

Sholing Junior School - Science

Topic: Forces and Magnets

Year: 3

Strand: Physics

What should I already know?

- The shape of some materials can be changed when they are **stretched, twisted, bent and squashed**.
- Know how different toys move.
- Know what a **force** is and be able to explain that a **push and pull** are types of **forces**.
- That when **forces** are applied to an object they allow them to move or stop moving.
- The strength of the **force** determines how far and fast an object moves.

Vocabulary

attract	If one object attracts another object, it causes the second object to move towards it
bendy	an object that bends easily into a curved shape
friction	the resistance of motion when there is contact between two surfaces
force	the pulling or pushing effect that something has on something else
gravity	the force which causes things to drop to the ground
magnet	a piece of iron or other material which attracts magnetic materials towards it
magnetic field	an area around a magnet , or something functioning as a magnet, in which the magnet's power to attract things is felt
metal	a hard substance such as iron, steel, gold, or lead
motion	the activity of changing position or moving from one place to another
non-magnetic	an object that is not magnetic
opposite	Opposite is used to describe things of the same kind which are completely different in a particular way. For example, north and south are opposite directions
position	The position of someone or something is the place where they are in relation to other things
pull	When you pull something, you hold it firmly and use force in order to move it towards you or away from its previous position
push	When you push something, you use force to make it move away from you or away from its previous position
resistance	a force which slows down a moving object or vehicle
squash	pressed or crushed with such force that something loses its shape
stretchy	slightly elastic
surface	the flat top part of something or the outside of it
twist	turn something to make a spiral shape

Investigate!

- Investigate the amount of **friction** created by different **surfaces**. Use measures (such as length and time) to show how far or fast and object travels.
- Observe how a **magnetic field** attracts iron filings by using a bar **magnet**.
- Investigate how **magnets** are used in everyday life.
- Investigate which materials are **magnetic** and sort between objects that are **magnetic** and those that are **non-magnetic**.
- Investigate if the size of a **magnet** affects how strong it is (using chains of paper clips of varying lengths)
- Investigate if all **metals** are **magnetic**.
- Observe what happens when **magnets** with similar poles are placed next to each. Repeat this for when the poles are different.

What will I know by the end of the unit?

I will:

- compare how things move on different surfaces
- notice that some forces need contact between two objects, but magnetic forces can act at a distance
- observe how magnets attract or 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.

We will observe that magnetic forces can act without direct contact, unlike most forces, where direct contact is necessary (for example, opening a door, pushing a swing). We will explore the behaviour and everyday uses of different magnets (for example, bar, ring, button and horseshoe).

We might work scientifically by: comparing how different things move and grouping them; raising questions and carrying out tests to find out how far things move on different surfaces and gathering and recording data to find answers their questions; exploring the strengths of different magnets and finding a fair way to compare them; sorting materials into those that are magnetic and those that are not; looking for patterns in the way that magnets behave in relation to each other and what might affect this, for example, the strength of the magnet or which pole faces another; identifying how these properties make magnets useful in everyday items and suggesting creative uses for different magnets.

How do magnets work?



- **Magnets** produce an area of **force** around them called a **magnetic field**.
- When objects enter this **magnetic field**, they will be **attracted** to or **repelled** from the **magnet** if they are **magnetic**.
- When **magnets repel**, they **push** each other away
- When **magnets attract**, they **pull** together.

Which materials are magnetic?

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

How do magnetic poles work?

- The ends of a **magnet** are called poles.
- One end is called the north pole and the other end is called the south pole.
- **Opposite** poles **attract**, similar poles **repel**.
- If you place two **magnets** so the south pole of one faces the north pole of the other, the **magnets** will move towards each other. This is called **attraction**.
- If you place the **magnets** so that two of the same poles face each other, the magnets will move away from each other. They are **repelling** each other.

