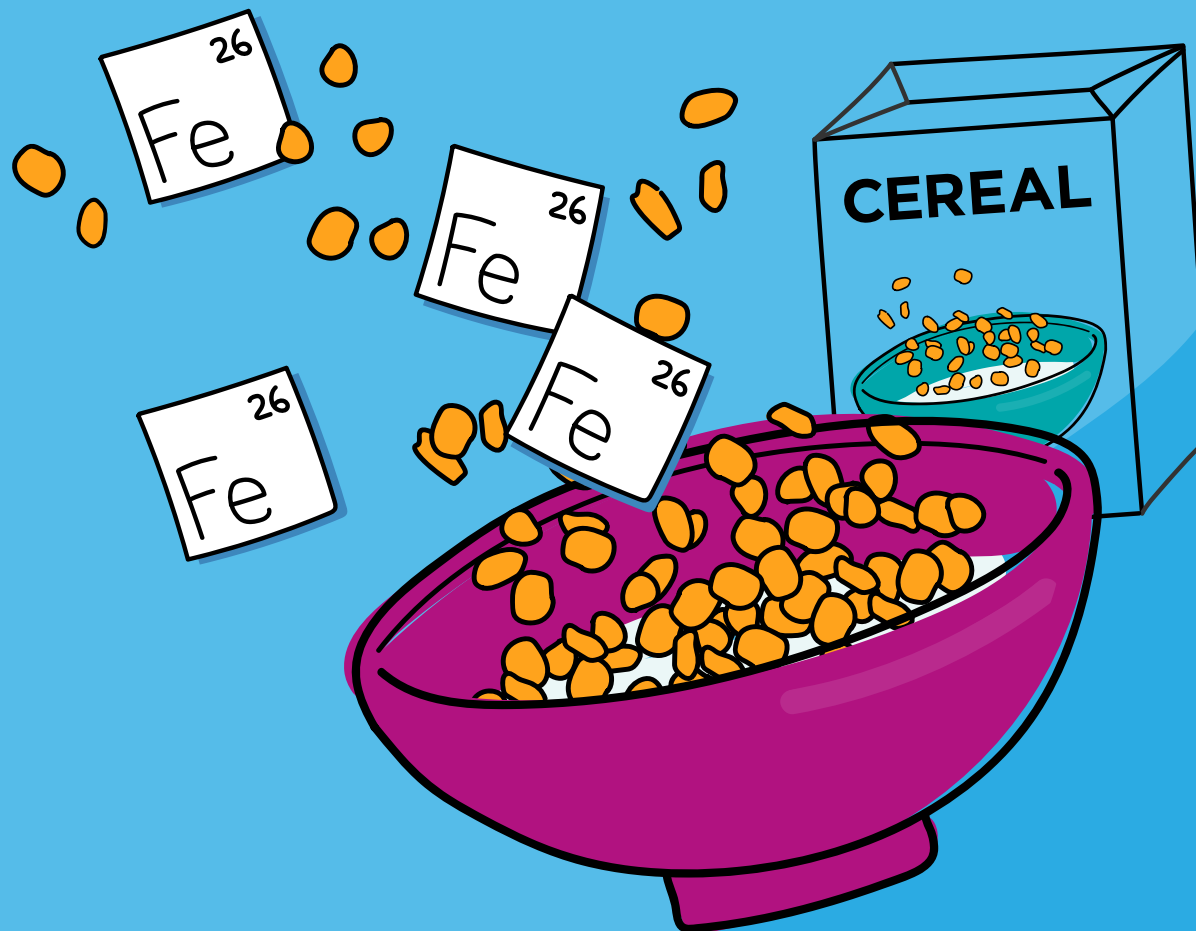


ACTIVITY

10

CHEMISTRY AT HOME

INVISIBLE IRON



●●○ MEDIUM



7-12



1-2 HRS



1

Extract iron
from foods

2

Investigate
which foods
contain lots
of iron

3

Find out which
other metals
different animals
have in their
blood.

