

Reuse and Recycling of Waste Electrical and Electronic Equipment

Teacher
Topic
Pack

P1 - P3



XS Resources

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Topic: Reuse and Recycling of Waste Electrical and Electronic Equipment

Topic Overview: Reuse of electrical and electronic equipment to extend product lifespan and protect scarce resources.

Activity Overview: Pupils learn about the different types of technology within our homes and watch a phone being taken apart.

Learning Intention: I am learning that valuable materials are used in electrical and electronic equipment and that it is important to use equipment for as long as possible.

Success Criteria: I am starting to explore the importance of reducing, reusing and recycling electrical equipment.

Key Vocabulary:

WEEE – Waste Electrical and Electronic Equipment. Electrical and Electronic items are defined as items with a plug or battery.

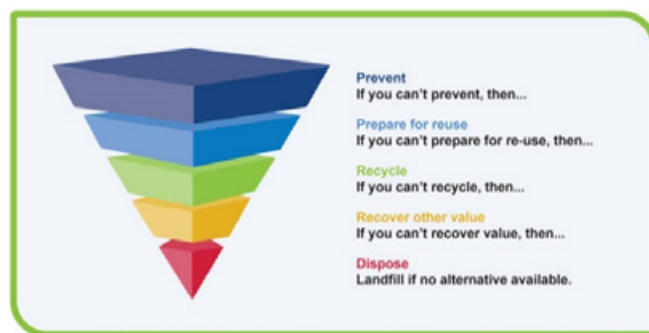
Waste Hierarchy Diagram illustrates the Scottish Government definition.

For children it is usually shortened to the 3 R's (Reduce, Reuse, Recycle).

Reduce – lowering the amount of materials or energy used e.g. purchasing items with no/less packaging.

Reuse – using items again (and again) for example by donating or purchasing items from a charity shop.

Recycle – Reprocessing items to enable them to be used again.



Circular Economy:

A move from the conventional “make goods – use goods – dispose of goods” approach. The circular economy is an alternative system in which products and materials are kept in a high-value state of use for as long as possible. For example designing a phone to be easily repaired, rather than replaced.

Resources:

All resources contained within WEEE reuse pack. Request pack from your local authority or XS Resources Ltd CIC.

Concept Introduction:

- What's inside my mobile phone poster (x2).

Main Activity:

- Children watch the Teacher take apart a mobile phone.
- Children use the checklists to find the technology on the Activity Mat.

Fun Facts to support discussion:

New research funded by Recycle Your Electricals in 2020 revealed that:

- UK households and businesses are producing 1.45 million tonnes of electrical waste per annum
- 1.65 million tonnes of electricals are bought each year
- 915,000 tonnes of electricals are sent for reuse and recycling
- At least 500,000 tonnes of waste electricals are being lost through being thrown away, hoarded, stolen, or illegally exported
- Electrical waste is one of the fastest growing waste streams in the UK and in the world, with discarded or hoarded household electricals estimated to cost the UK economy over £370 million per year of lost valuable raw materials such as gold, copper, aluminium and steel.

Source: Recycle Your Electricals

Topic Plan

This topic has been broken down into 30 minute – 1 hour sessions to enable teachers to either work through the topic over the term, or to pick and choose sessions based on the interests of pupils. Workshops and a resource pack can be arranged through your council's Recycling Team to support learning.

Teacher Links:

Video clip about electronics recycling produced by Recycle Your Electricals (suitable for children). How are electronics recycled? Ask Hypnocat:

<https://www.youtube.com/watch?v=7msucy0Jl1c&t=1s>

Video clip describing Circular Economy produced by Ellen MacArthur Foundation (suitable for children):

<https://www.youtube.com/watch?v=zCRKvDyyHml>

Video clip about electronics recycling produced by recycle now (suitable for children):

<https://youtu.be/3Qilx3981oc>

Establishing Prior Knowledge (10 mins):

Discussion Points

- Discussion of waste hierarchy (Reduce, Reuse, Recycle).
- What is electrical/ electronic equipment?

Suggested Answer: Anything with a plug or batteries

Concept Introduction (30 mins):

“Hands-up” survey

- How many mobile phones does your family own?

Children could suggest additional electrical items that they own.

Introductory Activity (1hr):

Examination of mobile phone and the different materials that make up a mobile phone.

Split pupils into groups and ask them to draw and count the different materials within a phone (see **posters 1** and **2** for details of the types of components that make up a mobile phone) and **Worksheet 1**: Drawing a mobile phone.

