## Acids and Bases Are All Around

You may not know it, but you come in contact with acids and bases when cooking, cleaning, and eating. Have you ever used baking soda in the kitchen? **Baking soda** is a base. Maybe you have eaten salad dressing with **vinegar** in it – vinegar is a weak form of **acetic acid**. Citrus fruits that you eat contain **citric acid**. If you drink a carbonated soda, **carbonic acid** is created when the carbon dioxide in the soda combines with water in your body. If you have ever combined vinegar with baking soda, you have seen that a chemical reaction occurs. The fizzing and foaming that results is due to the interaction between the acid (vinegar) and the base (baking soda).

You also have acids and bases in your body. One of the best examples is in your stomach. Human stomachs contain **hydrochloric acid** that is used to digest food. The stomach acid must be kept away from the rest of the body because it is very harsh and can cause damage. The lining of your stomach is specially built to survive the acidic environment.

When scientists talk about how acidic or basic something is they use the **pH scale**. The pH scale goes from 0 to 14. Things that are **acids** have pH numbers below 7. The lower the number is, the stronger the acid. Very strong acids include things like battery acid. **Bases** have pH values above 7. The higher the number is, the stronger the base. An example of a very strong base is drain or oven cleaner. Both strong acids and strong bases can be very harmful to your skin and other tissues. Distilled water is a substance with a pH of 7 which is **neutral**.

What does a pH value actually mean? Well, water is made of two hydrogen atoms and one oxygen atom. When water breaks apart it can form **hydrogen ions (H<sup>+</sup>)** and **hydroxide ions (OH')**. Solutions are called acidic or basic depending on what kind of ions they release. Acidic solutions have lots of hydrogen ions present and basic solutions have lots of hydroxide ions present. For example, stomach acid has a pH of 2 or 3 which means that it is very acidic and has lots of hydrogen ions. The pH outside of your stomach is much closer to neutral. Most of the cells in our body cannot live in the presence of a strong acid. This is why it is important that the acid stays in the stomach. The cells that make up the lining of your stomach have to replace themselves all of the time because it is a tough place to live!

One of the easiest ways to measure pH and determine if something is an acid or a base is to use **pH indicator** paper. Litmus paper is paper coated with an indicator that turns red in an acid or blue in a base. Other pH indicators have a whole range of colors – one for every number on the pH scale. There are also pH indicators that can be found in nature. The juice that is produced by boiling red cabbage is useful for determining pH. A very acidic solution will turn cabbage juice red. Neutral solutions appear purple and basic solutions turn a greenish-yellow when cabbage juice is added.

## Acids and Bases Are All Around Questions

- 1. True or False. Acids and bases are common in everyday places such as the kitchen.
- 2. Give an example of an acid found in something you can eat.
- 3. True or False. Acids and bases react with each other when they are put together. (Think of the vinegar and baking soda).
- 4. What is the environment like inside of your stomach?
  - a. acidic
  - b. basic
- 5. The pH scale goes from \_\_\_\_\_ to \_\_\_\_\_.
- Acids have pH numbers \_\_\_\_\_ than 7.
  a. greater than
  - b. less than
- 7. Bases have pH numbers \_\_\_\_\_ than 7.a. greater thanb. less than
- 8. A substance with a pH of 7 like distilled water is called \_\_\_\_\_.
- 9. Acidic solutions have lots of \_\_\_\_\_\_ ions present.
- 10. A pH \_\_\_\_\_\_ is something that can be used to determine the pH of a solution.
  - a. chart
  - b. indicator
  - c. acid
  - d. base

## Acids and Bases Are All Around Answers

- 1. **True** or False. Acids and bases are common in everyday places such as the kitchen.
- 2. Give an example of an acid found in something you can eat. Acetic acid in vinegar, citric acid in citrus fruits...
- 3. **True** or False. Acids and bases react with each other when they are put together. (Think of the vinegar and baking soda).
- 4. What is the environment like inside of your stomach?
  - a. acidic
  - b. basic
- 5. The pH scale goes from **0** to **14**.
- 6. Acids have pH numbers \_\_\_\_\_ than 7.
  - a. greater than
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- 7. Bases have pH numbers \_\_\_\_\_\_ than 7.
  - a. greater than
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- 8. A substance with a pH of 7 like distilled water is called **neutral**.
- 9. Acidic solutions have lots of hydrogen ions present.
- 10. A pH \_\_\_\_\_\_ is something that can be used to determine the pH of a solution.
  - a. chart
  - b. indicator
  - c. acid
  - d. base