

Summer Week 4 - Science lesson 2

Can I experiment with air resistance?

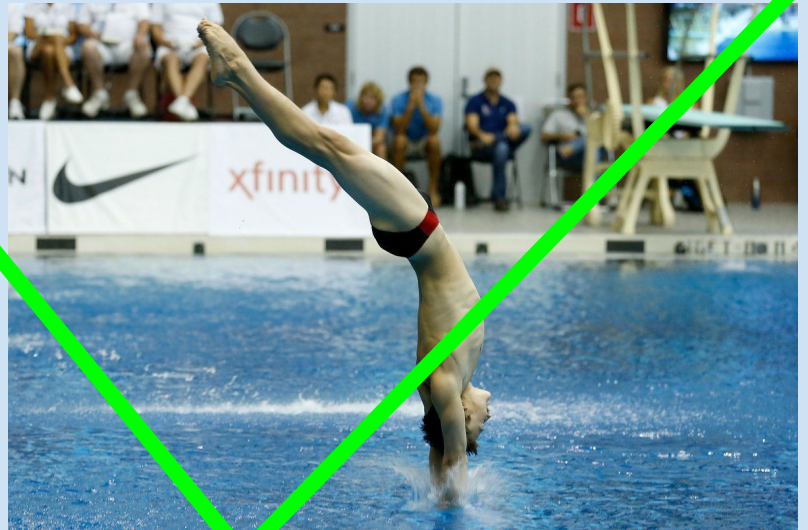
Fast Five - answers are on the next slide

Describe what water resistance is and how being streamlined is important for Olympic divers.



Fast Five: **Answers**

Water resistance is a type of force, often called drag. Water resistance uses friction to slow things down that are moving through water. Streamlined objects are ones which are curved and pointed, this helps it to cut through the water more easily, lowering the water resistance against them. It is important for olympic divers to be as streamlined as possible so that they don't make a splash as they hit the water.



What is air resistance?

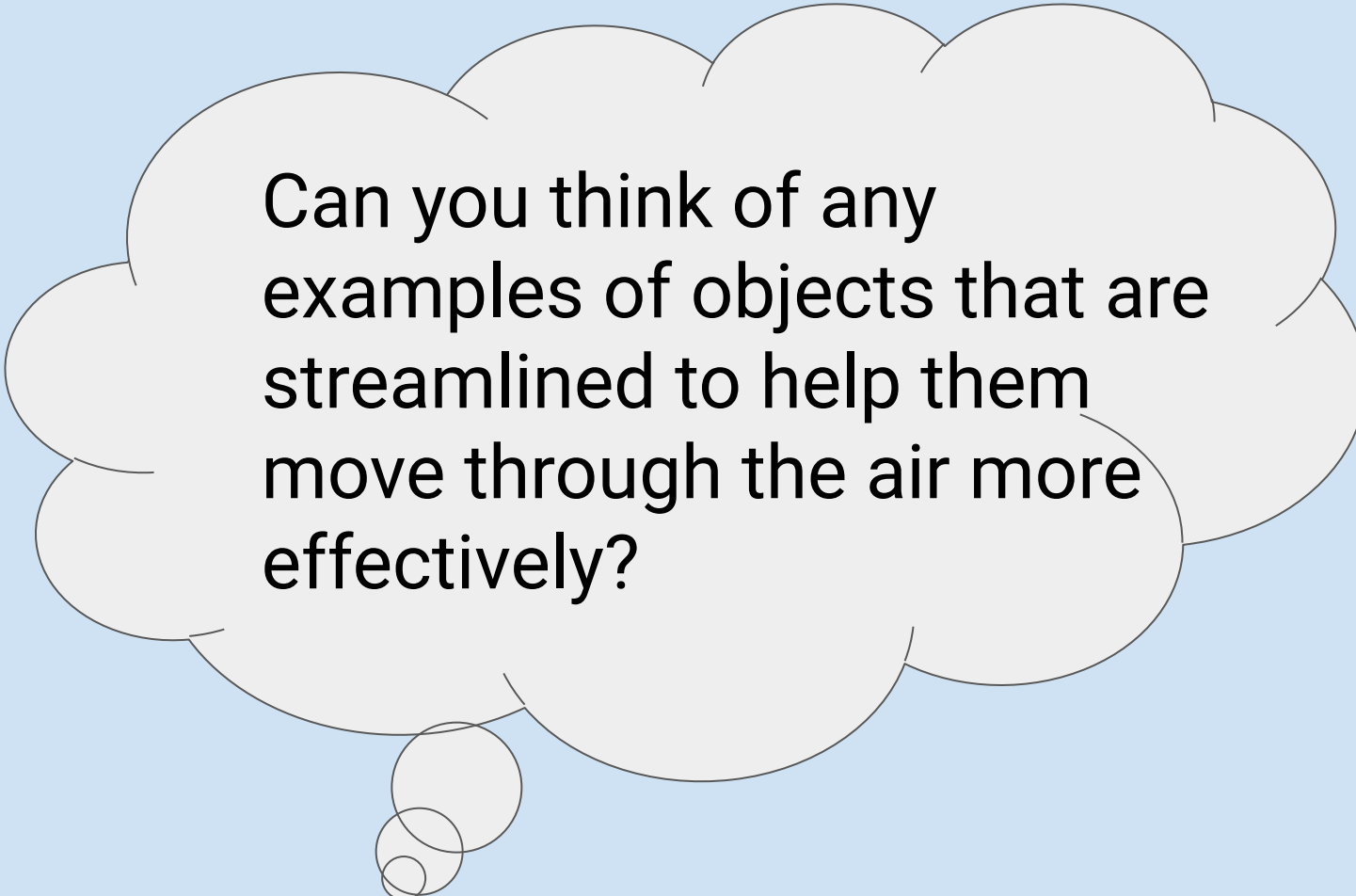
Air resistance is the type of friction between the air and another object. For example, when an aeroplane flies through the air, the tiny air particles hit the aeroplane making it more difficult for it to move through the air.



