

Potatoes Au Floatin'

Neutral buoyancy occurs when densities are equal. We will use measurement techniques to determine the density of a potato. Then we will add salt to water to create a solution with the same density as the potato to make it neutrally buoyant.



Determination of the Density of the Potato

The density of an object can be determined by measuring the mass and volume of an object.

$$\text{Density} = \frac{\text{Mass}}{\text{Volume}}$$

Potato Density Data			
Mass of Potato (g)			
Volume of Potato (cm ³)	V _i	V _f	V _{potato}

Q1. Measure mass and volume of your potato and record your data in the table above

Q2. Use your data about the potato to calculate the density of the potato.

SHOW YOUR WORK!

Determination of the Density of Water

For this part, you will take a sample of water in a 100 mL graduated cylinder and measure mass and volume of the sample to determine the density.

1. First, you will need to measure the mass of the graduated cylinder without anything in it.

Q3. Why is it necessary to measure the mass of the empty graduated cylinder before filling it with water?

2. Once you have the mass of the empty cylinder, fill it with 50 mL of water and determine the mass of the water.

Q4. Use your water data to calculate the density.

SHOW YOUR WORK!

Water Density Data	
Mass of Empty Cylinder (g)	
Mass of Full Cylinder (g)	
Mass of Water (g)	
Volume of Water (mL)	

☆ **An object will float if it is less dense than the fluid it is in, sink if it is more dense, and be neutrally buoyant if the densities of the fluid and the object are the same.**

Q5. What would the density of the water have to be to allow the potato to be neutrally buoyant?

3. Adding salt to the water will increase its density. Add salt to your 50 mL sample of water and recalculate the density. (Any increase in the mass is due to the salt) Try to add the right amount of salt to make the salt water solution have the same density as the potato.

Q6. Use the space below to record any important observations. (If you have any questions, ask your teacher)

4. Once you have the solution with the desired density, you will want to scale up and make a beaker full of water with the same density so that you can test to see if the potato is neutrally buoyant.

Q7. Use the space below to record any important observations. (If you have any questions, ask your teacher)

Q8. Were you successful in making the potato neutrally buoyant? If yes, what was difficult about the process? If no, what would you need to do to be successful?