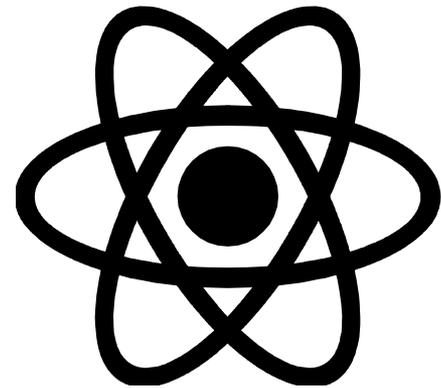
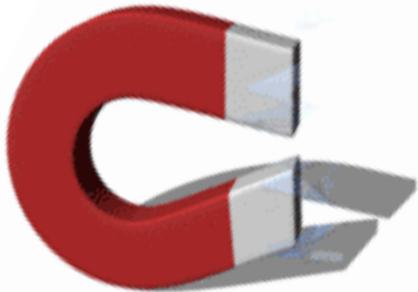
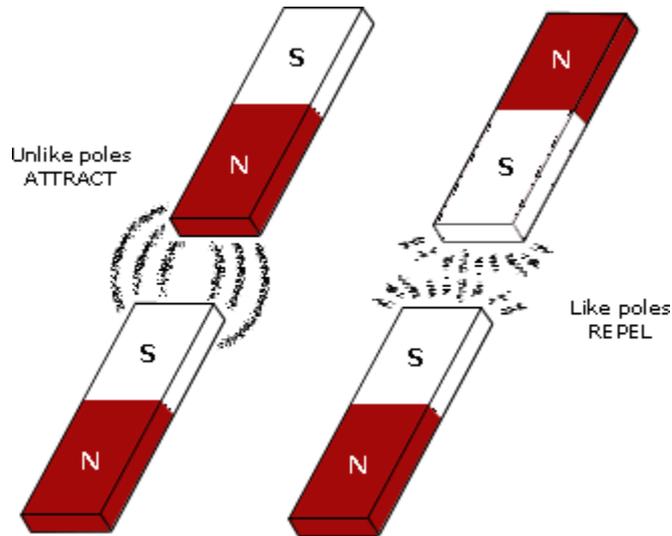


Magnetism



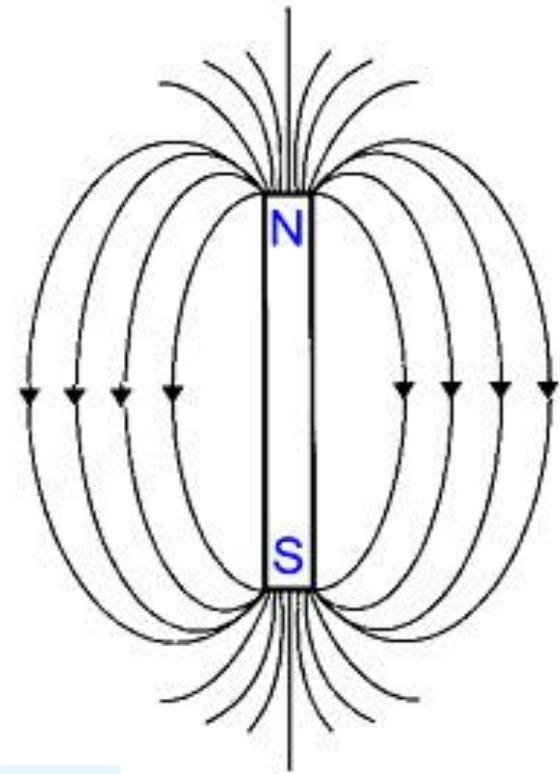
What is Magnetism?



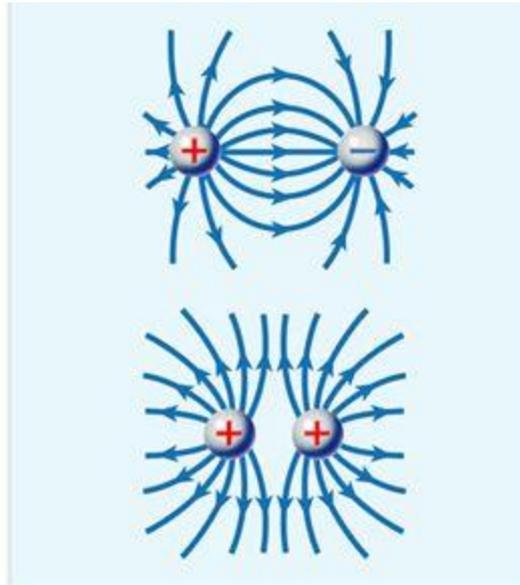
Magnetism is the force of attraction or repulsion of a magnetic material due to the arrangement of its atoms, particularly its electrons.

