Forms part of the Gr 10 Physical Sciences 3-in-1 Class text and Study Guide.
See p. 19 & 20 MODULE 1 TOPIC 1 Units 6 to 8 for the theory.

PRACTICAL INVESTIGATION

Conductivity of metals and non-metals

Electrical conductivity

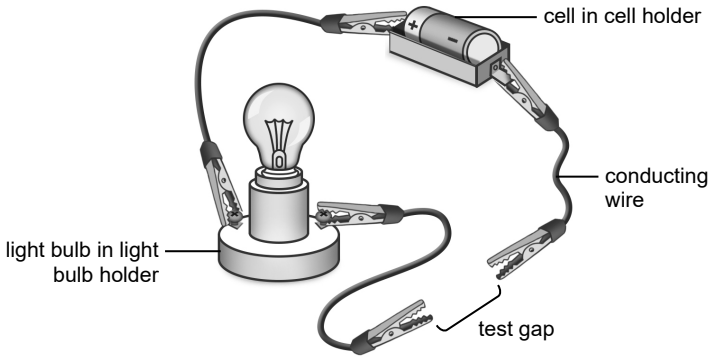
PART 1

Materials

- cell in a cell holder
- light bulb in a light bulb holder
- 3 copper conducting wires with crocodile clips
- pieces of different materials similar in size, e.g. glass, wood, graphite, copper wire, zinc plate, aluminium foil, steel nail, nickel coin, brass coin, stainless steel ring/disk, silver/gold ring, plastic button, cork stopper

Method

1. Construct a circuit as shown in the diagram below. Connect the cell and light bulb making sure to leave a test gap somewhere between two conducting wires.



2. Connect each of the materials/objects into the test gap, one at a time. Observe and compare the brightness of the light bulb in each case.
3. Draw a table with all the different materials to indicate which of them can conduct electricity. Try to arrange the conductors in order of increasing electrical conductivity.

Conclusion

- If the light bulb lights up, the material is an electrical conductor.
- The brighter the bulb lights up, the better conductor the material is.

NOTE

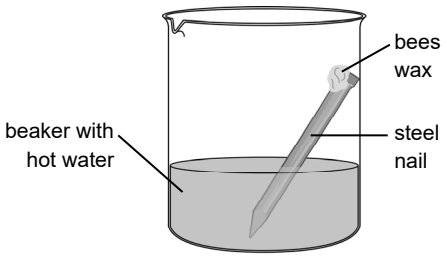
The light bulb may be replaced with an ammeter to measure the strength of the electric current in each case.

Thermal conductivity

PART 2

Materials

- a beaker with hot water
- tongues
- stopwatch
- bees wax/candle wax
- small pieces of the materials used in **Part 1**



Method

1. For each material used in **Part 1** – put a small amount of bees wax/candle wax onto the one end of the material.
2. Use the tongues to hold the other end of the material (without the wax) into the beaker with hot water.
3. Measure the approximate time it takes for the wax to melt.
4. Draw a table with all the different materials to indicate which of them can conduct heat. Try to arrange the conductors in order of increasing thermal conductivity.

Conclusion

The faster the wax melts, the better the substance conducts heat.

Magnetic properties

PART 3

Materials

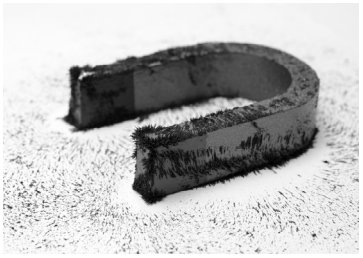
- a permanent horseshoe magnet
- small pieces of the materials used in **Part 1**

Method

1. Take turns holding the materials in **Part 1** close to the permanent magnet.
2. Observe which materials are attracted by the magnet.
3. Draw a table with all the different materials to indicate which of them are magnetic.

Conclusion

- Materials that are attracted by a magnet are **magnetic**.
- The metals iron and nickel are the only magnetic materials in this investigation.
- The only other metal that is magnetic is cobalt.
- Non-metals are **non-magnetic**.



Horseshoe magnet attracts iron filings