Science

Knowledge Organisers

Year 3 Science – Autumn Term I: Animal Nutrition



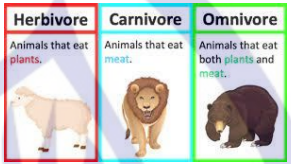
1. What do living things need?

All animals, including humans, need food, water, air, shelter, sleep and space to reproduce and survive. Plants need air, light, water, nutrients and room to grow, in order to survive.



2. Where do animals get their nutrition from?

Animals cannot make their own food and need to get nutrition from the food they eat. Carnivores get their nutrition from eating other animals. Herbivores get their nutrition from plants. Omnivores get their nutrition from eating a combination of both plants and other animals.



Why do animals (including humans) need food?

3. What is a balanced diet?

Humans get nutrition from what they eat. It is important to have a balanced diet made up of the main food groups, including: proteins, carbohydrates, fruit and vegetables, dairy products and alternatives, and fats and spreads. Humans stay hydrated by drinking water.

4. Which foods contain the most fat content?

butter	☐	chocolate	☐
crisps	☐	cheese	☐
fruit	☐	cereal	☐
bread	☐	yoghurt	☐

5. How do the seasons affect the diets of animals?

In the wild, animals' diets change over the year as the seasons change due to certain foods becoming available or unavailable.

Food	Diet	Carnivore	Vitamins Minerals	Carbohydrate	Growth
Nutrition	Herbivore	Omnivore	Protein	Balanced	Energy

Year 3 Science – Autumn Term 2: The Skeletal System

1. Why do humans have a skeleton?

Humans have a skeleton for **movement**, **support** and **protecting organs**.

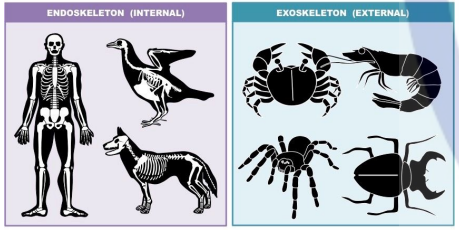
2. What are joints?

A **joint** is a place where two or more bones **meet** and **connect**. Skeletons have many bones connected by joints to easily move and **bend** parts of the body in different directions.

3. What are muscles?

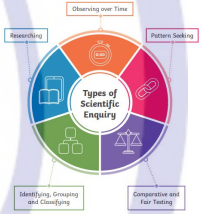
Muscles are soft tissues made up of many stretchy **fibres**. They allow humans to move, breathe and digest food.

What would happen if I had no skeleton?



4. Do all animals have a skeleton?

Most animals have skeletons for support, movement and protection. **Endoskeletons** are those found inside some animals. **Exoskeletons** are those found on the outside of some animals and some animals have no skeleton.



5. Can I research an animal's skeletal system?

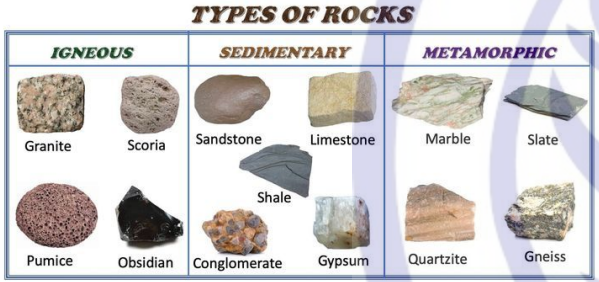
Research is one of the five **scientific enquiries** and furthers our understanding of specific topics.

Skeleton	**Support**	**Joint**	**Muscles**	**Endoskeleton**	**Research**
Movement	**Protecting**	**Bend**	**Fibre**	**Exoskeleton**	**Scientific enquiry**

Year 3 Science - Spring Term 1: Rocks

1. What does classify mean?

Rocks can be **classified** by their appearance and **properties** .



2. What are the three different types of rock?

There are three different rock types: **sedimentary** , **igneous** and **metamorphic**

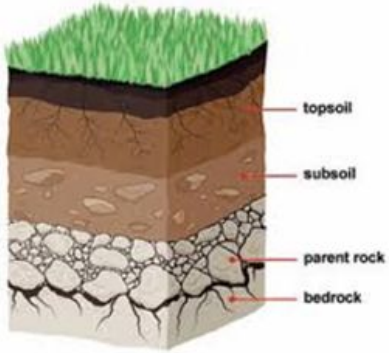
3. How are fossils formed?

Fossils form over millions of years and are the remains of a once-living organism, **preserved** as rock.

How are rocks used in our everyday lives?

4. What are the four layers in a soil profile?

Soils are made from tiny pieces of **eroded** rock, air and **organic** matter. There are a variety of naturally occurring soils.



5. How is rock used?

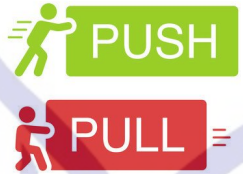
Different types of **rock** can be found in a variety of different everyday uses.

Classify	**Sedimentary**	**Metamorphic**	**Preserved**	**Eroded**	**Rock**
Properties	**Igneous**	**Fossils**	**Soils**	**Organic**	**Compare**

Year 3 Science – Spring Term 2: Forces and Magnets

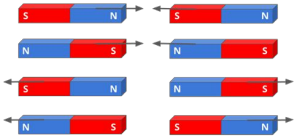
1. How do forces move objects?

