Euromines NEWSLETTER



1 December 2021



The future of the European raw materials industry is dependent on building strong connections with society. It is crucially important that society has an accurate understanding of the importance of mineral resources and their sourcing in ethical and sustainable ways.

Our objectives:

- Bringing minerals and mining closer to society and increase the general knowledge about the importance of the European mining industry.
- Bridging the gap between the highly technical mining world and the public.
- ⇒ Building awareness among the public, kids and students.
- Showing the importance of metals and minerals for the EU value chains and ecosystems.
- ⇒ Providing engaging online educational materials.











VI European RM@Schools Conference

1st December 2021 at 15:00 – 3rd December 2021 at 18:30

Don't miss the opportunity to join the RM@Schools Consortium presenting different education toolkits, activities and hands-on experiments! The RM@Schools European Conference is the project's flagship annual event, bringing together students, educators, and raw materials specialists from across Europe to boost raw materials education in schools. Euromines is proud to support this event!

The RM@Schools + RM@Schools-ESEE consortium comprises 30 Scientific Organization from 20 European Countries with complementary expertise in the field of Raw Matters and education. The consortium will activate cooperative processes between the three sides of the knowledge triangle: research, education, and business.

The conference is composed by two parts:

- 1) one morning session where students from High schools present directly what they have developed/done in the framework of the project
- 2) three afternoon sessions where the experts from the RM@Schools 4.0 and RM@Schools-ESEE consortium will give webinars to schools

Morning session 2nd of December 2021 – <u>full programme is available here</u>

- 9:50 -10:00 Virtual Room Opening
- 10:00-10:15 Welcome and short Overview by Didier Zimmermann (Education & Innovation Director of EIT RawMaterials) & Armida Torreggiani (Project Coordinator -CNR)
- 10:15-12.15 Students' Presentation guided by Marco Castellazzi (RAI-TV)

Join us for the event and REGISTER!





Webinars, workshops and online games

Full programme of the afternoon sessions is available here.

1 December 2021

- 15:00 15:30 Circular economy: creating a world without waste (interactive quiz), VITO, Belgium
- ⇒ 15:00 15:30 RockCheck you rock the rocks, GeoZS, Slovenia
- ⇒ 15:30 16:30 Mineral resources, sustainability and history in Congo, SGU, Sweden
- 15:40 16:20 An Overview of Silicon Photovoltaic Panels from basic theory of functioning to their end of life, University of Milano Bicocca, Italy
- 16:30 17:00 Polymers in everyday life-Curriculum for effective recycling, University of Banja Luka, Bosnia & Herzegovina
- ⇒ 16:40 17:30 Digital EcoCEO (game), VITO, Belgium
- ⇒ 17:00 17:40 Electronic waste or raw material?, University of Miskolc, Hungary
- ⇒ 17:40 18:00 Choose your own adventure (with game), LPRC, Spain (ENGIE)
- ⇒ 17:40 18:20 Great extinction events, University of Miskolc, Hungary (ENGIE)

2 December 2021

- ⇒ 15:00 16:00 Mineral resources, sustainability and history in Congo, SGU, Sweden
- ⇒ 15:15 16:00 WEEE jungle: the (electronic) urban mining, ERION, Italy
- ⇒ 16:00 16:30 How can we mine using plants?, TalTech, Estonia
- ⇒ 16:00 16:45 Shape our future on an interactive poster, MyClimate, Switzerland
- ⇒ 16:00 17:00 Mixed Reality in Teaching for teachers, RWTH, Germany
- ⇒ 16:30 17:00 Introduction to Sustainability, MUL, Austria
- ⇒ 16:50 17:50 Repository of ideas: A few words about the circular economy, AGH, Poland
- ⇒ 17:00 18:00 RAWsiko Materials around us (game), CNR Bologna, Italy
- 18:00 19:00 Circular economy and electric car batteries, Universidad Politecnica de Madrid, Spain

3 December 2021

- ⇒ 15:00 15:30 Historical mining adventure through Europe, NOVA, Portugal
- ⇒ 15:00 15:30 A word without waste? The challenge of circular economy, CNR- Bologna, Italy
- ⇒ 15:00 16:30 How project management can be introduced in schools? for teachers, IFAM, Germany
- ⇒ 15:30 16:10 SORT-IN-LIEGE, Why robots sort better than humans, University of Liege, Belgium
- ⇒ 15:30 16:15- Who wants to be an RM-ambassador (game), NTUA, Greece
- ⇒ 16:15 17:15 Sustainable crosswords (with interactive quiz), CNR –Palermo, Italy
- 16:15 16:45 Energy futures: the past, present, and future of battery technology, Trinity College Dublin, Ireland
- ⇒ 16:45 17:30 Let's know the geological processes of the Earth University of Miskolc, Hungary (ENGIE)
- ⇒ 17:15 -18:15 RAWsiko Materials around us (game), CNR- Bologna, Italy

Broadcasted live on the official <u>**RM@School YouTube channel**</u>, join us! and watch the <u>Young Ambassadors in action</u>!





