# Exploring Floating and Sinking[1]

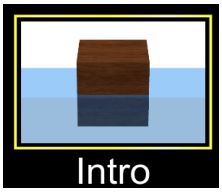
Activity Sheet

**Name: _____ Class Period: _____**

**Learning Objectives:**

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

**1. Play around with the Density sim on the "intro" screen.** What can you do? What happens? List at least 3 things that you find. Share this information with your partner.




**Class Discussion**: Share all the things you found that you can do with the simulation.

2. Explore different materials and different sizes. Then, complete the following table:

| Which materials sink? | Which materials float? |
|---|---|
| | |

Styrofoam
Wood
Ice
Brick
Aluminum

3. Keep exploring …

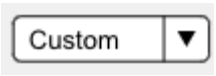
a. What do you think the label "Volume" means?

b. What do you think the label "Mass" means?

[1] Perkins, K. and Denison, C.Density introduction (2015). Original activity available at: https://phet.colorado.edu/en/contributions/view/3314. Attribution CC BY 4.0. Make a copy of this sheet as a Google Doc.

4. Explore what happens when you make the block bigger and smaller and fill in the following table:

| Action | What changes? | How does it change? | Why does this make sense? |
|---|---|---|---|
| Make the block bigger and smaller | ☐ The mass | | |
| | ☐ The density | | |
| Does the floating or sinking behavior change? | | | |

4. Design your own block! Experiment with **making your own block out of your own material** with the "**custom**" option 


a. What properties of the block can you change?

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

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

d. 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? _____

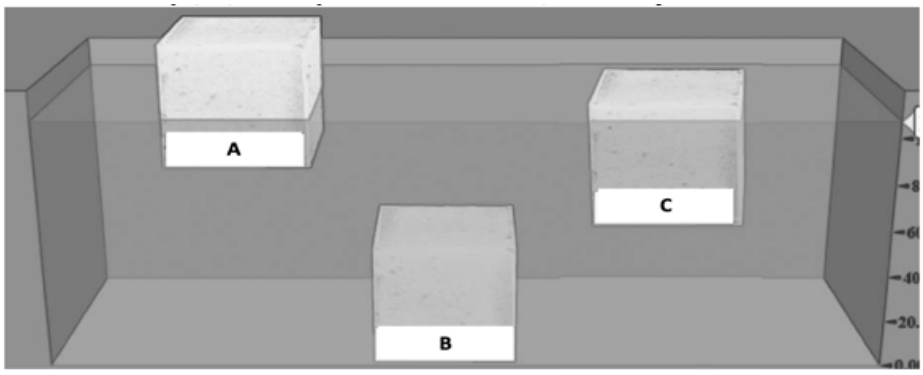
e. Try to create a block with a very **LOW density.**

Do you think your block will sink or float? _____

What is your block's volume? _____What is your block's mass? _____

 **Class Discussion:** Share what you discovered!

**5. 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?

b. Using the "Custom" option, 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?

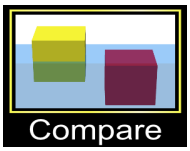
_____

_____

Which object must have the most mass? _____

Which has the second most mass? _____

Which has the least amount of mass?_____




**6. Test your ideas using the objects in the Compare screen, "Same volume".**

a. All of these blocks are the same _____.

b. Besides being different colors, the blocks also have different _____.

**7. Explore objects of the "same mass".**

a. All of the blocks are different colors and different _____.

b. Observe how they float. What do you notice? _____

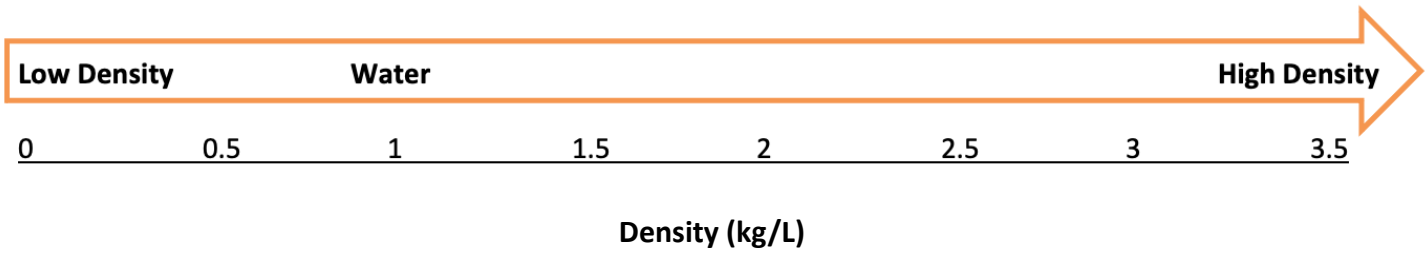
c. If all of the blocks have the same mass, why do you think some are floating and some sinking?

_____

_____

## 8. Whole Class Activity:

Draw our Density scale on the class whiteboard:




Let's figure out where to write these labels on the 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 ÷ Volume. Let's try this using the "mystery" screen! Select a set and find each object's density

Set select: _____

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