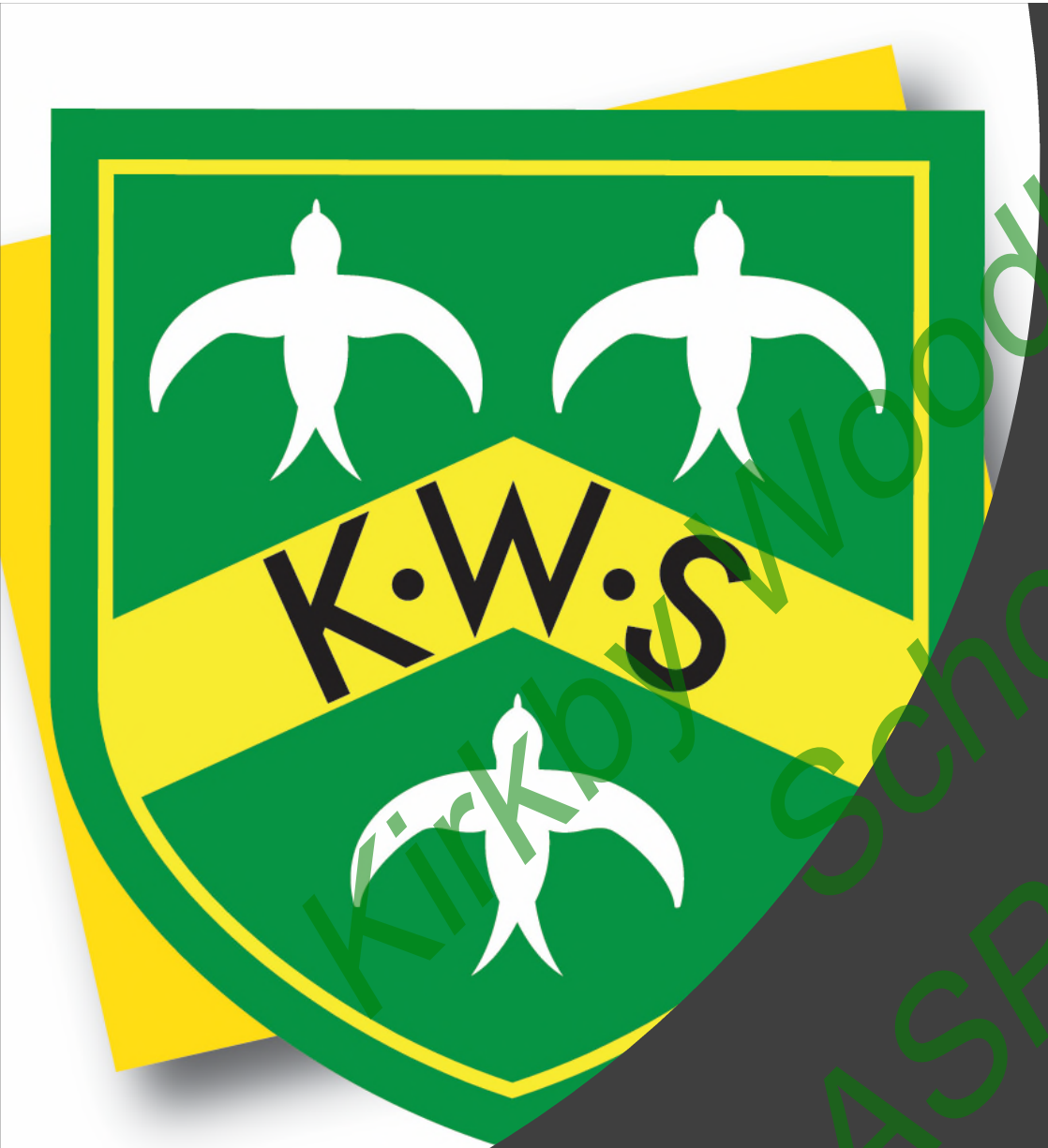
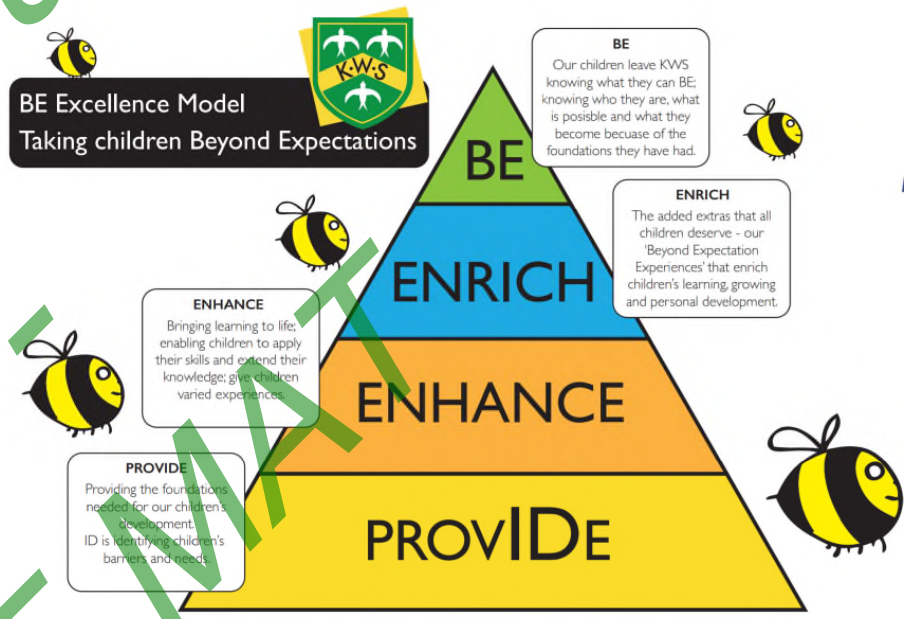
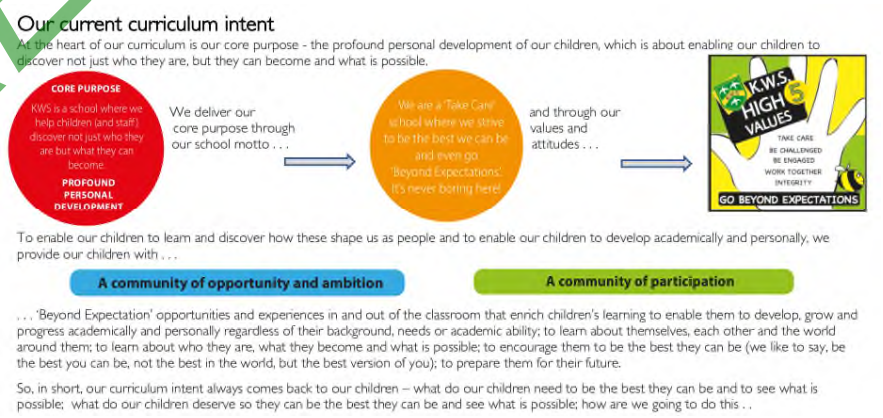


The Science Curriculum

Curriculum Intent Statement – Science

At Kirkby Woodhouse School the science curriculum will ***provide*** a high quality science education that provokes awe and wonder in pupils who then make connections between the world around them and a range of scientific phenomenon. We will ***enhance*** learning experiences by provision of observational and practical learning opportunities with strong cross-curriculum links, and a focus on oracy in science through questioning and the process of scientific enquiry. Our curriculum will be ***enriched*** by curriculum visits and our residential programme where awe and wonder of the world around the pupils is a fundamental part of the residential experience. Finally, through our science curriculum our children will ***become*** people who understand, thrive and care for the world around them with a curiosity, and a desire to question what they see and find solutions where appropriate.





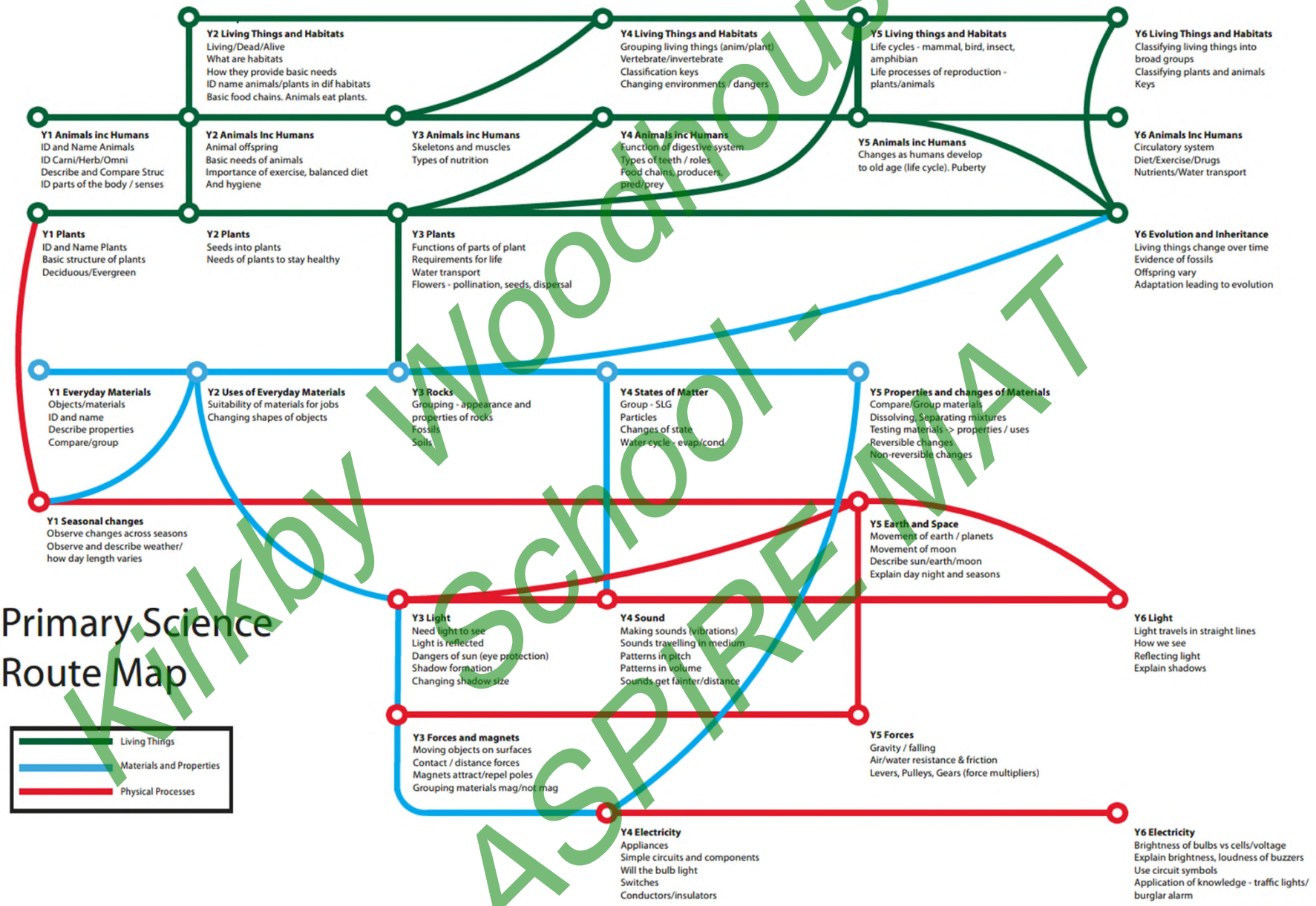
Using the Science Toolkit

Kirkby Woodhouse School – Science Toolkit Overview

Included in the toolkit:

- Focus Scheme of work for Science
- Fixed topics to be taught in the year groups indicated by the tool kit
- Skills to be taught in each year group
- An agreed set of knowledge/vocabulary to be taught in each year group
- A document for auditing the science curriculum
- Pupil interview questionnaires
- Deep Dive Questions to consider

Primary Science Route Map



Kirkby Woodhouse School – How to use it

Toolkit Elements	Where/How to Use
National Curriculum Statements	To be copied onto the long-term plan to show our coverage of the National Curriculum.
Skills Progression Documents.	These are broken down by topic areas. These are to be copied onto the half termly curriculum skills plan to show skills are being taught.
Knowledge Mats	To be stuck into the children's books at the start of the unit to support the children's learning during the topic. It will also provide the vocabulary and knowledge the children should know.
Assessment strategy	A 4 part document that shows how science teaching will be monitored across the school.
Auditing/Deep Dive Documents	For subject leaders to check and consider their subject and how it can be improved.
Pupil interview documents	To be used by subject leaders to find out how children respond to their subject and how successful they feel it is being implemented.

Knowledge, Skills and Understanding Breakdown for Working Scientifically			
Nursery			
Observing	**Performing Tests**	**Identifying, Classifying and Sorting**	**Recording Findings**
Talk about what they see, using a wide vocabulary. Talk about the differences between materials and changes they notice. Understand 'why' questions, like: "Why do you think the caterpillar got so fat?"	Make healthy choices about food, drink, activity and toothbrushing. Use all their senses in hands-on exploration of natural materials. Explore how things work	Explore collections of materials with similar and/or different properties. Begin to make sense of their own life-story and family's history. Plant seeds and care for growing plants.	

