Y5 Science – Earth and Space
Key Concept – Systems and Cause & Effect

Essential Knowledge

What is in our solar system?
The Sun is a star, which lies at the centre of our solar system. Everything orbits around it.
There are eight major planets in our solar system. Earth is the third closest to the sun.

How do we know that the Earth, Sun and moon are spherical bodies?
It was once thought that everything orbited the Earth, known as the geocentric model of the solar system. However, scientists like Copernicus and Galileo used telescopes and measurements to show that the Earth orbited the Sun, which is called the heliocentric model.

How do the planets move in relation to the sun?
The further away the planet from the Sun, the longer its orbit takes. Those planets furthest away are also the coldest planets. A satellite orbits planets. Moons are natural satellites.

What effect does the Earth's rotation have?
The tilt of the Earth towards and away from the Sun's light as the Earth orbits it leads to the seasons, as during winter the light is spread over a wider area.

What causes the Moon's changing appearance?
The Moon orbits the Earth roughly every 28 days.
As the Moon orbits the Earth, different parts of it are lit up by the Sun, which is why the moon *appears* to change shape in the sky. These differences are called the phases of the Moon.

Key Vocabulary

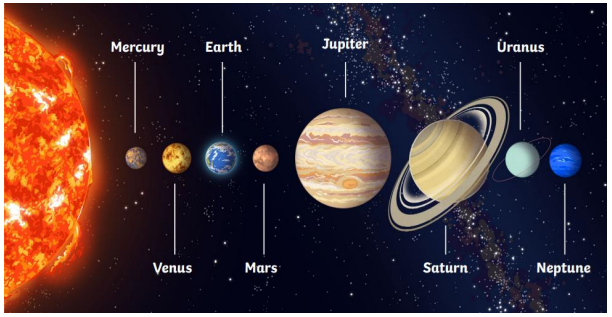
orbit	A regular, repeating path that one object in space takes around another one.
rotate	To spin about an axis.
axis	A real or imaginary line through the centre of an object, around which the object turns.
spherical	Having or nearly having the shape of a sphere
solar system	The Sun and everything that orbits, or travels around, it.

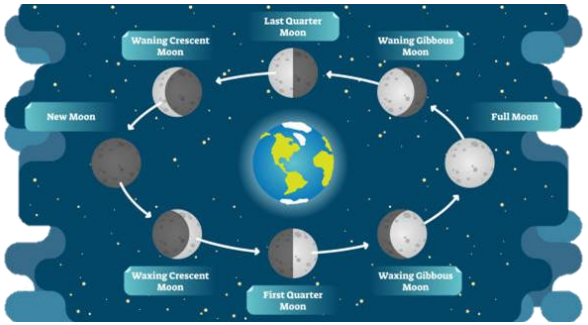
Aspirational Knowledge

A solar eclipse occurs when the Moon is between the Sun and the Earth, casting a shadow on the Earth; a lunar eclipse occurs when the Earth is between the Sun and the Moon, casting a shadow on the Moon.

Working Scientifically

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





Y5 Science – Earth and Space
Key Concept – Systems and Cause & Effect

Key Knowledge

What is in our solar system?
The Sun is a star. It is in the middle of our solar system.
There are eight planets in our solar system.

How do we know that the Earth, Sun and moon are spherical (round)?
Scientists have shown that they are round by doing lots of research.

How do the planets move in our solar system?
The planets orbit around the sun.
A satellite orbits a planet. The Moon is a type of satellite.

Why do we have night and day?
Night and day are caused by the Earth rotating on its axis.

