Science - Autumn Term 1

Earth and Space

What shape are the Earth, Sun and Moon?	Answer
How long does it take the Earth to travel once around the Sun?	Answer
How long does it take the Moon to travel once around the Earth?	Answer
Why does the Moon seem to change shape? (Tick the correct response.)	• Because it gets bigger and smaller ❑ • Because we only see the part of the Moon that is lit by the Sun ❑ • Because sometimes it is cloud ❑
What causes the Earth to have seasons?	Answer
Which phase of the Moon is this? 	• full moon • new moon • crescent moon

EARTH and SPACE KNOWLEDGE ORGANISER

V5

Overview

-The Earth (our planet) is a part of the Solar System. At the centre of the Solar System is the Sun. The Sun is a star.

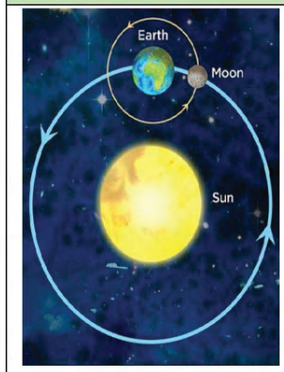
-There are 8 planets and 5 dwarf planets in the Solar System, which orbit (go around) the Sun.

-It takes Earth just over 365 days to go around the Sun (one year).

-The Earth rotates on its axis once every 24 hours (one day). This causes day and night, as different parts of the planet face the Sun.

-The Moon orbits around the Earth. The Sun, Earth and Moon are all roughly spherical.

The Sun and the Moon



-The Sun is a star: a huge ball of hot gas that gives off light & heat. The Earth (and all of the planets in the Solar System) orbit the Sun.

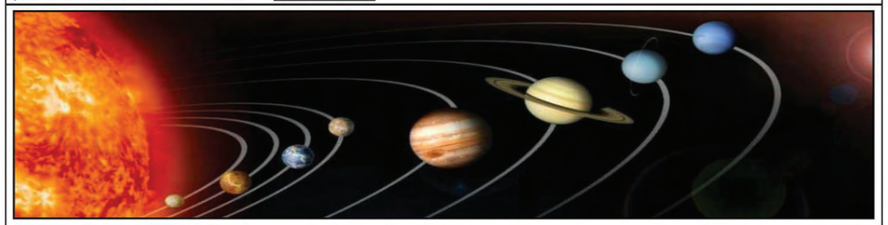
-It takes the Earth just over 365 days to make one complete orbit around the Sun – this is one year. The Earth and other planets are held in place around the Sun by gravity – the same force that keeps you on the Earth!

-The Earth is always spinning around. When a point on Earth is facing the Sun, it is daytime. When facing away, it is nighttime. It takes 24 hours for the Earth to complete a spin (one day).

-Some objects orbit around the planets. These are called moons. The Earth has one moon (just called The Moon). The Moon is much smaller than the Earth, and takes one full day to complete an orbit around the Earth.

The Solar System

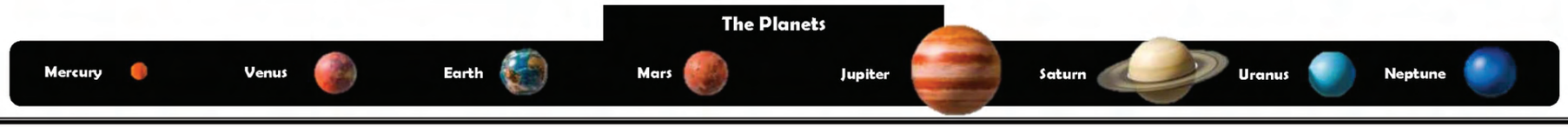
-The Solar System includes the Sun and all of the objects that orbit around it due to gravity.
-The Earth is one of eight planets that orbit the Sun. It is the third closest to the Sun.
-The planets are (from closest to furthest away from the Sun) Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune. Jupiter is the largest planet and Mercury is the smallest.
-There are also five dwarf planets: Haumea, Makemake, Ceres, Eris and Pluto.
- Earth is the only known planet in the Solar System where there are living things. The planets closer to the Sun are thought to be too hot, whilst some of those further away are too cold.
-You could fit about 1,321 Earths inside Jupiter. You could fit 1.3 million Earths into the Sun!
-Many of the planets (including Earth) have moons which orbit them. Jupiter has around 80 moons!
- The Sun is gigantic, but it is just one of billions of stars in our galaxy: The Milky Way. The Milky Way is just one of billions of galaxies in the Universe!



Planet Facts

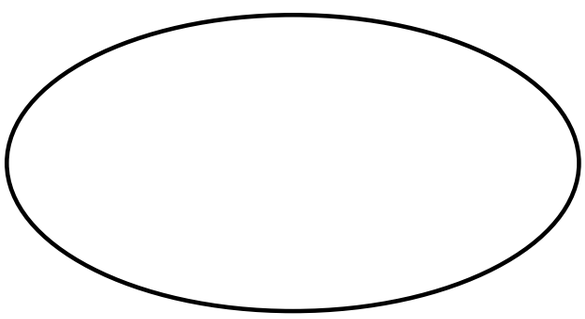
Mercury	Venus	Earth	Mars	Jupiter	Saturn	Uranus	Neptune
Area: 0.147 Earths 8th Largest	Area: 0.902 Earths 6th Largest	Area: 1 Earth! 5th Largest	Area: 0.284 Earths 7th Largest	Area: 121.9 Earths 1st Largest	Area: 83.7 Earths 2nd Largest	Area: 15.91 Earths 3rd Largest	Area: 14.98 Earths 4th Largest
Moons: None	Moons: None	Moons: 1 moon	Moons: 2 moons	Moons: Around 80 moons	Moons: Around 65 moons	Moons: Around 30 moons	Moons: Around 15 moons
Length of Day: 1,408 hours	Length of Day: 5,832 hours	Length of Day: 24 hours	Length of Day: 25 hours	Length of Day: 10 hours	Length of Day: 11 hours	Length of Day: 17 hours	Length of Day: 16 hours
Length of Year: 88 days	Length of Year: 225 days	Length of Year: 365 days	Length of Year: 687 days	Length of Year: 12 Years	Length of Year: 29 Years	Length of Year: 84 Years	Length of Year: 165 Years

The Planets



National curriculum	Earth and space
Year 5	describe the movement of the Earth, and other planets, relative to the Sun
Year 5	describe the movement of the Moon relative to the Earth
Year 5	describe the Sun, Earth and Moon as approximately spherical bodies
Year 5	use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky

Mind Map



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What is this picture telling me?

