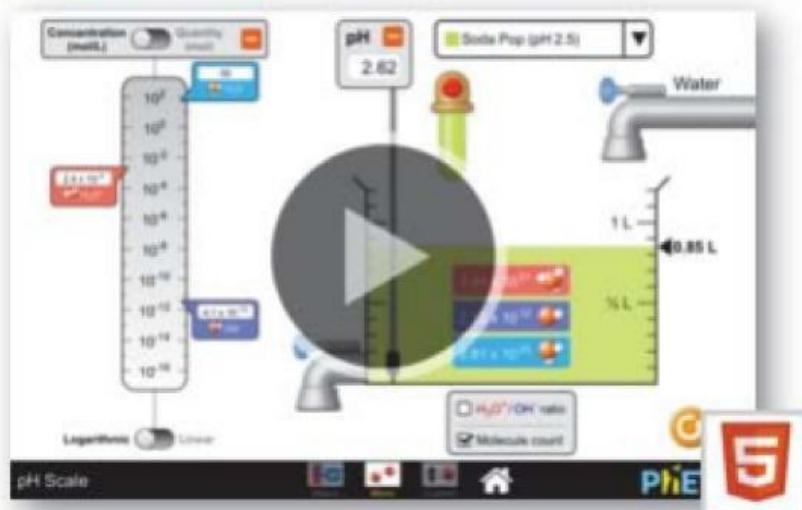


# AT\_(\*) Investigating the pH Scale - PhET Lab

Name: \_\_\_\_\_ Period: \_\_\_\_\_

How does the pH scale relate to acids, bases, hydronium ion and hydroxide ion concentrations?

## pH Scale



1. Navigate to the PhET "pH scale" simulation (follow this link: [pH Scale](#))

2. Click on the "Macro" box.

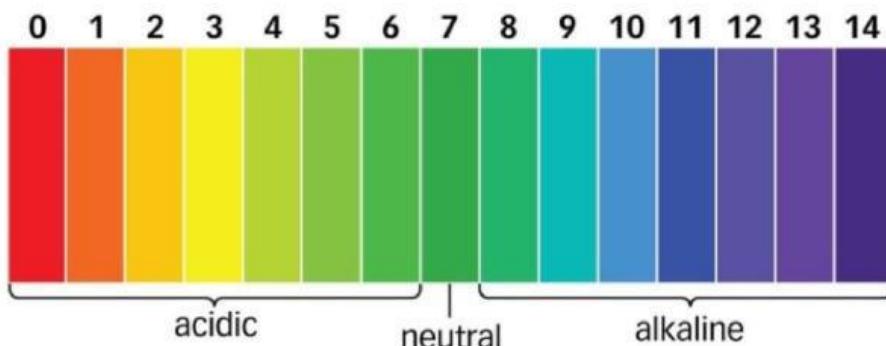


3. In the pH scale below, which pH values represent a neutral, an acidic, and a basic pH?

Neutral:

Acidic:

Basic:



4. Investigate the pH of each of the following substances.

a) Drag the pH sensor into the solution to see the pH reading. The default substance is water.



To change the substance simply select from the drop down menu.

b) Record the pH of the substance and whether the substance falls into the acid or base end of the pH scale.

Substance	pH	Acid/Base
Water		
Blood		
Spit		
Milk		
Chicken Soup		
Coffee		
Orange Juice		
Soda Pop		
Vomit		
Battery Acid		

5. Investigate the substances below.

Which pH do they have? Are these products acidic or basic?

Substance	pH	Acid/Base
Drain Cleaner		
Hand Soap		

6. Using the information from the chart and simulation answer the following questions.

- Which pH values correspond to acids?
- Which pH values correspond to bases?
- Which pH value is neutral?

7. Navigate to the "Micro" box.



8. The same substances that were on the previous tab (Macro) are in this tab. However this tab gives you additional information. Click on the  $\text{H}_3\text{O}^+/\text{OH}^-$  ratio box located below the beaker with the substance to see the concentration of hydronium ions ( $\text{H}_3\text{O}^+$ ) and hydroxide ions ( $\text{OH}^-$ ).

$\text{H}_3\text{O}^+/\text{OH}^-$  ratio  
 Molecule count

9. Fill in the chart below for each substance.

Substance	pH	Acid or Base?	Concentration (mol/L)	
			$\text{H}_3\text{O}^+$	$\text{OH}^-$
Drain cleaner				
Hand soap				
Blood				
Spit				

Substance	pH	Acid or Base?	Concentration (mol/L)	
			$\text{H}_3\text{O}^+$	$\text{OH}^-$
Milk				
Drain cleaner				
Coffee				
Orange Juice				
Soda Pop				
Vomit				
Battery Acid				

10. Using the information from the chart and simulation answer the following questions.

a) As the pH approaches 0, what happens to the concentration of hydronium ( $\text{H}_3\text{O}^+$ ) ions?

b) As the pH approaches 0, what happens to the concentration of hydroxide ( $\text{OH}^-$ ) ions?

c) As a solution becomes more acidic, the concentration of ( $\text{H}_3\text{O}^+/\text{OH}^-$ ) ions increases and the concentration of ( $\text{H}_3\text{O}^+/\text{OH}^-$ ) ions decreases. *Highlight/circle one, respectively.*

d) As the pH approaches 14, what happens to the concentration of  $\text{H}_3\text{O}^+$  ions?

e) As the pH approaches 14, what happens to the concentration of  $\text{OH}^-$  ions?

f) As a solution becomes more basic (aka alkaline), the concentration of ( $\text{H}_3\text{O}^+/\text{OH}^-$ ) ions increases and the concentration of ( $\text{H}_3\text{O}^+/\text{OH}^-$ ) ions decreases. *Highlight/circle one, respectively.*

11. When adding an acid (e.g., hydrochloric acid; HCl) to tap water, the pH...

- Increases
- Decreases
- Stays the same

12. When adding a base (e.g., sodium hydroxide; NaOH) to tap water, the pH...

- Increases
- Decreases
- Stays the same

\*\*\*\*\* END \*\*\*\*\*