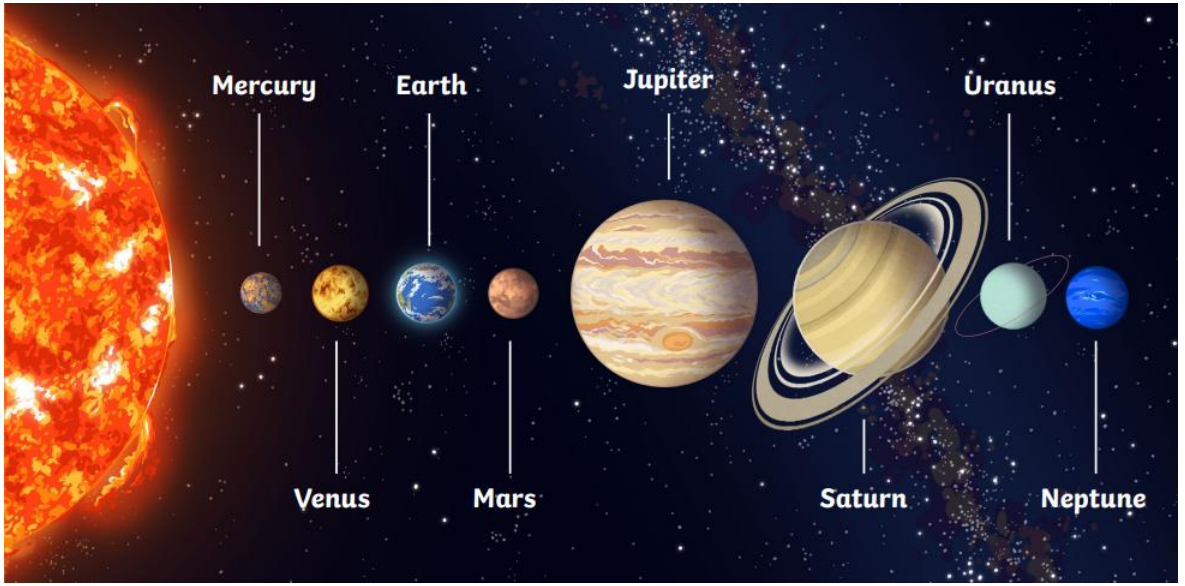
Why does the Moon look different shapes?
The Moon orbits the Earth every 28 days.

Working Scientifically

Identify scientific evidence that has been used to agree with or disagree with ideas or arguments.

Key Vocabulary

orbit	to travel around another object
rotate	to spin around
planet	large, natural objects that travel around stars, like the sun
spherical	being the shape of a sphere
solar system	the sun and everything that travels around (orbits) it



Y5 Science – Animals, including humans
Key Concept – Change

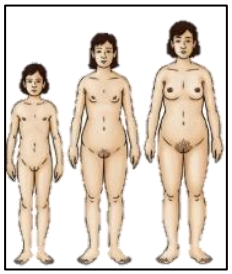
Essential Knowledge

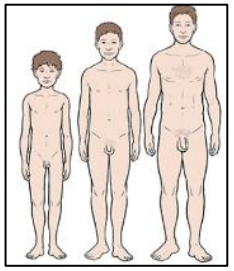
How do babies grow inside the womb?
It takes 9 months for a baby to grow inside the womb from an embryo, to a foetus to a fully grown baby.

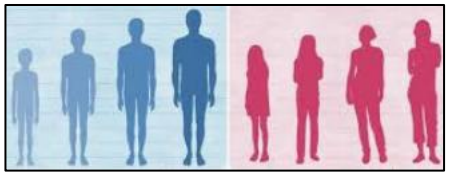
How do I develop?
Humans go through stages of development:
1) Begin as fertilized eggs.
2) Develop into embryos.
3) Developing into babies.
4) Once they are born, these newborn babies become infants (roughly 2 months to 2 years).
5) Young children (roughly 2-12 years old).
6) Children develop into adults during adolescence (roughly 12-16 years old) at which age they become physically capable of reproduction.
7) Adults (18+).
8) Adults develop into old age (roughly 55+ years old).

What is puberty?
Puberty is the change in our bodies from child to adult.

What happens when we get old?
When you get older, you start to develop wrinkles and hair begins to turn grey.







Key Vocabulary

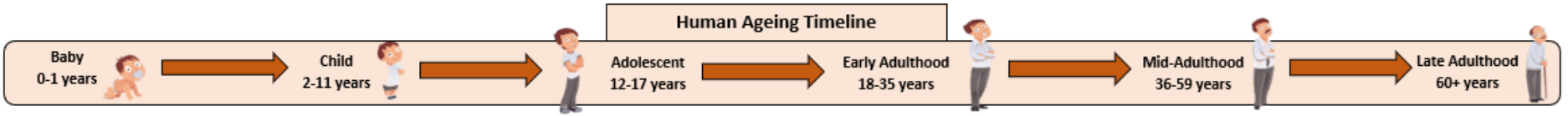
gestation	The period that a mammal carries her offspring, or babies, inside her body before giving birth.
foetus	The young of an animal in the womb or egg.
adolescence	The time in a young person's life between childhood and adulthood.
puberty	The name for the time when your body begins to develop as you move from child to adult.
reproduction	The process by which a living organism creates a likeness of itself.