Knowledge, Skills and Understanding Breakdown for Working Scientifically

Reception

Observing	Performing Tests	Identifying, Classifying and Sorting	Recording Findings
Ask questions to find out more and to check what has been said to them. Explore the natural world around them. Understand the effect of changing seasons on the natural world around them.	Make comments about what they have heard and ask questions to clarify their understanding. Explore the natural world around them, making observations and drawing pictures of animals and plants.	Recognise some environments that are different to the one in which they live Manage their own basic hygiene and personal needs, including dressing, going to the toilet and understanding the importance of healthy food choices.	Learn new vocabulary. Articulate their ideas and thoughts in well-formed sentences Describe events in some detail. Use talk to work out problems and organise thinking and activities. Explain how things work and why they might happen. Use new vocabulary in different contexts. Know and talk about the different factors that support their overall health and wellbeing: Describe what they see, hear and feel while they are outside. Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class. Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.

Key Stage One

Year 1
Working Scientifically
Ask questions such as: • Why are flowers different colours? • Why do some animals eat meat and others do not?
Set up a test to see which materials keeps things warmest, know if the test has been successful and can say what has been learned
Explain to someone what has been learned from an investigation they have been involved with and draw conclusions from the answers to the questions asked
Measures (within Year 1 mathematical limits) to help find out more about the investigations undertaken

Year 1

Biology			Chemistry	Physics
Animals, including Humans	**Animals, including Humans**	**Plants**	**Everyday Materials**	**Seasonal Change**
• *Name common animals* • *Carnivores, etc*	• *Human body and senses*	• *Common plants* • *Plant structure*	• *Properties of materials* • *Grouping materials*	• *The four seasons* • *Seasonal weather*
• Know how to classify a range of animals by amphibian, reptile, mammal, fish and birds • Know and classify animals by what they eat (carnivore, herbivore and omnivore) • Know how to sort by living and non living things • Describe how an animal is suited to its environment • Name and label the parts of an animal's body	• Know the name of parts of the human body that can be seen • Can you draw & label basic parts of the human body? • Can you identify the main parts of the human body and link them to your senses?	• Know and name a variety of common wild and garden plants/trees • Know and name the petals, stem, leaves and root of a plant • Know and name the roots, trunk, branches and leaves of a tree	• Know the name of the materials an object is made from • Know about the properties of everyday materials • Sort every day objects by their materials.	• Name the seasons and know about the type of weather in each season

Human Body Knowledge Mat

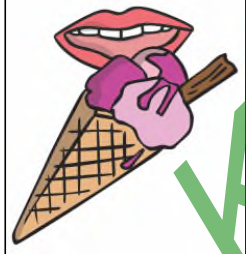
Year 1

sight

hearing

smell

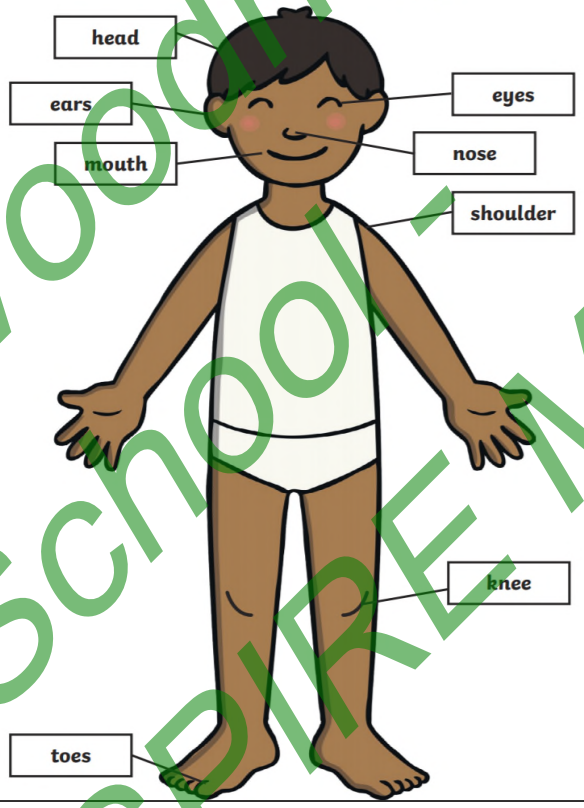
taste



The 5 senses

touch

Parts of the Body



Vocabulary Expectations

senses	A way the body can find out about the world around it.
body	The whole of a person or animal
human	A type of animal. We belong to this group of animals.
limb	An arm or leg – or wings for birds
muscles	Inside the human body. They allow different body parts to move.

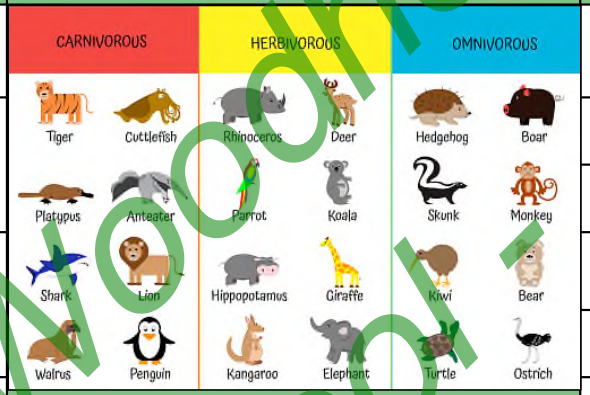
End of Unit Quiz

1. Can you tell me the names of some body parts and point to them?
2. Tell me how some parts of our bodies are different from each other?
3. What senses do you know?
4. Which body part would you use to smell?
6. Can you tell me any parts of the body that are inside and we can't see?
7. How can we make sure that our body stays healthy?

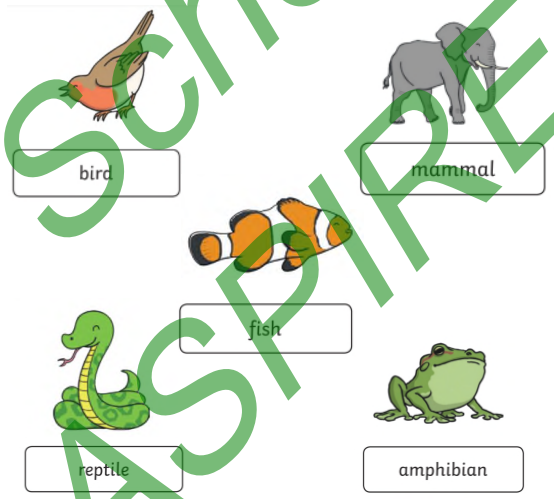
Year 1: Animals Knowledge Mat

Subject Specific Vocabulary	
fish	A fish is a scaly skinned creature with a spine that swims in water and breathes using gills.
amphibians	All amphibians begin their life in water with gills and tails. Examples are frogs and newts.
reptiles	Are animals that are cold-blooded. Most lay eggs and their skin is covered with hard, dry scales.
birds	Birds have feathers and wings. They lay eggs and are warm-blooded animals.
mammals	Mammals are also warm blooded animals. They breathe air and have a backbone.
carnivore	A carnivore is a meat-eating animal that gets its food from killing other animals.
herbivore	A herbivore eats plants.
omnivore	An omnivore eats plants and meat.
tame	Domesticated animals that are not frightened of humans and do not try to hurt humans.
wild	Living in the natural environment and not belonging to humans.
nocturnal	Animals that are active during the night time.

What do animals eat?

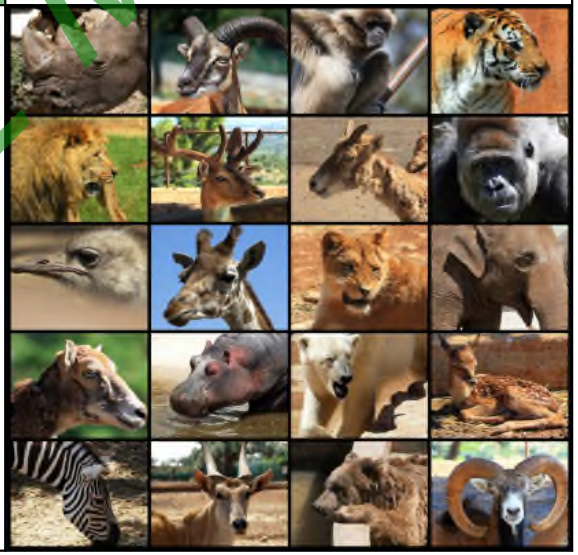


Classifying Animals



End of Unit Quiz

1. Can you tell me what a carnivore is? Can you tell me some examples of animals that are carnivores?
2. Can you tell me different ways of classifying animals?
3. Can you tell me the body parts a bird might have and what they are used for? E.g. eyes for seeing
4. Can you tell me some animals that are nocturnal?
5. How do you know if something is alive or not alive?
6. Can you tell me the difference between amphibians and reptiles? Can you find any things that are the same?



Year 1: Materials Knowledge Mat

Subject Specific Vocabulary

materials	What something is made of, e.g. wood or plastic.
wood	The material that comes from a tree. It varies in hardness.
plastic	A 'man-made' material that can be shaped or moulded to any shape.
metal	A tough and strong material which can be heated and shaped into anything.
opaque	A property of a material where it does not let light through it.
flexible	We can't see gas but it is all around us. There are different types of gas.
stretch	A stretchy material is one that is like elastic.
stiff	A stiff material is firm and hard and not flexible.
bend	A bendy material is one that can be twisted and is flexible.
waterproof	A material that does not allow water or liquid through.
absorbent	A material that soaks up liquid easily.

Fabrics

1	**Leather** – used for shoes, jackets and belts.
2	**Wool** – used for jumpers, socks, pyjamas and coats
3	**Cotton** – used for clothes we wear on warmer days and shirts.
4	**Silk** – expensive material used for scarves and blouses

Hard Materials

End of Unit Quiz

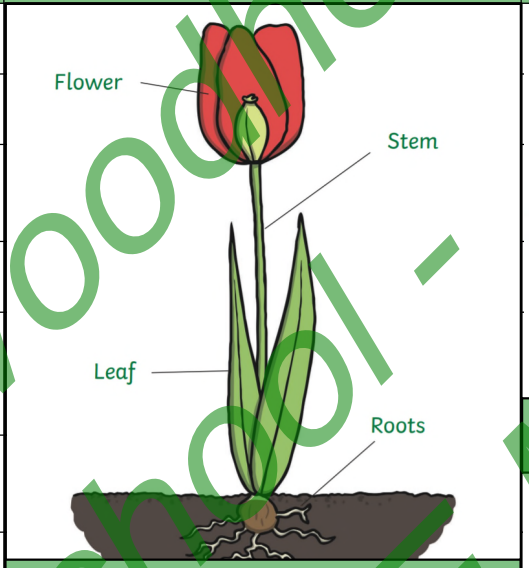
1. Can you name some materials that would be used for clothes?
2. What are the properties of wood? What can it be used for?
3. Can you tell me a material that would be good for making a tea cup? Can you tell me why?
4. Can you tell me a material that is transparent?
5. Can you tell me a material that is flexible? What could it be used for?

Year 1: Plants Knowledge Mat

Subject Specific Vocabulary

buds	A small lump on a stem or twig that will grow into a leaf, flower or shoot.
bulbs	The resting stage of a plant that is usually formed underground.
deciduous	Deciduous is the name given to trees that lose their leaves in autumn and are bare in the winter.
evergreen	Evergreen is the name of trees that have leaves all year round.
trunk	A tree's trunk holds up its crown, protects its inner parts and works like a pipeline, transporting essential materials to the different parts of the tree.
vegetable	A vegetable is a plant or part of a plant which is used as food, for example cabbage or potato.
fruit	A fruit is the product of a plant which is used as food. It normally contains seeds.
environment	The area where a plant or tree lives is its environment.
blossom	Blossom is the flower that comes before the fruit. For example, apple blossom comes before the apple starts to grow.
petals	A petal is a part of the flower and is usually coloured. The colour attracts insects.
branches	Branches come from the tree trunk and grow outwards.

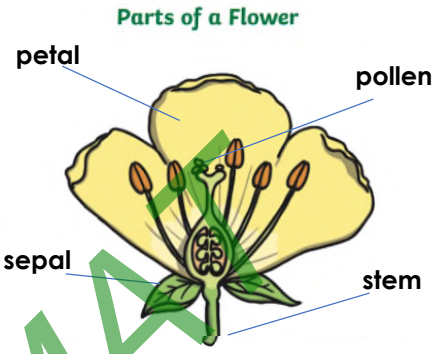
Parts of a plant



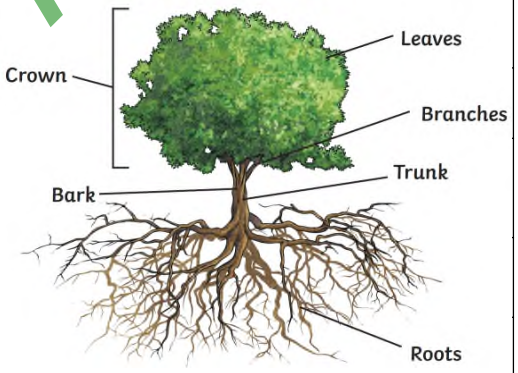
End of Unit Quiz

1. Can you tell me the different parts of the plant?
2. Can you tell me the different parts of a flower?
3. Can you tell me some foods that come from plants?
4. What does the stem do?
5. Can you tell me the names of some plants you might find at our school?

