

## Spletna delavnica: Iz česa so izdelani? Surovine in izdelki v vsakdanjem življenju – življenjski cikel izdelkov



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# Projekt 3DBRIEFCASE

*“Learning the use of minerals through non conventional and digital tools”*

Trajanje: 2 leti (1. 1.2020 – 31. 12. 2021)

Vodilni partner: **Fundacija Gómez Pardo + 14 partnerjev**

Projekt financira: **EIT RawMaterials**

## Izzivi:

- Evropa je odvisna od uvoza surovin (delež EU v globalni proizvodnji surovin je **5 % letno**)
- Pereče pomanjkanje **kritičnih surovin** (P, Pt skupina, lantanidi, ...)
- **30** kritičnih surovin (2020).



## Cilji:

- Spremeniti **odvisnost od surovin v strateško moč Evrope** (novi načini pridobivanja surovin, recikliranje...).
- Pospešiti **konkurenčnost, rast in privlačnost evropskega surovinskega sektorja skozi IZOBRAŽEVANJE, radikalne inovacije in podjetništvo.**

# Izbrani EIT RawMaterials projekti na ZAG-u

## RC Adria

Boosting regional eco-innovativeness and increasing its competitiveness



## Laboratory for Stone, Aggregate and Recycled Materials

Applicative research work as well as expert work, consultancy and supervision in the following area:

- Stone and Aggregate
- **Recycling, development of sustainable construction products**
- **Remediation of water and soil**
- Life cycle assessment (E-LCA, S-LCA, LCC)
- Mineralogical analysis (e.g. asbestos, dust in working)



Building a **roadmap** for zero waste **extraction of CRM and metals** from mining tailings and metallurgical heaps in SEE



Tailing Lojane, North Macedonia (photo: R. Šajn).

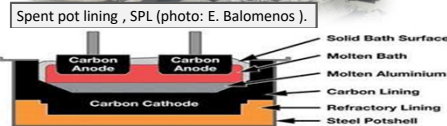


Tailing Veles, North Macedonia (photo: R. Šajn).

RIS-RECOVER stakeholder registration



Novel type of **zero waste** technology for the **recycling** of the hazardous waste – **spent pot linings (SPL)** from aluminium production.



Scheme of the electrolytic cell in aluminium production (www.environment.gov.au).

**Building knowledge community**  
If you would like to be regularly updated about project activities, kindly invited to register as a relevant stakeholder using QR code



Establishing a **network** of **Cu value chain** stakeholders in the ESEE region for promoting an **innovative service** for the zero waste **extraction of metals (Cu, Ag, As, Au, and REE)** from Cu mining wastes.



Tailing in Buchim, North Macedonia (photo: https://neuralnetwork.pro/bucim-dooel-radovich/).

RIS-CuRE stakeholder registration



## Participating in the projects

**INNOCAT**      **RIS-RESTORE**      **DIM ESEE**      **BusiSource**  
**VirtualMine**      **RIS-ALiCE**      **Whisper**      **MINE TOUR**      **RC ADRIA**  
                          **REEBAUX**      **VISUAL 3D**      **Innomat**      **Whisper**  
    **and others ...**



