

# ACIDS & BASES Reading Guide

Name \_\_\_\_\_ Per \_\_\_\_\_

## Common Acids and where they are found:

Name	Chemical Formula	Where Found
Acetic Acid	CH <sub>3</sub> COOH	<i>Vinegar</i>
Acetylsalicylic Acid	HOOC-C <sub>6</sub> H <sub>4</sub> -OOCCH <sub>3</sub>	<i>Aspirin</i>
Ascorbic Acid (vitamin C)	H <sub>2</sub> C <sub>6</sub> H <sub>6</sub> O <sub>6</sub>	<i>Citrus fruits, tomatoes, vegetables</i>
Boric Acid	H <sub>3</sub> BO <sub>3</sub>	<i>Eyewash Solutions</i>
Carbonic Acid	H <sub>2</sub> CO <sub>3</sub>	<i>Carbonated drinks</i>
Hydrochloric Acid	HCl	<i>Gastric juices in stomach</i>
Nitric Acid	HNO <sub>3</sub>	<i>Making fertilizers, explosives (TNT)</i>
Phosphoric Acid	H <sub>3</sub> PO <sub>4</sub>	<i>Making detergents, fertilizers</i>
Sulfuric Acid	H <sub>2</sub> SO <sub>4</sub>	<i>Car batteries, making fertilizers</i>

## Common Bases and where they are found:

Name	Chemical Formula	Uses
Aluminum hydroxide	Al(OH) <sub>3</sub>	<i>Deodorant, antacid</i>
Calcium hydroxide	Ca(OH) <sub>2</sub>	<i>Leather production, manufacture of mortar and plaster</i>
Magnesium hydroxide	Mg(OH) <sub>2</sub>	<i>Laxative, antacid</i>
Sodium hydroxide	NaOH	<i>Drain cleaner, soap making</i>
Ammonia	NH <sub>3</sub>	<i>Household cleaners, fertilizer, production of rayon and nylon</i>

Read/use chapter 14 (pages 467-476) and the charts above to answer the following questions.

1. What are three properties of acids?
2. What are three properties of bases?
3. Name 2 acids and their uses.
4. Name 2 bases and their uses.
5. Describe one way you can **safely** determine whether an unknown solution is an acid or base?
6. Write the formula for each acid or base:  
barium hydroxide: \_\_\_\_\_  
hydrobromic acid \_\_\_\_\_  
rubidium hydroxide \_\_\_\_\_  
hydrosulfuric acid \_\_\_\_\_
7. Name each as an acid or base:  
HF: \_\_\_\_\_  
HClO<sub>3</sub>: \_\_\_\_\_  
H<sub>2</sub>CO<sub>3</sub>: \_\_\_\_\_  
Al(OH)<sub>3</sub>: \_\_\_\_\_
8. What is an Arrhenius acid?
9. What is an Arrhenius base?

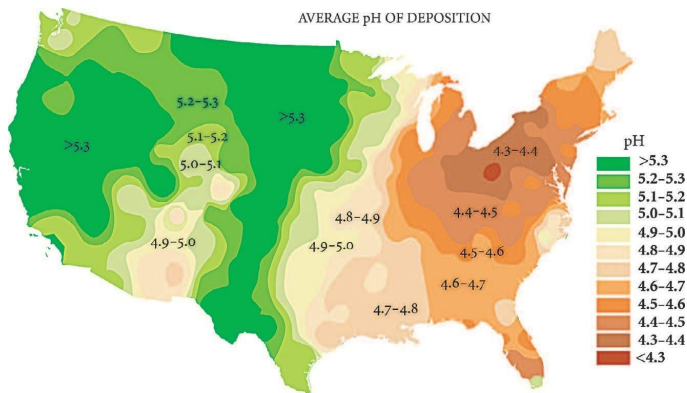
10. Write the formula of a hydronium ion:
11. Explain when a hydronium ion forms:
12. What is the difference between a strong acid and a weak acid?

**Read/use Chapter 14.2 (pg 478-482) to answer the following questions.**

13. How are acids and bases defined by the Bronsted-Lowry theory?
14. How are acids and bases defined by Lewis theory?

**Read/use chapter 15.1 (pages 499-503) to answer the following questions.**

15. Describe the pH scale:
16. What is the pH range of an acid? \_\_\_\_\_ What is the pH range of a base? \_\_\_\_\_



**ACID RAIN**

Acid rain and snow are often worse in areas near heavy industry or large cities. Oxides or nitrogen and sulfur from cars, factories and power plants mix with water in the air to form nitric acid and sulfuric acid. The other factor is the Jet Stream winds which blow storms and pollution from west to east across the USA.

17. What is the range of pH values of the rainfall shown on the above map: \_\_\_\_\_  
Is the rain Acidic or Basic? \_\_\_\_\_
18. What is a stronger acid, a pH of 5.5 or a pH of 4.2? \_\_\_\_\_  
Explain why:
19. What is the average pH of rain/snow for California? \_\_\_\_\_ In New York \_\_\_\_\_
20. Which region of the country has the worst acid precipitation? \_\_\_\_\_
21. Why do you think this is?

