Forces – Gravity

LESSON STARTER

We are looking at gravity and its effect on the world around us.

Look at the following questions and write down your answers underneath. You do not need to carry out this investigation.

What will happen when I let go of an apple that is in my hand?

_____

_____

Why do you think this will happen? _____

_____

What will happen when I let go of a whole apple and half an apple at exactly the same time?

_____

_____

Why do you think this will happen? _____

_____

When you've finished, watch the video to see whether you were right!

Were you right? _____

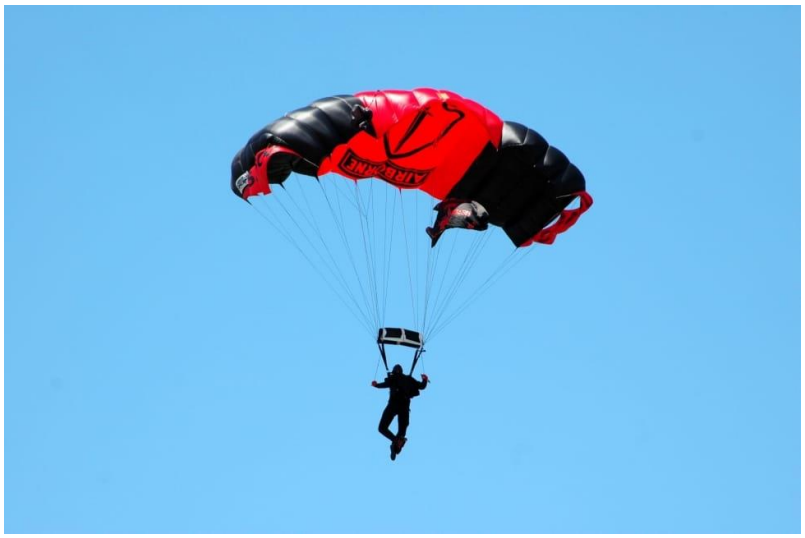
Do you understand why? _____

When anything falls to the ground there are two forces affecting any object.
One is **GRAVITY**. Gravity makes any object fall to the ground at the same rate, no matter how big or small, heavy or light.

However, all objects fall to the ground through the air. The air that the objects travel through slows the fall of the objects. This is the second force and is called **AIR RESISTANCE.**

When anything falls to the ground, there is a **balance** between gravity pulling it down and the air resistance slowing down its fall.

In this picture we can see a parachute using the balance between gravity and air resistance to get the parachutist down to the Earth safely.



The Investigation

Today we are going to do 2 investigations.

Investigation 1

What forces do you think are at work in this investigation?

Force 1 is _____

Force 2 is _____

We know these two forces work against each other when things fall. Some objects appear to fall more quickly to the Earth than others. We know that gravity makes things fall to the Earth at the same rate and that it is the air resistance that slows an object's fall.

So, what makes the air resistance slow down an object's fall? Is it the weight of the object or the shape of the object? Let's carry out our next investigation.

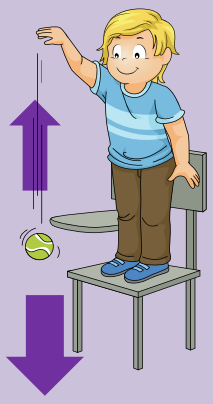
The science behind the investigation

All forces work in pairs. GRAVITY and AIR RESISTANCE are an example of paired forces.

We know that forces can be pushes, pulls, or twists.

GRAVITY is a pull force that pulls objects down to the Earth.
AIR RESISTANCE acts as a push force that pushes upwards against any object falling to the Earth.

Forces are shown in diagrams as arrows. The large the force the bigger the arrow. Take a look at the pictures below and see how the arrows are showing us the strength of the forces at work.



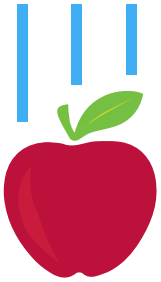
Forces are measured in Newtons. This is a newton meter.

Did you know that your weight will change as you visit different planets? A person's weight is calculated by multiplying the person's mass by that planet's gravity. Earth's gravity is 10 newton's per metre.

Mars' gravity is less than half of the Earth's so you would weigh less than half of your current weight on Earth!

Your challenge!

Look at the pictures below. Can you draw in the arrows to show the strength of the forces at work? Remember to show which is the stronger force.



Can you name the forces at work in these pictures?

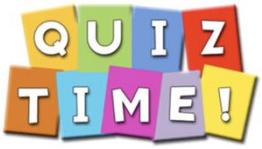
_____

What do you think it means when an object reaches terminal velocity?

_____

_____

What was your score?



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