# (3D) BRIEFCASE

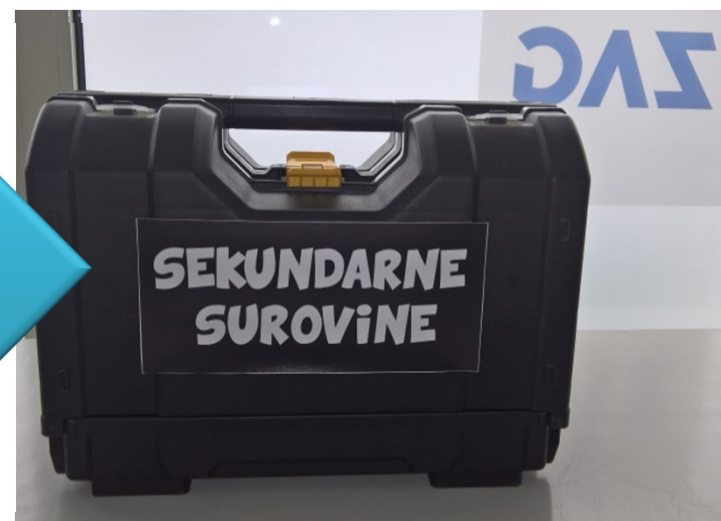
## 2 osnovna didaktična kovčka

Vsakdanji minerali & predmeti



Namigi, grafična  
orodja, vodnik za  
uporabnika, ... v  
SLO jeziku

Odpadki, surovine, proizvodi





# Podporne vsebine & promocija

The **Briefcase**  
of mineral applications

Learning the uses of minerals through non-conventional teaching tools

**Briefcase**  
pripomočki za prepoznavanje mineralov

Spoznavanje uporabe mineralov z domiselnimi orodji poučevanja

Learning the uses of minerals through non-conventional teaching and digital tools

**The BRIEFCASE and 3DBRIEFCASE projects**

**About the projects**  
The project seeks to bring minerals and mining closer to society as a whole. Its ultimate goal is for youngsters (youth aged 6 to 14 years) and their teachers to understand where the minerals forming daily products come from and how our daily purchase decisions affect the social environment of the people who live in countries with resource exploitation. The BRIEFCASE and the 3DBRIEFCASE are a Wider Society Learning projects which raise social awareness of the use of and need for raw materials.

**What the projects aim to teach**

- Which minerals we use in our daily life.
- What products are made with them.
- Where they are obtained from.

**A perfect tool to raise awareness**

- About the utility and indispensability of minerals and mining.
- On the consequences of their uses and production systems (social and environmental consequences).

**Workshop material**

- The physical Briefcase:**
  - 10 minerals, tools and 10 daily life products.
  - educational material (preparations and quiz sheets)
- The virtual Briefcase:**
  - educational material (preparations and quiz sheets).
  - materials for the trainers.
- Training teachers:**
  - workshops in different parts of Europe.
  - replication of the workshops at over Europe.

**Consortium**

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#EITRawMaterialsProject

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**NAŠI VSAKDANJI PREDMETI**

**IN KROŽNO GOSPODARSTVO**

ZAG  
ZAVOD ZA GRADNENIŠTVO SLOVENIJE  
SLOVENIAN NATIONAL BUILDING AND CIVIL ENGINEERING INSTITUTE  
Ekošola

Kovček vsebuje:

- Nabor različnih mineralov/rud
- Nabor predmetov
- Pripomoček za učitelje/uporabnike
- Namige
- Slikovno gradivo



# Primarne surovine

# Uporabne povezave

- **Spletna stran projekta:**

<https://www.thebriefcasegame.eu/>

- **The Briefcase of mineral applications:**

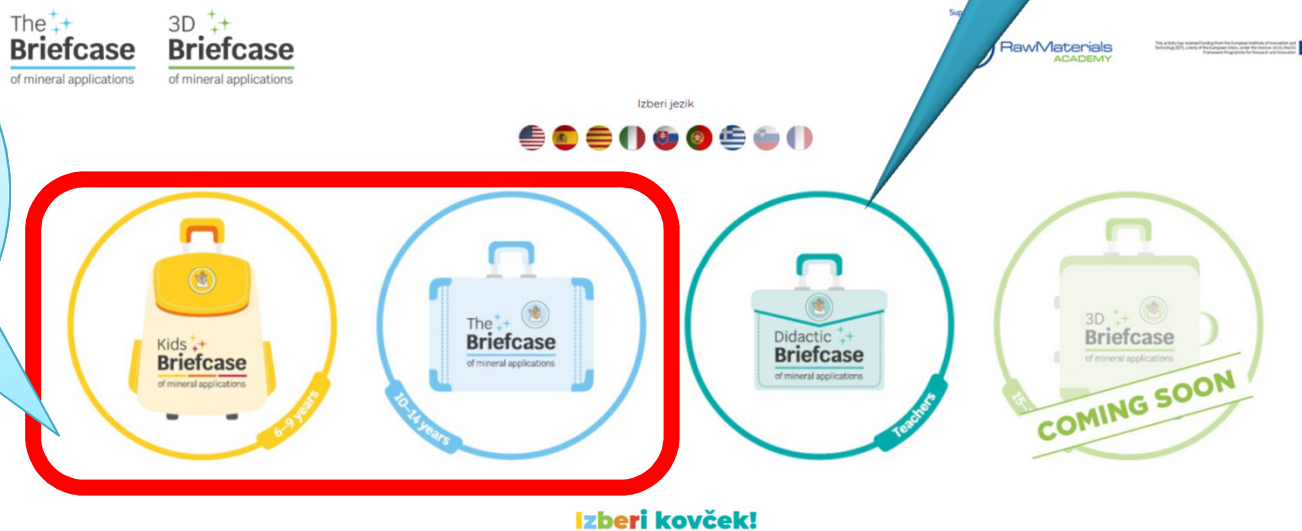
<https://www.youtube.com/watch?v=5VWcj4Ecvfc>

