



**Garden of the Salish Sea Curriculum**  
**Pre-Day 2: Ocean Acidification Laboratories**  
**Wade King Elementary**  
**Third Grade**



NAME: \_\_\_\_\_

## Video Questions- The Other CO<sub>2</sub> Problem

Watch the video at: <https://www.youtube.com/watch?v=kvUsSMa0nQU> and answer the questions below.

1. What is the octopus's big problem?

\_\_\_\_\_

2. What does the shellfish use calcium carbonate for?

\_\_\_\_\_

3. Who has caused the problem of ocean acidification?

\_\_\_\_\_

4. When the oceans become more acidic, what major food source will die?

\_\_\_\_\_

5. What part of the food chain do clams eat?

\_\_\_\_\_

6. Who must change to reduce ocean acidification?

\_\_\_\_\_

7. \_\_\_\_\_ causes the oceans to become more acidic, which is destroying the animals that live in the ocean's homes.

8. What is the increase in acidity in the oceans? \_\_\_\_\_%

9. The burning of fossil fuels (oil and gas) is causing the oceans to be more acidic. What are ways you can help reduce the need for fossil fuels? \_\_\_\_\_

\_\_\_\_\_





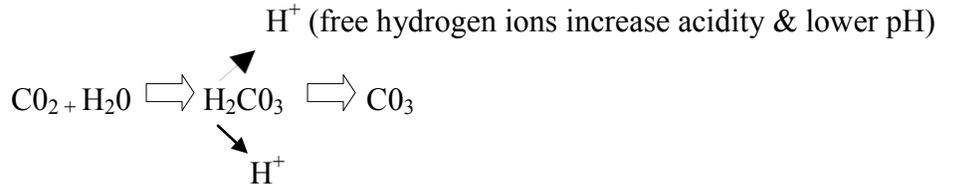
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## The Human Smoke Stack

When carbon dioxide ( $\text{CO}_2$ ) interacts with water ( $\text{H}_2\text{O}$ ), a chemical reaction occurs:



When you exhale, **carbon dioxide ( $\text{CO}_2$ )** is released in your breath. Carbon dioxide from our breath is the same thing that comes from a car when it burns gas or from a coal burning power plant. Many sources of  $\text{CO}_2$  come from natural processes, but too much  $\text{CO}_2$  produced by humans is a problem for shell-building sea life. When there is too much carbon dioxide in our air, it becomes polluted. The oceans can absorb the excess carbon dioxide in the air, which causes a shift in water chemistry. We can measure these changes carbon dioxide causes in the water by measuring the pH.

Following the procedures, complete the experiment and then answer these questions:

**Data Type**      **Cup #1 (changing variable, breath)**                      **Cup #2 (no change, controlled variable)**

<b>Color</b>		
<b>pH</b>		

What changes did you see in the changing variable cup (the one you breathed into)?

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What color was the solution before you breathed into it? \_\_\_\_\_

What color did the solution change to after you breathed into it? \_\_\_\_\_

**Change:** Why did the color of the solution change? \_\_\_\_\_

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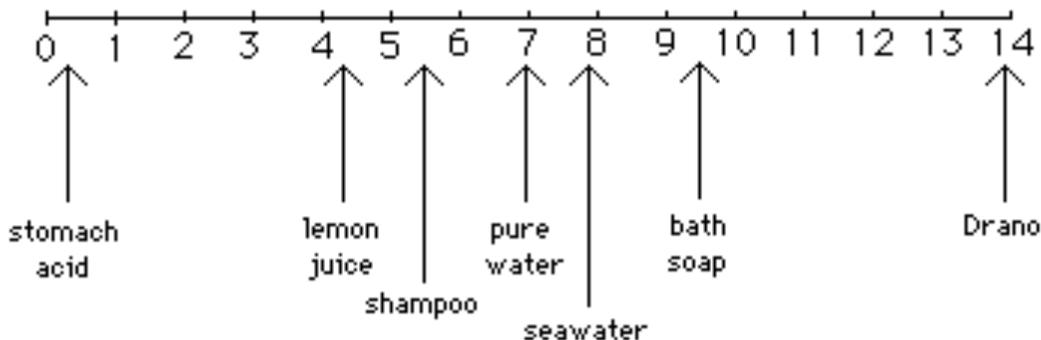
## The pH of Household Solutions

The pH scale is used to describe the acidity of a solution. The pH scale goes from 0 to 14 and changes from **acidic** to **basic** as the number increases. Pure water is **neutral**, with a pH of 7, right in the middle. Notice that seawater is slightly basic.

With your lab group:

1. First, predict where on the pH scale each solution will fall. Use relative pHs to determine if each solution will have a pH higher or lower than pure water first, then compare if pH will be higher or lower than the household solutions on the pH scale below. This is called a hypothesis.
2. Use a piece of litmus paper to test the pH of each household solution. Repeat 3 times (each time is called a “trial”).
3. In the table below, measure and record the pH of each solution using the closest color on the chart to determine the pH of each solution. (Remember, pH below 7 is acidic, 7 is neutral, and above 7 is basic.)

The pH Scale



Household Solution	Prediction	pH Trial 1	pH Trial 2	pH Trial 3
Vinegar				
Lemon Juice				
Club Soda				
Pure Water				
Baking Soda dissolved in distilled water				
Tums dissolved in distilled water				



## Investigation: I'm Melting

Observe the shells that were soaked in vinegar (acid) to shells soaked in distilled water (neutral). Compare the shells soaked in vinegar to the shells soaked in water. Draw a picture of the two jars and describe what happened to the shells soaked in acid using complete sentences.

Shells soaked in acidic solution:

Shells soaked in neutral solution:

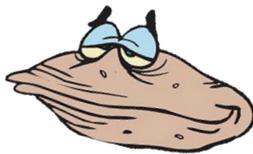
Observed differences between shells soaked in acidic solution vs. shells soaked in a neutral solution:

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Day 2: Ocean Acidification Laboratories

**A Tale of Two Cities:**



Perspective: Look at the two cities (also show above). Which one looks like the city and ocean that is healthier, and why?

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Look at the **watershed map**. How far away do you live from a stream, a lake, or the ocean?

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## Day 2 Review:

### Thinking about today's activities

What are three things you learned?

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

What are two things that you already knew?

1. \_\_\_\_\_
2. \_\_\_\_\_

What is one thing that surprised you?

1. \_\_\_\_\_