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Show what you know. Recall two things on the topic.	Connect - can you link this to one more thing that you know.
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Show what you know. Recall two things on the topic.	Connect - can you link this to one more thing that you know.
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Science - Autumn Term 2

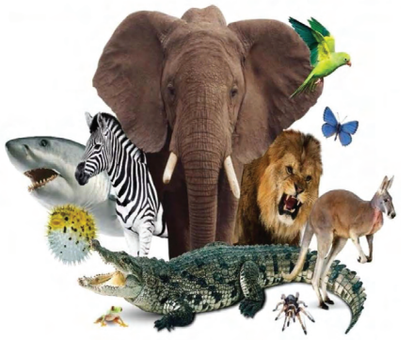
Animals Including Humans

True or False? (Write T or F next to each statement.)	A baby is born after 11 months. A human learns to read, write, talk and make friends when he/she is a child. Teenagers go through a period of change called adulthood. Adult's bodies are fully developed.
What scientific name is used to describe a baby who has not yet been born?	Answer
True or False? (Write T or F next to each statement.)	Adults can create their own families. Adulthood is the last stage of a human's life cycle. Old age starts at 65 years. A baby who has not yet been born cannot breathe, eat or drink for itself.
How long does a baby spend in its mother's womb before he/she is born?	Answer
How does a baby who has not yet been born receive its nutrition?	Answer
What word is used to describe the period of physical and emotional change that a child goes through when they start to grow into an adult?	Answer

ANIMALS including Humans KNOWLEDGE ORGANISER

Y5

What you should already know...



-Food chains are used to show how living things get their food.

-Food chains are made up of producers (who produce their own food) and consumers (animals who eat producers and other consumers).

-Humans have incisor, canine, pre-molar and molar teeth, each with different jobs. Animals have different make-ups of teeth depending on their food.

-The digestive system has several functions, including ingestion, absorption and excretion. It is made up of different parts, e.g. the stomach.

Ageing to Old Age

-Muscle mass decreases and muscles lose strength.

-Wrinkles develop on the skin, and it loses its elasticity.

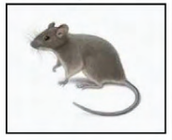
-Hair begins to turn grey/ white. Many people begin to lose the hair on their heads (mainly men).

-Fertility decreases (more quickly for women).

-People begin to shrink in height as bones and cartilage become worn down.

-Organs begin to lose their effectiveness, and the senses (e.g. sight, hearing, etc.) become weaker.

Growth and Development of Animals

Humans	House Mice	African Elephants	Saltwater Crocodiles	Blue Whales
Gestation Period: 9 months	Gestation Period: 20 days	Gestation Period: 22 months	Gestation Period: 2-3 months	Gestation Period: 10-12 months
Sexual Maturity: 11-17 years	Sexual Maturity: 4-6 weeks	Sexual Maturity: 10-12 years	Sexual Maturity: 10-12 years	Sexual Maturity: 10 years
Life Expectancy: 80 years	Life Expectancy: 1 year	Life Expectancy: 60 years	Life Expectancy: 70 years	Life Expectancy: 90 years
				

life cycle

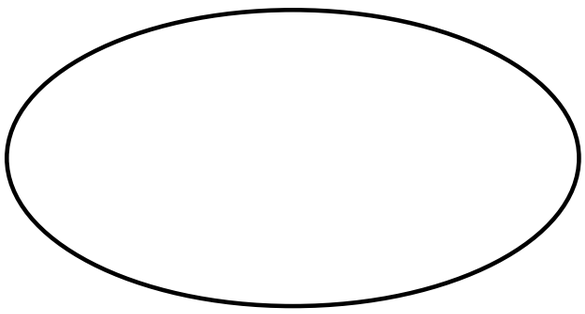
Key Vocabulary

human development
baby
toddler
child
teenager
adult
gestation
length
mass
grows
grow
growing
organs
muscle
food chains
develop

Human Ageing Timeline

National curriculum	Living things
Year 4	recognise that living things can be grouped in a variety of ways
Year 4	explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment
Year 4	recognise that environments can change and that this can sometimes pose dangers to living things
Year 5	describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird
Year 5	describe the life process of reproduction in some plants and animals