- **The Briefcase educational tool:**

<https://www.youtube.com/watch?v=4ZYK8sVUC9g>

Pripomočki za  
učitelje,  
vzgojitelje, ...

Digitalna  
igrica, tudi v  
času covid-19.  
2 težavni  
stopnji!





# Uporabne povezave

- **Življenje brez surovin:**

<https://www.youtube.com/watch?v=IXawf9OBOyw>





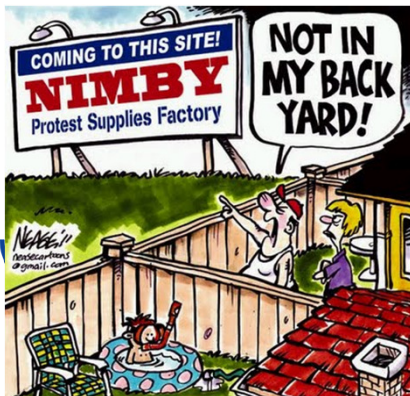
# Uporabne povezave

- **Krvavi/konfliktni minerali**

[https://m.facebook.com/story.php?story\\_fbid=372230530361535&id=276157035868006](https://m.facebook.com/story.php?story_fbid=372230530361535&id=276157035868006)



ZN: 250 milijonov otrok med 4-14 let prisiljeno dela v nerazvitem svetu (61 % Azija, 32 % Afrika, 7% Južna Amerika). Brez izobrazbe in OTROŠTVA!



# Uporabne povezave

## Primer dobre prakse:

- **Briefcase delavnice na OŠ Slave Klavore Maribor:**

<https://www.youtube.com/watch?v=WK5GhisxoaM&t=103s>



Video so posneli  
in sestavili učenci  
7. in 8. razreda OŠ  
Slave Klavora  
Maribor

