Teachers' Card

Modern devices – yes please! What about mining?

Index

General Introduction 2
Extended background information 3
Key Competence European Framework 4
United Nations' Sustainable Development Goals 5
Activity 6
Learning Pathway 6
Evaluation 7
Description of Student's Cards 7
Sources 8

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General Introduction

The toolkit is an innovative tool that raises awareness of the importance of raw materials in our daily lives, develops a better understanding of how raw materials are used, teaches students about mining opportunities in Europe, and shows students the impact of circular economy strategies on a company's performance. It is appropriate for students of 14 years and older. It is designed to be interactive as students can interact with the PDF/PPT presentation through links, by answering questions or by making choices. They are also challenged to start their own company, spend a budget, and make their own key decisions related to the circular economy that have significant and lasting consequences for the company from a raw materials perspective. This makes learning fun and interesting. Because the content is presented in a meaningful context and connected to real-world problems, they learn faster, and the knowledge is more sustainable. Toolkits teaches students about opportunities for circular strategies such as better design, alternative raw materials, and recycling. Toolkit's solution is not one, but several, which provides the opportunity to discuss different ways to make decisions and control a company's flexibility to external events such as political action, the local community, market disruptions, and resource availability.

Key words: *Circular economy, sustainable development, raw materials, critical raw materials, battery, sustainable company*

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Extended background information

In view of the large population growth and rapid economic development, even in underdeveloped countries, our need for raw materials has never been greater. Raw materials are essential to our everyday life as well as to support the transition to a sustainable economy. They are needed to produce renewable energy and to store this energy in batteries, which are needed for elements of sustainable transport and infrastructure, such as electric vehicles. At the same time, we are not sufficiently aware that raw materials are limited and that, if consumption remains unchanged and we do not move away from the current linear (take - make - dispose) society, we will be faced with the increasing dependence of the European economy on foreign raw materials and the scarcity of the critical raw materials needed for our economy. We will have to adapt, and it will be necessary to make many important decisions, new technologies and solutions for the use of raw materials in the economic, commercial, and industrial sectors. Education on sustainable development and circular economy is currently not yet sufficiently widespread. That is why we want to use the toolkit to raise young people's awareness and educate them properly so that they will be able to make the right decisions and will contribute to the sustainable society in the future.

The toolkit touches on a wide range of topics from raw materials, critical raw materials, circular economy to the design, production, substitution, and recycling of a product. These topics are briefly introduced in PPT presentation for lesson and also in Interactive students' presentation.

A teacher can find all additional background information for the toolkit on the website of the RM@Schools project under Teacher's R

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Key Competence European Framework

Literacy competence
S1. Ability to understand and interpret concepts, feelings, facts or opinions in oral and written form.
S2. Ability to express concepts, feelings, facts or opinion in written and oral form.
S4. Ability to interact in an appropriate and creative way in any situation.
Mathematical competence and competence in science, technology and engineering
S1. Ability to use constructed thinking in order to solve a problem in every situation.
S4. Readiness to address new problems from new areas.
Digital competence
S1. Critical use of information technology for work
S2. Basic skills in ICT
S4. Ability to use and handle technological tools and machines
Personal, social and learning to learn competence
S1. Ability to pursue and persist in different kinds of learning.
S2. Identifying available opportunities.
Citizen competence
S1. Ability to effective interaction with other people
S2. Ability to adapt to the changing situation, being flexible and work under pressure
S3. Ability to work effectively and collaborate with other team members
Entrepreneurship competence
S1. Ability to turn idea into action
S2. Creativity/innovation
S3. Ability to plan and manage tasks
S4. Independence, Motivation and Determination

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United Nations' Sustainable Development Goals

The Sustainable Development Goals are the blueprint to achieve a better and more sustainable future for all. They address the global challenges we face, including those related to poverty, inequality, climate change, environmental degradation, peace and justice. *Goals linked to this activity:*

