Traveling Science Shows

THE FRANKLIN INSTITUTE

Pre-Show

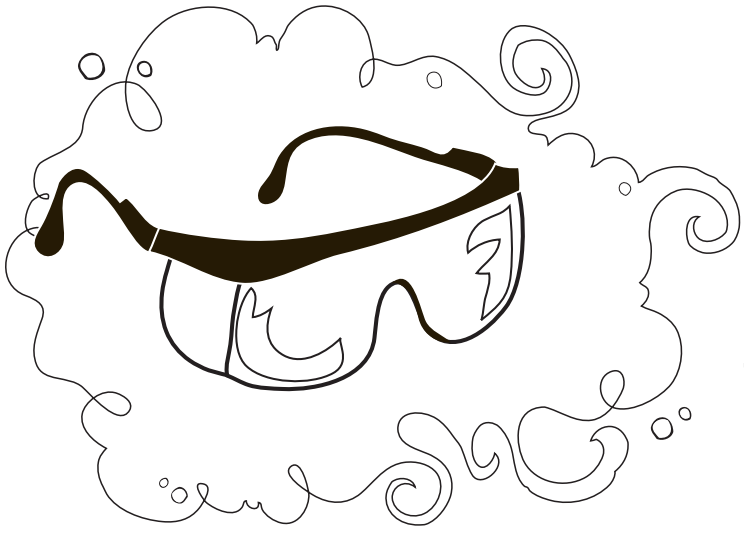
CHEMISTRY

About the Show

The Chemistry show uses exciting demonstrations to explain why we study chemistry and how chemists improve our daily lives. Students leave the program not only with a solid understanding of chemistry basics, but also with enthusiasm and curiosity about chemistry!

Before the show, ask students to draw a picture of a chemist. Students often picture someone wearing a lab coat, pouring liquids into glassware. Actually, a chemist is a detective who uses clues to learn about chemicals. Chemicals are not just in the laboratory; they surround us. You may not realize it, but every substance is a chemical. Wood, soap, plastic, and even food are made of chemicals.

The following activities are designed to help your students preview some chemistry concepts and see how chemistry relates to daily life. They will also help your students have some fun with chemistry, but please remember to use appropriate safety rules for all activities. Adults should always supervise students during experiments. Materials in chemistry experiments should never be ingested. Goggles or safety glasses are recommended for all activities, but not required unless stated.



Thank you for scheduling a Franklin Institute Traveling Science Show.
We are excited to visit you soon!

MYSTERY GOO

FOR GRADES 1-3

During the show, we will demonstrate lots of chemical reactions. In this activity, students combine ingredients to create a new substance. In the process, they discover how the properties of chemicals can change when mixed together – and how chemistry can give us some fun new materials! This activity can get messy, so you may want to cover the table with newspaper before beginning.

EQUIPMENT

Cornstarch
Water
Large bowl
Large spoon
Cake pan

PROCEDURE

1. Give students small samples of cornstarch and water. Ask them to list their observations of the properties of each. How does each chemical look? Feel? Smell? Decide if each sample is a solid, liquid, or gas.

2. Mix about 2 parts cornstarch to 1 part water in the bowl until you have a uniform, gooey consistency. If the mixture is grainy, add more water. If the mixture splashes, add more cornstarch.

3. Pour the mixture into the cake pan. Smack the mixture with your hand and observe the reaction. Now scoop up the mixture and try to hold it in your hand. What happens?

4. Ask students to observe the mixture and describe its properties. How is it like the ingredients, cornstarch and water? How is it different?

5. Review the properties of solids and liquids. How is this mixture like a solid? How is it like a liquid?

6. To dispose of the mixture, throw it away in a trash can. Do NOT rinse it down a drain.

CHEMICALS IN OUR CEREAL

FOR GRADES 4-8

In the chemistry show, we will prove that chemistry is all around us. This activity illustrates how chemistry helps us understand our own bodies. Students will find iron in breakfast cereal and discover that we eat chemicals every day.

