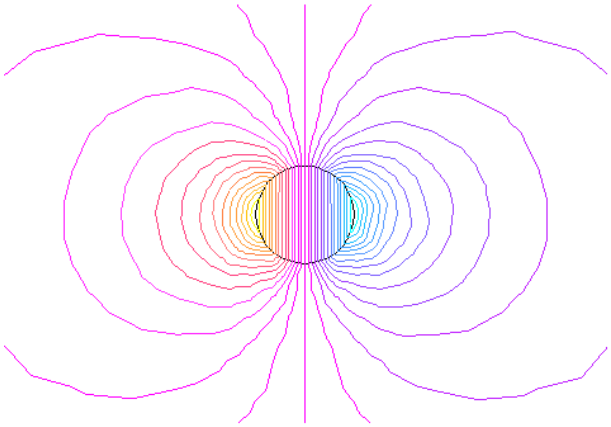
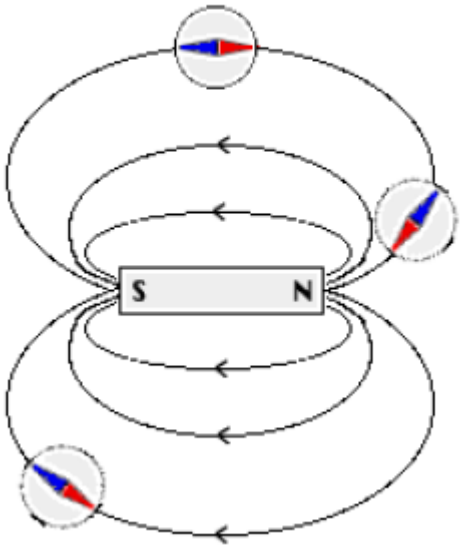
1. Which of the following materials form domains? Domains = ferromagnetic=Co,Ni,Fe,Nd

a. plastic__no_
b. silver(Ag)__ no_
c. copper(Cu)__ no_
d. cobalt(Co)__yes
e. neodymium(Nd)_ yes Fe,Nd,Co,Ni

2. What will happen to a ferromagnetic material like nickel if it comes into contact with a temporary magnet?
It will stick to it.

3. Draw the domains within a permanent spherical magnet.

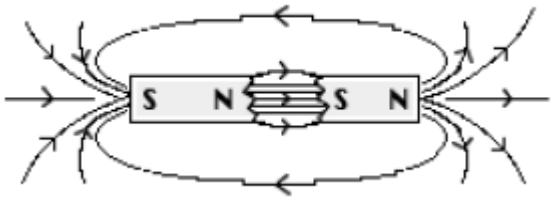




4. a) In the diagram above, are the magnetic field lines drawn correctly? yes
b) Label the North end of each compass needle. North is blue
c) Modify the diagram so that it represents a stronger magnet. Add more lines

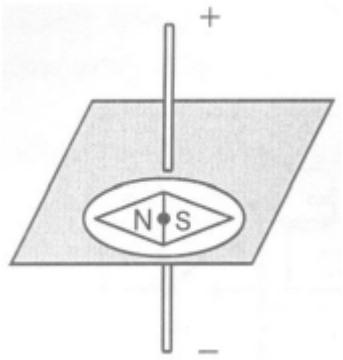
5. a) In the diagram below, can you predict whether the 2 magnets are attracting? Yes they are. Look at N and S in the middle.

b) Are the magnetic field lines correctly represented in between the two



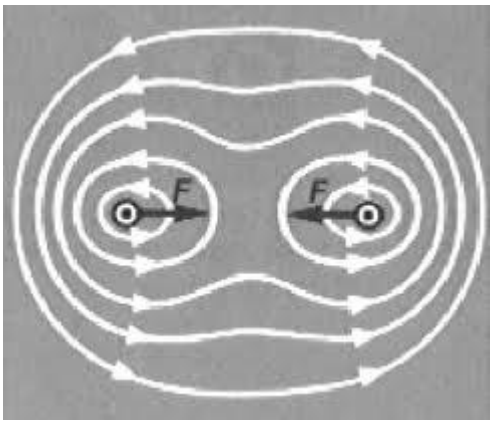
opposite poles? Yes

6. Why does the compass point to the left?



a. Apply the left hand rule. Have your thumb point up because the electricity is flowing straight (like your thumb) from (-) to (+). Notice that the rest of your fingers point left. This is the direction of the magnetic field in front of the wire. The field is caused by the moving electrons.

7. Imagine a very strong current flowing through two parallel wires. The electrons in the two wires are both flowing in the same direction. Draw the magnetic field around each wire. The resulting magnetic fields will interact. Will the wires repel or attract?



They will attract.

8. *A coffee maker is connected to a 120 V outlet. The resistance, R, of the heating* element of the coffee maker is 20 Ω. This coffee maker works for 15 minutes.

a) How much energy in joules is used by the heating element of the coffee maker during this period?

E = VIt
= 120 J/C(120/20)C/s(15*60 s)
= 648 000 J

V=IR, so I =V/R=120/20

b) What is the power rating of the coffee maker?

P = VI
= (120 J/C)(6 C/s) = 720 W = 720 J/s

c) How much will it cost to operate the coffee maker every year if it's used 15 minutes per day in a non leap year? Assume cost $0.075/kWh.

Every day: 648000J (1kWh/ 3 600 000 J) = 0.18 kWh
Whole year: 365*0.18kWh = 65.7 kWh

65.7 kWh($0.075/kWh.) = $4.93

9. A series circuit with three light bulbs has voltage drops of 1.2 V, 1.4 V and 1.4 V. The ammeter measures 0.50 A.

a) What is the wattage of the bulb that consumes the least energy?

P = VI = 1.2J/C(0.50 C/s) = 0.6 J/s = 0. 6 W.

b) How much energy is used by all three bulbs every hour they're turned on?

V_t = 1.2+1.4+1.4= 4.0 V
E = VIt=4(0.5)(3600 s) = 7200 J