

Lesson 2.6: Investigating Hawaiian Rocks

You have done an excellent job investigating the geologic history of the Rocky Mountains and Great Plains so far. To help you deepen your understanding of how rocks form, you will turn your focus to another interesting region on Earth. Today, you will work with a partner to investigate rocks in Hawaii. You will also take on a variety of new challenges, using the Sim and the key concepts from this unit to complete these tasks.

Unit Question

- How do rocks form and change?

Chapter 2 Question

- Where did the magma and sediment that formed the rock of the Great Plains and the Rocky Mountains come from?

Key Concepts

- Rocks can form in different ways. This causes them to be different types.
- When sediment is compacted and cemented together, it forms sedimentary rock.
- When magma cools, it hardens to form igneous rock.
- Matter gets transformed by energy, but the same matter is still present.
- Sediment forms when any type of rock is weathered, a process driven by energy from the sun.
- Magma forms when any type of rock is melted, a process driven by energy from Earth's interior.

Vocabulary

- | | | |
|---------------|------------------|--------------------|
| • cementation | • igneous rock | • sample |
| • compaction | • magma | • sediment |
| • energy | • matter | • sedimentary rock |
| • erosion | • rock formation | • weathering |

Digital Tools

- *Rock Transformations* Simulation

Name: _____

Date: _____

Purple Group: Warm-Up

Reading “Rocks on the Hawaiian Islands”

Focus question: *How do igneous rock and sedimentary rock form?*

1. Both igneous and sedimentary rock form on the Hawaiian Islands. You will first read about how these rocks form in Hawaii. Then, you will model these processes in the Sim.
2. Read and annotate the “Rocks on the Hawaiian Islands” article. When you are done, review your annotations, answer the reflection questions below.

How do sedimentary rocks form on the Hawaiian Islands?

How do igneous rocks form on the Hawaiian Islands?

Purple Group: Making Rock Material in the Sim

Investigating Rocks in Hawaii Using the Sim

Think or look back at the text you read. Plan how you will form igneous and sedimentary rocks in the Sim.

1. Open the Process Mode of the *Rock Transformations* Simulation.
2. Try to form igneous rock in the landscape.
3. Press ANALYZE ROCKS to see if you were successful. If not, try again.
4. After you form igneous rock, answer the first question below.
5. Repeat steps 2–4, forming sedimentary rock this time. Once you are done, answer the second question below.

What processes in the Sim form igneous rock? (circle as many as needed)

- a. weathering rock
- b. adding sediment
- c. melting
- d. compacting and cementing
- e. cooling at the surface
- f. cooling below the surface

What processes in the Sim form sedimentary rock? (circle as many as needed)

