

Investigating the pH Scale

Guiding Question:

How does the pH scale qualitatively relate to acids and bases?

Macro Investigation

1. Click on the "Macro" box.



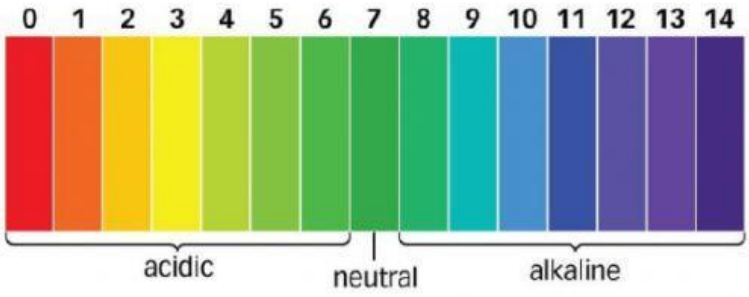
2. Investigate the pH of each of the following substances.

   a) Drag the pH sensor into the solution to see the pH reading.
   b) Record the pH of the substance and whether the substance falls into the acid or base end of the pH scale.
   c) To change the substance simply select from the drop-down menu.



Substance	pH	acid/base
Drain cleaner		
Hand soap		
Blood		
Spit		
Milk		
Chicken Soup		
Coffee		
Orange Juice		
Soda Pop		
Vomit		
Battery Acid		

3. Now draw lines from the substances on the table to the position of the substance on the pH scale.



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4. Using the information from the chart and simulation answer the following questions.
   a) What pH values correspond to acids?

   b) What pH values correspond to bases?

Further Investigations into the pH scale

Guiding Questions:

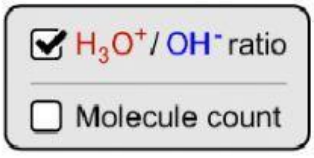
- How does adding water affect the pH of acid and base solutions?
- What are the outer limits of the pH scale?
- How low and high does it go and what does this mean?

My Solution Investigation

1. Click on the "My Solution" box.



2. Click on the H_3O^+/OH^- ratio box located below the beaker with the substance.

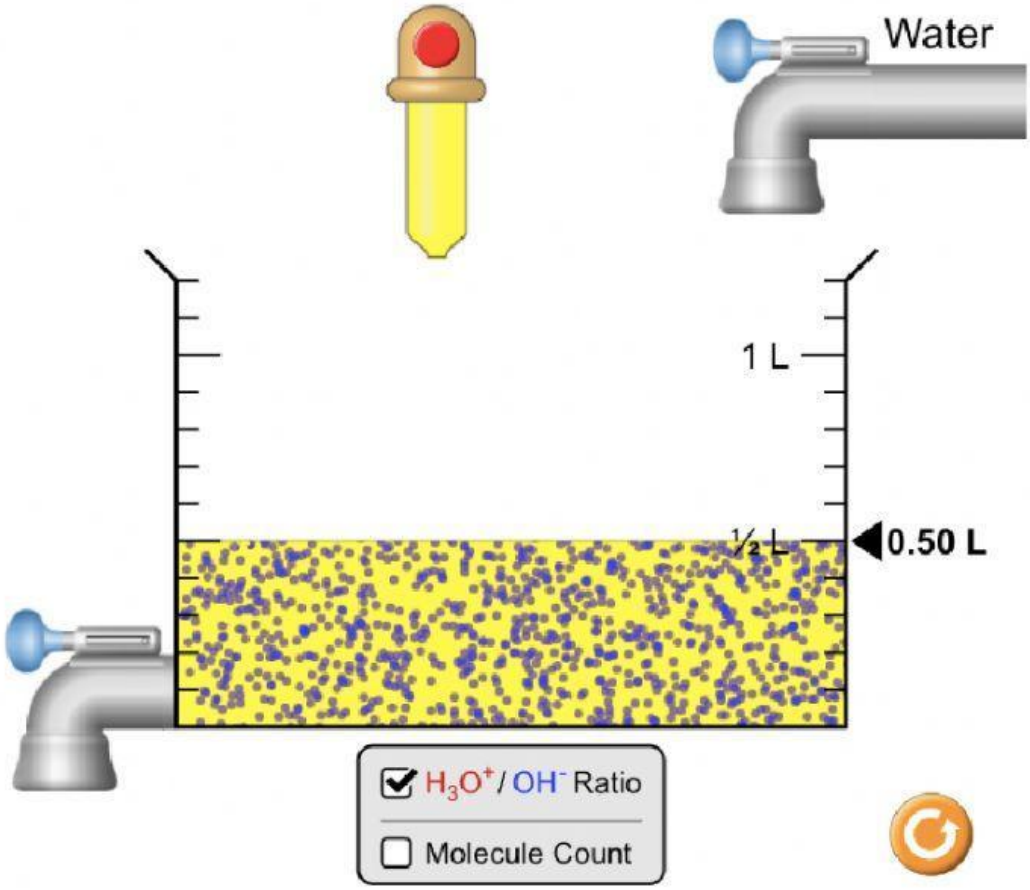


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3. Complete a particulate diagram of the solution with the lowest pH. You have to drag and drop H_3O^+ (●) OR OH^-(●) particles into the beaker.