Just like to reduce the effects of water resistance, streamlined objects can also reduce the effects of air resistance.

The pointed object 'cuts' through the air, making the object move through the air more easily.





Can you think of any examples of objects that are streamlined to help them move through the air more effectively?

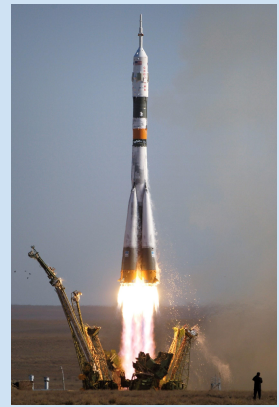
Here are just a few examples:

A car

A bullet



Can you think of any examples of objects that are streamlined to help them move through the air more effectively?



A rocket

Racing bikes



We have looked at ways where reducing air resistance is beneficial, but there are also ways where increasing air resistance is helpful too!

If we increase the air resistance, this would mean that the object would find it harder to travel through the air. Can you think of an example where this might be a good thing?



Increasing air resistance, and therefore slowing an object traveling through the air down, is beneficial with parachutes.

Parachutes are designed to be a shape that is opposite to streamlined! They are wide, they catch the air which stops the falling object gaining speed. This is beneficial as a falling person can open their parachute and slow their fall down, landing on the ground slowly and carefully, rather than at top speed where they could hurt themselves.



Kites are also designed to catch the wind, and increase air resistance! If there was no air resistance, the kite would just fall back down. The top of the kite is pointed, to help move through the air, but the wide, rounded part of the kite increases the air resistance. This combination of design enables the kite to move through the air but also stay up in the air.

