ScienceCube

Finding the Poles of a Magnet

Learning Objectives	Identify the poles of a magnet.
Should I think about it?	Determine which part of the magnet attracts the most paperclips.

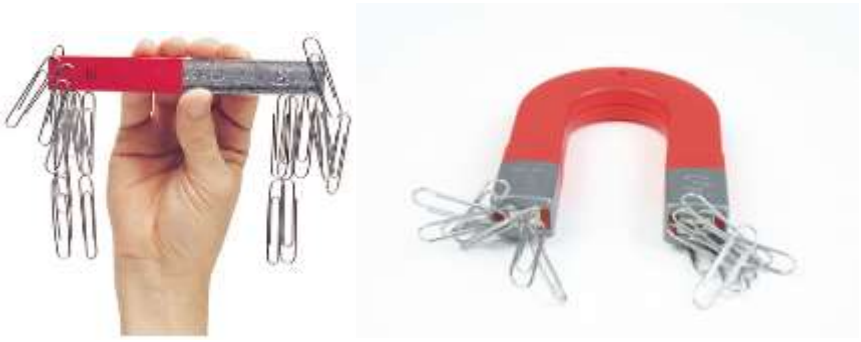
Learning Content

1. Magnetic Poles

1) What are magnetic poles?

- The parts of a magnet where the most paperclips stick.

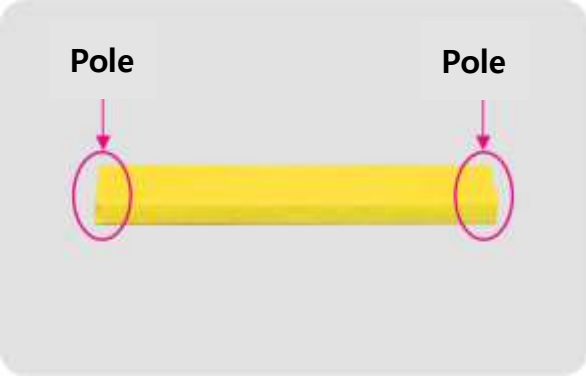
- Magnetic poles exert a much stronger force than other parts of the magnet.

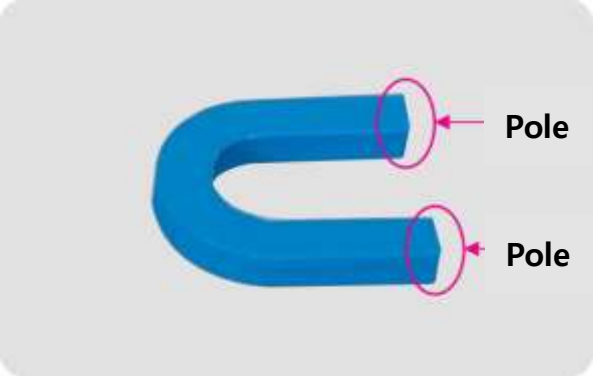


2) Why do most paperclips stick to the magnetic poles?

- The force that attracts objects is strongest at the poles.

- Every magnet has two poles.





2. Types of Magnetic Poles

1) Bar Magnet: Has N and S poles at each end of the bar.

2) Horseshoe Magnet: U-shaped with N and S poles at each end.

3) Circular Magnet: Flat cylindrical shape with N and S poles on the top and bottom surfaces.

3. Magnetic Field Sensor

- A sensor that measures the strength of a magnet's force.

- The sensor at the end of a rod measures the magnetic force.

Experimental Activities

Materials Needed

Interface, Science# program (smart device), Magnetic field sensor, Bar magnet, Circular magnet (ferrite), Neodymium magnet, A4 paper, Ruler, Pencil, Colored stickers (for marking magnet positions), Cellophane tape

