travels in **straight lines** from a light source.

The outline of an opaque object is then cast as a shadow.

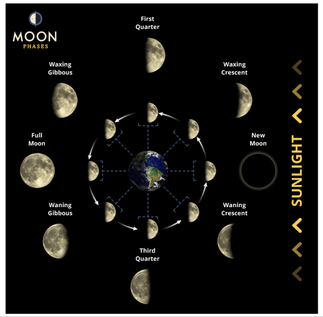


Why does the moon appear to change shape?

Light travels in a straight line from the sun.

Light reflects off the surface of the moon.

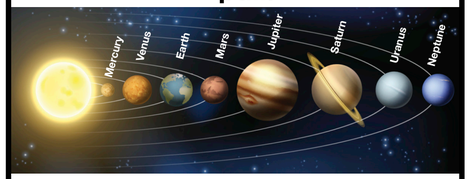
As the moon rotates around Earth, we can see different parts of the moon reflection at night.



How do the planets move in the solar system?

All planets **orbit** around the sun in a near circular motion.

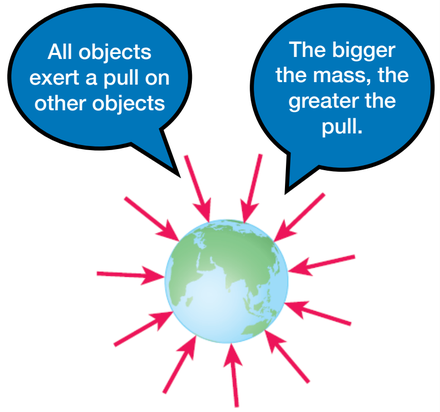
This is due to its **gravitational pull**.



Length of Orbit

Orbit of **MERCURY** *88 Earth Days*	Orbit of **EARTH** *365 Days*	Orbit of **JUPITER** *12 Earth Years*	Orbit of **URANUS** *84 Earth Years*
Orbit of **VENUS** *225 Earth Days*	Orbit of **MARS** *1.9 Earth Years*	Orbit of **SATURN** *29 Earth Years*	Orbit of **NEPTUNE** *165 Earth Years*

How does gravity affect objects?

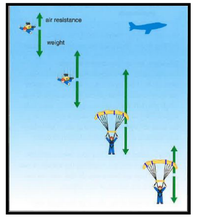


This force is called
GRAVITY

What is air resistance and water resistance?

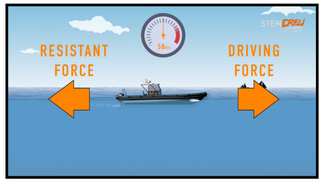
Air Resistance

*A kind of **friction** that occurs between air and another object*



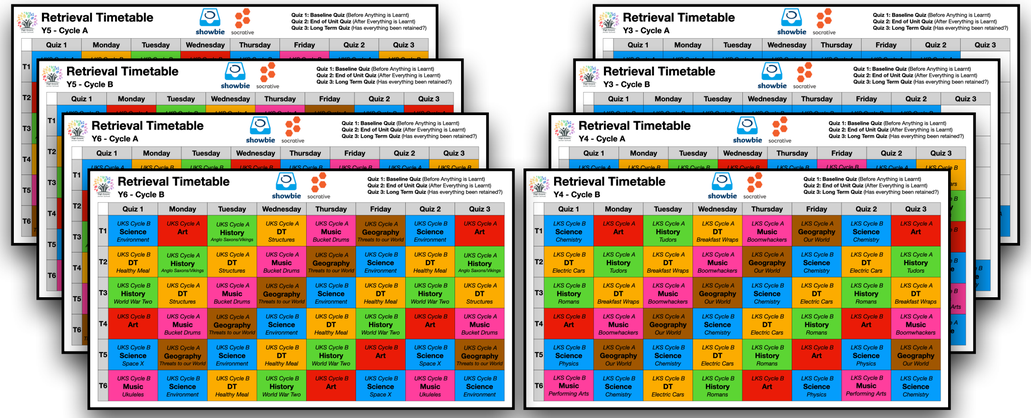
Water Resistance

*A kind of **friction** that occurs between water and another object*



A SCIENTIST … → **ASKS QUESTIONS** → **CLASSIFY GROUPS** → **INVESTIGATE** → **CONCLUDE FINDINGS**

Science | Retrieval Practice



The Long Term Memory Goal

At High Greave, we want our learners to **know more and do more** in Science. To achieve this, we embed **daily rehearsal and retrieval practice** into our curriculum. Retrieval practice helps strengthen **long-term memory** by recalling previously learned knowledge, ensuring learning is **retained and applied** over time.

