**Iron in Total Cereal**

**Grade 5**

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**References:**

* (I had heard of this experiment and looked online for references on how get the best results. My method is described below. A very helpful site is <http://www.stevespanglerscience.com/experiment/00000034> )

**Benchmarks:**

* Summarize how conclusions and ideas change as new knowledge is gained.
* Use evidence and observations to explain and communicate the results of investigations.
* Develop, design and safely conduct scientific investigations and communicate the results.

**Objective:**

Students will learn that the iron we are used to seeing (i.e. in nails) is the same kind of iron that we need in our body. We simply need it in smaller amounts

**Materials:**

* 2 ziplock bags per student
* Total Cereal with 100% dv of iron (about a cupful per student)
* Rolling pins (optional)
* Water
* Several magnets (they need to be fairly strong for this to work well)

**Target Concept:**

* We need iron in our bodies to stay healthy. In particular, we need it in our blood to help it to carry oxygen through our bodies.
* Iron is an element. Whenever you are talking about iron, you are talking about the same kind of iron. The iron that is used in nails is the same type of iron that our bodies need, but in much smaller amounts.

**Initial Introduction:**

1. Begin this lesson by talking about iron. Have the students brainstorm the places in which they thought iron could be found, in whatever amount. (As a hint, tell them iron was used to make steel, so anything made of steel has some iron in it.) After they all make lists have several students share their lists with the class. Could include things like: Earth’s core, nails, cars, and cereal. None of the students in my group came up with cereal -- I left it for last because it surprised most of them.
2. Give one student a box of total cereal and have them look at the nutrition facts. They will find iron listed.
3. Ask them if the iron in cereal is the same as the iron in, say, a nail. (Some will probably think yes and others will think no. Have them give their reasoning).
4. See if they can come up with an experiment to determine whether or not the iron in nails is the same as the iron in Total cereal. If they aren’t sure, remind them that iron can be magnetized. Have them then again try to think of experiments to test to see if the iron in cereal is actually the same iron as in a nail.

**Procedure:**

1. Give groups each one ziplock bag and put about ¾ cup of Total cereal in the bag. Now the students must crush the cereal! They can simply press on it with their hands. I let them use paper plates to press into the bags as well as a rolling pin. The cereal should be as close to a powder as possible.
2. Now the crushed cereal must be transferred to a new bag (because this one probably has holes in it). The new bag should then be filled approximately ¾ full with water and sealed.
3. Let the bags set for about 5 minutes. Use this time to have students make hypotheses on how they will find the iron in their bag of mushy cereal water and what will happen.
4. After the bags have been setting (\*\*the students will probably need help with this\*\*) take a magnet and hold it on the bottom, either gently rubbing it around or gently swishing the bag back and forth. Make sure the magnet maintains contact with the bag. Then carefully turn the bag over—once again, make sure the magnet maintains contact with the bag while turning it over, or else you will lose your iron.
5. The magnet should now be above the air pocket in the bag. Gently lift it and look underneath. You should see tiny gray bits. You can use the magnet to pull these tiny pieces of iron around!
6. **Lastly, explain to the students that science is important even for food! Did they know that there is a whole branch of scientists known as *food scientists?* Food scientists experiment with foods to determine what chemicals are in it, what are the properties (physical and chemical) of different foods, and how food interacts with the environment. This is important to make sure that food is healthy and safe! This is one of many types of jobs that require a scientist! Ask for comments, questions, etc about this.**

**Target Observations:**

* They should see that, just like the nail from the electromagnet, these bits of iron were attracted by a magnet. That’s because it is the same kind of iron as in a nail. It’s just in a very small amount.
* To maintain a healthy body, we need to ingest small amounts iron from our food. This is naturally occurring in some foods. In others, like Total cereal, it is purposely put into the food.
* The students should recognize that iron is an element, and many things have iron in them—even some foods we eat.

**Comments:**

Students were extremely incredulous at the beginning of this experiment, which helped to grab their attention. They were a bit messy in crushing their cereal, because we did it on paper towels. I would highly recommend doing it in ziplock bags and then changing to a new bag as written above. I did it this way myself, and didn’t with the students for lack of extra bags. Also be careful of holes in the bag—this can make quite a mess!