Science

Forces

Air Resistance

Aim

- To investigate the effects of air resistance.

Success Criteria

- I can explain how air resistance affects moving objects.
- I can plan and conduct an investigation into the effects of air resistance.

Gravity and Falling

You have learnt that **gravity** pulls objects towards the centre of the Earth.

But do you think all objects are pulled as fast as each other?

These two balls are the **same size**, but one has a much **greater mass**.

Do you think they will hit the ground at the **same time** when dropped from a height?

Gravity and Falling

Galileo Galilei (1564-1642) was an Italian scientist and mathematician who wondered about this.

In 1590, he decided to carry out an investigation to find the answer. He climbed to the top of the Leaning Tower of Pisa with two balls of similar shape and size, but with different masses.

He dropped both of the balls from the top of the tower at the same time. Both balls hit the ground at the same time.

Gravity and Falling

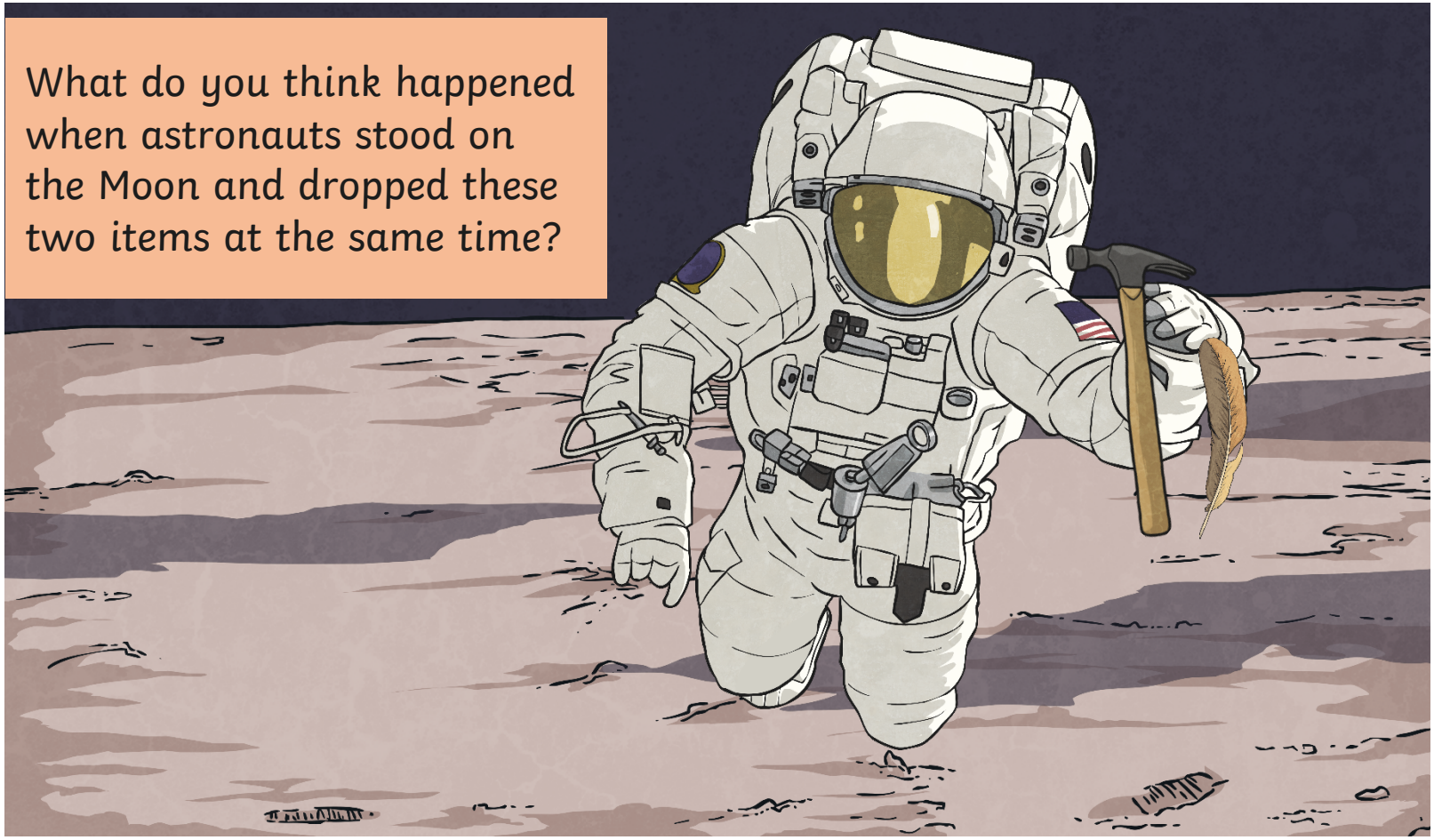
Galileo's experiment proved that **all objects fall at the same rate**, no matter what their mass is.

