



science

Exploring Acids and Bases

Quiz

What do you know about acids and bases?

Acids are dangerous but bases are not.

True

False

If a substance has a bitter taste, feels slippery, conducts electricity, and has a high pH, it is a

- Acidic substance
- Basic substance
- Neutral substance

A substance is considered to be acidic if it

- increases the concentration of hydrogen ions in a solution.
- increases the concentration of hydroxide ions in a solution.
- has a high pH.
- conducts electricity.

What is an Acid?

An acid is a substance that produces hydrogen ions (H^+) when it dissolves in water

Common Acids

Name	Formula	Use
Hydrochloric Acid	HCl	Stomach acid
Ascorbic Acid	$H_2C_6H_6O_6$	Vitamin C
Sulfuric Acid	H_2SO_4	Car Battery Acid
Acetic Acid	$HC_2H_3O_2$	Vinegar

Quiz

In what way are all the acid formulas alike?

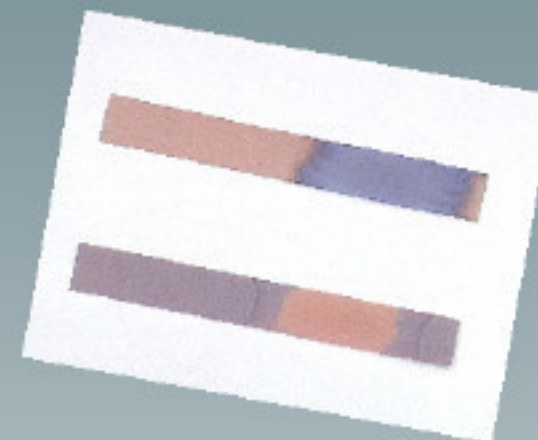
In what way are all the acid formulas alike?

- They all contain carbon (C).
- They all contain oxygen (O).
- They all begin with hydrogen (H).

What are some properties of Acids?

Acids:

- have a sour taste
- change color in indicators
- are corrosive
- react with metals and carbonates
- conduct electricity



What is a Base?

A base is a substance that produces hydroxide ions (OH^-) when it dissolves in water

Common Bases

Name	Formula	Use
sodium hydroxide	NaOH	Soap making, drain cleaner
magnesium hydroxide	$\text{Mg}(\text{OH})_2$	antacid
calcium hydroxide	$\text{Ca}(\text{OH})_2$	to reduce the acidity of soil

Quiz

In what way are all the base formulas alike?

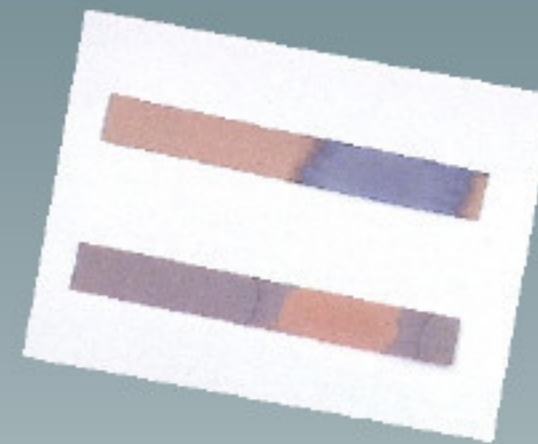
In what way are all the base formulas alike?

- They all end with -OH.
- They all contain sodium (Na).
- They all begin with hydrogen (H).

What are some properties of Bases?

Bases:

- have a bitter taste
- change color in indicators
- are corrosive
- feel slippery
- conduct electricity



Quiz

Which of these properties could be used to distinguish acids from bases?

Which of these properties could be used to distinguish acids from bases?

- Acids change colors in indicators, but bases do not.
- Bases conduct electricity, but acids do not.
- Bases have a slippery feel, but acids do not.
- Acids are corrosive, but bases are not.

**Acids and Bases are often referred to by their pH.
What is pH?**

*pH is a measure of how many hydrogen ions
are moving around in a solution.*

*You can think of it as **POWERFUL HYDROGEN!***



The pH Scale

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Car battery acid		Stomach acid			Tomatoes		Pure Water		Baking Soda			Ammonia		Drain Cleaner

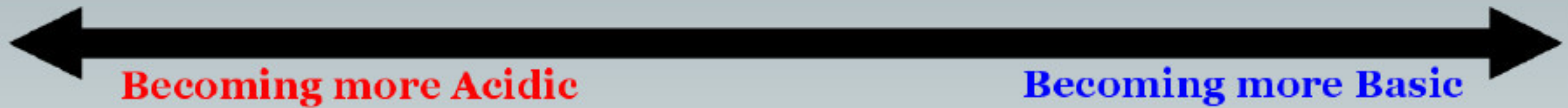
Strong Acids

Weak Acids

Neutral

Weak Bases

Strong Bases



Quiz

Where are the most dangerous acids and bases found on the pH scale?

Where are the most dangerous acids and bases found on the pH scale?

- at 7
- at 6 and 8
- at 0 and 14

Draw It

Circle the substances that will raise the pH of water when they are added to water..



Quiz

What do you know about acids and bases?

Acids are dangerous but bases are not.

False

True

If a substance has a sour taste, conducts electricity, and has a low pH, it is considered to be

- an acidic substance.
- a basic substance.
- a neutral substance.

A substance is considered to be basic if it

- increases the concentration of hydrogen ions in a solution.
- increases the concentration of hydroxide ions in a solution.
- has a low pH.
- smells bad.



<https://www.youtube.com/embed/Q32LQYCO9AA>

Open Ended Question

What is the name of this compound: FeBr_3 ?

Open Ended Question

What is the name of this compound: P_2O_5 ?

Quiz

Are acids ionic or covalent?

ionic

covalent

Why do you think that?

- Because they all have a metal and a nonmetal
- Because they have all nonmetals

Acids are weird

Acids ALL have hydrogen as the first element. This hydrogen acts as a nonmetal when it's bonded with the other nonmetal. So, acids are put together like covalent molecules.

However, when acids dissolve in water (dissociate), they make hydrogen IONS and ions from whatever other element or polyatomic they are with. So, acids come apart in water like ionic formula units.

Naming Acids

1. All acids have H in front, and some anion, A, after it.
2. A can be a polyatomic ion (with oxygen), or it can be a single atom

Oxyacids

H and a polyatomic ion

--If polyatomic ends in -ate, you change the ending to -ic

--If polyatomic ends in -ite, you change the ending to -ous

*I 'ate' something, and now I feel 'ic'ky. I think I have the 'ite'-'ous.'

Binary Acids

H and a single element (no oxygen)

-- hydro_____ -ic acid
(name of element)

Quiz

Naming Acids

What is the name of HCl?

- hydrogen monochloride
- chloric acid
- hydrochloric acid
- chlorous acid

What is the name of H_2SO_4 ?

- sulfurous acid
- dihydrogen monosulfur tetraoxide
- sulfuric acid
- hydrosulfuric acid

What is the formula for hydronitric acid?

HNO_3

H_3N

HNO_2

HN

What is the formula for phosphoric acid?

H_3PO_3

HP

H_3PO_4

H_3P

Draw It

Draw the formula for carbonic acid. Write your ions!