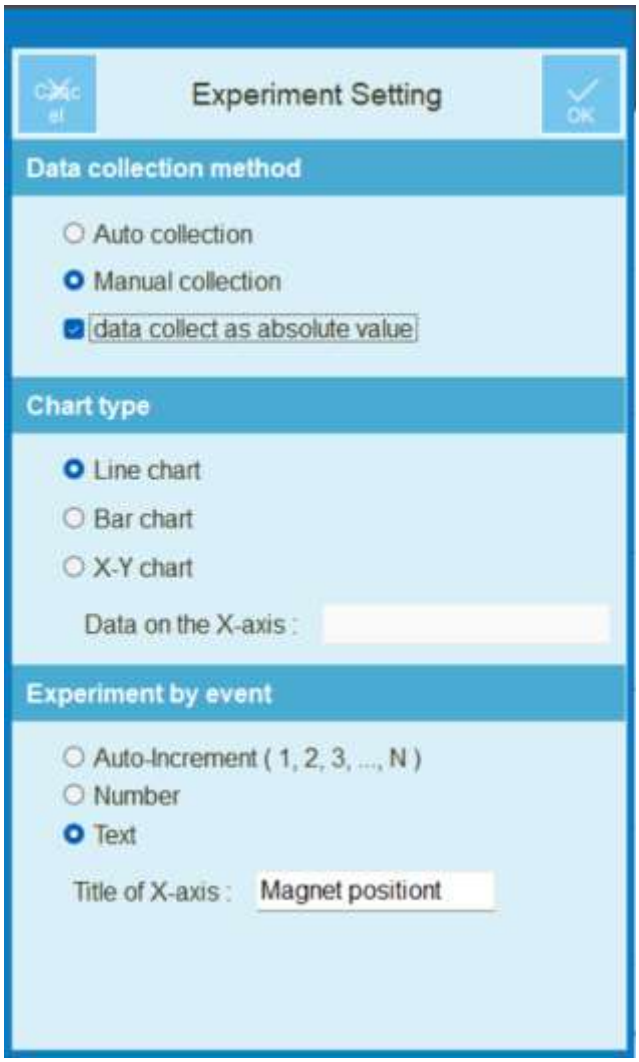
Experimental Procedure

Setup

1. Run the Science# program on your smart device and connect it to the powered-on interface via Bluetooth or cable.

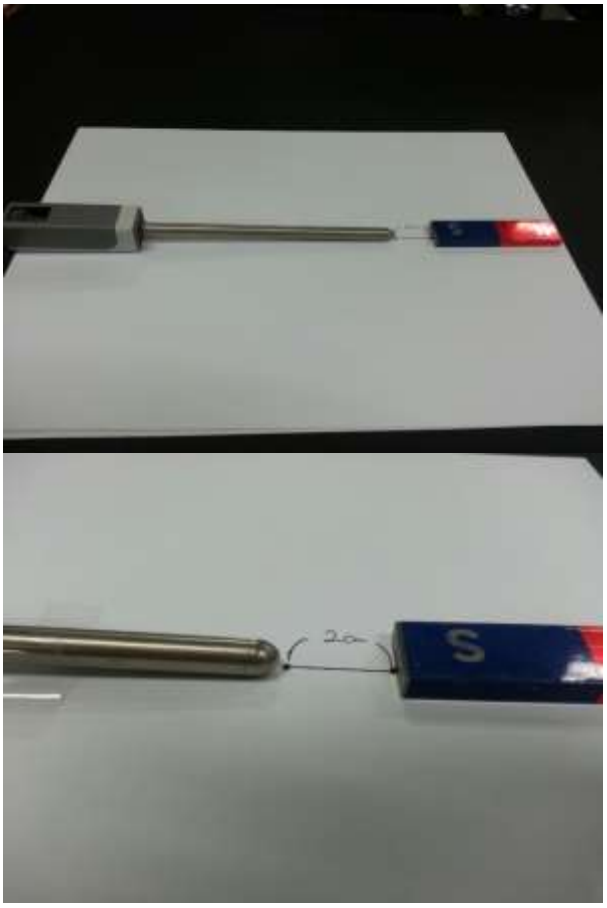
2. Connect the magnetic field sensor to the interface.

3. Press  in Science# to set up the experimental environment as shown (automatic setup).



[Experiment 1] Finding the Poles of Various Magnets

1. Draw a 2 cm line in the center of the A4 paper and fix the magnetic field sensor at one end with cellophane tape.
2. Press  to zero the sensor (ensure no magnets are nearby).
3. Place the bar magnet parallel to the line on the opposite end from the sensor.



4. Press the and buttons to measure the magnetic force of the bar magnet and name the position (e.g., N pole, or red sticker).

5. Rotate the bar magnet clockwise, measuring the force at each of the four sides..

6. Press to end the experiment, remove the bar magnet, and press to title the chart <Bar Magnet>.

7. Press and place the circular magnet in the bar magnet's position.
8. Stand the circular magnet with its flat surface facing the sensor, press to measure the force, and name the position (e.g., front, yellow sticker).
9. Rotate and measure the force for the circular magnet's sides and back, pressing to end the experiment.

10. Press to title the chart <Circular Magnet>.

[Experiment 2] Comparing the Strength of Two Circular Magnets

1. Press and replace the ferrite circular magnet with the neodymium magnet.
2. Measure the force of the neodymium magnet at each position using the same method.

Experimental contents

1. Compare the strengths of different shaped magnets using the magnetic field sensor and

represent the forces in a bar graph.

Bar Magnet

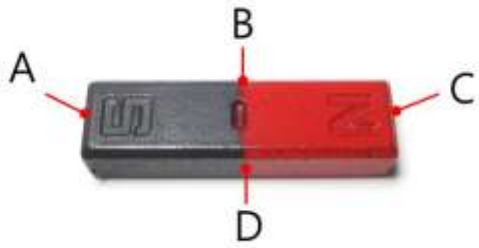
Circular Magnet (Ferrite)

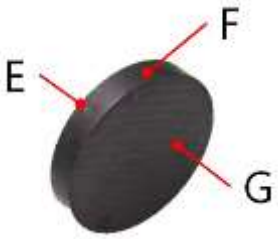
Circular Magnet (Neodymium)

2. Identify the parts of the graph that indicate the poles of the magnets.

Experimental results

1. Indicate the symbols for the poles of the bar magnet and the circular magnets based on the measured strength.





2. When comparing the strength of the two circular magnets (ferrite and neodymium), which one was stronger? Explain why you think so.


Report
(For Teachers)
Report
(For Students)