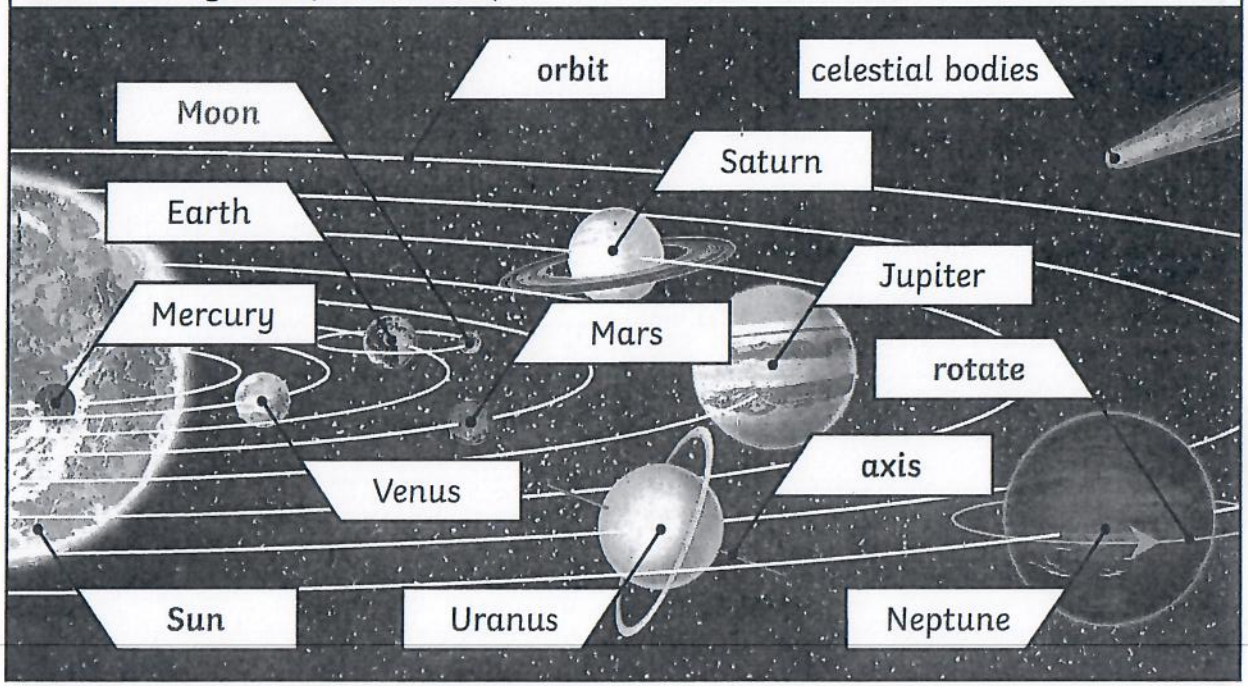
Key Vocabulary

Sun	A huge star that Earth and the other planets in our solar system orbit around.
star	A giant ball of gas held together by its own gravity.
moon	A natural satellite which orbits Earth or other planets.
planet	A large object, round or nearly round, that orbits a star.
sphere	A round 3D shape in the shape of a ball.
spherical bodies	Astronomical objects shapes like spheres.
satellite	Any object or body in space that orbits something else, for example: the Moon is a satellite of Earth.