But this can seem hard to believe!

Think about a feather and a hammer. If you dropped both objects at the same time, would they hit the ground at the same time?

Gravity and Falling

Whole Class



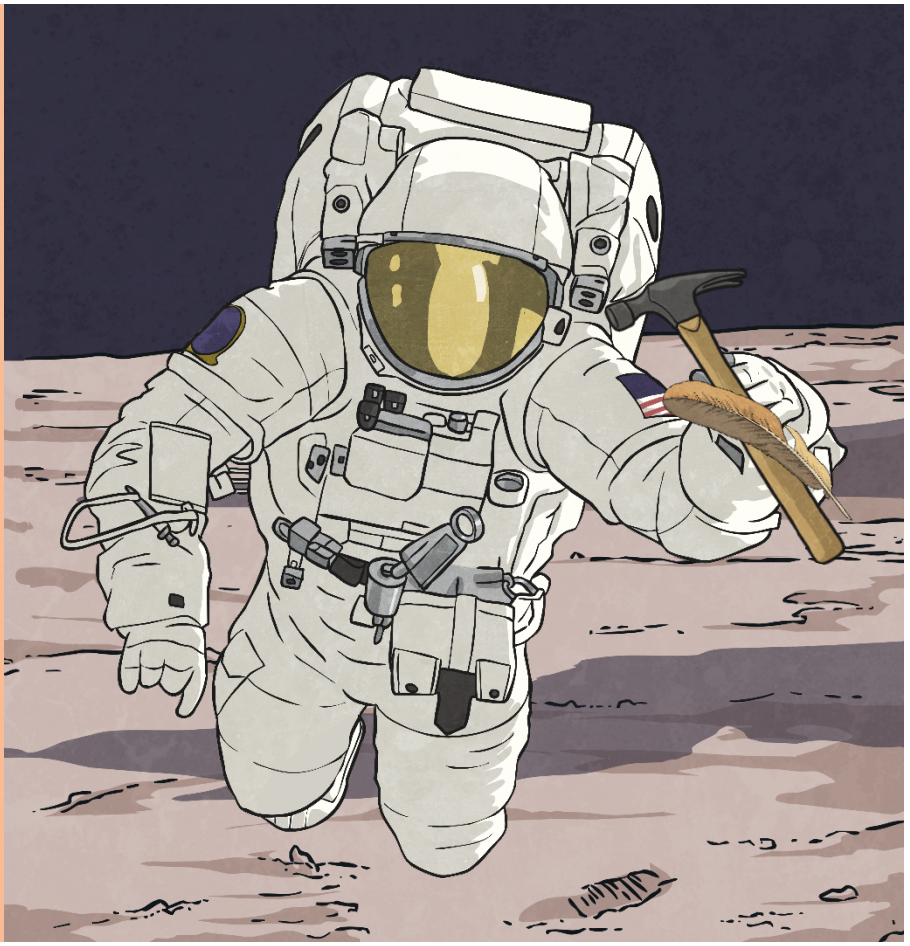
Gravity and Falling

The feather and the hammer hit the surface of the Moon at the **same time**!

This proves that Galileo's findings are correct.

Can you think why the two objects might fall at the same speed on the Moon but the feather falls so much more slowly on Earth?

What is different about the Moon and the Earth that could cause this to happen?