Ask the pupils to think about the different parts of the phone and the time and effort that is required to manufacture a phone. **Useful fact**: “Mobile phones contain over 40 different chemical elements and hundreds of components”.

Discussion (15 mins):

- What happens to electronic/ electrical equipment when it is no longer needed?
- Suggested responses may include: Passed on to friends/ family, hoarded, recycled, landfilled/ binned, sold, donated to charity shops.
- Discuss the merits & disadvantages of what happens to equipment when it is no longer needed.
- Briefly introduce the waste hierarchy (reduce, reuse, recycle).

Main Activity (1 hour):

1. To support activity, see and download materials from: <https://www.xsresources.org/education-work>
2. Using one of the phones provided within the resource box, follow the instructions on the video and take apart one of the phones to show the pupils what is inside a mobile phone.
3. Remove the small screws located on the back cover (some screws may be covered by stickers) if necessary.
4. Separate the battery compartment to expose the circuit board.
5. Remove the small screws securing the circuit board.
6. The vast majority of components are on the circuit board, but there will be others on the casing, etc that can also be removed, e.g. the screen, speaker, etc.
7. There are approximately 300 components within each phone, ask the pupils to count up and identify individual components and their uses.
8. Ask the pupils to photograph the activity or draw the individual components.
9. Allow some time at the end for the phones to be re-assembled.

Second Activity

1. Pupils use the Activity Mat and checklists to identify the average amount of technology one person would use within their lifetime. The number of toasters, TVs, etc shown on the Activity Mat are based on the 'WEEE MAN'. The WEEE Man was built for the Eden Centre, he stands 7m tall and weighs approximately 3.3 tonnes. He represents the amount of Electrical and Electronic Equipment one person would use during their life time.

Follow-on Discussion:

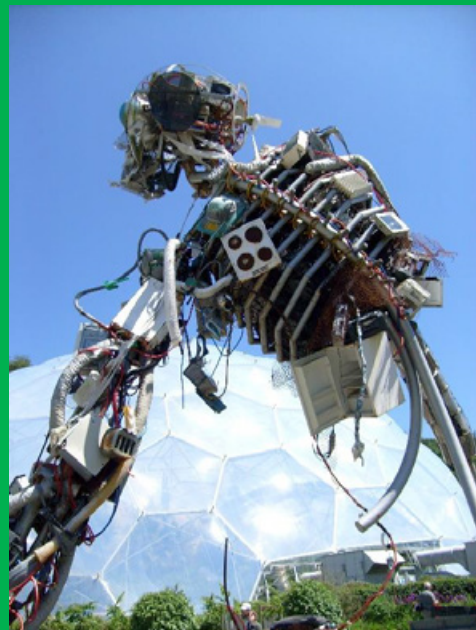
- Discuss what happens to unwanted equipment within school and at home.

Suggested Follow-On Activities:

- Pupils design posters/ leaflets to raise awareness of the importance of reusing/ recycling equipment.
- Pupils produce a bar chart of different types of equipment owned by families/ the school.
- Pupils use the 'activity mat' to find different types of electrical items found within the home.

The WEEE Man

Built for the Eden Centre, the WEEE man stands 7m tall and weighs approximately 3.3 tonnes. He represents the amount of Electrical and Electronic Equipment one person would use during their life time.



A person born in 2003 and living until 2080, would generate 8 tonnes of WEEE in their lifetime. This means the WEEE Man would be more than twice the size!

Home Links:

