



TEACHER GUIDE

ROCKS AND MINERALS GRADES 6-8

COMMON MISCONCEPTIONS

- **Rocks and minerals are the same thing.**
Rocks and minerals are not the same thing. Minerals make up rocks. Rocks are combinations of minerals. Minerals are naturally occurring solids that are made up of one or more compounds.
- **Rocks cannot melt.**
Magma is liquid and rock is solid. Rock is solid because it has cooled and is no longer in the liquid form. When heated again, the rock will liquefy. This is what allows glass to be formed when sand is heated up to high temperatures.
- **All rocks have the same properties.**
All rocks do not have the same properties. They vary in color, luster, hardness, shape, and size. Igneous, sedimentary, and metamorphic rocks share similar properties, but all rocks have properties and while they may share some, no two rocks are exactly the same.

THE ROCK CYCLE

Rocks are formed by and move through the rock cycle. As liquid magma deep within Earth moves closer to the surface, it cools and hardens, forming igneous rock. Over thousands of years, igneous rock breaks apart and is moved to other locations by weathering, erosion, and other geologic processes. That rock forms layers of sediment that lay on top of one another and compress. As those layers compress, sediment gets buried deep in Earth. Because sedimentary rock is closer to the core of Earth, heat and pressure change it into metamorphic rock. Metamorphic rock can be pushed to the surface, or it can be pushed deeper into Earth, where it melts to form magma. When magma moves closer to Earth's crust, the rock cycle begins again.

ROCKS AND MINERALS

Hot water dissolves naturally occurring minerals. When that water evaporates, it leaves behind all dissolved particles within it. Those minerals crystallize as they cool and, depending on how long it takes for them to crystallize, they will form large or small crystals. The three different rock types are formed by different processes, but minerals will be seen in each phase of the rock cycle because matter cannot be created nor destroyed—matter can only change forms. For that reason, the rock cycle is a process of heating and cooling naturally occurring solid materials to form different substances.

SEDIMENTARY STRATA

Over time, igneous rock will break down and move to different areas through natural processes like erosion. That sediment will become compressed over time in layers. Those layers can tell scientists important information about the formation of Earth and the organisms that lived during those periods of time. Sedimentary rock will show stratifications, called *strata*, that are visible in many types of sedimentary rock. When layers of sedimentary rock become compressed over long periods of time by tectonic plate movement, they become metamorphic rock such as marble, granite, and quartz. That metamorphic rock can liquefy under intense pressure and heat, become magma, and begin the rock cycle again.

TEACHER TIPS

Encourage students to think about how the rock cycle connects to their lives. Students usually enjoy observing different types of rocks and their properties but often struggle with making the connection to their everyday lives. The Generation Genius video describes this connection, but encourage students to think about it as they move through the lesson.

ABOUT THIS LESSON

This lesson was created by the National Science Teaching Association (NSTA) to pair with the Generation Genius video and support NGSS.

They have requested we provide the following background with this lesson:

The Next Generation Science Standards (NGSS) are the national standards on how students learn science, and they are based on contemporary research presented in *A Framework for K–12 Science Education (the Framework)*. The shift in science teaching and learning required by the Framework is summarized in this infographic: [A New Vision for Science Education](#).

At the start of each Generation Genius lesson, students are presented with a phenomenon, then they try to explain it. Students will notice they have gaps in their knowledge and ask questions, which motivates them to build ownership of science ideas they need in order to explain how or why the phenomenon occurred. The way students build ownership of science and engineering ideas is through active engagement in the science and engineering practices (SEPs). This process of sensemaking, or doing science to figure out how the world works, is one of the major shifts the *Framework* encourages.

To engage in the SEPs, students should be part of a learning community that allows them to share their ideas, evaluate competing ideas, give and receive critiques, and reach consensus. Students can start by sharing ideas with a partner, then with a small group, and finally, with the whole class. This strategy creates opportunities for all students to be heard, build confidence, and have something to contribute to whole-class discussions. Each Generation Genius lesson provides conversational supports to facilitate such productive student discussions to contribute to sensemaking.

Excited to continue your shift toward the new vision for science education? Check out the [Generation Genius Teacher Guide](#) page on the NSTA website for resources and strategies to engage every student in your classroom in **doing** science.

