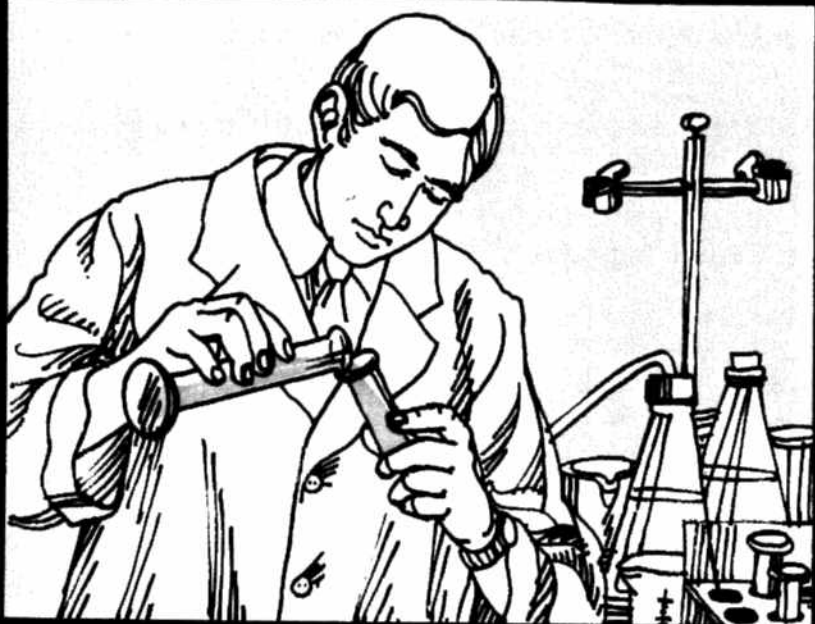


WHAT HAPPENS WHEN WE MIX AN ACID WITH A BASE?

21c



neutral: not an acid and not a base

chemical reaction: a chemical change in the way atoms link up

neutralization: the forming of a salt and water from the combining of the right amounts of an acid and a base

AIM | What happens when we mix 21 | an acid with a base?

In a courtroom, a judge is not supposed to take sides. The judge is there to make sure that everything is fair for both sides. An umpire does the same thing in a baseball game. We say that people like judges and umpires are *neutral*.

In chemistry, a liquid is neutral if it is not an acid nor a base.

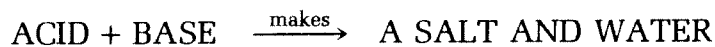
Take water, for example. Water is neutral. It is not an acid. It is not a base.

Acids and bases have definite properties. In many ways they are opposite. What happens if you mix an acid with a base?

When you mix an acid with a base, a *chemical reaction* takes place. The atoms from the acid and the base change the way they are linked up. New products are formed. These new products have their own properties. The properties are different from the properties of either acids or bases.

What do you get?

When you mix the right amounts of an acid and a base, you get *a salt and water*. The salt is dissolved in the water. It forms a salt solution. A salt solution is not an acid; it is not a base. It is *neutral*.



The link-up of an acid and a base to form a salt and water is called *neutralization* [new truh li ZAY shun].

There are *many* kinds of salts. The salt you sprinkle on your food is just one kind of salt. Its formula is NaCl. Different salts have different formulas.

SEE WHAT HAPPENS WHEN YOU MIX AN ACID AND A BASE

What You Need dilute hydrochloric acid (HCl)
dilute sodium hydroxide (NaOH)
(The acid and base must be the same strength.)
small test tube
2 droppers
glass stirring rod
phenolphthalein
red and blue litmus paper
test tube holder

Caution—Handle these chemicals carefully!

What To Do

1. Place 20 drops of sodium hydroxide into the test tube.
2. Add one drop of phenolphthalein.

The phenolphthalein turns deep pink.

