



Subject: Science

Year group: 3

Term: Spring

Unit name: Forces and Magnets

Prior Knowledge - Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. (Y2 - Uses of everyday materials)

Scientific enquiry

Classifying	Identifying magnetic and non-magnetic materials.
Observing over time	Not relevant
Pattern seeking	Magnetic forces at a distance
Comparative/fair testing	Venn diagrams – fair testing Which materials are magnetic around the classroom How magnets make objects move on different surfaces Magnetic forces at a distance
Researching	Functions of magnets

National curriculum:

- 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.

Assessment for learning

Recapping prior knowledge- beginning of unit- what do children already know?

Beginning of each lesson- focus on recall of previous learning (quick quizzes)

Knowledge Organiser

Topic: Forces

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 <u>is</u> felt
metal	a hard substance such as iron, steel, gold, or lead

What will I know by the end of the unit?

What are **forces**?

- **Forces** are **pushes** and **pulls**.
- These **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 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 brakes, the bike slows down and eventually stops.

How do different **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 an **opposite** force.
- **Friction** is a **force** that holds back the **motion** of an object.
- Some **surfaces** create more **friction** than others which means that objects move across them slower.





- On a ramp, the **force** that causes the object to move downwards is **gravity**.
- Objects move differently depending on the **surface** of the object itself and the **surface** of

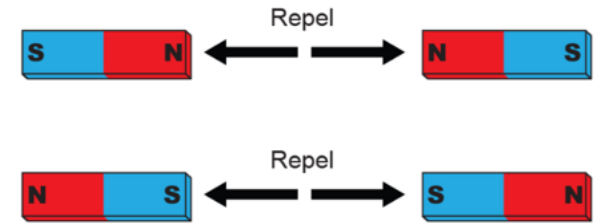
motion	the activity of changing position or moving from one place to another
non-magnetic	an object that is not magnetic
opposite	Opposite is used to describe things of the same kind which are completely different in a particular way. For example, north and south are opposite directions
position	The 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.
- Compare how different things move and group them.
- Observe how a **magnetic field** attracts iron filings by using a bar magnet.
- Investigate how **magnets** are used in everyday life.

	the ramp.
How do magnets work?	<ul style="list-style-type: none"> • 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, the push each other away • When magnets attract, they pull together.
	
Which materials are magnetic?	<ul style="list-style-type: none"> • Objects that are magnetic, are attracted to magnets. • Iron and steel are magnetic. • Aluminium and copper are non-magnetic.
How do magnetic poles work?	<ul style="list-style-type: none"> • 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.
	

- 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.





Lesson Sequence



1. Explore contact and non-contact forces



2. Compare how things move on different surfaces



3. Explore different types of magnets



4. Explore the properties of magnets and everyday objects that are magnetic

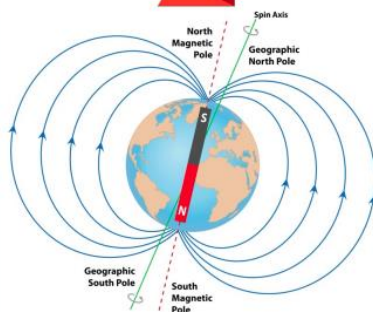


5. Understand that magnetic forces can act at a distance



6. Explore the everyday uses of magnets

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.

Forces

- Forces act in opposite directions to each other.
- When an object moves across a surface, **friction** acts as an opposite force. Friction is a force that holds back the **motion** of an object.
- Some surfaces create more friction than others which means that objects move across them slower.
- On a ramp, the force that causes the object to move downwards is gravity.
- Objects move differently depending on the **surface** of the object itself and the surface of the **ramp**.

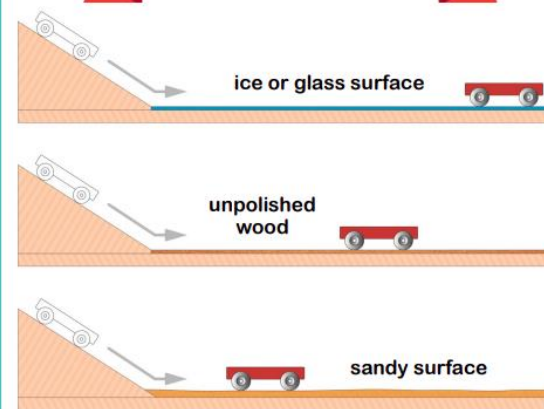
non-magnetic



magnetic

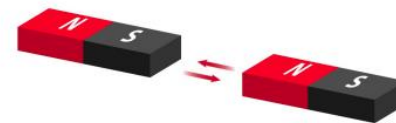


Friction

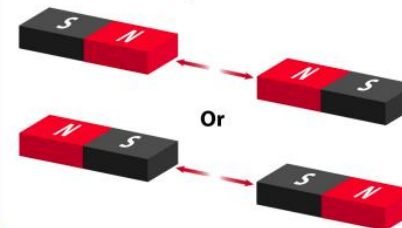


Magnetic Forces

Attraction



Repulsion





**Enriching lives every day; enabling our school community to learn, achieve and flourish
through living 'life in all its fullness'**

