

## Magnets

### What's the science story?

This topic can be one of the most engaging. Please get out our stock of supermagnets (making sure you know exactly who is responsible for handing them back in to you at the end of the lesson) and try loads of [extra experiments](#).

Look at the previous knowledge – they did all the stuff we usually do in year 8 in year 3!

### Previous knowledge:

In YEAR 3

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.

### Next steps...

Exactly the same in KS4 +  
Induced magnetism  
Direction of magnetic fields and where they are strongest  
Evidence the core of the Earth is magnetic  
The word 'solenoid'

Higher tier: Fleming's left hand rule  
Explaining how a motor works



### Keywords

|   |                           |                        |               |       |   |
|---|---------------------------|------------------------|---------------|-------|---|
| magnetism<br>repulsion<br>non-magnetic<br>magnetic<br>attraction<br>poles<br>north-seeking pole<br>south-seeking pole | compass<br><br>field line | navigation<br><br>core | electromagnet | motor | variable<br>independent<br>dependent<br>control |
|---|---------------------------|------------------------|---------------|-------|---|

**Working scientifically skills:**

WS8

WS13

WS17

**Assessments:**

End of unit test (summative)

Exit tickets x 2/3 (formative)

- Magnetic fields

| Lesson No. and Title           | Learning objectives   | National Curriculum   | Practical equipment  |
|--------------------------------|---|---|--|
| 1. Magnetism – year 3 reminder | see ARE for year 3 above  | magnetic poles, attraction and repulsion                                | magnets<br>iron filings<br>thread  |
| 2. Magnetic fields             | <ul style="list-style-type: none"> <li>• ARE Accurately plot the magnetic field of a bar magnet</li> <li>• AGD Compare magnetic field lines and a magnetic field</li> </ul> | magnetic fields by plotting with compass, representation by field lines | Demo: plastic covered iron filings in liquid apparatus<br><br>Compass<br>Pencil<br>Plain paper<br>Bar magnet x 2<br>Iron filings |

**KS3 – Year 8**

|                               |   |  |  |
|-------------------------------|---|--|--|
| 3. The Earth's magnetic field | <ul style="list-style-type: none"> <li>• ARE Describe the Earth's magnetic field</li> <li>• AGD Explain how a compass works</li> </ul>                            | Earth's magnetism, compass and navigation        | Bar magnet<br>Thread and card to make hanging magnet holder<br>compass   |
| 4. Electromagnets             | <ul style="list-style-type: none"> <li>• ARE Describe how to change the strength of an electromagnet</li> <li>• AGD Explain how an electromagnet works</li> </ul> | the magnetic effect of a current, electromagnets | Demo: several compasses<br>Power pack<br>Thick wire<br>Stiff cardboard<br>Iron filings<br><br>Class: iron nail<br>Insulated wire<br>Power pack<br>Leads with crocodile clips<br>paperclips |
| 5. Motors                     | ARE Describe how a simple motor works<br>AGD Apply knowledge about electromagnets to design a circuit   | DC motors (principles only)                      | motor kits   |

**KS3 – Year 8**

|                                 |  |                      |   |
|---------------------------------|--|----------------------|---|
| 6. Investigating electromagnets | ARE Find out how much one factor affects the strength of an electromagnet<br>AGD Compare the affect of two different factors on the strength of an electromagnet | <b>investigation</b> | Class: iron nail<br>Insulated wire of different thicknesses<br>Power pack<br>Leads with crocodile clips<br>paperclips |
|---------------------------------|--|----------------------|---|