ENCOURAGING TOMORROW'S CHEMISTS TODAY

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INVISIBLE IRON

Iron is the most common metal on earth. It is found in rocks and the centre of planet earth is a molten ball of iron! Iron is used to make nails, bridges and ships, but did you know that iron is also found in our bodies?

Iron is found in human blood as part of a chemical called haemoglobin. Haemoglobin carries oxygen around your body, allowing you to grow and exercise properly. Iron is essential for healthy growth, and we get iron from the food we eat. Red meat, dark green leafy vegetables, dried fruit and beans contain high amounts of iron. If you see the word “fortified” written on packets of cereals, flour and bread this means iron has been added to help everyone get the recommended daily amount.

You will need

For activity 1

400g of cornflakes
1.5l water
2 large mixing bowls or jugs
Rolling pin or potato masher
Large spoon
See-through medium sized plastic food bag
Strong magnet or 3-4 fridge magnets

For the challenge

5 unused tea bags
Large jug
2 clear small glasses / tumblers
Teaspoon
Measuring jug
Jar of yeast extract e.g. Marmite
100ml Apple juice
Small torch



Instructions

Activity 1

Extracting iron from cornflakes

- Measure the cornflakes into a large mixing bowl/jug and, using a rolling pin or potato masher, crush the cornflakes into a fine dust.
- Place the magnets in the bottom of the second large mixing bowl, face up and then place an empty clear plastic food bag on top of the magnets.
- Put the crushed cornflakes into the food bag and add approximately 1.5l of water. Mix with a spoon to form a mush with the consistency of fresh orange juice.
- Tie the top of the bag and swirl the bowl around for about 5 minutes to move the cornflake mush around inside the bag and allow the magnets to attract any iron.
- Carefully lift the bag out of the bowl to see a fine black powder in the bottom of the bag where the magnets were touching – this is the iron powder added to “fortify” the cornflakes.



Safety

- Ask an adult to handle hot liquids.
- Check the food packaging for allergens.
- Take care with magnets.
- This activity should be supervised at all times.



Did you know?

Snails, lobsters, crabs and spiders have blood that appears blue, not red like human blood. This is because the chemical that carries oxygen in their blood is called haemocyanin. It contains copper, instead of the haemoglobin in human blood which contains iron.

Challenge 1

Looking for iron in other foods

Ada wants to test some foods to see if they contain iron. She chooses yeast extract, apple juice and water, they all need to be clear liquids. She has read that adding black tea to liquids containing iron causes the mixture to turn cloudy.

Which of these liquids would you expect to contain lots of iron? You could test your prediction using the instructions below.

Instructions:

1. Ask an adult to prepare some strong black tea by adding the 5 teabags to 500ml of hot water and leaving to cool to room temperature before using.
2. Dissolve 1 teaspoon of yeast extract in 100ml of warm water in a measuring jug.
3. Pour 50ml of the yeast extract mixture into each of the two glasses.
4. To one of the glasses add 50ml of the cooled tea mixture. Leave for 2-3 minutes.
5. Has adding the black tea made the mixture turn cloudy – compare the two glasses? Shining a torch through the glass can help you see if it's cloudy. The cloudier the mixture, the more iron is present.
6. Repeat steps 3 to 5, first using apple juice and then water. Did your results agree with your prediction? Can you think of any other foods you could test?

What's happening?

Iron metal is magnetic, which means it is attracted to magnets. The iron fortified cornflakes contain tiny amounts of iron powder. Adding water to dissolve the cornflakes releases the iron powder which is attracted to the magnets. Only small amounts of iron are added, so you cannot pick up an individual cornflake with the magnet!

Some foods contain naturally occurring iron, but not in the form of the fine iron powder we saw in the cornflakes. Black tea contains a group of chemicals called tanning, which join to naturally occurring iron making the liquid go cloudy. The greater the amount of iron in the food, the cloudier the mixture will appear.



Did you know?

An average adult human contains about 4 grams of iron! Lack of iron in your body could lead to a medical condition called anaemia, which can cause lack of energy, shortness of breath and pale skin.

