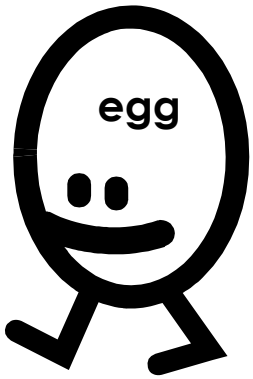
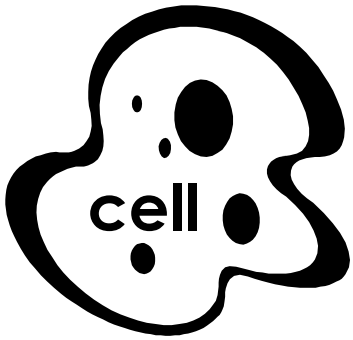
Name _____ Date _____ Block _____

how is an  like a  ?

a take-home LAB project

Background

One of the cell structures you learned about in the beginning of Chapter 2 is the cell membrane which is semi-permeable to substances. As we continue into Chapter 2 you will also learn that substances can move in and out of a cell through the cell membrane in one of 3 ways – diffusion, osmosis or active transport. In this project, you will model how a cell membrane works to let water enter and leave the cell in a process known as osmosis. You will use an uncooked egg as a model of a cell. After dissolving the shell in vinegar to expose the membrane, you will soak the egg in various liquids and observe how the size of the egg changes as it takes in or loses water through the membrane. You also will keep a daily record of observations and measurements of the egg.

Materials

1 egg (uncooked)
vinegar (~ ¾ cup)
tap water (~ ¾ cup)
food coloring (1 color)
salt (~ 2 tablespoons)
a liquid of your choice
plastic cup (large Solo© cup size)
paper towels
piece of string (attached)
paper ruler (attached)
kitchen sink

Procedure

☐ Step 1 –
Observe the features of your egg and measure its circumference. Record your observations and measurements in your data table.

☐ Step 2 –
Soak the egg in vinegar for 2 days. Then observe and record how the egg has changed, including any changes in appearance or texture. Also measure the circumference of the egg, using the procedure described on the next page. Record your observations and measurements in your data table.

☐ Step 3 –
Soak the egg in plain water for 1 or 2 days. Each day, observe and record how the egg has changed and measure and record its circumference in your data table.

☐ Step 4 –
Soak the egg in water with food coloring for 1 or 2 days. Each day, observe and record how the egg has changed and measure and record its circumference in your data table.

☐ Step 5 –
Soak the egg in salt water for 1 or 2 days. Each day, observe and record how the egg has changed and measure and record its circumference in your data table.

→ Continue with Step 6 on the next page.

☐ Step 6 –
Soak the egg in a liquid of your choice for 1 or 2 days. Each day, observe and record how the egg has changed and measure and record its circumference in your data table.

☐ Step 7 –
Graph the data you have collected and be prepared to explain your results. If you would like you may CAREFULLY bring in your egg, in a SECURE container, to show to the class. ☺

Project Hints

For best results –

- Measure your egg CAREFULLY each day. This is because changes in the circumference of the egg may be slight, and measurements that are not precise may mask changes that have occurred.

  Follow these steps when measuring the egg –

  → Carefully take the egg out of the liquid and pour the liquid down the drain.

  → Rinse off the egg in cold water over the sink and blot it dry with a paper towel.

  → Using your piece of string, measure the circumference of the egg using the following steps:

  1. Wrap the string snugly around the egg at the middle (but be careful not to cut into the egg's membrane with the string).
  2. Grasp the string between your thumb and finger exactly at the point where the end of the string meets the rest of the string after circling the egg.
  3. Keeping your thumb and finger in place, lay the string straight on a flat surface.
  4. Use your paper metric ruler to measure the distance from the end of the string to the point where you are holding it. Measure in cm and then convert to mm.
     Remember 1 cm = 1 mm therefore just move the decimal!
  5. Record your measurements and any other observations about the egg in the data table.
  6. Return your egg to the container and cover it with the same or another liquid, according to the procedure above.

Project Checklist

Have you? –

☐ Finished soaking egg in vinegar and recorded results

☐ Finished soaking egg in plain water and recorded results

☐ Finished soaking egg in water with food coloring and recorded results

☐ Finished soaking egg in salt water and recorded results

☐ Finished soaking egg in a liquid of your choice and recorded results

Data Table

Date	Liquid used?	Circumference (mm)	Other observations

Data Analysis

After you have collected the data and completed the table, use the data to create a line graph showing changes in the circumference of the egg over time. Label the horizontal axis of your graph "Date" and the vertical axis "Circumference (mm)." Also indicate on the graph what liquid the egg was soaking in each day.

Use the graph paper on the next page to construct your graph. Be sure your graph is correctly labeled and illustrated with color. Also, be sure to use as much of the graph as possible therefore, don't make your graph too small! Turn the graph paper long ways before you use it!

Due Date

Blocks 3/7 **Monday, January 7th**
Blocks 4/6 **Tuesday, January 8th**

Don't forget –
You MUST bring your completed lab sheet to class on the date due, bringing your egg is optional! ☺