Parts of a flower



Parts of a tree



Year 1: Human Body Knowledge Mat

Human Body Knowledge Mat

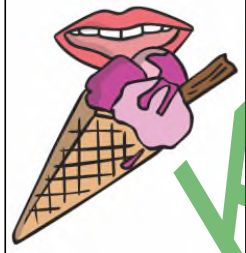
Year 1

sight

hearing

smell

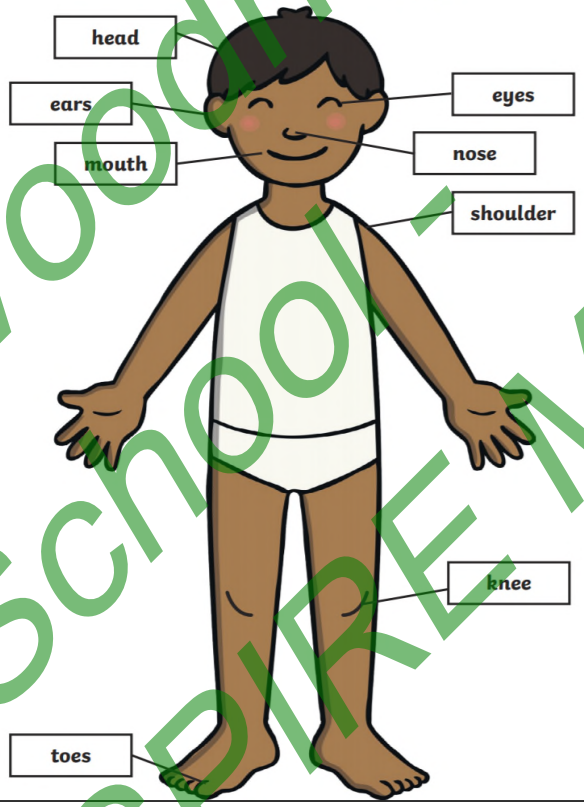
taste



The 5 senses

touch

Parts of the Body



Vocabulary Expectations

senses	A way the body can find out about the world around it.
body	The whole of a person or animal
human	A type of animal. We belong to this group of animals.
limb	An arm or leg – or wings for birds
muscles	Inside the human body. They allow different body parts to move.

End of Unit Quiz

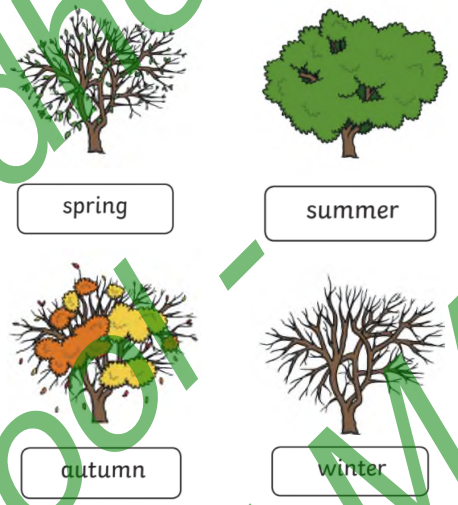
1. Can you tell me the names of some body parts and point to them?
2. Tell me how some parts of our bodies are different from each other?
3. What senses do you know?
4. Which body part would you use to smell?
5. Can you tell me any parts of the body that are inside and we can't see?
6. How can we make sure that our body stays healthy?

Year 1: Seasonal Change Knowledge Mat

Subject Specific Vocabulary

Autumn	The time of year between September and November. Many leaves fall off the trees.
Spring	The time of year between March and May. There is usually lots of signs of new growth in Spring.
Summer	The hottest season in the UK. It happens between June and August. The longest day is June 21st.
Winter	The coldest season in the UK. We can have snow in this season. It occurs between December and February.
Fall	The name given to the Autumn season by Americans. It is because so many leaves fall off the trees.
weather	Weather is what the sky and the air outside are like, such as cold and cloudy.
temperature	It is measurement of hot or cold that can be measured using a thermometer.
thermometer	This is the instrument that measures the temperature.
weather symbol 	These are signs used to help us understand more about our daily weather.
deciduous	Deciduous trees are trees that shed their leaves once a year, usually during the season of autumn.
coniferous	Most conifers are evergreens, or trees that keep their leaves year-round.

How trees change



Key fact

In the UK we have four seasons: spring, summer, autumn and winter. Summer is the hottest season and winter the coldest.

End of unit quiz

1. What are the names of the four seasons?
2. Which season is the hottest and which season is the coldest?
3. Can you tell me a special festival/celebration that happens in the spring time?
4. Can you tell me why the weather is warmer in the summer?
5. In which season is the shortest day?
6. Can you tell me what sort of clothes you would wear in the winter time?
7. Can you tell me which months of the year are at Autumn time?
8. Can you tell me what a tree might look like in spring time?
9. Can you tell me what the weather might be like in winter?

Seasons and Months

March	April	May	June	July	August	September	October	November	December	January	February
spring			summer			autumn			winter		

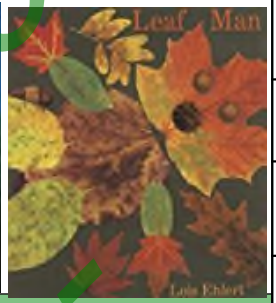
Year 2				
Biology			**Chemistry**	
All living things and their habitats	**Animals, including Humans**	**Plants**	**Everyday Materials**	
• *Alive or dead* • *Habitats* • *Adaptations* • *Food chains*	• *Animal reproduction* • *Healthy living* • *Basic needs*	• *Plant and seed growth* • *Plant reproduction* • *Keeping plants healthy*	• *Identify different materials* • *Name everyday materials* • *Properties of materials*	• *Compare the use of different materials* • *Compare movement on different surfaces*
• Classify things by living, dead or never lived • Know how a specific habitat provides for the basic needs of things living there (plants and animals) • Match living things to their habitat • Name some different sources of food for animals • Know about and explain a simple food chain	• Know the basic stages in a life cycle for animals, (including humans) • Know why exercise, a balanced diet and good hygiene are important for humans	• Know and explain how seeds and bulbs grow into plants • Know what plants need in order to grow and stay healthy (water, light & suitable temperature)	• Know how materials can be changed by squashing, bending, twisting and stretching	• Know why a material might or might not be used for a specific job

Year 2
Working Scientifically
Ask questions such as: • Why do some trees lose their leaves in Autumn and others do not? • How long are roots of tall trees? • Why do some animals have underground habitats?
Use equipment such as thermometers and rain gauges to help observe changes to local environment as the year progresses
Use microscopes to find out more about small creatures and plants
Know how to set up a fair test and do so when finding out about how seeds grow best
Classify or group things according to a given criteria, e.g. deciduous and coniferous trees
Draw conclusions from fair tests and explain what has been found out
Use measures (within Year 2 mathematical limits) to help find out more about the investigations they are engaged with

Year 2: Plants and Trees Knowledge Mat

Subject Specific Vocabulary	
roots	It is the part of a plant that is usually hidden under the ground. They make the plant stable and give it nutrients.
crown	The crown is made up of the leaves and branches at the top of the tree.
deciduous	Deciduous trees are trees that shed their leaves in the Autumn and grow new leaves in the spring.
evergreen	Evergreen trees are the same as coniferous trees. They do not lose their leaves in Autumn.
blossom	Is the mass of flowers created by a tree. Almost all fruit bearing trees have blossom. The blossom is usually at its best in the spring.
bulb	Bulbs are underground masses of food storage from which plants grow.
trunk	A tree's trunk holds up its crown, protects its inner parts and works like a pipeline, transporting essential materials to the different parts of the tree.
stem	The stem is the main part of the plant. It supports the weight of the leaves, as well as the flowers or fruit.
woodland	A woodland is a habitat where trees are the dominant plant form.
habitat	The place where a plant or animal (mostly) lives. There are different kinds of habitats, such as grassland, forest, river, sea and desert.
oxygen	Oxygen is used by animals and plants in the respiration (breathing) process.

Interesting Books



Common trees found in the UK

oak

Horse chestnut

conifer

willow

End of Unit Quiz

1. Can you describe how a plant grows? How do seeds and bulbs turn into plants?
2. What conditions do plants need to grow?
3. How do some seeds protect themselves from being eaten?
4. Can you tell me some trees found in the U.K and at school?
5. Can you tell me how new plants are made?
6. Can you tell me the difference between deciduous and evergreen plants?

Pre-Learning Recap

1. Can you tell me the different parts of the plant?
2. Can you tell me the different parts of a flower?
3. Can you tell me some foods that come from plants?
4. What does the stem do?
5. Can you tell me the names of some plants you might find at our school?

Year 2: Living things and their habitats
Knowledge Mat

Subject Specific Vocabulary	
indigenous	Produced, growing, living, or occurring naturally in a particular region or environment.
rivers	A river is a flowing, moving stream of water. Usually a river feeds water into an ocean, lake, pond, or even another river.
woodland	Woodland is a low-density forest with plenty of sunlight and limited shade.
ponds	A pond is a body of water smaller than a lake. Ponds support a very wide range of wildlife.
sea	A sea is part of the ocean partially enclosed by land. Seas are found on the margins of the ocean and are partially enclosed by land.
rainforest	Tropical rainforests are forests with tall trees, warm climates and lots of rain.
desert	A desert is any large region that gets very little rain each year. Very few plants or animals live in desert areas.
species	A group of animals, plants or other living things that all share common characteristics and that are all classified as alike in some manner.
microhabitats	Microhabitats are the small-scale physical requirements of a particular organism or a community of organisms.

Interesting Books

Important facts to know by the end of the habitats topic:

- **know how a specific habitat provides for the basic needs of things living there**
- **identify and name plants and animals in a range of habitats**
- **match living things to their habitat**
- **know how animals find their food**
- **name some different sources of food for animals**

End of Unit Quiz

1. Can you tell me some things that are alive and how you know they are alive?
2. Can you tell me what a habitat is?
3. Can you tell me an animal that might live in the forest and why it might live there?
4. Can you explain how an animal changes and grows as it gets older?
5. Can you tell me some animals that might live in the sea?
6. Can you tell me how an animal might adapt to it's environment to protect itself?

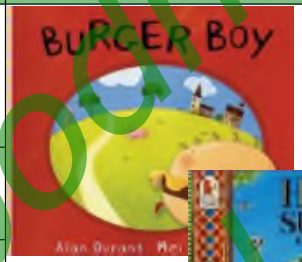
Pre-Learning Recap

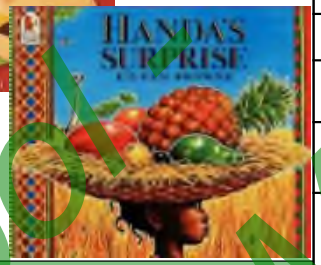
1. Can you tell me different ways of classifying animals?
2. Can you tell me the body parts a bird might have and what they are used for? E.g. eyes for seeing
3. Can you tell me some animals that are nocturnal?
4. How do you know if something is alive or not alive?
5. Can you tell me the difference between amphibians and reptiles? Can you find any things that are the same?

Year 2: Animals including Humans and Healthy Living Knowledge Mat

Subject Specific Vocabulary	
healthy	Keeping healthy means doing things that are good for your body – things like eating nutritious foods, exercising, brushing your teeth and getting enough sleep
diet	Eating a balanced diet means choosing foods in the right amounts from each of the food groups.
off-spring	You can refer to a person's children or an animal's young as their off-spring.
exercise	Means to keep your body healthy by running, walking and playing. You will need to feel out of breath if you have exercised properly.
proteins	Protein is a food group which includes meat, eggs, fish, dairy products, nuts and seeds
carbohydrates	Carbohydrates are sugars (such as fructose, glucose, and lactose) and starches, which are found in foods such as starchy vegetables, grains, rice, breads, and cereals.
fats	Fats are found in meat and other animal products, such as butter and cheese.
nutrition	Nutrition is the process by which the body nourishes itself by transforming food into energy and body tissues.
survival	Survive usually means to succeed in keeping alive.
hygiene	Taking care of our body by being clean and making sure we don't smell.

Interesting Books





Important facts to know by the end of the healthy living topic:

- **Know that animals, including humans, have young animals that look like them.**
- **Know that the babies will grow into adults.**
- **Know what humans need to survive (including food and water).**
- **Know what animals need to survive.**
- **Know why it is important to exercise.**
- **Know why it is important to eat the right amounts of food.**
- **Know why it is important to keep clean and wash regularly.**

End of Unit Quiz

1. Can you describe how a person grows? What are the different stages of growing?
2. What things do humans need to stay alive?
3. Can you tell me some healthy foods?
4. What is a balanced diet?
5. Can you tell me why washing your hands is important?
6. Can you tell me some foods that are high in fat?
7. Can you tell me some foods that contain lots of carbohydrates?

Pre-Learning Recap

1. Can you tell me the names of some body parts and point to them?
2. Tell me how some parts of our bodies are different from each other?
3. What senses do you know?
4. Which body part would you use to smell?
5. Can you tell me any parts of the body that are inside and we can't see?

Year 2: Materials Knowledge Mat

Subject Specific Vocabulary

metal	When heated, metals can be shaped into anything from a tiny paperclip to a huge aircraft.
plastic	Plastics are made from natural materials such as wood, coal and oil.
transparent	a property of a material which means you can see through it and light passes through it.
cardboard	Cardboard is a material often made from wood. It is a thick paper that is designed to be durable and last longer.
wood	Wood is a material that comes from trees and is used to make furniture, floors and many other things
squashing	Squashing is pushing things closely together.
bending	Bending is changing the shape and direction of something.
twisting	To twist something you move one part clockwise and the other part anticlockwise.
stretching	Stretching is to change shape by pulling it to make it longer or wider.
durable	The property of a material that is designed to last a long time. It is hard to damage and wear out.

