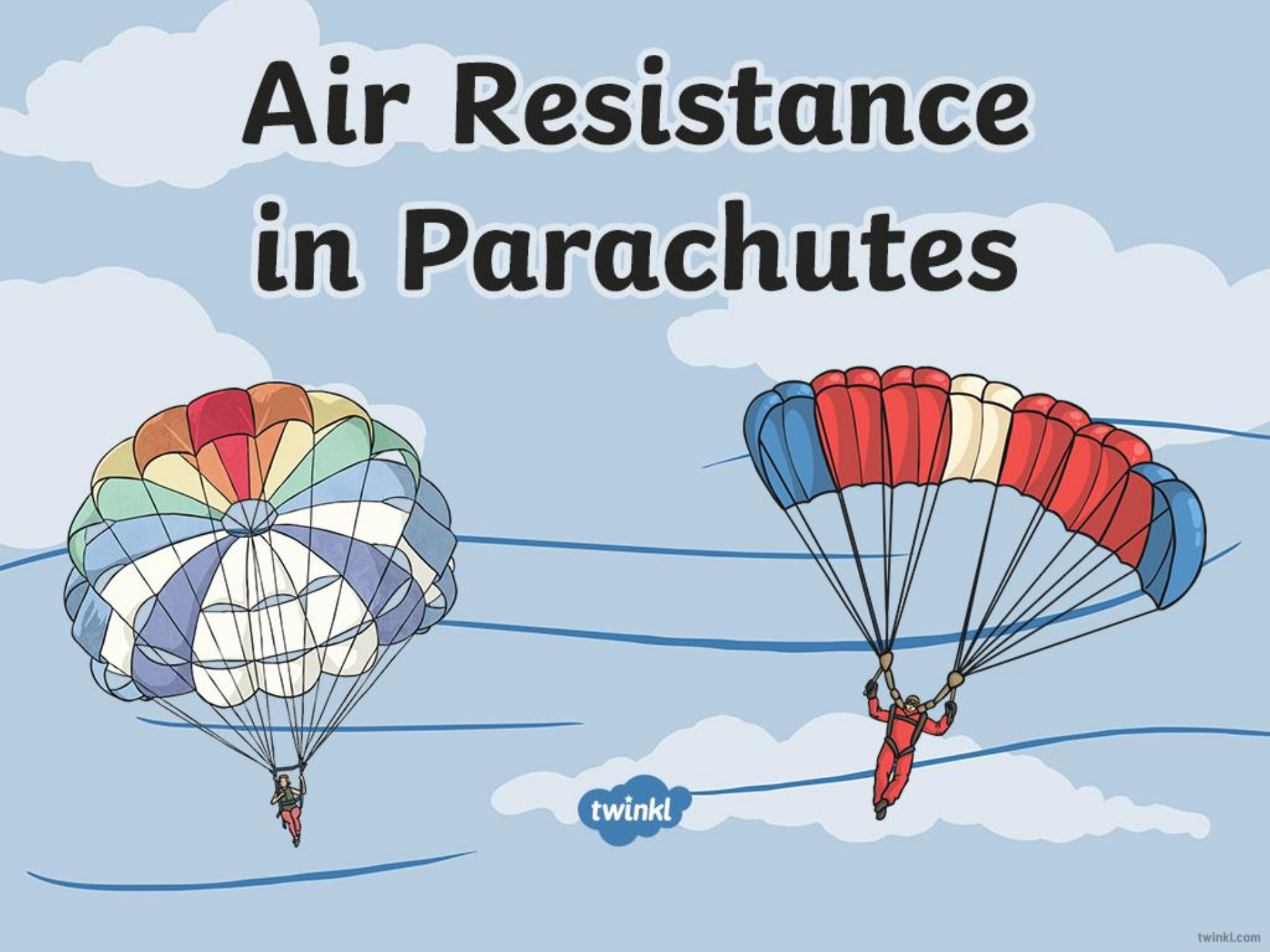
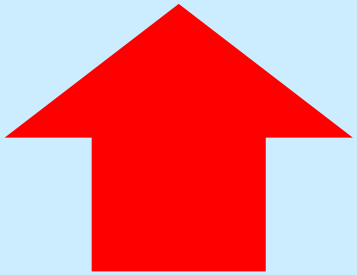
Air Resistance in Parachutes





LO: To know how the amount of surface area affects air resistance.