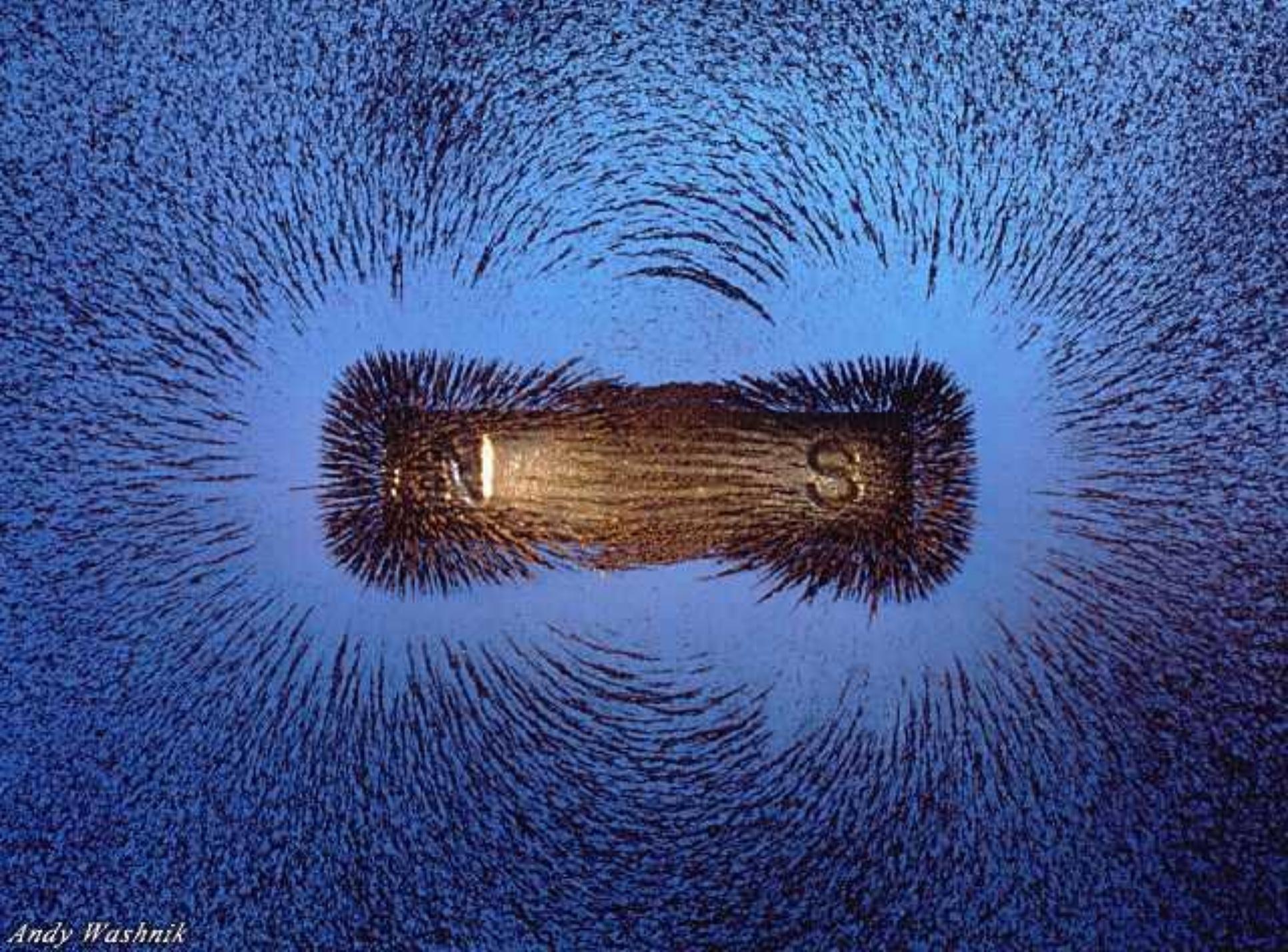
All magnetic phenomena result from forces/interactions between electric charges in motion.

- A magnetic field is a force field present around a magnet which exerts a force (a push or a pull) on other magnets or magnetic materials.



Similar to the electric field produced by negative and positive charges like during friction.