Mind Map



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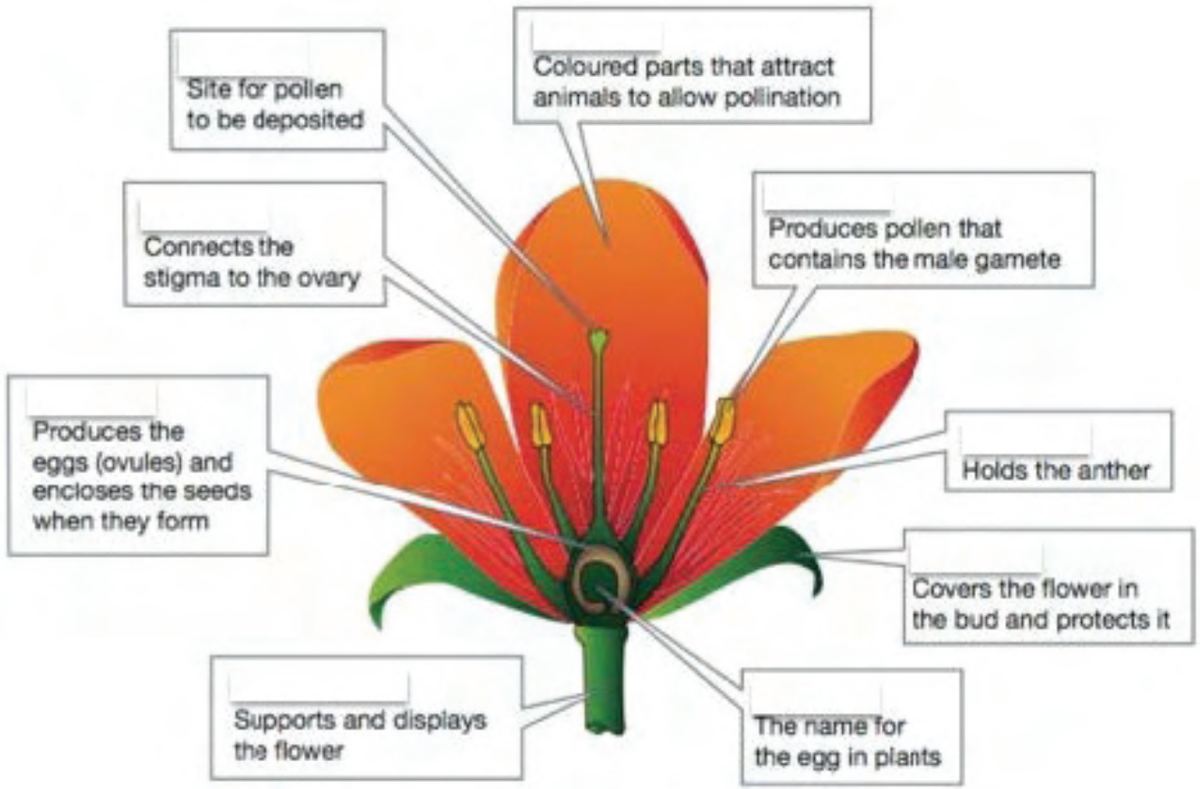
Science - Spring Term 1

Lifecycles

What is a life cycle?	Answer
Name the seven characteristics of all living things. Clue: M R S N E R G	Answer
Which types of animals lay eggs?	Amphibians Birds Fish Mammals Reptiles
What does metamorphosis mean?	Answer
Name the four stages of the butterfly life-cycle?	Answer
Can you label the parts of a flower? The image is on the next page.	Answer



YEAR 5 LIVING THINGS AND THEIR HABITATS KNOWLEDGE ORGANISER

KEY VOCABULARY AND SPELLINGS

Life cycle – the stages a living thing goes through in its life

Reproduction – the process by which a living organism creates a likeness to itself

Asexual reproduction – offspring gets genes from one parent so they are clones of their parents

Sexual reproduction – offspring get genes from both parents so they inherit a mix of features from both

Genes – carry information that determine your traits (features and characteristics)

Offspring – a person's child or children

Inherit – receive from one's parents

Amphibian – a cold-blooded vertebrate animal e.g. frogs, toads, newts

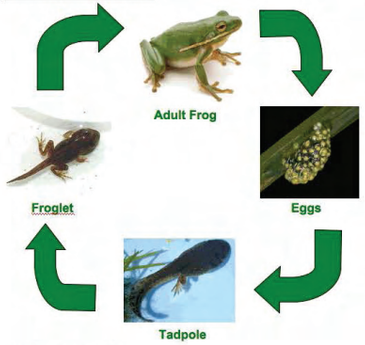
Bird – a warm-blooded egg-laying vertebrate animal with wings, feathers and a beak

Insect – a small animal that has 6 legs

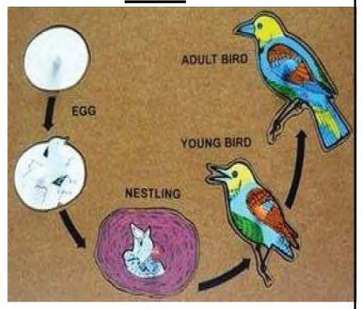
Mammal – a warm-blooded vertebrate animal, has hair or fur and give birth to live young. Females secrete milk for their young

EXAMPLE LIFE CYCLES:

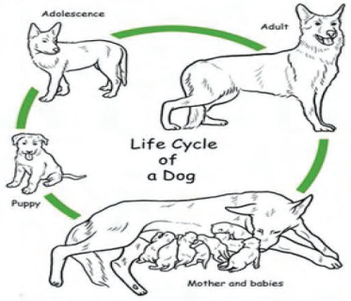
AMPHIBIAN



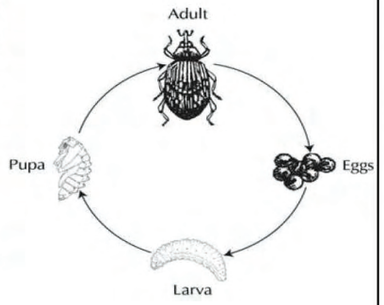
BIRD



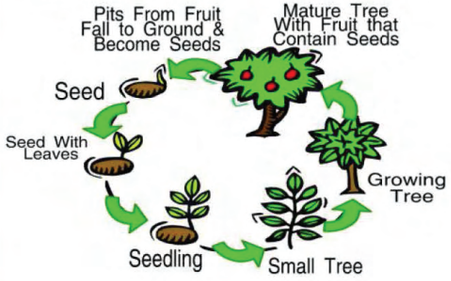
MAMMAL



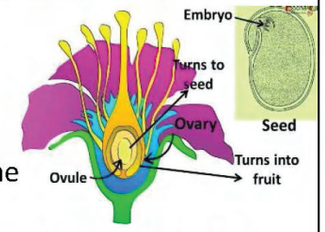
INSECT



PLANT



REPRODUCTION IN PLANTS



Pollen is carried by insects or blown by the wind from one flower to another. The pollen travels to the ovary where fertilisation occurs and seeds are made. Seeds are dispersed by animals or the wind and some seeds will grow into new plants.

REPRODUCTION IN ANIMALS

For most animals which live on the land, offspring are fertilised inside the mother's body. This happens in 1 of 3 ways:

1) The young develop inside the female and are born alive (most mammals).
2) Fertilised eggs are laid outside the female's body and develop in the egg getting nourishment from the yolk.
3) In some animals the eggs are held within the female and hatch as they are laid e.g. a fruit fly.