- Air resistance is a type of friction.
- Moving objects will always experience air resistance.
- Air resistance is a pushing force.

Every time an object moves, it will experience air resistance. This is a **pushing** force. You can feel it push your hair back and make your clothes ripple as you run or ride your bike. If you fan your face with your hand you can feel the air moving towards you.

Parachutes

It is a parachute's job to cause as much air resistance as possible by trapping as much air as it can. What do you think happens to the speed of a falling object the greater the air resistance it has?

The air resistance causes the parachute to fully open and become as big as possible.

Answer

It will slow down!

The bigger something is, the more air resistance there will be pushing against it.

We will be doing an experiment to see how the size of a parachute affects how fast an object will fall.

Variables

We are looking at how the **size** of a parachute affects the **speed** it falls at.

What variables will we need to look at?

Variables

- The height it is dropped from
- The weight of the object
- The size of the parachute

Which variable/s will we keep the same?

Which variable/s will we change?
(independent variable)

What are we measuring to see
if there is a change? (dependent variable)

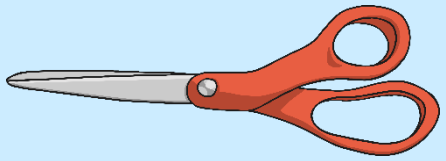
You will need to make a parachute that you will be able to measure the area of.

The plastic from bin bags makes excellent parachutes for these experiments.

How do you find the area of a square?

Square Parachutes

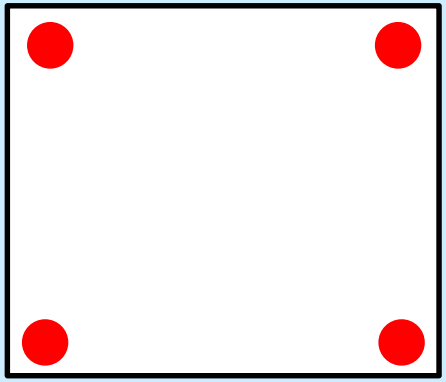
- Measure the area by multiplying the width by the length.
- You will need to draw a line on your bin bag material (white bin bags work best) with a marker and then use a square corner to make sure you draw perfect 90° angles to make a square.
- Choose a selection of sizes to make a selection of parachutes from eg. 20cm, 40cm, 60cm. Maybe make them follow a sequence: twice as big, then three times as big to see how it influences the time to fall.



Carefully cut a small hole in each of the corners. This will be to tie string through.

Cut 4 lengths of string around 60cm long, make sure they are **all** the **same** length.

Tie each piece of string to each corner of the parachute and tie the other ends to a hook. You can then hook whatever object you want to drop.



You are ready to drop!

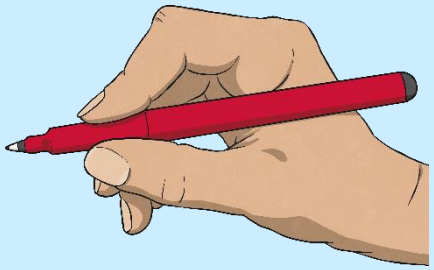
But before you do, copy this table of results down and write a prediction about what you think will happen to the times of the drop the bigger the parachutes get. Perhaps try 4 or 5 different sizes.

Surface Area (cm^2)	1st drop	2nd drop	3rd drop	Average Time

You will need to nominate:

- 1 person to drop the parachute
- 1 person to record the times
- 1 person to time the parachute with a stopwatch (it helps if they do a ‘3,2,1, GO!’ countdown)

Helpful Hint The higher you can drop the parachute, the more accurate the reading will be.



What did you find out?

- Was there a link between the sizes of the parachutes and the time it took them to fall to the ground?
- Did you manage to keep it a fair test?
- If you did the same experiment, what would you change or keep the same?
- Could you test another variable if you did it again?

Plenary

What is the connection between the size of a parachute and how long the object takes to fall?

Why is this?

HELPFUL PHRASES

The bigger the…, the smaller the..., pushing, surface area,

the longer the …, slower the …., air resistance, greater/more