



# Forces and Magnets

Key Vocabulary	
<b>force</b>	A <b>force</b> is a <b>push</b> or <b>pull</b> .
<b>push</b>	A <b>push</b> is a <b>force</b> that often moves an object further away.
<b>pull</b>	A <b>pull</b> is a force that often moves an object closer.
<b>contact force</b>	A <b>contact force</b> is a type of <b>force</b> that occurs between two or more objects that are touching.
<b>non-contact force</b>	A <b>non-contact force</b> is a type of <b>force</b> that occurs between objects that are not touching.
<b>friction</b>	<b>Friction</b> is a type of <b>contact force</b> . It occurs between two touching surfaces that are either trying to move or are already moving across each other.

Contact Forces: Examples of Pushes and Pulls			
Pushes		Pulls	
<p>The foot <b>pushes</b> against the ground, causing the scooter to move forwards.</p>	<p>The hands <b>push</b> on the trolley handle, causing the trolley to move forwards.</p>	<p>The hand <b>pulls</b> on the bowstring and arrow, causing the arrow to move closer to the person.</p>	<p>The hand <b>pulls</b> on the cord, causing the blind to lift up.</p>

**Forces** can make objects start or stop moving, change speed, change direction or change shape.

Smooth		Rough	
polished marble	laminate floor	artificial grass	sandpaper

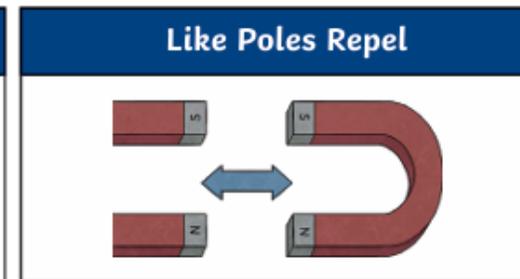
Moving on Rough Surfaces	Moving on Smooth Surfaces	Helpful Friction
<p>Objects move differently on different surfaces because of a force called <b>friction</b>. <b>Friction</b> can be high on rough surfaces, causing objects to slow down more quickly.</p>	<p>An object will travel further on a smooth surface because there are fewer bumps; therefore, there is less <b>friction</b> to slow it down.</p>	<p>Bumpy surfaces, such as tyres or the soles of shoes, help to reduce the risk of sliding or skidding.</p>



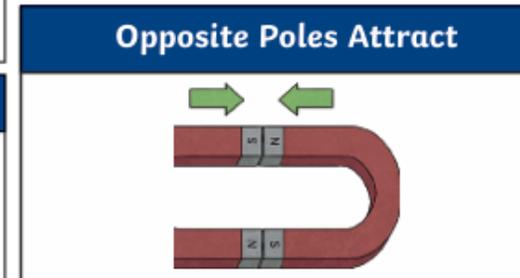
Key Vocabulary	
<b>magnet</b>	A <b>magnet</b> is a material that can sometimes <b>attract</b> (pull) and sometimes <b>repel</b> (push) other <b>magnetic</b> materials.
<b>metal</b>	<b>Metals</b> are materials that are usually hard and shiny, such as iron and aluminium.
<b>magnetic</b>	If a material is <b>magnetic</b> , it can be <b>attracted</b> or <b>repelled</b> by a <b>magnet</b> .
<b>magnetic force</b>	A <b>magnetic force</b> is a <b>non-contact force</b> produced by a <b>magnet</b> .
<b>poles</b>	The <b>poles</b> of a <b>magnet</b> are the two points where the <b>magnetic force</b> is strongest: the north pole and south pole.
<b>attract</b>	If a <b>magnet attracts</b> an object, it causes the object to move towards it.
<b>repel</b>	If a <b>magnet repels</b> an object, it causes the object to move away from it.

Magnetic Materials	Non-Magnetic Materials
 <p><b>Magnetic</b> objects are most often made of <b>iron</b>, <b>steel</b> (which contains iron), <b>nickel</b> and <b>cobalt</b>.</p>	 <p>Plastic, wood, rubber and wool are not <b>magnetic</b>. Some <b>metals</b>, such as aluminium, are not <b>magnetic</b>.</p>

Names of Magnets			
			
horseshoe	ring	cylinder	bar
			
square	button	arc/crescent	



Uses of Magnets	
 electro-magnetic cranes	 computers
 MRI machines	 maglev trains



A **magnetic force** is a **non-contact force** because the **magnet** and the object do not need to touch for the **force** to happen.



## As a Scientist...

### In Year 3:

- Compare how things move on different surfaces.
- Know how a simple pulley works and use making lifting an object simpler
- Notice that some forces need contact between two objects, but magnetic forces can act at a distance.
- Observe how magnets attract and repel each other and attract some materials and not others.
- Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials.
- Describe magnets as having two poles.
- Predict whether two magnets will attract or repel each other, depending on which poles are facing.

### In year 5:

- Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object and the impact of gravity on our lives.
- Identify the effects of air resistance, water resistance and friction, which act between moving surfaces.
- Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect. Pupils should explore falling objects and raise questions about the effects of air resistance. They should explore the effects of air resistance by observing how different objects such as parachutes and sycamore seeds fall. They should experience forces that make things begin to move, get faster or slow down.