Cooperating with EIT Raw Materials Academy

Euromines is liaising with the EIT Raw Materials Academy, which encompasses all the educational activities of the EIT Raw Materials. The Academy exists to foster understanding of the importance and relevance of mineral raw materials in society as a whole, to provide training for stakeholders, current and future, concerning technical standards of the raw materials industry and cultivate innovation and entrepreneurial skills. The EIT Raw Materials Academy involves a range of programs and activities, from innovative educational projects to MA and PhD education, working to connect academia, industry and research organisations.



RM@Schools Project

RM@School 4.0 is an innovative program to make science education and careers in raw materials attractive for younger audiences

The Raw Matters Ambassadors at Schools (RM@Schools) consortium wants to elaborate a strategic planning of dissemination capacity and methodology to improve the image of science & technology in schools for students aged 10-19, explaining the value of raw materials while promoting new professional careers in this sector. The best practice examples are used for two educational approaches, one targeting school students in the age of 10 to 13 years, the other one for 14-19 year old students. An active learning approach is proposed to schools by involving students in experiments with RM-related hands-on educational kits. 14-19 year old students are also involved in the dissemination of science by using both their native and the English language to became RM Ambassadors themselves (peer to peer education).





The Consortium started in 2016 with 6 partners from Italy, Netherlands, Belgium, Germany, Spain, and Hungary, and became 8 in 2017: one more from Germany and another from Austria. Since 2017 the project runs under the umbrella of the Raw Materials Academy.

In 2018 RM@Schools 3.0 became the Flagship project in the Wider Society Learning segment of the EIT Raw Materials and the Consortium welcomed more partners from Italy, Germany, France, Portugal, Estonia, Sweden, Slovenia and Finland. Moreover, RM@Schools started also in some Eastern European countries: Poland, Greece, Slovakia, Croatia, Bosnia-Herzegovina, and Switzerland and 9 more partners from RM@Schools-ESEE contributed to widen the consortium.

In 2021 Euromines is one of the new consortium partners in this project. RM@School 4.0 is an innovative program to make science education and careers in raw materials attractive for younger audiences. An active learning approach is proposed to the schools by RM (Raw Materials) ambassadors (experts in some RM-related issues and trained teachers) by involving students in experiments with RM- related hands-on educational kits, in excursions in industries, and in science dissemination activities. The students are asked to become Young RM Ambassadors themselves (science communicators) by creating dissemination products focused on some issues related to RM and /or collaborating with experts in supporting public events.

Local and International Competitions for awarding the best products developed by students, public events as well as an annual European Conference with delegates from European schools (students and teachers) are annually organized despite the Covid-19 crisis. These events represent a great opportunity for exchanging ideas and experiences in an atmosphere of inclusion and collaboration. In addition, teachers are trained to become RM Ambassadors themselves in the future at school and digital tools are developed. All the produced materials are open and accessible online to everyone on the Virtual Centre, an online platform devoted to the project, as well as the best communication materials realised by pupils are uploaded on the website to be shared with the wider public.







■ Virtual Centre

Course categories

- ▶ Properties & Applications of RM (4)
- Exploration & Mining (14)
- ▶ Recycling (17)
- ▷ Circular economy (6)
- ▶ Substitution (9)
- ▶ INFO 4 Partners (3)

Available courses

EduRAW



RM@Schools Ambassador: Barbora Ščerbáková

FIND the elements – Treasure Hunt 2.0



RM@Schools Ambassador: Simona Binetti RM@Schools Ambassador: Cinzia Cristiani RM@Schools Ambassador: Lorenzo Forini RM@Schools Ambassador: Alessia Le Donne RM@Schools Ambassador: Raffaella Soave

Glass Raw Materials



RM@Schools Ambassador: Inês Coutinho RM@Schools Ambassador: Andreia Ruivo RM@Schools Ambassador: Márcia Vilarigues

Who wants to be a RM Ambassador?



RM@Schools Virtual

Centre

RM@Schools has developed specific educational paths (called 'the learning pathways') for schools on the innovation themes listed on the European Institute of Innovation and Technology (EIT) **RawMaterials** (Exploration & Mining, Recycling, Substitution, and Circular Economy) which are intended to lead the students through a range of teaching methods and ends with the creation of a student-created piece of work that lets the students interact with the wider community.