Interesting Book

Important facts to know by the end of the Year 2 materials topic:

- ❑ **Know why some materials are more suitable than others for specific uses**
- ❑ **Know why glass, wood, plastic, brick or paper would be used for certain jobs**
- ❑ **Know that some materials can be squashed, twisted or bent according to need**
- ❑ **Know why certain materials are suitable for many different uses**
- ❑ **Know about the lives of important people who have developed useful new materials**

End of Unit Quiz

1. Can you tell me some different materials that you have been learning about?
2. What materials would be good for making a spoon? Tell me why?
3. Can you tell me some materials that are natural and some materials that are man-made?
4. Can you tell me some everyday objects that are made from glass? Why do they use glass to make these things?
5. Can you tell me how you can change the shape of some materials?
6. Can you tell me some materials and objects that can be stretched?

Pre-Learning Recap

1. Can you name some materials that would be used for clothes?
2. What are the properties of wood? What can it be used for?
3. Can you tell me a material that would be good for making a tea cup? Can you tell me why?
4. Can you tell me a material that is transparent?
5. Can you tell me a material that is flexible? What could it be used for?

Key Stage Two

Year 3

Biology			Chemistry	Physics	
Animals, including humans	**Plants**	**Plants**	**Rocks**	**Forces**	**Light**
• *Skeleton and muscles* • *Nutrition* • *Exercise and health*	• *Plant life* • *Basic structure and functions*	• *Life cycle* • *Water transportation*	• *Fossil formation* • *Compare and group rocks* • *Soil*	• *Different Forces* • *Magnets*	• *Reflections* • *Shadows*
• Know about the importance of a nutritious, balanced diet • Know how nutrients, water and oxygen are transported within animals and humans • Know about the skeletal and muscular system of a human	• Know the function of different parts of flowing plants and trees	• Know how water is transported within plants • Know the plant life cycle, especially the importance of flowers	• Compare and group rocks based on their appearance and physical properties, giving reasons • Know how soil is made and how fossils are formed • Know about and explain the difference between sedimentary, metamorphic and igneous rock	• Know about and describe how objects move on different surfaces • Know how a simple pulley works and use to on to lift an object • Know how some forces require contact and some do not, giving examples • Know about and explain how magnets attract and repel Predict whether magnets will attract or repel and give a reason	• Know that dark is the absence of light • Know that light is needed in order to see and is reflected from a surface • Know and demonstrate how a shadow is formed and explain how a shadow changes shape • Know about the danger of direct sunlight and describe how to keep protected

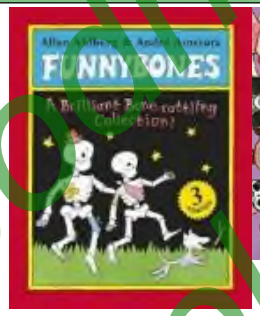
Year 3	
Working Scientifically	
Ask questions such as: • Why does the moon appear as different shapes in the night sky? • Why do shadows change during the day? • Where does a fossil come from?	Use a thermometer to measure temperature and know there are two main scales used to measure temperature
	Gather and record information using a chart, matrix or tally chart, depending on what is most sensible
Observe at what time of day a shadow is likely to be at its longest and shortest	Group information according to common factors e.g. plants that grow in woodlands or plants that grow in gardens
Observe which type of plants grow in different places e.g. bluebells in woodland, roses in domestic gardens, etc.	Use bar charts and other statistical tables (in line with Year 3 mathematics statistics) to record findings
Use research to find out how reflection can help us see things that are around the corner	Know how to use a key to help understand information presented on a chart
Use research to find out what the main differences are between sedimentary and igneous rocks	Be confident to stand in front of others and explain what has been found out, for example about how the moon changes shape
Test to see which type of soil is most suitable when growing two similar plants	Present findings using written explanations and include diagrams when needed
Test to see if their right hand is as efficient as their left hand	Make sense of findings and draw conclusions which help them to understand more about scientific information
Set up a fair test with different variables e.g. the best conditions for a plant to grow	Amend predictions according to findings
Explain to a partner why a test is a fair one e.g. lifting weights with right and left hand, etc.	Be prepared to change ideas as a result of what has been found out during a scientific enquiry
Measure carefully (taking account of mathematical knowledge up to Year 3) and add to scientific learning	

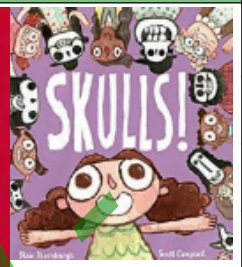
Year 3: Animals including humans: Skeleton and Muscles Knowledge Mat

Subject Specific Vocabulary

nutrition	Nutrition involves drinking enough water and eating the right amount of items from the four main food groups.
skeleton	The human skeleton is made of bone and grows as we grow. Our skull protects our brain and our ribs protect our heart and lungs.
muscles	Muscles are attached to bones by tendons and help them to move. When a muscle contracts it gets shorter and pulls on the bone it is attached to.
diet	Our bodies need a balanced diet to work properly. This involves drinking enough water and eating healthily.
joint	Joints allow the body to make movements. The body has many bones and are connected through the joints.
pelvis	The pelvis is a bony cradle-shaped structure located at the base of the spine.
cartilage	Cartilage is a connective tissue found in many areas of the body including joints between bones e.g. the elbows, knees and ankles.
rib cage	It is made up of curved bones. The rib cage is found in the chest area. It protects a person's internal organs from damage.
tendon	Muscles are attached to the bone by tendons and work in pairs to allow for smooth movement.
spine	Also known as your backbone, your spine is a strong, flexible column of ring-like bones that runs from your skull to your pelvis.

Interesting Books





Important facts to know by the end of the skeleton and muscle topic:

- **That humans cannot make their own food. They get their nutrition from what they eat.**
- **That humans have skeletons and muscles for support, protection and movement.**
- **Know that the body parts have special functions.**
- **Know the names of the body parts associated with skeleton and muscles.**
- **Compare the diets of different groups of animals, including humans.**
- **Know what a healthy meal looks like.**

End of Unit Quiz

1. Can you remember the different food groups?
2. Can you name some nutrients in foods and why they are important for a healthy body?
3. Can you describe the difference between a vertebrate and invertebrate?
4. Can you name some bones inside the body and locate them?
5. Can you name and locate the name of some of your muscles?
6. Which word describes a skeleton that is inside the body, and which word describes a skeleton that is outside the body?
7. Can you tell me how nutrients are transported around the body?

Pre-Learning Recap

1. Can you describe how a person grows? What are the different stages of growing?
2. What things do humans need to stay alive?
3. Can you tell me some healthy foods?
4. What is a balanced diet?
5. Can you tell me some foods that are high in fat?
6. Can you tell me some foods that contain lots of carbohydrates?

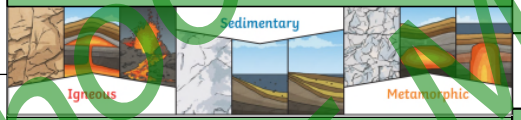
Year 3: Rocks and Soils

Subject Specific Vocabulary

fossil	A fossil is the preserved remains or traces of a dead organism.
soil	Soil consists of a mix of organic material (decayed plants and animals) and broken bits of rocks and minerals.
crystals	Crystals are a special kind of solid material where the molecules fit together in a repeating pattern.
sedimentary	Sedimentary rocks are made when sand, mud and pebbles get laid down in layers. Over time, these layers are squashed under more and more layers.
metamorphic	When a rock experiences heat and pressure, it becomes a metamorphic rock. All metamorphic rocks start as another type of rock.
igneous	Igneous rock is formed when magma cools and solidifies. It may do this above or below the Earth's surface.
permeable	A property of a material that allows water to pass through it.
fossilisation	The process by which fossils are made.
sediment	Natural solid material that is moved and dropped off in a new place by water or wind, e.g. sand.
magma	Molten rock that remains underground.
erosion	When water, wind or ice wears away land.

Types of rocks

Classification of Rocks



Important facts to know by the end of the rocks and soils topic:

- Know how fossils are formed.
- Know what soil is.
- Know the difference between igneous, sedimentary and metamorphic rocks.
- Group together different rocks according to different attributes.

End of Unit Quiz

1. Tell me what soil is?
2. Can you tell me the names of the different types of rock?
3. How are igneous rocks made?
4. How are sedimentary rocks made?
5. Can you tell me what a fossil is?
6. Can you tell me the properties of sedimentary rocks?
7. Can you name some metamorphic rocks?

Pre-Learning Recap

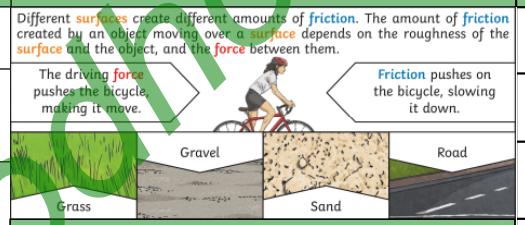
1. Describe the properties of rocks.
2. What objects/things would you make using rocks?
3. Is rock a man made or natural material?
4. How could you change the shape of rocks or stones?
5. Can you tell me what durable means?

Year 3: Forces and Magnets Knowledge Mat

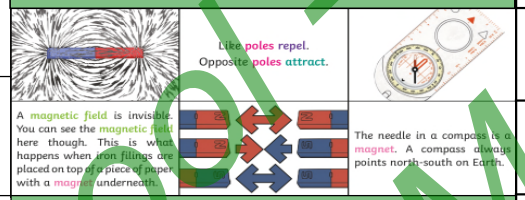
Subject Specific Vocabulary

forces	Pushes or pulls.
friction	A force that acts between two surfaces or objects that are moving or touching each other.
surface	The top layer of something.
magnet	An object that produces a magnetic force that pulls certain objects towards it.
attract	Attraction is a force that pulls objects together.
repel	Repulsion is a force that pushes objects apart.
magnetic field	The area around a magnet where there is a magnetic force.
magnetic pole	Either of two areas on the earth's surface, one near the geographic north pole and one near the geographic south pole, where the Earth's magnetic fields are strongest.
compass	An instrument containing a magnetized pointer which shows the direction of magnetic north and bearings from it.

Friction



Magnets



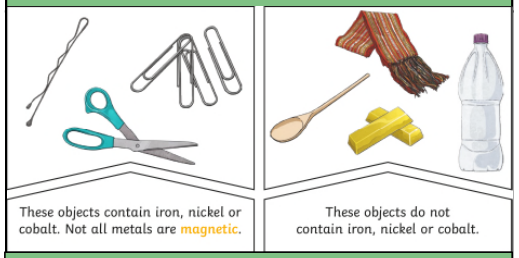
Important facts to know by the end of the forces and magnets topic:

- Know that magnets attract some objects but not others.
- Predict whether two magnets will attract or repeal each other.
- Know that magnets have two poles.
- Know what friction is.
- Know what a force is

End of Unit Quiz

1. Can you explain what friction is?
2. Explain the effect friction has on moving objects.
3. Can you describe how objects move on different surfaces?
4. Can you tell me what attract and repel mean?
5. Can you tell me some materials that are magnetic and some materials that are not magnetic?
6. Can you describe what a magnetic pole is?
7. Can you describe some other forces that make things move?

Magnetic / Not Magnetic



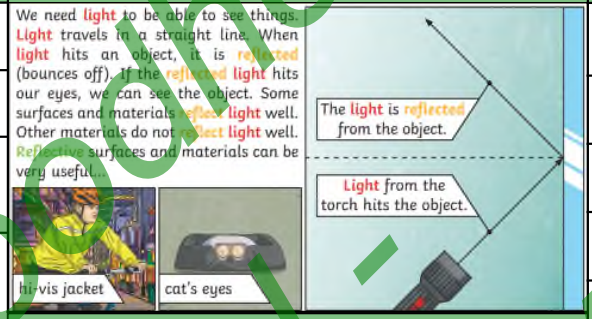
Other objects I have investigated:

Year 3: Light and Dark Knowledge Mat

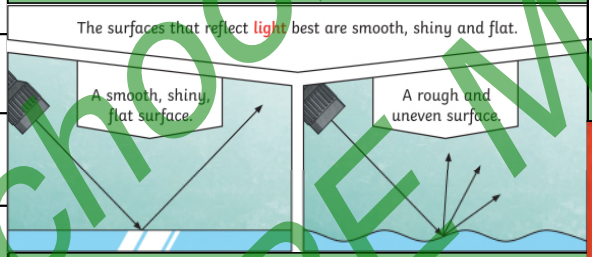
Subject Specific Vocabulary

light	A form of energy that travels in a wave from a light source.
ray	Waves of light are called rays.
reflection	A reflection occurs when a ray of light hits a surface and bounces off.
shadows	A shadow is formed when an object blocks out the light. The object must be opaque or translucent to make a shadow.
light source	The main light source for Earth is the Sun. Some other luminous objects give out light, for example, torches, candles and lamps.
opaque	Opaque objects do not allow light to pass through them, in most cases creating a shadow.
translucent	Translucent objects let light through but scatter the light waves so that we can't see through it properly.
transparent	Transparent objects allow light waves to pass through them easily so you can see through them.
refraction	It is the change of direction of a light ray as it passes through different surfaces, for example, from air to water.
retina	A part of the eye that receives the light rays and changes it into nerve signals to send to the brains.
dark	Darkness is the absence of light. Human vision is unable to distinguish colours as easily when there is less visible light.

Light and Reflection



Reflections



Key Knowledge

- What dark is (in relation to absence of light).
- Know that we need light so we can see things.
- Know that light can be reflected.
- Know how a shadow is formed.
- Understand why shadows change shape.
- Know the dangers of looking directly at the Sun.
- Know how to protect oneself from direct sunlight.