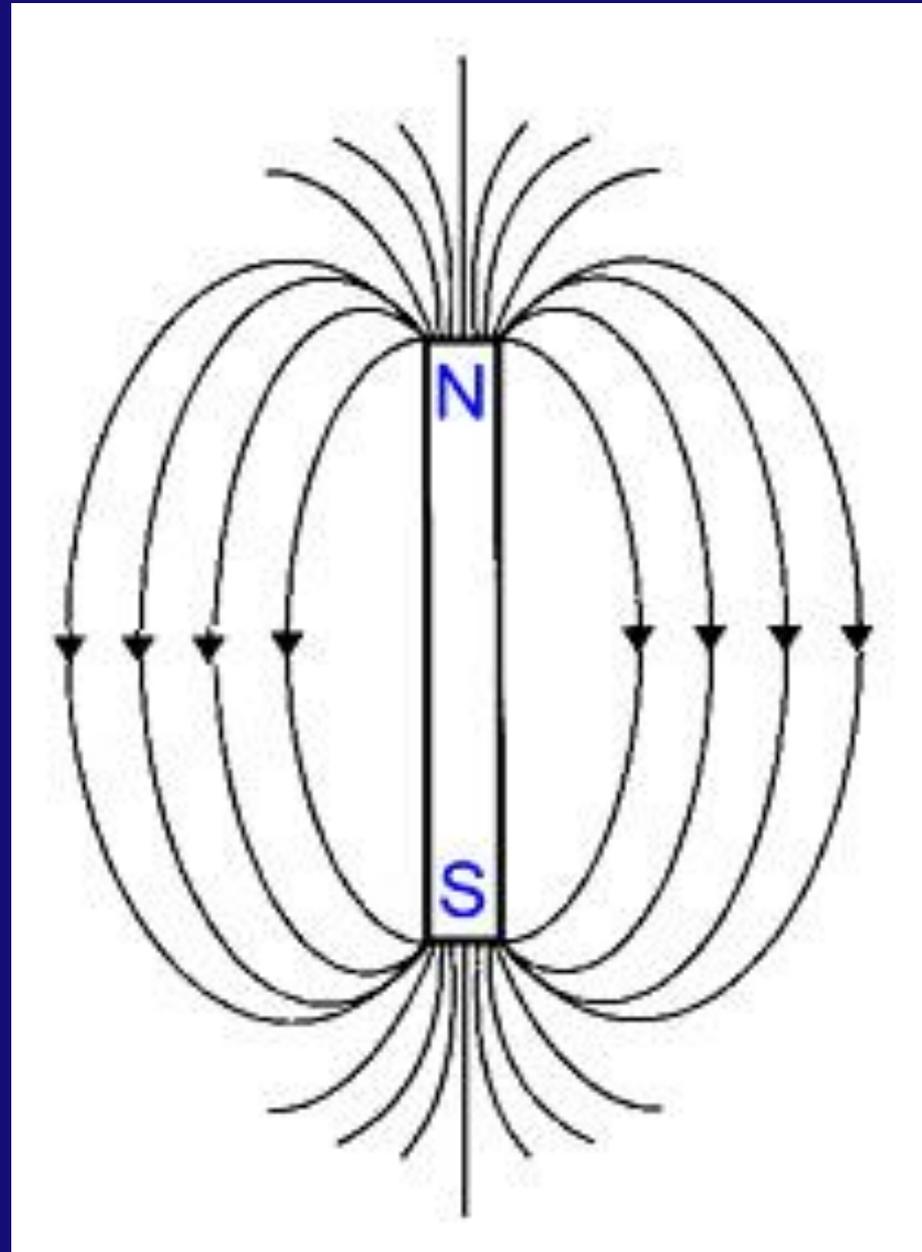




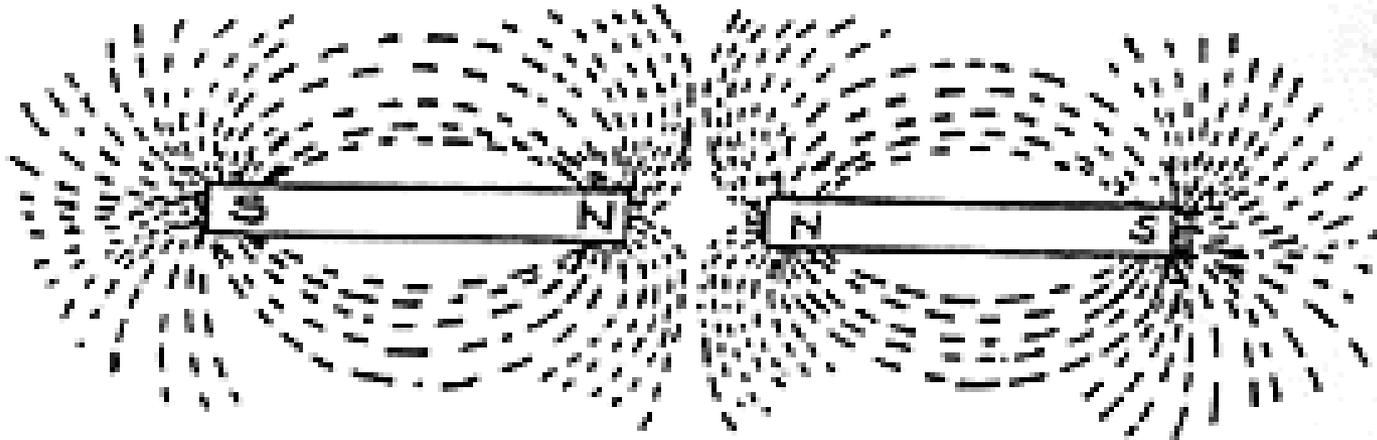
- In the picture, the closer the lines the greater the magnetic force.

The force is greatest next to the poles.

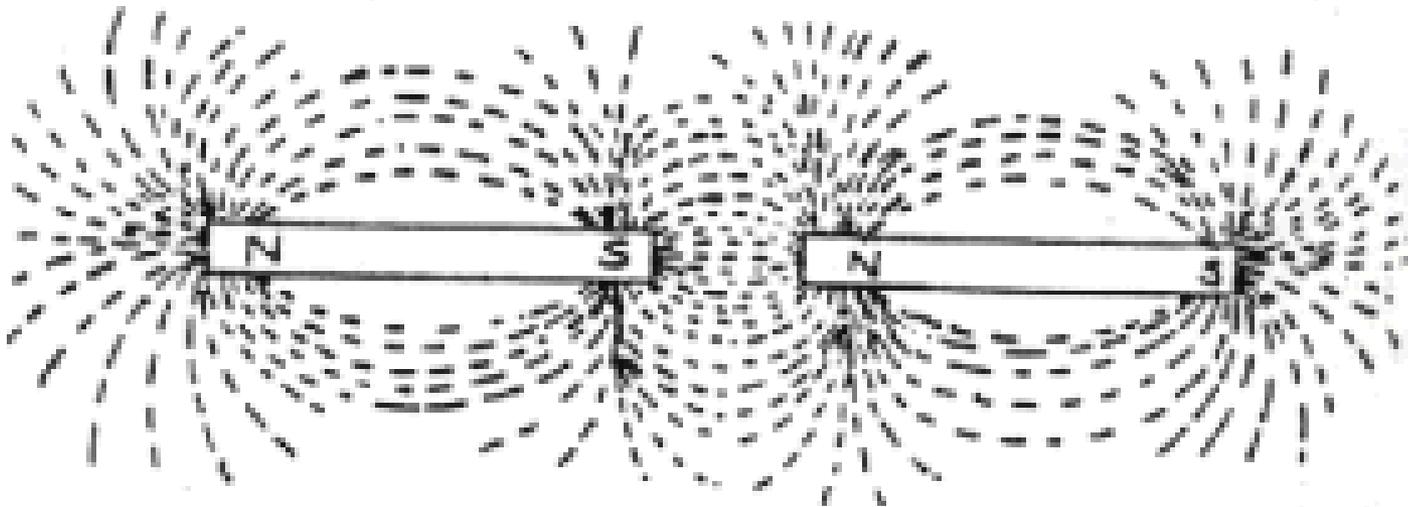
A magnetic pole is the north (+) or south (-) end of a magnet where the force is the greatest.



