



Grade 5 Teacher Resource- Beringia's Rocks Through Time

Curricular Outcome: Science 5 “Earth materials change as they move through the rock cycle and can be used as natural resources”

Core Concepts:

Rocks are constantly changing through the rock cycle over long periods of time

Heat, pressure, melting, cooling, weathering, and erosion cause materials to change from one rock type to another

The same earth material can be different types of rocks throughout the rock cycle

Rocks and minerals are natural resources that have been used by humans in many ways.

The geology of Beringia influenced the landscape, habits, and resources available to living things throughout the Ice Age.

Big Questions:

How do rocks change over time?

What forces cause Earth's material to move through the rock cycle?

Why are rocks considered natural resources?

How did Ice Age rocks support Beringian animals and people?

What models can we use to understand change that happens over millions of years?

Learning Outcomes:

Students will be able to:

Describe how Earth materials change through the rock cycles

Model the processes that create different types of rocks

Explain how heat, pressure, melting, and cooling cause rocks to transform over time

Compare the changes that occur during each stage of the rock cycle

Introduction:

Students will investigate how rocks change through the rock cycle via an experiment using Starburst candies as models. These models will connect these changes to ancient landscapes and resources of Beringia.

This fun video introduces the rock cycles: <https://www.youtube.com/watch?v=CeuYx-AbZdo>

This video is also super informative, but could also spoil the experiment that is to come: https://youtu.be/Vp_S3BDiR-I?si=-tJ6cQ1hCqhvFul1

Show students pictures of landscapes including rocky mountains, river valleys, or exposed cliffs. Ask them:

Have these rocks always looked the same?

Can a rock become a different type of rock?

How do you think the First People used rocks?

Main Activity:

Attached is a recording sheet where students can track changes throughout the experiment.

Experiment 1- Sedimentary Rocks

Materials:

For each group:

- 1 square of wax paper (optional, to keep workstation clean)
- 1 Square of aluminum foil
- 3 Starburst candies (different colours) (Starburst minis work even better!)

Students in groups will each receive 3 starbursts. More can be used to form a larger “rock” depending on the size of the group. Remind students that there is no eating during science labs, so they cannot eat the starbursts they are using for this.

Steps:

1. Unwrap the Starburst candies.
2. Set the foil down flat on the table and layer the wax paper on top.
3. Stack the three Starburst on top of each other.
4. Wrap the paper and foil tightly around the candies.
5. Ask students to change the shape of the three rocks (Starbursts) with pressure alone.

6. After applying pressure, the three “rocks” will be crushed together into a single “rock”. Compare this to how sedimentary rocks are formed. Pressure creates a new type of rock from smaller rocks or fragments, but the individual components are still visible in the new rock.

Following this experiment, engage in a class discussion:

What changed?

Can you still see the original colours?

What process does this represent?

Layers of sediment build up over long periods. Rivers and glaciers in Beringia carried sediment that eventually became sedimentary rock.

Experiment 2- Metamorphic Rock

Materials:

- Starburst rock from previous experiment
- Hair dryer
- Oven mitt (If necessary)
- Wax paper

Steps:

1. Set starburst “rock” onto the wax paper
2. Using Teacher/TA assistance, use the hairdryer to heat up the starburst rock.
3. The rock should now be much more malleable, and after it has cooled down sufficiently but is still warm, students can mold and reshape their rock.

Following this experiment, engage in a class discussion:

Ask students what changed about their rock. What observations do they have?

Why did the colours mix more?

Why was it easier to reshape?

What would provide this heat and pressure inside the Earth?

Deep underground, rocks beneath Beringia were squeezed and heated as Earth’s crust changed.

Experiment 3- Igneous Rock

Materials:

- 1 square of aluminum foil
- 1 square of wax paper
- Starburst rock from past experiment
- Microwave safe dish
- Toaster oven, oven, or microwave
- Oven mitts

OR

- Plastic Tupperware or glass bowl/container
- Pot
- Stove
- Wax Paper
- Tongs
- Starburst Rock from past experiment

Directions:

Option 1: Use a toaster oven, oven or microwave to heat the starbursts until they become liquid. **Ensure that a microwave safe dish is used.** Show students the liquid form it has taken, then allow the Starburst rock to rest until it has hardened once again. Only then may students handle the Starburst rock to feel the changes

Option 2: Boil water. Place the starburst rock in your container. Carefully place the container inside the boiling water allowing it to float on the surface until it takes a liquid form. Show students the liquid form it has taken, then allow the Starburst rock to rest until it has hardened once again. Only then may students handle the Starburst rock to feel the changes

The molten Starbursts represent magma, and upon cooling they solidify into igneous rock.

Although Beringia is known for mammoths and glaciers, the landscape was formed from rocks that changed over millions of years. Ancient people used these rocks as resources. They used sharp stone for cutting tools, rocks for hammerstones, and even mineral pigments for art and decoration. The rock cycle isn't just about geology, it also concerns what resources are available to living things.

Following this experiment, engage in a class discussion:

What happened to the rock before it cooled?

What changed after it cooled?

Why can't you see the original layers/colours anymore?

Molten rock cools into new igneous rock beneath or on Earth's surface.