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Name: _____

Date: _____

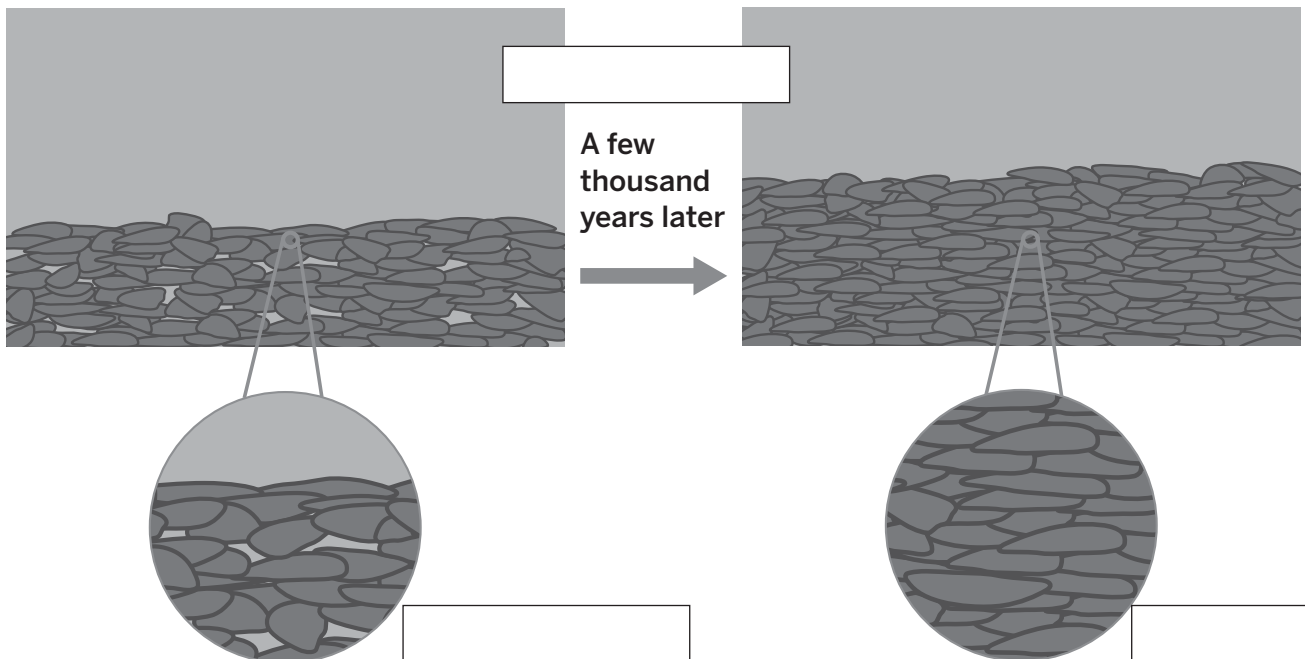
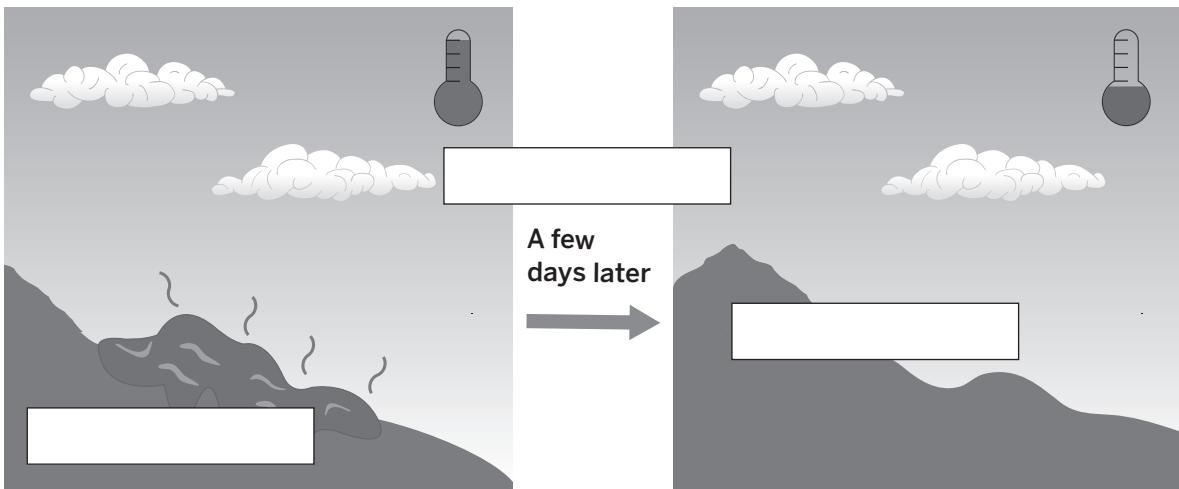
Purple Group: Making Rock Material in the Sim (continued)

Using What You Learned

Using what you learned from your article and the Sim activity, use the Word Bank to label the diagrams below.

Word Bank

sediment	magma	sedimentary rock
igneous rock	cooling	compaction and cementation



Name: _____

Date: _____

Green Group: Warm-Up

Reading “Hawaiian Volcanoes and Beaches”

Focus question: *How do underwater volcanoes and volcanic sediment form?*

1. You will first read about how volcanoes and sediment in Hawaii form. Then, you will model this process in the Sim.
2. Read and annotate the “Hawaiian Volcanoes and Beaches” article. When you are done, review your annotations and answer the reflection questions below.

How does the magma in underwater volcanoes in Hawaii form?

How does volcanic rock in Hawaii turn into sediment?

Name: _____

Date: _____

Green Group: Making Rock Material in the Sim

Investigating Rocks in Hawaii Using the Sim

Think or look back at the text you read. Plan how to form an underwater volcano and volcanic sediment in the Sim.

1. Open the Process Mode of the *Rock Transformations* Simulation.
2. Try to form an underwater volcano in the landscape.
3. After you form the underwater volcano, answer the first question below.
4. Next, form a volcano on land. Then, try to form sediment from the new volcano.
5. After you form the sediment, answer the second question below.

