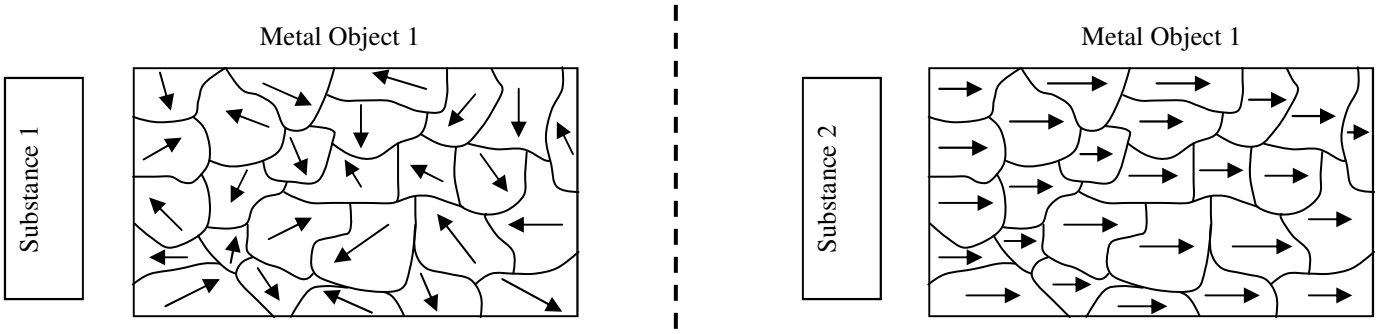
A-Day Due Tues., May 12
B-Day: Due Wed., May 13

2009 PreAP Magnetism 2

You should first complete the regular physics homework: Magnetism 2.
Those of you that missed class, must make up the lab we did. Do it very soon.



1. Substance 1 is placed next to a piece of metal (Object 1). Then Substance 1 is removed and Substance 2 is placed next to Object 1. The microscopic view of Object 1 is shown for both situations and occurs immediately.
   A. The small regions of the metal are known as what?
   B. Which substance is magnetic: Substance 1 or Substance 2?
   C. Justify your answer.

   D. For the magnetic substance you chose in part B, above, label its North and South magnetic poles.

   E. Is Object 1 a soft or hard magnetic substance?
   F. Why?

   G. What type of metal is it, most likely?

   H. A non-ferrous materials (one that cannot be magnetized) would look like which picture of Object 1?

2. We now know that current carrying wires produce magnetic fields. Let's use logic to figure out how current and distance change the strength of the magnetic field (B).
   A. Do the magnetic field lines go out from a wire parallel to each other or do they separate from each other with greater distance?

   This is just like for a point charge.
   B. If the distance from the wire is doubled, how will the magnetic field strength change?
   C. If the current in the wire is doubled, how will B change?

   $F_{magnetic} = qvB$, *where q is a charge in coulombs, v is velocity of the charge in m/s, and B is the magnetic field in Teslas. This equation is valid only if the charge is moving perpendicular to the magnetic field.*

3. What is the force on a 3C charge at rest in a 0.8 Tesla magnetic field?

4. A 5μC charge moving 180 m/s perpendicular to a magnetic field feels a 12 N force.
   A. What is the magnetic field strength?

   B. What will be the shape of the path of the charge in the magnetic field?

$F_{magnetic} = BI\ell$ *where B is a magnetic field not caused by the wire, I is the current in amps flowing thru the wire and "L" is the length of a straight wire.*

5. A 1.5 T magnetic field is surrounding a 35 cm long wire that has 1.2 amperes running thru it. What is the force exerted on the wire?

6. A 1.6 meter long wire carrying 6 A creates a 0.5 T magnetic field. What is the magnetic force on the wire?