A core element of the RM@Schools approach is to empower students to communicate with peers and wider society about critical concepts related to raw materials and their use. RM@Schools designed these learning pathways to lead the students toward becoming Young RM Ambassadors (science communicators) and getting more involved in the programme by creating dissemination products focused on issues related to RM (i.e. videos, cards, comics, etc.), developing lab experiments for peers or serious games, or participating in public science dissemination events with RM Ambassadors.

RM@Schools Virtual Centre - propose an active learning by involving 10 - 19 year old students in experiments on raw materials. Learning pathways supplied with detailed explanations and toolkits to perform hands-on experiments are available in the virtual centre.





RM@Schools Partnership

- Italian National Research Council (Lead Partner), Italy
- ⇒ Aalto University, Finland
- → Università di Bologna, Italy
- ⇒ Bay Zoltan Nonprofit Ltd. for Applied Research, Hungary
- ➡ ERION, Italy
- ⇒ European Association of Mining Industries, Metal Ores & Industrial Minerals (EUROMINES)
- ⇒ Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung e.V. (Fraunhofer), Germany
- ⇒ Geological Survey of Slovenia (GeoZS), Slovenia
- ⇒ Geological Survey of Sweden (SGU), Sweden
- ⇒ Royal Institute of Technology, Sweden
- ⇒ Montanuniversität Leoben, Austria
- ⇒ The Polytechnic University of Milan, Italy
- ⇒ Rheinisch-Westfaelische Technische Hochschule Aachen (RWTH Aachen), Germany
- ⇒ Riga Technical University, Latvia
- Stichting Wetsus European Centre of Excellence for Sustainable Water Technology (Wetsus), Netherlands
- ➡ Tallinn University of Technology, Estonia
- Clausthal University of Technology, Germany
- Technical University of Madrid, Spain
- New University of Lisbon

 Faculty of Sciences and
 Technology (FCT NOVA),
 Portugal
- University of Milano-Bicocca, Italy
- Université de Liège,
 Belgium
- University of Banja Luka, Bosnia and Herzegovina
- Flemish Institute for Technological Research, Belgium







RM@Schools Toolkits – Examples

RAWsiko - Materials around us

"RAWsiko – Materials Around Us" (RAWsiko – Digital Version) is an educational digital game about the distribution of critical raw materials in the world, their use in the modern technologies and why access to them is pivotal. The players will experience the complexity of the raw material supply that occurs behind some everyday life devices such as smartphones, flat screens and lamps, but also behind the plants for the transition to the renewable energies such as solar cells, wind turbines and electric cars. Students can play both together in organized class-wide game sessions, or on their own free time against friends and family or other people accessing the game remotely. RAWsiko DV is offered in different versions: Online Version, to maximize the compatibility with most of desktop

operating systems and web browsers, and Dedicated Clients-based Versions, for maximum performance and stability.

<u>Play the game</u>.



Learning Goals

- ⇒ Learn about circular economy and critical raw materials.
- ⇒ Understand the distribution of the critical raw materials in the world.
- ⇒ Know the main uses and applications of the critical raw materials.
- Be aware of the importance to have access to the critical raw materials
- ⇒ for the production of the everyday-life devices.

At the end of the activity the student will be able to know the main applications of critical raw materials in the technological field and for the creation of everyday objects. They will also understand the economic importance of critical RM for the technology, geopolitical issues, and why critical RM are incredibly sought after and can be the cause for economic and military conflicts.





RockCheck

Toolkit covers learning about basic geological concepts, minerals, rocks and their connection with raw materials. A good knowledge of the geological basics like minerals and rocks is the basis for all further knowledge about the role of raw materials in circular economy. Toolkit is designed so that students use free RockCheck app for activities. With the app, students can identify different types of rocks, learn about their formation and use, and link this to learning about raw materials. Toolkit consists of two modules

RockCheck application rocks the world

RockCheck app: The educational tool for the identification of rocks.

(interactive worksheet and crossword puzzle) that present the topic and summarize the mineral-rockraw material connection.

RockCheck app is available here.

Learning Goals

- \Rightarrow Students connects mineral to rocks.
- ⇒ Students identify and classify different rocks.
- ⇒ Students determine processes needed for rock formation.
- ⇒ Students evaluate importance of rocks as raw materials for our everyday life.



At the end of the activity the student will be able to explain difference between minerals and rocks and get to know basic characteristic for recognizing rocks. Students will use application RockCheck for identification of rocks and relate rocks to different raw materials.





EcoCEO - entrepreneurship for a circular economy!

ecoCEO[™] engages students to participate in the global challenge of creating a circular economy that manages our finite resources in a sustainable way. The shift from the current linear economy to a circular economy requires a drastic change in how we produce and consume. By learning about circular economy strategies and business models, students develop the knowledge, skills and mindset to engage in shaping a more sustainable society.

ecoCEO[™] offers fun and engaging educational materials for the classroom, to help students build insights in the circular economy and sustainable entrepreneurship! The activities encourage independent research, experimentation, collaboration, entrepreneurship and creativity. The topics are cross-disciplinary, making them well-suited for project work related to economics, geography, science and ethics.

