Physics 140 Discovery Room #9

10.3 switches, electric current, batteries, power, voltage; 11.1 magnets, compasses, electromagnets

Name_____ Date/Time_____

Flashlight circuit

1. Create a "flashlight" using one battery, a switch, and a light bulb. Using a dry erase marker, draw arrows on the board that show the direction of the current everywhere in the circuit. Copy a picture of your circuit and the arrows below.

2. Place the compass underneath one of the wires, with the wire running parallel to the needle. Turn the switch and watch the light turn on. What does the compass do? Why?

2. Compare the brightness of the light when you close the switch for two situations: one battery vs. two batteries in series (with the "+" terminal of one battery connected to the "–" of the other). How can you explain your observation?

3. Reverse the polarity of one of the batteries. What happens? Why?

4. Where is the most power consumed in this circuit? How can you tell? What can you say about power, voltage, current, resistance and how they are related? Which parts of the circuit have the highest resistance?

Fuses

Close the switch so that current begins to flow in the circuit. Observe what happens.

1. What causes the fuses to blow?

2. What can you say about the power consumed in the fuse?

3. Do you want a thin high-resistance wire as a fuse or a short thick copper bar as a fuse and why?

Electromagnet

Try to pick up the paper clips with the nail. Then connect the wire wrapped around the nail to the battery and try to pick up the paper clips again with the nail.

1. Can you pick up a string of paperclips? Why or why not?

2. Now disconnect the wire, do the paperclips still stick together at all? Why or why not?

Using the margins of this sheet of paper, write down a question regarding a topic, concept, or example you do not understand from this week in PHYS140.