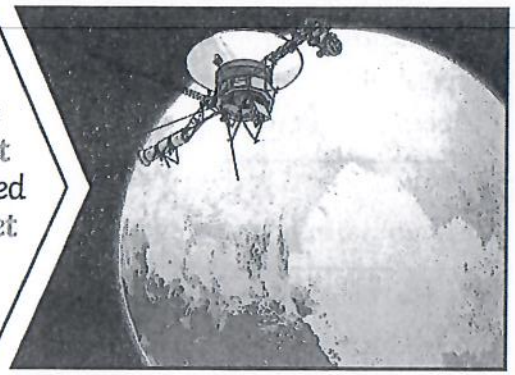
Key Knowledge

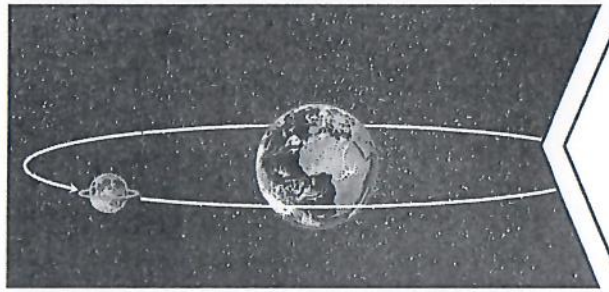
Mercury, Venus, Earth and Mars are rocky planets. They are mostly made up of metal and rock. Jupiter, Saturn, Uranus and Neptune are mostly made up of gases (helium and hydrogen) although they do have cores made up of rock and metal.

Our Solar System (not to scale)



Pluto used to be considered a planet but was reclassified as a dwarf planet in 2006.





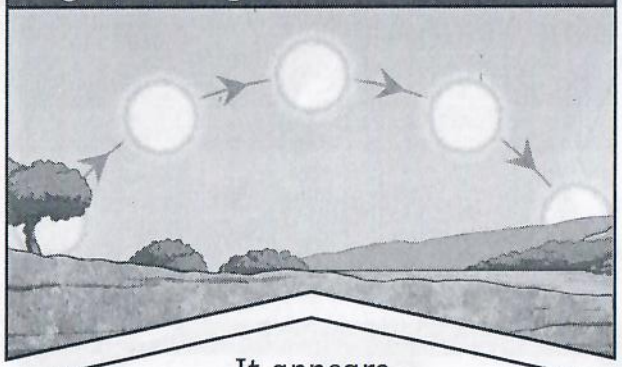
The Moon orbits Earth in an oval-shaped path while spinning on its axis. At various times in a month, the Moon appears to be different shapes. This is because as the Moon rotates round Earth, the Sun lights up different parts of it.

This is a Space 'knowledge organiser'. Read it then create one of your own or a topic of your choice.

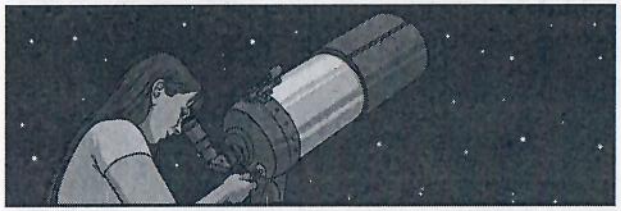
Key Vocabulary

orbit	To move in a regular, repeating curved path around another object.
rotate	To spin. E.g. Earth rotates on its own **axis**.
axis	An imaginary line that a body rotates around. E.g. Earth's **axis** (imaginary line) runs from the North Pole to the South Pole.
geocentric model	A belief people used to have that other planets and the Sun orbited around Earth.
heliocentric model	The structure of the Solar System where the planets orbit around the Sun.
astronomer	Someone who studies or is an expert in astronomy (space science).

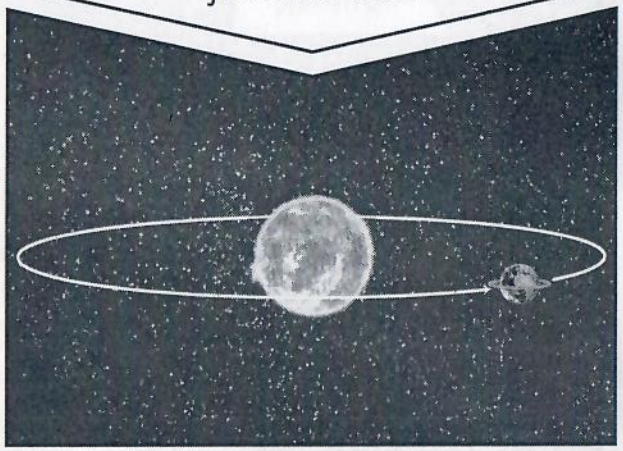
Key Knowledge



It appears to us that the Sun moves across the sky during the day but the Sun does not move at all. It seems to us that the Sun moves because of the movements of Earth.