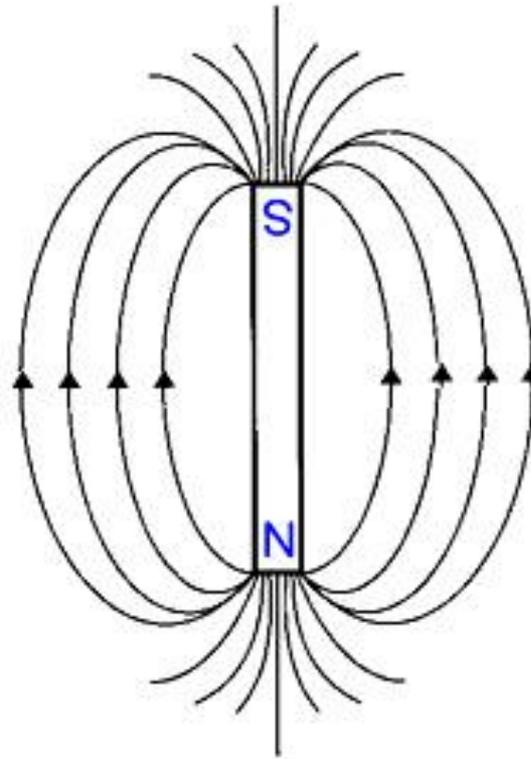
Like repels like...



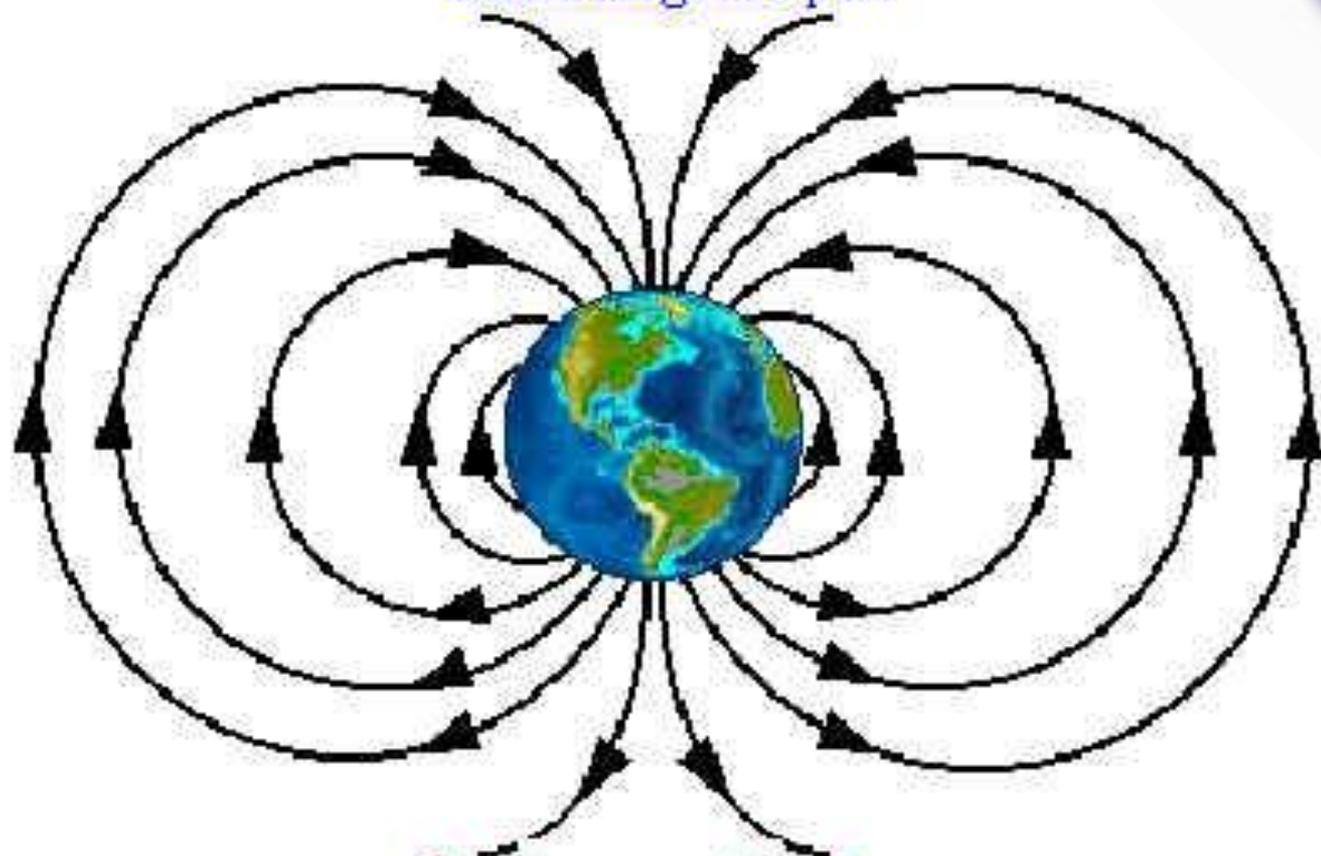
Opposites attract!



- A magnetic field causes a magnet to align in the direction of the opposite pole. So the north end of the compass aligns with the south end of the magnet. Remember opposites attract.