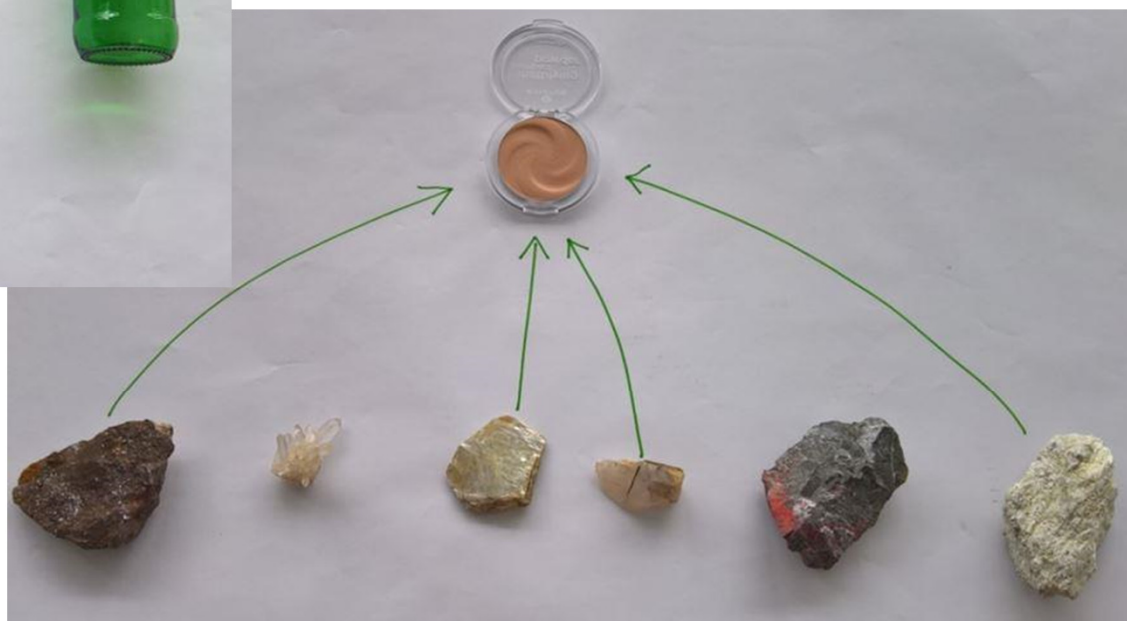
# MINERAL ↔ PREDMET



## Različni načini uporabe:

- ugotavljamo predmet
- ugotavljamo mineral/element
- kaj vse lahko dobimo iz enega minerala/elementa

- ...





# CINABARIT (živo srebro)





# SADRA (mavec)



# GRAFIT (ogljik)



# FLUORIT (fluor)





# KIANIT (aluminij)

# BOKSIT (aluminij)





# SFALERIT (cink)



# GALENIT (svinec)



Različni mineral – isti kem. element

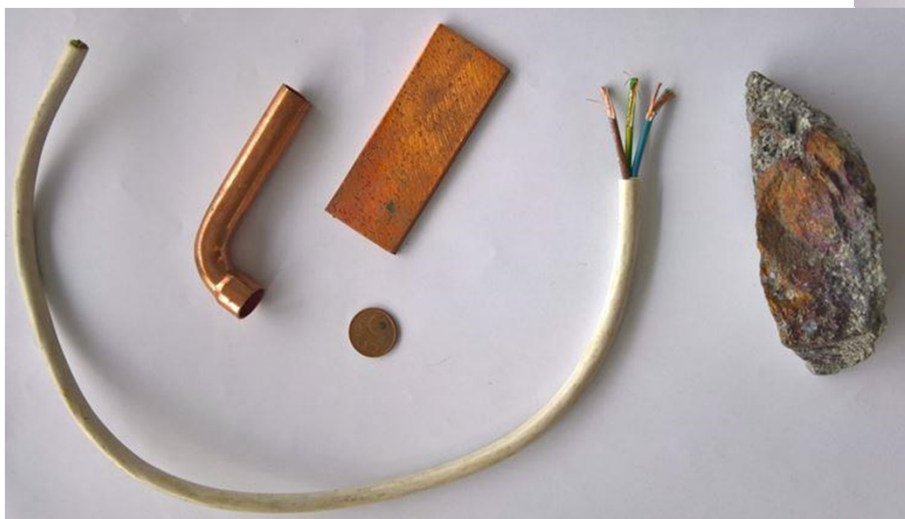


# LEPIDOLIT (litij)

# SPODUMEN (litij)



# MALAHIT (baker)



# BORNIT (baker)

# ORTOKLAZ/GLINENEC (silicij)



# KREMEN (silicij)



# VOLFRAMIT (volfram)



# MAGNETIT (železo)

# HEMATIT (železo)



# RUTIL (titan)



# LOJEVEC (magnezij in silicij)



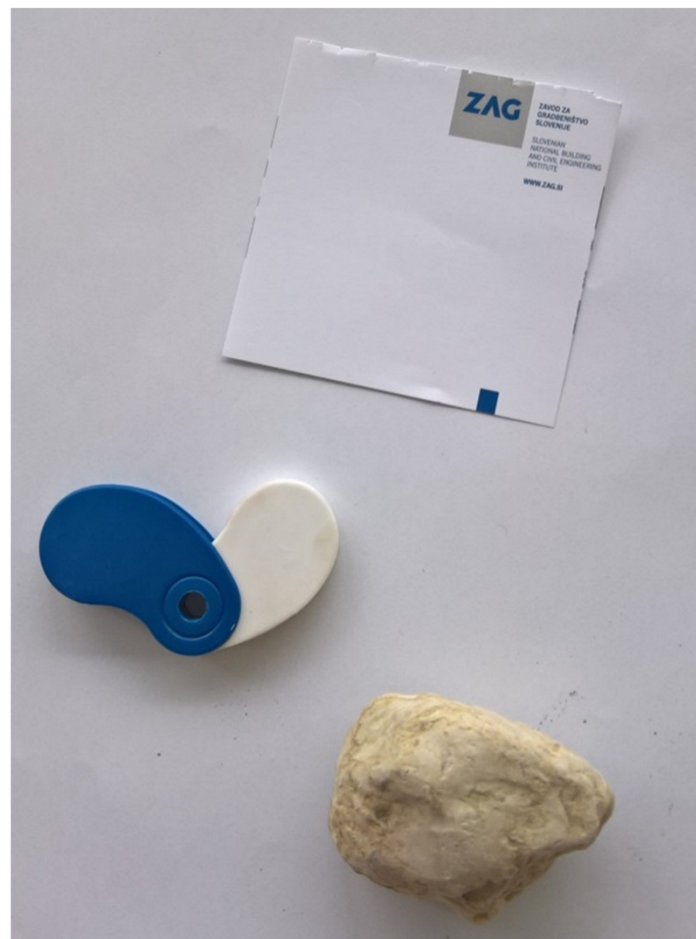
# MUSKOVIT (aluminij in kalij)



