

Concepts

Chemicals naturally occur in our food. These chemicals can be used for testing household chemicals or making new chemicals.

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- acid—a compound that increases the hydrogen ions (H^+) in a solution; often sour in taste.
- antioxidant—very reactive molecule that are broken down by oxygen, vitamin C is an example
- base—a compound that increases the hydroxide ions (OH^-) in a solution; often bitter in taste.
- chemical reaction—when two substances combine to create a new substance; often characterized by fizzing, color change, change in temperature, or creation of light.
- dissolve—when the molecules of a solid separate and become completely surrounded by the molecules of a liquid.
- indicator—a chemical that changes color with changes in pH.
- molecule—a group of at least two atoms held together in a definite arrangement.
- neutralize—to counter or lessen in effect; acids and bases neutralize each other
- pH—a scale measuring relative acidity and basicity.
- polymer—a large molecule that is made of many smaller molecules linked together.
- solution—a completely uniform mixture.
- soluble—the ability of a substance to dissolve in another substance.

Unscramble words from the Words to Know list to solve the double puzzle.

1. Unscramble each of the clue words.
2. Write down each of the letters that appear in a circle in the box above.
3. Unscramble these letters to discover the final word.

CIAD	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>						
BEAS	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>						
EREINLZATU	<input type="text"/>									
AETLM	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>						
SEILODVS	<input type="text"/>									
SLULBOE	<input type="text"/>									
PMREOLY	<input type="text"/>									

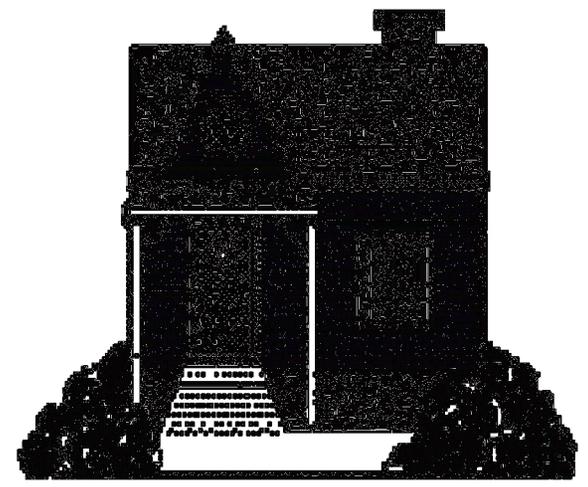
← Final Word

Circled letters:



Chem Lab

Take-Home Activities



Everyday Chemistry

Spicy Indicator

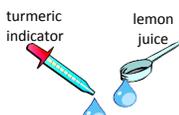
Use turmeric to test for bases in your home!

Materials:

¼ teaspoon turmeric powder
¼ cup rubbing (isopropyl) alcohol
one small jar with a tight-fitting lid
one eyedropper or small spoon
several small bowls or cups
household chemicals to test (for example: soap, household spray cleaner, window cleaner, ammonia, vinegar, baking soda, baking powder, milk, soda water, and lemon juice.)

To do and notice:

1. Combine the turmeric with the alcohol in the jar. Mix the two thoroughly. This is your indicator. (An indicator is a chemical that changes color with a change in pH (acidity/basicity).)
 - **What color is the turmeric-and-alcohol solution?**
2. In small bowls or cups, mix one teaspoon of each household chemical to be tested with a few drops of turmeric indicator. (You will be able to test only white or colorless substances.) Turmeric is yellow in an acid or neutral solution, but it turns red in a base.
 - **Which household chemicals are bases? Which are acids?**



A closer look:

The compound that creates the yellow color in turmeric will react with a base to form a red compound. Alcohol is used to prepare the indicator because turmeric is more soluble (dissolves better) in alcohol than in water.

Many soaps and household cleaners are bases. Baking soda is also a base, but baking powder has added ingredients that make it acidic.

Iron in Cereal

Find iron in your food!

Materials:

Total® brand cereal or other high-iron-content breakfast cereal
mixing bowl
water
plastic or glass rod
large spoon

To do and notice:

1. Place the entire box of cereal flakes into a large bowl. Use your hands to crush the flakes into small pieces.
 2. Add enough water to the bowl to cover the flakes. Stir. As the flakes absorb water, add enough water to keep the mixture thin and soupy.
 3. Tape a small magnet on the end of the rod.
 4. Stir the cereal soup with the magnet for 20 minutes (take turns with a partner).
 5. Remove the magnet from the cereal and observe.
- What has collected on the magnet?**



A closer look:

As you stirred the cereal you dislodged small particles of the metal iron from the cereal flakes and these stuck to the magnet. These particles are so small that you do not notice them when you eat cereal.

The human body requires iron for many functions including production of hemoglobin in red blood cells. Hemoglobin is the molecule that enables red blood cells to carry oxygen. The iron found in cereal (which is the same iron found in nails!) is converted by the acid in your stomach into a form that can be absorbed readily by your body.

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Mystery Writing

Materials:

2 tablespoons lemon juice
small cup
small brush or cotton swab
paper
shallow bowl or pie plate
water
rubber gloves
10 drops tincture of iodine (available at drugstore)

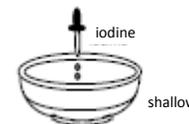
To do and notice:

1. Pour the lemon juice into the cup. Dip the brush or swab into the lemon juice, and use it to write on the piece of paper. Allow the paper to dry completely (about 15 minutes).

Can you see the writing?



2. Put on the gloves.
3. Cover the pie plate with 1/2 inch of water. Add 10 drops tincture of iodine to the water. Stir with your finger to mix completely.



CAUTION: Iodine can stain skin and clothes.

4. Place the paper into the bowl. Push the paper completely under the iodine solution. After a few moments, remove the paper and let it dry on paper towels.

What does your writing look like now?

A closer look:

Iodine molecules combine with starch molecules in the paper to make a dark blue compound. Vitamin C from the lemon juice reacts with the iodine and prevents it from turning blue with the paper. Thus the writing on your paper stays white, while the rest of the paper stays blue. This allows you to see your writing.