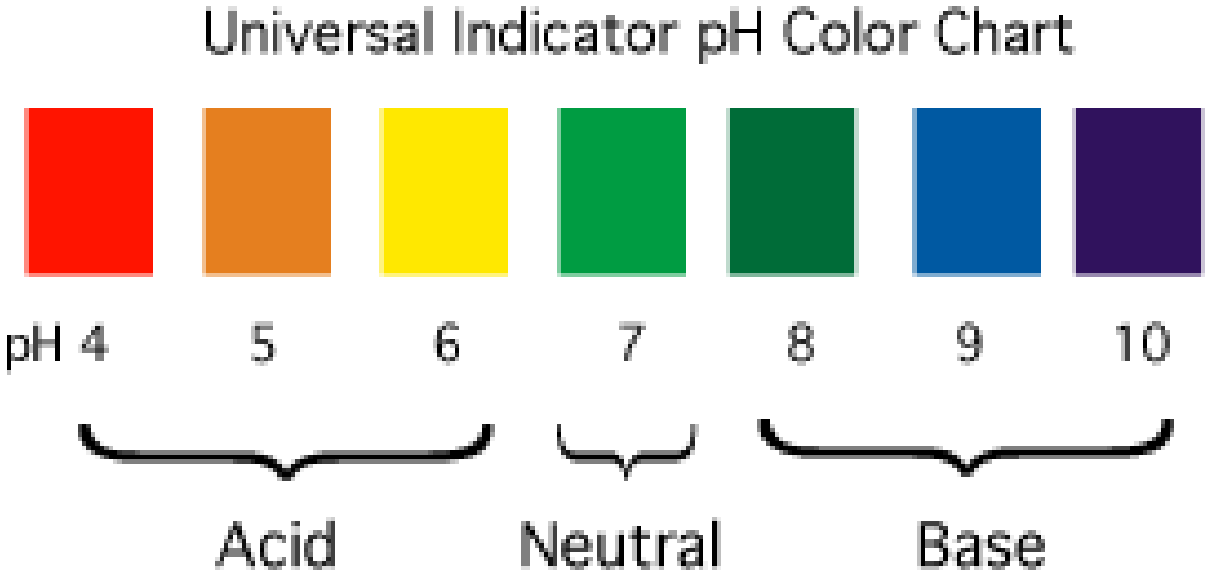
pH and Color Change

- Objective
- To be able to explain, on the molecular level, that ***pH*** is a measure of the ***concentration of the H_3O^+*** in water and that adding an ***acid*** or a ***base*** to water affects the concentration of these ***ions.***

Demonstration

- What does the color of the indicator solution tell you about the substance your teacher placed in each cup?
- That they are different because the indicator changed different colors.

Demonstration



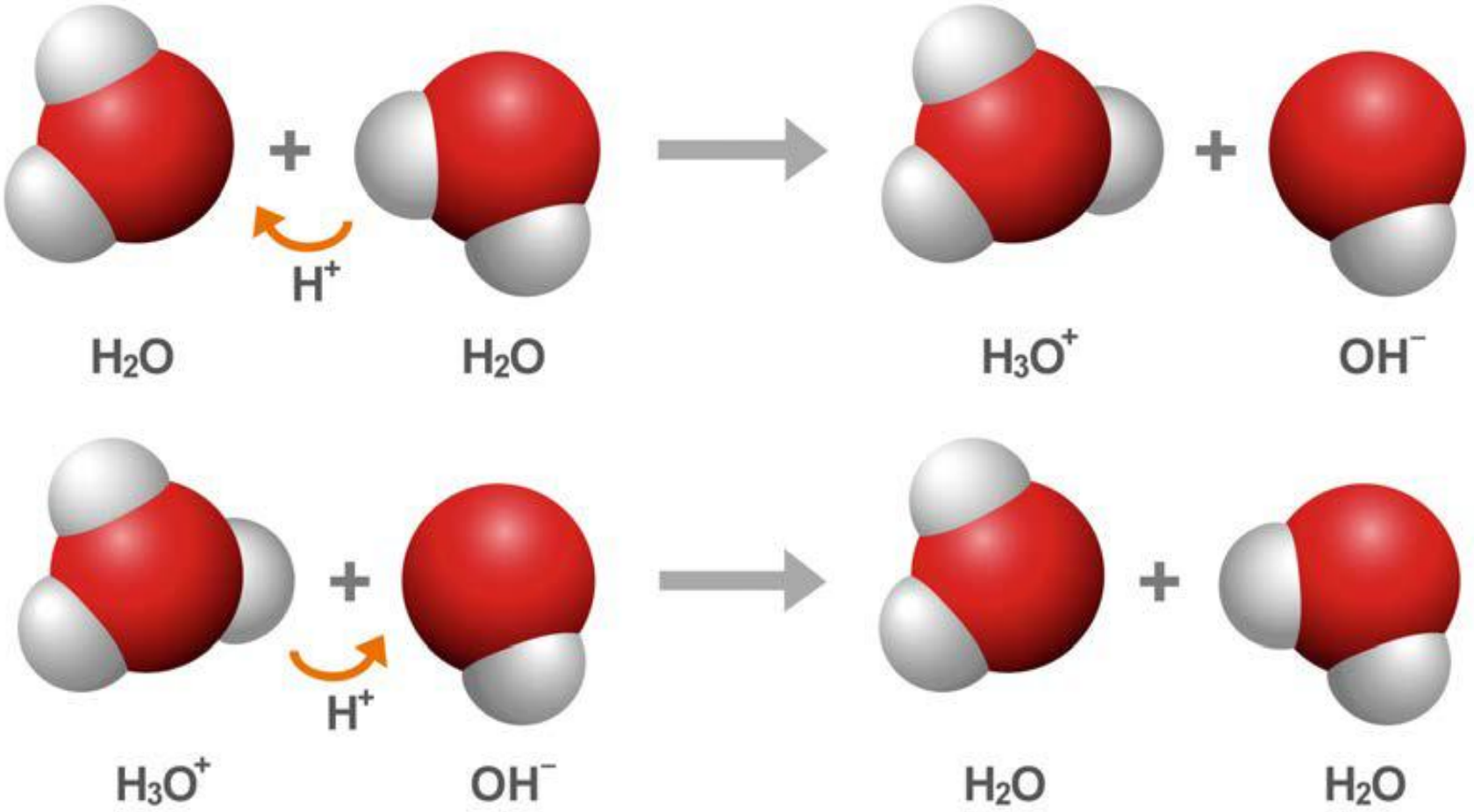
- What do the color of the liquids in the cup tell you about what is in each cup?