Aspirational Knowledge

Adults develop into old age they experience changes in their body which require them to move more carefully and rest more frequently.
Puberty happens when the pituitary glands begin to release hormones.

Working Scientifically

To be able to ask relevant questions.

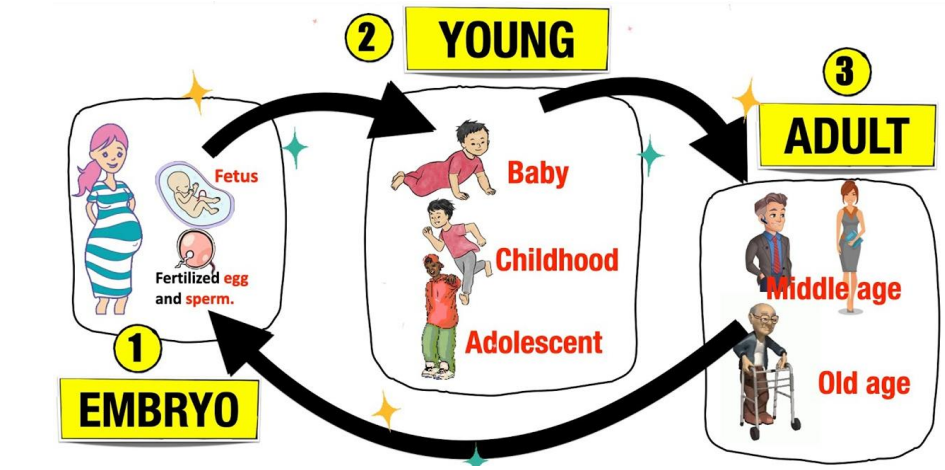


Y5 Science – Animals, including humans
Key Concept – Change

Key Knowledge

How does a baby grow before it is born?
It takes 9 months for a baby to grow inside the mother's womb.

How do I change as I grow?



What is puberty?
The change in our bodies from child to adult.

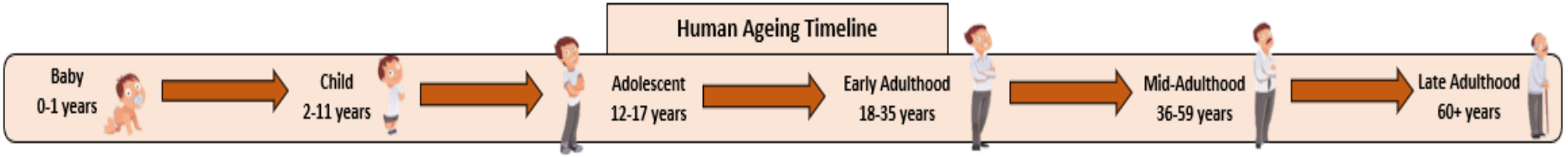
What happens when we get old?
Adults begin to develop wrinkles and hair turns grey.

Key Vocabulary

pregnancy	When a mammal carries her babies inside her body before giving birth.
foetus	The young of an animal in the womb or egg.
teenager	Between child and adult.
puberty	When your body begins to develop as you move from child to adult.
reproduction	The process by which a living organism creates a likeness of itself.

Working Scientifically

To be able to ask relevant questions.



Y5 Science – Forces
Key Concept – Cause and Effect

Essential Knowledge

What is gravity?
Gravity is a force that acts between all objects in the universe.
Force is measured in a unit called Newtons.
The amount of matter in an object is its mass.

When do we get air resistance?
Air resistance is a force felt by an object as it moves through the air.

What is water resistance?
Water resistance is a force felt by an object as it moves through water.

Why are gears, pulleys and levers used?
A lever is a rigid length pivoting around a fulcrum. Gears, pulleys and levers are simple machines that are used to allow a smaller force to have a greater effect.

How can I show forces in action?
A Rube Goldberg machine is something that completes a simple task in a complicated way. The machines require a high level of skill and patience to create.

