



Topic: Forces

Year 5

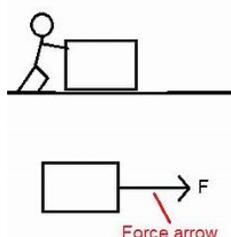
Strand: Physics

What I should know by the end of this unit:

- Unsupported objects fall towards the Earth because of gravity acting between the Earth and the falling object
- Air resistance, water resistance and friction act between moving surfaces
- Some mechanisms, including levers, pulleys and gears allow a smaller force to have a greater effect

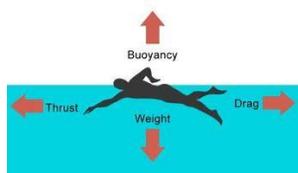
What are forces

Forces are just pushes and pulls in a particular direction. Forces are shown by arrows in diagrams. The direction of the arrow shows the direction in which the force is acting. The bigger the arrow, the bigger the force



Forces change the **motion** of an object. They will make it start to move or speed up, slow it down or even make it stop.

For instance, when a cyclist pushes down on the pedals of a bike, it begins to move. The harder the cyclist pedals, the faster the bike moves. When the cyclist pulls the brakes, the bike slows down and eventually stops.



Water **resistance** and air resistance are forms of **friction**. Friction can sometimes be helpful and sometimes unhelpful.

For instance, air resistance is helpful as it stops the skydiver hitting the ground at high speed. Water resistance makes it harder to move through water so the swimmer has to work hard.

Key Vocabulary

Spelling	definition
attract	If one object attracts another object, it causes the second object to move towards it
forces	The pulling or pushing of something effect that something has on something else
friction	The resistance when one object rubs against another
gear	A part of a machine that causes another part to move because of teeth which connect the two moving parts
gravity	A pulling force exerted by the Earth (or anything else which has a mass)
lever	A basic tool used to lift used to lift or pry things
motion	The activity of changing position or moving from one place to another
pulley	A simple machine that makes lifting something easier. A pulley has a wheel or set of wheels with grooves that a rope or chain can be pulled over
repel	When a magnetic pole repels another magnetic pole, it gives out a force that pushes the other pole away
resistance	A force which slows down a moving object or vehicle



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What is friction?

Friction is a force between two surfaces that are sliding or trying to slide across each other. Friction always works in the direction opposite to the direction in which the object is moving or trying to move. Friction always slows a moving object down.

The amount of friction depends on the materials from which the two surfaces are made. The rougher the surface, the more friction is produced.

Friction also produces heat. If you rub your hands together quickly, you will feel them get warmer.

Friction can be a useful force because it prevents our shoes slipping on the pavement when we walk and stops car tyres skidding on the road. Sometimes we want to reduce friction. For example, we use oil to reduce the friction between the moving parts inside a car engine.

What is gravity?

The force that pulls things to the ground on Earth (and other planets) is called **gravity**.

Gravity also holds Earth and the other planets in their orbit around the Sun.

The force of gravity also exists on the Moon but it is not as strong as it is on Earth. This is because the Moon is much smaller than our planet.

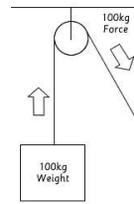
What are examples of mechanisms?

Levers allow us to do heavy work with less effort. For example, trying to pick up a large, heavy box is difficult, however, if a lever is used it becomes much easier to move it.

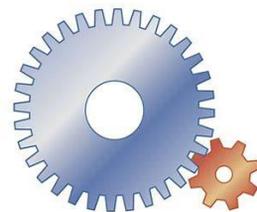
Levers in action



Pulleys also allow us to do heavy work – objects are attached to ropes and pulley wheels and so, instead of lifting heavy objects upwards, we can pull on the pulley rope downwards.



Gears are toothed wheels. Their 'teeth' can fit into each other so that when the first wheel turns, so does the next one. This allows forces to move across a surface.



Springs can be stretched by pulling them or squashed by pushing them. The greater the force pulling or pushing the spring, the greater the force the spring uses to move back to the normal shape.





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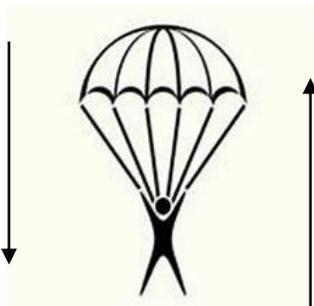
Strand: Physics

The pulling or pushing effect that something has on something else can be best described as a ...	Start of unit	End of unit

Which force pulls objects towards the ground?	Start of unit	End of unit
Resistance		
Magnetism		
Gravity		
friction		

A force which slows down a moving object is ...?	Start of unit	End of unit
Resistance		
Magnetism		
Gravity		
Friction		

Match the mechanism to the name of it	Start of unit	End of unit
 <div style="display: inline-block; border: 1px solid black; padding: 2px; margin-left: 10px;">gear</div>		
 <div style="display: inline-block; border: 1px solid black; padding: 2px; margin-left: 10px;">spring</div>		
 <div style="display: inline-block; border: 1px solid black; padding: 2px; margin-left: 10px;">lever</div>		
 <div style="display: inline-block; border: 1px solid black; padding: 2px; margin-left: 10px;">pulley</div>		

Label this drawing to show which forces are acting on the parachute	Start of unit	End of unit
		

Label this drawing to show which forces are acting on the swimmer	Start of unit	End of unit