# KROMIT (krom)



# KAOLINIT (kaolin)





# HALIT (sol)

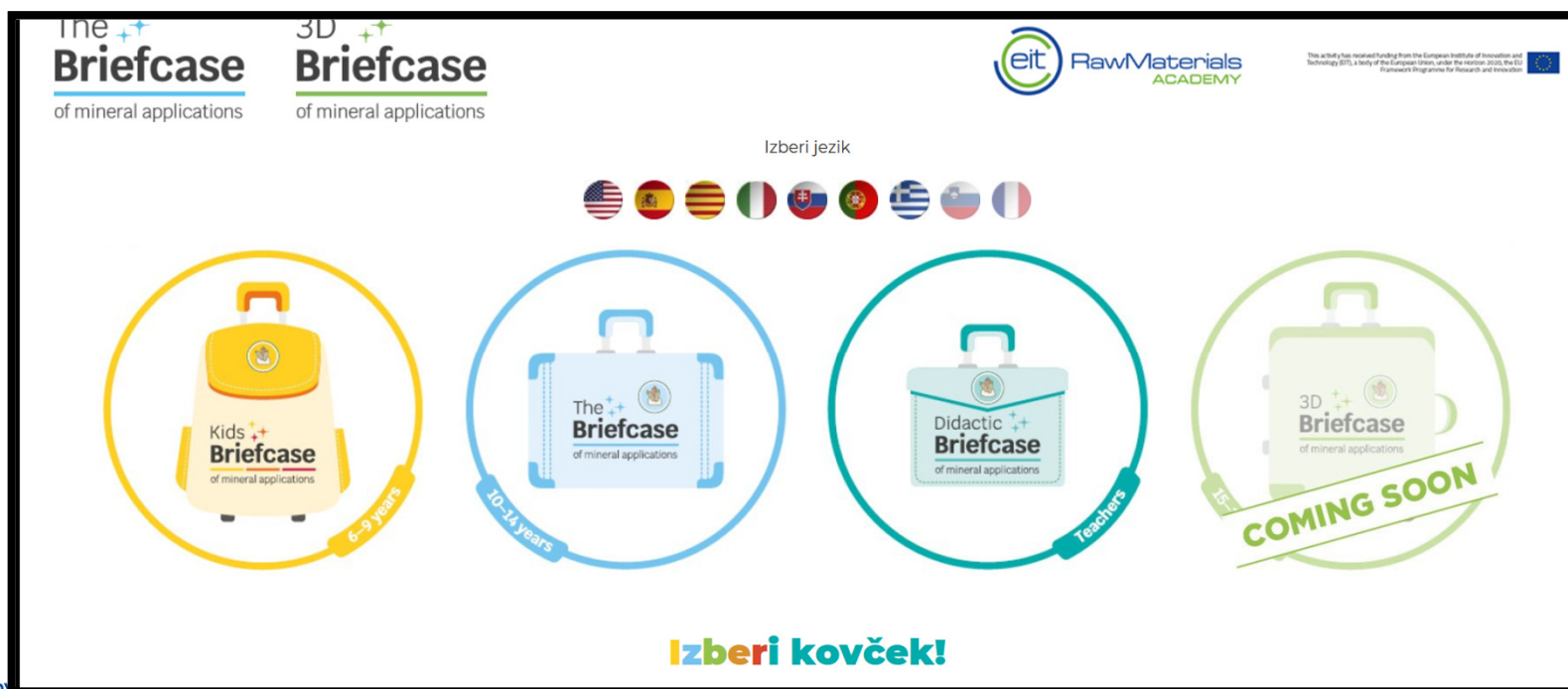


# DELAVNICE



Tekom projekta smo razvili tudi spletno igrico „**Spoznaj minerale**”, in sicer za **mlajše (6–9 let)** in **starejše učence (10–14 let)**.