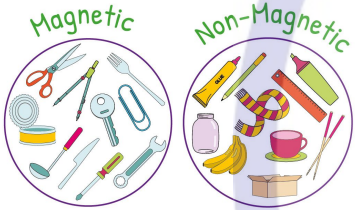
Objects will not move unless a **push or pull force** is applied. Push and pull forces work together. Some forces can have direct **contact** which means that the objects touch.



2. What is magnetism?

Magnetism is a **non-contact** force. Magnets have two poles (north and south) and that opposite **poles attract** each other, while like poles **repel** each other





How can we 'feel the force'?

3. Are all materials magnetic?

Some materials have magnetic properties. **Magnetic materials are attracted to magnets** . All magnetic materials are metals but not all metals are magnetic. Iron and steel are magnetic metals. It is possible to plan an investigation to prove this.

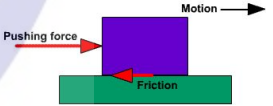
4. Can I conduct a fair test?

A **fair test** includes:

- aim
- equipment
- method
- a conclusion can be made from the results of an experiment.

5. What is friction?

Friction is a contact force and can result in resistance as one surface moves against another.



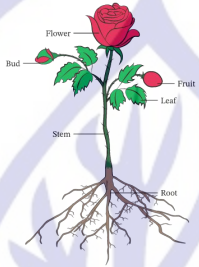
force	**non-contact**	**magnetism**	**south pole**	**repel**	**resistance**
contact	**magnet**	**north pole**	**attract**	**investigation**	**friction**

Year 3 Science – Summer Term I: Plant Nutrition & Reproduction

What do plants need to survive?

1. What is the function of each part of a flower?

Flowering plants have different parts: roots, stem/trunk, leaves and flowers. They are each essential to the growth of a plant.



2. What do plants need to grow?

Plants require air, light, water, nutrients from soil, and room to grow. This varies from plant to plant.

3. How do I ensure my science experiment is a fair test?

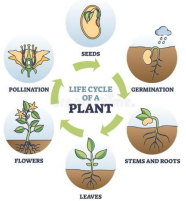
In Science, a fair test is carried out to answer a scientific question - What do Plants Need to Survive?

4. How do we know water is transported throughout plants?

Plants can transport water throughout their structure. Water is essential for their nutrition.

5. What role does each part of a flowering plant play in its lifecycle?

Each part of a flower plays a part in the life cycle of a flowering plant



nutrition	**reproduction**	**stem**	**leaves**	**sepal**	**petal**
nutrients	**transportation**	**roots**	**life cycle**	**stamen**	**carpel**

Year 3 Science - Summer Term 2: Light & Shadows

1. **Dark** is the absence of **light** and we need light to be able to see. Light is a form of **energy** that travels in **straight lines**.

2. Light can be **reflected** from different surfaces. Some surfaces are poor reflectors, such as some fabrics, while other surfaces are good reflectors, such as mirrors. **Reflective materials** are light in colour, shiny and smooth. Non-reflective materials are dark in colour, dull and rough.

Light and shadows- can you have one without the other?

3. Light from the **Sun** is damaging for vision and the skin. **Protection** from the Sun includes sun cream, sun hats, sunglasses and staying indoors or in the shade.

4. A **shadow** is formed when light from a light source, such as the Sun, is **blocked** by an object. **Opaque** objects cast dark shadows. **Translucent** objects cast pale shadows. **Transparent** objects cast very pale shadows.

5. Shadows **change** when the light source or the object moves. For example, when a light source is **lowered**, shadows grow **longer**.

Light	**Reflected**	**Sun**	**Shadow**	**Translucent**	**Energy**
Dark	**Reflective materials**	**Protection**	**Opaque**	**Transparent**	**Straight lines**

Year 4 Science - Autumn Term I: Food and The Digestive System

1. What is a producer and consumer?

A producer is a living thing that makes its own food energy, such as a plant. A consumer is a living thing that feeds on other living things.

2. What is an ecosystem?

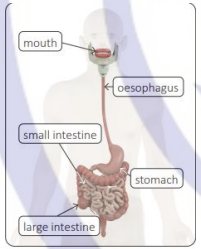
An ecosystem is a community of living organisms and their environments that interact with each other. Rainforests, deserts and oceans are examples of ecosystems.

3. What does a food chain show?

Food chains show what animals eat within a habitat and how energy is passed on over time. All food chains start with a producer, which is typically a green plant.

4. Can you name 3 natural and 3 human influences that cause habits to change?

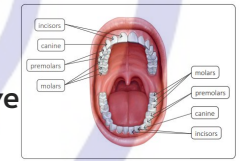
Habitats change over time, either due to natural or human influences. Natural influences include extreme or unseasonable weather. Human influences include habitat destruction or pollution.



What are the simple functions of the human digestive system?

5. How does the digestive system work?

The digestive system is responsible for digesting food and absorbing nutrients and water. The main parts of the digestive system are the mouth, oesophagus, stomach, small intestines, large intestines and rectum.



