



Metal Munch

Lesson By Katherine Harmon; Scientific American

Theme: Earth science and human health

Grade Level: 4th-6th

Subject Area: Science and ELA

Summary:

What does your breakfast cereal have in common with Earth's crust? They both have some of the same materials in them. It might seem strange to compare a bowl of cornflakes to a pile of dirt. But science can help us find one of the most common elements on Earth in your cereal: iron.

If you have ever seen rocks or dirt that have a red or orange tint to them, they most likely contain iron; iron tends to rust when it is exposed to oxygen, causing that rusty red color on old metal objects—or rocks! Iron also plays an important role in our bodies. It is found in a part of our blood called hemoglobin, which helps our blood to carry oxygen molecules from our lungs to the rest of our bodies.

Like many metals, iron is magnetic, so if you have a strong enough magnet, you will be able to pick it up. Will you be able to pick up your box of breakfast cereal just by magnetic force alone? No, because it doesn't contain enough iron for the magnetism to overpower gravity pulling the weight of all that cereal down. But we are going to find a way to remove—or "extract"—the iron from that cereal and pick it up with a magnet.

Standards:

Fourth Grade ELA

[CCSS.ELA-LITERACY.RI.4.3](#) Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in the text.

Preparation: Gather materials, divide cereal evenly for groups

Teaching Time: 30 minutes

Materials: Split students into groups of four. Each group will require the following materials:

- Breakfast cereal that contains Iron, such as fortified cornflakes (check the label to see how much Iron each serving contains -- the more the better!)
- Bowl and spoon (or mortar and pestle)
- Magnet (as strong as possible)
- White piece of paper
- Resealable zip-top bag (optional)
- Water (optional)

Lesson Procedure:

Crush the cereal with the back of a spoon, pestle or other firm kitchen utensil. Keep crushing it until it becomes a fine powder (the finer you can get it, the easier it will be to separate out the iron particles).

Carefully pour the powder onto the white piece of paper in a thin layer.

Run the magnet closely over the top of the cereal powder. Is the magnet picking up any black particles? Those are bits of Iron! If you aren't collecting any, make sure your powder is fine enough and try running the magnet through it -- otherwise, you might need a stronger magnet.

How much Iron did you get out of the cereal?

If you want to try to get more Iron, carefully pour the cereal into the resealable plastic bag.

Fill the bag halfway full of water (warm water works well).

Carefully seal the bag and gently swish the liquid around until the cereal powder has dissolved.

Gently insert the magnet into the bag (if your magnet has a handle, carefully move it around without spilling the liquid; if your magnet does not have a handle, you can drop it in the bag and reseal it). Examine the magnet's surface -- were you able to collect more Iron?

Wrap up:

What happened when you ran the magnet over the whole cereal flakes? What happened when you passed the magnet over the crushed cereal powder? How much iron were you able to extract from your cereal? Were you able to get more by dissolving the cereal powder in water? Check the nutrition facts label to see how much iron each serving actually contains (keep in mind that this tabletop project might not be able to get *all* of the iron out of the cereal).

As it is in Earth's rocks and soil, the iron in your breakfast cereal is attached to the other substances around it. But when you crush the cereal down, it helps to free up the iron particles, so they can be picked up by the magnet (dissolving the other parts of the cereal frees up the iron even more).

Extensions:

Try this activity with different types of cereals and see whether you collect more or less Iron. Compare your findings with the nutrition facts label on the boxes.