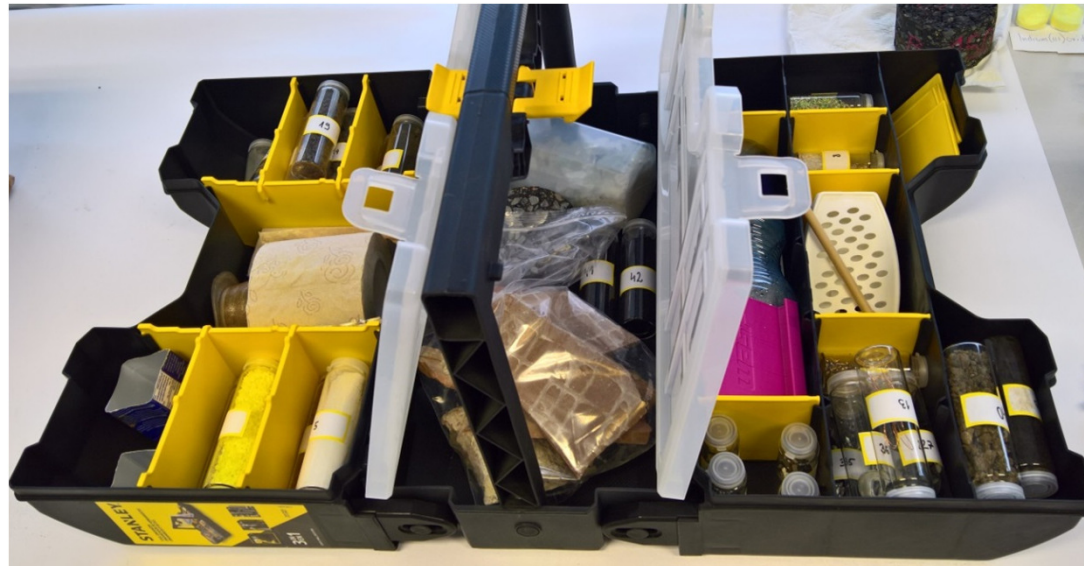
<https://www.thebriefcasegame.eu/>







# Sekundarne surovine





# SUROVINE (linearno gospodarstvo)



# ODPADKI

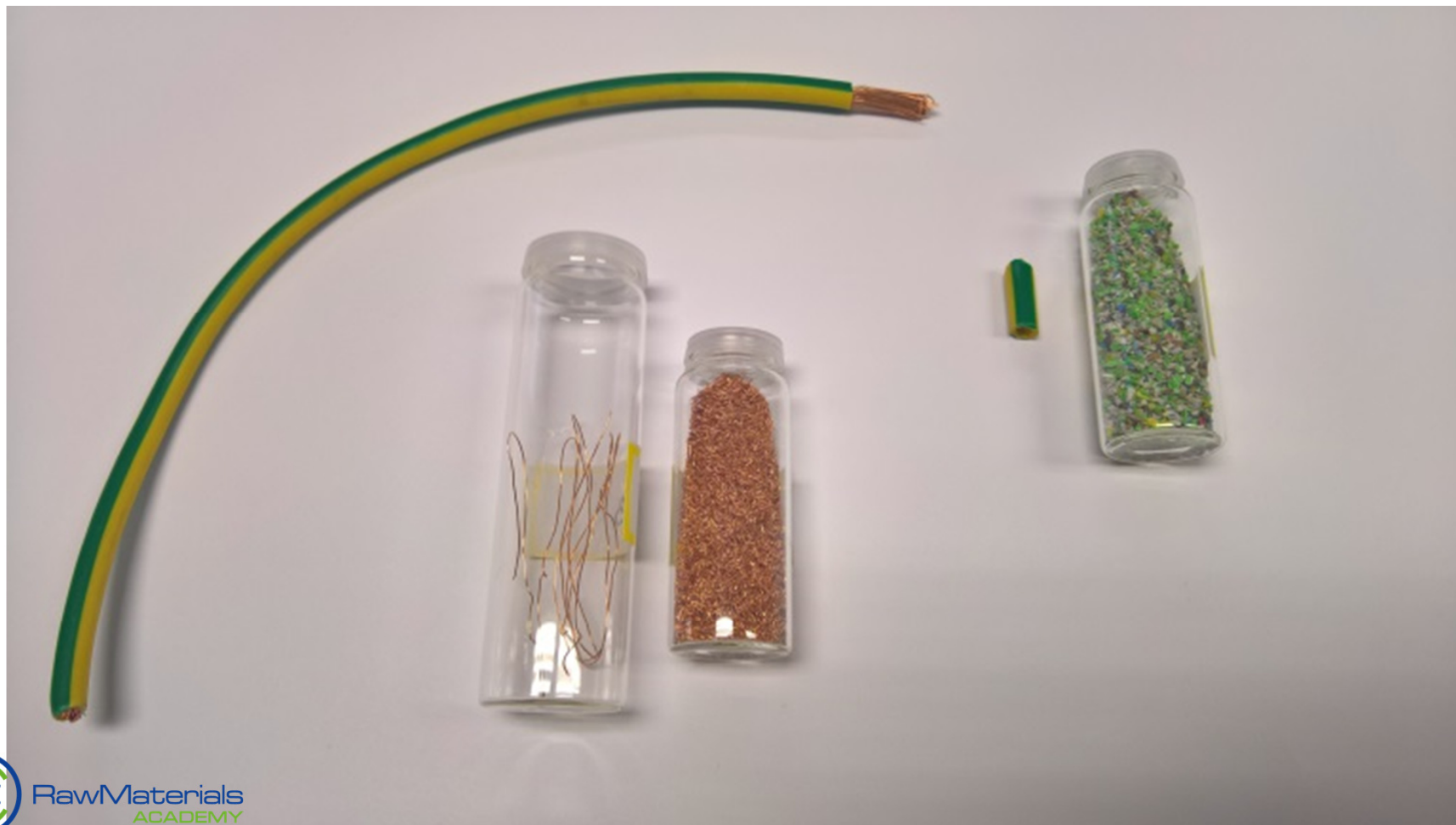


# SUROVINE (krožno gospodarstvo)





# Bakrena žica





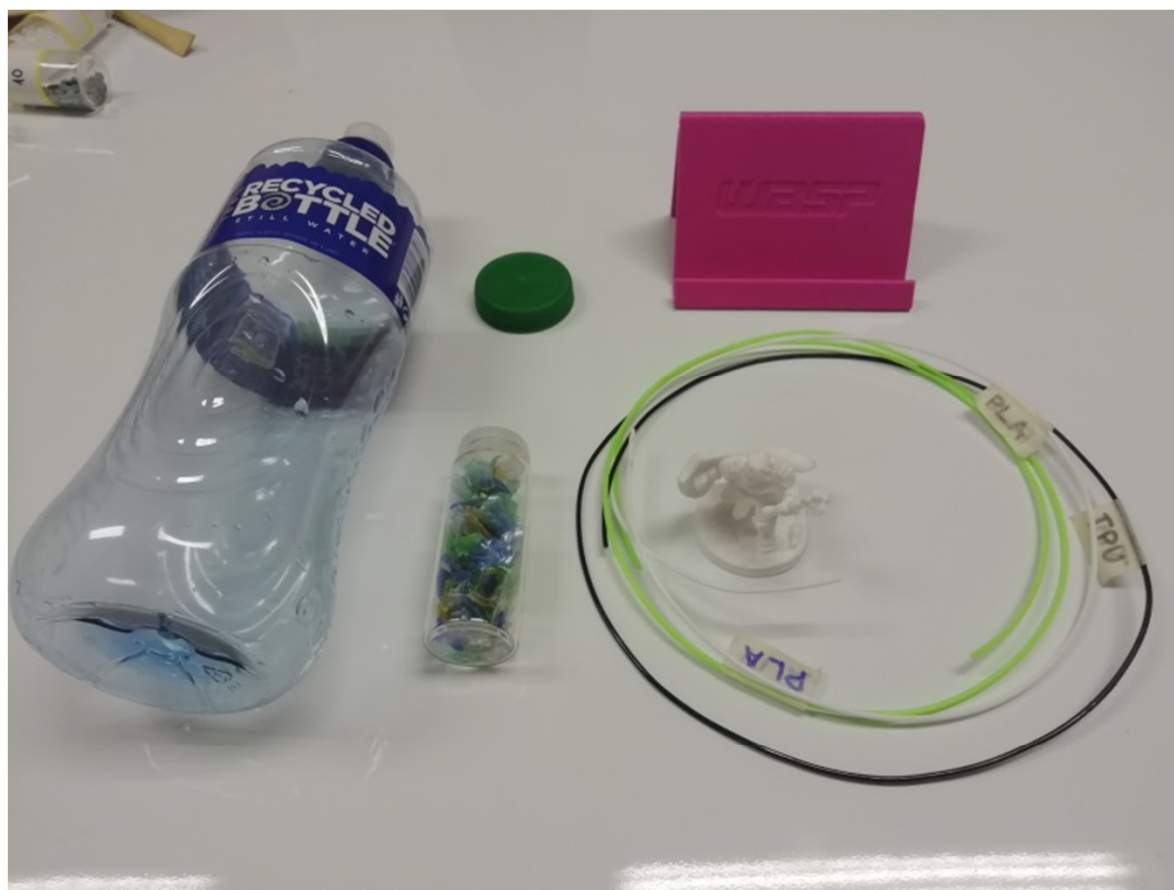
# Pomarančni olupki



# Tetra Pak



# Plastika





# Beton





# Komunalni odpadki



# Gume





# Različni opilki



# Pepeli





# Utrinki iz delavnic



# Gradivo

**Digitalno gradivo** je dostopno na spletni strani projekta BRIEFCASE, medtem ko sta **tematska didaktična kovčka** na voljo na ZAG (izpostava Maribor) po predhodni rezervaciji.

<https://www.thebriefcasegame.eu/>



Izposoja kovčkov:

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# Interdisciplinarnost



## Povezovanje med predmeti:

Naravoslovje, Kemija, Biologija,  
Zgodovina, Angleščina, Fizika,  
Družba, Etika, Tehnika,...

**USPEH!**





# Sledi:

kovček „**Pb & Zn**“ (svinec in cink) v sodelovanju z Rudnikom v Mežici ter Sitarjevec pri Litiji





