THE FARADAY INSTITUTION FutureCat

NEXT GENERATION LI-ION CATHODE MATERIALS

BUILDING BLOCKS OF A PHONE

Quiz!

1. How many people in the world have a smartphone(s)?

   a. 675,000 b. 5.9 million c. 2.7 billion

2. What do, 75% (3 out of 4) of smartphone users do with their old mobile phone when they get a new one?

   a. Put it away in a drawer b. Recycle it c. Throw it in the bin d. Donate it

Answers

There are over (c.) 2.7 billion smartphone users in the world! That means that 1 in three people have a mobile phone!

Most of them will probably get a new one at some point, but what will they do with the old one?

Around 75% of smartphone users will (a.) put it away in a drawer and forget about it!

Learning Outcomes:

Find out what's inside our phones and why we choose the materials we do.

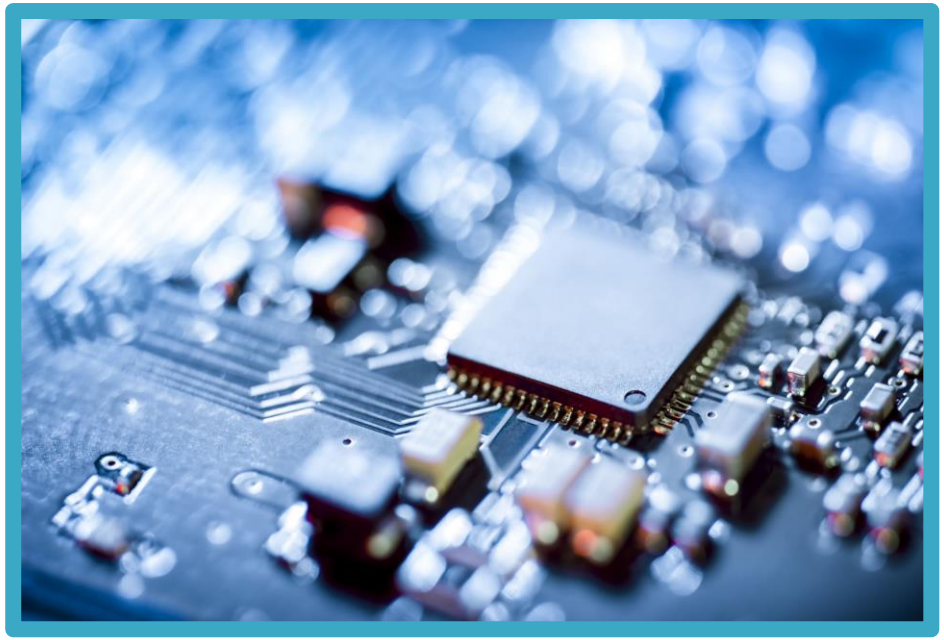
You will need to cut out a template, decorate your phone and finally stick it all together.

The Mainboard

The brains of your smartphone!

Covered with computer chips, wires, and other tiny electronic bits-and-bobs which turn your phone into a handheld computer!

All other parts of the phone like the screen, camera and battery all connect to the mainboard.



What's inside your phone?

The Battery

The battery stores CHEMICAL energy which it can then release as ELECTRICAL energy to power your phone.

The Camera

Not only is your phone great for calling and messaging friends and family it can also take photos and videos!

The Frame and Screen

The frame keeps everything together and helps protect the fragile components inside.

The screen is the main way we interact with our mobile devices. It converts electricity to light.

What's inside your phone?

Our phones contain many, many different materials. Each material was chosen for its specific properties which allow it to carry out its specific task.

1. MOVE a property to assign it to a material.
2. MOVE a component into the box of the material it might contain.
3. DISCUSS which properties of a material make it suitable for a particular component.

Metal

Glass

Plastic

Properties

Hard
Soft
Transparent
Stiff
Conductor
Flammable
Insulator
Bendy
Opaque

Component

Mainboard
Frame
Camera
Screen
Battery

Wood

What's inside your phone?

Metal

Hard
Stiff
Conductor
Opaque

Camera
Screen
Mainboard
Frame
Battery

Metal is a great all-round material. It is HARD and STIFF making it a great material for structural components like the frame. It is also a CONDUCTOR so can be used in electronics to make wires, computer chips, connectors and is essential in batteries.

However, metal can be HEAVY and EXPENSIVE so we don't want to use too much of it in a handheld device.

Glass

Transparent
Hard
Stiff
Insulator

Frame
Camera
Screen

Glass is very useful for making screens and lenses as it is TRANSPARENT. It is also very HARD, STIFF and can be attractive making it a good material to use in the frame of your phone.

However, glass can be BRITTLE and shatter or smash easily, and therefore can be dangerous when broken. Imagine dropping a phone made completely out of glass!

