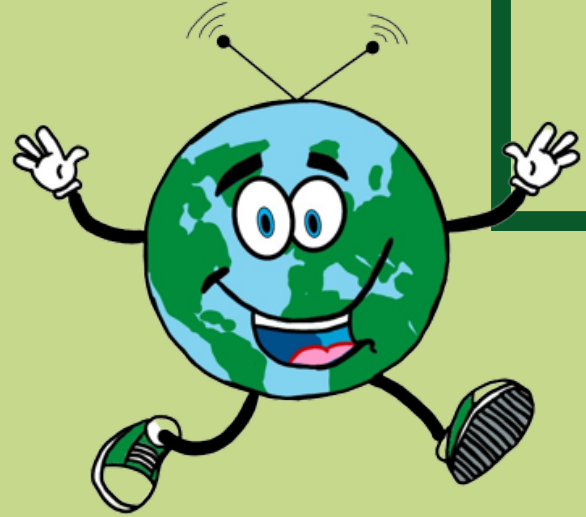


WS 2.1: WHAT'S INSIDE YOUR PHONE?

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?



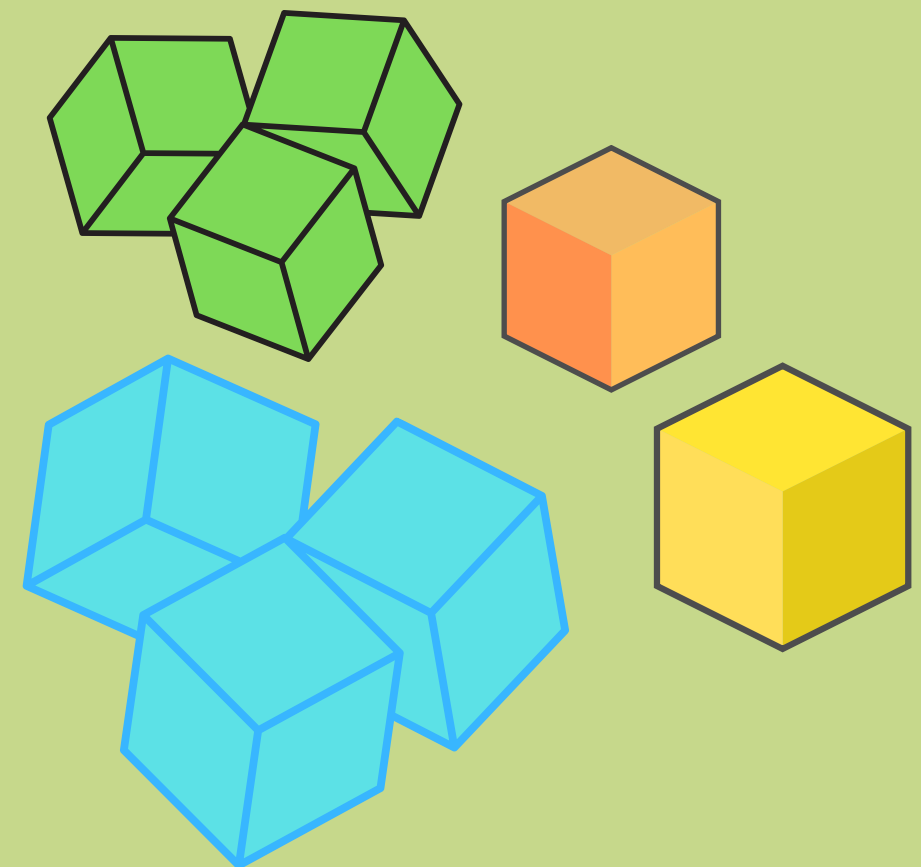
What's inside your phone?

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

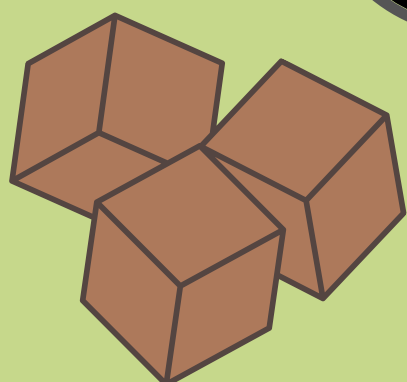
Explore the cubes. What are they all about?