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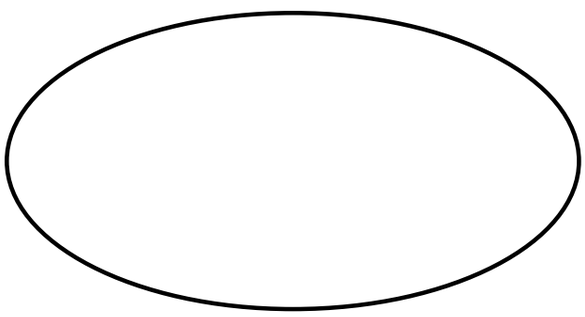
Mind Map



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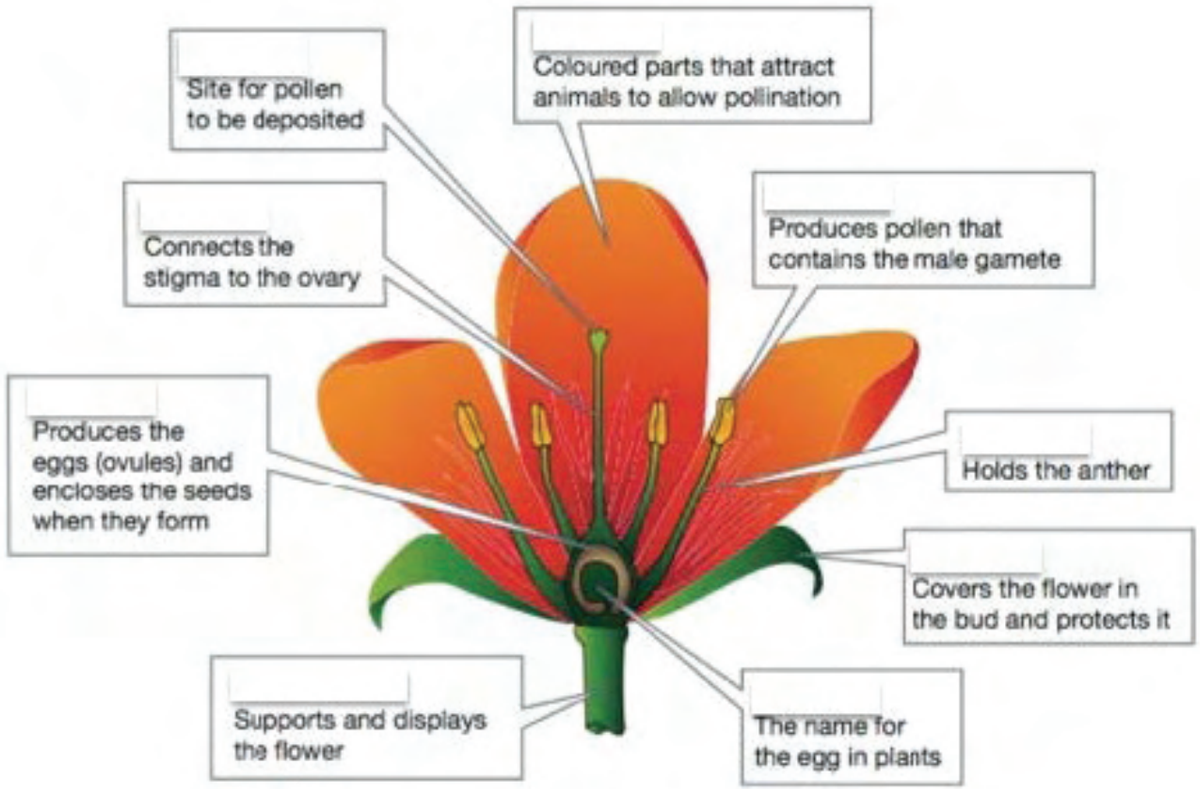

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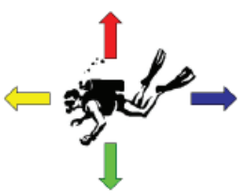
Science - Spring Term 2

Forces

What is a force?	Answer
Name a force which slows objects falling through the air.	Answer
This piece of equipment is used to measure a force. What is it called?	
What name is given to the force that causes a rolling ball to slow down and stop?	Answer
Name the force that enables an object to float.	Answer
Label the arrows with the names of the forces that are working on the diver.	Answer 

Key Vocabulary

forces	Pushes or pulls.
gravity	A pulling **force** exerted by the Earth (or anything else which has **mass**).
Earth's gravitational pull	The pull that Earth exerts on an object, pulling it towards Earth's centre. It is the Earth's **gravitational pull** which keeps us on the ground.
weight	The measure of the **force** of **gravity** on an object.
mass	A measure of how much matter (or 'stuff') is inside an object.

The Moon has a smaller **mass** than Earth so the **gravitational pull** on the Moon is smaller than it is on Earth.

Jupiter has a greater **mass** than Earth so the **gravitational pull** on Jupiter is stronger than on Earth.

Key Knowledge

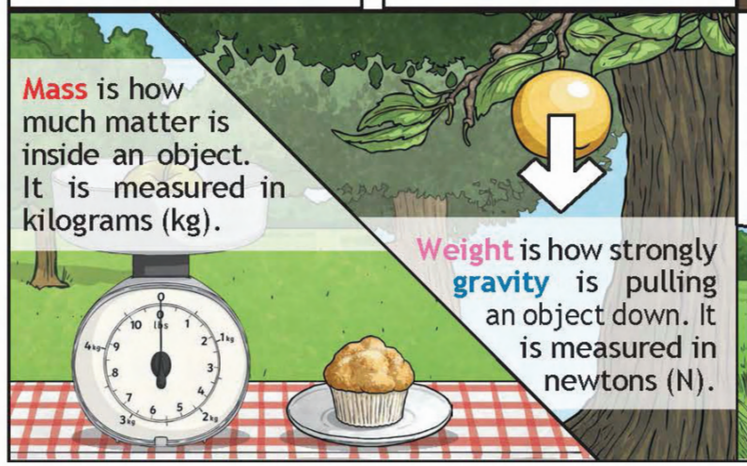
Forces

Forces can make an object...