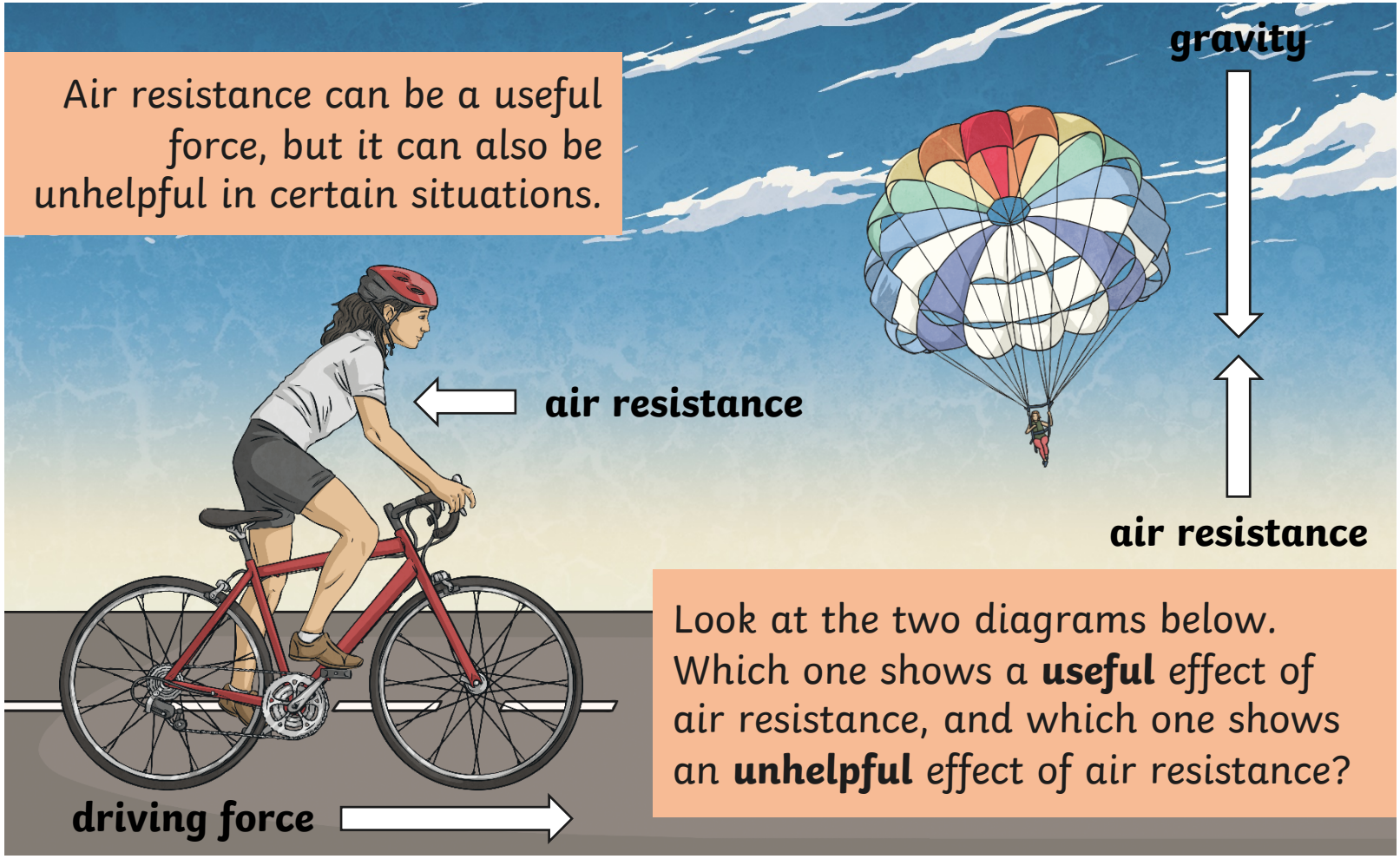
Air Resistance

There is **no air** on the Moon.
Air pushes against any object moving through it. This is known as **air resistance**.

