

# A SIMPLE GAME, A GREAT MESSAGE

CLASS 4F LICEO COPERNICO BOLOGNA

This activity has received funding from the European Institute of Innovation and Technology (EIT), a body of the European Union, under the Horizon 2020, the EU Framework Programme for Research and Innovation



# WHAT WE WANT TO PASS DOWN TO YOU

- The exhaustion of raw materials that make up our mobile phones
- Where these materials come from
- What we must do to help the environment
- How many rare metals are inside your phones



# ELEMENTS OF A SMARTPHONE

ELEMENTS COLOUR KEY: ● ALKALI METAL ● ALKALI EARTH METAL ● TRANSITION METAL ● GROUP 13 ● GROUP 14 ● GROUP 15 ● GROUP 16 ● HALOGEN ● LANTHANIDE

## SCREEN



Indium tin oxide is a mixture of indium oxide and tin oxide, used in a transparent film in the screen that conducts electricity. This allows the screen to function as a touch screen.



The glass used on the majority of smartphones is an aluminosilicate glass, composed of a mix of alumina ( $\text{Al}_2\text{O}_3$ ) and silica ( $\text{SiO}_2$ ). This glass also contains potassium ions, which help to strengthen it.



A variety of Rare Earth Element compounds are used in small quantities to produce the colours in the smartphone's screen. Some compounds are also used to reduce UV light penetration into the phone.

## BATTERY



The majority of phones use lithium ion batteries, which are composed of lithium cobalt oxide as a positive electrode and graphite (carbon) as the negative electrode. Some batteries use other metals, such as manganese, in place of cobalt. The battery's casing is made of aluminium.

## ELECTRONICS

Copper is used for wiring in the phone, whilst copper, gold and silver are the major metals from which microelectrical components are fashioned. Tantalum is the major component of micro-capacitors.



Nickel is used in the microphone and other electrical connections. Praseodymium, gadolinium and neodymium compounds are used in the magnets in the speaker and microphone. Neodymium, terbium and dysprosium compounds are used in the vibration unit.



Pure silicon is used to manufacture the chip in the phone. It is oxidised to produce non-conducting regions, then other elements are added in order to allow the chip to conduct electricity.



Tin & lead are used to solder electronics in the phone. Newer lead-free solders use a mix of tin, copper and silver.



## CASING

Magnesium compounds are alloyed to make some phone cases, whilst many are made of plastics. Plastics will also include flame retardant compounds, some of which contain bromine, whilst nickel can be included to reduce electromagnetic interference.





Minerals used for pc and smartphone components often come from Congo and other areas of violence: regions rich in minerals but very poor in lifestyle.

More and more phones are produced and always more frequently people throw away theirs to have the new model.

This requires lots of materials which increase wars in the African continent; in fact 80% of world resources are extracted in Congo.

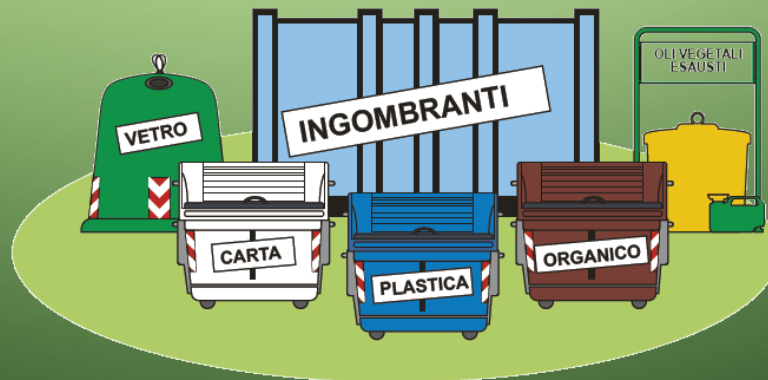
In a sense, it can be said that it is our mobiles, or rather our desire for innovation and fashion to finance these wars.

# WHAT WE MUST DO

The ecological islands are fenced and guarded areas, equipped for the separate collection of waste, available in many Italian municipalities.

There can be through away waste that you can't in the traditional collect system, like bulky waste (furniture, mattresses, bulky furniture...).

The main purpose is to avoid landfill, recovering resources and protecting the environment.



# WHY DID WE MAKE A GAME?

- It's creative, and we made it to raise awareness about recycling
- It's simple
- It's fun!!

# HOW DID WE CREATE THE GAME?

- Unity engine
- Click and play on every computer
- No need to install any software



## HOW CAN YOU PLAY?

- Press the arrows (up, down, right, left) to move the character;
- Jump: press the spacebar;

## OBJECTIVES

To collect all the raw materials and take them to a recycling centre



# PLAY AND LEARN

This is a very simple game ..

But you can learn a lot from it.

Just play and save the Earth from this