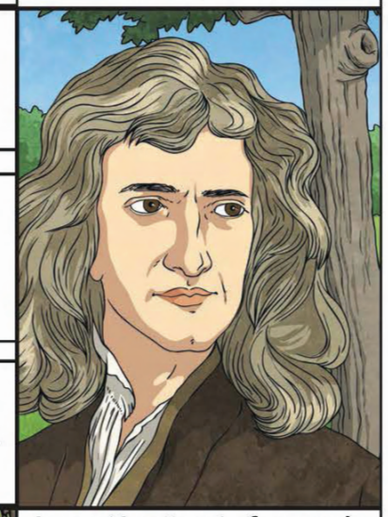
- start to move.
- stop moving.
- change direction.
- move faster.
- change its shape.
- move more slowly.

Mass is how much matter is inside an object. It is measured in kilograms (kg).

Weight is how strongly **gravity** is pulling an object down. It is measured in newtons (N).



Isaac Newton



Isaac Newton is famously thought to have developed his theory of **gravity** when he saw an apple fall to the ground from an apple tree.

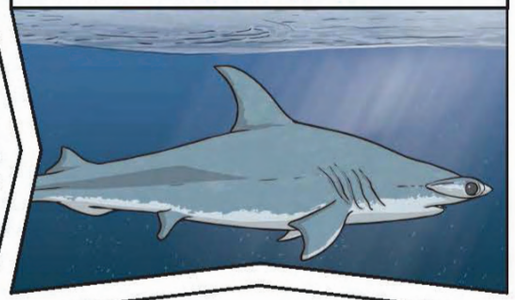
To look at all the planning resources linked to the Forces unit, click here.

Key Vocabulary

friction	A force that acts between two surfaces or objects that are moving, or trying to move, across each other.
air resistance	A type of friction caused by air pushing against any moving object.
water resistance	A type of friction caused by water pushing against any moving object.
buoyancy	An upward force that a liquid applies to objects.
streamlined	When an object is shaped to minimise the effects of air or water resistance.
mechanism	Parts which work together in a machine. Examples of mechanisms are pulleys, gears and levers.

This shark is **streamlined**.

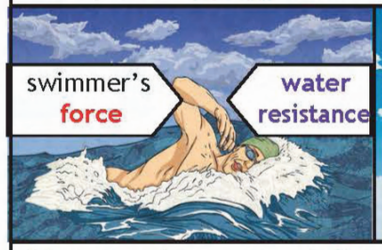
It has a pointed nose to cut through the water, and a smooth, low, curved back to allow the water to flow over and around it.

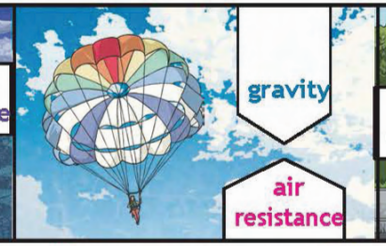


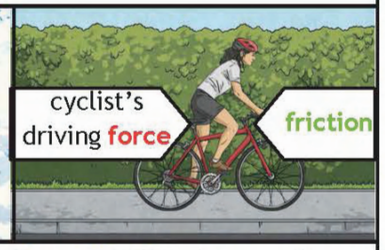
It does not create much water resistance so it can move through the water quickly.

Key Knowledge

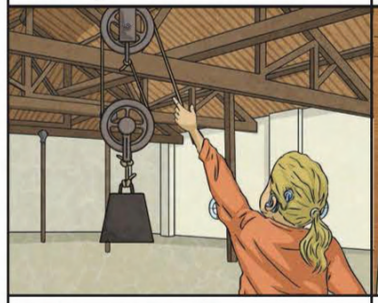
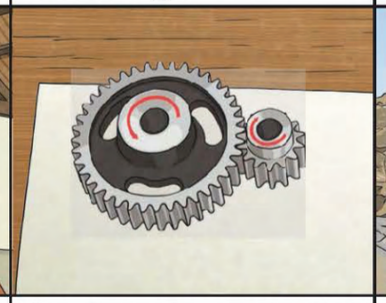
Examples of forces in action:





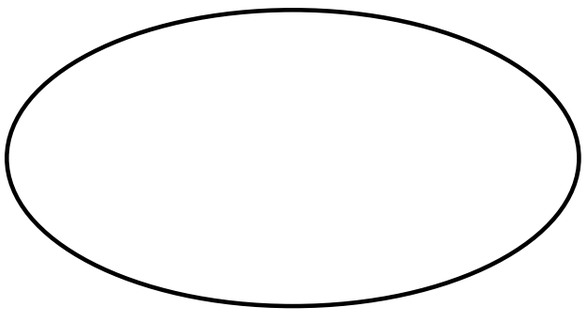


Water resistance and air resistance are forms of friction. Friction is sometimes helpful and sometimes unhelpful. For example, air resistance is helpful as it stops the skydiver hitting the ground at high speed. Friction on a bike chain can make the bike harder to pedal so it is unhelpful.

Pulleys	Gears/Cogs	Levers
		
Pulleys can be used to make a small force lift a heavier load. The more wheels in a pulley, the less force is needed to lift a weight.	Gears or cogs can be used to change the speed, force or direction of a motion. When two gears are connected, they always turn in the opposite direction to each other.	Levers can be used to make a small force lift a heavier load. A lever always rests on a pivot.

National curriculum	Forces
Year 5	explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object
Year 5	identify the effects of air resistance, water resistance and friction, that act between moving surfaces
Year 5	recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect

Mind Map



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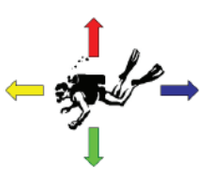
Label the arrows with the names of the forces that are working on the diver.	Answer 

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Science - Summer Term

Changes in Materials

Describe the properties of plastic.	Answer
Irreversible change – what does this mean in science?	Answer
Give an everyday example of evaporation taking place.	Answer
What would you use to separate a mixture of flour and raisins?	Answer
Why are electric cables covered in plastic or rubber-like material?	Answer
What do the following mean:	Transparent? Translucent? Opaque?