Working Scientifically

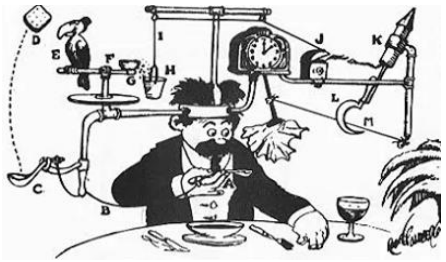
Plan different types of scientific enquiries to answer questions.
Take measurements, using a range of scientific equipment.
Record data and results of increasing complexity using tables and bar graphs.

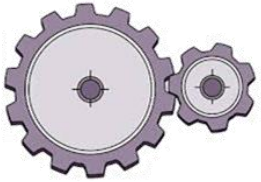
Aspirational Knowledge

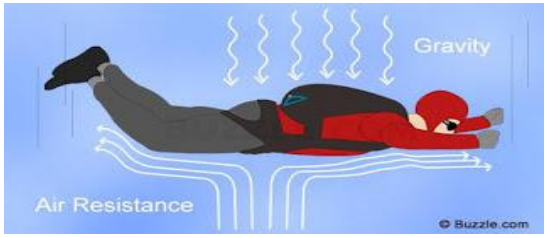
A parachute's shape increases the air resistance that a falling object experiences.
The shape of an object determines how much air resistance or water resistance it experiences.
A falling object will accelerate until its air resistance matches the gravitational force pulling it down.

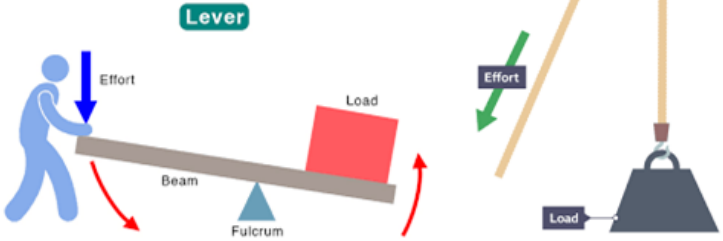
Key Vocabulary

force	A push or pull upon an object resulting from its interaction with another object.
friction	The resistance that one surface or object encounters when moving over another.
pull force	To draw or haul towards oneself or itself, in a particular direction.
push force	To move something in a specific way by exerting force.
variable	Any factor, trait, or condition that can exist in differing amounts or types.









Y5 Science – Forces
Key Concept – Cause and Effect

Key Knowledge

Why do things fall?
Force is measured in Newtons.
The amount of matter in an object is its mass.
Gravity is a force that acts between all objects.

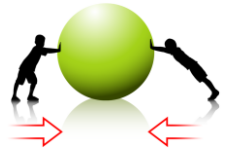
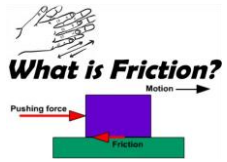
What makes things slow down when they fall?
Air resistance is a force felt by an object as it moves through the air.

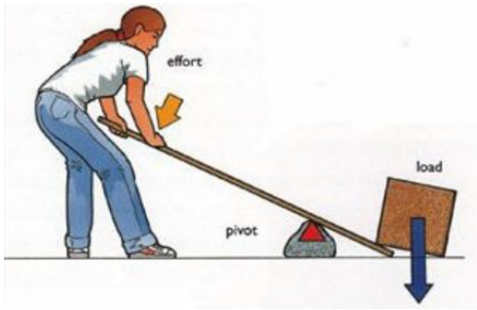
What makes things slow down in water?
Water resistance is a force felt by an object as it moves through water.

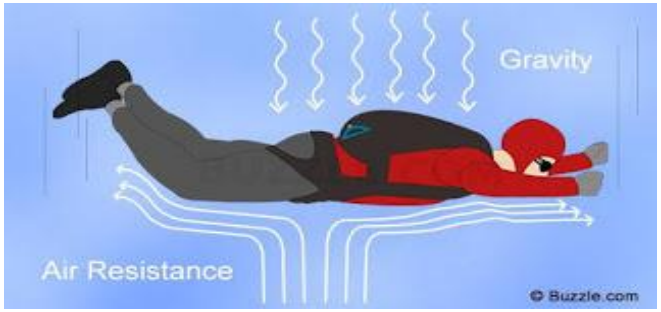
Why do we need gears, pulleys and levers?
Gears, pulleys and levers are simple machines.

How can I show forces happening?
A Rube Goldberg machine is something that completes a simple task in a complicated way. They take a long time to set up.

