April 15 – April 19

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Density Worksheet & Lab (Solids)

Name_____
Date: _____

Please answer all questions as completely as possible showing all calculation and work needed. Also don't forget to include your units!

Density = Mass / Volume

1) Rearrange the density equation for the following:

Mass = Volume =

2) Calculate the density of a material that has a mass of 52.457 g and a volume of 13.5 cm^3.

3) A student finds a rock on the way to school. In the laboratory he determines that the volume of the rock is 22.7 mL, and the mass in 39.943 g. What is the density of the rock?

4) The density of silver is 10.49 g/cm^3. If a sample of pure silver has a volume of 12.993 cm^3, what is the mass?

5) What is the mass of a 350 cm^3 sample of pure silicon with a density of 2.336 g/cm^3?

Solids Density Practice

Item	Mass (g)	Volume (cm^3 or mL)	Show your work!	Density (units?)

Name: _____ 5____
Date: _____

Buoyancy...does it sink or float?

Test each object and then place a check mark under the correct column to indicate if the object sinks, floats, or is in the middle.

Object	Sink (negative buoyancy)	Float (positive buoyancy)	In the middle (neutral buoyancy)
Empty canister with top on			
Canister filled with water			
Canister half filled with water			
Canister with cotton ball			
Canister with beans			
Beans			
Canister with pebbles			
Wood block			
Styrofoam ball			
Rock			

Bonus! Try to construct your own boat using a notecard and tape that floats. Next, make it sink.

Why do you think that some objects sink and others float? _____

Name: _____
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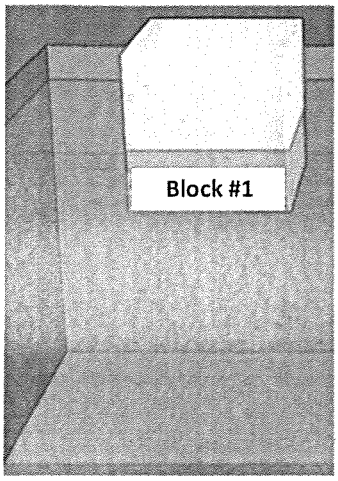
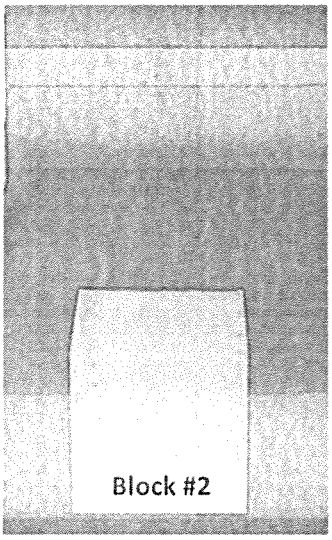
Floating and Sinking:
Pre Lab Questions:



You have a block, and you see that it floats in water.

What could it be made of?

What do you think will happen if you make a bigger block out of the same material? Will it float or sink?



You have another block that sinks.

What could it be made of?

What do you think will happen if you make a smaller block out of the same material? Will it float or sink?

Why do you think Block #1 floats and Block #2 sinks?