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?



WS 2.2: 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

Others

25

There are 25 metals. Among these are ...

Copper

Aluminum

Iron

Gold, Silver and others

Nickel

Tin

WS 2.3: WHAT'S INSIDE YOUR PHONE?

Match the phone parts with the raw materials!

The diagram illustrates the following matches between phone parts and raw materials:

- Gold** is used for SIM cards.
- Gallium** is used for SIM card trays.
- Plastics, Ceramics** are used for the phone's outer casing.
- Platinum, Palladium, Copper, Silver, Gold, Tantalum, etc.** are used for the internal circuit board.
- Indium** is used for the LCD screen.
- Tin** is used for the battery.
- Tantalum (from coltan)** is used for capacitors.
- Aluminum** is used for the SIM card tray and other internal components.
- Rare earths, Gallium, Tungsten** are used for the camera lens.
- Iron** is used for screws.
- Gold** is used for the charging port.
- Cobalt, Coltan, Lithium** are used for the battery.
- Copper** is used for the charging cable.

A cartoon Earth character with arms and legs is shown running on the right side of the diagram.

WS 2.4: WHAT'S INSIDE YOUR PHONE?

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

Part of a Phone

phone case, cover

display

solder joints

SIM-card, contacts

shielding plate

speakers,
microphones

flat cables, wires

main circuit board

Raw Material

Silver

Aluminum

Iron

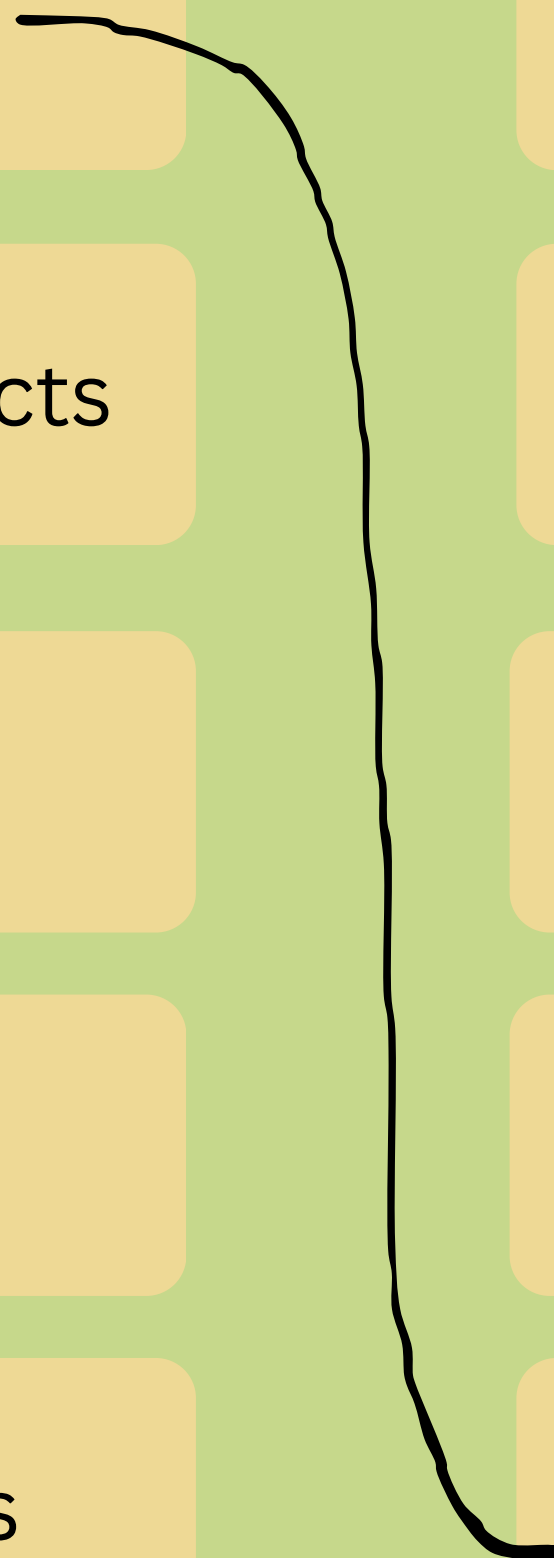
Glass and Ceramics

Copper

Plastics

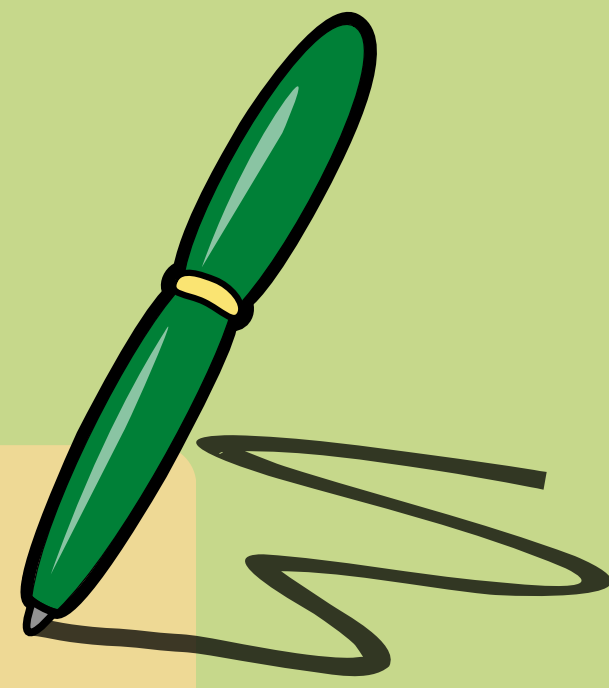
Tin

Gold



WS 2.4: 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.

WS 2.4: 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.

WS 2.3: WHAT'S INSIDE YOUR PHONE?

KEY



WS 2.2: 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



WS 2.2: WHAT'S INSIDE YOUR PHONE?



