





What should I already know?

- The shape of some materials can be changed when they are stretched, twisted, bent and squashed.
- How different toys move.

What I will know by the end of the unit?




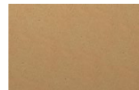
What are forces?

- Forces are pushes and pulls.
- Forces change the motion of an object.
- Forces will make an object start to move or speed up, slow it down or make it stop.
- For example, 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 breaks, the bike slows down and eventually stops.

Pushes		Pulls	
			
The foot pushes against the ground, causing the scooter to move forwards.	The hands push on the trolley handle, causing the trolley to move forwards.	The hand pulls on the bowstring and arrow, causing the arrow to move closer to the person.	The hand pulls on the cord, causing the blind to lift up.

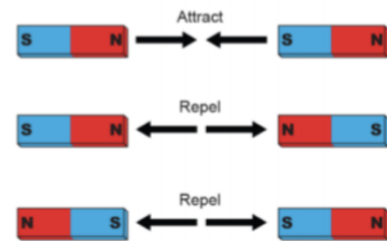
How do difference surfaces affect the motion of an object?

- Forces act in opposite directions to each other.
- When an object moves across a surface, friction acts as the opposite force. It holds back the motion of an object.
- Some surfaces create more friction than others which makes the object move across them slower.
- Friction on rough surfaces is higher, causing the objects to slow down quicker.
- Friction is lower on a smooth surface because there are fewer bumps. There is less friction to slow it down.
- Bumpy surfaces such as tyres or the soles of shoes, help to reduce the risk of sliding or skidding.

Smooth		Rough	
			
polished marble	laminate floor	artificial grass	sandpaper



How do magnets work?

- Magnets produce an area of force around them called a magnetic field which is invisible.
- When objects enter this magnetic field, they will be attracted or repelled from the magnet if they are magnetic.
- The ends of a magnet are called poles.
- One is called the north pole and the other end is the south pole.
- The same pole on a magnet repels each other, so they push each other away.
- Opposite poles on a magnet attract each other, so they pull together each other away.



Which materials are magnetic?

- Objects that are magnetic are attracted to magnets.
- Iron and steel are magnetic.
- Aluminium and copper are non-magnetic.

Magnetic Materials	Non-Magnetic Materials
	

Key Vocabulary

attract	an object that moves towards a magnet.
friction	a type of force between two touching surfaces that are moving across each other
force	a push or a pull
magnet	a material that can attract or repel magnetic materials
magnetic field	the area around a magnet which pulls magnetic objects towards the magnet
metal	materials that are usually hard and shiny
magnetic	objects that are attracted to magnets
poles	north and south poles are found at different ends of the magnet
pull	a force that often moves an object closer
push	a force that often moves an object further away
repel	when a magnet pushes an object away from it
surface	the top layer of something

<p>Working Scientifically</p>	<p>Ask questions about the world around them and explain that they can be answered in different ways.</p> <p>Set up and carry out some simple, comparative and fair tests, making predictions for what might happen. Tests can be set up and carried out by following or planning a set of instructions. A prediction is a best guess for what might happen in an investigation based on some prior knowledge.</p> <p>Take measurements in standard units, using a range of simple equipment eg. data loggers plus sensors, timers (seconds, minutes and hours), thermometers ($^{\circ}\text{C}$) and metre sticks (millimetres, centimetres and metres). Make increasingly careful observations, identifying similarities, differences and changes, and make simple connections Taking repeat readings can increase the accuracy of the measurement.</p> <p>An observation involves looking closely at objects, materials and living things, which can be compared and grouped according to their features. Gather and record findings in a variety of ways (labelled diagrams, tables, charts and graphs) with increasing accuracy. Data can be used to provide evidence to answer questions.</p> <p>Data can be used to provide evidence to answer questions. Results are information that has been discovered as part of an investigation. A conclusion is the answer to a question that uses the evidence collected.</p> <p>Use suitable vocabulary to talk or write about what they have done, what the purpose was and, with help, draw a simple conclusion based on evidence collected, beginning to identify next steps or improvements.</p>
<p>Forces and magnets</p>	<p>Explain that an object will not move unless a push or pull (force) is applied, describing forces in action and whether the force requires direct contact or whether the force can act at a distance (magnetic force).</p> <p>Compare how things move on different surfaces. Notice that some forces need contact between two objects, but magnetic forces can act at a distance.</p> <p>Observe how magnets attract or repel each other and attract some materials and not others. Magnetic materials are attracted to magnets.</p> <p>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. All magnetic materials are metals but not all metals are magnetic. The metal iron is magnetic.</p> <p>Investigate and compare a range of magnets (bar and horseshoe) and explain that magnets have two poles (north and south) and that opposite poles attract each other, while like poles repel each other. Predict whether two magnets will attract or repel each other, depending on which poles are facing.</p>
<p>Possible activities</p>	<p>Investigate how things move on different surfaces. Notice that some forces need contact between two objects, but magnetic forces can act at a distance.</p> <p>Observe how a magnetic field attracts iron filings by using a bar magnet.</p> <p>Investigate how magnets are used in everyday life.</p> <p>Investigate which materials are magnetic and sort between objects that are magnetic and those that are non-magnetic.</p> <p>Investigate if the size of a magnet affects how strong it is using chains of paper clips of varying lengths.</p> <p>Investigate if all metals are magnetic.</p> <p>Observe what happens when magnets with similar poles are placed next to each other.</p>