Y5 Knowledge Organiser Science: Properties and Changes of Materials

Key knowledge

Different materials are used for particular jobs based on their properties:
Electrical conductivity Flexibility Hardness
Insulator **Magnetism** **Solubility**
Thermal conductivity Transparency

For example… glass is used for windows because it is hard and **transparent.**

Oven gloves are made from a **thermal insulator** to keep the heat from burning your hands

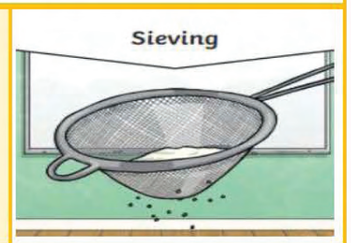
Reversible and Irreversible Changes

Reversible	Irreversible
Dissolving water in sugar Freezing water Melting chocolate	Toasting bread Cooking a cake A candle melting

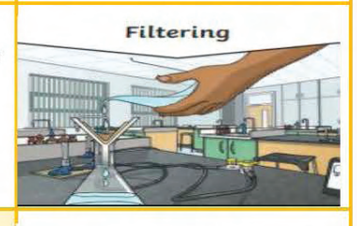
Toasting bread is irreversible: once it is toasted it can't go back to being untoasted

Separating materials

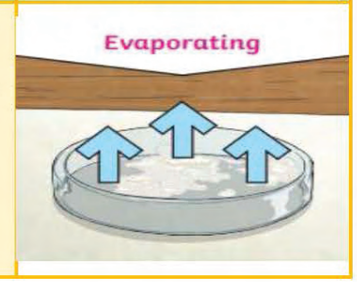
Sieving: Smaller materials are able to fall through the holes in the sieve, separating them from the larger particles.



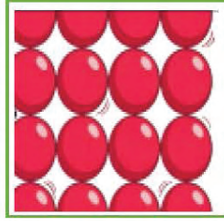
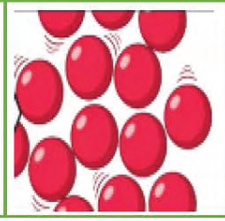
Filtering: the solid particles will get caught in the filer paper but the liquid will be able to get through.



Evaporating the liquid changes into a gas, leaving the solid particles behind.



Particle Arrangement

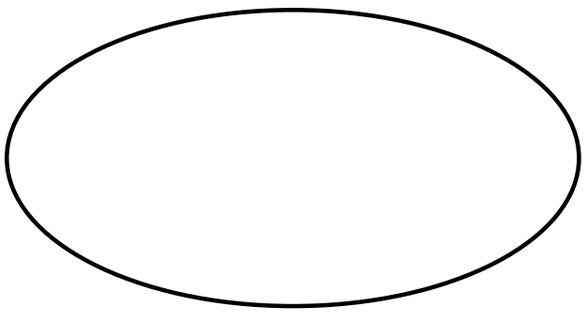
Solid – particles are packed closely together	Liquid – particles have some space to move	Gas – particles are free to move
		

Key Vocab

Soluble	Able to be dissolved, especially in water
Insoluble	Cannot be dissolved, especially in water
Dissolve	When something solid mixes with a liquid and becomes part of the liquid
Solution	A solution is made when one substance dissolves into another
Reversible change	Can be reversed back to its original state
Irreversible change	Cannot be reversed back to its original state
Transparent	Allows light to pass through
Thermal conductor	A material or device which allows heat to carry through
Electrical conductor	A material or device with allows electricity to carry through
Electrical Insulator	Does not allow electricity to pass through it.
Magnetic	Capable of being magnetised or attracted by a magnet
Evaporation	The process of liquid heating and changing into a gas
Filter	Separates an insoluble solid that is mixed in a liquid.
Sieve	Separates solids of different sizes

National curriculum	Changes in materials
Year 3	compare how things move on different surfaces
Year 3	notice that some forces need contact between two objects, but magnetic forces can act at a distance
Year 5	compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, con-ductivity (electrical and thermal), and response to magnets
Year 5	know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution
Year 5	use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating
Year 5	give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic
Year 5	demonstrate that dissolving, mixing and changes of state are reversible changes
Year 5	explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda

Mind Map



Before starting the topic, add what you already know.

What is this picture telling me?

Describe the properties of plastic.	Answer
Irreversible change – what does this mean in science?	Answer
Give an everyday example of evaporation taking place.	Answer
What would you use to separate a mixture of flour and raisins?	Answer
Why are electric cables covered in plastic or rubber-like material?	Answer
What do the following mean:	Transparent? Translucent? Opaque?

Show what you know. Recall two things on the topic.	Connect - can you link this to one more thing that you know.
1.	
2.	

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1.	
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Science
End of Year

Assessment

Q1.

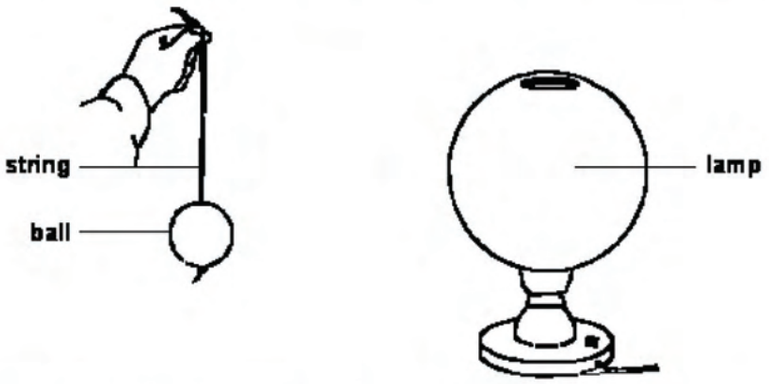
Earth and space

(a) **How long** does it take for the Earth to orbit the Sun?

.....

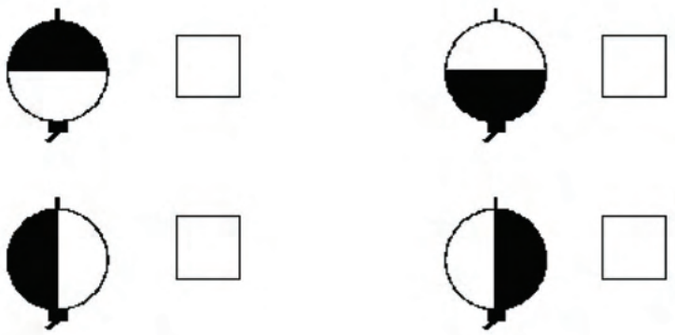
1 mark

(b) Jan makes a model of the Earth and the Sun to show day-time and night-time.
She uses a lamp for the Sun and a ball for the Earth.