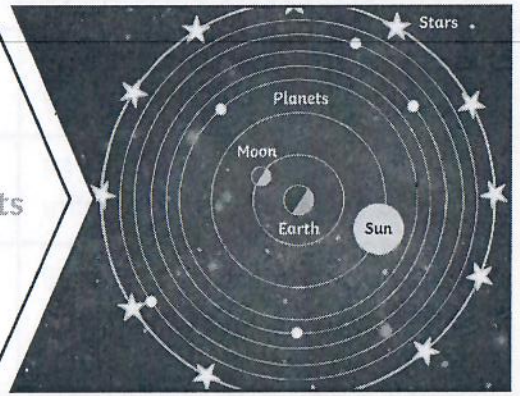


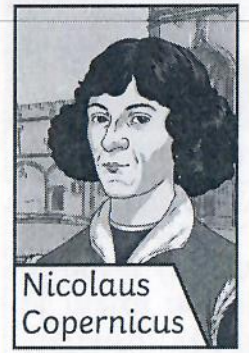
Earth rotates (spins) on its **axis**. It does a full rotation once in every 24 hours. At the same time that Earth is rotating, it is also orbiting (revolving) around the Sun. It takes a little more than 365 days to orbit the Sun. Daytime occurs when the side of Earth is facing towards the Sun. Night occurs when the side of Earth is facing away from the Sun.



Geocentric model

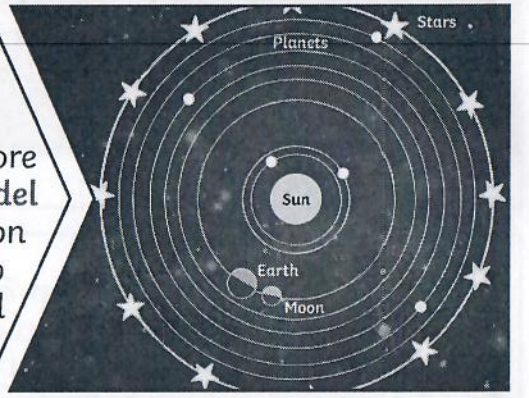
Years ago people believed that planets moved around the Earth.





Nicolaus Copernicus

The work and ideas of many astronomers (such as Copernicus and Kepler) combined over many years before the idea of the heliocentric model was developed. Galileo's work on gravity allowed astronomers to understand how planets stayed in orbit.



If you are unsure of the answers, research on the internet or in books.

Name: Date:

Science Assessment Year 5: Paper A: Forces

Measuring Forces

1. In what units do we measure force?

.....

1 mark

2. What is the name of the force that pulls things towards the centre of the Earth?

.....

1 mark

3. Who discovered this force?

.....

1 mark

4. What piece of equipment do we use to measure force?

.....

1 mark

5. Write **true** or **false** next to each of these statements.

a) Mass is a force. .....

b) Weight is a force. .....

c) Length is a force. .....

d) A force is a push or a pull. .....

3 marks

6. Explain why astronauts move in a bouncy way on the moon.

.....

1 mark

Total for this page

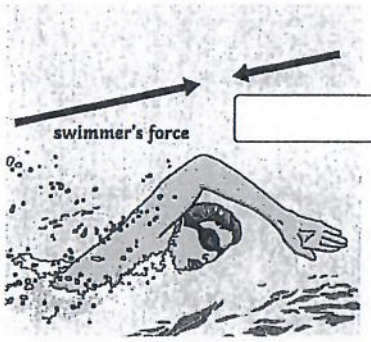
7. Explain why astronauts in space float around.

.....

