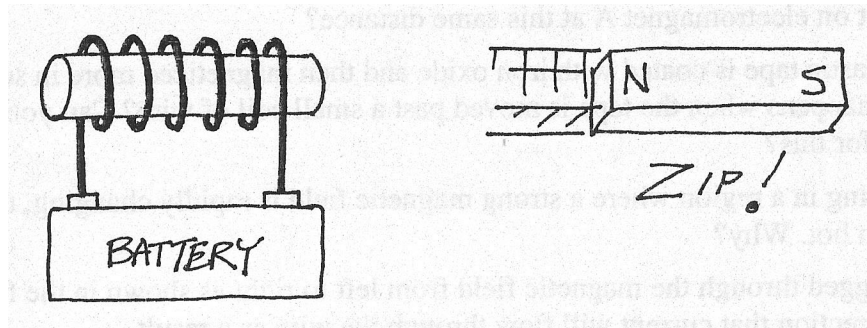


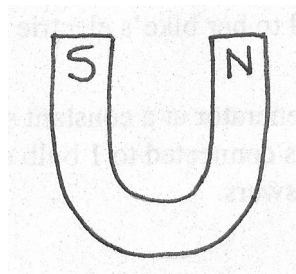
Physics

Magnet Homework

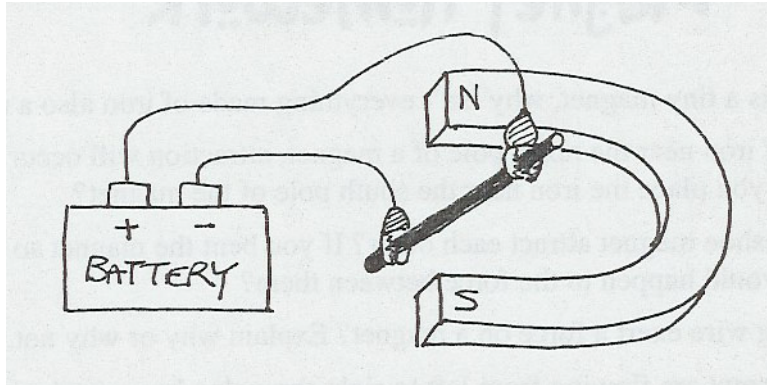
1. Since every iron atom is a tiny magnet, why isn't everything made of iron also a magnet?
2. If you place a chunk of iron near the north pole of a magnet, attraction will occur. Why will attraction also occur if you place the same side of the iron chunk near the south pole of the magnet?
3. Do the poles of a horseshoe magnet attract each other? If you bent the magnet so that the poles got closer together, what would happen to the force between them?
4. Does a current-carrying wire exert a force on a magnet? Explain why or why not.
5. Assume 10 amps of current are flowing from left to right through a horizontal wire. Draw a diagram using our arrow conventions to show where the magnetic field lines enter and exit the page. Would the magnetic field change if the current direction was reversed? If so, draw another diagram illustrating the second case.
6. Draw a diagram showing the magnetic field lines produced by the coil and magnet below:



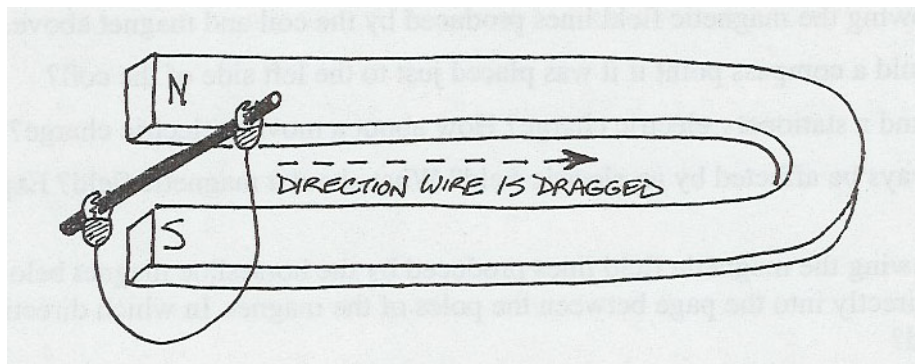
7. Which battery terminal is positive in the circuit above?
8. Which direction would a compass point if it was placed just to the left side of the coil?
9. What field(s) surround a stationary electric charge? How about a moving electric charge?
10. Will an electron always be affected by an electric field? What about a magnetic field? Explain your answers carefully.
11. Draw a diagram showing the magnetic field lines produced by the horseshoe magnet below. Suppose an electron is shot directly into the page between the poles of the magnet. In which direction will the electron be deflected?



12. Explain how a magnet placed in front of a black & white TV distorts the picture. **Warning!** Don't try this with a color TV, as it will permanently damage the set.
13. What would the picture look like if the electromagnets on the left and right sides of a TV picture tube burned out?
14. Which direction will the wire move in the following **3-D** diagram? What if **both** the direction of the current and the poles of the magnet are reversed?



15. What is the major difference between an electric motor and a galvanometer? How are they similar?
16. Residents of northern Canada are bombarded by more intense cosmic radiation than are residents of Mexico. Explain why.
17. Electromagnet A has twice the strength of electromagnet B. Give three potential causes for this difference. When separated by 1 meter, electromagnet A pulls on electromagnet B with a force of 20 newtons. How much force does electromagnet B exert on electromagnet A at this same distance?
18. If you place a metal ring in a region where a strong magnetic field is rapidly changing, the ring may become warm or even hot. Why?
19. A straight wire (with attached flexible wire to complete the circuit) is dragged through the field of the horseshoe magnet from left to right as shown in the following **3-D** diagram. Label the direction that current will flow through the straight wire as a result.



20. 10 volts AC is generated by a permanent magnet moving rhythmically back and forth inside a coil of wire with 100 turns. How many volts are generated if the permanent magnet is twice as strong, 100 more turns are added to the coil, and the permanent magnet is moved twice as fast?
21. Suppose you are trying to turn the hand crank of a generator at a constant speed of one revolution per second. Will it be easier to turn if the generator is connected to 1 bulb or 3 bulbs in series? How about 1 bulb vs. 3 bulbs in parallel? Explain your answers.