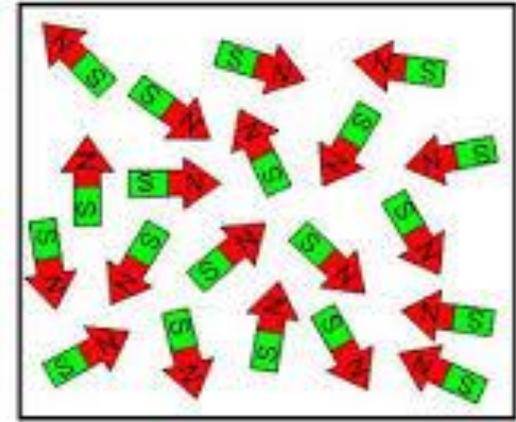
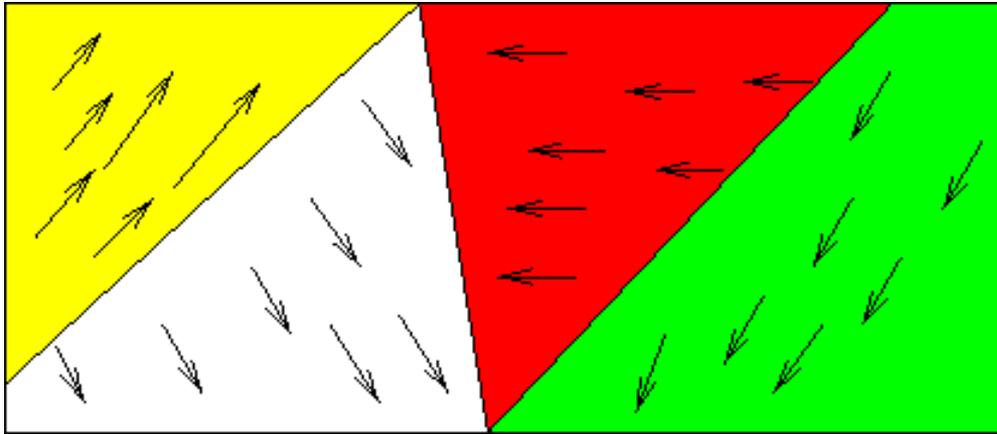