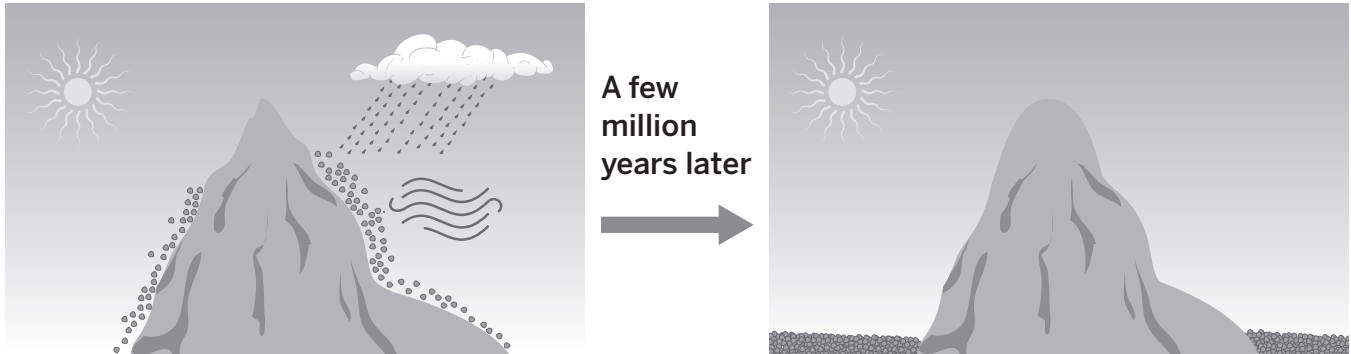
How did you form an underwater volcano?

How did you form sediment from a volcano?

Green Group: Making Rock Material in the Sim (continued)

Using What You Learned

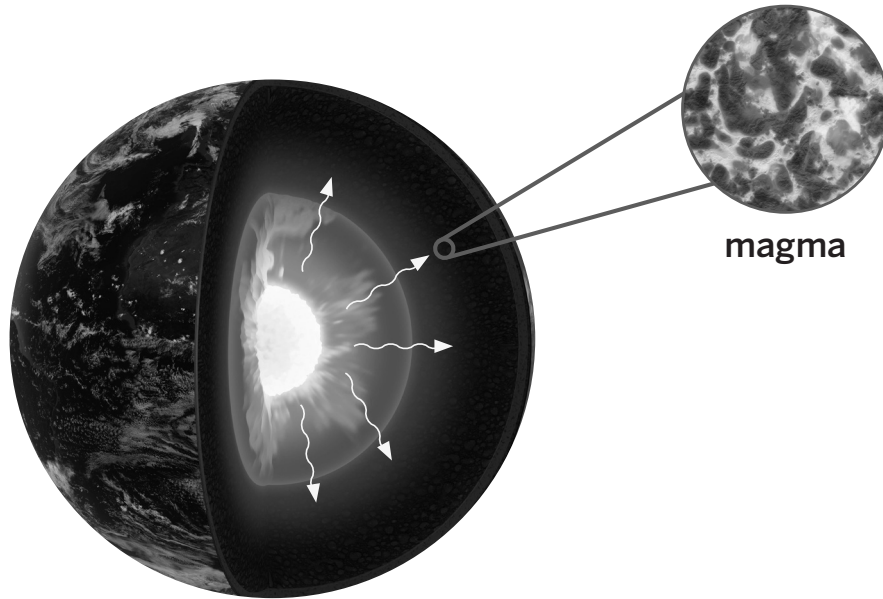
Using what you learned from your article and the Sim, answer the questions about the diagrams below.



Explain what transformation process is happening in the above diagram. Use the following terms to help you with your explanation:

- energy from the sun
- weathering
- sediment

Green Group: Making Rock Material in the Sim (continued)



Explain what transformation process is happening in the above diagram. Use the following terms to help you with your explanation:

- energy from Earth's interior
- melting
- magma

Name: _____

Date: _____

Blue Group: Warm-Up

Reading “Hawaii’s Colorful Sand”

Focus question: *How do different kinds of igneous rock form?*

1. There are many different colors of sand on Hawaiian beaches. You will first read about what causes these different colors of sand. Then, you will model the process in the Sim.
2. Read and annotate the “Hawaii’s Colorful Sand” article. When you are done, review your annotations and answer the reflection question below.

Why might sand on beaches in Hawaii be different colors even though the sand all formed from igneous rock?

Name: _____

Date: _____

Blue Group: Making Rock Material in the Sim

Investigating Rocks in Hawaii Using the Sim

Think or look back at the text you read. Plan how to form different kinds of igneous rock in the Sim.