How Retrieval Practice Works:

Quiz 1 *(Before Learning Begins)*
- *Each topic starts with a Socrative quiz to assess prior knowledge.*
- *Scores are usually low, highlighting gaps in understanding.*

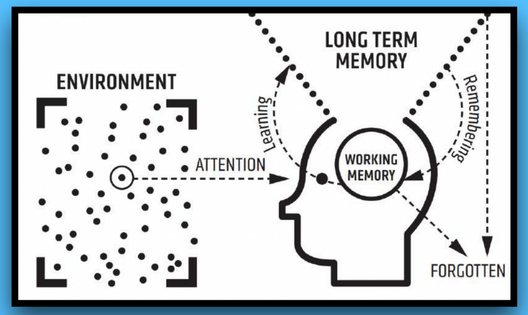
Daily Rehearsal and Memorisation
- *Key knowledge is practised and revisited every day throughout the term.*
- *This strengthens long-term memory and deepens understanding.*

Quiz 2 *(After Learning is Complete)*
- *At the end of the term, learners take another Socrative quiz.*
- *Scores typically show significant improvement, demonstrating progress.*

Weekly 10-Minute Reviews
- *The topic is revisited for ten minutes each week to prevent forgetting.*
- *This helps maintain knowledge and keeps key concepts fresh.*

Quiz 3 *(Five Terms Later)*
- *A final quiz assesses long-term retention.*
- *The results help us evaluate our curriculum's effectiveness and make improvements where needed.*

By embedding **retrieval practice into daily routines**, we ensure that musical knowledge is not just learned temporarily but **retained for life**.



Retrieval Timetable

Y6 - Cycle A

showbie socrative

Quiz 1: Baseline Quiz (Before Anything is Learnt)
Quiz 2: End of Unit Quiz (After Everything is Learnt)
Quiz 3: Long Term Quiz (Has everything been retained?)

	Quiz 1	Monday	Tuesday	Wednesday	Thursday	Friday	Quiz 2	Quiz 3
T1	UKS Cycle A **Science** *Conservation*	UKS Cycle B **DT** *Healthy Meal*	UKS Cycle B **History** *World War Two*	UKS Cycle B **Art**	UKS Cycle B **Science** *Space X*	UKS Cycle B **Music** *Ukuleles*	UKS Cycle A **Science** *Conservation*	UKS Cycle B **DT** *Healthy Meal*
T2	UKS Cycle A **Art**	UKS Cycle B **History** *World War Two*	UKS Cycle B **Art**	UKS Cycle B **Science** *Space X*	UKS Cycle B **Music** *Ukuleles*	UKS Cycle A **Science** *Conservation*	UKS Cycle A **Art**	UKS Cycle B **History** *World War Two*
T3	UKS Cycle A **History** *Anglo Saxons/Vikings*	UKS Cycle B **Art**	UKS Cycle B **Science** *Space X*	UKS Cycle B **Music** *Ukuleles*	UKS Cycle A **Science** *Conservation*	UKS Cycle A **Art**	UKS Cycle A **History** *Anglo Saxons/Vikings*	UKS Cycle B **Art**
T4	UKS Cycle A **DT** *Structures*	UKS Cycle B **Science** *Space X*	UKS Cycle B **Music** *Ukuleles*	UKS Cycle A **Science** *Conservation*	UKS Cycle A **Art**	UKS Cycle A **History** *Anglo Saxons/Vikings*	UKS Cycle A **DT** *Structures*	UKS Cycle B **Science** *Space X*
T5	UKS Cycle A **Music** *Bucket Drums*	UKS Cycle B **Music** *Ukuleles*	UKS Cycle A **Science** *Conservation*	UKS Cycle A **Art**	UKS Cycle A **History** *Anglo Saxons/Vikings*	UKS Cycle A **DT** *Structures*	UKS Cycle A **Music** *Bucket Drums*	UKS Cycle B **Music** *Ukuleles*
T6	UKS Cycle A **Geography** *Threats to our World*	UKS Cycle A **Science** *Conservation*	UKS Cycle A **Art**	UKS Cycle A **History** *Anglo Saxons/Vikings*	UKS Cycle A **DT** *Structures*	UKS Cycle A **Music** *Bucket Drums*	UKS Cycle A **Geography** *Threats to our World*	UKS Cycle A **Science** *Conservation*