End of Unit Quiz

1. How does light move?
2. Tell me some sources of natural light and man-made light?
3. How is a shadow created? And how do you change its shape?
4. What is the different between transparent and translucent?
5. What does the word dark mean?
6. Can you describe some of the dangers of sunlight and how to protect yourself?

Interesting Books

Year 3: Plants Knowledge Mat

Subject Specific Vocabulary

roots	The root is the part of a plant that typically lies below the surface of the soil.
stem	The stem is the plant axis that bears buds and shoots with leaves.
nutrients	Nutrients are the food the plant wants. Most of the plant's nutrients comes from the soil.
pollination	Pollination is the act of transferring pollen grains from the male anther of a flower to the female stigma.
seed dispersal	Seed dispersal is the movement or transport of seeds away from the parent plant.
fertiliser	Fertilisers are used to increase the rate of a plant's growth.
seed formation	A seed is a small baby plant enclosed in a covering called the seed coat, usually with some stored food.
stigma	The stigma is usually sticky and receives pollen.
anther	The stamen has a pollen producing structure at the end which is called the anther.
soil	The soil has water and nutrients that a plant needs to grow healthily.

Interesting Book

Important facts to know by the end of the plant topic

- ❑ Know the function of the different parts of the flowering plant.
- ❑ Identify and know the names of: stem; roots; leaves and flowers.
- ❑ Know what a plant needs to grow.
- ❑ Know that light, air, water, nutrients from soil are all important for plant growth.
- ❑ Find out how water is transported within a plant.
- ❑ Know the part that flowers play in the life cycle of a flowering plant.
- ❑ Know about pollination, seed formation and seed dispersal.

End of Unit Quiz

1. Can you tell me some parts of a flowering plant?
2. Can you tell me what flowering plants need to help them grow and which parts of the plant help acquire and move these around the plant?
3. Can you explain the process of how new plants are made? Can you use the words pollination, seed formation and seed dispersal?
4. Can you explain how water is transported in a flowering plant?
5. Can you explain what the stigma and stamen do in a flowering plan

Pre-Learning Recap

1. Can you describe how a plant grows? How do seeds and bulbs turn into plants?
2. What conditions do plants need to grow?
3. How do some seeds protect themselves from being eaten?
5. Can you tell me how new plants are made?
6. Can you tell me the difference between deciduous and evergreen plants?

Year 4

Biology		Chemistry	Physics	
Animals, including humans	**All living things and their habitats**	**States of Matter**	**Electricity**	**Sound**
• *Digestive system* • *Teeth* • *Food chains*	• *Grouping living things* • *Classification keys* • *Adaptation of living things*	• *Compare and group materials* • *Solids, liquids and gases* • *Changing state* • *Water cycle*	• *Uses of electricity* • *Simple circuits and switches* • *Conductors and insulators*	• *How sounds are made* • *Sound vibrations* • *Pitch and Volume*
• Identify and name the parts of the human digestive system • Know the functions of the organs in the human digestive system • Identify and know the different types of human teeth • Know the functions of different human teeth • Use and construct food chains to identify producers, predators and prey	• Use classification keys to group, identify and name living things (inc. vertebrates and invertebrates) • Know how changes to an environment could endanger living things	• Know the temperature at which materials change state • Know about and explore how some materials can change state • Know the part played by evaporation and condensation in the water cycle • Group materials based on their state of matter (solid, liquid or gas)	• Identify and name appliances that require electricity to function • Construct a series circuit • Identify and name the components in a series circuit (including cells, wires, bulbs, switches and buzzers) • Predict and test whether a lamp will light within a circuit • Know the function of a switch • Know the difference between a conductor and an insulator; giving examples of each	• Know how sound is made, associating some of them with vibrating • Know how sound travels from a source to our ears • Know the correlation between pitch and the object producing a sound • Know the correlation between the volume of a sound and the strength of the vibrations that produced it • Know what happens to a sound as it travels away from its source

Year 4	
Working Scientifically	
Ask questions such as: • Why are steam and ice the same thing? • Why is the liver important in the digestive systems? • What do we mean by 'pitch' when it comes to sound?	Gather and record information using a chart, matrix or tally chart, depending on what is most sensible
	Group information according to common factors e.g. materials that make good conductors or insulators
Use research to find out how much time it takes to digest most of our food	Use bar charts and other statistical tables (in line with Year 4 mathematics statistics) to record findings
Use research to find out which materials make effective conductors and insulators of electricity	Present findings using written explanations and include diagrams, when needed
Carry out tests to see, for example, which of two instruments make the highest or lowest sounds and to see if a glass of ice weighs the same as a glass of water	Write up findings using a planning, doing and evaluating process
Set up a fair test with more than one variable e.g. using different materials to cut out sound	Make sense of findings and draw conclusions which helps them understand more about the scientific information that has been learned
Explain to others why a test that has been set up is a fair one e.g. discover how fast ice melts in different temperatures	When making predictions there are plausible reasons as to why they have done so
Measure carefully (taking account of mathematical knowledge up to Year 4) and add to scientific learning	Able to amend predictions according to findings
Use a data logger to check on the time it takes ice to melt to water in different temperatures	Prepared to change ideas as a result of what has been found out during a scientific enquiry
Use a thermometer to measure temperature and know there are two main scales used to measure temperature	

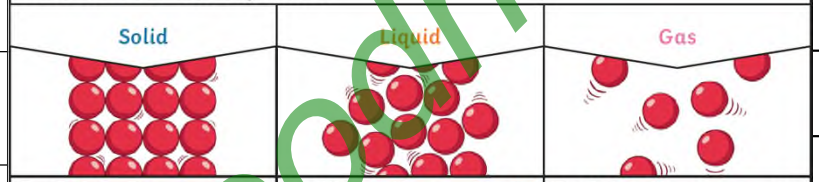
Year 4: Water Cycle Knowledge Mat

Subject Specific Vocabulary

water vapour	Water that is in the form of gas.
condensation	When water vapour that is around us changes from a gas back to liquid.
precipitation	Any watery substance such as rain, water, snow, hail or sleet that falls to Earth.
evaporation	When liquid changes into gas, usually when it heats up.
substance	Any solid, liquid, powder or gas is a substance.
matter	Any solid, liquid or gas that exists in the universe.
lava	Very hot liquid that comes out of a volcano.
solid	A substance that stays the same shape. Its particles do not move.
liquid	Liquids will flow as they are made up of loosely packed particles.
gas	Gaseous matter is made up of matter that is so loose it is always moving.

States of matter

There are three states of matter.



Solid	Liquid	Gas
Particles in a solid are close together and cannot move. They can only vibrate.	Particles in a liquid are close together but can move around each other easily.	Particles in a gas are spread out and can move around very quickly in all directions.

End of Unit Quiz

1. Can you explain the process of the water cycle?
2. Can you namethe different states of matter?
3. At what temperature does water boil and at what temperature does it freeze?
4. Can you describe what water vapor is?
5. Can you explain the structure of particles in a solid, liquid and gas?

Pre-Learning Recap

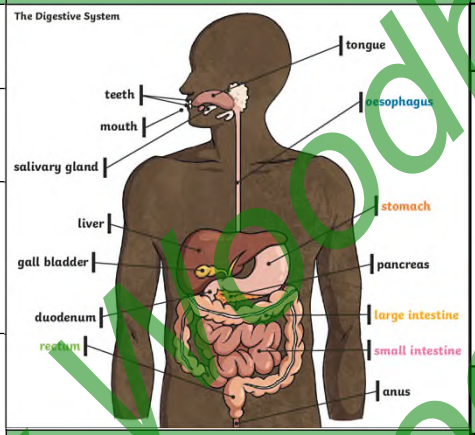
1. Can you explain what melting means?
2. Can you explain what freezing means?
3. Can you explain how you can change the shape of some materials?
4. Can you explain how rocks change shape and change state from solids to liquids?

Year 4: Animals including Humans Knowledge Mat

Subject Specific Vocabulary

pancreas	The pancreas produces juices called enzymes which help the body digest food.
oesophagus	The oesophagus is like a stretchy tube that moves food from the back of the throat to the stomach.
intestine	The main function of the small intestine is absorption of nutrients and minerals from food. The major function of the large intestine is to absorb water from the remaining indigestible food.
organ	The skin is the biggest organ of your body. Other organs include your brain, lungs, heart, liver, stomach, intestines, pancreas, and kidneys, all called internal organs.
molars	Molars are the teeth that are used for chewing and grinding our food.
canine	Canines are the teeth used for ripping and tearing our food. We have two located at the top of our mouth and two at the bottom.
food chain	A food chain is a diagram that shows us how animals are linked by what they eat.
predators	Predators are wild animals that hunt, or prey on, other animals. Predatory animals need the flesh of the animals that they kill to survive.
prey	The term prey refers to an animal that is sought, captured, and eaten by a predator.
salivary gland	The salivary glands contain special enzymes that help digest the starches in your food.

The Digestive System

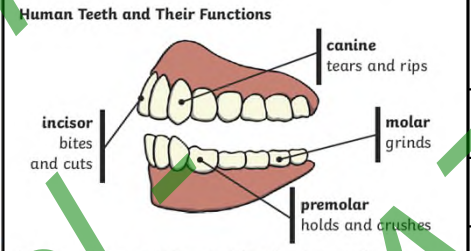


Important facts to know by the end of the digestive system topic:

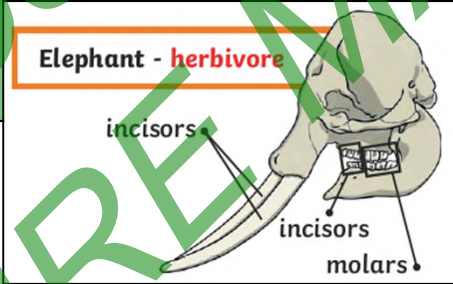
- Know and name the parts of the digestive system.
- Know the function of each organ of the digestive system.
- Know and identify the different types of teeth in humans.
- Know the function of different human teeth.
- Use food chains to identify producers, predators and prey.
- Construct food chains to identify producers, predators and prey.

Teeth

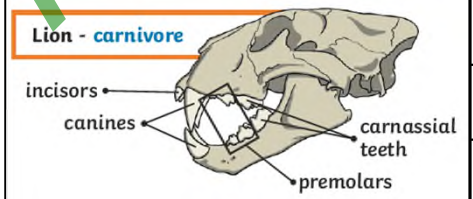
Human Teeth



Herbivores



Carnivores



End of Unit Quiz

1. Can you describe the journey your food makes through your body?
2. Can you explain the differences in teeth between carnivores, omnivores and herbivores?
3. Can you explain how energy is passed through a food chain?
4. Explain the function of the oesophagus.
5. Give an example of an animal that is both prey and a predator.
6. Explain what a producer is.
7. Give an example of food chain you have studied from producer to predator.

Pre-Learning Recap

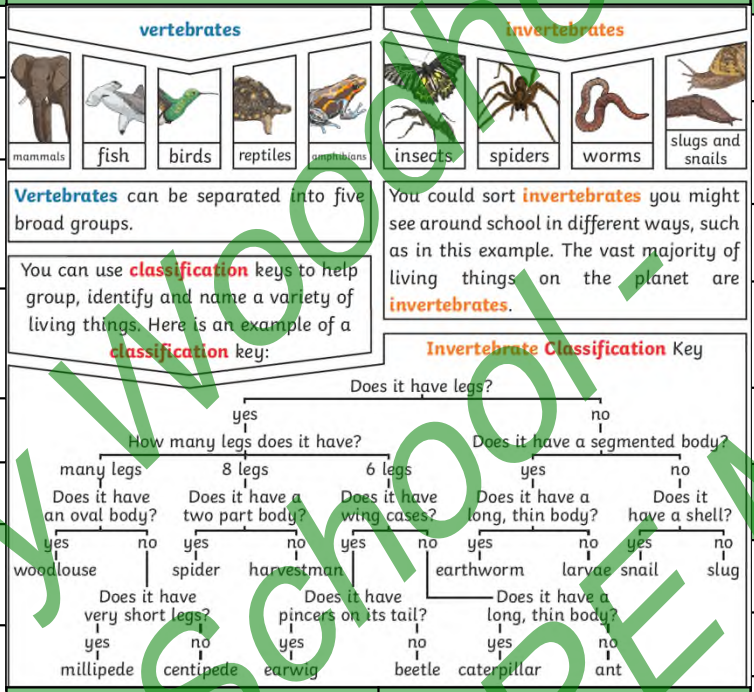
1. Can you tell me how nutrients are transported around the body?
2. Can you tell me some healthy foods?
3. What is a balanced diet?
4. Can you tell me different ways of classifying animals?
5. Can you remember the different food groups?
6. Can you name some nutrients in foods and why they are important for a healthy body?

Year 4: Living things and their habitats

Subject Specific Vocabulary

organism	Another word to mean "living thing".
Life processes	The things organisms do to stay alive.
respiration	A process where organisms use oxygen gas from the air to help turn their food into energy.
sensitivity	The way a living thing reacts to its environment.
classification	A way of organising and sorting organisms by their similarities.
specimen	A particular organism that is being studied.
characteristic	The specific features of qualities of an organism/group if organisms.
habitat	The specific area in which organisms live.
environment	A geographical location that may contain many habitats as well as many varieties of living / non-living things.
extinct	A word used to described when there are no more of a specific species living on the planet.
endangered	A word used to described a species of animal that is close to extinction.

Classification



Key Knowledge

- Use classification keys to group, name and identify living things.
- Know how changes to an environment could endanger living things.

