

Hewitt – Magnetism Video

https://www.youtube.com/watch?v=0pGeOER_zB0



Hewitt – Electromagnetic Induction

https://www.youtube.com/watch?v=iMMKT_9rcpM



Permanent Magnets

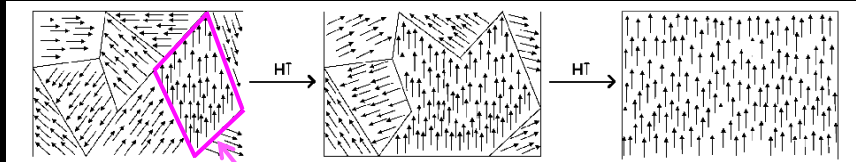
- Naturally occurring magnets (called lodestones) have been known for over 2000 years
- The Chinese were using magnets as compasses when the first Europeans visited.
- Magnets today are used in: motors, TVs, tape recorders, microphones

Magnets and Magnetic Fields

- ☐ Magnets have two poles
 - ☐ North and South
 - ☐ Like poles repel and unlike poles attract
 - ☐ Magnetic fields by convention start at the north pole and go to south pole
- ☐ If you break a magnet each piece still has two poles; you never get an isolated magnetic pole.

Permanent Magnets

- Magnets are created due to small *magnetic domains* inside a material on the microscopic level.
- As the domains align, the material will exhibit the magnetic properties.



magnetic domain

- Iron magnets are considered magnetically soft since they gain and lose magnetic fields easily.

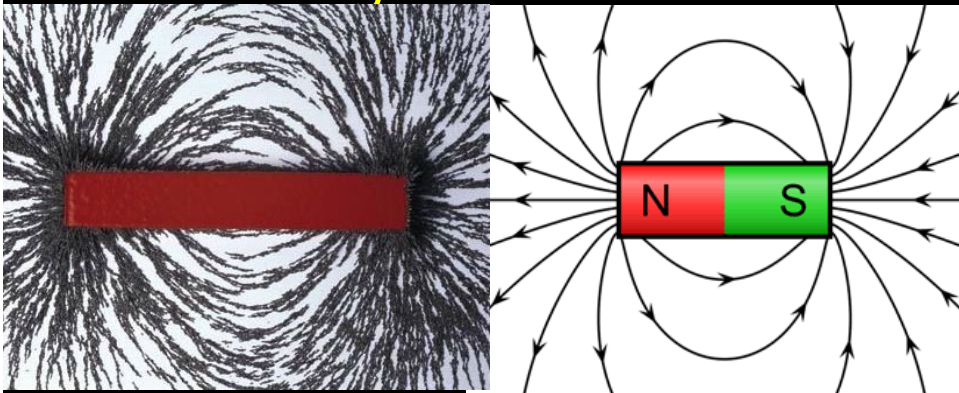
More on Magnets

- Nickel and Cobalt magnets and ceramic magnets are considered hard magnets.
 - Once the domains of hard magnets are aligned, the domains are not easily disordered.

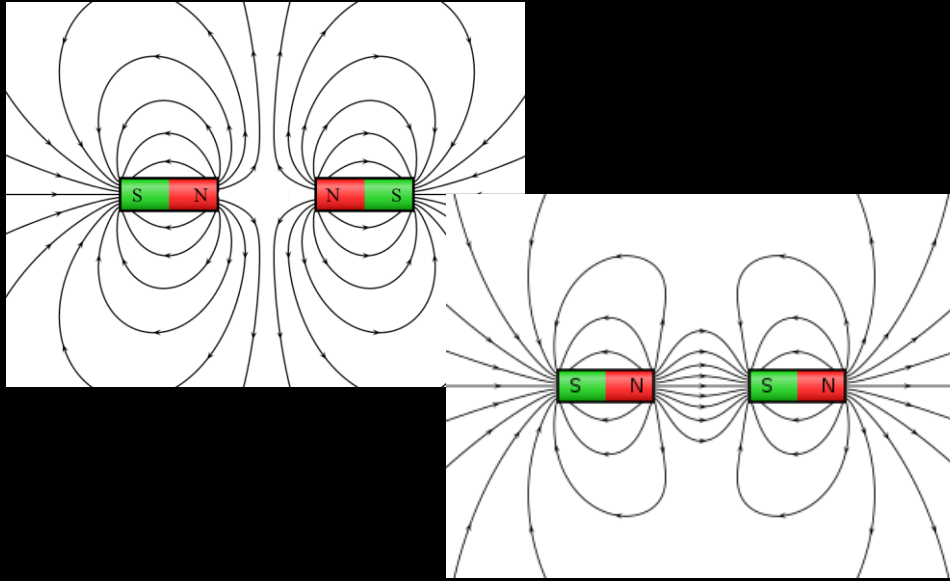
General Properties of Magnets

- Magnets can temporarily polarize some conductors, making them magnets as well.
- Magnetic poles always come in pairs.
 - ❖ No magnetic monopoles have been found.
- Can be made of exotic material combinations such as ALNICO (Aluminum, Nickel, and Cobalt) or rare-earth elements such as neodymium.

Magnetic Fields



Interaction between Magnetic Fields



Magnetic field is represented by the letter **B** and is measured in Tesla's (T)

➤ In the plane of the page



➤ Into the page



➤ Out of the page (towards reader)



Lets think about the Earth



- The **GEOGRAPHIC North pole** is the earth's **MAGNETIC south pole**
- The **GEOGRAPHIC South pole** is the earth's **magnetic north pole**
- **WHY???**

Because the north end of a compass has to point which direction?

SOUTH!!