Density Phet Assignment

Follow this link to find the density simulation on the Phet website: <http://phet.colorado.edu/sims/density-and-buoyancy/density_en.html>

A. When you see the wooden block, grab it with your mouse and put it in the water. Note that you can manipulate the block by pushing them underwater

Wooden block:

Mass= \_\_\_\_\_\_ Volume = \_\_\_\_\_\_\_ Density:\_\_\_\_\_\_\_\_

How much of the block is under the water? \_\_\_\_\_\_\_\_

Manipulate blocks , use different materials, in the custom setting to find out the following

1. Is there a relationship between the volume of water displaced and the total volume of the block that has anything to do with density? If so, what is it? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. When objects float , they displace an amount of water equal to their: \_\_\_\_\_\_\_\_\_\_\_
2. When objects sink, they displace an amount of water equal to their: \_\_\_\_\_\_\_\_\_\_
3. What is the density of water?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. How do you think this activity would change if the objects were placed in a denser liquid like Mercury? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

B. Now with the button clicked for “Same mass” fill in the following table:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| color | Mass ( Kg) | Volume ( L) | D ( kg/L) | V of water displaced ( L) |
| Blue |  |  |  |  |
| Yellow |  |  |  |  |
| Green |  |  |  |  |
| Red |  |  |  |  |

C. With the button clicked for “Same volume” fill in the table below:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| color | Mass ( Kg) | Volume ( L) | D ( kg/L) | V of water displaced ( L) |
| Blue |  |  |  |  |
| Yellow |  |  |  |  |
| Green |  |  |  |  |
| Red |  |  |  |  |

D. Now fill in the table for the “ same density”:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| color | Mass ( Kg) | Volume ( L) | D ( kg/L) | V of water displaced ( L) |
| Blue |  |  |  |  |
| Yellow |  |  |  |  |
| Green |  |  |  |  |
| Red |  |  |  |  |

E. Now for the “Mystery Blocks”

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Block | Mass ( kg) | Volume ( L) | Density ( Kg/L) | Material ? |
| A |  |  |  |  |
| B |  |  |  |  |
| C |  |  |  |  |
| D |  |  |  |  |
| E |  |  |  |  |

1. Put the blocks in order from least to most dense: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Which blocks would float? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Which blocks would sink? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

F. Graphing activity:

Go back to the custom setting and make yourself a data tables for 6 different blocks of each material listed : wood, Ice, Brick and aluminum

Wood

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

Ice:

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

Brick :

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

Aluminum:

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

Remember from Algebra the “slope intercept” form of the equation for a line.

Y=mx+b.

1. Formulate a way to graph your data for mass and volume that allows you to read the density form the graph.

Y= \_\_\_\_\_\_\_\_ m= \_\_\_\_\_\_\_ x= \_\_\_\_\_\_\_\_\_ b= \_\_\_\_\_\_\_\_\_\_

2. Graph your data using an appropriate scale and legend for the

3. What does the slope of the lines on your graph indicate about density? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

