Earth's Magnetosphere- Student Activity

Magnetic fields around poles or magnetospheres

Earth is surrounded by a magnetic field (magnetosphere) like a simple dipole (two pole) magnet.

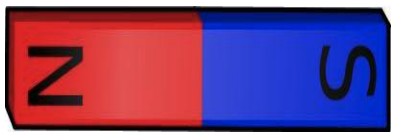
Materials per student or group

- Two dipole bar magnets
- Scrap paper
- Kitchen plastic film (Glad wrap or equivalent)
- Iron filings (preferably in a shaker)

Method

1. Wrap one magnet tightly with wrap.
2. Place on a piece of scrap paper.
3. Sprinkle iron filings across the magnet.
4. Draw what you observed below

Magnetic influence around one dipole magnet



Can you observe the sphere of magnetism around the magnet? Explain your answer.

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Place another sheet of paper over the magnet and sprinkle filings over its surface.
What can you infer?

_____

_____

_____

Earth's Magnetosphere- Student Activity

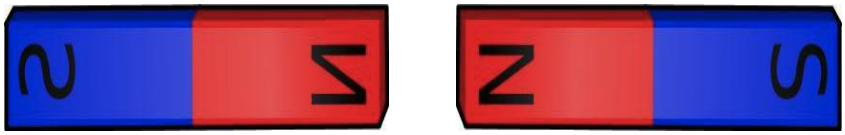
Magnetic influence between two opposing dipole magnets

Materials per student or group

- Two dipole bar magnets
- Scrap paper
- Kitchen plastic film (Glad wrap or equivalent)
- Iron filings (preferably in a shaker)

Method

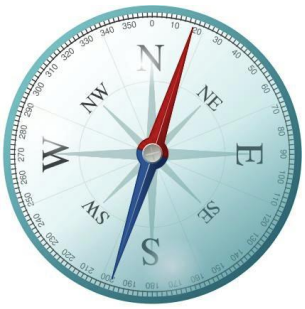
1. Separately wrap both magnets tightly with plastic.
2. Place 1cm apart with North Pole facing North Pole on a piece of scrap paper
3. Sprinkle iron filings across the magnets.
4. Observe and draw what you saw below.



Earth's magnetic field is not due to an internal magnet but is probably created by the rotation of the inner solid nickel iron core within the liquid outer core. Since the field is driven by movements in the core the magnetic poles are not in the same location as the geographic poles, wander and can even reverse, over time.

Interesting Fact: Magnets were called 'lodestones' because they could lead you to the correct path by indicating north.

How do the magnetic poles differ from the geographic poles?



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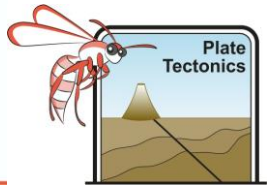
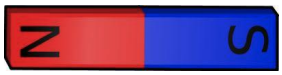
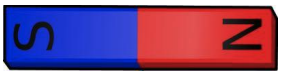


Interesting Fact: When working near the magnetic poles, a simple compass will not work as the declination of the needle towards the centre of the Earth is too steep to permit rotational movement.





Approach one pole of a magnet with the same pole of another magnet (north with north or south with south).

I observed _____

_____

Then approach one magnet with the opposite or unlike pole of another magnet.

I observed _____

_____

The rules for magnets are:

LIKE POLES (N and N or S and S) _____

UNLIKE POLES (N and S) _____

History tells that the Greek scientist and philosopher Archimedes used magnets to pull out the nails of attacking warships. Do you think this is true?

_____

_____

_____

Are magnetospheres spherical? _____