

National Curriculum
Science - Knowledge

Key Learning

Vocabulary

Pupils should be taught to:

- 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.

For anything to move a force needs to be applied – push or pull.
A force will change the motion of an object: speed up, slow down, change direction or stop.

Pushes



Pulls



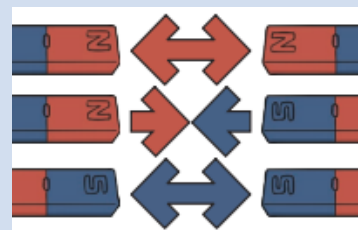
Different surfaces will affect how things move on them due to friction.

The driving **force** pushes the bicycle, making it move.



Friction pushes on the bicycle, slowing it down.

Most forces are contact forces but magnets do not require contact to exert a force. Magnets have poles: North and South. Like poles repel each other while opposite poles attract.



Forces – A push or pull that acts on an object to make it start, stop or change direction.

Friction - A force that acts between two surfaces or objects that are moving, or trying to move, across each other.

Magnet - An object which produces a magnetic force that pulls certain objects towards it.

Magnetic field – The area around a magnet where there is a magnetic force which will pull magnetic objects towards the magnet

Magnetic - Objects which are attracted to a magnet are magnetic.

Poles- North and south poles are found at different ends of a magnet.

Repel- Repulsion is a force that pushes objects away. For example, when a north pole is placed near the north pole of another magnet, the two poles repel (push away from each other).

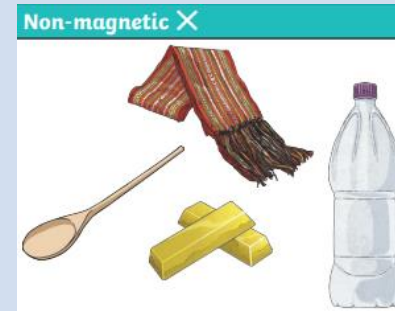
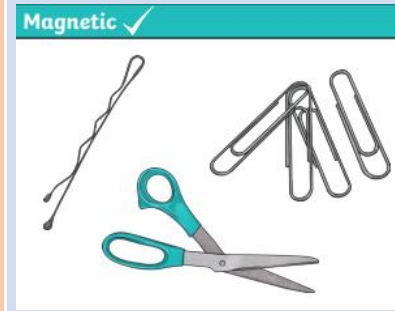
Attract- Attraction is a force that pulls objects together. For example, when a north pole is placed near the south pole of another magnet, the two poles attract (pull together).

National Curriculum Science – working scientifically

- Asking relevant questions and using different types of scientific enquiries to answer them
- Setting up simple practical enquiries, comparative and fair tests
- Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers
- Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions
- Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables
- Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions
- Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions
- Identifying differences, similarities or changes related to simple scientific ideas and processes
- using straightforward scientific evidence to answer questions or to support their findings.

Key Learning continued...

Some materials are attracted to magnets and some are not. Objects that contain, iron, nickel or cobalt are magnetic and all other materials are not.



Scientific investigations

To carry out comparative test – how do cars move on different surfaces?

- fair testing
- Collecting data
- Draw conclusions

Which magnet is the strongest?

- Recording using non-standard measures
- Present findings in a graph

Sequence of learning – Forces and Magnets

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| 1 | How do objects move? – Use PE equipment and explore how to move each item across the hall. Discuss the forces of pushes and pulls on movement – children demonstrate how to speed up, slow down change direction and stop objects using pushes or pulls. |
| 2 | How do objects move on different surfaces? Explore how toy cars move on different surfaces and introduce friction as a force that acts against the driving force. Children plan and carry out how to test the impact of different surfaces on how far a toy car will travel. Records results. |
| 3 | How do magnets work? To explore how magnets are attracted to each other and how they repel. They have north and south poles and opposites attract. They do not need to be in contact to provide a force. Can they make an object move without touching it? |
| 4 | Are all metals magnetic? Children explore and sort materials depending if they are magnetic or not. What properties do magnetic materials have (made of metal) and are all metal objects magnetic? |
| 5 | Which magnet is the strongest? Design an investigation to find out which magnet is the strongest – using paper clips as units or weights that are moved by the magnet. Will the largest magnet be the strongest? Record findings in a bar graph. |
| 6 | How are magnets used in the real world? Research how magnetism can be useful in the real world – sorting recycling/ scrap/ games etc. |