

## Student Directions for *Buoyancy*: How Does Buoyant Force Act on Objects in a Fluid?

<http://phet.colorado.edu>

**Sim Tip: The scales can be moved!**

### Learning Goals:

Students will be able to:

1. Use combinations of tools to find density of both liquids and solids
2. Describe the forces that act on a completely or partially submerged object
3. Describe what *Buoyancy* is and how it affects the *apparent weight* of an object in a fluid.
4. Predict whether an object will sink or float when placed in a liquid, given densities of the object and liquid
5. Predict the *apparent weight* of a completely or partially submerged object of known mass and volume in fluids for which the density is known

### Directions:

#### Intro Tab:

1. How can you use a block and the other tools on the **Intro** tab to determine the density of the “Oil”?
2. Determine what forces act on an object when it is in a fluid. How are the forces similar and different when the object sinks, floats immersed in the fluid, and when it is only partially submerged.
3. Give specific examples that you could use to explain what *buoyancy* is and how an object's *weight* can appear to change when in a fluid. Make sure to include situations where the object sinks, floats immersed in the fluid, and when it is only partially submerged.

#### Playground Tab:

4. Explain how you can use the information about the block and the fluid to determine if the block will sink, float immersed in the fluid, and when it is only partially submerged.
5. How can you determine the apparent mass of an object if you know the density of the object and the density of the fluid?
6. **Challenge:** Explain how an object that is more dense than water can be kept afloat by placing it on an object that is less dense than water