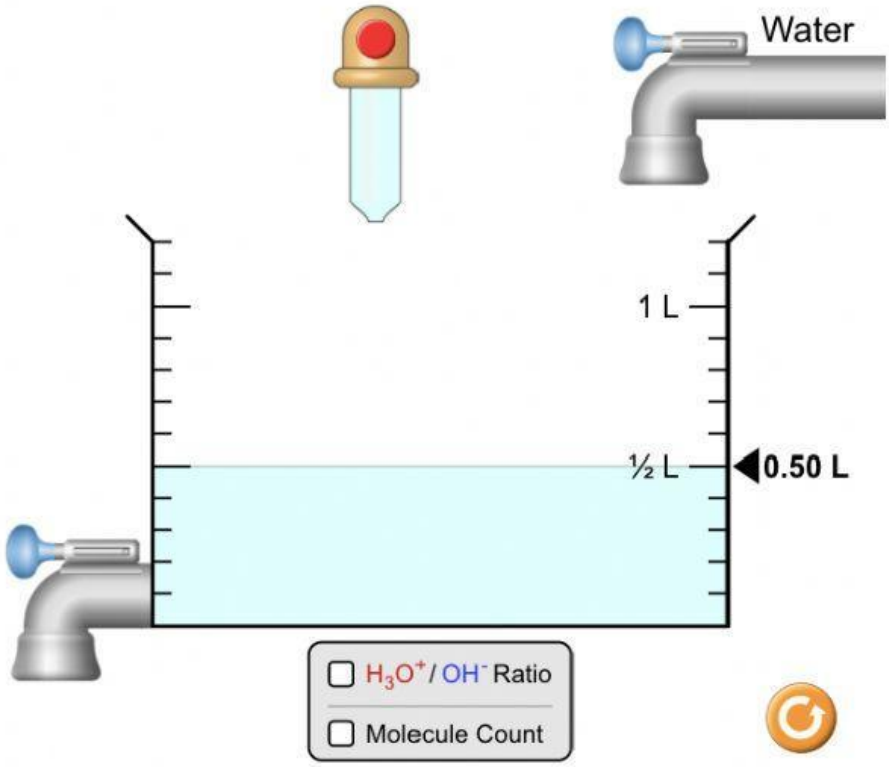
4. Is the solution strongly acidic or strongly basic?

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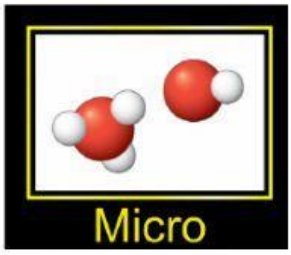
7. Adjust the pH scale so that you have a solution with a pH of 7.00. Draw a particulate level diagram of this solution.



8. Is this solution acidic or basic? Explain.

Micro Investigation

9. Navigate to the "Micro" box.

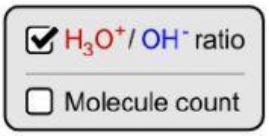


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10. Click on the H_3O^+/OH^- ratio box located below the beaker with the substance.



11. Investigate how adding more of the substance with the red button on the dropper changes the pH of the solution.



12. Fill in the data table with data for the 5 different solutions.

Substance	Volume (Liters)		pH	
	Initial	Final (Maximum)	Initial	Final
Battery acid				
Drain cleaner				
Soda pop				
Orange juice				
Hand soap				

13. What happens to the pH of the solution as you add more of the substance to it?

14. Now you will investigate how adding water changes the pH of the solution. Reset the simulation page with the reset arrow.



15. Investigate the effect of adding water to a substance on the pH of that substance. The pH of the substance is measured after adding 0.5 L of distilled water.



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16. Fill in the chart below with data from five different solutions.

Substance	Acid or base?	pH	
		Initial at 0.5 L	Final at 1 L
Battery acid			
Drain cleaner			
Soda pop			
Orange juice			
Hand soap			

17. Use the simulation and information from the chart to answer the following questions.

    a) What happens to the pH of an acid as water is added?

    b) What happens to the pH of a base as water is added?

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