Key Vocabulary

force		A push or pull.
friction		A force that acts between two objects that touch each other.
pull force		A force that causes an object to move towards the person who is pulling the object
push force		A force that causes an object to move away from the person who is pushing the object
variable	Something that can be changed.	





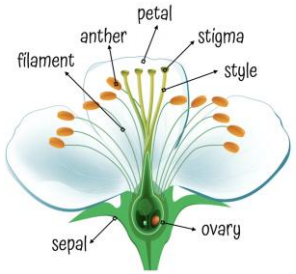
Working Scientifically

Plan different types of science tests to answer questions.
Take measurements.
Record data and results.

Y5 Science – Living Things and their Habitats
Key Concept – Similarity & Difference and Systems

Essential Knowledge

What are the names of parts of a plant?



What is sexual and asexual reproduction in plants?
Sexual reproduction requires two parent plants, whereas asexual only requires one.

What is metamorphosis?
A process involving a dramatic, abrupt change in an animal's body structure to transition from an immature to an adult form.

How do mammals and birds reproduce?
In most mammals a fertilised egg develops in the womb into an embryo, then is born and fed on milk before it is weaned onto the food that is adapted to eat. It then develops to maturity in a period called adolescence after which it can reproduce, the cycle can begin again.
In birds, a fertilised egg hatches in a nest and is fed by its parents until it is ready to fly; it then leaves the nest and grows into an adult after which it can reproduce, the cycle can begin again.

Do mammals lay eggs?
Mammals called monotremes can lay eggs.

Key Vocabulary

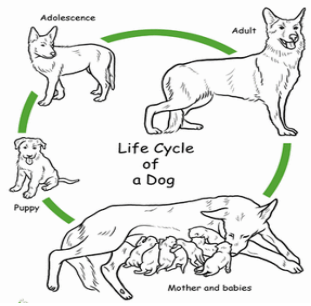
lifecycle	the different stages of life for a living thing.
reproduction	the process by which an organism creates new versions of itself.
offspring	the child or young of a particular human, animal, or plant.
amphibian	cold-blooded animals which means their body temperature is regulated by their surrounding temperature.
mammal	an animal that breathes air, has a backbone, and grows hair at some point during its life.

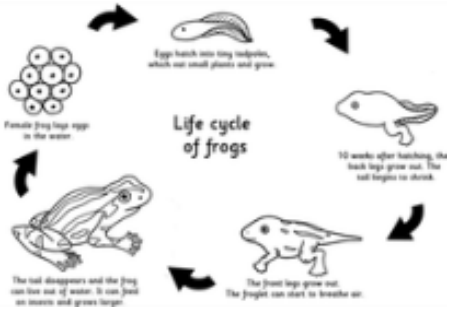
Aspirational Knowledge

The life cycle of a platypus goes through 4 key stages: the egg stage, the hatching stage, the infant stage and the adult stage. The mother will lay a few eggs in a burrow, which usually hatch after about 10 days.

Working Scientifically

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

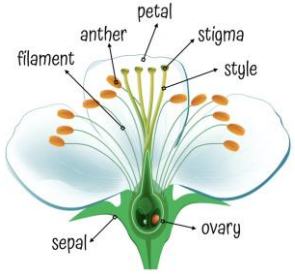




Y5 Science – Living Things and their Habitats
Key Concept – Similarity & Difference and Systems

Key Knowledge

What are the parts of a plant called?



How do plants reproduce?
Plants reproduce using pollination or growing extra branches or tubers into the ground.

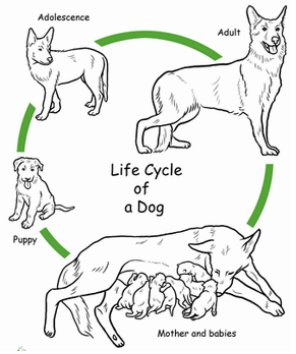
How do animals change?
Amphibians and insects can change using metamorphosis.

How do mammals and birds reproduce?
Mammals give birth to live young, who drink milk from their mother. Birds lay eggs in a nest.

Do mammals lay eggs?
Mammals called monotremes lay eggs.

