

PhET Tips for Teachers: *Density*

Tips for controls:

- You can put the blocks in the water. If an object floats, you can hold it under water to measure its volume.
- Use the scale and the volume of water displaced to calculate the density of the mystery objects.
- Use the table to determine the identity of the mystery objects.
- If you are doing a lecture demonstration, set your screen resolution to 1024x768 so the simulation will fill the screen and be seen easily.

Important modeling notes / simplifications:

- For named objects in the drop-down menu, mass changes volume to keep density constant; for "My Block", mass changes density.
- The color of an object in one mode does not imply the same density in other modes; we did this to challenge students to use other characteristics to understand density.
- In the "Same Mass" mode, the density of the blue block is the same as that of water.
- We purposely left out the density of water on the slider, since we saw that it caused students to engage more with the sim.

Insights into student use / thinking:

- Students do not need to be told to put the block in the water; it is often their first move.
- Students who do not already know the density of water are able to figure it out by playing with the sim.
- Some students notice that when objects float, they displace their mass, but when objects sink, they displace their volume.
- Students learn that density is what determines whether an object sinks or floats.
- Students are confused by the behavior of the blue block in the "Same Mass" mode; later they discover the block has the density of water.
- Most students do not notice the table in the "Mystery" mode.

Suggestions for sim use:

- For tips on using PhET sims with your students, see: [Guidelines for Inquiry Contributions](#) and [Using PhET Sims](#).
- The simulations have been used successfully with homework, lectures, in-class activities, or lab activities. Use them for introduction to concepts, learning new concepts, reinforcement of concepts, as visual aids for interactive demonstrations, or with in-class clicker questions. To read more, see: [Teaching Physics using PhET Simulations](#).
- For activities and lesson plans written by the PhET team and other teachers, see: [Teacher Ideas & Activities](#).