

Electromagnets solutions

Answers

1. How do we know that this is an electromagnet?

We know it is an electromagnet because the magnetic field only exists when an electric current flows through the wire coil. When the current is turned off, the paper clips are no longer attracted, showing that the magnetism depends on electricity.

- At what points along the electromagnet is the magnetic field the strongest? How can you tell?

The magnetic field is strongest at the ends (the poles) of the electromagnet. This can be seen because the paper clips are mainly attracted to and stick at the ends of the iron core. The field lines are closest together at the poles, indicating a stronger magnetic field there.

- Explain why the paper clips are not attracted to the electromagnet at its centre but appear to be attracted at the ends.

At the centre of the electromagnet, the magnetic field lines run roughly parallel to the surface of the iron core and are more evenly spread out, so the field is weaker there. At the ends, the field lines emerge or enter the iron core and are much denser, creating strong north and south poles that attract magnetic materials like paper clips.

A summary of the video reveals that the paper clips move toward and cling to the ends of the iron core when the electromagnet is switched on, showing that a magnetic field is produced by the electric current. When the current is turned off, the paper clips fall away, indicating that the magnetic field disappears. This demonstrates that the magnetism field depends entirely on the flow of electricity through the loops of wire. An interesting question may be "Will a magnetic field be created if the wire runs the length of the iron core rather than looping around the iron core?"