## Workshop Module 1

- 1. What is the ratio of the electromagnetic force to the force of gravitational attraction between the electron and the proton in a hydrogen atom?
- 2. Why does clothing tend to stick together after going through the dryer? Would you expect there to be more or less clinging if all your clothing was made of the same material (say, cotton) than if you dry different kinds of clothing together?
- 3. A charged insulator and an uncharged metal object
  - (a) always repel one another
  - (b) exert no electrostatic force on one another
  - (c) always attract one another
  - (d) may attract or repel, depending on the sign of the charge on the insulator
- 4. Some modern aircraft are made primarily of composite materials (nonconductors). The U.S. Federal Aviation Administration requires that such aircraft have conducting wires imbedded into their surfaces. Why?
- 5. Open the "Charge By Induction" applet from MIT TEAL labs. Before running it, make predictions about what the charges will do if you don't change any settings. The objects you see will behave as tho they were charged rubber balls. We discussed in class that because of the repulsion of like charges, electric charge tends not to all fall together. However, there is attraction from opposite charges. The charges have to do something. Draw what you expect might happen on the board. Make a few guesses.
- 6. Once you've let the applet settle down, make predictions for and then crank up the central charge slowly (either positive or negative). Watch how the charges behave as you change the central charge. How do various structures act? How and when do they break apart, if they ever do. Start over and do this a few times. Which structures seem to be the most resilient?