This shows that sodium hydroxide is _____.
an acid, a base, neutral

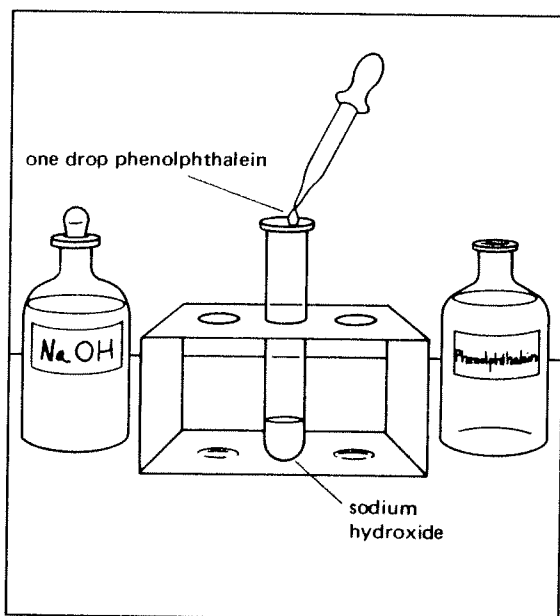


Figure A

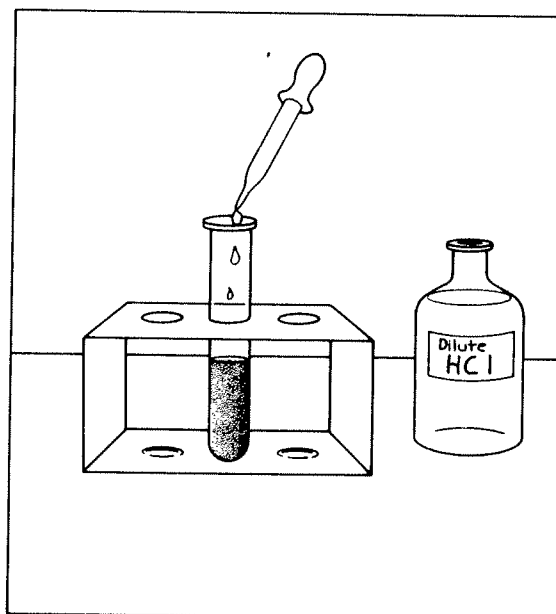


Figure B

3. Add 15 drops hydrochloric acid to the test tube—one drop at a time. (Use a clean dropper.)

The solution stays pink. (Figure B)

This shows that the mixture _____.
is neutral, is an acid, is still a base

4. Add more hydrochloric acid . . . one drop at a time. Stir after each drop. Stop when the pink disappears.

The loss of the pink color shows that the mixture is _____ .
an acid, no longer a base

5. Test the solution in the test tube with blue litmus paper. (Figure C)

The blue litmus paper stays blue.

This shows that the mixture is not _____ .
an acid, a base

6. Test the solution in the test tube with red litmus paper. (Figure D)

The red litmus paper stays red.

This shows that the mixture is not _____ .
an acid, a base

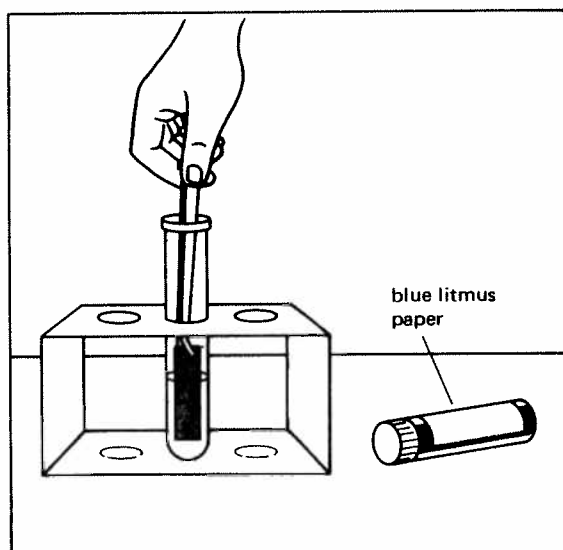


Figure C

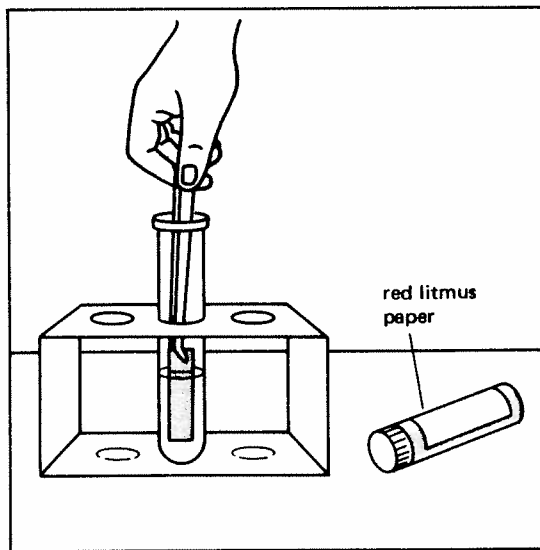
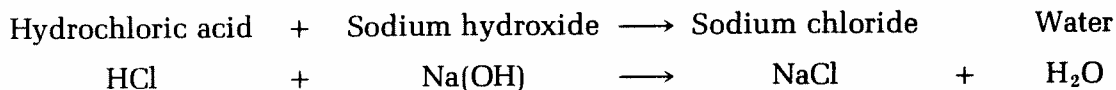
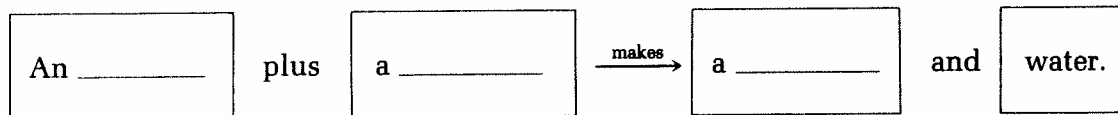