	1 NO POVERTY, 2 ZERO HUNGER — Enable access to basic services		10 REDUCED INEQUALITIES — Equal access to global expertise
	3 GOOD HEALTH AND WELL-BEING — Safe medical devices		11 SUSTAINABLE CITIES AND COMMUNITIES — Sustainable urbanization
	4 QUALITY EDUCATION — Access to education	✓	12 RESPONSIBLE CONSUMPTION AND PRODUCTION — Responsible consumption and production
	5 GENDER EQUALITY — Less hardship, more opportunities		13 CLIMATE ACTION — Strengthen resilience, reduce disaster impact
	6 CLEAN WATER AND SANITATION — Safe and affordable water		14 LIFE BELOW WATER — Reduce marine pollution
	7 AFFORDABLE AND CLEAN ENERGY — Energy – the golden thread		15 LIFE ON LAND — Sustainable use of terrestrial ecosystems
	8 DECENT WORK AND ECONOMIC GROWTH — Safety of workers and economic growth		16 PEACE, JUSTICE AND STRONG INSTITUTIONS — Promote peaceful and inclusive societies
✓	9 INDUSTRY, INNOVATION AND INFRASTRUCTURE — Resilient infrastructure and sustainable industrialization		17 PARTNERSHIPS FOR THE GOALS — Better access to technology and innovation

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Activity

This toolkit increases awareness of the importance of raw materials and the impact of the circular economy on our lives. Students solve an interactive presentation (in PDF or PPT) in which they first learn what we use raw materials for, what some objects (can, saltshaker, light bulb…) are made of and whether we can make them from European raw materials.

With the acquired knowledge, they try to build up a successful sustainable company using the decision key.

They must make key decisions related to a circular economy that have significant and lasting consequences on the company from a raw materials perspective.

Module 1 – How to use Interactive students' presentation

Appendix 1 – Presentation for lesson (ppt file)

Learning Pathway

Step 1 – 15 minutes: The teachers give a short introduction with a prepared PowerPoint presentation for a lesson. They can also use their own PowerPoint presentation prepared according to the RM@Schools handbook. They briefly introduce what raw materials, circular economy, and critical raw materials are.

Step 2 – 30 minutes: Students are divided into groups (preferably the number of students in a group is 4, but it can also be more). Each group receives the interactive students' presentation (on a computer, tablet… in PDF or in PPT version) and has about 30 minutes to work through it. You can find instruction on how to use this interactive presentation in Module 1.

Step 3 – 30 minutes: Each team presents their path to the final slide (or more of them if they go through more times) and explains the decisions they have made. In the PPT presentation for lesson there are all 35 possible final slides with the numbers that the students can use as background for a presentation. Students and teachers discuss together why they made such decisions and why their company was successful or not. Optionally, they can simultaneously write their findings, why the company was successful or not, to the board.

Step 4 – 15 minutes: Summarize the key facts that have led to a successful sustainable company (last slide of the PowerPoint presentation for teachers).

Possible answers:

- Communication with the local community is very important.

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- Investing in a new design or alternative raw materials can improve the flexibility of a company.
- Investment in recycling is the key to sustainable development as secondary raw materials can be returned in the production cycle.
- Circular Economy is about much more than just recycling. It is about reducing the consumption of raw materials at every stage of production (with better design, alternative raw materials, recycling, and use of secondary raw materials).
- Circular economy leads to the sustainable development of the company.
- A company must be developed according to its capabilities and budget. Due to the current market situation, it is more expensive to extract raw materials in Europe. Therefore, it is currently impossible to develop a company that uses European raw materials and introduces all the functions of the circular economy, for the same budget as when using raw materials from other Non-European countries. This is a goal for the future, but it is a long process.
- Flexibility of a company towards external events such as political measures, local community, market interruptions, and availability of resources.

Evaluation

- Students do a research and report on different products that are made in Europe, what raw materials they are made from, where these raw materials come from, and if we can possibly use only European resources (are there operating mines for this raw material?).

- Students find different companies that already use some circular economy strategies for sustainable development (e.g., better design for more sustainable products and easier replacement of components): https://www.fairphone.com/en/). Students create a presentation and present the company and its solutions in front of the whole class.

Description of Student's Cards

Other supporting materials that need to be distribute to Students before the activity:

Students'Card - Interactive students' presentation (in PDF or PPT version)

Appendix 2 - Map of Main Mineral Deposits of Europe

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Sources

- ***web sites***
  - https://eitrawmaterials.eu/
  - https://ec.europa.eu/growth/sectors/raw-materials_en
  - A_CEintro_student_EN.pdf (hubspotusercontent00.net)

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