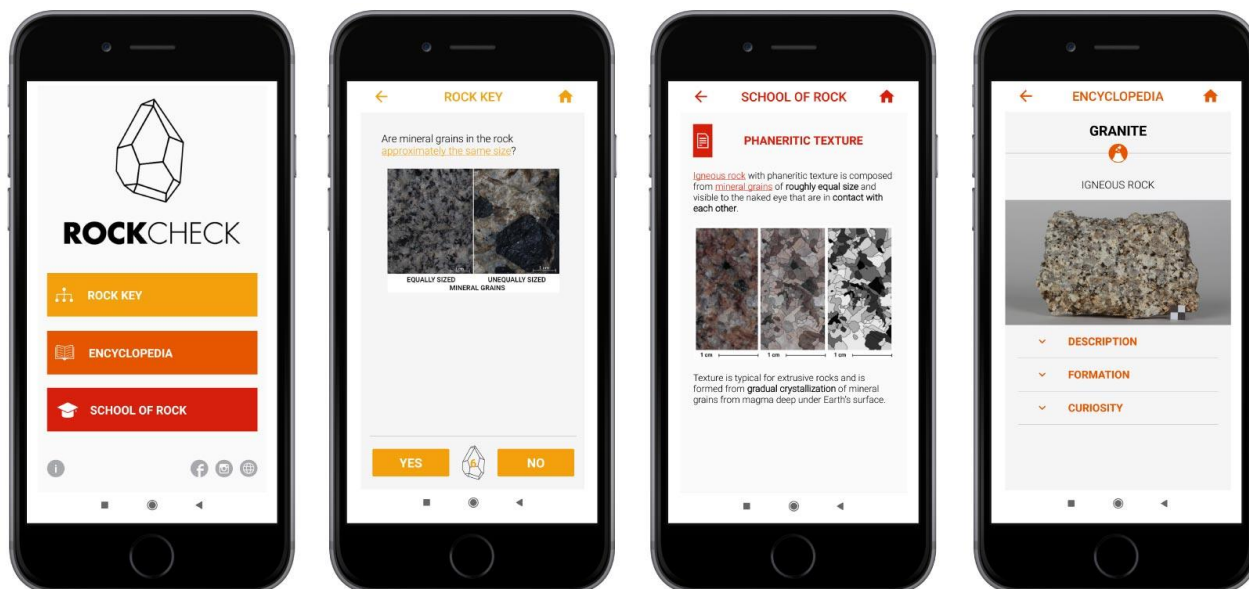


Teachers' Card

RockCheck



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General Introduction

The RockCheck toolkit is an innovative learning tool that uses the free Android app RockCheck to teach about geology with connection to raw materials. The RockCheck application is an innovative mobile learning application for more interesting and effective geology lessons and helps to reach younger digital native generations. It helps users to identify different types of rocks, learn about their formation and use and link this to learning about raw materials. Since the application uses the approach of experimental observational based learning and is equipped with graphical learning aids, no prior knowledge is required, and users can determine names of typical rocks only by following the app's instructions.

Additional printed materials have been developed to support teachers in using the application in their classrooms. The workshop uses an innovative approach based on observing and testing the properties of minerals and rocks and covers a variety of challenges that are addressed through different teaching methods. Finally, it combines the possibility of interactive learning both in the classroom and in nature. The RockCheck toolkit is so adapted to the needs of teachers and students and contributes to the quality of teaching geological content in the formal school system.

Key words: *minerals, rocks, rock identification, rock cycle, use of rocks as raw material, exploration, mining*

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Extended background information

Almost every kid and many adults are fascinated by rocks. They collect them from trips and keep them at home without knowing anything about them and the stories they tell us. Overall low awareness about the importance and use of rocks in our economy and culture is also neglected in most of the formal educational school systems throughout the world. A good knowledge of the geological basics is the basis for all further knowledge about the circular economy and sustainable development. Pupils and students in primary and secondary schools learn about rocks several times, but due to the overcrowding of curricula and content fragmentation, they usually do not gain sufficient understanding of the topic.

Rocks occur naturally and are a coherent aggregate of one or more minerals. Rocks are part of the outer solid layer of the earth, the crust. They are categorized according to the minerals they contain, their chemical composition and the way they are formed. Rocks are usually divided into three main groups according to the processes that led to their formation. These groups are igneous rocks, sedimentary rocks and metamorphic rocks. The use of rocks has had an enormous influence on the cultural and technological development of mankind. They are used for many purposes and many of them can be seen in our daily lives. First, rocks are very important because they are one of the best sources of fuel and energy. For example, we extract coal, oil and even natural gas from rocks. Secondly, minerals are extracted from rocks. Many important minerals like gold and diamonds are mined directly from rock. Rocks also serve as a source of water supply. Many springs and wells around the world draw their sources from rocks. They are also widely used for infrastructure/building (cement, building and roofing materials) and as decorations/ornaments (ornaments, statues, facades, stairs). Furthermore, rocks are among the beauties of our nature and can therefore serve as a tourist attraction. Many rocks have wonderful shapes and components. That is why rocks are very important for our society and so, it is important that we learn to recognize them and to know their meaning in our lives.

A teacher can find all additional background information for the toolkit in the Teachers' Resources in sections:

- Section 3: Using the toolkits – 3. Exploration & Mining;
- Appendix A: Exploration and Mining and
- Appendix B: The Rock Cycle – Igneous, Metamorphic and Sedimentary Rocks.

Teacher can as well find more information about geological concepts in the RockCheck application, under the chapter School of Rock.