Which of the following correctly shows day and night in this model?

Tick **ONE** box.



1 mark

(c) How must Jan move the ball to show how one place on Earth has **day-time** and **night-time**?

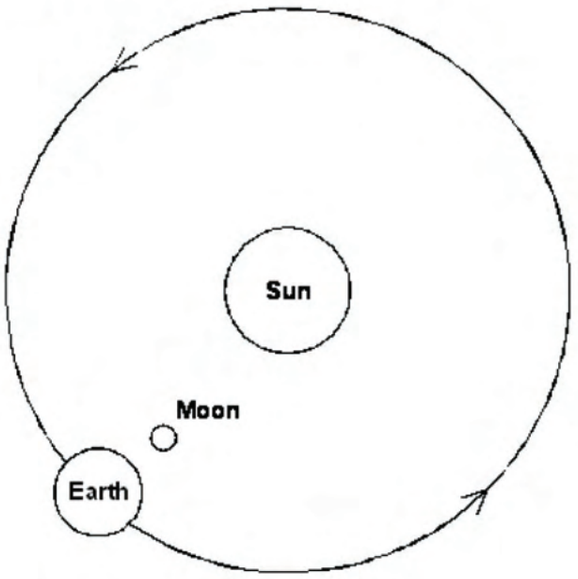
Tick **ONE** box.

walk with the ball around the lamp	☐	spin the ball on the string	☐
swing the ball backwards and forwards	☐	hold the ball lower then higher	☐

1 mark

(d) Jan draws this diagram to show how the Earth orbits the Sun.

Draw the orbit of the Moon on Jan's diagram.



1 mark

Q2.

Human life cycle

(a) Some children are comparing a baby and a doll.

baby

doll

The baby can breathe, but the doll cannot.

This shows that the baby is living.

What are **TWO** other things a baby does that show it is living?

Tick **TWO** boxes.

grow	☐	sit in a pushchair	☐
lie in bed	☐	be cuddled	☐
have a bath	☐	suck milk	☐
wear clothes	☐	get dirty	☐

2 marks

(b) A baby is a part of the human life cycle. The flow chart below shows different stages of the human life cycle.

baby → child → adolescent → adult

Which **ONE** life process can an **adult** do that a **young child** cannot?

.....

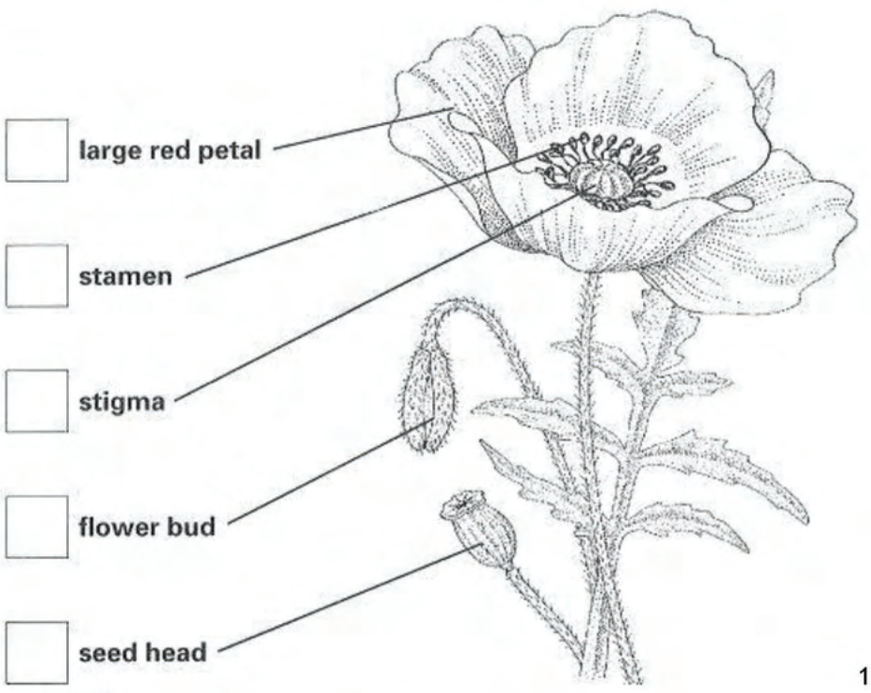
1 mark

Q3.

Looking at Plants

(a) Which part of the plant produces pollen?

Tick **ONE** box.



1 mark

(b) Which information about this plant suggests that it is pollinated by insects.

.....

1 mark

(c) After the insects pollinate this plant, it develops **seeds.**

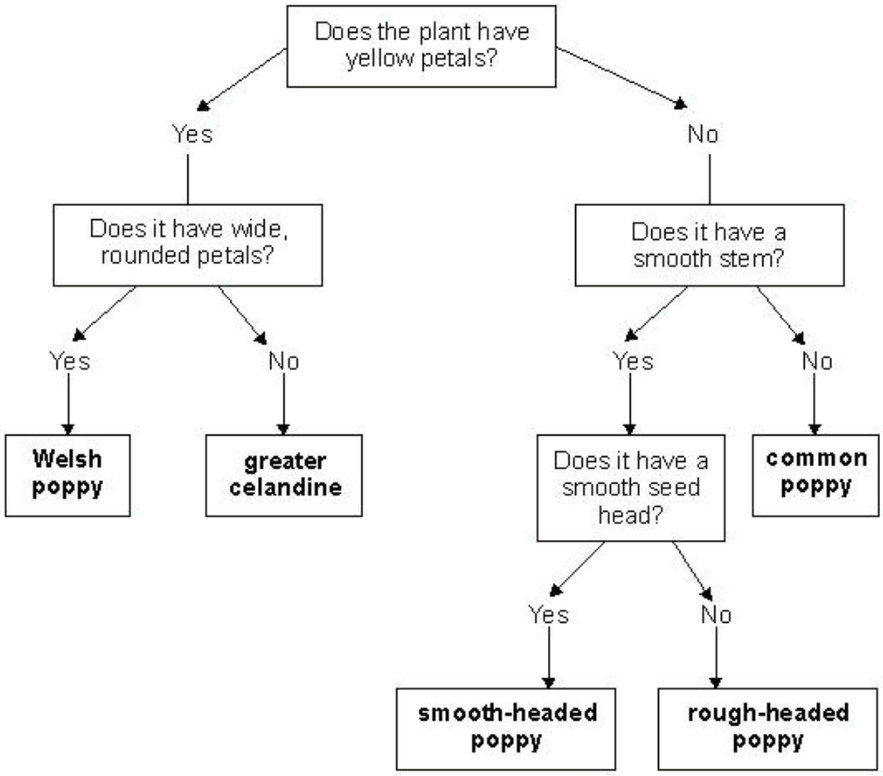
The seeds are scattered by the wind.