Life Processes

Movement	Reproduction
Respiration	Excretion
Sensitivity	Nutrition
Growth	

End of Unit Quiz

1. Describe some methods of classifying organisms.
2. Explain how organisms adapt to an environment that changes.
3. Give some examples of natural and man-made changes to an environment.
4. Describe some animals that have become extinct due to a change in their environment
5. Describe and recount the life processes.

Pre-Learning Recap

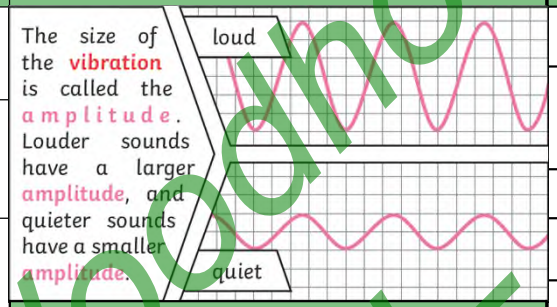
1. Can you tell me some things that are alive and how you know they are alive?
2. Can you tell me what a habitat is?
3. Can you tell me an animal that might live in the forest and why it might live there?
4. Can you explain how an animal changes and grows as it gets older?
5. Can you tell me some animals that might live in the sea?
6. Can you tell me how an animal might adapt to it's environment to protect itself?

Year 4: Sound Knowledge Mat

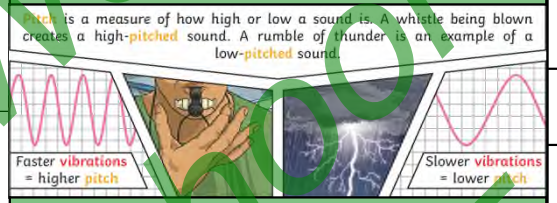
Subject Specific Vocabulary

vibrating	Sound is caused by the vibration of a medium (usually air) and it travels in waves.
pitch	A high sound has a high pitch and a low sound has a low pitch. A tight drum skin gives a higher pitched sound than a loose drum skin.
volume	Volume is the perception of loudness from the intensity of a sound wave. The higher the intensity of a sound, the louder it is perceived in our ears, and the higher volume it has.
insulation	Protecting something by surrounding it with material that reduces or prevents the transmission of sound.
outer, middle and inner ear	The ear is made up of three different sections: the outer ear, the middle ear, and the inner ear. These parts all work together so you can hear and process sounds.
cochlea	The cochlea looks like a spiral-shaped snail shell deep in your ear. It plays an important part in helping you hear.
auditory	Auditory is close in meaning to acoustic, but auditory usually refers more to hearing than to sound.
frequency	Frequency is measured as the number of wave cycles that occur in one second.
hammer	The ear has little bones called ossicles that help you hear. They are called the hammer (malleus), anvil (incus), and stirrup (stapes). They amplify the sound or make it louder.

Amplitude



Pitch



Vibrations

End of Unit Quiz

1. Describe how sound is made.
2. Give some examples of sound sources and the ways in which different sounds can be produced through them.
3. Describe how sound moves.
4. Define the words pitch and volume.
5. Describe what happens to sounds as you move further away from them.
6. Describe how particles react when an object vibrates.
7. Describe how your ear receives sounds that are made.
8. Describe some parts of the ear and their functions.

Important facts to know by the end of the sound topic:

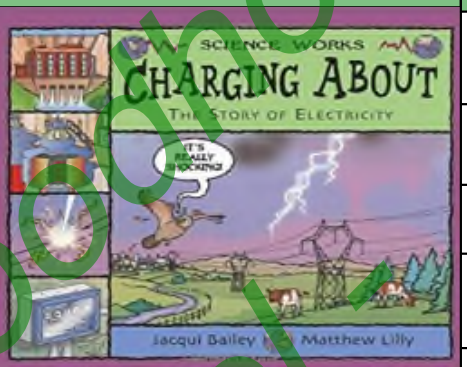
- Know how sound is made.
- Know how sound travels from the source to the ears.
- Know to associate sound with vibration.
- Know the correlation between pitch and the object producing a sound.
- Know the correlation between the volume of a sound and the strength of the vibrations that produced it.
- Know what happens to a sound as it travels away from its source.

Year 4: Electricity Knowledge Mat

Subject Specific Vocabulary

circuit	An electrical circuit is a completed path through which an electrical current flows.
buzzers	A buzzer is an automatic signalling device. They are used as alarms and door bells.
conductor	A conductor is an object or type of material that allows the flow of an electrical current in one or more directions
battery	A battery is a device that stores chemical energy and makes it available in an electrical form.
cells	An electrical cell is a device that is used to generate electricity.
switch	A switch is an electrical component that can 'make' or 'break' an electrical circuit.
socket	Sockets allow electrical equipment to be connected to the alternating current (AC) power supply in buildings and at other sites.
appliance	An electrical appliance is a device that uses electricity to perform a function.
appliance series circuit	Components connected in series are connected along a single path, so the same current flows through all of the components.
insulator	An insulator is a material whose internal electric charges do not flow freely.

Interesting Book



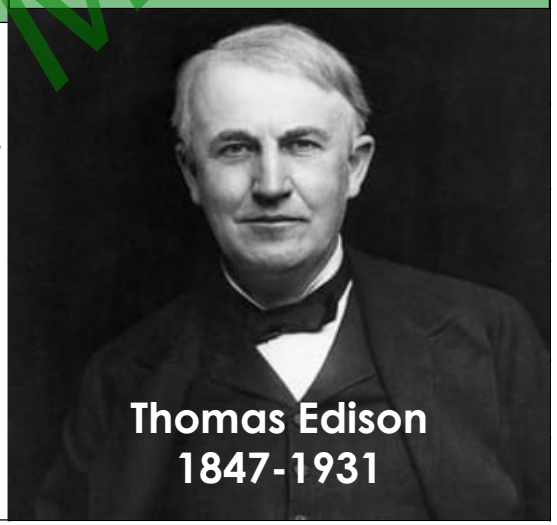
Important facts to know by the end of the electricity topic in Year 4

- ❑ Know about common appliances that run on electricity.
- ❑ Know how to construct a simple series electrical circuit.
- ❑ Identify and name the basic parts of the circuit, including cells, wires, bulbs, switches and buzzers.
- ❑ Know that a switch opens and closes a circuit.
- ❑ Know about some common conductors and insulators.
- ❑ Know that metals are good conductors.

End of Unit Quiz

1. Can you name some common appliances that use mains electricity and some that use battery power?
2. Can you name some materials that conduct electricity and some materials that are insulators?
3. Can you tell me the components that make up a simple circuit?
4. Can you describe the function a switch performs in a circuit?
5. Can you name some other component parts of a circuit?

Learning Link



Year 5

Biology		Chemistry	Physics	
All living things and their habitats	**Animals, including humans**	**Properties and changes in materials**	**Forces**	**Earth and Space**
• *Life cycles – plants and animals* • *Reproductive processes* • *Famous naturalists*	• *Changes as humans develop from birth to old age*	• *Compare properties of everyday materials* • *Soluble/ dissolving* • *Reversible and irreversible substances*	• *Gravity* • *Friction* • *Forces and motion of mechanical devices*	• *Movement of the Earth and the planets* • *Movement of the Moon* • *Night and day*
• Know the life cycle of different living things e.g. mammal, amphibian, •insect and bird • Know the differences between different life cycles • Know the process of reproduction in plants • Know the process of reproduction in animals	• Create a timeline to indicate stages of growth in humans	• Compare and group materials based on their properties (e.g. hardness, solubility, transparency, conductivity, [electrical & thermal], and response to magnets • Know and explain how a material dissolves to form a solution • Know and show how to recover a substance from a solution • Know and demonstrate how some materials can be separated (e.g. through filtering, sieving and evaporating) • Know and demonstrate that some changes are reversible and some are not • Know how some changes result in the formation of a new material and that this is usually irreversible	• Know what gravity is and its impact on our lives • Identify and know the effect of air and water resistance • Identify and know the effect of friction • Explain how levers, pulleys and gears allow a smaller force to have a greater effect	• Know about and explain the movement of the Earth and other planets relative to the Sun • Know about and explain the movement of the Moon relative to the Earth • Know and demonstrate how night and day are created • Describe the Sun, Earth and Moon (using the term spherical)

Year 5	
Working Scientifically	
Set up an investigation when it is appropriate e.g. finding out which materials dissolve or not	Able to present information related to scientific enquiries in a range of ways including using IT such as power-point and iMovie
Set up a fair test when needed e.g. which surfaces create most friction?	Use diagrams, as and when necessary, to support writing
Set up an enquiry based investigation e.g. find out what adults / children can do now that they couldn't when a baby	Is evaluative when explaining findings from scientific enquiry
Know what the variables are in a given enquiry and can isolate each one when investigating e.g. finding out how effective parachutes are when made with different materials	Clear about what has been found out from recent enquiry and can relate this to other enquiries, where appropriate
Use all measurements as set out in Year 5 mathematics (measurement), including capacity and mass	Their explanations set out clearly why something has happened and its possible impact on other things
Use other scientific instruments as needed e.g. thermometer, rain gauge, spring scales (for measuring Newtons)	Able to give an example of something focused on when supporting a scientific theory e.g. how much easier it is to lift a heavy object using pulleys
Able to record data and present them in a range of ways including diagrams, labels, classification keys, tables, scatter graphs and bar and line graphs	Keep an on-going record of new scientific words that they have come across for the first time
Make predictions based on information gleaned from investigations	Able to relate causal relationships when, for example, studying life cycles
Create new investigations which take account of what has been learned previously	Frequently carry out research when investigating a scientific principle or theory

Year 5: Earth and Space Knowledge Mat

Subject Specific Vocabulary

orbit	An orbit is a repeating path that one celestial body takes around another.
solar system	The solar system is made of the eight planets that orbit our sun; it is also made of asteroids, moons, comets and lots more.
astronomical	Astronomy is the study of outer space, focusing on celestial bodies such as stars, comets, planets and galaxies.
planet	There are 8 planets in our solar system, they are Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune.
rotation	Rotation is when a shape is turned around a fixed point.
spherical	Something spherical is like a sphere in being round, or more or less round, in three dimensions.
crescent moon	It is a slither of the moon that is lit up and can be seen. It is less than half the moon.
gibbous moon	The best way to describe a gibbous moon is that the moon is three-quarters lit up.
eclipse	An eclipse occurs when an astronomical object is temporarily obscured. A lunar eclipse is when the Earth moves between the Sun and the Moon, therefore blocking the Sun's rays from striking the Moon.
lunar	Is anything related to the moon.

Important facts to know by the end of the Earth and space topic:

- Know about and explain the movement of the Earth and other planets relative to the Sun.
- Know about and explain the movement of the Moon relative to the Earth.
- Know and demonstrate how night and day are created.
- Describe the Sun, Earth and Moon (using the term spherical).
- Know information about the planets.
- Neil Armstrong was the first man to step on the moon.

End of Unit Quiz

1. Can you explain what heliocentric means?
2. Can you explain how the Earth, the Moon and the Sun move in relation to each other?
3. Can you describe the shape of the Earth and other planets?
4. Can you explain how night and day are created?
5. Can you recall some facts about the moon landings?
6. Can you name all the planets in order?

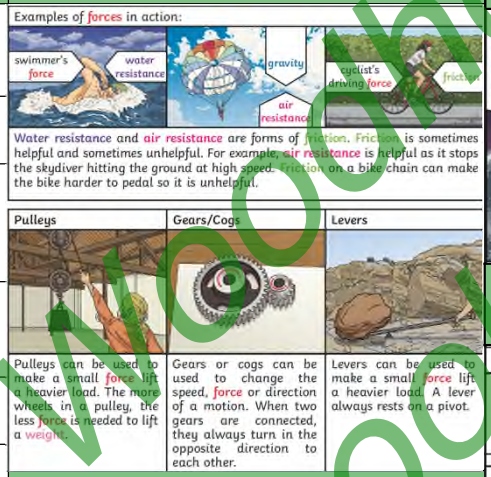
Learning Link

Year 5: Forces Knowledge Mat

Subject Specific Vocabulary

friction	Friction is a force between two surfaces that are sliding, or trying to slide, across each other.
gravity	Gravity is a force which tries to pull two objects towards each other.
air resistance	Air resistance is a type of friction between air and another material. For example, when an aeroplane flies through the air.
water resistance	If you go swimming, there is friction between your skin and the water particles.
levers	A lever can be described as a long rigid body with a fulcrum along its length.
pulleys	Pulley is a simple machine and comprises of a wheel on a fixed axle, with a groove along the edges to guide a rope or cable.
gears	Gears are wheels with teeth that slot together. When one gear is turned the other one turns as well.
parachute	A parachute is a device used to slow down an object that is falling towards the ground. As the parachute opens, the air resistance increases.
Galileo	Galileo developed the telescope to enable close observation of the night sky.
Newton	During his lifetime, Newton developed the theory of gravity and made breakthroughs in the area of optics, such as the reflecting telescope.