22. Why do you think international agreements are important in dealing with acid rain and snow? Does pollution stay in one place? (Pg 489)

**Circle as either true (T) or false (F): (use your textbook- ch 14 & 15)**

- True or False 23. Acids will not conduct electricity.  
True or False 24. Bases will conduct electricity.  
True or False 25. Acids taste bitter.  
True or False 26. Bases will turn red litmus paper blue.  
True or False 27. Acids react with some metals to produce hydrogen gas.  
True or False 28. Acids will turn phenolphthalein (PHTH) indicator pink. (p. 511-513)  
True or False 29. An indicator is a substance which changes colors in acids and bases. (p. 511-513)  
True or False 30. Acids will turn blue litmus paper red.  
True or False 31. Bases feel slippery.  
True or False 32. The pH of water is 7.

33. Dishwater feels slippery. What can you infer about the detergent used to wash dishes?

34. How can an acid be neutralized? (p. 487)

35. The pH of a strong base would be closest to? \_\_\_\_\_  
36. The pH of a strong acid would be closest to? \_\_\_\_\_  
37. A compound that shows a definite color change when mixed with an acid is called an \_\_\_\_\_.  
38. Bases have a \_\_\_\_\_ taste.  
39. As the pH number of an acid decreases, the strength of the acid \_\_\_\_\_.  
40. The chemical reaction in which an acid combines with a base is called \_\_\_\_\_.

## **Notes: Acids, Bases, and the pH Scale**

Some of our favorite foods make our tongue curl up because they are SOUR/Bitter!

- Some foods have a “bite” of their own because they’re somewhat bitter. WHY?
- There is a scientific reason for this: These foods are either \_\_\_\_\_ or \_\_\_\_\_
- Other substances besides foods have these characteristics.
- Chemicals may be classed as acids or bases.
- Things that are neither acids nor bases are neutral.
- pH measures how acidic or basic a solution is.

### **Acids**

Often taste \_\_\_\_\_  
-Strong acids can burn skin & eyes  
-Strong acids can dissolve metals  
-Examples: Lemon juice, vinegar, car battery acid

### **Bases**

-Can taste \_\_\_\_\_  
-Strong bases can burn skin & eyes  
-Bases react more easily with protein than with metal; they are often used for \_\_\_\_\_  
-Examples: Milk, baking soda, soap, drain cleaner, bleach

Some substances are not really an acid or a base: **For example, pure water.** Most substances can be identified as either acidic or basic. Like the soil in our backyard.

## pH

-A special name is given to the acid or base characteristic that a substance has: It is called: pH

-“p” stands for potential and “H” stands for hydrogen; hence, the potential of a substance to attract hydrogen ions



Hydrangea flowers are a naturally occurring pH indicator, turning pink in basic soil and blue in acidic.

## How Do We Measure pH?

-We measure pH by using special strips of paper called pH paper

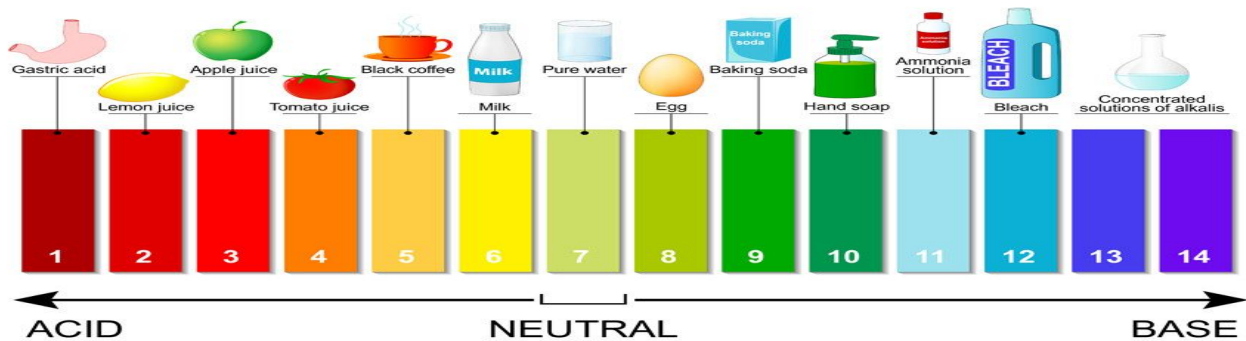
-The paper is treated with chemicals that change color to show the pH.

-When the paper touches the substance being tested, it turns a specific color to tell if the substance is an acid or a base.



## The pH Scale

- pH scale ranges from \_\_\_\_\_
- pH 7 is \_\_\_\_\_; neither acid nor base (Pure water is pH 7!)
- Low pH (0-6.9) = \_\_\_\_\_
- High pH (7.1-14) = \_\_\_\_\_
- The closer to the ends of the scale, the \_\_\_\_\_ the solution is



## The pH Scale

- Each pH unit is *10 times* as large as the previous one
- A change of 2 pH units means *100 times* more basic or acidic
- Careful measurement is important
- A mistake of *one* pH unit means *10 times* too much or too little!

## Why is pH important?

- Fish can't live if the pH is too high or too low
- Soil has to be in a certain pH range for plants to grow and stay healthy.
- Water that has too high or low pH contains harmful dissolved chemicals.
- Water plant operators keep a careful watch on the pH of our drinking water, to keep it safe.

