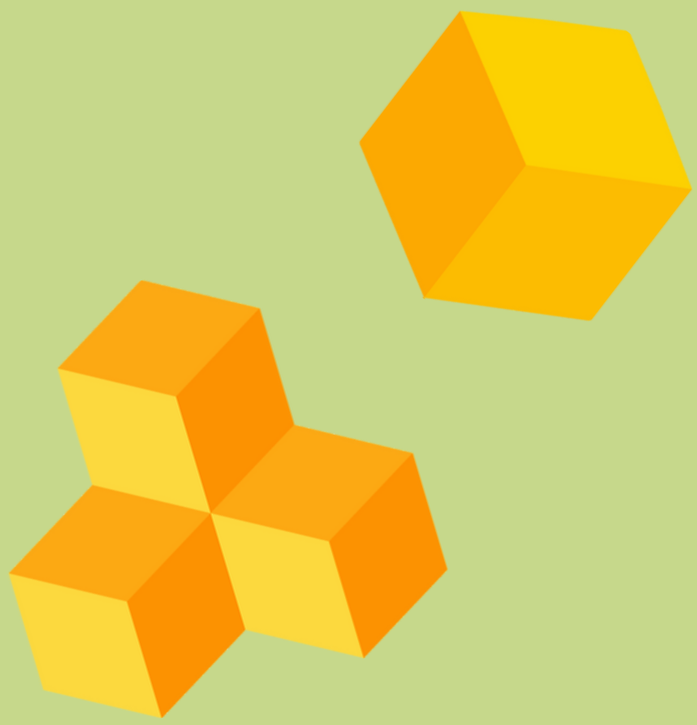
WHAT'S INSIDE YOUR PHONE?

WHAT RAW MATERIALS DOES A PHONE ACTUALLY CONSIST OF?



Mobile phones are our daily companions. But what raw materials go into them? Why are some of them really precious? And how much of which material can we find in a phone?



What's inside your phone?

There are sets of 100 coloured cubes each in front of you.

Explore the cubes. What are they all about?

Look at the provided diagrams. Group the cubes according to their colour. Then try to match them with the materials.

Compare with the key. Were you right? The diagrams are from the year 2015. Discuss – have the materials changed?

As a next step, discuss the following questions:
What materials could be used to make a mobile phone more sustainable?
For instance, could there be a mobile phone made entirely of wood?
Why/why not?





PH Wien
TECHNISCHE UNIVERSITÄT DARMSTADT
Teacher Academy Project
TEACHING SUSTAINABILITY
Co-funded by the European Union
Icons: www.flaticon.com (by Freepik)
Mascot "SAM" by Judith Neuthard
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Author: Petra Szucsich

WHAT'S INSIDE YOUR PHONE?

Fill in the number and colour of cubes!
100 cubes = raw materials in a phone
1 cube corresponds to 1 %



number of cubes	colour	
		Plastics
		Glass and Ceramics
3		Others
25		There are 25 metals. Among these are ...
		Copper
		Aluminum
		Iron
		Gold, Silver and others
		Nickel
		Tin

WHAT'S INSIDE YOUR PHONE?

Match the phone parts with the raw materials!

Gold

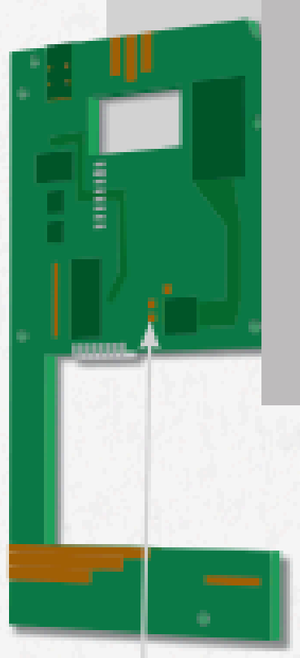
Gallium

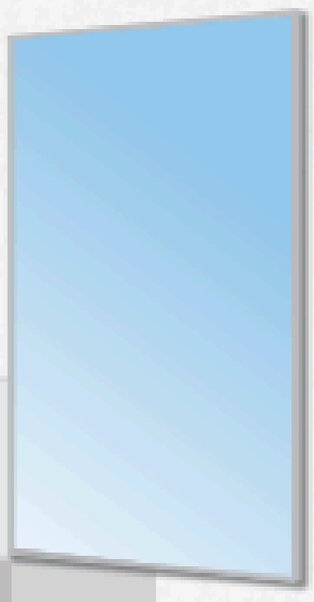


Plastics, Ceramics



Platinum
Palladium
Copper
Silver
Gold
Tantalum
etc.