Science | iPad Workbooks



At High Greave Junior School, **iPad Workbooks** enhance the Science curriculum by providing an **interactive and engaging** way for students to record and reflect on their learning. These digital workbooks allow pupils to develop their **scientific knowledge and skills** in a **dynamic format**, moving beyond traditional worksheets.

Key Benefits of iPad Workbooks:

- Enable students to **record, analyse, and reflect** on their scientific learning.
- Offer a **variety of formats** to demonstrate understanding.
- Support **personalised and interactive** learning experiences.

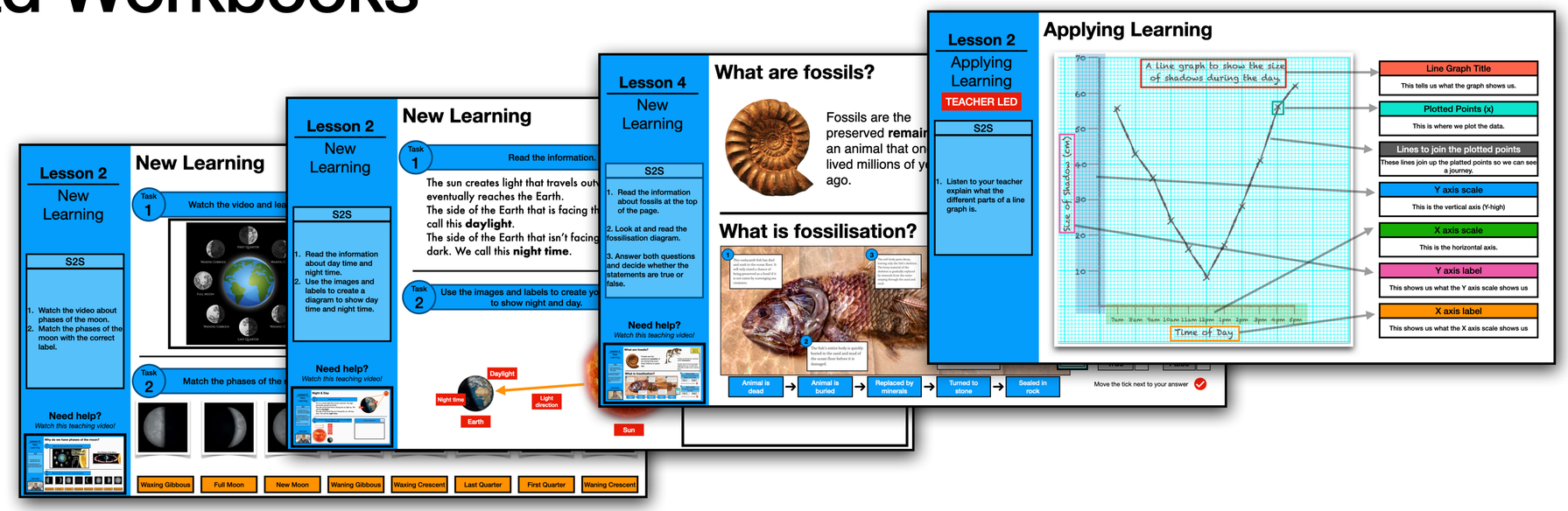
Ways Students Demonstrate Learning:

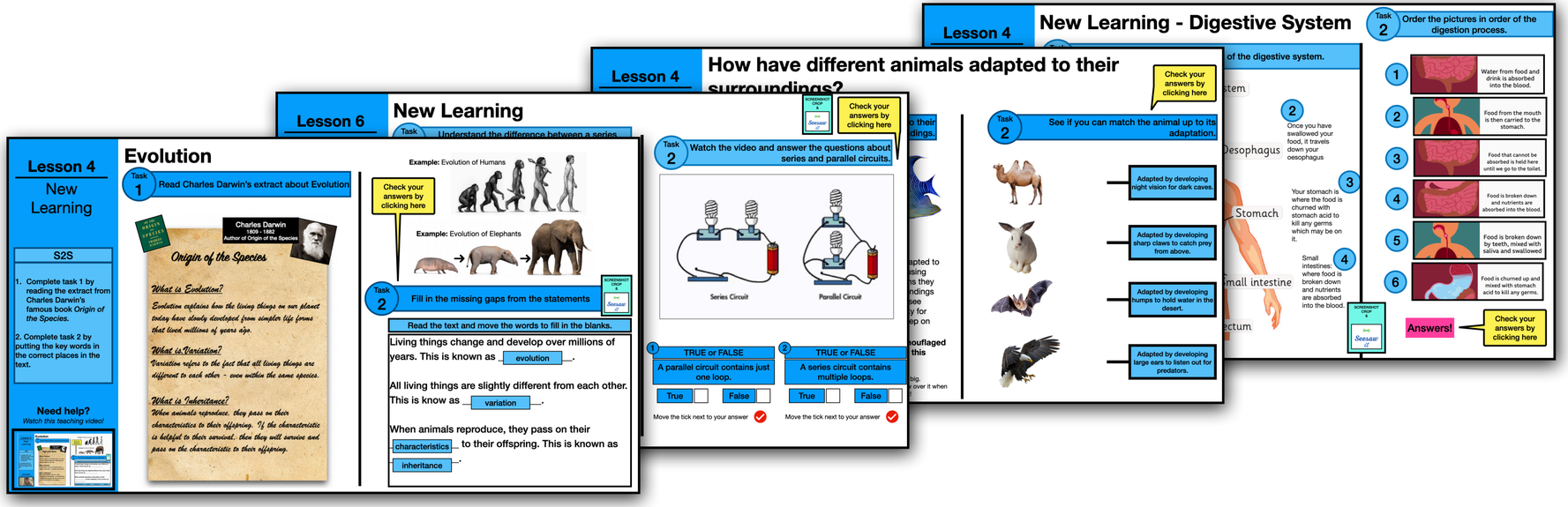
- **Videos** – Explain predictions, observe changes over time, or demonstrate experiments.
- **Pictures & Diagrams** – Capture step-by-step images of investigations to ensure a controlled method.
- **Voice Notes** – Reflect on results, identify patterns, and explain scientific concepts.
- **Digital Graphing Tools** – Present and analyse data effectively.

Scientific Skills Developed:

- **Inquiry** – Asking questions and exploring scientific concepts.
- **Prediction** – Making and explaining hypotheses before investigations.
- **Data Analysis** – Collecting, organising, and interpreting results.
- **Evaluation** – Identifying patterns and drawing conclusions from experiments.

By integrating technology into Science lessons, **iPad Workbooks** help students develop **digital literacy** and **scientific communication skills**, making learning more **interactive, personalised, and reflective of real-world scientific methods**.





Science | Experiences

Y3 Y4

- 2x Science Days
- **Trip:** The Deep Aquarium
- **Trip:** Eureka!
- **Visitor:** Dentist
- 2x Science Exhibitions
- Plus many investigations!



Y3 Y4 The Deep Aquarium



Y3 Y4 Dentist Visit



Y3 Y4 Planting Nature

Y5 Y6

- 2x Science Days
- **Trip:** Yorkshire Wildlife Park
- **Trip:** Leicester Space Centre
- **Visitor:** STEM Ambassador
- 2x Science Exhibitions
- Plus many investigations!



Y5 Y6 National Space Centre



Y5 Y6 Yorkshire Wildlife Park



Y5 Y6 Science Day