



Iron for Breakfast

Grades K – 12

Introduction

Our bodies need iron. An iron deficiency can result in anemia, a fairly common condition for adolescent girls. Iron-deficiency anemia can cause fatigue during sports activities because iron is necessary for the blood to carry oxygen to the muscles. Some foods are fortified with iron and can help prevent anemia. In this activity, you'll verify the presence of iron in iron-fortified cereal.

Materials

- Wheaties® or other iron-fortified food that lists iron or reduced iron as an ingredient, such as Total®, Carnation® Instant Breakfast, or iron-fortified grits

Note: Cereals that contain ferric (iron) phosphate will not work!

- 2 nonmetallic containers, about 500 mL (2 cups) in volume
- plastic container or cup, about 500 mL (2 cups) in volume
- 1 cow magnet
- 1 plastic bag
- 1 magnifying lens
- 1 paper plate

Procedure

1. Place a cow magnet inside of a small zip-close bag.
2. Pour about 2 inches of Cocoa Wheaties® into a plastic cup.
3. Stir the cereal with the magnet inside of the zip-close bag for about 1 minute.
4. Remove the magnet and bag from the cup and gently shake off the excess cereal. Do not wipe the bag!
5. Over the paper plate, open the bag and remove the magnet, allowing any iron filings to fall onto the plate. Do not let the magnet directly touch the iron filings, because once in contact with the magnet, the filings are extremely difficult to remove.
6. Place the magnet under the plate and move it around, observing the magnetic behavior of the filings. Examine the filings with a magnifying lens.

Where's the Chemistry?

Iron is an essential element. Every molecule of hemoglobin (the compound in red blood cells that carries oxygen from the lungs to the tissues) has four iron ions in it. A healthy adult needs about 18mg of iron each day. If all of the iron from your body were extracted and converted into elemental iron, you would have enough iron to make two small nails. This amount is about 5–7 g.

Dietary iron is found in red meats, egg yolks, shellfish, and vegetables such as beans and spinach. Under normal conditions our bodies absorb only 5–15% of the iron in the foods that we eat. To ensure that we have adequate iron in our diets, many foods are iron fortified. Iron can occur in several chemical forms. The iron in the iron-fortified cereal is typically elemental or metallic iron (Fe). While the body is unable to directly absorb elemental iron, the reaction that occurs with hydrochloric acid (HCl) in the stomach produces ferrous iron (Fe²⁺), which is absorbed in the small intestines.

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