6. What are the four different types of teeth?

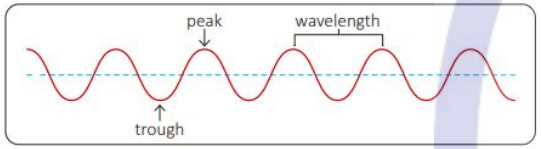
There are four different types of teeth: incisors, canines, premolars and molars.

Producer	Consumer	Food chain	Ecosystem	Habitat	Mouth
Stomach	Intestines	Oesophagus	Canines	Molars	Incisors

Year 4 Science - Autumn Term 2: Sound

1. What is sound?

Sound is energy produced by vibrations made by a sound source. When an instrument is played, the air around or inside it vibrates. These vibrations travel as a sound wave.



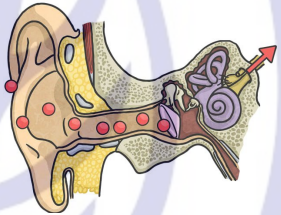
2. How does sound travel?

A sound source is a vibrating object that disturbs particles of air that collide with each other and pass the vibrations along, creating a sound wave. Sound waves travel through a medium and enter the ear.

How does sound travel and what affects how we hear it?

3. How do we hear sounds?

The pinna funnels sound waves into the ear canal. The vibrations travel along it making the eardrum vibrate. The vibrations travel through the ossicles, and then to the inner ear. They travel through the cochlea, where tiny hairs vibrate. This sends electrical signals from the cochlea to the brain, which interprets them as sounds.



4. What effect do materials have on sound?

The volume of sound is measured in decibels (dB). Loud or continuous noise can damage hearing. Sound can be muffled by inserting a material into the sound wave's path that absorbs sound waves.

5. How does distance from a sound source affect the volume?

Sounds are louder closer to the sound source and fainter as the distance from the sound source

6. What factors influence the pitch of a sound?

Pitch is how high or low a sound is. Parts of an instrument that are shorter, tighter or thinner produce high-pitched sounds. Parts of an instrument that are longer, looser or fatter produce low-pitched sounds.

7. How can you change the volume of a sound?

Volume is how loud or quiet a sound is. The harder an instrument is hit, plucked or blown, the stronger the vibrations and the louder the sound.

Sound	Sound Wave	Pinna	Cochlea	Volume	Pitch
Vibrations	Ear	Ossicles	Ear Drum	Decibels	Electrical Signals

Year 4 Science - Spring Term I: States Of Matter

1. What are the three states of matter?

Materials can be grouped according to whether they are solids, liquids or gases. Solids stay in one place and can be held. Examples include metal and plastic. Liquids move around easily and are difficult to hold. Examples include water and milk. Gases spread out to fill the available space and cannot be held. Examples include oxygen and carbon dioxide.

2. How are particles arranged in their different states?

The particles are close together and arranged in a regular pattern in a solid. In a liquid, the particles are close together but arranged randomly. In a gas, the particles are randomly arranged and far apart.

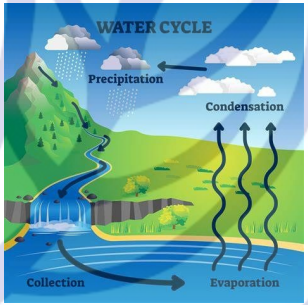
3. How does matter change state?

Heating or cooling materials can bring about a change of state. This change can be reversible or irreversible. The temperature at which materials change state varies. The process of changing from a solid to liquid is called melting. The reverse process is called freezing. The process of changing from a liquid to a gas is called evaporation. The reverse process is called condensation.

4. How does chocolate change when heated or cooled?

Some materials change state when they are heated or cooled to a certain temperature.

What are the states of matter and how do materials change between them?



5. What are the four stages of the water cycle?

The water cycle has four stages: evaporation, condensation, precipitation and collection. Water is warmed by the Sun, causing it to evaporate and rise as water vapour. As it rises it cools and condenses to form clouds. Eventually the clouds become full so the water falls back to the ground as precipitation . The fallen water collects back in lakes, rivers and streams.

solid	**liquid**	**gas**	**melt**	**freeze**	**evaporation**
condensation	**temperature**	**precipitation**	**heating**	**cooling**	**particles**

Year 4 Science - Spring Term 2: Grouping and Classifying

1. What is multi-stage classification?

By asking a series of questions you can identify a specific living thing. Classification keys help with this.

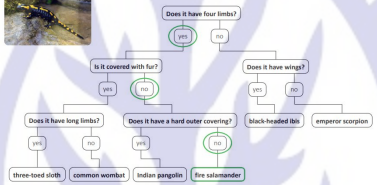
fish

mammal

reptile

2. How do you create a classification key?

Classification keys are created by devising a set of yes or no questions that separate a group into two groups until objects end up on their own.



How do scientists group and classify living things?

3. How do scientists classify living things?

The animal kingdom is divided into vertebrates and invertebrates. A vertebrate is an animal with a backbone. An invertebrate is an animal without a backbone. The plant kingdom is divided into vascular and nonvascular plants.

4. How do scientists classify vertebrates?

Animals can be divided into six main groups: mammals, reptiles, amphibians, birds, fish and invertebrates.

5. How do scientists classify the plant kingdom?

The plant kingdom is divided into vascular and nonvascular plants. There are two main types of vascular plants: plants with seeds and plants with spores. There are two groups of plants with seeds: flowering plants and cone-bearing plants.