KEY

Diagram 1: Raw materials in a mobile phone

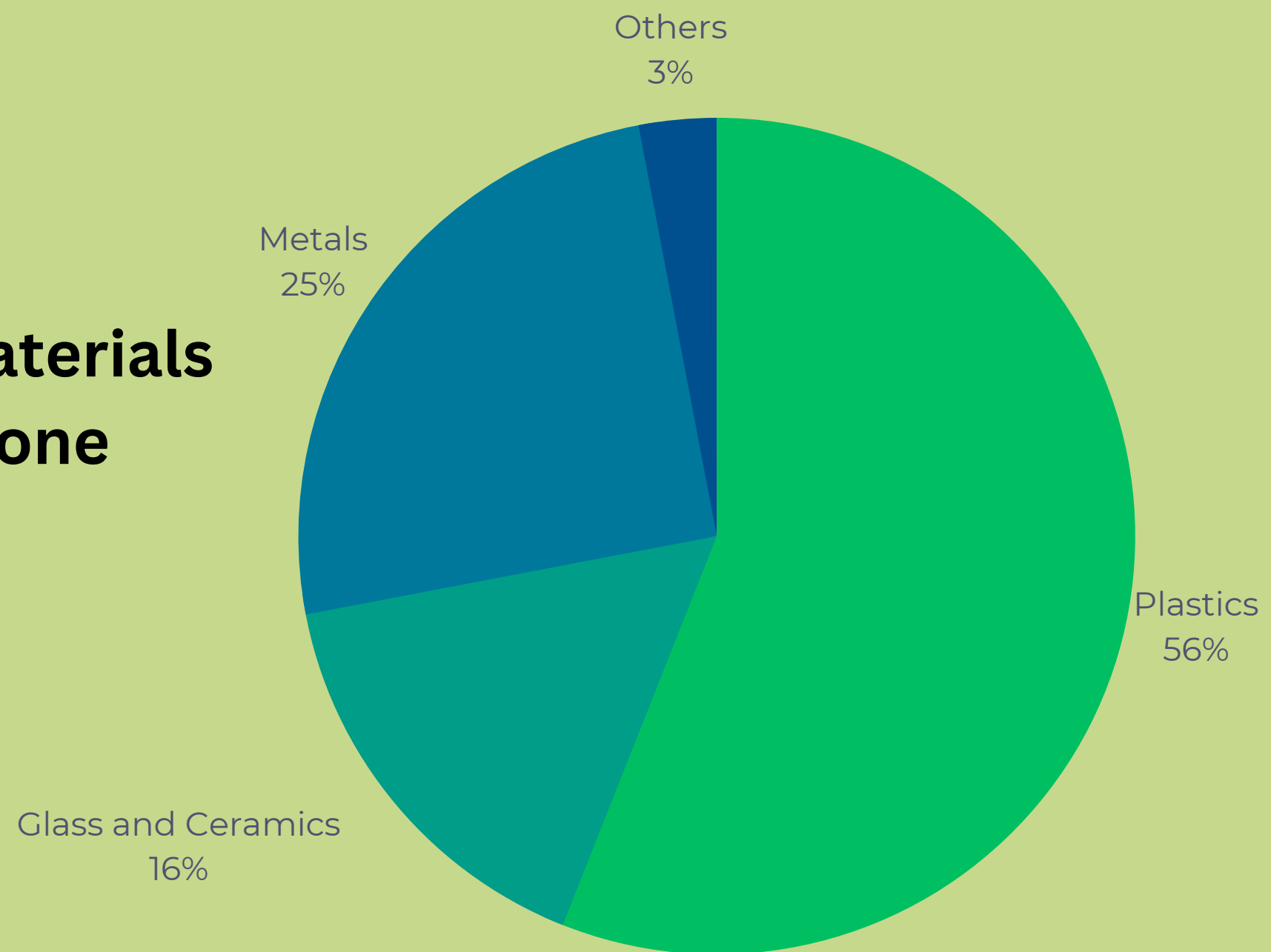
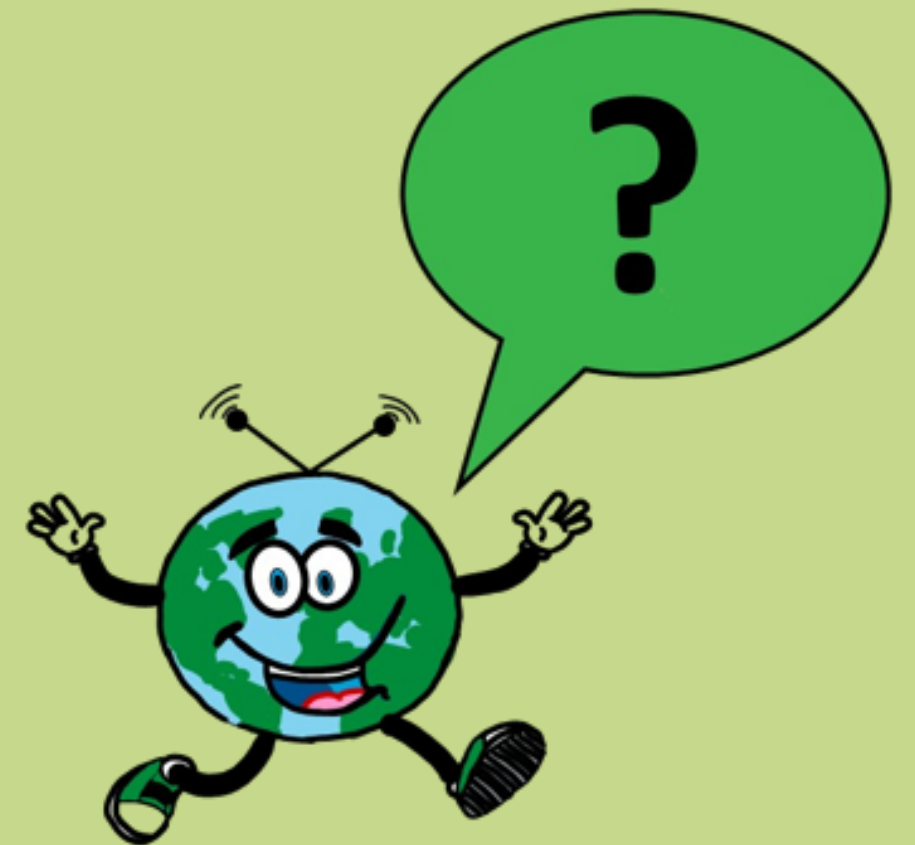
