The Rock Cycle

Suggested Age / Grade Level	Concepts Covered
Grades 3 - 8	● Sedimentary, metamorphic and igneous rocks ● Geologic formation of rocks over time based on weather and erosion

Overview

Rocks are everywhere on our planet, from the Earth's outer crust layer to the Himalayan mountains or Mount Everest and giant volcanoes we see around the world. This activity allows students to visually see the formation of rocks through the rock cycle using chocolate. They will learn about sedimentary, metamorphic and igneous rocks and the geologic processes of weathering, erosion, heat and pressure that create these rocks. They will also learn about the difference between intrusive and extrusive rocks.

Learning goals

- The difference between between sedimentary, metamorphic and igneous rocks and the processes that create each of them
- The geologic processes of compaction, cementation, weathering, erosion, melting, heat and pressure
- The difference between intrusive and extrusive igneous rocks
- How sedimentary, metamorphic and igneous rocks are connected in the rock cycle

Key Terms

Sedimentary - Layered rocks that form when sediments, or small pieces of older rocks undergo high pressure

Metamorphic - Rocks that form and change shape deep within the Earth when more heat and pressure is applied to sediments

Igneous - Rocks that form when sediments or older rocks completely melt very deep within the Earth where the heat and pressure is extremely high. As these molten rocks cool, they turn into igneous rocks

Intrusive Rocks - A type of igneous rock. When magma, a type of molten rock, cools - it is called an intrusive rock because it is formed within the Earth

Extrusive Rocks - A type of igneous rock. When lava, a type of molten rock, cools - it is called an extrusive rock because it is formed above the Earth's surface
Weathering - The geological process of large rocks slowly being broken down into sediments, or smaller pieces over time, due to rivers/glaciers/wind
Erosion - The geological process of sediments being moved to a new location, usually the bottom of lakes or rivers, due to natural forces like water/glaciers/wind
Lithification - The geological process of sediments being compacted/cemented/pressured together over time creating sedimentary rock
Foliation - When pressure is applied in a certain direction, metamorphic rocks can either be foliated with a striped appearance, or they can be non-foliated, with a more messy appearance
Heat and Pressure - These are required to change rocks over time into new types of rock
Crystallization - This is the process that occurs when molten rock (such as magma or lava) cools into igneous rock over time

Activity Timeline

Activity	Time
Introduction to Rocks and their Variety - Volcanoes, Mountains, Crystals, Fossils and their notable characteristics	1 minute
Introduction to Sedimentary Rocks	1 minute
Activity - Creating Sedimentary Rocks with Chocolate	5 minutes
Discussion - Geological effects that create sedimentary rocks and their major characteristics, comparing that to their chocolate	2 - 3 minutes
Introduction to Metamorphic Rocks	1 minute
Activity - Creating Metamorphic Rocks with Chocolate	5 minutes
Discussion - Geological effects that create metamorphic rocks and their major characteristics, comparing that to their chocolate	2 - 3 minutes

Introduction to Igneous Rocks	1 minute
Activity - Creating Igneous Rocks	5 minutes
Discussion - Geological effects that create igneous rocks and their major characteristics, comparing that to their chocolate (including intrusive and extrusive rocks)	2 - 3 minutes
Conclusion - putting all of these together creates the rock cycle! Worksheet will help connect ideas from video	2 - 3 minutes

Materials Needed

- Large dark/milk and white chocolate blocks (Toblerone etc.)
- Aluminum foil
- Hot water and container to hold it
- Plastic knife or fork - simple scraping device
- Gummy bears (optional)

Additional Setup Requirements

The activity should be performed in the kitchen or a sanitary environment so they can eat their chocolate after!

Procedure - Activity

Sedimentary Rock (Heat and Pressure)

1. Scrape some chocolate shaving from both white and dark/milk chocolate blocks
2. Gather these scrapings or “sediment” in aluminum foil and push down on them
3. The joined together chocolate shavings are now sedimentary rock! The white and dark chocolate represent different layers of the sedimentary rock
4. Extra activity for fossil formation
    a. Gummy candy with animal shapes
    b. Layer some chocolate between the gummy candies and press down hard
    c. You can put aluminum foil on the chocolate and put heavy books

d. Under heat and pressure, the animals will be squished, turning into fossils and later on fuel we can use!

Metamorphic Rock

1. Place the sedimentary rocks, the chocolate shavings and blocks from the dark and white chocolate on aluminum foil or an aluminum cup holder if you have one
2. Float this on the hot water
3. The heat from the water transfers to the chocolate and you will see it melt
4. Remove the foil with the chocolate when the chocolate is really soft using the plastic knife (do not use your hands as the water is really hot!)
5. Let the chocolate cool - the half cooled and fully cooled chocolate is metamorphic rock!

Igneous Rock

1. Place sedimentary and metamorphic rock along with new blocks from the white and dark chocolate onto your aluminum foil
2. Float this on very hot water
3. As the heat transfers, all the chocolate should melt
4. Remove the chocolate and let it cool in the aluminum foil. Melted and cooled chocolate you see is igneous rock!
5. When your chocolate fully cools, it will become a block again and you can use your plastic knife to shave the chocolate again to make it into sediment and then sedimentary rock! The rock cycle continues!