Classification keys	Vertebrate	Invertebrate	Mammals	Reptiles	Amphibians
Birds	Fish	Vascular plants	nonvascular	Animal Kingdom	Plant Kingdom

Year 4 Science – Summer Term 1: Electrical Circuits & Conductors

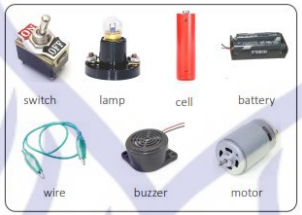
1. What is electricity?

Electricity is the flow of tiny particles called electrons and protons. It can come from the mains or from a battery, in nature it can come from lightning.

mains electricity

cell

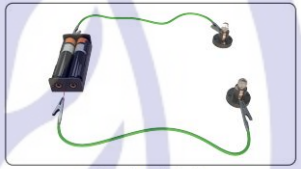
battery



2. What is an electrical component?

Electrical components include cells, wires, lamps, motors, switches and buzzers.

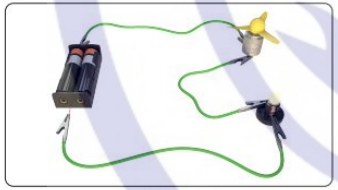
How do you build a working circuit?



incomplete series circuit

3. What is a series circuit?

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



complete series circuit

4. How does a series circuit work?

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

5. What is the difference between an electrical conductor and insulator?

Electrical conductors allow electricity to flow through them, whereas insulators do not.

6. How could you safely test whether tinfoil is an electrical conductor?

Scientific enquiries can be set up and carried out by following or planning a method.

Battery	Bulb	Cell	Component	Conductor	Current
Electricity	Insulator	Motor	Series Circuit	Switch	Wire

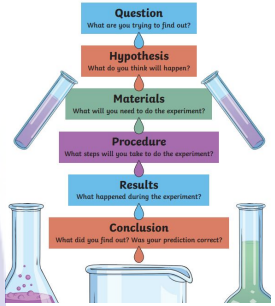
Year 4 Science - Summer Term 2: Scientific Inquiry

1. What are the key components of a scientific Inquiry?

When you plan a scientific inquiry you must follow these steps:

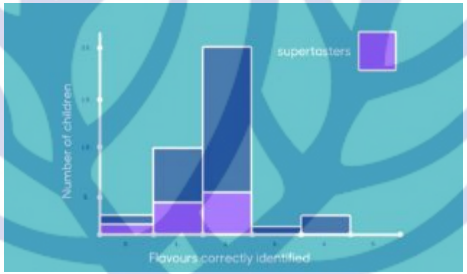
1) Ask a question
2) Plan a fair test
3) Make a prediction
4) Collect and present the data

How do you plan a scientific inquiry?



2. Why should you only change one variable in a fair test?

A variable is the thing that you change in an inquiry. A fair test must ensure that only one variable has been changed. This means that you can be sure that your results were caused by your variable.



3. Why is it important to be accurate when collecting data?

It is important to be accurate when you collect data. Mistakes could make your results inaccurate.

You should think carefully about the best way to present your data (e.g in a graph, table or picture).

variable	**prediction**	**fair test**	**method**	**relevant**	**observe**
question	**valid**	**data**	**diagram**	**results**	**hypothesis**

Year 5 Science - Autumn Term I: Forces & Mechanisms

1. What are the two types of force?

A force is a push or a pull that makes something move, change its speed or change its shape. There are two types of forces: contact forces and non-contact forces. Contact forces include friction, air resistance and water resistance. Non-contact forces include magnetism and gravitational force, or gravity.

2. How do objects fall to the ground?

Gravity is a force of attraction. Anything with a mass can exert a gravitational pull on another object. The Earth's large mass exerts a gravitational pull on all objects on Earth, making dropped objects fall to the ground. Gravity is a non-contact, pulling force which attracts two objects that have mass.

3 What do force meters measure?

A force meter can be used to measure an object's mass (the quantity of matter in an object) in grams and kilograms; weight is a measure of the Earth's gravitational force acting on the object and is measured in newtons.

What are forces?

4. How does Friction work?

Different surfaces create different amounts of friction. Smooth, flat surfaces exert a smaller frictional force than rough, bumpy surfaces. Moving objects will travel further on surfaces with less friction.

5. What is air resistance?

Air resistance is a type of friction. It is a contact force that acts when an object moves through air. It always acts against the direction of movement. Increasing air resistance makes an object fall to Earth more slowly.

6. What is water resistance and how can it be reduced?

Water resistance is a type of friction. It is a contact force that acts when an object moves through water. It always acts against the direction of movement. Decreasing the surface area at the front of an object reduces the amount of water resistance. The more streamlined an object, the faster it will fall through water.

7. How do levers, gears and pulleys assist the movement of objects?

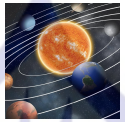
Levers, gears, and pulleys are all clever tools that help us move objects more easily. They are types of mechanisms that change the way a force works, allowing a smaller push or pull to have a bigger effect.