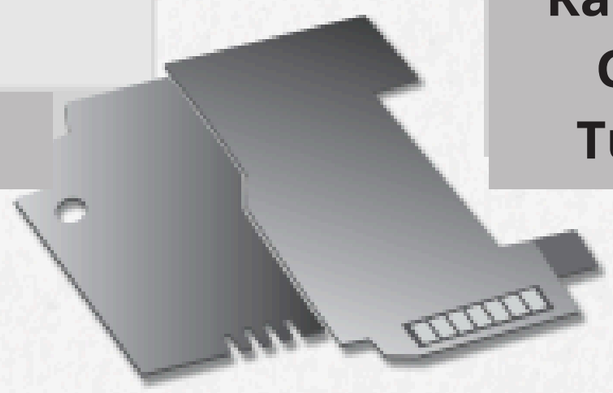
Indium

Tantalum
(from coltan)



Tin

Aluminum



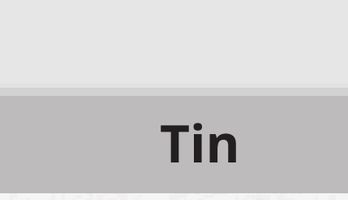
Rare earths
Gallium
Tungsten



Iron



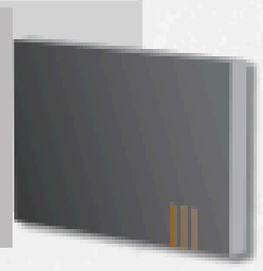
Gold



Copper



Cobalt
Coltan
Lithium

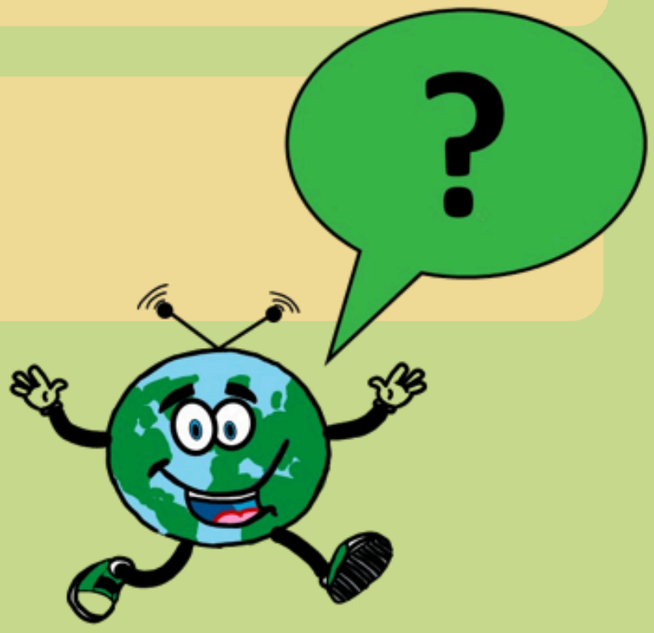


Author: Petra Szucsich

WHAT'S INSIDE YOUR PHONE?

Match the phone parts with the raw materials.
Then compare with the key!

Part of a Phone	Raw Material
phone case, cover	Silver
display	Aluminum
solder joints	Iron
SIM-card, contacts	Glass and Ceramics
shielding plate	Copper
speakers, microphones	Plastics
flat cables, wires	Tin
main circuit board	Gold



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Mascot "SAM" by Judith Neuthard

Author: Martin Sankofi

WHAT'S INSIDE YOUR PHONE?

KEY

Part of a Phone	Raw Material
phone case, cover	Silver
display	Aluminum
solder joints	Iron
SIM-card, contacts	Glass and Ceramics
shielding plate	Copper
speakers, microphones	Plastics
flat cables, wires	Tin
main circuit board	Gold

Nickle is found in contacts and capacitors (capacitors store electrical charges). Nickle, Cobalt, Coltan and Lithium are found in phone batteries.

