



Appendix 2 - Structure and Background Info on RockCheck application

The RockCheck application consists of Rock key, Encyclopedia and School of rock.



Figure 1: Main menu of the application RockCheck.









Rock key

In the Rock key, you determine the name of a selected rock by answering the questions YES /NO. As you answer the questions, you can help yourself with orange links that provide additional explanations of geological concepts and procedures. Pictures below the questions help you decide on the correct answer. The mineral symbol shows you how many rocks you can choose between.



Figure 2: Screen from the rock key and screen with a name of a rock.

See below the schematic presentation of questions and the process of determining rocks for every group of rocks.







Figure 3: Schematic presentation of questions for igneous rocks.



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Figure 4: Schematic presentation of questions for metamorphic rocks.





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Figure 5: Schematic presentation of questions for sedimentary rocks.





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Encyclopedia

In the encyclopedia you can learn more about rocks in general, what they look like, how they are formed, and what they are used for. The description of rocks can also be found at the end of the Rock key. Each type of rock has an indication which classifies one of the three basic rock groups: sedimentary rocks, metamorphic rocks, igneous rocks.





The presentation of rocks is divided into three parts: description, formation and curiosity. In the description part student learns to which specific group the rock belongs and what its main features are - structure, texture, size and color of grains and name of minerals that make up the rock. The formation part explains how the rock was formed. At the end, related rocks that have similar formation are listed. Interesting features and attractions of the rock, as well as its use as a raw material, can be found in the curiosity part.

Example of text for Pegmatite:

Description:

Pegmatite is an **igneous rock**, which has crystallized into **mineral grains with individual minerals larger than 2 cm**.

The main minerals that compose this rock are quartz, alkali feldspar, plagioclase and mica. Pegmatite can be of different colours. Some pegmatites have large tourmalines of different colours (black, red, blue, green), as well as shiny, white and brown mica muscovite.









Formation:

Pegmatite is an **intrusive igneous rock**. The composition of the magma is like granitic magma; therefore, it contains a large amount of **silicon and oxygen**; however, the rocks differ in cooling rate. Pegmatite **magma cools in cracks, veins or lenticular spaces within other rocks**. Mineral grains grow very quickly due to rapid pressure changes.

Related rocks: diorite, gabbro, peridotite, granite, aplite

Curiosities:

Pegmatite can contain rare minerals (tin, tungsten) or gemstones (tourmaline, corundum, aquamarine), which are sometimes economically valuable and extracted from the rock.

School of rock

The School of Rock describes geological terms and procedures that are important in identifying rocks. They can also be accessed by clicking on the orange links in the Rock key. We have already listed descriptions from the School of rock in the Appendix 1: Properties of minerals and rocks.



Figure 7: Screens from the School of rock.









Required material for using the RockCheck toolkit

• RockCheck application

The RockCheck application is available for free from the Google Play Store. It only works on Android devices. You can download it on your phone or tablet. Link: https://play.google.com/store/apps/details?id=si.digied.rockcheck

LINK. <u>https://piay.google.com/store/apps/detailsrid=si.digied.rc</u>

• Collection of rocks

Rocks that students can identify with the application are:

- Metamorphic rocks: Phyllite, Mica schist, Gneiss, Marble, Eclogite, Quartzite, Amphibolite, Serpentinite.
- Magmatic rocks: Granite, Diorite, Gabbro, Peridotite, Diabase, Pegmatite, Aplite, Rhyolite, Andesite, Basalt, Obsidian, Pumice, Lava.
- Sedimentary rocks: Claystone, Siltstone, Sandstone, Conglomerate, Breccia, Marlstone, Limestone, Tufa, Dolomite, Chert.

You can use only some of these rocks, for example, rocks that are found near your home or rocks that are available to you in the school collection.

You can also create your own rock collection. Find the rocks in nature and shape them to a suitable size. It should be somewhere between $8 \times 10 \times 5$ cm and $5 \times 7 \times 3$ cm. Try to determine them with the RockCheck application. For each rock in your collection, you will need to add a label with a name, location, and serial number, which you should also write on the rock. You can also buy rocks from a website, for example: <u>https://www.geologysuperstore.com/</u>. The price is about $1 \notin$ for one rock.

When choosing rocks for recognition with the app, make sure that rocks have the characteristics mentioned in the questions of the RockCheck. For example, make sure that gneiss has clearly visible layers or that granite also contains some pink feldspars (mineral grains). The application is used to identify typical rocks, so it is important that the rocks have the most expressed typical properties.

• Geological investigation kit

The geological investigation kit contains a magnifying glass, metal nail, glass slide, and dilute 10 % hydrochloric acid or alcohol vinegar. In the application in School of rock, there is a description and video of a procedure for each tool and substitution that you can find at home.

Hardness determination with a glass slide

Scrape with freshly broken piece of rock on the glass slide or other glass surface. After that you watch out for scratch on a glass.

Mineral hardness is a property where we describe the resistance of a mineral against the action of a mechanical force. Rocks are composed of minerals, and each one of them has its hardness. If hardness of mineral is known, type of mineral present in the rock can be defined on basis of scratching. Scratching of glass slide or metal (geologists use a hammer for the test on the field) is the most common, because it is slightly less hard than quartz (SiO₂), which is one of the most common minerals in rocks. Quartz is presented if the rock scratches the glass slide. Attention: Be careful not to break the glass or cut yourself with it.









Solubility using HCl

Drop 10% dilute hydrochloric acid (HCl) or alcohol vinegar on fresh rock surface. If bubbles and/or fizzing appears, there was a reaction.

To distinguish between calcite $(CaCO_3)$ and dolomite mineral $(CaMg(CO_3)_2)$, cold dilute 10 % hydrochloric acid (or alcohol vinegar) is used. The two minerals are present in different rocks, and a chemical reaction helps you to distinguish between them. If you notice bubbles and swishing on the surface, the rock contains calcite mineral.

Attention: The acid irritates the skin, so that is why we advise that younger users ask for help of an adult or use alcohol vinegar. Do not carry acid in your pocket, because it can be heated, and reaction will appear on dolomite also.

Scraping with a metal nail

Gently scrape your rock with a metal tip (nail). You need to observe if you scraped any grains from the rock, however, be careful not to break it.

Grains that assemble clastic sedimentary rocks, such as sandstone, are from half a millimeter to two millimeters large. Siltstone and claystone are composed from grains which are not visible to the naked eye. Grains are bind together with matrix. You can scrape small grains from the rock, when scraping it with a metal tip (this can be a nail or some other metal object).

Attention: Scrape with moderate pressure. If you scrape the rock too strong, bigger pieces of rock may break that are not grains.