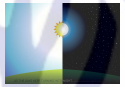
Attraction	air-resistance	force	friction	gravity	magnetism
mass	matter	newtons	streamlining	Water resistance	weight

Year 5 Science - Autumn Term 2: Earth and Space

1. What is the order of the planets from the sun ?

The Solar System is made up of the Sun and everything that orbits around it. There are eight planets in our Solar System: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune. Earth orbits around the Sun and a year (365.25 days) is the length of time it takes for Earth to complete a full orbit. The Earth rotates on its axis once every 24 hours, which is a day. This rotation creates daytime and night time.





2. How long does it take for the moon to orbit the Earth?

The Moon orbits the Earth once every 27.3 days. The Moon also rotates on its axis once every 27.3 days. This is why the same side of the Moon always faces Earth. Earth also rotates on its axis, an imaginary line that runs through Earth's centre from the North Pole to the South Pole. Earth completes one rotation in 24 hours. This is equal to one day.

3. Why are planets spherical?

The Sun, Earth, Moon and the planets in our solar system are roughly spherical. All planets are spherical because their mass is so large that they have their own force of gravity. This force of gravity pulls all of a planet's material towards its centre, which compresses it into the most compact shape – a sphere.

4. Why is it dark at night time?

As Earth orbits the Sun, it also spins on its axis. It takes Earth a day (24 hours) to complete a full spin. During the day, the Sun appears to move through the sky. However, this is due to the Earth rotating and not the Sun moving. Earth rotates to the east or, if viewed from above the North Pole, it rotates anti-clockwise, which means the Sun rises in the east and sets in the west. As Earth rotates, different parts of it face the Sun, which brings what we call daytime. The part facing away is in shadow, which is night time.

How do the Earth and planets move in relation to the sun and moon?

5. Why do we have summer and winter?

The tilt of the Earth's axis as it orbits the Sun changes the length of daytime and night time and creates different seasons. When the Northern Hemisphere tilts away from the Sun, it is winter. It gets less direct sunlight, the weather is colder, the daytime is shorter, and the night time is longer. The Arctic Circle gets no sunlight in winter, so it is always night time. At the same time, the Southern Hemisphere tilts towards the Sun, which is summer. It gets plenty of direct sunlight, the weather is warmer, the daytime is longer, and the night time is shorter. Antarctica has daylight all day, and it is never night time. As the Earth continues its orbit, the day lengths and the seasons in the hemispheres continually change.

6. What are the phases of the moon and why do we have them?

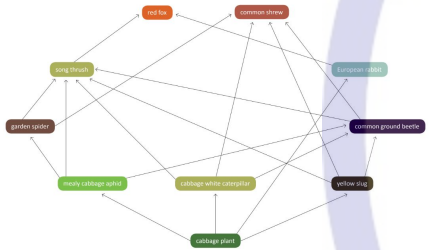
The Moon appears lit up because it reflects sunlight. As the Moon completes one orbit of the Earth, our view of the lit side gradually changes. This changing view is called the phases of the Moon, of which there are eight: new Moon, waxing crescent Moon, first quarter Moon, waxing gibbous Moon, full Moon, waning gibbous Moon, last quarter Moon and waning crescent Moon. Waxing means to increase and waning means to decrease.

axis	**day**	**equator**	**moon**	**night**	**orbit**
planets	**rotate**	**seasons**	**Solar system**	**sun**	**tilt**

Year 5 Science – Spring Term I: Living Things & Their Habitats

1. What is a food web?

Population changes in a habitat can have significant consequences for food chains and webs. A **food web** is a set of **interconnected food chains** that show how animals rely on plants and other animals for food.



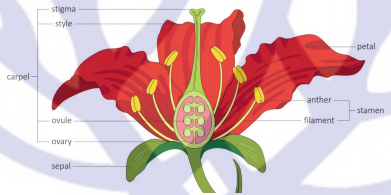
2. What is a life cycle?

A life cycle is the series of changes in the life of a living thing and includes these basic stages: birth, growth, reproduction and death.

What are living things and their habitats and processes?

3. What are the parts of a flower?

Parts of a flower include the **stamen, filament, anther, pollen, carpe**l, **stigma, style, ovary, ovule** and **sepal**.

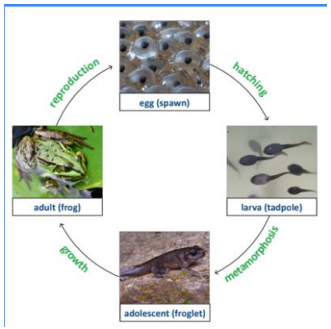


4. How do you dissect a flower and what are its reproductive parts?

Pollination is when the **male** part of a plant **(pollen)** is carried, by wind, insects or other animals, to the **female** part of the plant **(carpel)**. The pollen travels to the **ovary**, where it **fertilises** the **ovules** (eggs). **Seeds** are then produced, which **disperse** far away from the parent plant and grow new plants.

5, What do plants need to grow well? (Enquiry)

Make a prediction and then plant your seeds and make regular observations.as it grows.



habitat	**Life cycle**	**birth**	**growth**	**reproduction**	**asexual**
stamen	**pollen**	**ovary**	**ovule**	**fertilise**	**dissect**

Year 5 Science - Spring Term 2: Human Reproduction and Ageing

1. What are mammals?

A mammal is a vertebrate, which means it has a backbone. The five key mammalian characteristics of mammals are that they produce milk to feed their young, are warm blooded, give birth to live young, have fur or hair and breathe air with lungs.

