

# Density, Volume and Mass

Name \_\_\_\_\_ Date \_\_\_\_\_ Block \_\_\_\_\_

Play around with the PhET simulation Density. Link on Google Classroom

[https://phet.colorado.edu/sims/density-and-buoyancy/density\\_en.html](https://phet.colorado.edu/sims/density-and-buoyancy/density_en.html)

## Choose “Custom” and “My Block” (top left)

1. If you change the mass of the block, how does the block change?
2. If you change the volume of the block, how does the block change?
3. How does the density of the block change when you adjust only the volume?
4. How does the density of the block change when you adjust only the mass?

**Prediction:** If you have several blocks of the same mass, will they all float or all sink the same in water?

## Try out the button “Same Mass”

5. Explain what is different and what is the same about each of these blocks.

**Prediction:** If you have several blocks of the same volume, will they all float or all sink the same in water?

## Try out the button “Same Volume”

6. Explain what is different and the same about each of these blocks.

## Click “Reset All” in lower right.

Explore each of the objects by placing them in water. Record if each object sinks or floats, its mass, volume and density. To change the object use the dropdown arrow in the top left.

Object	Sinks/Floats	Mass (kg)	Volume (L)	Density (kg/L)
Styrofoam				
Wood				
Ice				
Brick				
Aluminum				

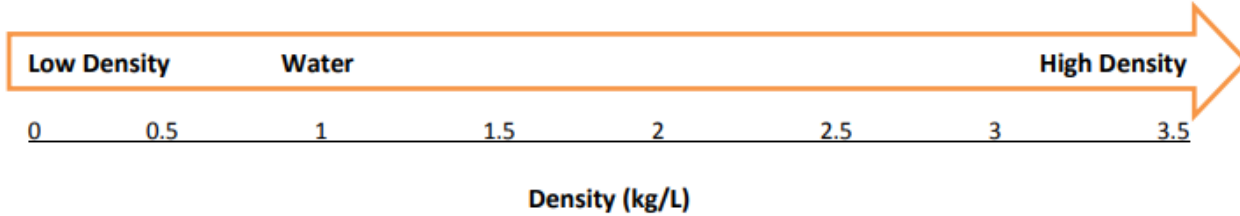
7. Write a rule about the densities of sinkers vs. floaters.

8. Click on the “My Block” option. Design a block that has the same density as water.

Density of your block \_\_\_\_\_kg/L

How do you know it has the same density as water?

9. Label the arrow below:



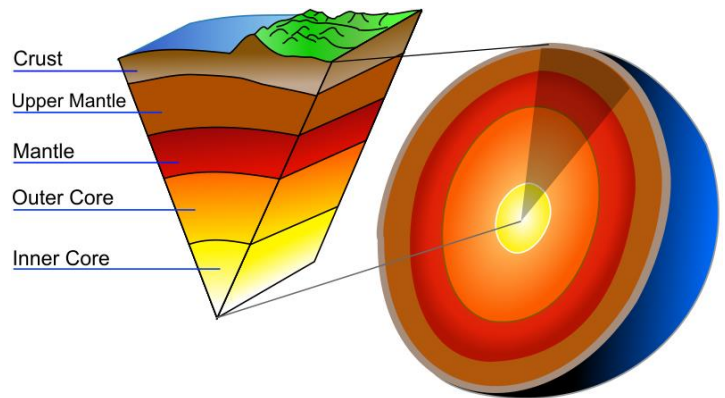
Write these labels under the density scale above:

- Sinks quickly*
- Barely sinks*
- Barely floats*
- Floats well*

Click “Reset All”. Click “Mystery” on the top right.

10. Rank the relative density of the five mystery blocks A – E compared to each other and to water. List them in order of most dense to least dense.

11. **Layers of the Earth:** Based on your understanding of floating and sinking, what can you infer about the density of the Earth’s crust (solid) compared to the mantle (molten)? Extend this inference to the densities of the inner core and outer core.



12. **Oceanic and Continental Crusts:** The Earth is covered in two types of crust, continental and oceanic. Continental crust is made mostly of a rock called granite with a density of 2.65 - 2.75 g/cm<sup>3</sup>, whereas, oceanic crust is made of a rock called basalt with a density of approximately 2.9 g/cm<sup>3</sup>.

a. Why do you think this difference in density is important for the existence of oceans?

b. What would happen if both types of crust had the same density?