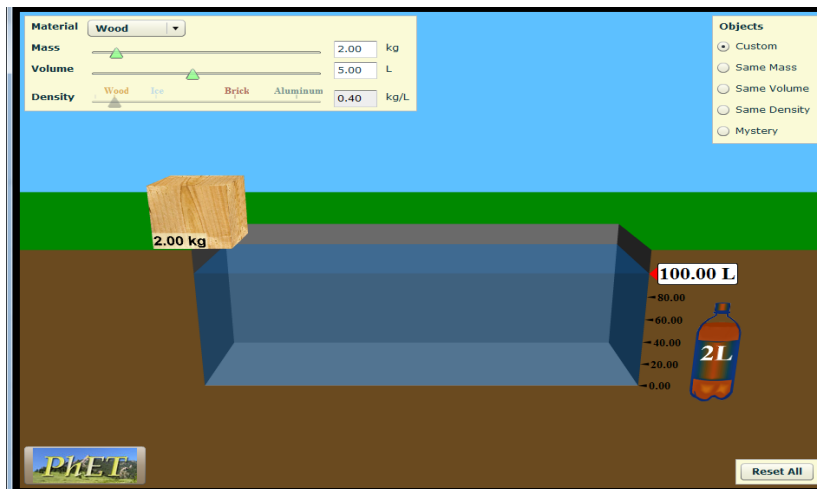


## Exploring Floating and Sinking and Density: A Simulation

**Learning Objectives:**

1. Classify matter based on physical properties, including relative density (sinking and floating).
2. Be able to rank the relative density of objects after observing their floating behavior
3. Be able to determine density of an object through measurement

**1. Play around with the sim.** What can you do? What happens? Talk about what you find with your partner.



**2. Exploring different materials and different sizes.**

- a. Which materials sink? \_\_\_\_\_
- b. Which materials float? \_\_\_\_\_
- c. Keep exploring ...

In your own words, write what you think the label "Volume" means?

\_\_\_\_\_

In your own words, write what you think the label "Mass" means?

\_\_\_\_\_

d. Explore what happens when you make the block bigger and smaller.

Does the Mass change? \_\_\_\_\_

Explain why this makes sense: \_\_\_\_\_

Does the Density change? \_\_\_\_\_

Explain why this makes sense: \_\_\_\_\_

Does the floating or sinking change? \_\_\_\_\_

**3. Design your own block!**

Experiment with **making your own block out of your own material** with “My Object”.

What properties of the block can you change?

What makes a block more likely to sink? How does this change the block’s density?

What makes a block more likely to float? How does this change the block’s density?

Try to create a block with a very **HIGH density**.

Do you think your block will sink or float? \_\_\_\_\_

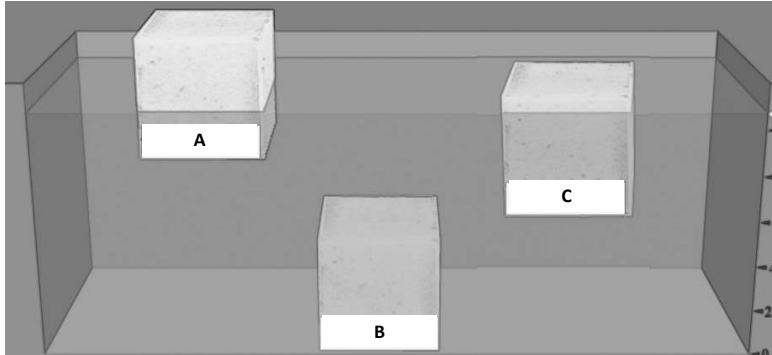
What is your block’s volume? \_\_\_\_\_ What is your block’s mass? \_\_\_\_\_

Try to create a block with a very **LOW density**.

Do you think your block will sink or float? \_\_\_\_\_

What is your block’s volume? \_\_\_\_\_ What is your block’s mass? \_\_\_\_\_

**4. Your friend has three blocks (A, B, and C) of the same size, but they each float differently in water.**



a. What do you think is making them float differently?

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b. Using “My Object”, check your answer by playing with your block to make it behave like A, then B, then C.

Which slider did you need to change? \_\_\_\_\_

Could A, B, and C be made out of the same material? Why or why not?

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Which object must have the most mass? \_\_\_\_\_

Which has the second most mass? \_\_\_\_\_

Which has the least amount of mass? \_\_\_\_\_

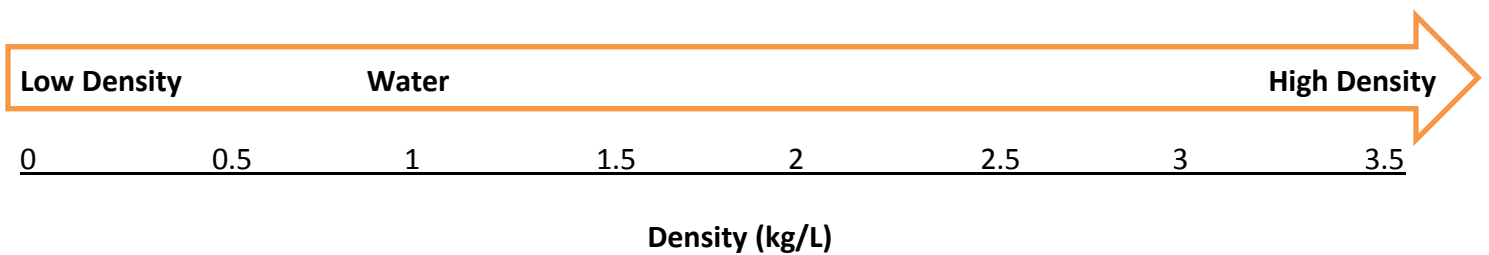
**5. Test your ideas using the objects of “same volume”.**

- a. All of these blocks are the same \_\_\_\_\_.
- b. Besides being different colors, the blocks also have different \_\_\_\_\_.

**6. Explore objects of the “same mass”.**

- a. All of the blocks have a mass of \_\_\_\_\_ kg.
  - b. All of the blocks are different colors and different \_\_\_\_\_.
  - c. Observe how they float. What do you notice? \_\_\_\_\_
- If all of the blocks have the same mass, why do you think some are floating and some sinking?
- \_\_\_\_\_
- \_\_\_\_\_

**7. Use density scale below...**



Place the following on the above density scale:

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

**9. Calculating Density**

We can figure out the density of blocks using division if we know their volume and mass. The equation is  $Density = Mass \div Volume$ . Let's try this using the “mystery tab”!

Object	Mass (kg)	Volume (L)	Density (kg/L)	Sink or Float?
A				
B				
C				
D				
E				