2. What are the different types of mammalian life cycles?

The processes in mammalian life cycles are birth, growth, puberty and reproduction. The stages in mammalian life cycles are embryo, juvenile, adolescent and adult. The length of time for each stage and process varies between different mammals.

3. What are the stages of the human life cycle?

Humans are mammals and have a mammalian life cycle. We start as an embryo, go through the process of birth and become a juvenile. After, we go through another process of growth to become an adolescent then the process of puberty to finally become an adult. Lastly, humans can reproduce to create a new embryo.

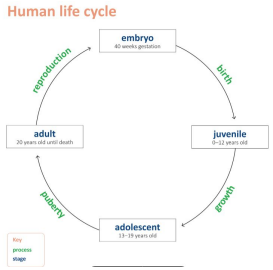
How do humans develop as they age?

4.How do humans develop from birth to old age?

Humans go through characteristic stages as they develop towards old age. These stages include baby, infant, toddler, child, adolescent, young adult, adult and senior citizen. Puberty is the transition between childhood and adulthood.

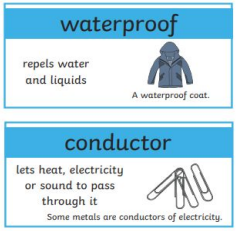
5. How do human adults age?

As humans age, many of the body's systems gradually decline, leading to the changes seen in older people. These changes include the loss of eyesight and hearing, greying hair, wrinkled skin, weakened bones, joints and muscles, heart problems, memory loss, and brain function problems.



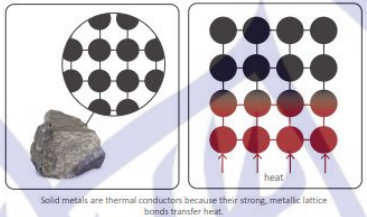
mammal	birth	growth	puberty	embryo	juvenile
adolescent	adult	infant	toddler	childhood	adulthood

Year 5 Science - Summer Term I: Properties & Changes of Materials



1. : How can materials be grouped? Can you give some examples?

Materials can be grouped according to their basic physical properties. Properties include: *hardness, solubility, transparency, conductivity (electrical and thermal) and magnetism.*



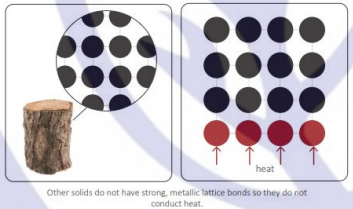
2. What is thermal conductivity? How can it be tested?

Thermal conductors conduct heat. Solid metals are good thermal conductors because their particles are closely packed and they have strong, lattice metallic bonds.

What are the properties of materials and how can they change?

3. What is a thermal insulator? Can you give some examples?

Solids, such as plastic, wood and glass do not have these bonds so they do not conduct heat. They are thermal insulators. Liquids and gases are poor conductors of heat because their particles are further apart.



4. What is solubility? Give an example of a material that is soluble / insoluble .

Solubility is a measure of a material's ability to dissolve in a solvent. A material is soluble if it can dissolve in a solvent to form a solution. A material is insoluble if it cannot be dissolved in a solvent to form a solution. Dissolving is when a solute becomes incorporated into a solvent and can no longer be seen.

dissolve	**soluble**	**insoluble**	**bonds**	**conduct**	**insulate**
particles	**solubility**	**conductors**	**properties**	**insulators**	**solution**

Year 6 Science - Autumn Term I: The Circulatory System

1. What are the systems of the human body called and what do they support?

The human body has different **systems** that support the seven **life processes** . The **systems** are: skeletal (movement, shape and protection), endocrine (growth), nervous (sensation and movement), digestive (nutrition), excretory (getting rid of waste), reproductive (reproduction), respiratory (respiration).

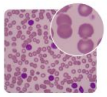
2. What are the main parts of the circulatory system?

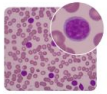
The role of the **circulatory** system is to transport **oxygen** , water and nutrients around the body. The circulatory system includes the **heart** , **blood vessels** and **blood** .

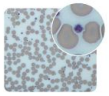
3. How does the structure of the heart enable it to pump blood around the body?

The heart has four chambers: the right atrium, left atrium, right ventricle and left ventricle. **Deoxygenated** blood enters the right **atrium** , then the right **ventricle** . From there, it is pumped through a valve into the **pulmonary artery** . The artery carries the blood to the lungs, where it absorbs oxygen. The **pulmonary veins** carry **oxygenated** blood back from the lungs to the left atrium, to the left ventricle and is pumped out through the **aorta** to the rest of the body.

How does the circulatory system work?





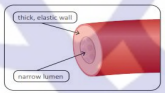


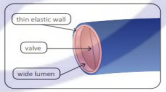
4. What are the components and functions of blood?

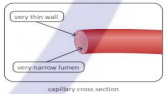
Blood is made up of four different components. **Plasma** is a yellowish liquid, mainly water but contains many essential proteins and salts. It carries **red blood cells** , **white blood cells** and platelets around the body. **Platelets** are small cell fragments that clump together to stop bleeding from a cut in a **blood vessel** . Blood has many functions, including supporting immunity, removing waste, clotting, transporting hormones and distributing heat.

