

Chemical Change

Fireworks designers achieve their colourful, noisy displays through chemical changes in the substances that make up the fireworks. A **chemical change** is a change in matter that occurs when substances combine to form new substances. For example, fireworks designers know that when certain substances are heated they will combine explosively to form new substances. When fireworks explode, gases form from the solids in the fireworks.

Designers also know that certain substances will change colour when they are heated. By adding substances made from barium and chlorine to a barrage-type firework, fireworks designers can create a huge sparkling green fan in the sky. When you light a sparkler, it glows a bright white colour. This is because sparklers contain magnesium, which burns bright white. Adding these types of substances to fireworks creates the spectacular fireworks you observe in the night sky.

Did You Know?

The word “pyrotechnics” refers to explosives used in displays or for other purposes such as smoke screens. The prefix “pyro” means fire, and “technics” refers to art.

1-2A Bag of Change

Find Out ACTIVITY

In this activity, you will mix three unknown substances together in a plastic bag and observe the changes that occur. Watch for changes in state (solid, liquid, or gas), colour, volume, temperature, and anything else you can detect.

Safety



- Be careful not to get any chemicals near your eyes or mouth.

Materials

- Chemical A—a white solid
- Chemical B—a white solid
- Chemical C—a blue liquid composed of a blue solid dissolved in water
- 2 small spoons for measuring A and B
- 50 mL graduated cylinder
- 2 resealable plastic bags per group
- water

What to Do

1. Describe and record the properties of chemicals A, B, and C. Observations may include the colour or state (solid or liquid) of the chemical.

2. Mix one spoonful of chemical A, one spoonful of chemical B, and 10 mL of chemical C into a plastic bag, and then quickly seal it up.
3. In the first 30 s, squeeze the bag in various places to mix the chemicals. Detect any temperature changes with your hand.
4. Record as many observations as you can.
5. When you are finished, wash all the chemicals down the drain and rinse out the plastic bag.
6. Clean up and put away all the equipment. Wash your hands.

What Did You Find Out?

1. List and describe changes you observed in the plastic bag.
2. Share your list with the class, and add to your list any new observations discussed in class.
3. If time and the quantity of chemicals permit, try to identify which two chemicals are responsible for each effect you see. To do this, mix just two chemicals together in the bag. You might wish to simply mix water and one of the chemicals. Your goal is to use the minimum number of chemicals to produce each effect.