North geographic pole
South magnetic pole



South geographic pole
North magnetic pole

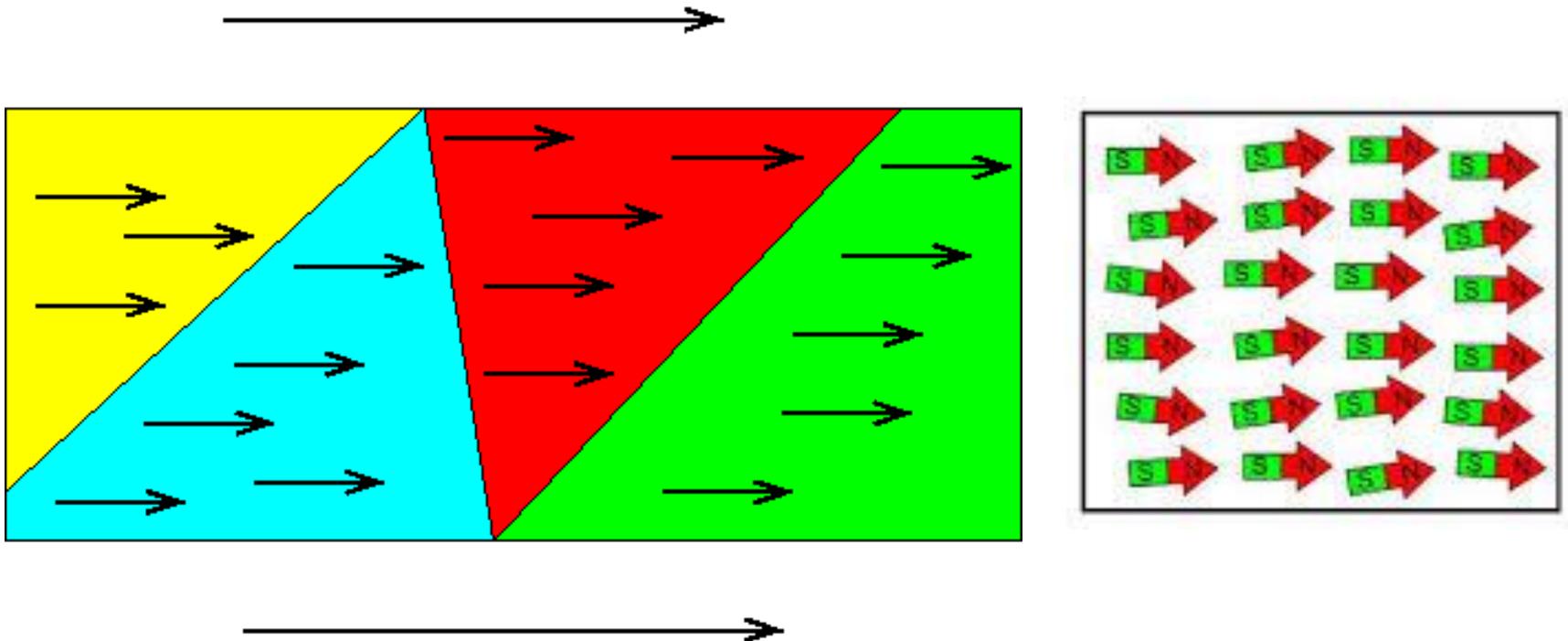




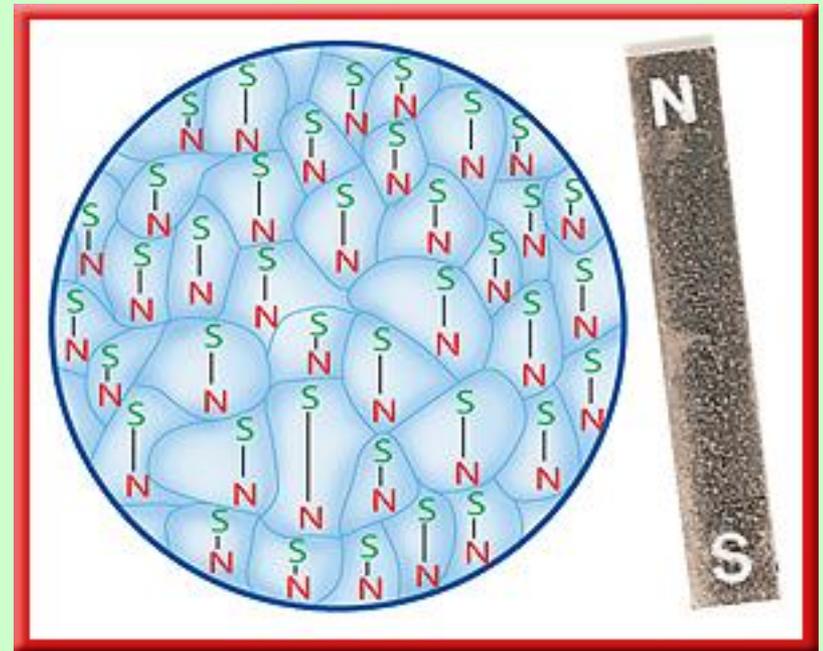
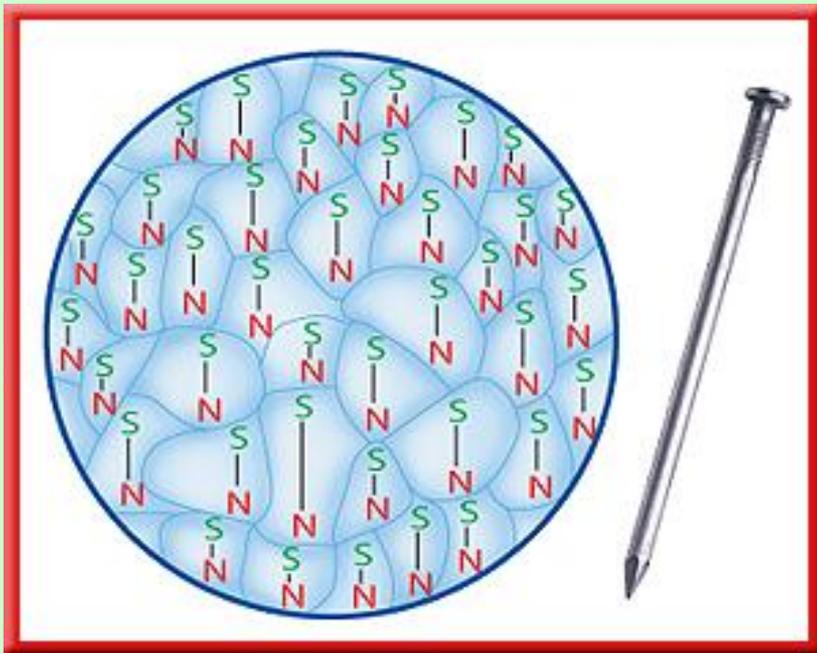
- ☆ **Atoms themselves have magnetic properties due to the spin of the atom's electrons.**
- ☆ **Groups of atoms join so that their magnetic fields are all going in the same direction**
- ☆ **These areas of atoms are called “domains”**
- ☆ **Materials that do not exhibit a magnetic force look like the example above.**

A magnets has domains that align in the same direction.
When an unmagnetized substance is placed in a magnetic field, the substance can become magnetized.
This happens when the spinning electrons line up in the same direction.

