

EGG FLOAT

How does the amount of salt in water affect its density?

MATERIALS

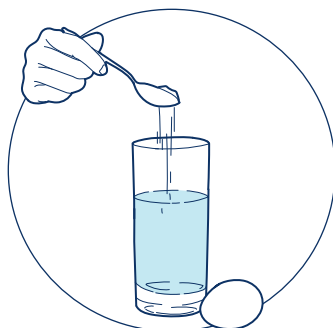
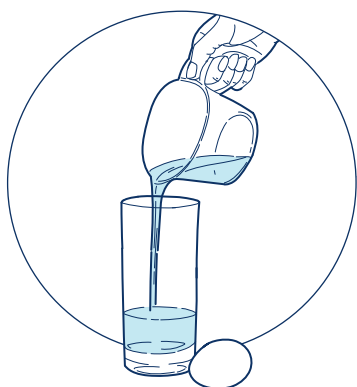
You will need:

- Water
- Salt
- Large glass
- 1 fresh egg
- Measuring cup
- Tablespoon



Density is a measure of how much mass there is in a certain volume. For example, 1 liter of cold (4°C or 39.2°F) water has a mass of 1 kilogram. We say that its density is 1 kilogram per liter.

If a material is denser than water (if 1 liter of the material weighs more than 1 kilogram), it will sink. If it is less dense, it will float.



PROCEDURE

- 1 Fill a clear glass with 1 cup (240 mL) of warm tap water. Place an egg in the water to see whether it floats. Record your results on the next page.
- 2 Remove the egg from the glass and add 1 tablespoon (15 mL) of salt to the water. Stir it for 30 seconds to let the salt dissolve. Test whether the egg floats again and record your results.
- 3 Remove the egg, add 1 tablespoon of salt, and test whether the egg floats again until a total of 5 tablespoons of salt have been added to the water. Include sketches and notes in your results.
- 4 Keep your materials for the activities on pages 166-167.

**RESULTS:**

- 28 Record whether the egg floated with each amount of salt mixed in, and sketch what the egg looked like in the water for each test. Include notes as needed.

Tablespoons of salt added to 1 cup of water:

0 TBSP	1 TBSP	2 TBSP	3 TBSP	4 TBSP	5 TBSP
Floats? Yes No ☐ ☐	Floats? Yes No ☐ ☐	Floats? Yes No ☐ ☐	Floats? Yes No ☐ ☐	Floats? Yes No ☐ ☐	Floats? Yes No ☐ ☐
					

NOTES: _____

- 29 Did the egg float better in freshwater or saltwater? Explain.

- 30 This woman is relaxing in the Dead Sea. She floats easily without a life jacket. Do you think that the Dead Sea is more or less salty than most of the ocean?



Materials float or sink based on differences in density.

31 If two fluids have the same volume but different masses, which has the greater density?

- ☐ The greater mass
 ☐ The smaller mass
 ☐ They have equal densities

32 If two fluids have the same mass but different volumes, which has the greater density?

- ☐ The greater volume
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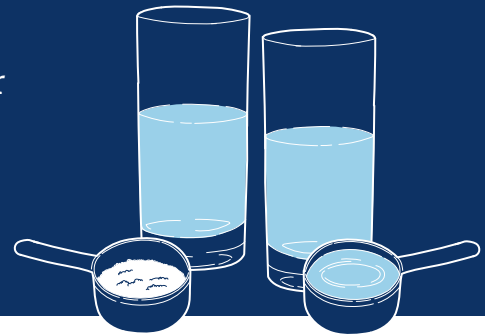
33 1 liter of cold water has a mass of about 1 kilogram. A 1-liter container of table salt has a mass of about $1\frac{1}{4}$ kg. Which has the greater density?

- ☐ Cold water
 ☐ Table salt
 ☐ They have equal densities

Fill two identical glasses with 1 cup of water each. Place them side-by-side to make sure that the water level is the same.

Add $\frac{1}{4}$ cup of salt to one glass and stir it in.

Add $\frac{1}{4}$ cup of water to the other glass.



34 Compare the heights of the water in each glass. Which glass holds more volume?

- ☐ Saltwater glass
 ☐ Freshwater glass
 ☐ Their volumes are equal

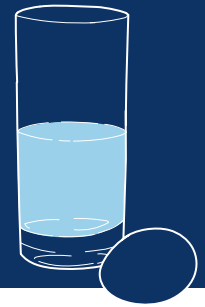
35 The mass of $\frac{1}{4}$ cup of water is about 60 grams. The mass of $\frac{1}{4}$ cup of salt is about 75 grams. Which glass holds more mass?

- ☐ Saltwater glass
 ☐ Freshwater glass
 ☐ Their volumes are equal

36 Which has the greater density: saltwater or freshwater? Does this support what you found with the egg float experiment on pages 164-165? Explain.

On pages 164-165, we got an egg to float or sink based on the salinity of the water. Let's explore more.

Fill a glass halfway with very salty water. Stir in a little food coloring if you have it. Place an egg in the saltwater. Carefully pour tap water into the glass to fill it almost to the top.



- 37 Describe what happens to the egg in the demonstration described above.

- 38 When a river reaches the ocean, it takes a while for the river water to mix into the ocean. Would you expect the river water to stay near the surface or sink to the bottom. Why?

- 39 Which of the following has the **highest** density? Check one.

- | | |
|---|---|
| ☐ Warm water with 5% salinity | ☐ Cold water with 5% salinity |
| ☐ Warm water with 1% salinity | ☐ Cold water with 1% salinity |

- 40 Which of the following has the **lowest** density? Check one.

- | | |
|---|---|
| ☐ Warm water with 5% salinity | ☐ Cold water with 5% salinity |
| ☐ Warm water with 1% salinity | ☐ Cold water with 1% salinity |

Why the density difference?

Adding salt to water is like pouring sand into a cup of rocks; the sand fills the gaps between rocks. Similarly,

when salt dissolves, the particles can fill the spaces between water molecules without pushing them much

farther apart. This increases the mass of the liquid without much increase in volume.