

## Inside of a Mobile Phone



### Instructions

The following instructions have been created to help you and your class deconstruct an old mobile phone to investigate what they are made of and how they work.

We recommend that you only take apart older mobile phones. Smartphones are more difficult to dismantle whereas the older models contain screws which can be easily taken apart. Familiarise yourself with these instructions and conduct further necessary research on the model of phone you are dismantling to ensure you feel fully equipped to take part the phone.

### Safety

- Remove the battery safely in one piece from the mobile phone. Do not open or puncture the battery. At the end of the activity wrap the battery in bubble wrap or similar and seal before putting in the MobileMuster collection box or satchel.
- Place the phone on a table when dismantling and work away from your body.
- Be aware that this activity involves sharp tools and objects. We advise that you wear safety gloves and goggles.
- Use all tools carefully and take care of sharp edges. You are separating the mobile phone components not trying to break them apart.

### Recycling

All mobile phones and components can be recycled with MobileMuster at the end of the activity. If your school is a MobileMuster drop off point place them in the collection box or visit the MobileMuster website on where to recycle in your local area. For more information visit [www.mobilemuster.com.au/recycle-a-mobile](http://www.mobilemuster.com.au/recycle-a-mobile)



## What you will need

1. **Workspace:** Sturdy table which is clear.
2. **Safety equipment.** We recommend gloves and safety goggles.
3. **An old mobile phone.** The older the better. We would recommend an old handset like a Nokia or Motorola. We don't recommend using a smartphone due to the difficulty in removing the glass and battery.
4. **Tools.** Small sized screwdrivers are useful for removing screws and the case of the mobile phone. Tweezers are good to pick of components from the circuit board.
5. **Containers.** Take care as the components within the phone are small and can be easily lost. Place them into containers so you can keep track of them.
6. **Magnifying glass.** To see the components in real detail.
7. **First aid kit.** Just in case you need it.



### Disclaimer

We have provided this material as a guide only. We have made every effort to ensure the information is correct and the activities have been designed to minimise risk to the participants. The Australian Mobile Telecommunications Association (AMTA) disclaim any liability for any loss, damage or disruption caused by errors or omissions whether such errors or omissions result from negligence, accident, or any other cause. The activity may pose some risk and therefore, AMTA advise teachers to take full responsibility for their safety. We recommend that you demonstrate the activities to your class and ensure that you have experience working with tools.

## How to dismantle your phone

Remove the battery from the mobile phone safely in one piece. Do not open or puncture the battery.



Use a small screwdriver to remove any tiny screws on the outside of the mobile phone.

Keep the loose screws in a container so they don't get lost.



The phone will split into different layers, sometimes these are held firmly together and will require some strength to separate.



Protective covers sit on the Printed Circuit Board.

Use flat head screwdriver or tweezers to try and peel these off to find the components underneath.

Use a magnifying glass to see the components in real detail.



Enjoy exploring the rest of your phone, some parts don't even require tools. Pull out the buttons and peel back the button receptors with your fingers.