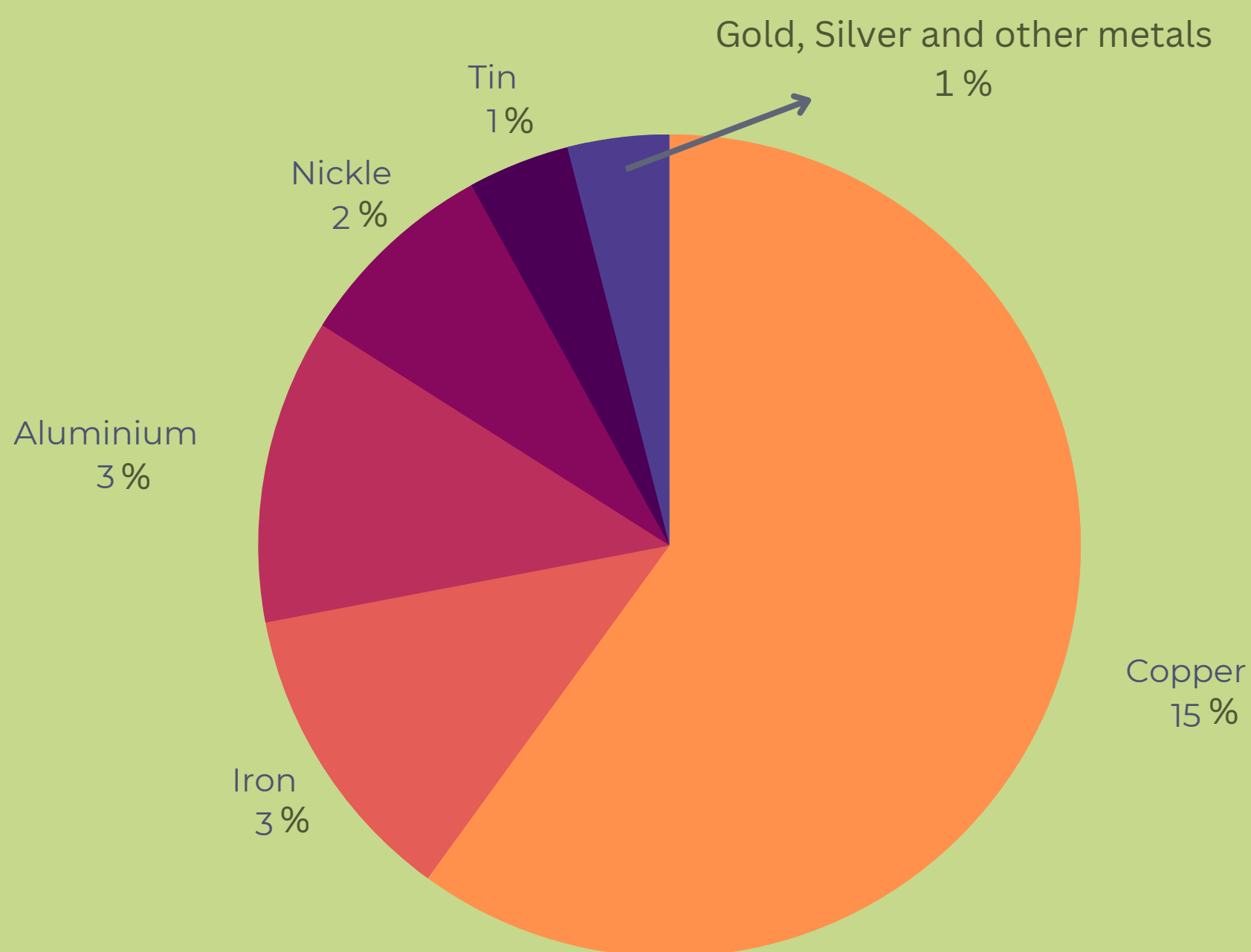


Diagram 2: Metals in a phone



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

WS 2.1: WHAT'S INSIDE YOUR PHONE?

KEY



Gold, Silver and other metals