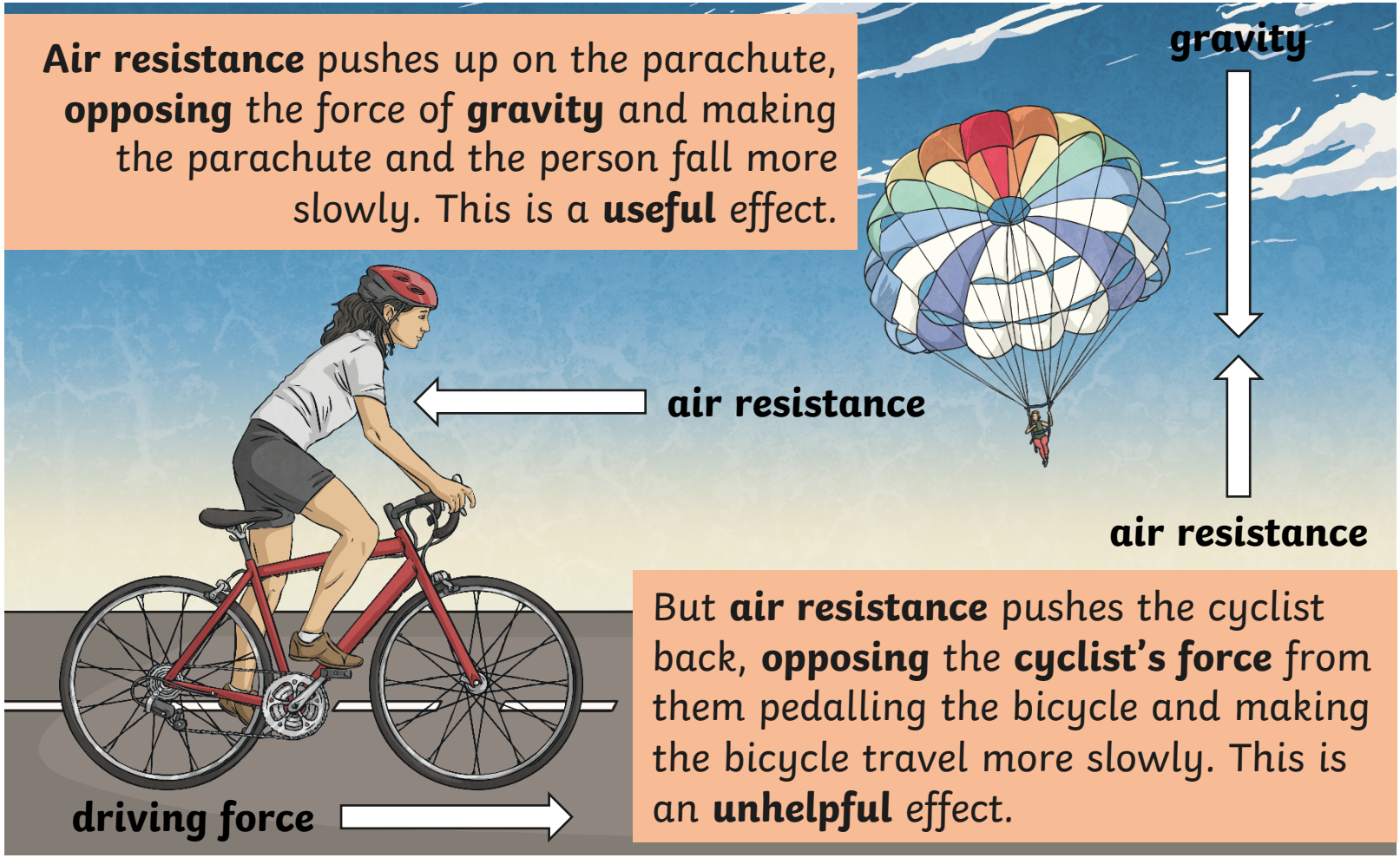
On Earth, air resistance acts on both objects. The feather has a large surface area in comparison to its mass. The hammer has a small surface area in comparison to its mass. Air resistance therefore has a greater upwards force on the feather.

Since there is no air on the Moon, there is no **air resistance** to push against the feather, so the two objects fall at the **same speed**.

Air Resistance



Air Resistance



The Perfect Parachute

The Super Skydiving Company are redesigning the parachute they use to allow people to perform skydives from aeroplanes. They want to make sure that the parachute they use allows their customers to fall from the aeroplane as **slowly** and **safely** as possible.

You are going to investigate a helpful effect of **air resistance** by finding the best design for their new parachute.

