

## Homework #1 – Due 1/28

If you have any questions about the homework, feel free to email me: [sawtelle@umd.edu](mailto:sawtelle@umd.edu)

There are two essay questions in this assignment. Read them carefully; think about them; think about how you're thinking about them. What assumptions might you be making? What assumptions might someone else make? What knowledge and experience do you have that might be related?

Please do talk with others in the class– it really helps to get other perspectives – but, please, write your own essays. Along the same lines, **don't worry about being "right"**! You're shopping around and collecting ideas, mostly from your own mind, and if you worry too much about being "right" too soon you're liable not to find as many good ones.

### 0) Reading Assignment

I would like for you to read through the syllabus. I basically skimmed the highlights in class, but I would like for you to e-mail to me ([Sawtelle@umd.edu](mailto:Sawtelle@umd.edu)) one question or comment you have from looking over the syllabus.

### 1) What makes a good model?

During your 12+ years of school so far, you have no doubt had many different kinds of science classes and teachers. Each one of those classes has contributed to your perception of what a science class “should” be like and has helped you form an opinion, or expectation, about the nature of science and science learning.

Today in class we had a discussion around the building paper airplanes. My hope with this task was to generate a conversation about what makes a good model as well as how we might best communicate with one another in this class. For this part of the homework I would like for you to write an essay examining why I might have chosen to do this activity on the first day of class. Additionally, I would like you to address the question of whether a paper airplane is a “good” model of an airplane in the sense of a science model. Remember, the point isn't about being right here, it's about making a good argument that has both a clear stance as well as reasons to back up the stance you take.

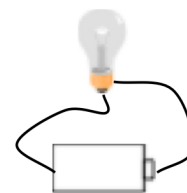
### 2) What's going on in circuits?

Playing with battery, bulb, and wires in class you all found that to light in the bulb there needed to be

two connections from the battery, one to the “+” and one to the “-”;

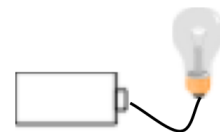
two connections to the bulb, one to the bottom and one to the side;

so that it all forms a continuous loop, such as in this picture, but it didn't matter which direction you made the connections – the + of the battery could connect to the bottom of the bulb or the side, as long as the – of the battery connected to the other part of the bulb.

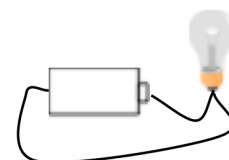


And you found that the “connection” could be direct contact between that part of the bulb and that part of the battery, or a wires (as in this example), or a couple of people tried metal bracelets — you decided it has to be metal.

Some other very reasonable ideas didn’t work, such as connecting one wire from the battery to the bulb, say like this:



or connecting two wires from the battery to only one spot on the bulb, like this:



We started to come up with explanations for why the bulb lit in some situations, but not others. On Monday we’ll be examining some more situations and trying to make progress on understanding what’s going on. But first I’d like for you to spend some time deciding what you think happens! I’m leaving this pretty open ended because I’d like to see what you think is happening.

Part A): Based on the observations you made in class on Wednesday, what do you think is going on inside the circuit (battery, light bulb, wire)? This might be tough, considering that we haven’t talked about it yet in class, but I just want you to start coming up with an idea that you can bring to class on Monday to discuss. If it helps, you might also want to draw a picture of your idea. Try to say how your ideas explain some of the results from your observations.

Part B): Now, think about what’s missing from your description above. What else would you want to be able to say? What questions do you still have? You might think about these as holes in your description. What things might you want to try with the batteries and bulbs that would help you fill these holes, and how would they help?