WHAT'S INSIDE YOUR PHONE?

KEY

Part of a Phone	Raw Material
phone case, cover	Plastics
display	Glass and Ceramics
solder joints	Tin to connect individual components to the board
SIM-card, contacts	Gold (~ 0,3 gram)
shielding plate	Aluminum to shield the electronics from electromagnetic radiation
speakers, microphones	Iron
flat cables, wires	Copper to conduct electricity
main circuit board	Silver (~ 0,034 gram)



Nickle is found in contacts and capacitors (capacitors store electrical charges). Nickle, Cobalt, Coltan and Lithium are found in phone batteries.

Icon: www.flaticon.com (by Freepik)
Mascot "SAM" by Judith Neuthard

Author: Martin Sankofi

WHAT'S INSIDE YOUR PHONE?

KEY

SIM-card

Gold

LED and camera

Gallium



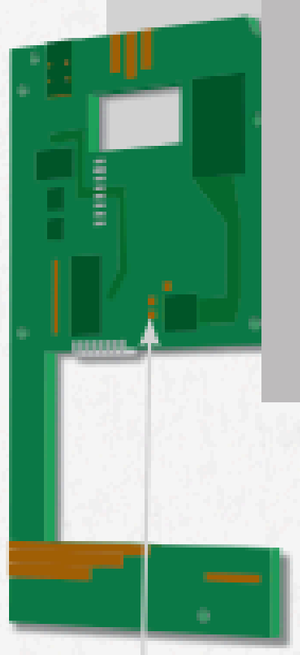
phone case, cover

Plastics, Ceramics



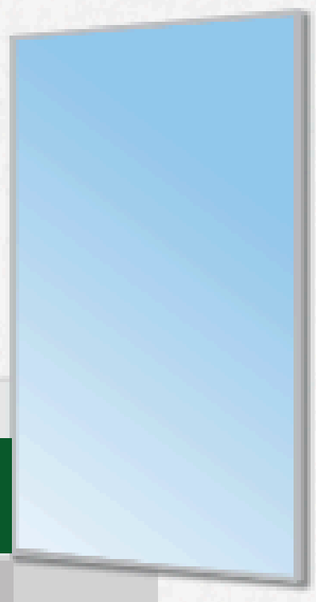
main circuit board

Platinum
Palladium
Copper
Silver
Gold
Tantalum
etc.



display

Indium



capacitors

Tantalum (from coltan)

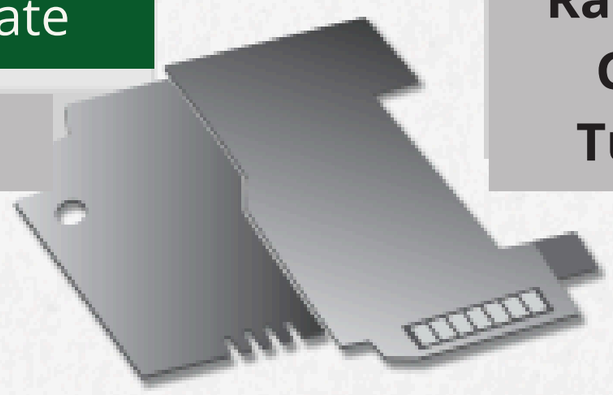


solder joints

Tin

shielding plate

Aluminum



loudspeaker, microphone

Rare earths
Gallium
Tungsten



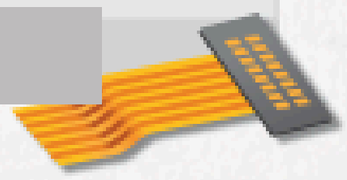
screws

Iron



contacts

Gold



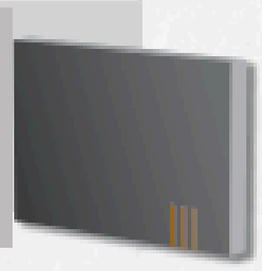
flat cables, wires

Copper



battery

Cobalt
Coltan
Lithium



WHAT'S INSIDE YOUR PHONE?