Activity Day One

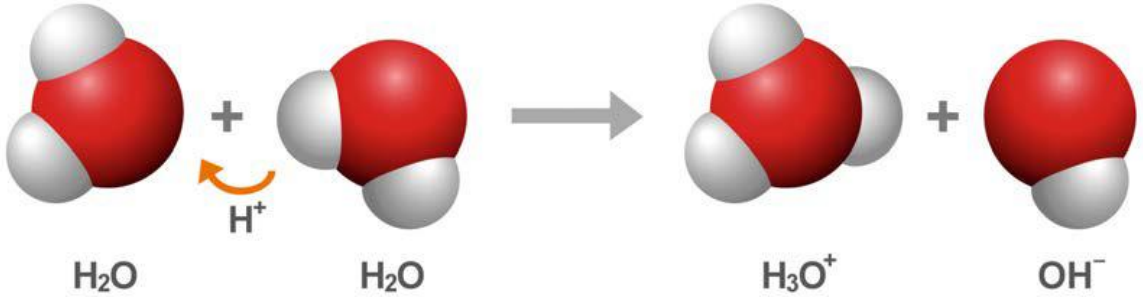
- Complete the Acid portions of the activity and fill in the data table on the activity sheet.
- 15 minutes

Explain it with Atoms and Molecules

- Proton transfer - Video

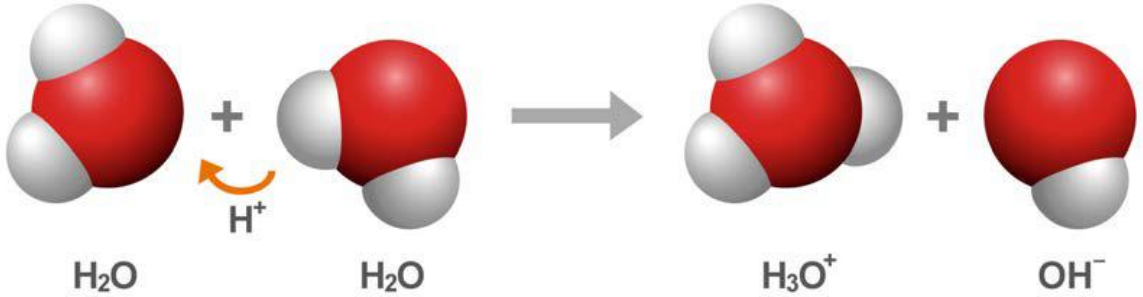


Explain it with Atoms and Molecules



- What is happening in the chemical equation above?
- A proton is being transferred from one water molecule to another.

Explain it with Atoms and Molecules



- Why is one ion positive and the other negative?
- Since a proton has a positive charge, the molecule that gained the proton is a positively charged ion and the water molecule that lost the proton now is a negatively charged ion.

Explain it with Atoms and Molecules

- Acids donate a proton - Video
- Bases accept a proton - Video

Activity Day Two

- Complete the Base portions of the activity and fill in the data table on the activity sheet.
- Complete the TAKE IT FURTHER portion of the lab.
- 20 minutes

Key Concepts

- Whether a solution is acidic or basic can be measured on the ***pH scale.***
- When universal indicator is added to a solution, the color change can indicate the ***approximate pH*** of the solution.
- ***Acids*** cause universal indicator solution to change from ***green*** toward ***red.***
- ***Bases*** cause universal indicator to change from ***green*** toward ***purple.***

Key Concepts

- Water molecules (H_2O) can interact with one another to form $\boldsymbol{H_3O^+}$ ions and $\boldsymbol{OH^-}$ ions.
- At a pH of ***7***, there are ***equal numbers of*** $\boldsymbol{H_3O^+}$ ions and $\boldsymbol{OH^-}$ ions in water, and this is called a ***neutral*** solution.

Key Concepts

- ***Acidic*** solutions have a pH ***below*** 7 on the pH scale.
- ***Basic*** solutions have a pH ***above*** 7 on the pH scale.