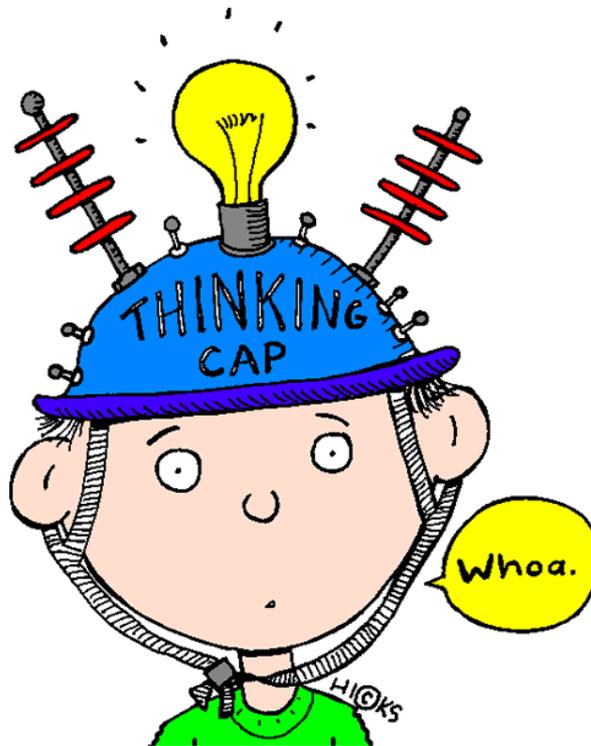
External Magnetic Field



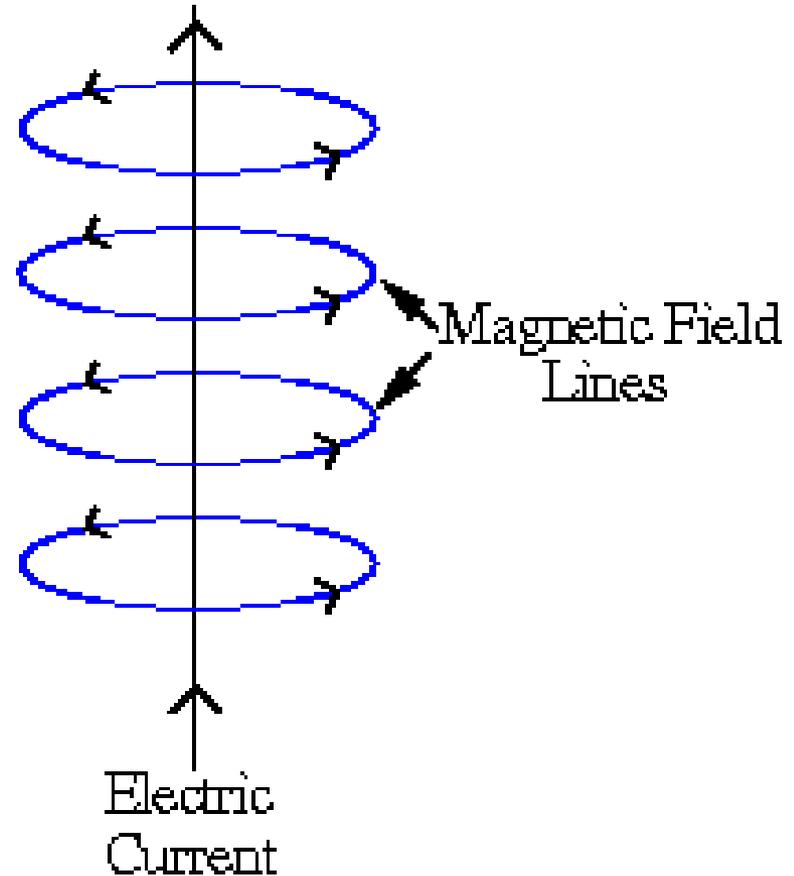
- Different materials can become magnets or are effected by magnets. Iron is the most common, but cobalt and nickel have similar properties.
- These atoms(domains) can be made to align by either passing an electric current through the material, or by placing the material next to a magnet. These methods, however, will only create temporary magnets.



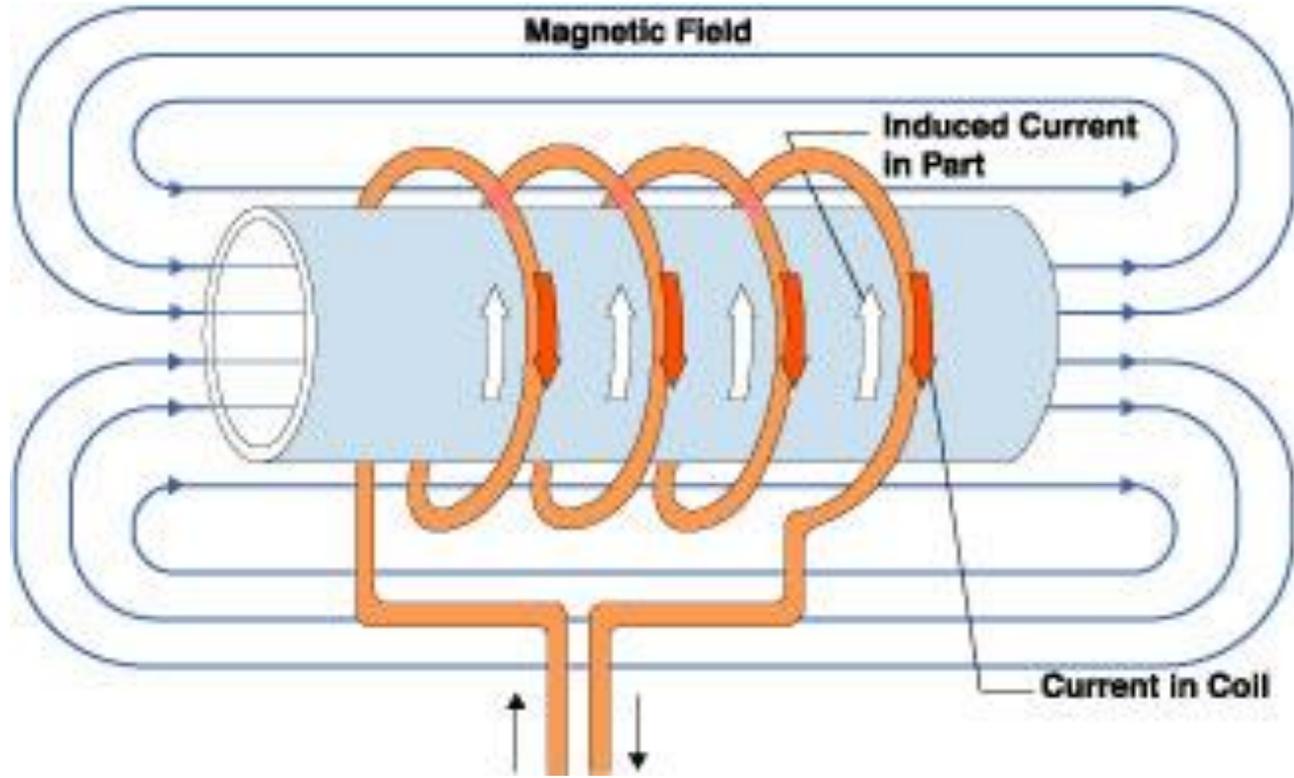
- Is the strength of a magnet determined by it's size?

