



High School Science Virtual Learning

College Chemistry

Acids and Bases Virtual Lab

April 27, 2020



High School College Chemistry
Lesson: April 27, 2020

Objective/Learning Target:
**Students will complete lab activities to learn about acids
and bases.**



Let's Get Started:

1. How can you identify a substance as an acid?
2. How can you identify a substance as a base? What polyatomic ion do strong bases contain?

Let's Get Started: Answer Key

1. How can you identify a substance as an acid? Acids have a hydrogen ion that they are able to donate. When given a formula they typically begin with hydrogen, such as HCl or H_2SO_4 .
2. How can you identify a substance as a base? What polyatomic ion do strong bases contain? Bases accept hydrogen ions, and strong bases contain a hydroxide (OH^-) group



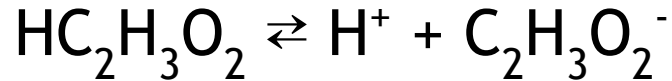
Lesson Activity:

- Just like the lab from last week, this activity will be split between two days.
- Today you will watch the lab video and complete the lab worksheet. There are some new concepts, so there are some key points introduced before the lab.
- Tomorrow you will check your answers and watch a deeper explanation of the lab.

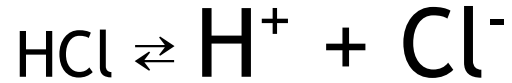


- The reaction above is the general pattern for an acid in water. HX represents the acid, while H^+ represents the donated proton and X^- represents the conjugate base.
- The conjugate base is what is left of the acid after the hydrogen has been donated.
- The reaction below shows the specific case of acetic acid where acetate is the conjugate base.

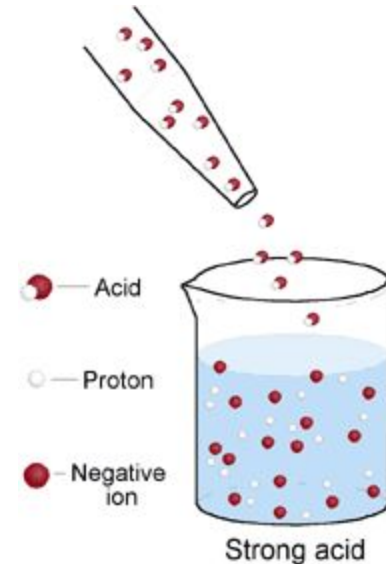


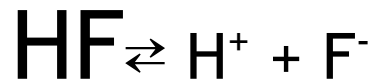


- The back and forth arrows represent equilibrium, which means that the reaction happens in both directions, which means there will always be some reactants AND some products.
- Baking a cake is not an equilibrium reaction because there is no cake batter left after baking. This reaction would have only a forward arrow, like most of what you have seen in chemistry. Cake batter \rightarrow Cake

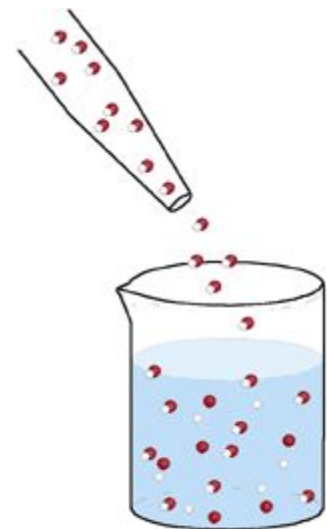


- When the acid breaks apart (going from left to right), this is called dissociation or ionization.
- Strong acids dissociate almost completely, so there are lots of products formed (shown by the bigger font), and less reactants (shown by the smaller font).
- We describe this by saying the reaction goes to the right.





- When weak acids are dissolved in water, they dissociate less. There are a noticeable number of reactants left undissociated, while fewer ionized products were formed (represented by the smaller font).
- We describe this by saying the reaction goes to the left.



Strong Acids

Dissociates nearly completely

Goes to the right

Lower pH (more ionized H^+)

Weak Acids

Dissociates somewhat

Goes to the left

Higher pH (less ionized H^+)



Lesson Activity:

Directions

- Watch this [video](#).
- Answer the questions on your [lab worksheet](#).
- The data for the lab worksheet can be found [here](#).



Practice

Complete the following questions using the information you learned during the lesson activity.

Questions:

1. The video mentions that acid-base chemistry is important for understanding the environmental impacts of carbon dioxide on the ocean. Where else do you think it would be important to understand acids and bases.
2. What are some household substances that you would think are interesting to test as acids and bases?
3. Would stronger acids have a strong or weak conjugate base?

Answer key:

1. Acids and bases are important for sports science because your body builds up lactic acid. It is also very important in biology, cells and blood both have very important systems to make sure that pH doesn't change. Acid rain is another important environmental effect of pollution.
2. Here is a [list of common household acids and bases](#).
3. Stronger acid is a weaker conjugate base. If the acid is strong it gives away all hydrogen, and the base will not want it back