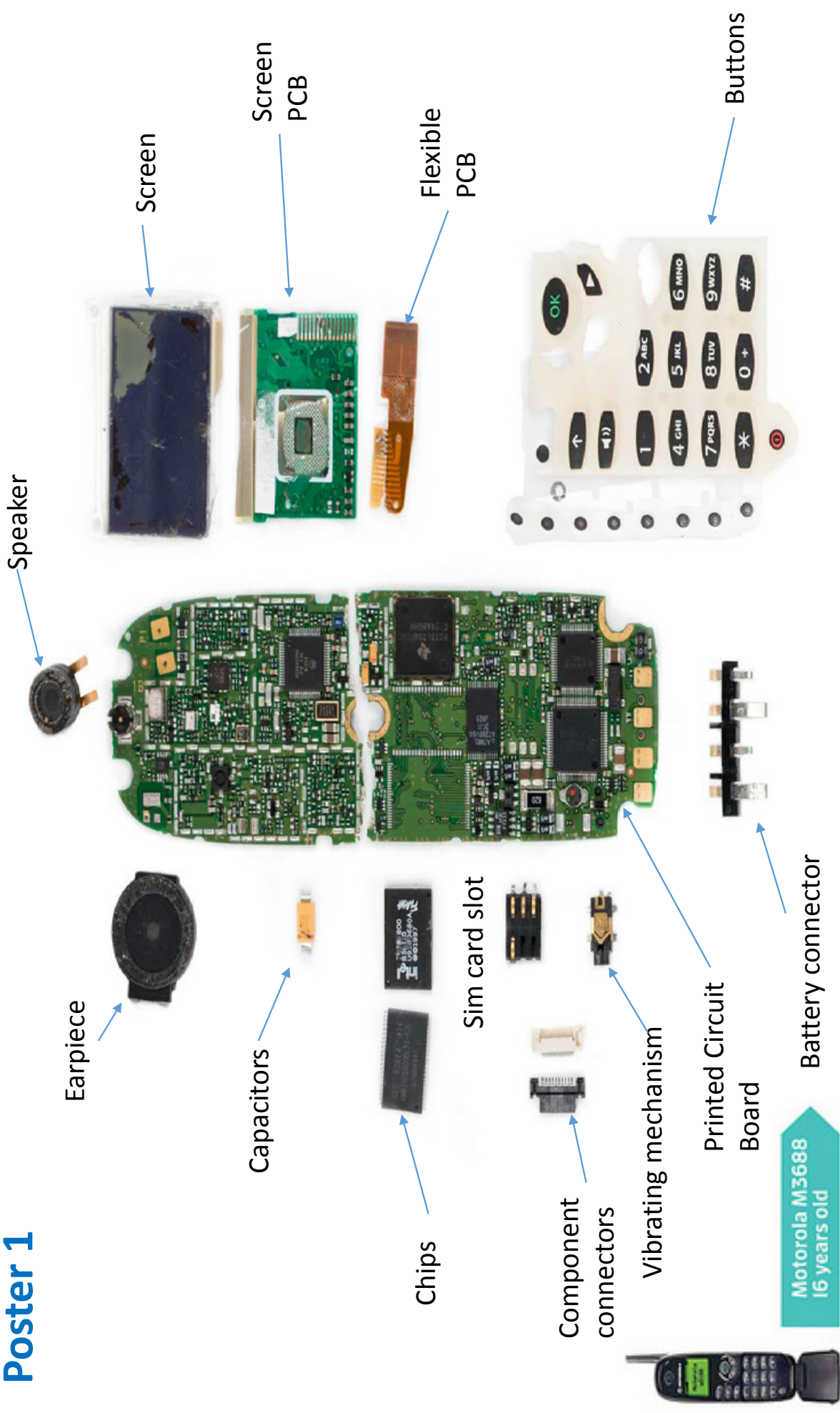
- Pupils to discuss with family what happens to unwanted equipment.
- Pupils to count the number of electrical and electronic items within the house.

Teachers Resources

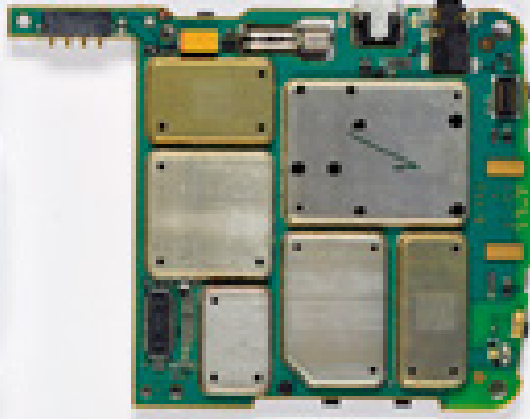
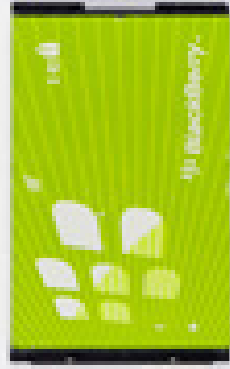
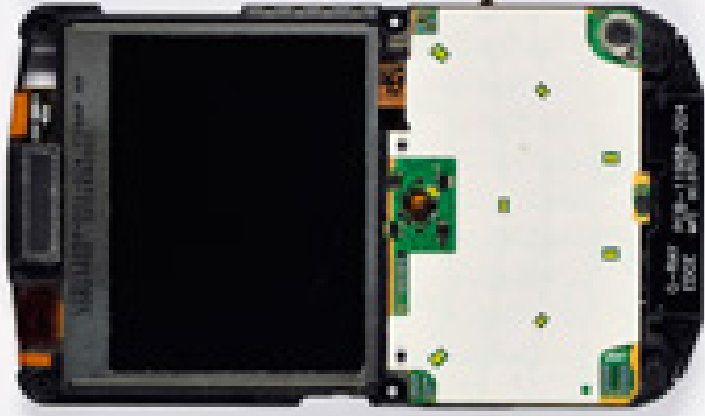
What is inside a mobile phone?

