What concentration of salt water will float an egg, and what does that say about the egg's density?

Name _____ Date _____

MATERIALS

You supply everything. Tick each item as you gather it.

- ☐ A raw egg (a fresh one works best)
- ☐ A tall glass or jar that holds at least 1.2 L, and a spoon
- ☐ Table salt and a kitchen scale (grams)
- ☐ About 1,000 g (1.0 L) of tap water
- ☐ A measuring cup, paper, pencil and calculator

SAFETY

Do not drink the salt water. Handle the raw egg gently and wash your hands with soap afterward, because raw eggs can carry bacteria. Do not put the egg back in the food supply afterward. Salt water can damage some surfaces, so pour it out down the drain.

PROCEDURE

1. Pour 1,000 g of water into the jar. Lower the egg in gently. Record where it sits (sinks, hovers off the bottom, or floats).
2. Add 20 g of salt, stir for one minute until it dissolves, and check the egg. Record the total salt added and the egg's position.
3. Keep adding 20 g at a time, stirring each time, until the egg floats clearly.
4. Calculate the mass percent of the salt solution at the point where the egg floats: salt ÷ (salt + water) × 100. Also calculate its molality: moles of salt ÷ kilograms of water, using NaCl = 58.44 g/mol.
5. Now pour in plain water 100 mL at a time and record when the egg goes back down.
6. Compare your result with the table value of about 1.07 g/mL for 10 percent salt water and 1.09 g/mL for 12 percent, and estimate the density of the egg.

RECORD YOUR DATA

Total salt added (g)	Egg position (sinks, hovers, floats)
0	
20	
40	
60	
80	
100	
120	
140	
160	

Plain water added after the egg floated (mL)	Egg position
100	
200	
300	

LAB REPORT

Write a report that gives your two tables, shows the mass percent and molality calculations at the point where the egg floated, and estimates the density of the egg. Explain in terms of particles why dissolving salt raises the density of water, and explain why the egg returns to the bottom when you dilute it.

Report the numbers you actually got, even when they disagree with the lesson. Write on the lines, or type your report on the website and send it to a teacher there.

Question and hypothesis *State the question in your own words, what you expect to happen, and why you expect it.*

Method *What you changed, what you measured, what you kept the same, and how many trials you ran.*

Observations *Describe what you saw, including anything unexpected. Your data tables are added to the report automatically.*

Calculations *Show each calculation step by step, with units.*

Claim and reasoning *Answer the question using your numbers, then explain why, using the science from the unit.*

Limits and next step *What could have affected your results, and one change you would make next time.*