Key Vocabulary

lifecycle		the different stages of life
reproduction		an organism creates new versions of itself.
offspring	 chicken - chick	the child of a human, animal, or plant.
amphibian		cold-blooded animals
mammal		an animal that breathes air, has a backbone, and grows hair at some point during its life.



Working Scientifically

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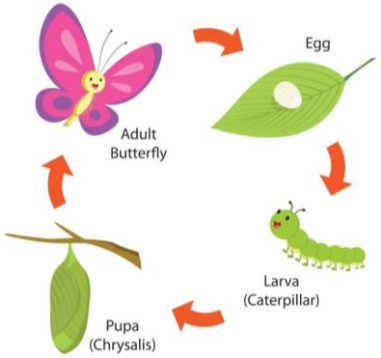

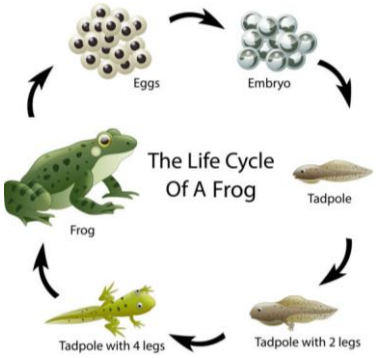

Y5 Science – Materials
Key Concept – Similarity & Difference and Change

Essential Knowledge

What is a solid, liquid and a gas?
There are three main states of matter: solids, liquids and gases. In each, the particles behave differently. In solids, the particles are tightly packed; less so in liquids and are free roaming in gases.

How do I separate George's marvellous medicine?
Filtering allows solids and liquids to be separated. Sieving allows solids made up of different-sized parts to be separated.

What is soluble?
Substances can be dissolved in water.

What is a reversible change?
A reversible change is one that can be reversed, like evaporating a liquid.

How do I get salt from brine?
Brine is salt water and can be separated through evaporation.

What is an irreversible change?
An irreversible change is one that cannot be reversed, like burning.

What are the properties of a material?
Materials can be sorted in a variety of ways based on their properties.
Materials' different properties can be tested.

Key Vocabulary

particle	a tiny piece of matter, which everything is made up of
substance	the material, or matter, of which something is made
reversible	a change that can be undone or reversed
irreversible	a change that cannot be undone or reversed
soluble	when it is put in water it breaks down and seems to 'disappear'

Aspirational Knowledge

In some solid materials the bonds between particles break when surrounded by a liquid; this allows the liquid to absorb the solid. When this happens, the solid is called a **solute**, the liquid is called a **solvent,** and the result is a **solution**.
When a solid does dissolve in a liquid, it is **soluble**. When it does not, it is insoluble.

Working Scientifically

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

PARTICLE ARRANGEMENT

Solid – particles packed closely together

Liquid – particles have some space to move

Gas – particles are free to move

REVERSIBLE AND IRREVERSIBLE CHANGES

REVERSIBLE	IRREVERSIBLE
Dissolving sugar in water	Toasting bread
Freezing water	Cooking a cake
Melting chocolate	A candle melting

Y5 Science – Materials
Key Concept – Similarity & Difference and Change

Key Knowledge

What is a solid, liquid and a gas?
There are three main states of matter: solids, liquids and gases.

How do I separate George's marvellous medicine?
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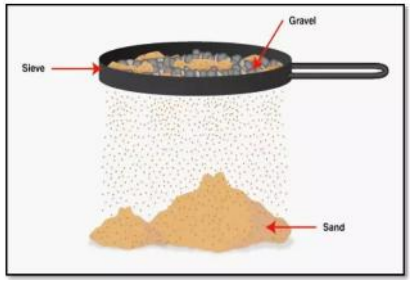
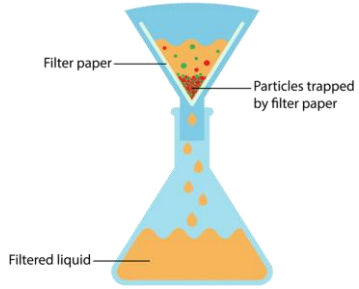
Key Vocabulary

particle	a tiny piece of matter, which everything is made up of
reversible	a change that can be undone or reversed
irreversible	a change that cannot be undone or reversed

Sieving



Filtering



Evaporation

PARTICLE ARRANGEMENT

Solid – particles packed closely together

Liquid – particles have some space to move

Gas – particles are free to move

Working Scientifically

Plan different types of test to answer questions.