



# I Can Statement - Year 7

## Magnets and Electromagnets

| Unit/Topic Overview                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Pre-taught Vocabulary |                  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------------------|
| <p>In this topic, magnetism and electromagnetism are key ideas in science that help us understand non-contact forces created by magnetic fields and moving electric charges. You will learn how permanent magnets attract or repel materials, how magnetic poles interact, and how passing an electric current through a wire generates an artificial magnetic field. Electromagnetism also helps us understand how controlled magnetic fields are used in switches, motors, and generators. By studying magnets and electromagnets, you will be able to better explain modern technologies and circuit components.</p> | Magnet                | Electromagnet    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Magnetic Field        | Solenoid         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Magnetic Pole         | Electric Current |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Attraction            | Induction        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Repulsion             | Ferromagnetic    |

| RAG Rating: |                                                                                                                                                                                                                     | Start | End |
|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-----|
| 1.          | I can distinguish between magnetic materials (Iron, Nickel, Cobalt, and Steel) and non-magnetic materials, explaining that not all metals are magnetic.                                                             |       |     |
| 2.          | I can state the law of magnetic poles: Like poles repel; opposite poles attract. They can demonstrate this using a pair of bar magnets.                                                                             |       |     |
| 3.          | I can define magnetism as a non-contact force and describe how the strength of the force decreases as the distance between the magnet and the object increases.                                                     |       |     |
| 4.          | I can accurately map a magnetic field using plotting compasses or iron filings, showing the field lines moving from the North Pole to the South Pole.                                                               |       |     |
| 5.          | I can explain that the Earth has a magnetic field and that a compass needle aligns itself with this field, acting as a navigation tool.                                                                             |       |     |
| 6.          | I can describe the difference between a permanent magnet (always magnetic) and induced magnetism (a material that becomes a magnet only when placed in a magnetic field).                                           |       |     |
| 7.          | I can successfully build a simple electromagnet by wrapping a coil of wire around a magnetic core (like an iron nail) and connecting it to a power source.                                                          |       |     |
| 8.          | I can explain the primary advantage of an electromagnet over a permanent magnet: it can be switched on and off by controlling the flow of electricity.                                                              |       |     |
| 9.          | I can identify and test the factors that increase the strength of an electromagnet, specifically: Increasing the number of turns in the coil. Increasing the current (voltage). Using a magnetic core (e.g., iron). |       |     |
| 10.         | I can link the properties of magnets and electromagnets to practical uses, such as maglev trains, electric motors, or scrap metal cranes.                                                                           |       |     |