

Name: _____

Period: _____ Date: _____

Acids and Bases

The degree of **acidity** or **alkalinity (basic)** is important in organisms. The body must constantly maintain a near neutral pH (7) in the blood and body tissues. To do this, the body produces **buffers** that can **neutralize** acids. Acidic and basic conditions in the body occur due to different **metabolic (chemical) reactions** taking place throughout the body.



1. What does alkalinity mean? _____

2. What pH must organisms maintain? _____
3. What characteristic of life would maintaining this balance be? _____
4. What chemicals does the body produce to keep neutral pH? _____
5. Buffers _____ acids in the body.
6. Acidic and basic conditions occur due to _____ reactions in the body.

Water is one of the most important molecules in the body. Cells are made mostly of water and water is required for almost every metabolic reaction in the body. The force of attraction between water molecules is so strong that the oxygen atom of one molecule can actually remove the hydrogen from other water molecules. This reaction is known as **dissociation**, and it takes place in our cells. Water (**H₂O**) **dissociates** into **H⁺** and **OH⁻ ions**. A charged atom or molecule is called an **ion**. The **OH⁻ ion** is called the **hydroxide ion**, while the **H⁺ ion** is called the **hydrogen ion**. **Free H⁺ ions** can react with another water molecule to form the **H₃O⁺** or **hydronium ion**. The human body requires a **neutral pH** for many reasons. One reason cells like a neutral pH is for proteins. **Basic or acidic solutions denature proteins (change their shape) so they no longer work.**

7. What is dissociation? _____
8. What is the chemical formula for water? _____
9. What is an ion? _____
10. Name the 2 ions that form when water dissociates. _____
11. What is the hydroxide ion? _____
12. What is a hydrogen ion? _____
13. What is the hydronium ion and its formula? _____

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Acidity or alkalinity is a measure of the relative amount of **H⁺ and OH⁻ ions** dissolved in a solution. **Neutral solutions** have an equal number of **H⁺ and OH⁻ ions**. **Acids** have more **H₃O⁺ ions (H⁺)** than **OH⁻ ions**. **Acids** taste **sour** and can be **corrosive**. **Digestive fluids** in the body are acidic and must be neutralized by buffers. **Bases** contain more **OH⁻ ions** than **H₃O⁺ ions**. **Bases** taste **bitter** and **feel slippery**. When an acid is combined with a base, **neutralization** occurs. The result of neutralization is a **salt** and **water**. Neutralization helps return our body **pH** to **neutral**. The process of our bodies maintaining neutral pH so that proteins can work properly without being denatured (unfolded) is known as **homeostasis**.

14. How do you measure for acidity or alkalinity? _____

15. What is a neutral solution? _____

16. Acids have more _____ ions and taste _____. And can be _____.

17. Bases contain more _____ ions than _____ ions.

18. _____ fluids are acid in the body and must be _____ by _____.

19. Bases taste _____ and feel _____.

20. What is neutralization? _____

21. What 2 things are produced by neutralization? _____

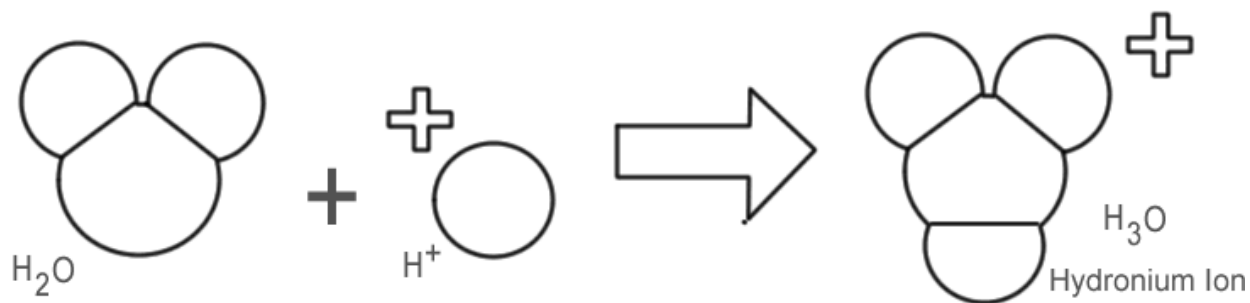
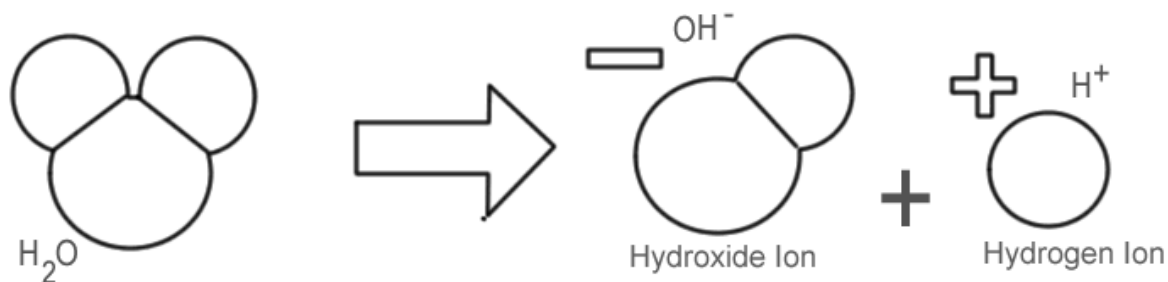
22. Neutralization keeps our pH at _____ and is an example of maintaining _____.

