**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Period: \_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Density Interactive Simulation Activity**

Access the internet and go to PhET Interactive Simulations website by using the URL below <http://phet.colorado.edu/en/simulation/density> Click on “Run Now!” Use the box in the upper right hand corner to navigate through this simulation. Make sure to include the correct units when recording your measurements.

**Custom**

1. Change the material of the cube and record the density of each material.

Styrofoam: \_\_\_\_\_\_\_\_\_\_

Wood: \_\_\_\_\_\_\_\_\_\_

Ice: \_\_\_\_\_\_\_\_\_\_

Brick: \_\_\_\_\_\_\_\_\_\_

Aluminum: \_\_\_\_\_\_\_\_\_\_

1. Explain why the cubes of different materials occupy different positions in the water?
2. What happens to the volume of the wooden cube when you change its mass by sliding the green triangle to the right? Explain why this happens.

**Same Mass**

1. Prior to placing the cubes in the water or any calculations, predict which cube(s) will float?
2. Now test your prediction and calculate the density of each block. Determine the volume of a floating cube by left clicking on it and dragging it completely under the water.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Red** | **Blue** | **Yellow** | **Green** |
| **Mass** |  |  |  |  |
| **Volume** |  |  |  |  |
| **Density** |  |  |  |  |

6) Which block(s) floated? Explain why.

7) What happens to the density of each block if I double the volume?

**Same Volume**

8) Prior to placing the cubes in the water or any calculations, predict which cube(s) will float? (Yes or No)

Red: \_\_\_\_\_\_\_\_\_ Yellow: \_\_\_\_\_\_\_\_\_\_\_ Blue: \_\_\_\_\_\_\_\_\_\_\_ Green: \_\_\_\_\_\_\_\_\_\_\_

9) Now test your prediction and calculate the density of each block. Determine the volume of a floating cube by left clicking on it and dragging it completely under the water.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Red** | **Blue** | **Yellow** | **Green** |
| **Mass** |  |  |  |  |
| **Volume** |  |  |  |  |
| **Density** |  |  |  |  |

10) Which block(s) floated? Explain why.

11) If I halved the volume of each block, how would that alter the density?

12) Draw a particle diagram representing each cube. Each box below has the same volume, just as they were in the demo you just worked with. Draw particles (circles) in each of the following indicating the relative density of each, assuming each particle has the same mass.

Red

Yellow

Green

Blue

**Mystery**

13) Calculate the density of each cube and identify each cube’s material by clicking on the “Show Table” button. Indicate whether or not the cube will float.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Cube** | **Mass** | **Volume** | **Density** | **Material** | **Float? Yes or No** |
| **A** |  |  |  |  |  |
| **B** |  |  |  |  |  |
| **C** |  |  |  |  |  |
| **D** |  |  |  |  |  |
| **E** |  |  |  |  |  |

**(Honors) Show all calculations necessary in determining the answer for the following.**

14) Determine the mass of a wooden block with a volume of 30.0 L.

15) Determine the volume of a Styrofoam block with a mass of 7.0 kg.

16) Using [www.ptable.com](http://www.ptable.com), determine which elements in group 2 will float in liquid bromine.