Available from website in many languages, download centre.



During the game, players run a company producing electronic goods, such as microchips, smartphones and e-bikes. They need to make decisions on which resource management, production processes and revenue models to apply. By combining different investments, they can improve the performance and profitability of their company. However, unforeseen events can complicate their plans!

The game demonstrates the impact of linear and circular business strategies on the performance of a company and its resilience against external events such as policy measures, market disruptions and availability of resources. It teaches students about the relevance and the opportunities of circular strategies such as recycling, take-back systems, reuse and repair activities and product-service systems.







Augmented reality meets RM

The toolkit Augmented reality meets RM provides an interactive introductory lesson about the topic of mining and raw materials. The students learn about mineral raw materials and their importance in our everyday lives and see how mining is done today and in the future. Just like the modern mining activity, our lesson has a digital component and uses modern technology – namely augmented reality. The students only need a smartphone in order to see a mining truck and can visit a modern mine right in the classroom. During the course of the lesson the students will get the chance to reflect on their own impression of mining and what they imagine the mining activities entail. In addition, by using the example of the smartphone, the students get a direct link to how mining is related to the tools we use in our everyday lives and the effects it has on our world.

Available from website in many languages, Mixed Reality Handbooks for Mining Education website.

Learning Goals

- ⇒ Become more familiar with the topic of raw materials
- ⇒ Learn about mining activities
- ⇒ Learn about the importance of mineral raw materials in our lives



The array of possible industrial mine environment examples that students can be immersed into becomes endless and thus the industry will receive graduates that are familiarized in-depth with a holistic view on the industrial context. Students will enter the job market skilled as digital natives and highly influence the way the industry will work and develop in this way in the future. Mixed Reality is certainly a most promising way to enable users to make the most of their learning experience and thus leverage the improvement of operational efficiencies and innovation.

Technically, the MiReBooks-assisted lectures will include Smartphones with a special App that allows the students to trigger additional information from augmented illustrations within the MiReBooks textbooks. In addition, virtual reality goggles allow them to immerse into a virtual mining environment/3D-filmed sequence of a real mine process.







Competition "The wealth of the Earth" and RM@School Project

Partners: Masaryk University, Euromines, RM@Schools

The two-day workshop for 70 students of the Czech National Competition "The wealth of the Earth" took place in October in Northern Bohemia. It is a competition in which teams of high school students prepare a professional-scientific study in the field of economic geology. The result of the competition is the elaboration of a mining project business plan, considering the social and environmental aspects of mining. Veronika Sochorová from Euromines presented some of the RM@Schools toolkits and the current best practice cases of sustainable mining in Europe, which is shared with the students for their work on the competition project.



At the introductory workshop, students were introduced to the rules of the competition, assignments,





and time schedule. They also have received a series of professional lectures in the field of geology (mineralogy, petrology, deposit geology, mathematics, geo-environmental risks), economics, finance, and social aspects of solving investment projects in the target area.



The student had a chance to participate in a field trip to a copper mine and a rehabilitated mining area. The social and economic impact of mining as well as environmental issues were discussed with students during the field trip.



The content of the competition is students' work in groups on specific tasks, active solution of issues under the guidance of expert lecturers. Students attend educational workshops, where they receive professional materials for the elaboration of a search and the solution of a given task. All involved students have a chance to join an excursion to the mining operation, where they get acquainted with





the methods and modern mining technologies and use this opportunity to discuss with experts. Subsequently, students will use practical examples in the in their own project execution.



The final projects are then defended before an expert committee, which evaluates not only the project correctness, but also the importance of inter-linking disciplines, orientation in the disciplines, argumentation, and a comprehensive understanding of the issue. In this competition students try out a form of a university study and gain valuable experience applicable immediately after entering the university environment.

Science Night



The Science Night provided another great opportunity to test our 3DBriefcase. Students, kids and their parents provided valuable feedback. Most of the visitors were surprised by the fact that minerals and metals are part of our everyday life. In total more than 800 visitors joined the Science Night.











Workshops for teachers

More than 45 teachers joined hybrid Workshop for teachers co-organised by Euromines and Masaryk University on 6th November 2021. Series of tools was presented with very positive feedback from high school teachers that joined the workshops.







Presentations in Schools

In October and September, a number of presentations were organized in schools in Brno, Czech Republic. More than 80 kids aged 10 – 12 joined the presentations.



Are you interested to learn more about **RM@School project?**

Please contact: Veronika Sochorová sochorova@euromines.be.



We appreciate your feedback, please send your comments and suggestions!

Supported by



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