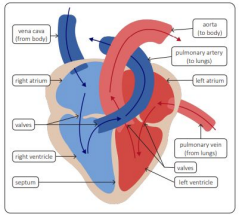
5. What are the functions of arteries, veins and capillaries?

Arteries carry **oxygenated** blood away from the heart, providing the tissues and organs with oxygen and other nutrients. **Veins** carry **deoxygenated** blood back to the heart. **Capillaries** are tiny **blood vessels** that form a network and allow oxygen and other nutrients to pass from the blood into the tissues.







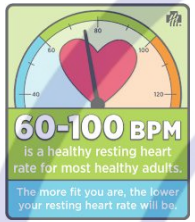


aorta	arteries	atrium	blood vessels	capillaries	circulatory
deoxygenated	oxygenated	platelets	plasma	systems	veins

Year 6 Science - Autumn Term 2: The Circulatory System

1. What is a resting heart rate and how can it be monitored?

The **resting heart rate** is the number of times a **heart beats** per minute when a person is at rest. The heart rate can be measured by recording the **pulse** at different points of the body.



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3. How does exercise affect the heart?

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4. How can scientific questions be answered?

Questions can help us find out about the world and can be answered using a range of **scientific enquiries**, including fair tests, research and observation.

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Data can be recorded and displayed in different ways, including tables, bar and line charts, scatter graphs, classification keys and labelled diagrams.

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aerobic	conclusion	data	enquiries	exercise	fitter
heart beat	heart rate	method	oxygen	questions	resting

Year 5 Science - Summer Term 2: Properties & Changes of Materials


1.What is a mixture? Can you name the two different types?

A mixture is a combination of two or more **substances** that aren't chemically joined and can be **separated** back into their individual substances. **Heterogeneous** mixtures consist of distinctly different substances and are easy to separate. Substances in homogeneous mixtures are evenly distributed and you cannot see the different parts. **Homogeneous** mixtures are difficult to **separate.**


2. What can seiving be used to separate?

Sieving can be used to separate **large solids** from **liquids** and some **solids** from other **solids.**

What are mixtures and how can they be separated?


rusting


burning


decaying

3.What can filtering be used to separate?

Filters separate **solid** particles from **liquids** or gases. **Filters** can be made from thin materials that contain tiny holes or layers of **solid** materials.

4.What can evaporation be used to separate?

Evaporating can be used to separate dissolved **solids** from **liquids.**

5. What are reversible changes?

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

6. What are irreversible changes?

Irreversible changes include burning, rusting, decaying and chemical reactions. **Irreversible changes** are usually accompanied by one or more of these signs: a gas is produced; light is produced; a smell is produced or the smell changes; the colour changes; sound is produced, or the temperature changes.

mixture	**heterogeneous**	**homogeneous**	**separate**	**substance**	**liquids**
reversible	**irreversible**	**filtering**	**sieving**	**evaporating**	**solids**

Year 6 Science - Autumn Term I: The Circulatory System

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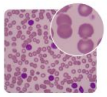

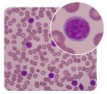

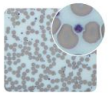

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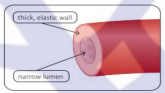

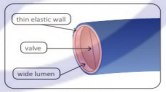

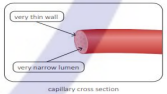

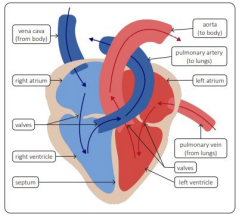

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Year 6 Science - Autumn Term 2: The Circulatory System

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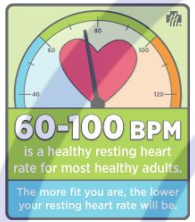

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aerobic	conclusion	data	enquiries	exercise	fitter
heart beat	heart rate	method	oxygen	questions	resting

Year 6 Science – Spring Term I: Living Things & Their Habitats

1. How can plants and animals be classified?

The first and widest level in the biological classification system is called a **kingdom** , the second a **phylum** , then **class,** order**, family, genus** and **species** . There are five kingdoms: animals, plants, fungi, protists and monerans. Members of each kingdom have features in common. Living things are **classified** into groups, according to common observable **characteristics** and based on similarities and differences.

2. What are classification keys?

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

polar bear

How have polar animals adapted to suit their environment?

3. What is an adaptation?

An **adaptation** is a **physical** or **behavioural** trait that allows a living thing to **survive** and fill an ecological niche. Adaptations **evolve** by natural selection. **Favourable** traits help an organism survive and pass on their genes to subsequent **generations.**

humpback whale

4. How do animals stay warm?

Blubber is a layer of fat that acts as an **insulator** under the skin of some animals, such as walruses and whales. It is an **adaptation** that is essential for their survival. Blubber also prevents the internal organs of some animals from freezing and gives them energy when food is hard to find. Animals with fur, such as polar bears and arctic foxes, trap a layer of air close to their skin to help **insulate** them from the cold.

emperor penguin

5. What factors change the rate at which an iceberg melts?

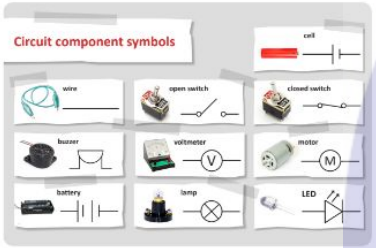
Increases in global temperatures are accelerating the break up of ice shelves and glaciers, leading to the calving and melting of icebergs.