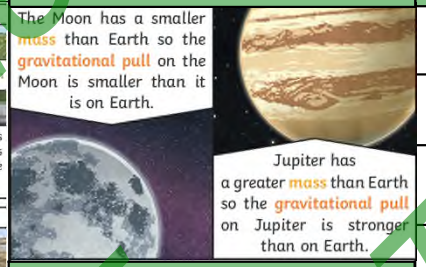
Resistance



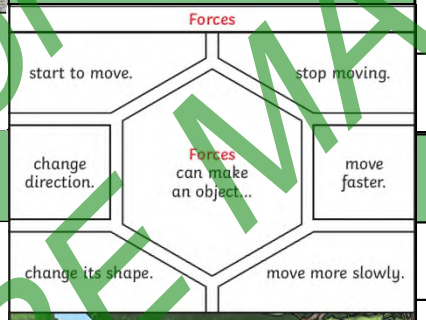
Important facts to know by the end of the forces topic:

- Know what gravity is and its impact on our lives.
- Identify and know the effect of air resistance.
- Identify and know the effect of water resistance.
- Identify and know the effect of friction.
- Explain how levers, pulleys and gears allow a smaller force to have a greater effect.
- Know who Isaac Newton and Galileo were.

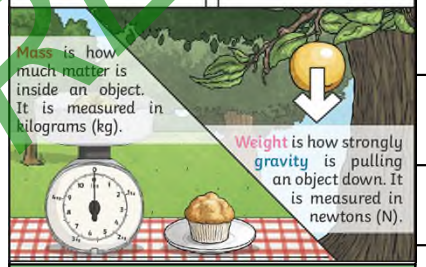
Gravity



Forces



Mass and Weight



End of Unit Quiz

1. Can you explain what gravity is and how it affects us every day.
2. Can you explain what air resistance is?
3. Can you explain what water resistance is?
4. Can you explain how pulleys, gears and levers work?
5. Can you describe an experiment you have done to test some of these forces?
6. Can you explain who Isaac Newton and Galileo Galilei are?

Pre-Learning Recap

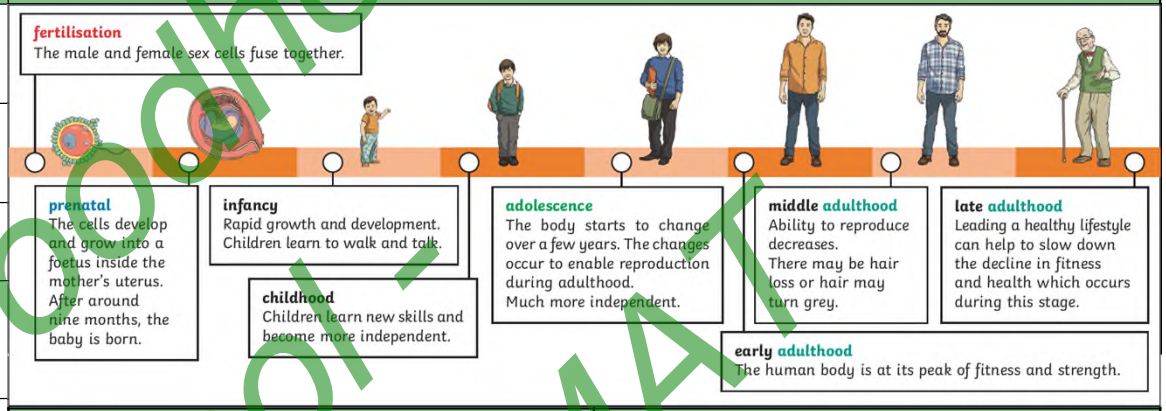
1. Can you explain what friction is?
2. Explain the effect friction has on moving objects.
3. Can you describe how objects move on different surfaces?
4. Can you tell me what attract and repel mean?
5. Can you describe some other forces that make things move?

Year 5: Life Cycles Knowledge Mat

Subject Specific Vocabulary

puberty	Puberty is the name for the time when your body begins to develop and change as you move from childhood to adulthood.
gestation	Gestation, in mammals, is the time between conception and birth, during which the embryo is developing in the uterus.
classification	This is the grouping together of similar species of plant, animal and other organisms.
precision	For scientists, precision describes a measurement system, that is, how reliable it is at giving the same result every time it measures the same thing.
reproduction	Reproduction is the way different plants and animals make new plants and animals. The reproduction system differs in plants and animals.
teenager	The age between thirteen and nineteen. The 'teen' element gives rise to the word teenager. It is a time that humans mature quite rapidly.
obese	Obesity is the condition of being much too heavy for one's height so that one's health is affected. In other words, it means to be too overweight.
toddler	Is the period that a young child starts to walk and become more independent.
embryo	Fertilisation happens when an egg cell meets with a sperm cell and joins with it. The fertilised egg divides to form a ball of cells called an embryo.

Human Life Cycle



Pre-Learning Recap

1. Can you describe how a person grows? What are the different stages of growing?
2. What things do humans need to stay alive?
3. What is a balanced diet?
4. Can you explain how energy is passed through a food chain?
5. Describe and recount the life processes.
6. Describe some methods of classifying organisms.

End of Unit Quiz

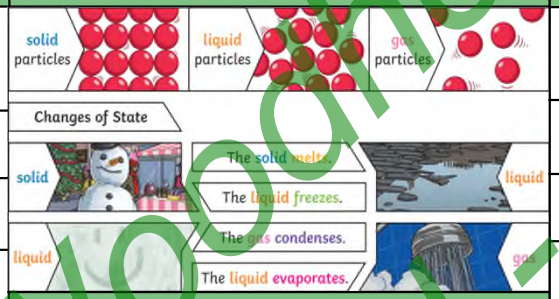
1. Can you explain the life cycle of a human?
2. Can you describe how human bodies change as they get older?
3. Can you describe how humans reproduce?
4. Can you use some words to classify humans?
5. Can you describe some things that might prevent humans from getting older and shorten their life span?

Year 5: Reversible and Irreversible Changes Knowledge Mat

Subject Specific Vocabulary

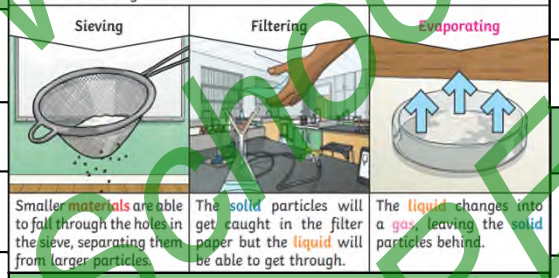
solubility	Is a chemical property referring to the ability for a given substance, the solute, to dissolve in a solvent.
conductivity	Conductivity defines a material's ability to conduct electricity.
transparency	In general, transparency is the quality of being easily seen through.
thermal evaporation	Something that is thermal is hot, retains heat, or has a warming effect. Evaporation is the process of a substance in a liquid state changing to a gaseous state due to an increase in temperature and/or pressure.
dissolve	To dissolve is defined as to become broken up or absorbed by something or to disappear into something else.
sieving	Sieving is a method of filtering where objects are separated by size.
thermal	Something that is thermal is hot, retains heat, or has a warming effect.
filtering	To filter a substance means to pass it through a device which is designed to remove certain particles contained within.
melting	Melting is a physical process that results in the transition of a substance from a solid to a liquid.
separate	Separate, part, and divide mean to break into parts or to keep apart.

Changing states

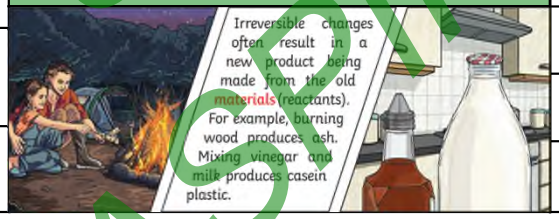


Reversible Changes

Reversible changes, such as mixing and dissolving solids and liquids together, can be reversed by:



Irreversible Changes



End of Unit Quiz

1. Give an example of every day objects that are transparent or conduct electricity and what these materials are used for.
2. Explain some different ways of separating materials.
3. Describe the process of how to form a solution and separate a solution.
4. Give an example of an irreversible change and why it is irreversible.
5. Explain what you can do to speed up the process of dissolving.
6. Give examples of materials you can separate by sieving.
7. Explain the difference between filtering and sieving.

Pre-Learning Recap

1. Can you tell me some different materials that you have been learning about?
2. Explain why materials are used for making specific objects. E.g. metal for spoons for example.
3. Can you tell me some materials that are natural and some materials that are man-made?
4. Can you tell me how you can change the shape of some materials?
5. Can you tell me some materials and objects that can be stretched?

Year 6

Biology			Physics	
Animals, including humans	**All living things and their habitats**	**Evolution and Inheritance**	**Electricity**	**Light**
• *The circulatory system* • *Water transportation* • *Impact of exercise on body*	• *Classification of living things and the reasons for it*	• *Identical and non identical off-spring* • *Fossil evidence and evolution* • *Adaptation and evolution*	• *Electrical components* • *Simple circuits* • *Fuses and voltage*	• *How light travels* • *Reflection* • *Ray models of light*
• Identify and name the main parts of the human circulatory system • Know the function of the heart, blood vessels and blood • Know the impact of diet, exercise, drugs and lifestyle on health • Know the ways in which nutrients and water are transported in animals, including humans	• Classify living things into broad groups according to observable characteristics and based on similarities and differences • Know how living things have been classified • Give reasons for classifying plants and animals in a specific way • Know that micro-organisms are alive and can be classified.	• Know how the Earth and living things have changed over time • Know how fossils can be used to find out about the past • Know about reproduction and offspring (recognising that offspring normally vary and are not identical to their parents) • Know how animals and plants are adapted to suit their environment • Link adaptation over time to evolution • Know about evolution and can explain what it is	• Compare and give reasons for why components work and do not work in a circuit • Draw circuit diagrams using correct symbols • Know how the number and voltage of cells in a circuit links to the brightness of a lamp or the volume of a buzzer	• Know how light travels • Know and demonstrate how we see objects • Know why shadows have the same shape as the object that casts them • Know how simple optical instruments work e.g. periscope, telescope, binoculars, mirror, magnifying glass etc.

Year 6	
Working Scientifically	
Know which type of investigation is needed to suit particular scientific enquiry e.g. looking at the relationship between pulse and exercise	Use a range of written methods to report findings, including focusing on the planning, doing and evaluating phases
Set up a fair test when needed e.g. does light travel in straight lines?	Clear about what has been found out from their enquiry and can relate this to others in class
Know how to set up an enquiry based investigation e.g. what is the relationship between oxygen and blood?	Explanations set out clearly why something has happened and its possible impact on other things
Know what the variables are in a given enquiry and can isolate each one when investigating	Aware of the need to support conclusions with evidence
Justify which variable has been isolated in scientific investigation	Keep an on-going record of new scientific words that they have come across for the first time and use these regularly in future scientific write ups
Use all measurements as set out in Year 6 mathematics (measurement), including capacity, mass, ratio and proportion	Use diagrams, as and when necessary, to support writing and be confident enough to present findings orally in front of the class
Able to record data and present them in a range of ways including diagrams, labels, classification keys, tables, scatter graphs and bar and line graphs	Able to give an example of something they have focused on when supporting a scientific theory e.g. classifying vertebrate and invertebrate creatures or why certain creatures choose their unique habitats
Make accurate predictions based on information gleaned from their investigations and create new investigations as a result	Frequently carry out research when investigating a scientific principle or theory
Able to present information related to scientific enquiries in a range of ways including using IT such as power-point, animoto and iMovie	

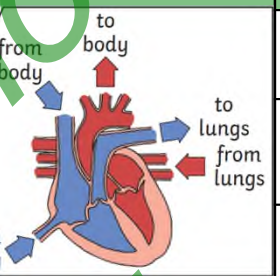
Year 6: Circulatory System Knowledge Mat

Subject Specific Vocabulary

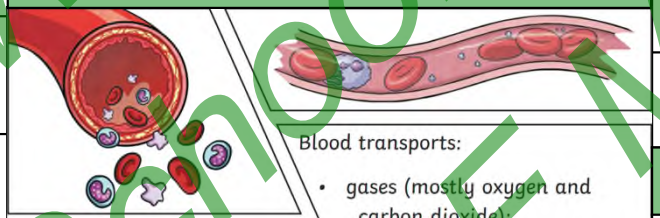
blood vessels	Blood vessels are a series of tubes inside your body. They move blood to and from your heart.
oxygenated blood	Blood that contains oxygen and is pumped from the heart to the rest of the body. It travels through the arteries.
de-oxygenated blood	Blood where the oxygen has been removed. It travels towards the heart through veins.
atriums	The atriums are the two uppermost chambers of the heart. Blood is pushed from the atriums to the ventricles.
cardiovascular	The blood circulatory system (cardiovascular system) delivers nutrients and oxygen to all cells in the body.
plasma	The liquid inside your veins and arteries. The other parts of your blood are solid.
cardiologists	A cardiologist is a doctor with special training and skill in finding, treating and preventing diseases of the heart and blood vessels.
capillaries	Capillaries are very thin blood vessels. They bring nutrients and oxygen to tissues and remove waste products.
pulse	Your heart has to push so much blood through your body that you can feel a little thump in your arteries each time the heart beats.
ventricles	The ventricles are the two lower chambers in the heart.

The Heart

Mammals have **hearts** with four chambers. Notice how the blood that has come from the body is **deoxygenated**, and the blood that has come from the lungs is **oxygenated** again. The blood isn't actually red and blue: we just show it like that on a diagram.



Transporting Blood



The liquid part of blood contains water and protein. This is called plasma.

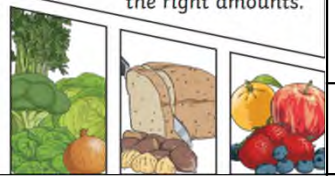
Blood transports:

- gases (mostly oxygen and carbon dioxide);
- **nutrients** (including water);
- waste products.

Keeping Healthy

Drugs, **alcohol** and smoking have negative effects on the body.