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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.
Multilingual 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 oral and written form.
S7. Ability to use technical language accordingly to the field of work.
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.
S3. Ability to gain process and assimilate new knowledge, skills and qualification required for career goals.
Entrepreneurship competence
S2. Creativity/innovation
S4. Independence, Motivation and Determination

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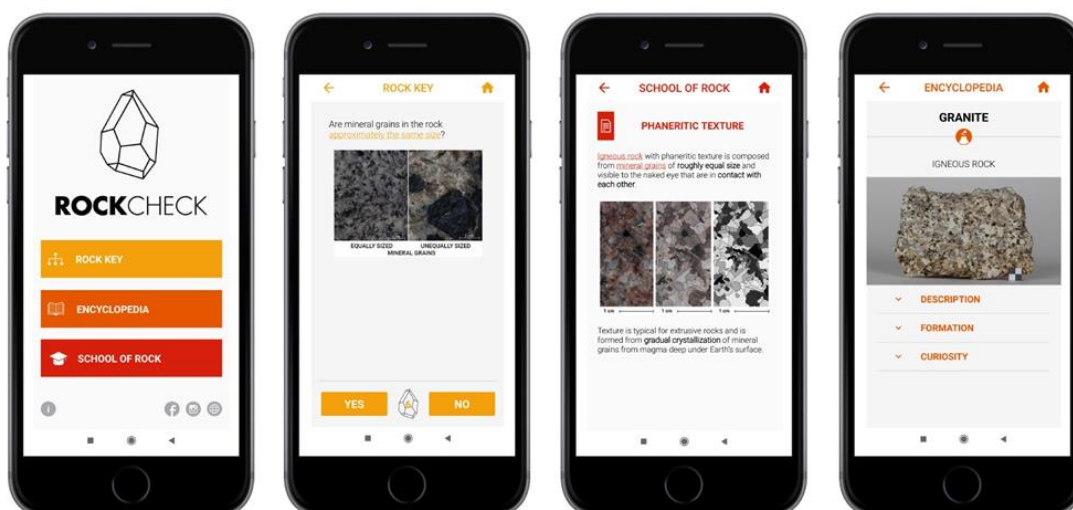
United Nations' Sustainable Development Goals

		Enable access to basic services		Equal access to global expertise
		Safe medical devices		Sustainable urbanization
		Access to education		 Responsible consumption and production
		Less hardship, more opportunities		Strengthen resilience, reduce disaster impact
		Safe and affordable water		Reduce marine pollution
		Energy — the golden thread		Sustainable use of terrestrial ecosystems
		Safety of workers and economic growth		Promote peaceful and inclusive societies
		Resilient infrastructure and sustainable industrialization		Better access to technology and innovation

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Contents – Theoretical principles

The application consists of three main chapters whose contents are interrelated. The main chapter presents the **Rock key** where through a simple decision key, by answering the question with yes or no, the user identifies the name of the individual rock. The application enables independent research by observing and experimenting with using simple tools. The other two chapters, **Encyclopaedia** and **School of rock**, help the user to enable further learning about rocks as well as help to understand geological concepts and procedures. The contents of the chapters are cautiously connected with the links. The last two chapters are a crucial support for planning and teaching the geological contents and present also the good base for preparing active learning challenges. RockCheck application is freely available in the Google Play Store and works on Android devices. Link: <https://play.google.com/store/apps/details?id=si.digied.rockcheck&hl=sl&gl=US>



Appendix 1 - Properties of minerals and rocks

Appendix 2 - Structure and Background Info of RockCheck application

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Activity

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. The 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 uses, and link this to learning about raw materials. The toolkit consists of two modules (Interactive worksheet and Link rocks to raw materials) that introduce the topic and summarize the connection between minerals, rocks, and raw materials.

Modules associated to this activity:

Module 1 – Interactive worksheet Meet RockCheck

Module 2 – Link rocks to raw materials

Appendix 3 - Printable file of the Interactive Worksheet Meet RockCheck

Appendix 4 - Ppt presentation of RockCheck toolkit

Learning Pathway

Step 1 - 10 minutes: Introductory motivation. The set goal of assessing the importance of rocks as a source of raw materials in our daily life and developing the ability to connect rocks with different raw materials is challenging. The teacher talks to the students about where they encounter rocks or raw materials extracted from rocks in their daily lives. He mentions rocks as a source of energy, mineral resources, water supply, infrastructure/buildings, decoration and tourist attractions as presented in the extended background information.

Step 2 - 10 minutes: Teachers give a short introduction and work instructions with a prepared PowerPoint presentation.

Step 3 – 40 minutes: Students are divided into groups (preferably the number of students in a group is 3-4). Each group do a Module 1. At the end teacher summarizes with students what they have learned and links this to real examples and environments in their country.

Step 4 – 30 minutes: Students solve the Module 2. At the end teacher discussed mineral resources/raw materials and connection between minerals, rocks and raw materials with them.

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Step 5 – 45 minutes: Students go for a walk in the school or in the immediate neighbourhood/town and try to find different object made from rocks (e.g.: stairs, statues, pavers, windowsills...). They can try to determine these rocks with the RockCheck app.

Evaluation



Ask students to prepare a short presentation/report about rocks and minerals in or around their house. They can take photos, determine rocks with RockCheck app and tell something interesting about this rock.

Appendix 5 - Check your knowledge: Questions & Answers

Description of Student's Cards

Student's Card 1 - Interactive worksheet Meet RockCheck

Student's Card 2 - Link rocks to raw materials

Appendix 6 - Check your knowledge

Sources

- **web sites**
 - <https://geology.com/>
- **articles**
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 - Gillespie, M R, and Styles, M T., (1999). BGS Rock Classification Scheme - Volume 1: Classification of igneous rocks. (99 str.). British Geological Survey Research Report, (2nd edition)
 - Robertson, S., (1999). BGS Rock Classification Scheme - Volume 2: Classification of metamorphic rocks. (99 str), British Geological Survey Research Report.
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