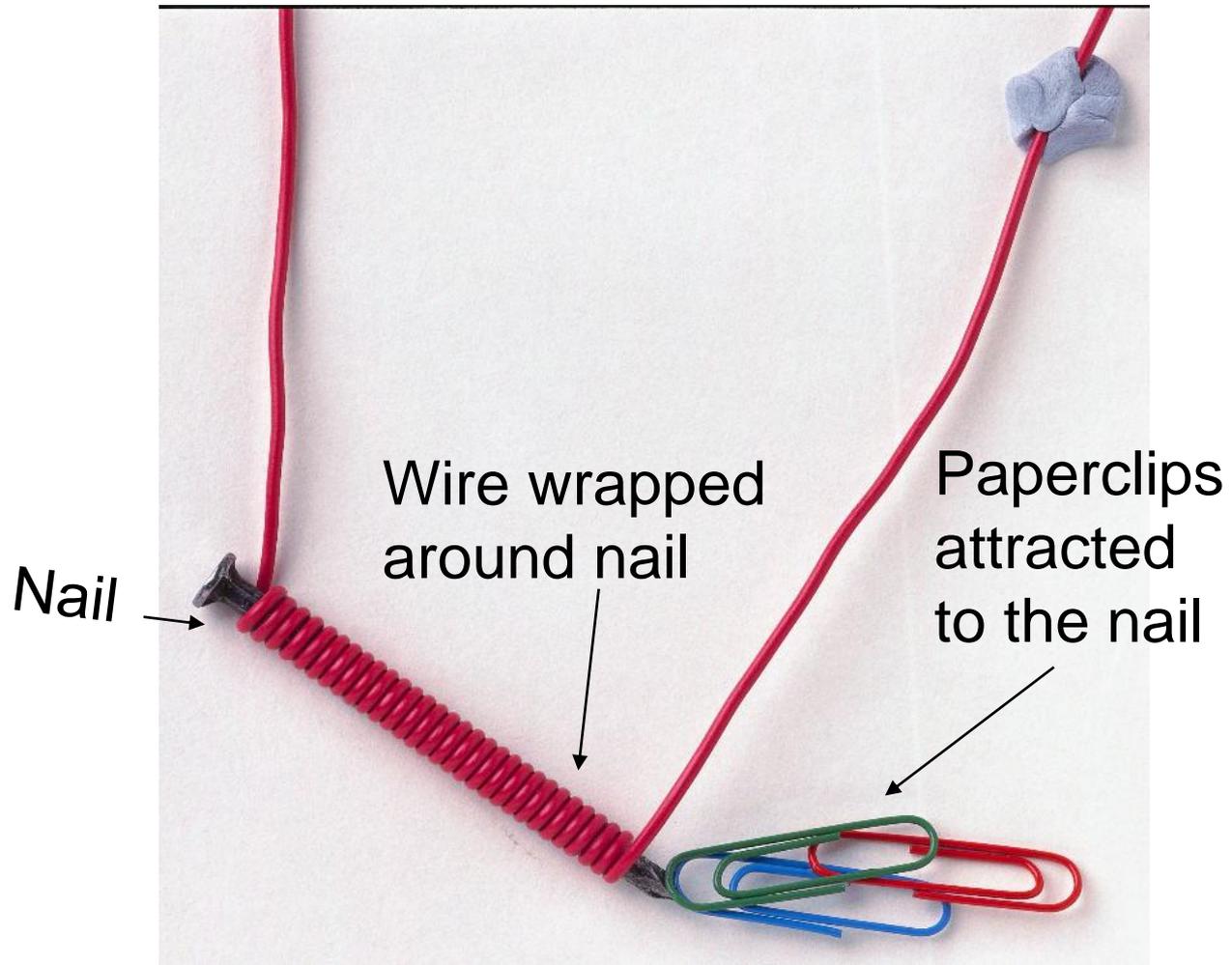


- Because magnetism can be created by electrons in atoms, and electricity is created by the flow of electrons, it stands to reason that an **electric current can produce a magnetic field.**



- An electromagnet is a temporary magnet created by coiling a wire around a metal core, and passing a current through the wire.



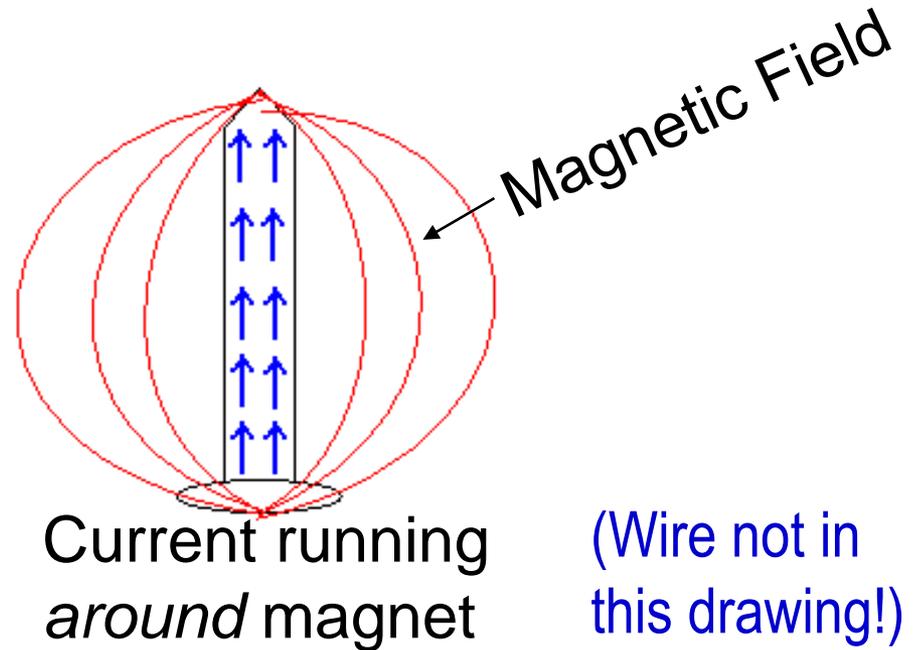
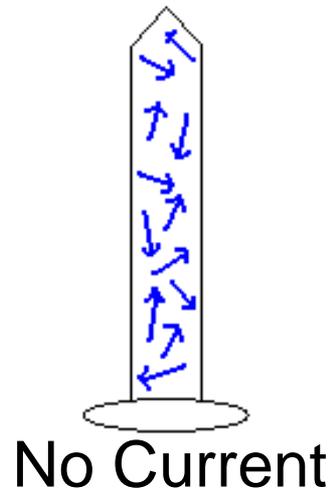


Nail

Wire wrapped
around nail

Paperclips
attracted
to the nail

Electromagnet



Strength of Electromagnet depends upon:

1. The size of the iron core

Larger core = Stronger electromagnet

2. The number of turns of wire around the core **More turns = Stronger electromagnet**