

Properties of Water Review

Life as we know it could not exist without water. Water molecules are polar and are capable of forming hydrogen bonds with other polar or charged molecules. As a result, water has the following properties:

- A. Water is considered to be the **universal solvent**
- B. H₂O molecules are **cohesive**; they form hydrogen bonds with each other
- C. H₂O molecules are **adhesive**; they form hydrogen bonds with other polar substances
- D. Water molecules have a **high surface tension**
- E. Ice is **less dense** than water.
- F. Water molecules can travel up narrow spaces due to **capillary action**
- G. Water has a **high specific heat capacity**

Which properties of water listed above are related to the situations described below?

- ___ 1 During the winter, air temperatures can remain below freezing; however, fish and other animals living in the lakes can survive.
- ___ 2 Many substances, such as salt and water, dissolve quickly in water
- ___ 3 When you pour water into a graduated cylinder, a curve forms at the top due to the water molecules sticking to the glass sides of the cylinder.
- ___ 4 Some light insects can walk across the surface of water.
- ___ 5 Water drops that fall on a surface tend to join together to form rounded drops or beads
- ___ 6 If you touch the edge of a paper towel to a drop of colored water, the water will move up into (or be absorbed) by the towel.
- ___ 7 On hot sunny days, the air and ground feel warmer than large bodies of water (such as oceans, lakes)

Acids, Bases, and pH

Demo

Observation	Inference

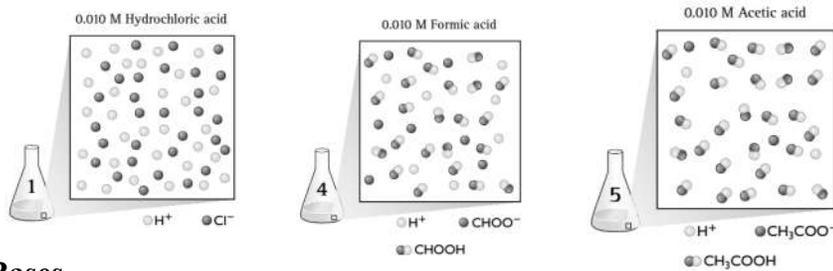
Autoionization of Water

Water (H_2O) can ionize and form two ions: _____

and _____

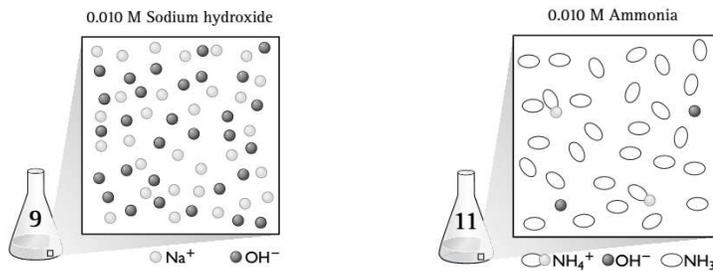
Acids:

Look at the cards labeled “acid”. What kind of ions do they form when dissolved in water? _____



Bases

Look at the cards labeled “base”. What kind of ions do they form when dissolved in water? _____



Neutral Substances

Based on the types of ion that water can form, why do you think water is considered a neutral substance?

Buffers

Buffers are solutions that _____

Why are they important?

• _____

• _____

(homeostasis!)

Testing pH Activity: pH is a measure of the concentration of hydrogen ions (or hydronium ions) in solution. Measuring this can tell you how acidic or basic different substances are.

For each substance, dip a new pH strip into the sample and record the color. Compare the color to the key to determine the approximate pH value. Then, classify it as an acid, base, or neutral.

Substance	Color of pH Paper	pH Value	Acid, Base, or Neutral?
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			

Summary:

1. What range of pH values go with acidic substances?
2. What range of pH values go with basic substances?
3. Which pH value is considered neutral?
4. What type of ions do acids form when dissolved in water?
5. What type of ions do bases form when dissolved in water?
6. Which type of substances that you tested tended to be acidic?
7. Which type of substances that you tested tended to be basic?
8. Using your new knowledge about acids and bases, explain what happened in the demo at the beginning of class. Is your breath acidic or basic? Explain.