Density Simulation
Inquiry - How can we predict if an object will sink or float in water?

Go to this Density Simulation link-
https://pbslm-contrib.s3.amazonaws.com/WGBH/arct15/SimBucket/Simulations/density lab/content/index.html

Introduction - Getting used to the tools of the simulation

Start the simulation by pressing the button Turn Fluid into Water. Notice how the fluid density is exactly 1 g/mL. This means that 1 gram of water will have a volume of 1 milliliter.
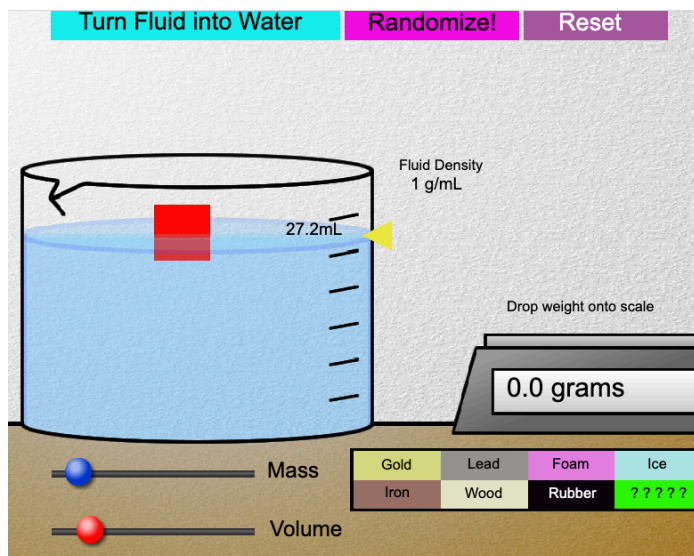
What do you notice about the red square? Is it sinking or floating? What does that tell you about its density compared to water?
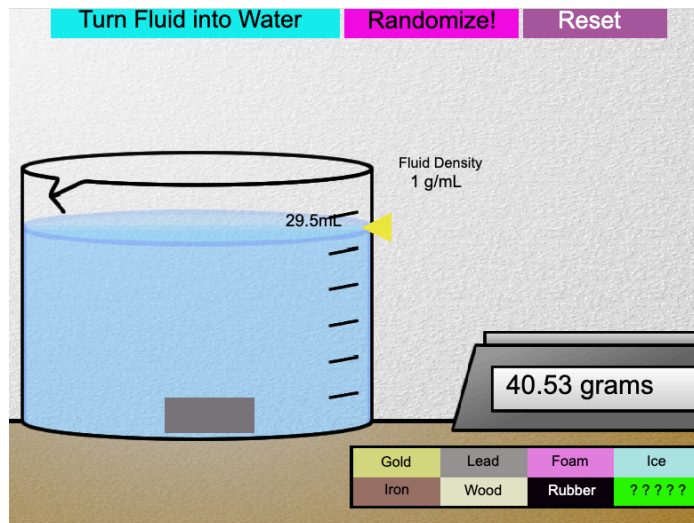
Play around with the simulation before you continue on with the activity.

Things to Explore

- Change the mass of the red cube using the mass toggle button. What pattern do you notice?

- Change the volume of the red cube by using the volume toggle button. What pattern do you notice?

- Put the red cube on the balance - How much does it weigh?

- When you put the red cube back into the beaker of water, how much does the volume change?

- For the foam block divide the grams that the block weighed by the change in volume. What number do you get? Is it greater or less than 1 g/mL

Predict and test
Click on the other materials to change them into gold, lead, foam, etc.

| Turn Fluid into Water | Randomize! | Reset |

Fluid Density
1 g/mL

29.5mL

40.53 grams

| Gold | Lead | Foam | Ice |
| Iron | Wood | Rubber | ????? |

- Before you try and test a new material to see if it sinks or floats in water. Predict what you think it will do. Then test it. Were you correct?

- For each material, find out how much the object weighs and how much it increases the volume of water. Record that in Table 1.

- Calculate the density for each object.

- What pattern do you see in the density of these materials?

Table 1				
Material Block	Predict: Sink or Float?	How much does it weigh? Mass (g)	How much does the water change? Volume (mL)	Calculate Density: Mass (g) /Volume (mL) = Density (g/mL)
Gold				
Lead				
Foam				
Ice				
Iron				
Wood				
Rubber				
?????				

My Claim: Objects that are [more or less] dense than water [sink or float].

My Evidence:

Extension: Reset the simulation. Now you can change the density of the fluid.

Remember the density of water was 1 g/mL.

Liquids or fluids that have a higher density will appear "thicker" than water - like corn syrup or motor oil.

Liquids or fluids that are less dense than water will appear "thinner" than water - like alcohol or nail polish remover.
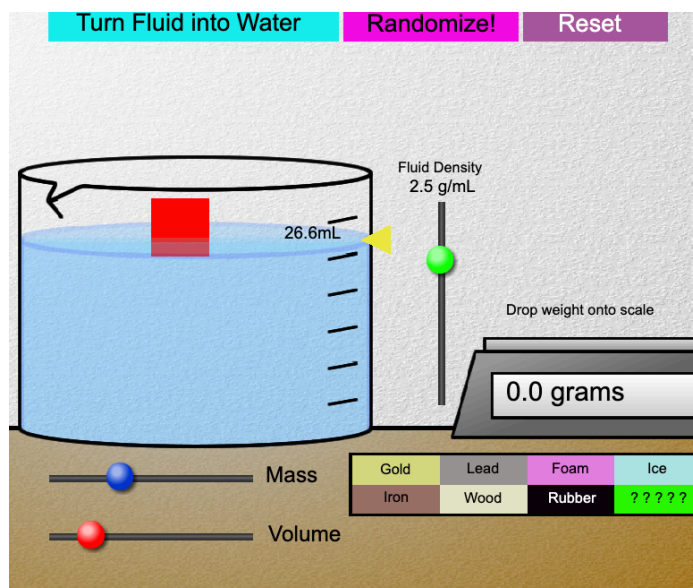
- What do you notice about the objects sinking and floating when you change the density of the liquid that they are floating in?

- How does changing the mass and volume affect how an object sinks or floats in liquids that have different densities?

- What patterns do you notice?