Plastic

Hard
Soft
Bendy
Stiff
Insulator
Transparent
Opaque
Flammable

Mainboard
Camera
Frame
Battery
Screen

Plastic is a CHEAP and readily AVAILABLE material. Depending on the process used to make it, it can take on any number of properties as can be seen above. All this makes it a great candidate for INSULATING electronics or adding strength and structure.

However, plastic takes thousands of years to decompose so we want to limit its use to protect our planet.

Wood

Hard
Flammable
Opaque

Insulator
Stiff

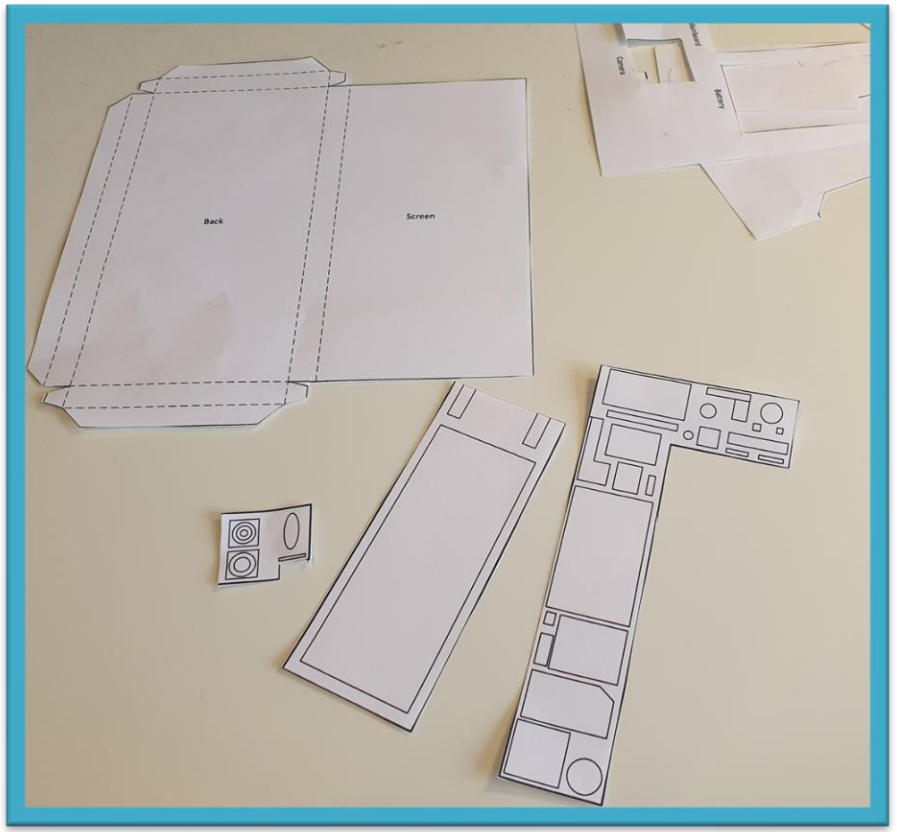
Wood has many desirable qualities for use in a phone.

Unfortunately, wood can be difficult to turn into the shapes we require for our phones and isn't always very DURABLE.

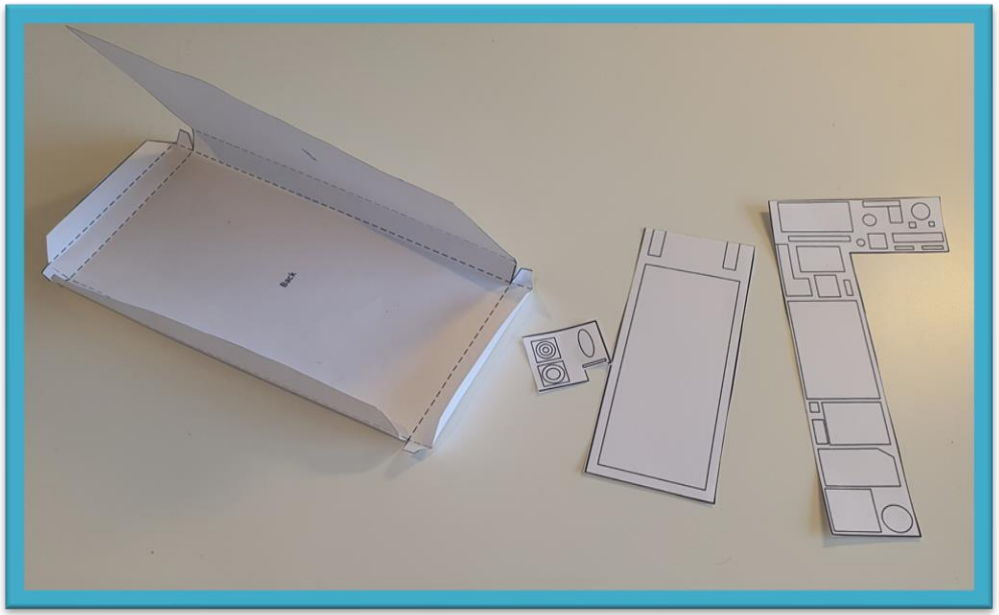
Other materials such as plastic or metal can carry out the same functions better.

