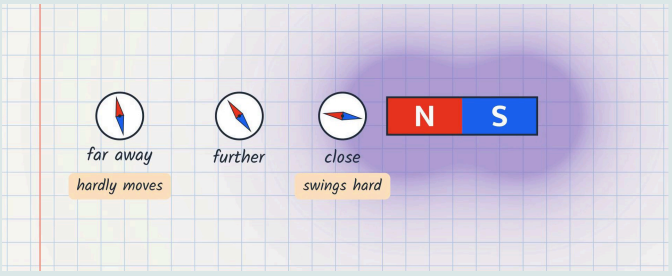
Magnetic fields

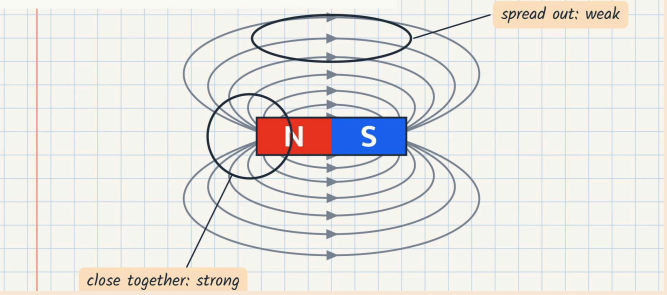
Field lines and compasses

1 What a field is



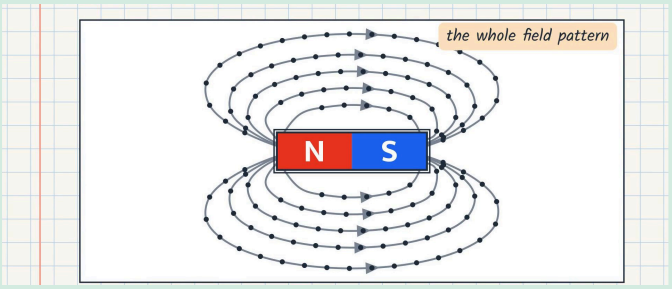
- The **magnetic field** is the region around a magnet where a force acts on another magnet or on a magnetic material.
- The field is **strongest at the poles** and gets weaker further from the magnet: a compass close by swings hard, far away it hardly moves.

2 Drawing field lines



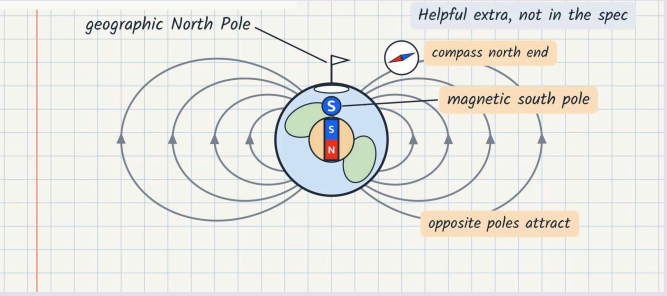
- A field line shows the way the force would push a **north pole**, so the arrows go **from north to south**.
- Lines close together: strong field. Start and end each line on a pole; curve smoothly; lines never touch or cross.

3 Plotting a field



- A compass is a tiny bar magnet; its needle lines up with the field. Mark a dot at the needle tip, move the compass **tip to tail**, repeat to the south pole, then join the dots and add an arrow.
- Use a small plotting compass and keep steel objects and other magnets away.

4 The Earth's field



- Far from any magnet, a compass still lines up with the **Earth's magnetic field**: evidence that the Earth's core is magnetic.
- Helpful extra: a compass's north end is attracted to a south pole, so a magnetic south pole lies near the geographic North Pole.

Exam tip

Don't write "the compass points north". Write "the compass needle lines up with the Earth's magnetic field", and check your field-line arrows go from north to south.

Check yourself

- 1 Where is the field of a bar magnet strongest?
- 2 Which way do the arrows on field lines point?

Answers: 1. At the poles 2. From the north pole to the south pole