EQUIPMENT

Cereal with high iron content (such as Total)
Ziploc bags
Water
Strong magnets

PROCEDURE

1. Show students the cereal. Ask them to describe it, and hypothesize what chemicals might be in it. Look at the nutritional information on the box to see how much iron is in the cereal, and ask how you might separate out the iron.
2. Place about one-half cup of cereal into a Ziploc bag. Use your hands to crush it.
3. Fill the bag with water to about an inch below the seal. Seal the bag.
4. Let the cereal dissolve and soften for about fifteen minutes. Gently shake the bag.
5. Hold the magnet in your hand, and place the bag flat (horizontal) on top of the magnet. Gently swirl the contents of the bag for 30 seconds.
6. Keep one hand underneath the bag, and put the other hand on top. Carefully turn the bag and magnet over, so the magnet is now on top of the bag. Gently squeeze the bag so you can lift the magnet up and see what it has collected. While the magnet is still touching the bag, you should see tiny iron particles on the inside of the bag.

DID YOU KNOW?

The iron found in your breakfast cereal is the same iron in nails and automobiles! Iron and other vitamins and minerals are added to cereal. When we digest the cereal, iron reacts with hydrochloric acid and other chemicals in the stomach and it is changed to a form more easily absorbed by the body. Iron then becomes part of a protein called hemoglobin, which is part of red blood cells. Hemoglobin transports oxygen throughout the body. What happens when you do not have enough iron in your body? Too much?

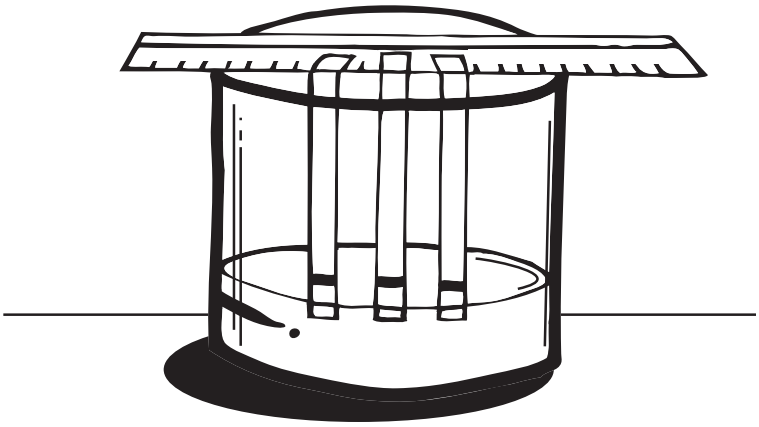
COLORFUL CHEMICALS

FOR GRADES 4-8

Our show includes many examples of chemical mixtures, an important topic in chemistry. This activity offers an example of a chemical mixture we use daily: ink. It also introduces chromatography, a process of separating a chemical mixture into its components. Before conducting this experiment with students, test out the markers, as some types will work better than others.

EQUIPMENT

3 or more different types of black markers
White coffee filters
Glass or plastic container
Ruler
Clear tape
Water



PROCEDURE

1. Label the markers #1, #2, and #3, and so on.

2. Cut test strips from the coffee filters. They should be about ½-inch wide and long enough to hang to the bottom of the container. You will need one test strip for each marker.

3. Label one of the strips #1, another #2, and so on for each marker. Write each number at one end of the strip, not in the middle.

4. Draw an ink line with the appropriate marker across the bottom (un-labeled end) of each test strip, approximately ½-inch from the bottom. Make sure you use marker #1 to write on the strip that is labeled #1, and so on.

5. Tape the numbered end (not the lined end) of the test strips to the ruler, leaving space in between so that the strips do not touch.

6. Fill the container with ¼-inch of water.

7. Place the ruler over the container of water. The strips should be hanging in the water, but the water should be below the ink line.

8. Let the strips soak for about 10 minutes. Remove from the water, and allow them to dry. Is ink made up of just one chemical? How do you know?

9. Draw pictures of your results. What colors do you observe? Did each ink sample separate into the same colors?