1 mark

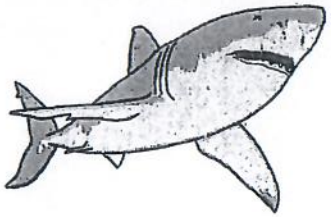
Forces in Water

8. Label the force that is pushing against this swimmer in the water.



1 mark

9. How does the shape of this shark help it to move quickly through the water?



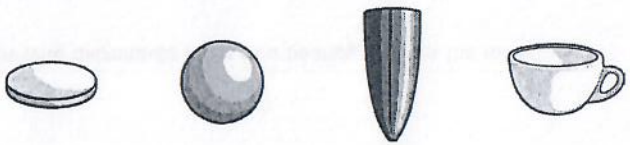
.....

.....

1 mark

Total for this page

10. All these shapes are made from the same material. Circle the shape that would fall the fastest in water and explain why.



This is because... .....

.....

2 marks

Boat Investigation

11. A group of children want to investigate if the shape of a boat affects how much weight it can hold. They all make a boat out of tin kitchen foil and they will float them on a tank of water and fill with weights until the boat sinks.

What is the **one** controlled variable they will change?

.....

1 mark

12. Name a variable that must stay the same.

.....

1 mark

13. What is the variable they will measure and record in their results table?

.....

1 mark

Total for this page

14. Here are the results:

Boat Number		1st Test Weight Held	2nd Test Weight Held	3rd Test Weight Held	
1	large rectangle	1050g	990g	1100g	
2	Streamlined and long	890g	768g	845g	
3	Small, double layered cup shape	445g	430g	25g	
4	Small rectangle with double layer of tin foil	330g	402g	376g	

a) What should be the title of column 2

.....

1 mark

b) What would go in the empty 5th column at the end?

.....

1 mark

c) Which result looks like an anomaly?

.....

1 mark

d) What could be a reason for this anomaly?

.....

1 mark

Total for this page

e) Why have the group tested each boat 3 times?

.....

.....

2 marks

f) If the large rectangle boat was checked a 4th time, what might the result be?

.....

1 mark

15. What conclusion could you draw from these results?

.....

.....

.....

2 marks

Total for this page

Name: Date:

25 total marks

Science Assessment Year 5: Paper B: Forces

Forces Acting on Objects

1. Label these diagrams to say whether the forces are balanced or imbalanced:

A car accelerating

.....

A woman skydiving

.....

A girl sitting on a chair

.....

Bicycle stopped at traffic lights

.....

2 marks

2. Label **gravity** and **one other force** on these two diagrams, showing the directions of these forces using arrows.

An aeroplane flying

Dropping a stone in water

3 marks

Total for this page

Mechanisms

3. Name these three mechanisms that make things easier to do as they lessen the force needed to be used.

.....

.....

.....

2 marks

Friction

4. Why do your hands feel hot when you rub them together?

.....

1 mark

5. Circle the correct word in each box:

Friction is a [force / weight] that happens between two surfaces rubbing together. Friction always acts in the [same / opposite] direction to the moving object, and always [slows down / speeds] up a moving object. Smooth surfaces like ice create [some / no] friction.

2 marks

6. Tick all the pictures that show something where friction is a **good** thing:

 Skiing ☐	 Stopping a bike ☐	 Climbing a rope ☐	 Ice skating ☐
 A car going round a bend ☐	 Water slide ☐	 Running ☐	 Catching a rugby ball ☐

4 marks

Total for this page

Forces in Air

7. If you drop a feather and a hammer on **Earth** at the same time:

a) Which will fall to the ground first?

.....

1 mark

b) Explain why this happens?

.....

1 mark

.....

8. If you drop a feather and a hammer on **the Moon** at the same time:

a) Which will fall to the ground first?

.....

1 mark

b) Explain why this happens?

.....

1 mark

.....

Air Resistance Investigation

9. If we want to investigate whether the size of a parachute affects the speed in which an object falls, what is the **Independent Variable**?

.....

1 mark

10. What would be the **Dependent Variable** in this investigation?

.....

1 mark

11. Name 2 **Controlled Variables** for this investigation.

.....