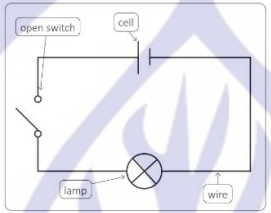
adaptation	**behavioral**	**characteristics**	**classification**	**classified**	**evolve**
generations	**genus**	**insulate / insulator**	**kingdom**	**physical**	**species**

Year 6 Science – Spring Term 2: Electrical Circuits & Components

1. What do electrical symbols represent?

Electrical **symbols** represent electrical **components** such as a switch, buzzer or lamp.





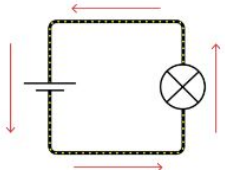
2. How can circuits be recorded?

Circuits can be recorded and using labelled diagrams including recognised **symbols** for different **components** of circuits.

What are the components and functions of electrical circuits?

3. What does a circuit need to function?

A circuit needs a power source, such as a **battery** or cell, with wires connected to both the **positive** and **negative terminals.**



4. How is an electric current measured? What is voltage?

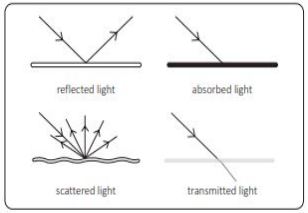
Electric **current** is measured using an **ammeter.** The force that pushes electric charge around a circuit, called the voltage, is measured using a **voltmeter.** A **multimeter** measures both electric **current** and **voltage.**

5. What is the effect of more/less voltage in an electric current?

Voltage is measured in **volts (V).** The bigger the voltage, the more **electrons** are pushed through the circuit. The more voltage flowing through a lamp, buzzer or motor, the brighter the lamp, the louder the buzzer and the faster the motor.

ammeter	**charge**	**components**	**current**	**electrons**	**multimeter**
negative	**positive**	**terminals**	**voltage**	**voltmeter**	**volts (V)**

Year 6 Science - Summer Term 1: Light Theory



1. How does light travel?

Light travels in waves in straight lines. Light waves in diagrams are drawn as straight lines with arrowheads that show the direction of travel. The angle at which light hits a reflective surface is the same angle at which it is reflected.

2. How do we see?

Due to how light travels, we can see things because they give out or reflect light into the eye. The lens focuses the light on the retina. The iris is a muscle that controls the amount of light that enters the eye.

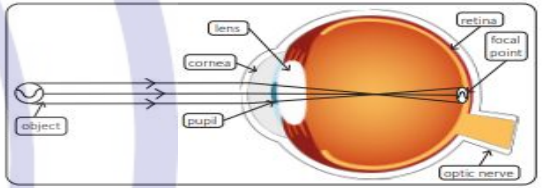
3. What happens when all the colours of visible light mix together?

Light sources give out light. They can be natural or artificial. When light hits an object, it is absorbed, scattered, reflected or a combination of all three. Coloured light mixes to make white light.

How does light travel?

4. How is colour perceived by the eye?

Cones in the retina that are sensitive to red, green and blue light help us to see different colours. When different combinations of cones are stimulated, we see different colours.



5. How is a shadow formed?

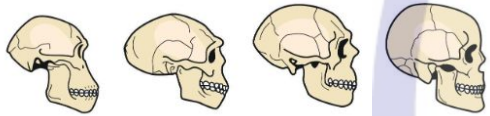
A shadow appears when an object blocks the passage of light. Apart from some distortion or fuzziness at the edges, shadows are the same shape as the object. The distortion or fuzziness depends on the position or type of light source.

waves	**straight lines**	**arrowheads**	**reflect**	**light sources**	**natural**
artificial	**absorbed**	**retina**	**shadow**	**distortion**	**lens**

Year 6 Science - Summer Term 2: Evolution & Inheritance

1. What is evolution?

Evolution means that all life on Earth has evolved from simple life forms to more complex ones over time. The fossils of living and extinct things provide evidence of evolution.



2. What is Inheritance?

Inheritance is when living things pass on **characteristics,** such as height, skin colour and eye colour.

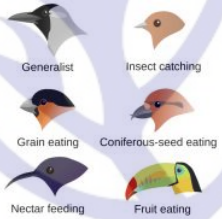
Why do living things change and develop over time?

3. What is adaptation?

An **adaptation** is a **physical** or **behavioural trait** that allows a living thing to survive. Adaptations may lead to **evolution.**

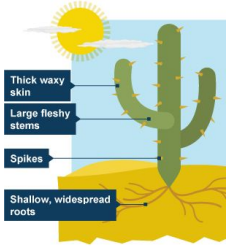
4. What is Natural Selection?

Natural selection is also known as 'survival of the fittest' because favourable **traits** help an organism survive and pass on their **genes** through reproduction.



5. In what ways can plants adapt?

There are 3 types of plant **adaptation** .
Structural : modified leaves, roots and trunks.
Behavioural: movement towards the Sun and regulated growth. **Chemical:** stings and poisons.



adaptation	**behavioural**	**characteristics**	**chemical**	**evolution**	**fossils**
genes	**Inheritance**	**natural selection**	**physical**	**species**	**traits**