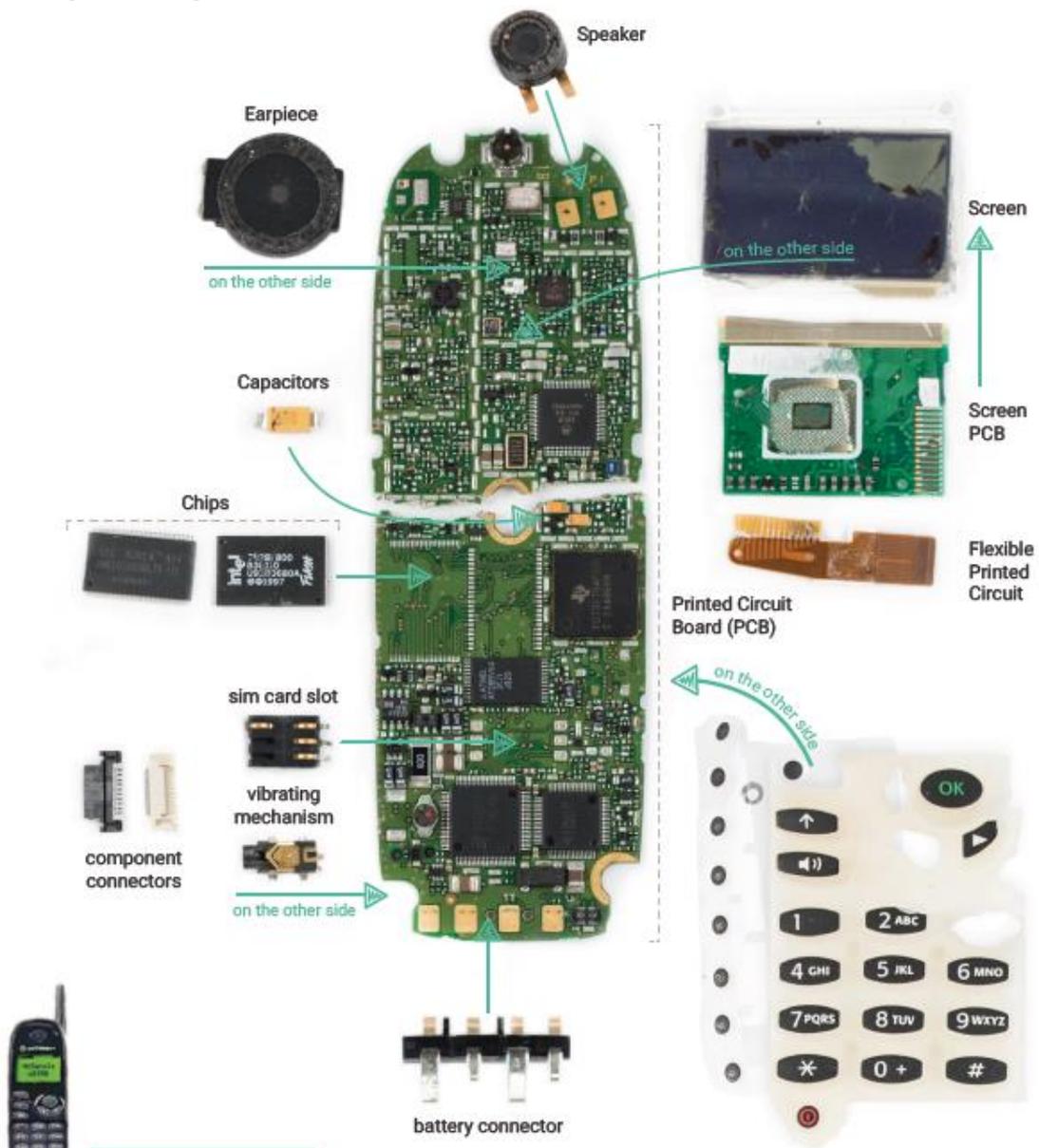


You will notice that many components are attached to the printed circuit board, don't forget to look inside the outer casing.

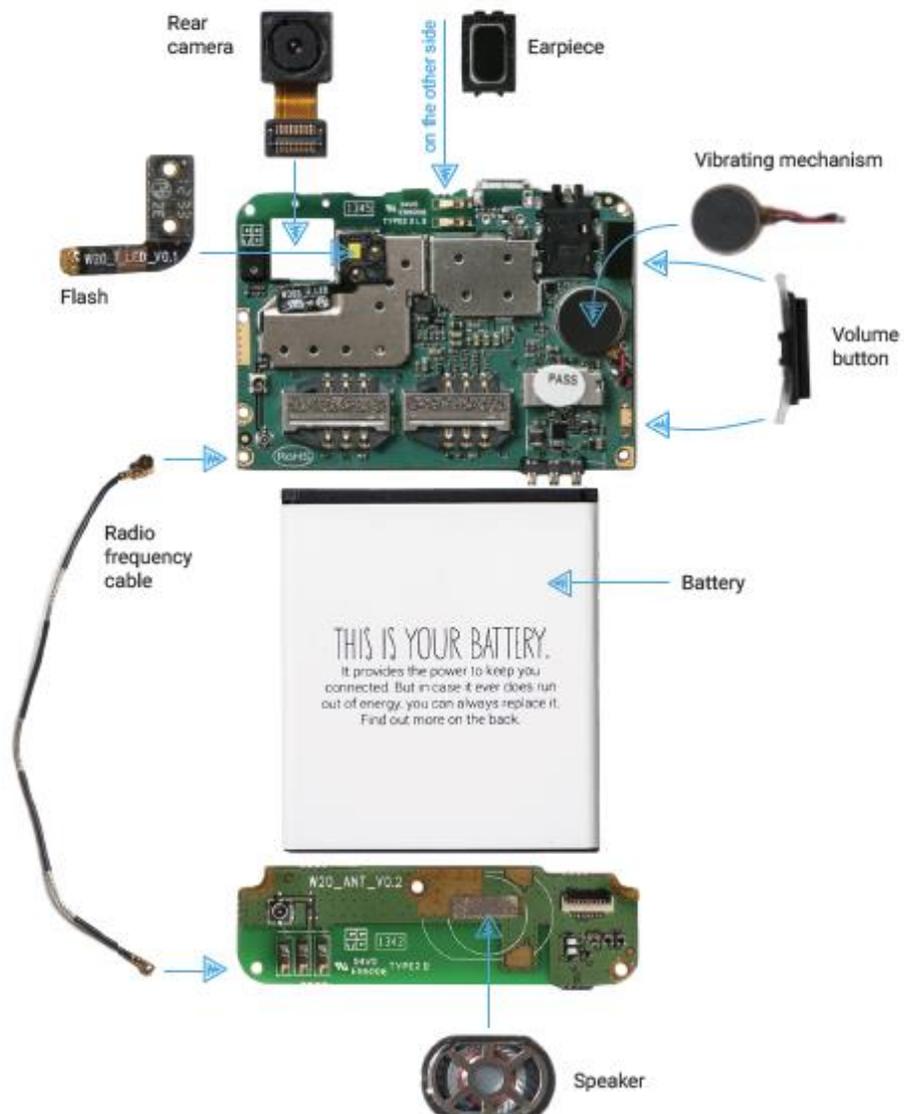
You may find the speaker, SIM holder, antenna.