Color the following diagrams according to the key.

DISSOCIATION OF WATER

HYDROGEN (yellow)

OXYGEN (red)

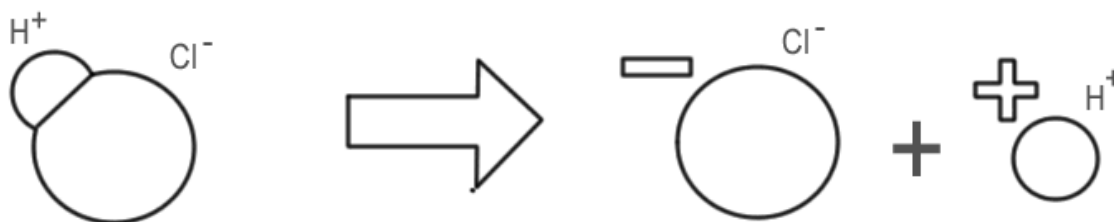


ACIDS & BASES

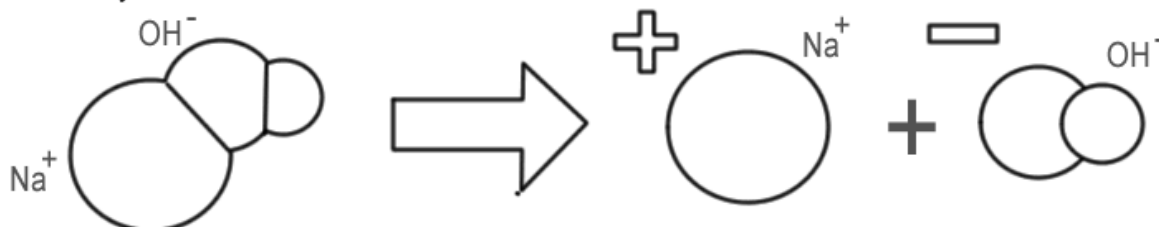
Chlorine (green)

Sodium (blue)

Hydrochloric Acid



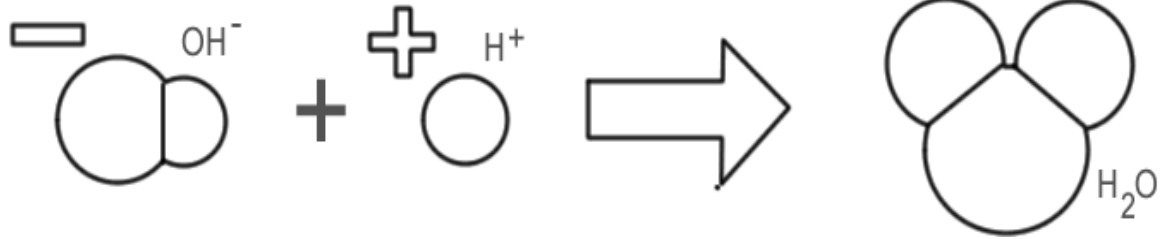
Sodium Hydroxide



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NEUTRALIZATION



Questions:

1. Why is the water molecule so important to organisms?

2. What ions form when water dissociates?

3. What is meant by the term alkalinity?

4. What is produced by the body to help neutralize acidic conditions?

5. What is the name for the OH^- ions?

6. What is the name for the H^+ ion?

7. How does the hydronium ion form? What is its formula?

8. Why do most proteins need near a neutral pH?

9. What two substances form from an acid-base neutralization?

10. Acids have an excess of _____ ions.