

IT'S CRUNCH TIME!



HOW CAN A CRUNCHIE BAR HELP US LEARN ABOUT BATTERY RECYCLING?



To understand:

1. The different ways we can recycle batteries
2. The differences between these battery recycling methods
3. The advantages and disadvantages of these techniques

THINGS YOU WILL NEED

Adult supervision needed!



To start with... A QUIZ! (ANSWERS AT THE END OF THE WORKSHEET!)

1. Circle the items that contain a battery.



Microwave



TV Remote



Mobile Phone

2. What is a rechargeable battery? Do any of the items above contain a rechargeable battery?
3. How many batteries are thrown away in the UK every year? Circle the answer

600 million

600

60,000

As you found out in the quiz, **MANY** batteries are thrown away each year. These batteries contain lots of valuable **MATERIALS** that we want to reuse, therefore it's very important to recycle them! **RECYCLING** is hugely important to ensure we don't damage our natural environment.

Here at the University of Birmingham, Beatrice and Rosie are looking at different ways we use to **SEPARATE** the materials which make up batteries.

In this experiment, we are going to use a crunchie to show you some of the ways that people use to separate materials in batteries. You can decide which seems to be the best way for a crunchie bar (and therefore for a battery)!

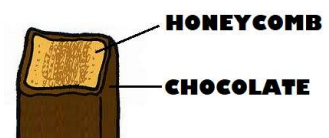


Beatrice Browning



Rosie Madge

There are 2 materials to separate in a crunchie: the honeycomb and the chocolate.



THE EXPERIMENT

METHOD 1 - Melting

Firstly, scientists crush up the batteries (your Crunchie bar) to make them easier to dissolve.

1. Take 1 Crunchie bar and smash it up into small pieces with the rolling pin.
2. Add half of the pieces of Crunchie into your microwave-safe bowl, and the other half to a cup.

Scientists then heat the shredded battery to melt it. The melted mixture can then be mixed with other materials to make new batteries.

3. Firstly, focussing on melting, heat the Crunchie pieces in the microwave until they are fully melted, stirring every 30 seconds. **Take care as it will get very hot!**
4. With help from an adult, pour the melted chocolate mixture into your ice cube tray and leave to set in the fridge.

TIME TO THINK



How does the melted mixture look after heating?

How does it look once it's set?

Is this a good way to separate the honeycomb and the chocolate?

What materials could you separate using melting?

METHOD 2 - Dissolving

Firstly, the batteries (your Crunchie bar) are crushed up to make them easier to dissolve.

1. Take 1 Crunchie bar and smash it up into small pieces with the rolling pin.

This crushed battery material is then added to a special solution to separate parts of the battery.

2. Fill your cup with warm water, add the crushed crunchie bar and stir with your spoon. Keep stirring until all your honeycomb is dissolved.

TIME TO THINK



What happened to the honeycomb and the chocolate when they were stirred in warm water?

Is this a good way to separate the honeycomb and the chocolate?

What materials could you separate using dissolving?

METHOD 3 - Separating the materials apart

Scientists are working on this method at the moment, as we want to avoid crushing up batteries as much as possible!

1. Take your whole Crunchie bar, and using the knife, try to separate all of the chocolate from the honeycomb so that they are completely separate. **Take care when cutting with a knife!**

TIME TO THINK



How easy was it to separate the honeycomb and the chocolate using this method?

Is this a good way to separate the honeycomb and the chocolate?

What have we learnt?

When trying to separate a crunchie bar, **SEPARATING THE MATERIALS APART** is the best way to get the materials on their own, this is the same for batteries, and scientists are working hard to do this effectively.

Separating the chocolate and the crunchie by **MELTING** or **DISSOLVING** doesn't work as well in this case!

Here are some ideas of things that can be separated by **MELTING** or **DISSOLVING**!

Salt stuck onto a spoon



They can be separated by **DISSOLVING**. If you stirred the spoon in warm water the salt would dissolve!

Flowers frozen in an ice cube



They can be separated by **MELTING** the ice.

A coin stuck in the middle of a candle



They can be separated by **MELTING**. You can light the candle to melt away the wax!

Send us pictures of your experiments (or other things that can be separated using these methods)!



@B_Browning_
@ChemBAMeditor
@sublimestem
@FaradayInst_