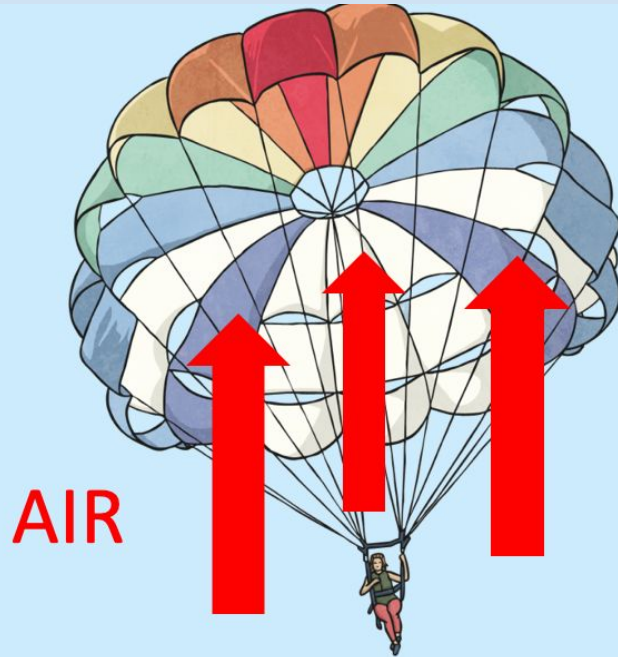


There are a few sports which rely on increased air resistance:

- Paragliding
- Parasailing



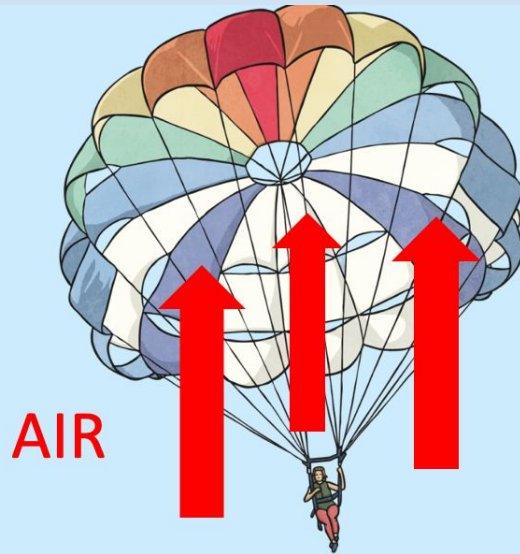
It is a parachute's job to cause as much air resistance as possible by trapping as much air as it can. What do you think happens to the speed of a falling object the greater the air resistance it has?



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

It will slow down!

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



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

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

You will choose the same object to drop from the same height each time. This object could be a pen, a small toy, a peg or anything that you can find around the house (not too heavy)!

Once you've chosen a safe place to drop it from (with the help from an adult), you need to ask someone to time how long it takes to reach the floor. If no one is around to help you, try timing it yourself!

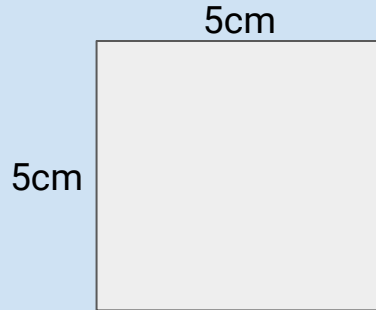


You will need to make three different sized parachutes, in squares - one large, one medium, and one small. To record what size they are, we will have to work out the area.

The plastic from bin bags or carrier bags make excellent parachutes for these experiments!

How do we work out the area of a square?

To find out the area of a square, we measure the lengths of the height and width of the square, then we multiply them together - don't forget the cm^2 !



$$\text{Area} = 5 \times 5 = 25\text{cm}^2$$

How do we work out the area of a square?

If you don't feel confident in working out the area of your square, then you can write large, medium, and small on your table.

Once you have made your three different sized parachutes, you are ready to make your predictions!

Complete the template sentences making your predictions about the experiment.

Now you are ready to start your experiment!

Make sure that an adult can watch you complete the investigation safely.

You will need to make sure you drop the parachute from the same height each time.

To make sure your results are as reliable as possible, try dropping the object with the same parachute more than once - if the times are similar then you know you have a reliable result.

Time the object falling with each parachute and record your results in the table on the activity sheet.

Now it's time to write the results of your experiment!
Complete the template sentences from the activity sheet.

What did you learn from completing your experiment?

Were the results what you expected?

If you were to do the experiment again, what would you change?