(Diagram from Fairphone website)

Poster 1

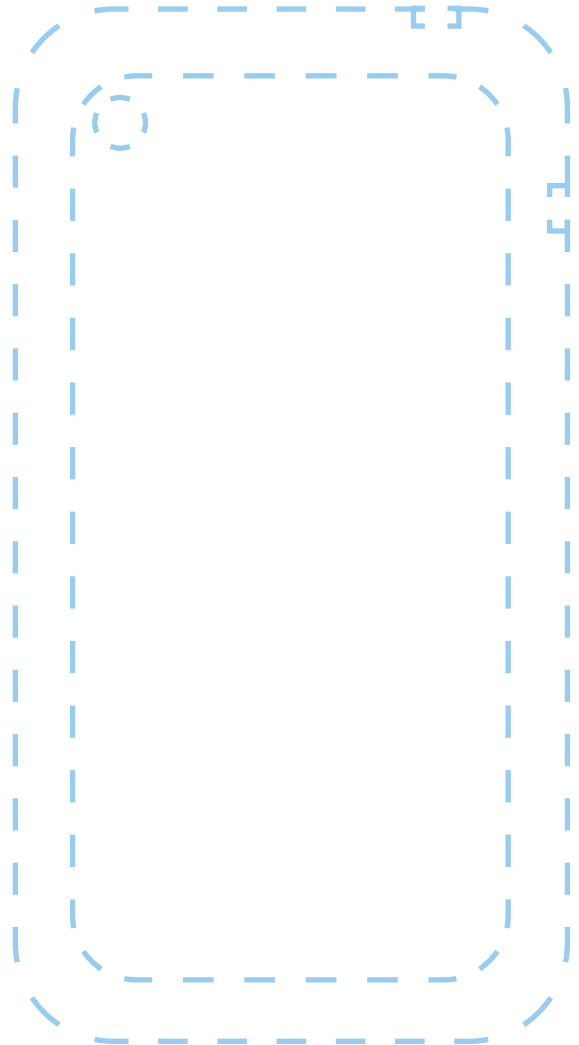
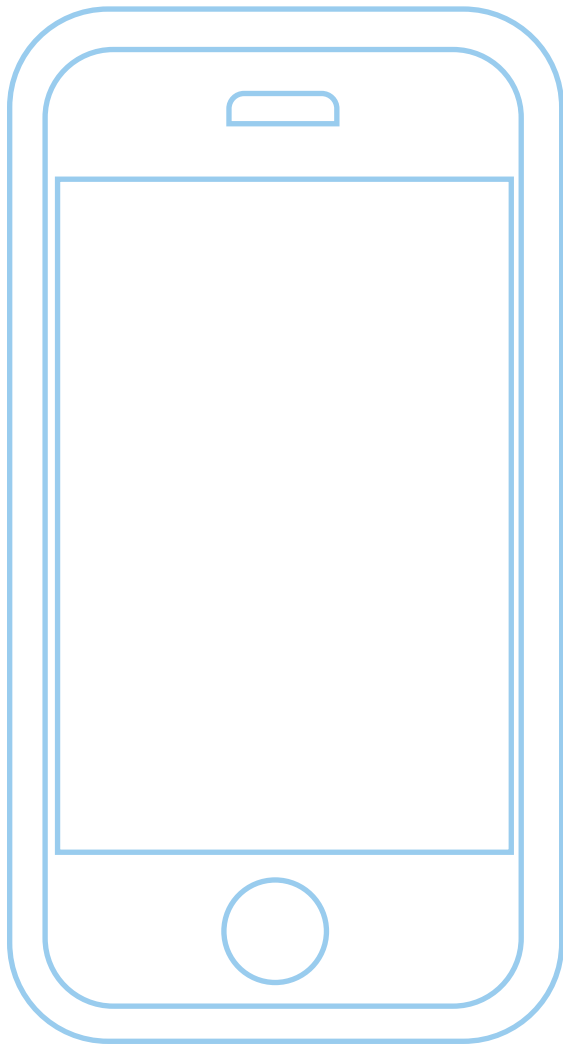


Motorola M3688
16 years old



Poster 2

Worksheet 1



Draw the different parts of a mobile phone