Figure D

7. The mixture _____ neutral.
is, is not

8. Fill in the boxes to show what happened.



9. NaCl in H₂O is _____ .
an acid, a base, salt water

COMPLETING
SENTENCES

Complete the sentences with the choices below. Four of these may be used twice.

water

neutralization

litmus paper

an acid

a base

many kinds

reaction

a salt

table

neutral

phenolphthalein

1. There are many acids and bases. Lemon juice is an example of _____ .
Lye is an example of _____ .
2. Any substance that is not an acid nor a base is said to be _____ .
3. An example of a neutral liquid is _____ .
4. The mixing of an acid and a base causes a chemical _____ .
5. If we mix the right amounts of an acid and a base, we get _____ and _____ .
6. The chemical reaction between an acid and a base to produce a salt and water is called _____ .
7. There are _____ of salts.
8. The most common salt is _____ salt.
9. Salt water does not change the color of _____ or _____ .
10. Salt water is neither _____ nor _____ . Salt water is _____ .

TRUE OR
FALSE

Write T on the line next to the number if the sentence is true.
Write F if the sentence is false.

1. _____ An acid is neutral.
2. _____ A base is neutral.
3. _____ Water is neutral.
4. _____ There is only one formula for water.
5. _____ There is only one kind of salt.
6. _____ Salt water is neutral.
7. _____ If you mix an acid with a base, you get only water.
8. _____ Blue litmus paper changes to red in salt water.
9. _____ Red litmus paper stays red in salt water.
10. _____ Phenolphthalein turns pink in salt water.

KEEPING UP WITH SCIENCE



'TIS
NOT
THE
SEASONING
TO BE JOLLY!

“Please pass the salt.” This is perhaps the most common request at the dining table—except for, “Can I have some more....?”

Sodium chloride, common table salt, is the most widely used seasoning. It has been for thousands of years. In the days before refrigeration, foods spoiled quickly and soon tasted rotten. Salt and spices were used to cover up the bad taste.

In ancient times, salt was a very important economic product. In some places, salt was so scarce and costly, it was used as money. Caesar's troops received part of their pay in salt. This part of their pay was called their *salarium*. Our word *salary* comes from that Latin word.

You have heard the expression “not worth his salt.” It dates back to the days when workers were paid partly in salt. It means that a person has not earned his wages.

Salt is an important part of your body. Your blood and your cells contain salt. You must have salt—but only a small amount. Too much salt in your diet can be very harmful to your body.

It is really the *sodium* in salt that is the trouble maker. Many foods contain sodium. But salt supplies the most.

Too much salt (sodium) in the diet increases the risk of brain stroke, kidney failure, and hypertension (high blood pressure). Hypertension is the nation's most common long lasting disease. It can lead to heart failure and death.

As a people, we consume too much salt. We have developed a “taste” for salt. Most foods we eat contain added salt—even dry cereals and baby food. To make matters worse, many of us overuse the salt shaker. We sprinkle salt onto food—even before we taste the food. It's a “sickening” habit.

The path leading to high blood pressure starts early in life. Avoid that path. What can you do about it? As a starter, throw away your salt shaker. Then you should avoid salt-rich foods. Start with salty snacks like pretzels, salted peanuts, and pickles. Cut down on pizzas, too.

Make an effort to develop a taste for less salty food. You will taste a lot more than just salt. You will taste the *food* itself. And if you live in a place where it snows, pressure your community to cut back on the use of road salt to melt the snow. This salt can get into your drinking water.

Take charge of your health. NOW! It's later than you think!