Name: Period:

Density Virtual Lab

**Directions**

1. Go get a chromebook and a partner.
2. Log in and go to Colorado PhET Website <https://phet.colorado.edu/>
3. Click “Play with Simulations”
4. On the left there is a tab with Simulations, click on “Chemistry”
5. Scroll Down and click on the Simulation titled “Density”
6. Run the interactive program called “Density”

**Section 1**

 You should notice that there is a block of wood in water and that there is a sliding scale in the upper left corner. Notice that you can “click” and “drag” green triangles to the left and right and that you can make the block of wood bigger and smaller. You can also change the block from “wood” into other substances by clicking the drop down tab. Fill in the tab below and answer the questions. Important!!! Pay attention to the values that already filled in. You will have to drag the “green triangles” in order to find the answers to the blank spots in the table.

Table 1: Custom Blocks and their Density

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Type of Block | Mass (kg) | Volume (L) | Density (kg/L) | Float or Sink |
| Styrofoam | 2.00 |  | 0.15 |  |
| Wood |  | 10.0 |  |  |
| Ice  | 5.00 |  |  | Floats |
| Brick |  | 5.00 |  |  |
| Aluminum |  | 2.50 |  |  |

Take a minute and see if you can change the density of wood by changing the mass or the volume of the wood on the interactive website. Is it possible to change the density?

**Yes or No**

**Section 2**

 Click the tab on the right hand side and select “same mass”. Down below rank the density of the boxes from **lowest** density to **highest** density and also fill in the column titled Volume.

Table 2: Lowest to Highest Density for Boxes with Same Mass

|  |  |  |  |
| --- | --- | --- | --- |
| Color of Box | Mass (kg) | Volume (L) | Density (kg/L) |
| Lowest |  |  |  |
|  |  |  |  |
|  |  |  |  |
| Highest |  |  |  |

Look at the table above and see if you can see a pattern between the Density and the Volume. What is the pattern?

For substances of equal mass, the substance with the highest density has a volume that is what?

**Smaller or Bigger**

**Section 3**

Click the tab on the right and select “same volume”. Fill in the table below.

Table 3: Density of boxes with equal Volume

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Color of Box | Mass (kg) | Volume (L) | Density | Float or Sink |
| Red |  |  |  |  |
| Green  |  |  |  |  |
| Blue |  |  |  |  |
| Yellow |  |  |  |  |

What is the volume of all the boxes?

Look at the table above and see if you can see a pattern between Density and Mass. What is the pattern?

For substances of equal volume, the substance with the highest density has a mass that is what?

**Smaller or Bigger**

**Section 4**

 Click the tab on the right and select “same density”. Fill in the table below.

Table 4: Mass and Volume of boxes with equal Density

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Color of Box | Mass (kg) | Volume (L) | Density | Float or Sink |
| Red  | 1.00 |  |  |  |
| Green  | 2.00 |  |  |  |
| Blue  | 3.00 |  |  |  |
| Yellow | 4.00 |  |  |  |

What is the Density of all the boxes? Do they float or sink?

Look at the table above and see if you can see a pattern between Mass and Volume. Notice that the Density stays the same, but what happens to the Volume as the Mass Increases?

For substances of equal Density, what is the relationship between the Mass and the Volume?

**Section 5**

 Click on the tab on the right and select “mystery”. Important!!! Also click on the button that says “Table”. Fill in the table below.

Table 5: Identity of Mystery Boxes using Density

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Color of Box | Mass (kg) | Volume (L) | Density | Float or Sink | Identity of Box |
| Red  | 3.10 | 3.38 | 0.92 | Float | Ice |
| Green  |  |  |  |  |  |
| Blue  |  |  |  |  |  |
| Yellow |  |  |  |  |  |
| Purple |  |  |  |  |  |

Can the Density of an unknown substance be used to identify it? If so, how and why?