Build your phone

1. Cut out the phone template, cutting along the black lines.
   Do **NOT** cut the dotted lines.
2. Cut out the components, cutting along the thicker black line.
   You might want to label the back so you don't forget which is which!



Build your phone

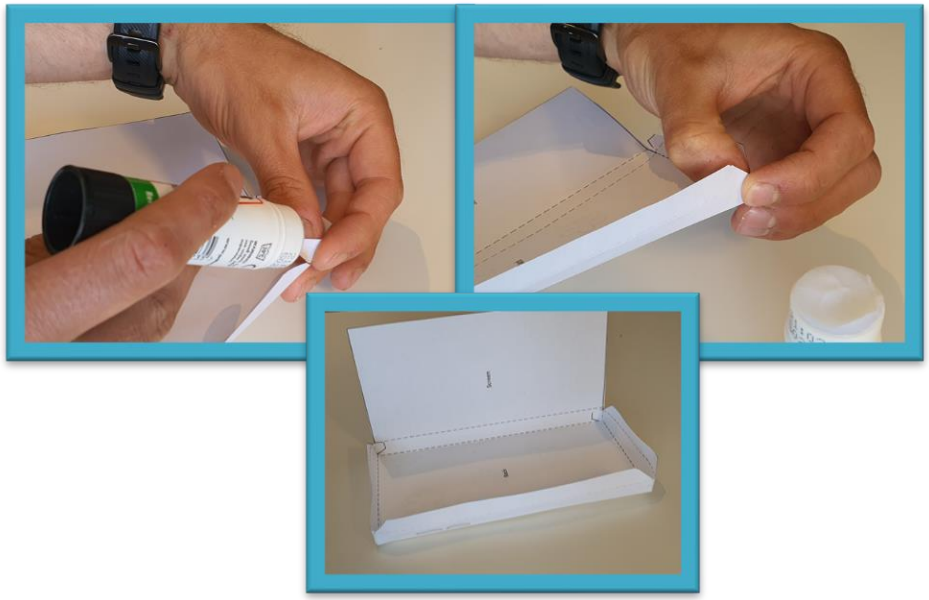


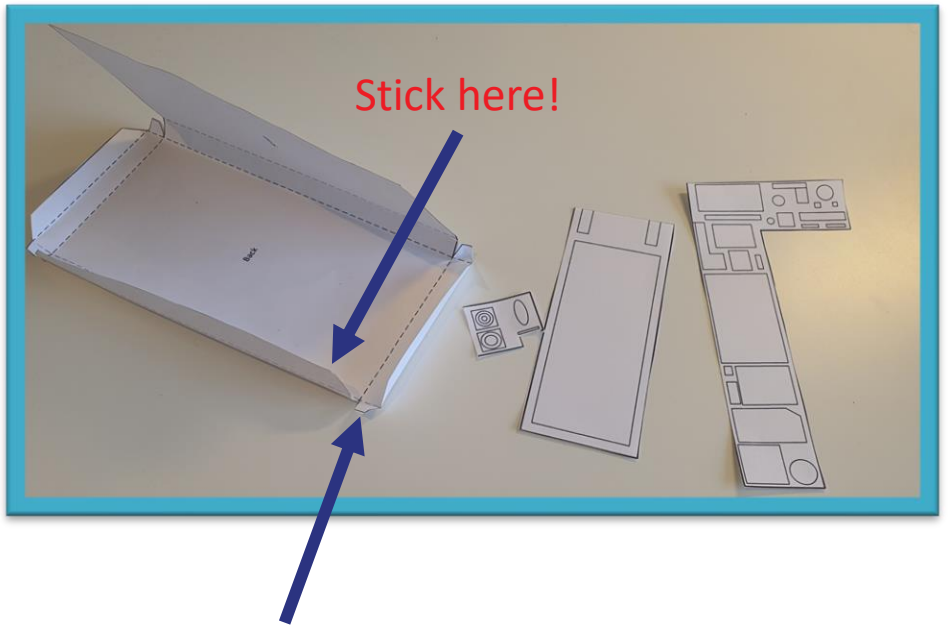
3. Decorate your phone on the side that doesn't have writing or lines on it.
   Think about what will have to be on the front of the phone, buttons, screen, camera?
   What about the back?
   Design how your case will look. What type of patterns or pictures will be on it?

4. Make a fold along each of the dotted lines.
   Make sure your decorations and designs are on the outside.

Build your phone

5. To give the phone its shape you will need to apply glue to the outside (side with no lines) of the small folded tabs and press it against the side of the phone next to it to make a corner.
   Do **NOT** stick down the screen yet!





Build your phone

6. Complete your phone by placing all the components inside.

   How do you think they should be arranged?
   Do you think it matters?