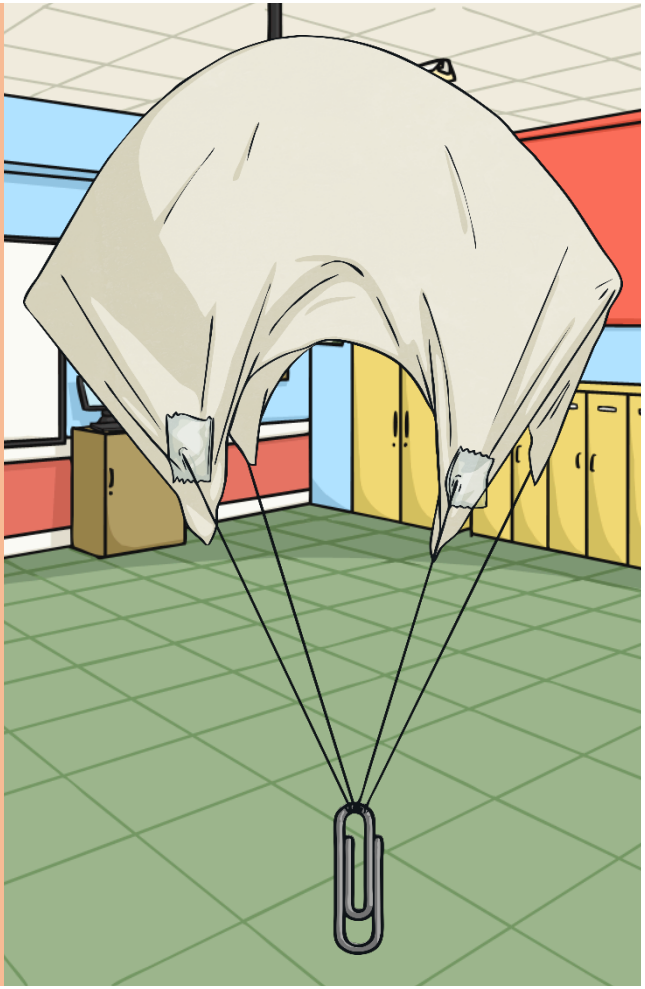
The perfect parachute will be the one that makes a person fall the **slowest**. It will cause **air resistance** to push it up with the **biggest force**.

The Perfect Parachute

You will make three parachutes and drop them from a height. Each of the three parachutes should be slightly different.

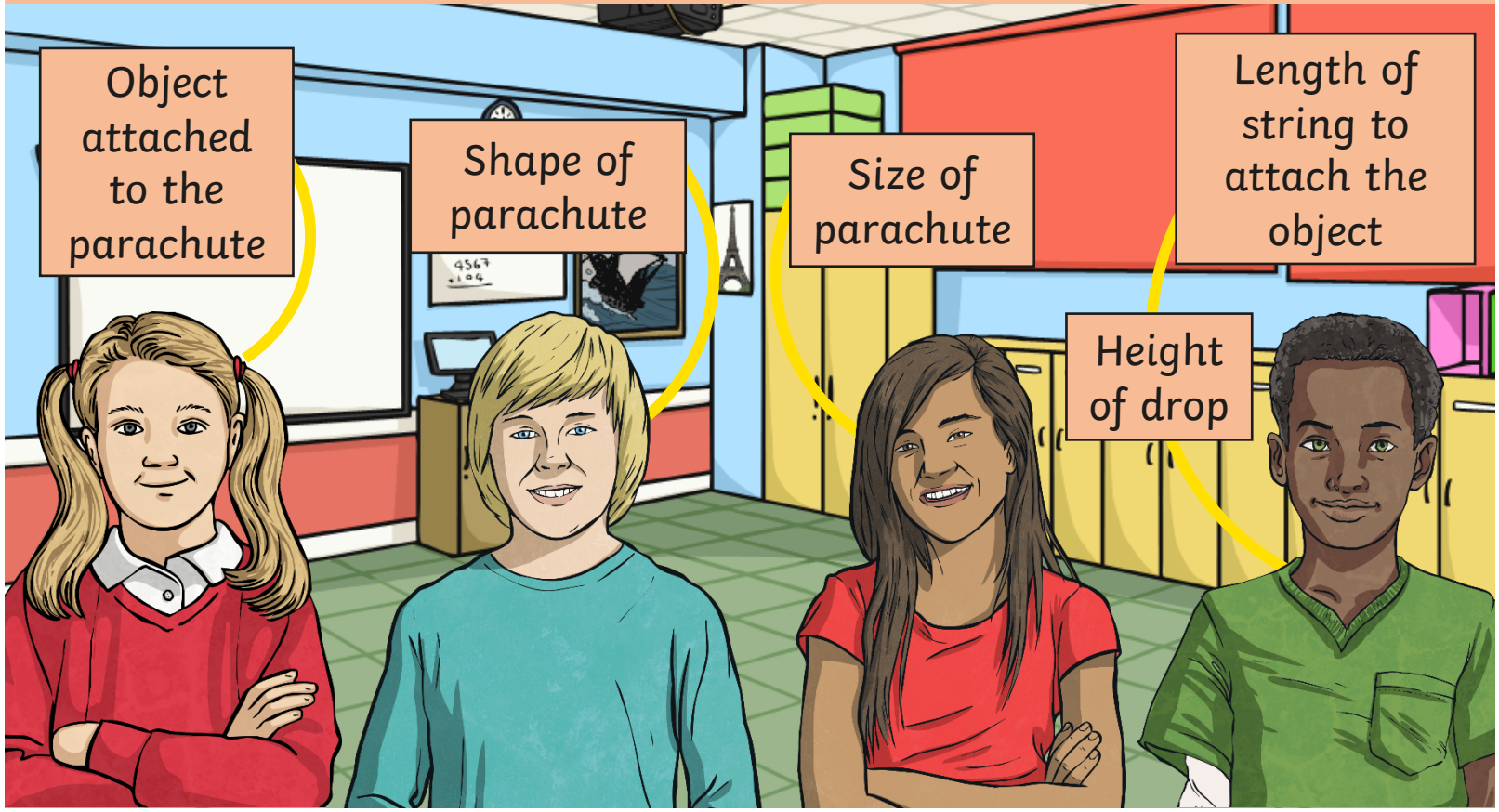
You will observe which of your parachutes falls the **most slowly**. This parachute will have the most **air resistance** pushing it up.