Write **ONE** different way that seeds from other plants are dispersed.

.....

1 mark

(d) Look carefully at this key for some flowering plants.



Use the key to answer the two questions below.

(i) What is the name of the plant in the picture?

..... 1 mark

(ii) What colour petals does a greater celandine have?

..... 1 mark

Q4.

Friction

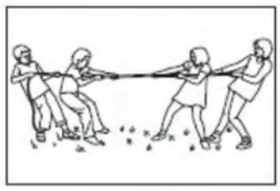
(a) Friction is the force which causes moving objects to slow down and stop.

Tick **THREE** boxes to show which activities are only possible because there is a **small** amount of friction.


☐


☐


☐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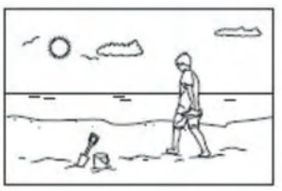
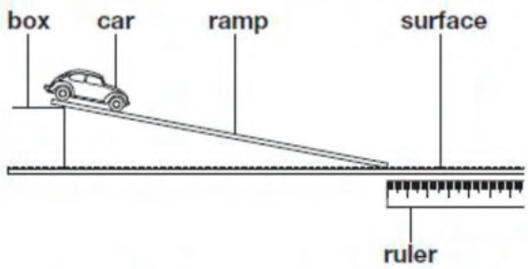

☐


☐

2 marks

(b) Sue rolls a car down a ramp. She investigates how far the car travels along different surfaces before friction causes the car to stop.



Name **ONE** variable Sue must keep the same to make her test fair.

.....

1 mark

(c) Sue draws a table of the results.

Surface	Distance travelled by car (cm)		
	first try	second try	third try
tiles	105	72	107
carpet	50	46	45
paving stones	68	66	67
wooden floor	124	129	131

Sue looks at the table.
She thinks she should test one of the surfaces again.

(i) Which of these surfaces should Sue test again?

.....

1 mark

(ii) Describe how the evidence in the table shows that Sue should test this surface again.

.....

.....

1 mark

(d) Look at the table of results.

Tick **ONE** box to show which surface caused the most friction.

tiles	☐	carpet	☐
paving stones	☐	wooden floor	☐

1 mark

Q5.

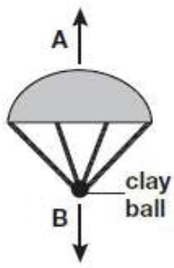
Parachutes

(a) Jamie has a parachute. The two arrows on the diagram below show two forces (**A** and **B**) acting on the falling parachute.

Label forces **A** and **B** on the diagram below.

(i) Force **A** is .....

(ii) Force **B** is .....



2 marks

(b) Tick **ONE** box to show the effect force **A** has on the parachute.

It makes the parachute fall faster.	☐	It makes the parachute heavier.	☐
It makes the parachute fall slower.	☐	It makes the parachute lighter.	☐

1 mark

(c) Jamie wants to find out if changing the material of the parachute affects the time it takes to fall to the ground.
The table shows some of the variables in Jamie's investigation.

Complete the table to show how Jamie should do his investigation. Tick **ONE** box in each row.

Variable	Variable to be changed	Variable to be measured	Variable to be kept the same
height of drop			
mass of modelling clay			
size of parachute			
material of parachute			
time taken to fall to the ground			

2 marks

(d) Jamie decides to test each of his parachutes three times.
He records his results in the table below.

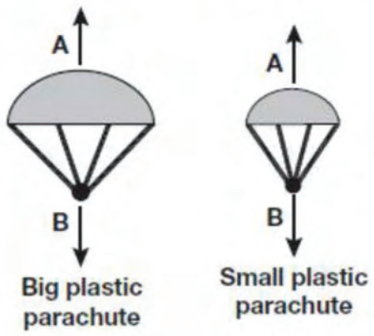
One of the times in his results table looks wrong.

Circle **ONE** time in the results table that Jamie should check.

Parachute material	Time taken to reach the ground (seconds)		
	test 1	test 2	test 3
plastic	2.4	2.4	2.5
bubble wrap	2.1	2.0	2.0
netting	2.9	1.0	1.0

1 mark

(e) Jamie makes a **smaller** parachute made of **plastic**.



Predict the time it will take the **smaller plastic** parachute to fall to the ground.

..... seconds

1 mark

Q6.

Sam's mixtures

(a) Sam wants to separate some steel paperclips from a mixture of sand and paperclips.

Tick **TWO** boxes to show the equipment that Sam could use to separate the paperclips from the sand.


sieve ☐


filter ☐


magnet ☐


candle ☐

1 mark

(b) Sam has some different mixtures.
He wants to separate **one** material from each of the mixtures.

Tick **ONE** box in each row of the table to show which process Sam must use to separate the material from the mixture.

One has been done for you.

Sam wants to separate...	Process Sam should use			Cannot separate that material
	filtering	evaporating	sieving	
salt from a mixture of salt and water.				
stones from a mixture of stones and sand.				
sand from a mixture of sand, sugar and water.	✓			
salt from a mixture of salt, sugar and water.				

3 marks

Q7.

Changes

Kim and Juan change the way some things look. The pictures below show the changes.

Which changes are reversible?

Tick **ONE** box for each change.

	Is this change reversible?	
	Yes	**No**
Bread  **Toast** 		
Ice  **Water** 		
Paper  **Ash** 		
Plasticine  **Plasticine snail** 		

2 marks