## What you may see



Source: Fairphone Urban Mining Manuel.



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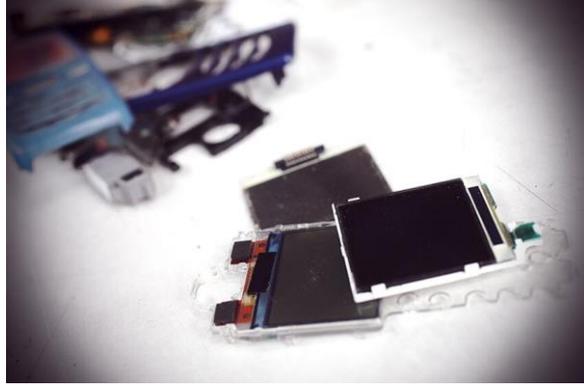
## What you will find inside

### Sim Card



The SIM card is made of plastic with embedded contacts and semiconductors. As technology has advanced, SIM cards have got smaller.

### Display Screen



Silicon dioxide, aluminium silicate, potassium, europium, sodium, yttrium, phosphorous, neodymium, zinc

### Printed Circuit Board



The printed circuit board connects the different components. They are made from plastic, copper, zinc, gold, tin, iron, platinum, cobalt manganese, silver, nickel, epoxy resin.

### Battery



Most phones use a lithium-ion battery. Lithium-ion batteries are made from lithium and other metals such as cobalt, nickel, copper and aluminium enclosed in plastic.

### Microphones & Speakers



Neodymium is used inside your phones' speakers. Its amazing magnetic strength means you only need a tiny amount for the speaker to work really well.

### Case



The case of your mobile phone is usually made from plastic or aluminium

### Capacitors



Capacitors are difficult to spot as they are very small. They are used to store the electrical energy in your phone. They contain tantalum and palladium.

### Solder



The tiny silver dots on the printed circuit board is tin solder. Tin solder is used to connect all the parts on the circuit board together. Tin is used because it has a low melting point and won't damage the other parts when melted.

### Key pad



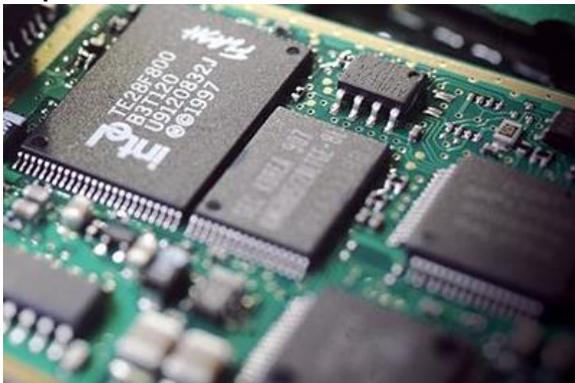
Old mobile phone used silicon buttons. A sheet of carbon connectors was inserted under the buttons so when they are pushed it activates the copper circles on the printed circuit boards.

### Covers



Inside the phone you will find covers that protect the chips and circuit boards underneath. They often contain a mixture of tin, iron, nickel, silver, zinc and aluminium.

### Chips



Chips almost always contain silicon. Pins, containing copper, come out on each side. Inside these chips are smaller, thinner layers which are connected with gold wires.

### Screws



Old mobile phones contain metal screws which are used to hold the components together.