

Fluid Simulation Lab

Name: _____

Buoyancy Introduction

https://phet.colorado.edu/sims/density-and-buoyancy/buoyancy_en.html

On your screen you should have two blocks. One is made of brick. The other is made of wood. There are also two grey scales. One in the water and one on land. You need to check the "Gravity" and "Buoyancy" boxes at the bottom left of your screen. A blue downward arrow should appear on each block.

1. What is the volume of the water in the simulation?
2. What is the mass of the wood block?
3. What is the mass of the brick block?
4. What force is acting on both blocks (represented by the blue arrow) outside of the water?

Take the wood block and place it in the water...

1. Another force appears as a pink arrow. What is this force?
2. What is the volume of the water now?
3. How much more is it than when it was first measured?
4. What is the mass of the wooden block?

5. The last two questions have the same numerical answer. This is also a principle explained in class. What is this principle (state it in your own words)?

Now take the brick block...and place it on your floating wooden block.

1. What is the volume of the water now?
2. How much more is it then when it was first measured?
3. What is the mass of both of the blocks?
4. If I took two blocks and they floated...one weighs 5kg and the other weighs 10kg. What would the volume of my water be then? (Show work)

Take the brick block and place it on the scale underwater.

1. What is the force of the brick block underwater?
2. What is the force of the brick block above water?
3. Why is there a difference? Explain using terms that also explain the pink and blue arrows on the screen.

At the bottom center of your screen there is an option to change the fluid from water to oil. Change the fluid to oil.

1. What is the force of the brick block under oil?
2. What is the force of the brick block above oil?
3. Why is there a difference between the force in water and in oil?
4. Which is more dense oil or water? How do you know? Explain using terms that also explain the pink and blue arrows on the screen.

Fluid Simulator

<http://phet.colorado.edu/en/simulation/fluid-pressure-and-flow>

Go to the "Flow" tab at the upper right hand of your screen. You should see a pipe with red dots flowing through it. There is a check box by the red button on the left center of your screen. Uncheck it. Then find the yellow barbells on either side of the pipe. Open both so now there is a bulge in the pipe. Push the red button.

1. What happens?

Push the red button again. However, you should first lower your flow rate (above red button) to 1000 L/s.

2. What is different about the black dots?

Push the red button again. However, you should increase your flow this time to 10000 L/s.

3. What happens?

Alright...now check the "Friction" box on the right center of your screen. Push the red button again. However, you should first lower your flow rate (above red button) to 1000 L/s.

4. Draw what happens to the dots below.

Push the red button again. However, you should increase your flow this time to 10000 L/s.

5. Draw what happens to the dots below.

6. Explain what you see in your own words.

7. What principle did we discuss in class that relates to this?