Name: _____

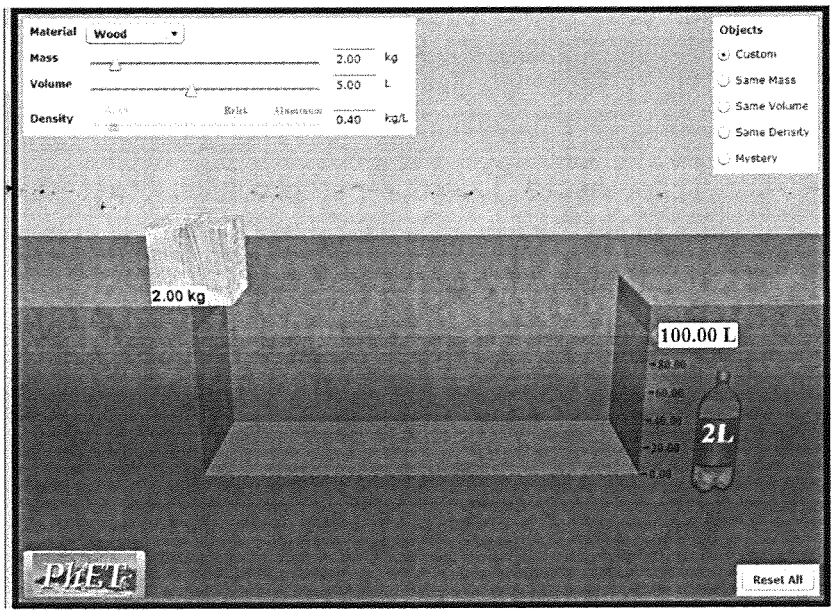
Class Period: _____

Exploring Floating and Sinking

Learning Objectives:

1. TEKS 5.5(A) 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. **Class Discussion: Share all the things you found that you can do with the simulation.**

3. Exploring different materials and different sizes.

a. Which materials sink? _____

b. Which materials float? _____

c. Keep exploring ...

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

_____

... and 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? _____

4. 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? _____

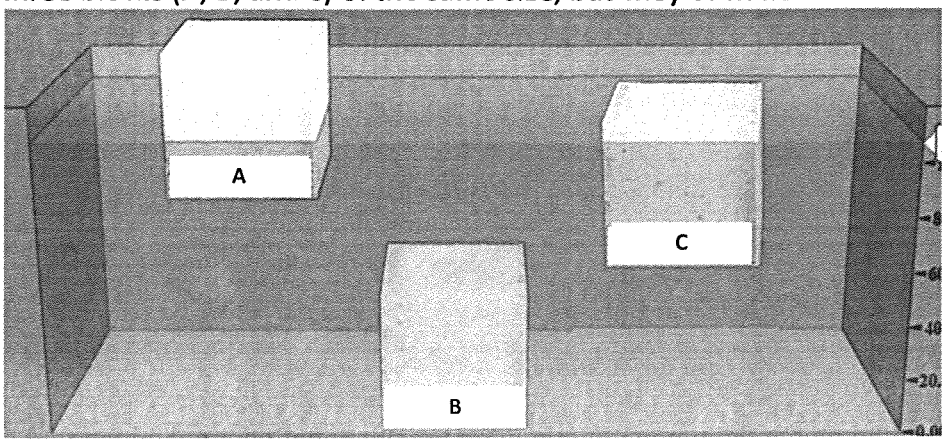
Try to create a block with a very **LOW density.**

Do you think your block will sink or float? _____

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

5. Whole Class Discussion: Share what you discovered!

6. **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 "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?

_____

_____

Which object must have the most mass? _____

Which has the second most mass? _____

Which has the least amount of mass?_____

7. **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 _____.

8. **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? _____

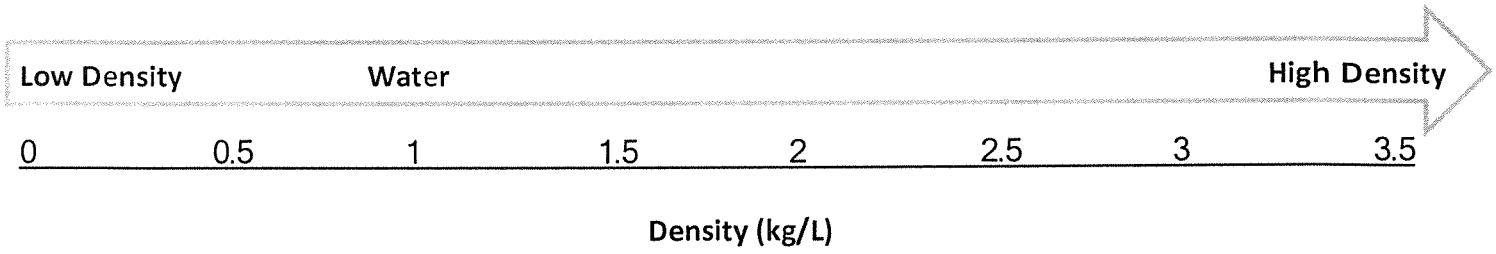
If all of the blocks have the same mass, why do you think some are floating and some sinking?

_____

_____

9. 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 tab"!