# Sledi:

## kovček „**MOBILNI TELEFON**“

**Display**

- Amorphous Silicon:** A mobile device's glass screen is very durable because glassmakers embed its main ingredient, silica (silicon dioxide or quartz sand), with various materials and fuse 100,000 layers.
- Indium Tin Oxide:** Layers of indium tin oxide are used to create transparent circuitry in the display. Tin is also the ingredients in printed board solder, and vanadium is a primary source of tin.
- Carbon:** provides light emitting diode (LED) backlighting. **Aluminum:** is the primary source of fiberoptics.
- Sapphire:** is the source of sapphire found in the screen's substrate casing, and gemstones found in displays and LEDs.

**Electronics and Circuitry**

- Copper:** The source of copper is a mobile device for exceeds the screen of any other metal. Copper conducts electricity and heat and comes from the mineral **chalcocite**.
- Telluride:** is a primary source of silver. Silver-based ink is compressed to form electrical pathways through a device.
- Silicon:** very abundant on the Earth's crust, is produced from the source with iron oxides and is the basis of integrated circuits.
- Semiconductor:** is a source of arsenic, which is used in radio frequency and power amplifiers.
- Capacitors:** from the source mineral **barium**, is added to capacitors to regulate voltage and improve the audio quality of a device.
- Wolframite:** is a source of tungsten, which acts as a heat shield and provides the spark for mobile phone's vibrator.

**Battery**

- Agave:** and **lithium** are used in the source of lithium, used in cathodes of lithium-ion batteries.
- Graphite:** is used for the anodes of lithium-ion batteries because of its electrical and thermal conductivity.

**Speakers and Vibration**

- Barium:** is a source of barium, elements used in graphite, magnets of speakers, microphones, and vibration systems.







**HVALA, ker  
vam je mar!**



Ekoskladovnica, Trajnostna mobilnost