KEY

number of cubes	colour	
56	mint green	Plastics
16	blue	Glass and Ceramics
3	yellow	Others
25		There are 25 metals. Among these are ...
15	brown	Copper
3	orange	Aluminum
3	black	Iron
1	gold/silver	Gold, Silver and others
2	white	Nickel
1	grey	Tin



Mascot “SAM” by Judith Neuthard Author: Martin Sankofi

WHAT'S INSIDE YOUR PHONE?



KEY

Diagram 1: Raw materials in a mobile phone

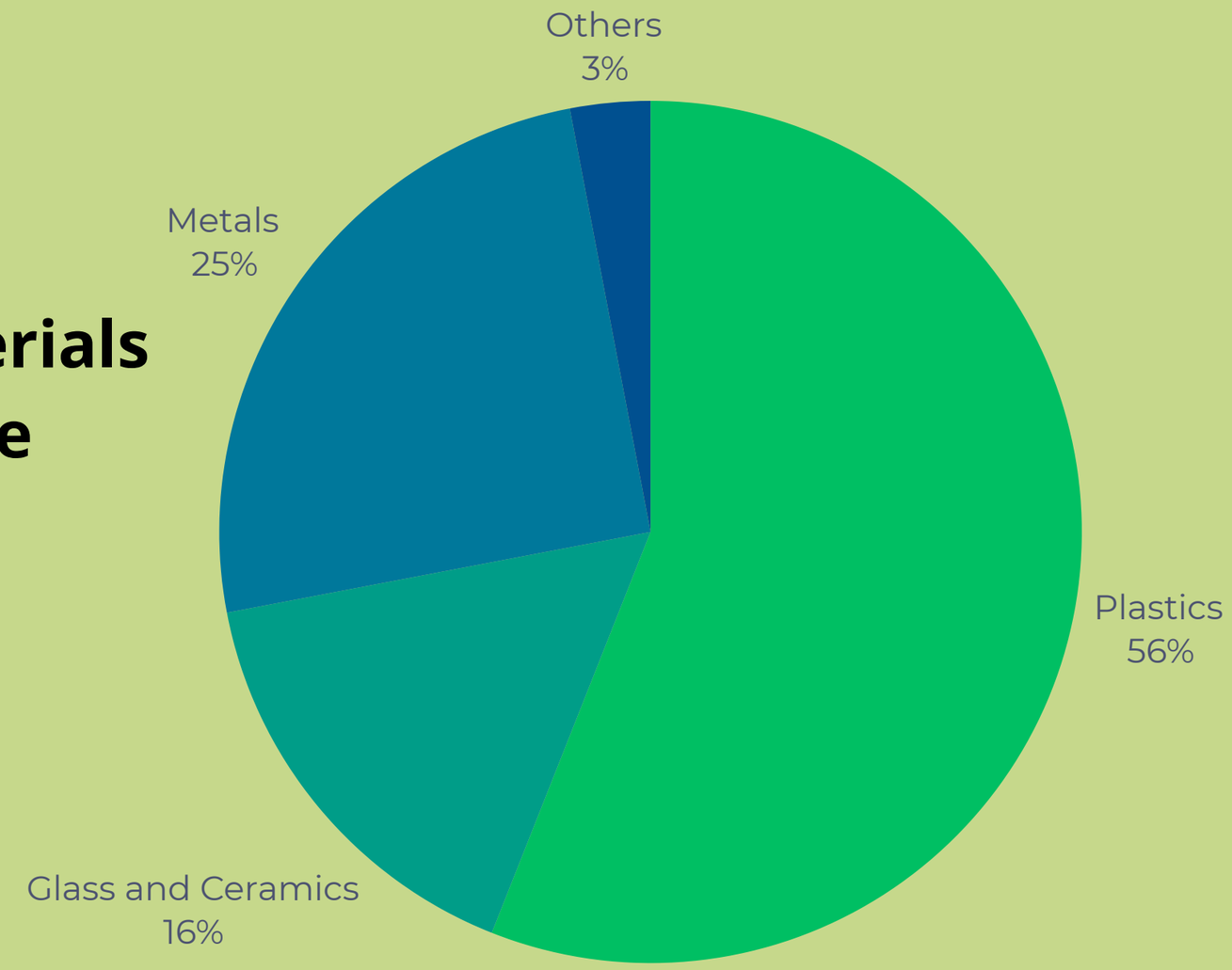
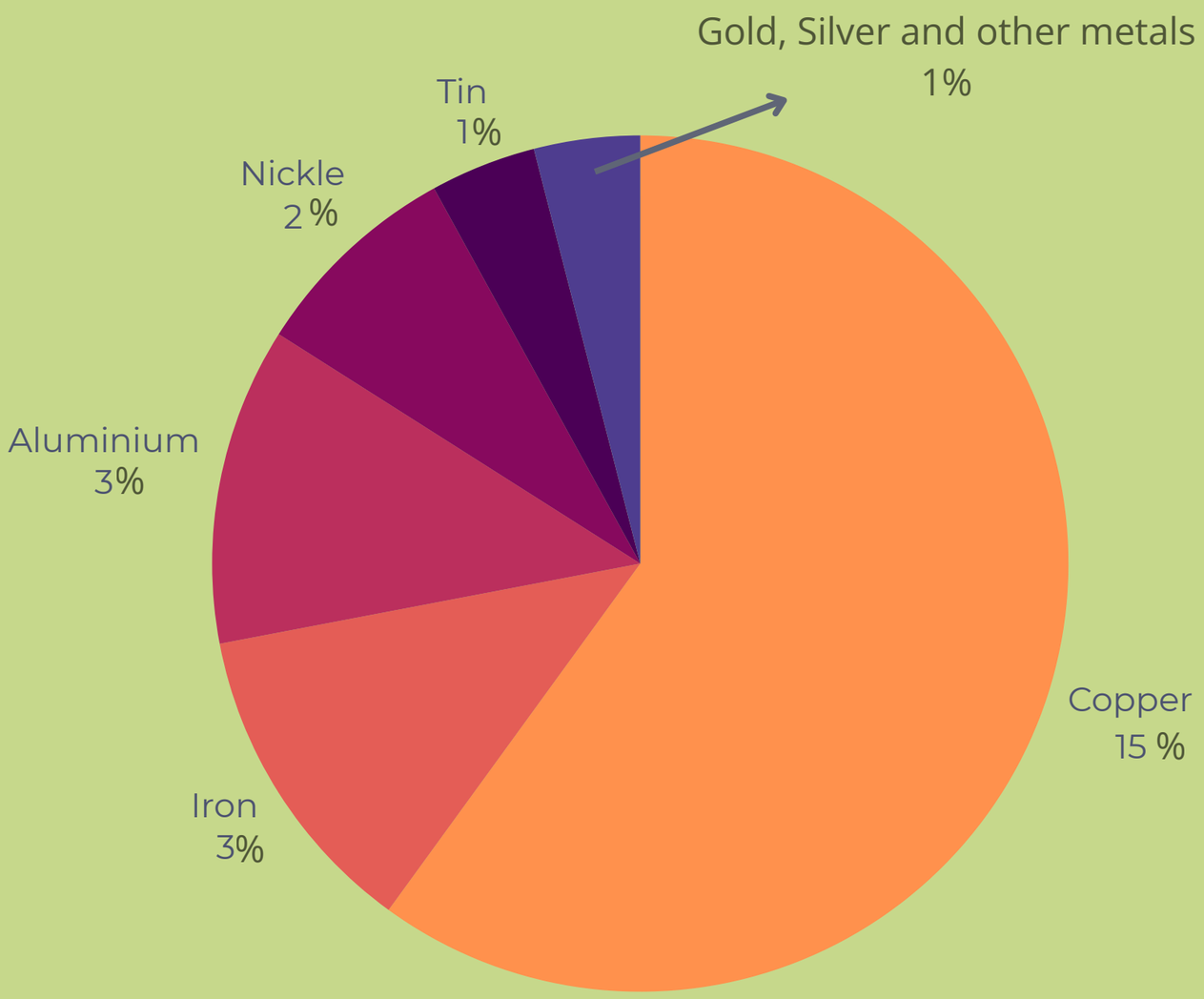


Diagram 2: Metals in a phone





1 % others = e.g.
Gold, Silver, Platinum and Palladium
Other rare metals, e.g.
Cobalt, Gallium, Indium and Tungsten
Rare earths e.g. Neodymium

Mascot “SAM” by Judith Neuthard
Author: Petra Szucsich
Co-funded by the European Union

WHAT'S INSIDE YOUR PHONE?

KEY