A healthy diet involves eating the right types of **nutrients** in the right amounts.



End of Unit Quiz

1. Name the key parts of the body in the circulatory system.
2. Describe what capillaries, arteries and veins are and their different functions.
3. Explain the role of the circulatory system in keeping humans alive.
4. Explain the role of drugs, alcohol and smoking on the body and the impact it can have.
5. Explain the different things that blood transports.
6. Explain other ways humans can stay healthy and improve their circulatory system.

Pre-Learning Recap

1. Can you explain the life cycle of a human?
2. Can you describe some things that might prevent humans from getting older and shorten their life span?
3. Can you describe the journey your food makes through your body?
4. Can you explain the differences in teeth between carnivores, omnivores and herbivores?
6. Explain the key body parts in the digestive system.

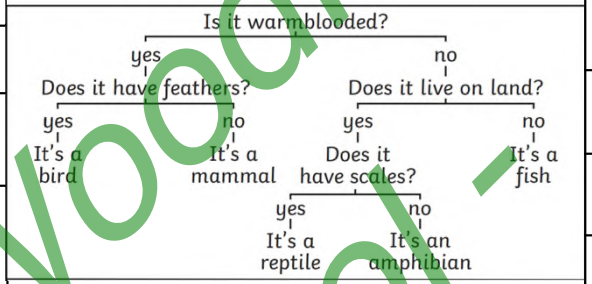
Year 6: Living things and their habitats Knowledge Mat

Subject Specific Vocabulary

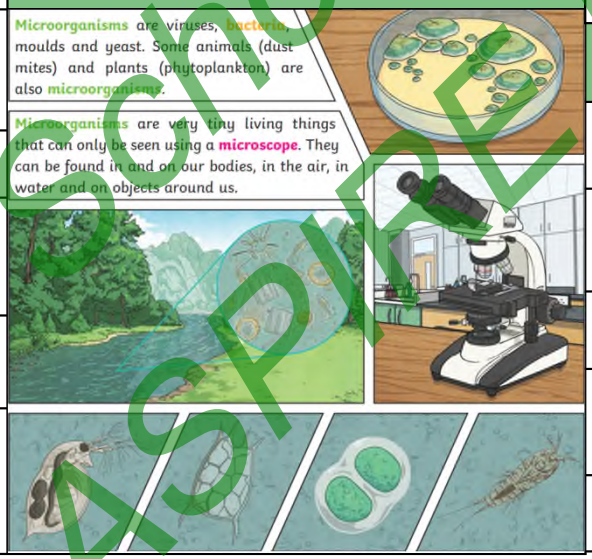
micro-organism	Micro-organisms are tiny. They are so small they can only be seen with a microscope.
vertebrates	A vertebrate animal is one that has a backbone.
invertebrates	An invertebrate animal does not have a backbone and 97% of creatures belong to this group.
species	This is the grouping together of similar types of plants, animals and other organisms that can reproduce with each other.
fungi	Fungi are a classification or group of living organisms. This means they are not animals, plants, or bacteria.
monera	The whole organism is made up of just one cell. This cell is more basic than cells of other organisms.
bacteria	Bacteria are tiny little organisms that are everywhere around us.
virus	A virus is a micro-organism that infects living things and replicates inside the living cells of an organism. It is not technically alive.
algae	Algae is a single or multi-cellular organism that has no roots, stems or leaves and is often found in water.
Carl Linnaeus	Carl Linnaeus is famous for his work in Taxonomy, the science of identifying, naming and classifying organisms (plants, animals, bacteria, fungi etc.).

Classifying

Scientists, called Taxonomists, sort and group living things according to their similarities and differences.



Micro-organisms



End of Unit Quiz

1. Who was Carl Linnaeus?
2. Describe some different methods of classifying animals. E.g. by species
3. What is the name given to scientists who classify living things into groups
4. Name different classifications of micro-organism.
5. Explain why a virus is an unusual micro-organism.
6. Describe some of the ways you have classified livings things within this unit of work.

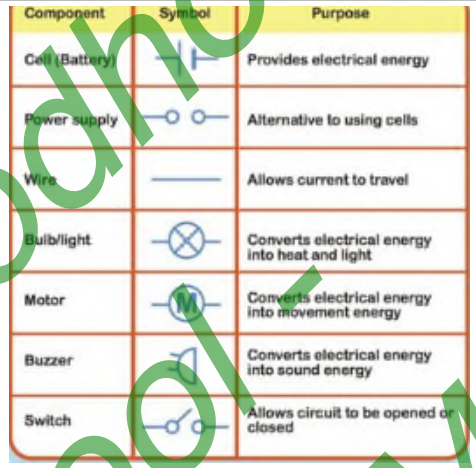
Pre-Learning Recap

1. Describe some methods of classifying organisms.
2. Explain how organisms adapt to an environment that changes.
3. Give some examples of natural and man-made changes to an environment.
4. Describe some animals that have become extinct due to a change in their environment
5. Describe and recount the life processes.

Year 6: Electricity Knowledge Mat

Subject Specific Vocabulary	
conductor	Some materials let electricity pass through them easily. These materials are known as electrical conductors.
insulator	Plastic, wood, glass and rubber are good electrical insulators.
socket	A socket is a safe device to plug your electrical items into at home. Almost every room at home will have at least one socket.
series circuits	A series circuit is one that has more than one resistor, but only one path through which the electricity (electrons) flows.
cells	An electrical cell is a device that is used to generate electricity, or one that is used to make chemical reactions possible by applying electricity.
volts	Voltage is an electrical potential difference, the difference in electric potential between two places.
generator	A machine that converts energy into electricity.
turbine	A machine that creates continuous power in which a wheel, or something similar, moves round and round by fast moving water, steam, gas or air.
fuses	These are safety devices. A fuse is a strip of wire that melts and breaks an electric circuit if it goes over a safe level.
Thomas Edison	He was a great inventor that came up with a way of making the electric light bulb accessible for homes, industry and outside in the streets.

Electrical symbols



Component	Symbol	Purpose
Cell (Battery)		Provides electrical energy
Power supply		Alternative to using cells
Wire		Allows current to travel
Bulb/light		Converts electrical energy into heat and light
Motor	M	Converts electrical energy into movement energy
Buzzer		Converts electrical energy into sound energy
Switch		Allows circuit to be opened or closed

Important facts to know by the end of the electricity topic:

- Know that the brightness of a bulb is associated with the voltage.
- Compare and give reasons for variations in how components function.
- Use recognised symbols when representing a simple circuit in a diagram.
- Construct simple series circuits.
- Be able to answer questions about what happens when they try different components, for example; switches, bulbs, buzzers and motors.

End of Unit Quiz

1. Can you tell me what volts and voltage is?
2. Can you explain how you would make a bulb brighter or dimmer in a series circuit?
3. Can you describe how component parts convert electrical energy into other types of energy? E.g. A buzzer converts electrical energy into…?
4. Can you explain the role a fuse plays in a circuit?
5. Can you describe 2 ways in which electricity is generated?

Pre-Learning Recap

1. Can you name some common appliances that use mains electricity and some that use battery power?
2. Can you name some materials that conduct electricity and some materials that are insulators?
3. Can you tell me the components that make up a simple circuit?
4. Can you describe the function a switch performs in a circuit?
5. Can you name some other component parts of a circuit?

Year 6: Light Knowledge Mat

Subject Specific Vocabulary

light wave	One of the characteristics of light is that it behaves like a wave. Light can be defined by its wavelength and frequency. The frequency is how fast the waves vibrate up and down.
light source	Light, or illumination, is a form of energy that travels in waves, like sound. You can find different sources of light, such as a candle or the sun.
concave	Is a lens that curves inwards and reflects light differently as a result.
convex	Is a lens that curves outwards and reflects light differently as a result.
filters	A filter is a transparent material that absorbs some colours and allows others to pass through.
lens	A lens is a curved piece of glass or plastic designed to refract light in a specific way.
retina	The retina is at the back of your eye and it has light-sensitive cells called rods and cones.
cornea	The cornea is thin, clear and covers your eye. It's important because it helps you see by focusing light as it enters the eye.
iris	By opening and closing the pupil, the iris can control the amount of light that enters the eye.
pupil	The pupil can be compared with the shutter of a camera. It is surrounded by the iris which is the coloured part of the eye.

How Light Moves

We need **light** to be able to see things. **Light** waves travel out from sources of **light** in straight lines. These lines are often called rays or beams of **light**.

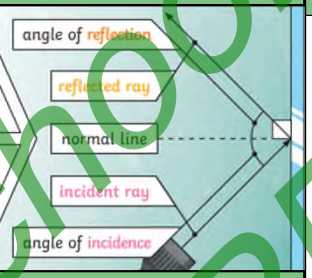
Light from the sun travels in a straight line and hits the chair. The **light** ray is then **reflected** off the chair and travels in a straight line to the girl's eye, enabling her to see the chair.

Reflections

The law of **reflection** states that the angle of **incidence** is equal to the angle of **reflection**. Whenever **light** is **reflected** from a surface, it obeys this law.

The angle of **reflection** is the angle between the normal line and the **reflected ray** of **light**.

The angle of **incidence** is the angle between the normal line and the **incident ray** of **light**.

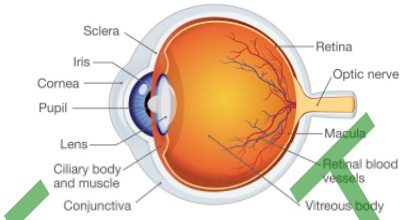


Shadows

A **shadow** is always the same shape as the object that casts it. This is because when an **opaque** object is in the path of **light** travelling from a **light source**, it will block the **light** rays that hit it, while the rest of the **light** can continue travelling.

Shadows can also be elongated or shortened depending on the angle of the **light source**. A **shadow** is also larger when the object is closer to the **light source**. This is because it blocks more of the **light**.

The Human Eye



Important facts to know by the end of the light topic:

- Know that light travels in straight lines.
- Understand that because light travels in straight lines objects are seen because they give out or reflect light into the eye.
- Know that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes.
- Know that light travels in straight lines and therefore shadows have the same shape as the objects that cast them.

Pre-Learning Recap

1. How does light move?
2. Tell me some sources of natural light and man-made light?
3. How is a shadow created? And how do you change its shape?
4. What is the different between transparent and translucent?
5. Describe how sound moves.

End of Unit Quiz

1. Describe how humans see objects.
2. Describe the functions of the iris, the lens, the pupil and the retina in the human eye.
3. Describe the similarities and differences of how light travels in comparison to sound.
4. Define the words transparent, translucent and opaque.
5. Explain how shadows can be altered if you place an opaque object at varying distances from a light source.
6. Explain why the sun is a source of light, but the moon is not.
7. Explain what an angle of incidence is.
8. Explain why objects may look distorted if surfaces are not completed flat.

Year 6: Evolution & Inheritance Knowledge Mat

Subject Specific Vocabulary

off-spring	When living things reproduce they pass on characteristics to their offspring. All living things produce offspring of the same kind, but normally offspring are not identical to their parents
adaptation	Adaptation is the process by which animals, plants and other living things have changed so that they better suit their habitat.
evolution	Evolution is the theory that all the kinds of living things that exist today developed from earlier types.
inheritance	When living things reproduce they pass on characteristics to their offspring. This is known as inheritance.
palaeontologist	A palaeontologist is someone studying the life of past geological periods, as known from fossil remains.
Charles Darwin	Charles Darwin was an English scientist who studied nature. He is known for his theory of evolution.
genes	Genes that are passed on to you determine many of your traits, such as your hair colour and skin colour.
chromosomes	Chromosomes are tiny structures inside cells made from DNA and protein.
variation	The difference between individuals within a species e.g. blonde hair and brown hair.
characteristics	The distinguishing features of a specific species. E.g. birds have feathers.

Fossils and Evolution

Fossils are the preserved remains, or partial remains, of ancient animals and plants. **Fossils** let scientists know how plants and animals used to look millions of years ago. This is proof that living things have evolved over time.

Evolution is the gradual process by which different kinds of living organism have developed from earlier forms over millions of years. Scientists have proof that living things are continuously evolving - even today!

Natural Selection

Natural Selection

Fossils of giraffes from millions of years ago show that they used to have shorter necks. They have gradually evolved through natural selection to have longer necks so that they can reach the top leaves on taller trees.

Off-spring and variation

Offspring

Animals and plants produce offspring that are similar but not identical to them. Offspring often look like their parents because features are passed on.

Variation

In the same way that there is variation between parents and their offspring, you can see variation within any species, even plants.

Adaptive and Inherited Traits

Adaptive Traits

Characteristics that are influenced by the environment the living things live in. These adaptations can develop as a result of many things, such as food and climate.

Inherited Traits

Eye colour is an example of an inherited trait, but so are things like hair colour, the shape of your earlobes and whether or not you can smell certain flowers.

Living Things		Habitat		Adaptive Traits
polar bear		arctic		Its white fur enables it to camouflage in the snow.
camel		desert		It has wide feet to make it easier to walk in the sand.
cactus		desert		It stores water in its stem.
toucan		rainforest		Its narrow tongue allows it to eat small fruit and insects.

End of Unit Quiz

1. Define evolution and who developed this theory.
2. Explain what an inherited trait is and give a personal example within your family.
3. Explain what an adapted trait is and give an example.
4. Give an example of how adaptive or inherited traits may lead to evolution.
5. Explain what natural selection is and how this shows that animals evolve over time.
6. Explain what physical evidence we can use to explain the theory of evolution.