Name: _____ Period: _____ Date: _____

pH Gizmo

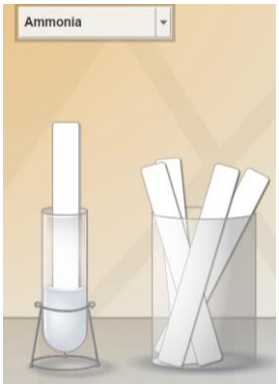
Prior Knowledge Questions (Do these BEFORE using the Gizmo.)

1. **Acids** are substances that produce hydrogen ions (H^+) when dissolved in water. Lemon juice is an example of an acid.
   A. What does lemon juice taste like? _____
   B. What does it feel like if lemon juice gets in your eye? _____

2. **Bases** are substances that produce hydroxide ions (OH^-) when dissolved in water. Hand soap is an example of a base.
   A. What does soap feel like? _____
   B. What does soap taste like? _____
   C. What does it feel like if soap gets in your eye? _____

Gizmo Warm-up:

The strength of an acid or base is measured on the **pH** scale. The term "pH" is short for "potential of hydrogen." It is a measure of how many excess H^+ ions there are in a solution. The pH scale runs from 0 to 14, with 0 representing the highest concentration of hydrogen ions. **Acidic** substances have a pH below 7, while **alkaline** substances (bases) have a pH above 7. Pure water has a pH of 7 and is considered **neutral**.



The *pH Analysis* Gizmo allows you to find the pH of a variety of liquids. In the Gizmo, check that the **Substance in the tube** is **Ammonia**, and click **Test**. Wait until the animation is finished.

1. **Indicators** change color in acids or bases. What is the color of the pH paper? _____
2. Compare the paper to the **pH color chart**. What is the pH of ammonia? _____
3. Is ammonia acidic or alkaline? _____
4. Without checking, **make a prediction**: What is the pH of stomach acid? _____
5. Ocean water generally has a pH of about 8. Is ocean water acidic or basic? _____
6. Along with H_2O molecules and NaCl (salt), what other ions does ocean water have floating around in it? H^+ or (OH^-)? (circle one)
   (*HINT → Look back at the prior knowledge questions above.*)
7. Rising global temperatures cause oceans to absorb more CO_2 from the atmosphere, which lowers the pH of the ocean water. What effect do you think this might have on ocean life?

Measuring pH: *Get the Gizmo ready by clicking "Reset". Check that 0-14 paper is selected.*

Use the Gizmo to find the pH of each of the available substances. Classify each substance as acidic (pH < 7), alkaline (ph > 7), or neutral (pH = 7).

0-14 pH indicator paper		
Material in the tube	**pH value**	**Acidic, alkaline, or neutral?**
Baking soda		
Bleach		
Coffee		
Cola		
Drain cleaner		
Hand soap		
Juice (lemon)		
Juice (orange)		
Juice (tomato)		
Milk		
Milk of magnesia		
Oven cleaner		
Saliva (human)		
Shampoo		
Stomach acid		
Vinegar		
Water (distilled)		
Water (ocean)		

8. Compare all the acidic substances and all the alkaline substances.

   A. In general, what types of substances tend to be acidic?

   B. What types of substances tend to be basic, or alkaline?

9. Do a quick Google search for "Why do soft drinks go flat?" Read what you find, and then explain why flat soda tastes different than cold, fresh soda:

10. Acids are highly reactive with calcium carbonate ($CaCO_3$), which is the same substance chemical compound found in seashells. Besides clams and oysters, what other important types of organisms might be affected by rising acidity in the oceans, and HOW might it affect them? (*HINT → Use the internet if you need help*.)

When finished, take the 5-question quiz at the bottom of the Gizmo. **Record your score: _____ out of 5**