OA Extended Activities

Dissolving Shells Classroom Experiment

$Ca^{++} + CO_3^{--} \Leftrightarrow CACO_3$

Calcium ion + Carbonate ion $\Leftrightarrow$ Calcium carbonate

H^+ (free hydrogen ions increase acidity, and decrease carbonate needed for shells)

$CO_2 + H_2O \Rightarrow H_2CO_3 \Rightarrow HCO_3^-$

Carbon dioxide + Water $\Rightarrow$ Carbonic acid (dissociates to hydrogen ions and bicarbonate)

As a class, you will set up a scientific experiment to answer a question. Answer the research questions and make your prediction.

Research Question: How does the acidity (pH) of a solution (water or vinegar) impact shells weight.

You will weigh shells in a solution over time (a week or two weeks).

Read the research question and see if you can answer them below.

What is the manipulated variable, what we are changing? _____

What is the responding variable, what we measure? _____

What is the controlled variable, what stays the same? _____

Now, make your prediction or **hypothesis** what do you think will happen to the shells?

_____

_____

_____

Materials:

- 2 oyster shells
- 2 cups with lids
- distilled water
- vinegar
- scale (to 1 gram)
- tweezers or tongs
- indelible sharpie

Procedure

1. Label 1 jar DH_2O and the other vinegar. (Also label the jars with your name.)
2. Fill each cup to cover the shell.
3. Measure the pH of the solution in each cup and record.
4. Label one shell #1, and the other #2. Be sure to label them well and go over it twice.
5. Weigh each shell using the triple balance beam or another scale. Be sure to zero the scale before weighing. Record the weight of the shells.
6. Place #1 in the jar labeled DH_2O, this is your control vessel.
7. Place #2 in the jar labeled vinegar, this is your treatment or experimental vessel.
8. Draw a picture of each jar and its contents.
9. In a week, observe and compare the contents of each jar. Draw a picture of each jar and its contents.
10. In two weeks, weigh the shells again. Calculate and record the difference in weights from day 1in your data table, #1.
11. Then as a class, pool your data for repetitions and record in the pooled data table, #2 and as a class calculate average weight difference in shells from the beginning to the end of the time period.
12. Write your conclusions in a paragraph describing your results and the reasons for them. Do your results agree with your prediction or not? Use evidence to support your conclusions.

Table1: Individual Before and After Weight Data

Vessel/variable	Date	pH	Weight (grams)	Description/drawing
Control DH_2O				
Control DH_2O				
Weight Difference				
Manipulated, vinegar				
Manipulated, vinegar				
Weight Difference (gm)				

Table 2: Pooled Class Weight Data for Controls (DH_2O)

Shell#	Beginning Weight	Ending Weight	Difference	% Difference
Group 1				
Group 2				
Group 3				
Group 4				
Group 5				
Group 6				
Group 7				
Group 8				
Group 9				
Group 10				
Average				
Median				

Table 3: Pooled Class Weight Data for Manipulated Variable, (Vinegar)

Shell#	Beginning Weight	Ending Weight	Difference	% Difference
Group 1				
Group 2				
Group 3				
Group 4				
Group 5				
Group 6				
Group 7				
Group 8				
Group 9				
Group 10				
Average				
Median				

Conclusions and discussion: Discuss what happened in the experiment with your groups. Then, write two paragraphs describing your results: What happened to the shells in water? What happened to the shells in vinegar? What is the evidence to support your conclusions? Do the results match your prediction? How does ocean acidification affect the shell building process?