

Phys 115: Inquiry Into Physics	2nd Assignment, due Tuesday Sept. 10th
Section 0201: Ayush Gupta	Please also email to ayush.courses@gmail.com

Please make three copies (one will be for me and the other two will be for fellow students in class; You can decide amongst yourselves which two group mates to give your HW but each person should have no more or no less than two HWs to comment on). Please also email them to me at ayush.courses@gmail.com. I encourage you to draw figures to explain your ideas.

1. In class - Open Ended

Pick something you saw or that happened in class that surprised you. An instance in which you found something turned out differently from what you thought. It can come from anytime since we started studying floating and sinking. A situation when you made an observation that didn't make sense to you. Maybe it didn't make sense only for a bit, or perhaps it still confuses you.

Once you've picked the topic write an essay to explain, as clearly as you can, what is (or was) your confusion. Here are a few steps to help your thoughts:

- A. Your essay should start by explaining what you expected to happen and why that initially made sense to you. How were you thinking about what was going on that made your expectation sensible?
- B. Then reflect on (and write about) why the reasoning that lead you to have the expectation you had might not be appropriate in this situation. What is different about this situation that makes your expectation not quite right in this situation?
- C. If you are no longer confused about the situation, explain the new reasoning you used to make sense of the surprising result. Maybe you have not resolved your confusion, but you have some speculations as to why things happened the way they did. Then tell me about these ideas you are toying with in an attempt to explain the surprising observation. It is also okay to say that you just cannot make sense of the situation.

The idea here is to refine your thinking. Don't just dismiss a way of thinking as wrong. Figure out where that way of thinking came from; locate the experiences and "hidden assumptions" that are behind that way of thinking, figure out why it's a reasonable way to think, and try to figure out why it doesn't work for the situation you're trying to understand.

2. What makes something float?

When you're starting to think about a new question, it helps to hold off worrying about being right. There'll be time for that later, don't worry – when we've pinned down some results and ideas that we've decided deserve commitment. Right now is the time to let yourself play with possibilities, use your imagination and give ideas a try.

In class you made some pretty good progress thinking about the patterns in what floats, and you've already started arguing and counter-arguing for and against these ideas. For example, with respect to "heaviness", some people made the argument that a cruise ship (which is very heavy) floats. Other possibilities people have mentioned include whether the object has any air in it, whether it has lots of surface area, and whether the object is "dense".

But you've just barely started to talk about how something floats or sinks. What keeps the object up?

- 1) For the first essay, **please discuss your ideas about possibilities for explaining how something floats.** Discuss at least one and at most two ideas but give an argument or evidence in support of or against your ideas. Why does it make sense to think of these ideas to explain floating/sinking? Don't worry about being *right*, but do worry about being tangible: Use words and ideas that are familiar and sensible to you and that you expect are familiar and sensible to others in the class. (If you want to use a term you're not sure others will understand, such as "density," then take some time to say clearly what it means.)
- 2) Now **describe something you'd like to try, some experiment, and explain what it could tell you.** Explain what are the different things that might happen, and what reasoning would predict them; explain what the implications would be if you tried it and it came out a particular way.