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

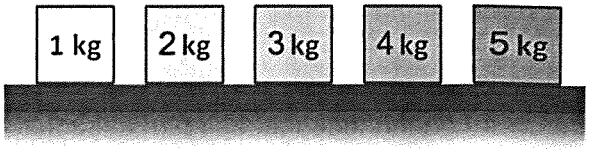
Name: _____

Class Period: _____

Floating and Sinking:

Post Lab Questions:

1. You have 5 blocks that are the same size, but different masses. The lightest one is 1kg, the heaviest one is 5kg.



The picture shows how the 2kg and 5kg blocks float and sink in water.

On the picture, **draw** where the other blocks would end up if you put them in the water.

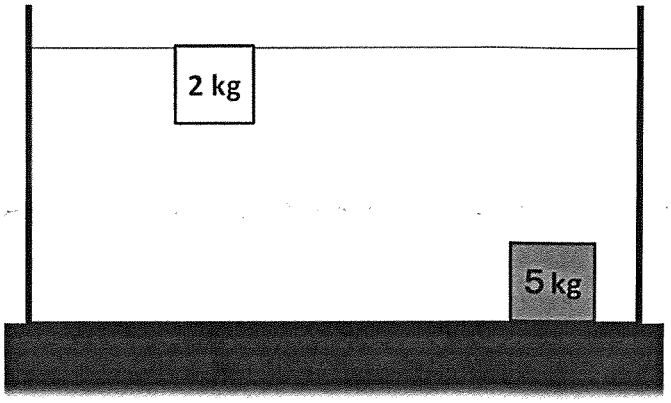
Explain why you think it would look that way?

_____

_____

_____

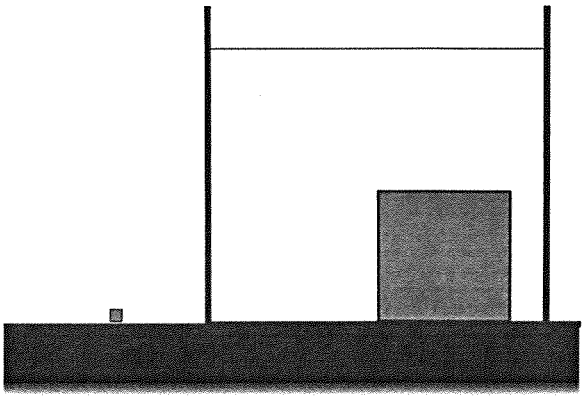
_____



(Adapted from Univ. of Washington assessment question)

2. This picture shows a large block that sinks in the water, and a much smaller block of the **exact same material** sitting outside of the water.

On the picture, **draw** what you think would happen if you put the smaller block into the water.

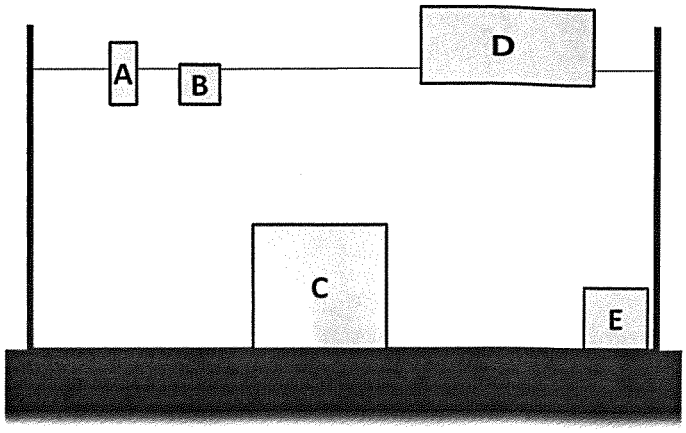


Would it float or sink, or does it depend? _____

The density of the smaller block is _____ the density of the larger block.

(smaller than, same as, larger than)

3. You have 5 blocks of different shapes, different sizes, and different materials. You put them in water and see that some float and some sink (see picture).



Can you tell which one has the **smallest density**? _____

If so, which one: _____

Explain how you can tell:

_____

_____

Can you tell which one has the **largest density**? _____

If so, which one: _____

Explain: _____

In the empty picture, **redraw** the blocks in the water in order from the **smallest density** one to the **largest density** one.

If you don't have enough information, **explain** what information you would need.