1 mark

Total for this page

12. Here are the results:

Size of parachute	1st drop (in seconds)	2nd drop (in seconds)	3rd drop (in seconds)
4cm x 4cm	1.32	1.22	1.50
8cm x 8cm	2.50	2.66	5.02
16cm x 16xm	3.32	1.33	3.45
32cm x 32cm	4.32	4.94	4.11

Why have the group done each drop 3 times?

.....

1 mark

13. Which results look like anomalies?

.....

1 mark

14. What could be the reason for these anomalies?

.....

1 mark

15. If we dropped the 32cm x 32cm parachute a 4th time what result would you predict?

.....

1 mark

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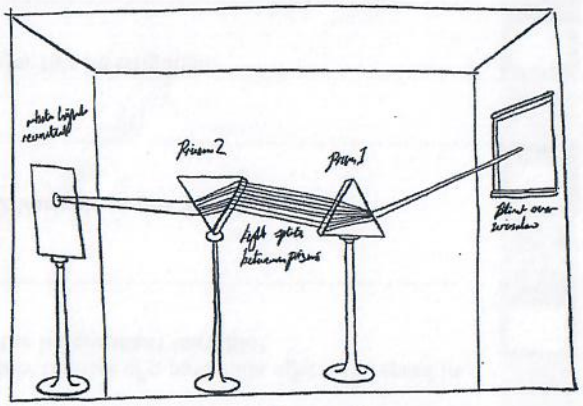
Isaac Newton's Colour Experiments Fact Sheet

Isaac Newton (1642 - 1727) was a famous scientist and mathematician. His experiments into light and colour were extremely influential in informing our understanding of these areas today.



Newton's sketch of his crucial experiment.

Newton started looking into the "celebrated phenomenon of colours" in the late 1660s. At the time, the deadly Bubonic Plague was rife in Cambridge, where Newton usually worked, so he conducted his first experiment at his home in Lincolnshire.

People then believed that colour was caused by a mixture of light and dark, and that red was the lightest colour with the least amount of dark added to it, while blue was the darkest colour, the last step before black. They also thought that prisms actively coloured light. Newton set out to prove this view wrong in what was to become known as his crucial experiment. He used a hole in his shutter to direct a beam of sunlight into his room, and refracted this beam using a prism. He was able to see the spectrum of colours form, and then used another prism to refract the separated rays of coloured light back into a ray of white light. This proved that light is made up of colours; the prism simply allows them to be seen.

Newton coined the phrase 'the colour spectrum', and he chose to split the spectrum into the seven colours we know today; red, orange, yellow, green, blue, indigo and violet. Although the spectrum is continuous, with no boundaries between each individual colour, he selected the number seven because he believed it to be a special number.

He was able to show that each colour has its own angle of refraction. He used this to prove that an object's colour is a property of the light reflecting off it, rather than something inherent within the object itself.

Newton continued to carry out further investigations into light and colour, and published his book 'Opticks' in 1704. Some scientists consider this the most influential book of that century, and it explained how raindrops refract sunlight to cause rainbows for the first time.


Isaac Newton: "If I have seen a little farther than others, it is because I stand on the shoulders of giants."

Newton felt that he learnt a lot from other scientists, such as Galileo and Copernicus.

Isaac Newton's Colour Experiments

Use the Fact Sheet above to answer these questions about Isaac Newton and his discoveries.

1. When was Isaac Newton born?

2. Where was his home?

3. Why did he conduct his experiment at home?

4. How did people in the 1660s believe colours were created?

5. What did Newton use to create a beam of light?

6. Why do you think his experiment is known as 'crucial'?

7. What did he prove about how we see an object's colour?

8. What do you think Newton mean when he says he 'stands on the shoulders or giants'?

9. Can you think of a different caption for the sketch of Newton's crucial experiment?

10. Look at this painting of Isaac Newton that hangs in the BOA Museum. What do you think he may be thinking as he carries out his crucial experiment?