Construct your parachutes using a sheet of plastic or card. Tie or tape string to the corners, and tie or tape the four pieces of string to an object such as a toy figure, paper clip or piece of modelling clay.



The Perfect Parachute

How many variables did you think of?
Did you come up with any of these?



The Perfect Parachute

Once you have identified the different variables of your investigation, you need to make

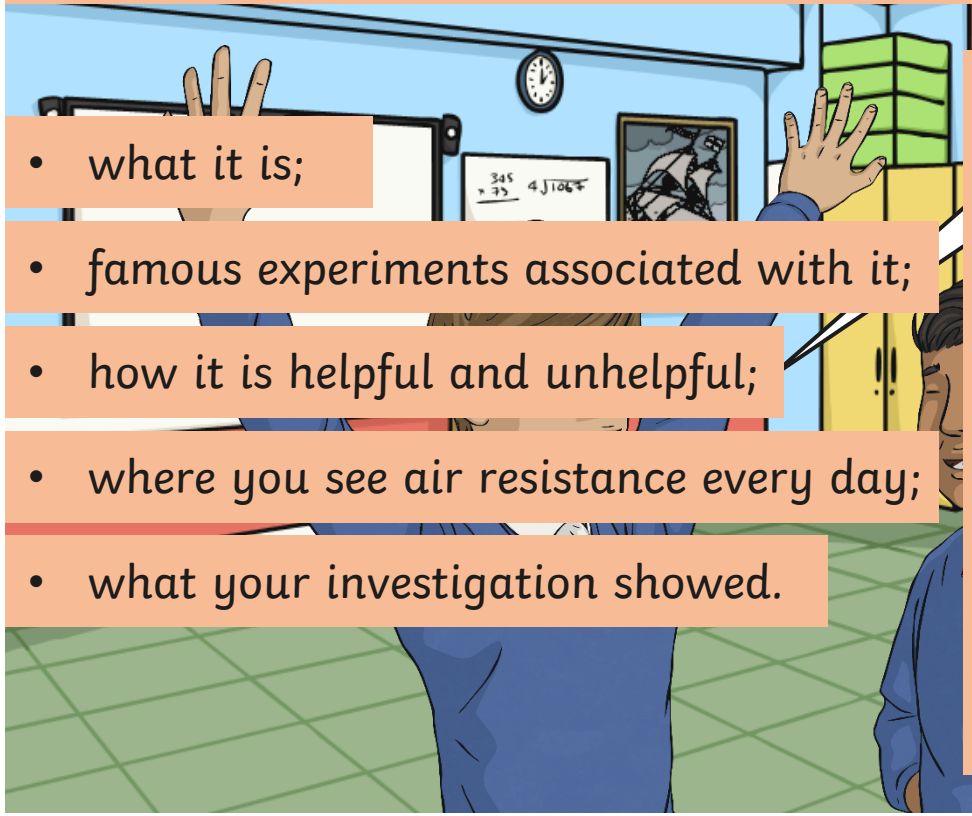
Did you plan and carry out a fair test? Explain your answer.

Activity Sheet.

Repeat the test to improve the reliability of your results.

Talk about It

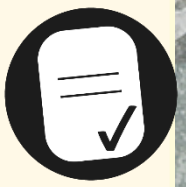
This word bank may help you:



- what it is;
- famous experiments associated with it;
- how it is helpful and unhelpful;
- where you see air resistance every day;
- what your investigation showed.

gravity	prediction
air resistance	investigation
Galileo Galilei	measure
mass	observe
parachute	variables
force	results

Aim



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