1. Open the Process Mode of the *Rock Transformations* Simulation.
2. Make as many different kinds of igneous rock as you can.
3. Check your work by pressing ANALYZE ROCKS and selecting rock material to see if the kinds of igneous rock you formed are different from each other.

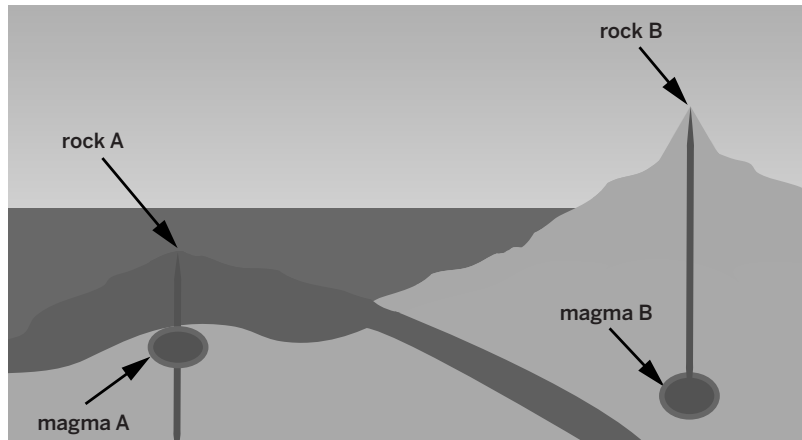
How many different kinds of igneous rock did you form?

How did you form the different kinds of igneous rocks?

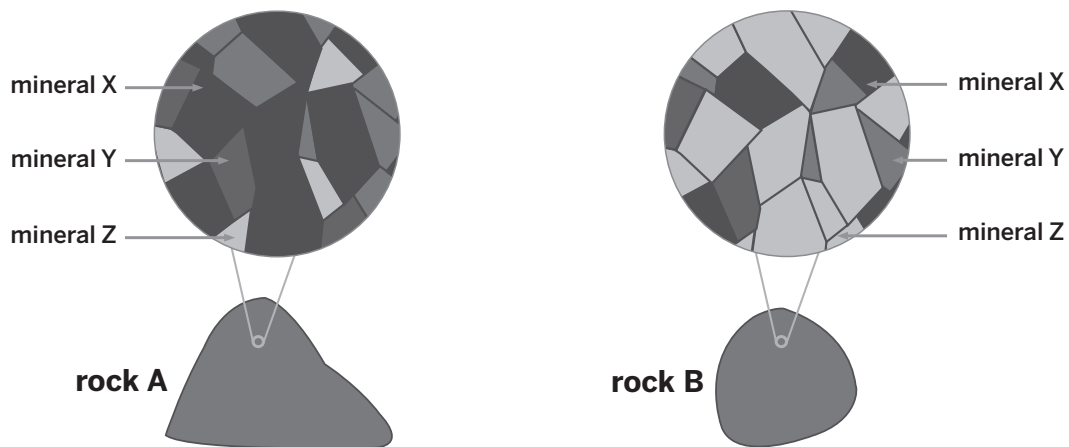
Blue Group: Making Rock Material in the Sim (continued)

Using What You Learned

Using what you learned from your article and the Sim, answer the questions about the diagrams below.



Examine the above diagram. Then, write your own key concept to summarize what is shown.



The rocks shown in the above diagram formed from magma. Examine the rocks and write your own key concept to summarize the diagram.

Name: _____

Date: _____

Blue Group: Making Rock Material in the Sim (continued)

Optional: Considering Waimea Canyon in Hawaii

Two famous canyons in the United States are pictured below. After reviewing, discuss the questions with your partner and then write responses.



The Grand Canyon in Arizona is made of sedimentary rock.



Waimea Canyon in Hawaii is made of igneous rock, but people still call it “The Grand Canyon of the Pacific.”

1. What similarities do you observe about the rock formations of the Grand Canyon and Waimea Canyon?

2. How do you think Waimea Canyon formed?

Name: _____

Date: _____

Homework: Check Your Understanding

This is a chance to reflect on your learning so far. This is not a test. Be open and truthful when you respond.

Scientists investigate in order to figure things out. Are you getting closer to figuring out why the rock samples from the Great Plains and Rocky Mountains are so similar?

1. I understand what is different about the rock formations in the Rocky Mountains and Great Plains. (check one)

yes not yet

Explain your answer choice.

2. I understand how the materials that turned into the rock formations in the Rocky Mountains and Great Plains were formed. (check one)

yes not yet

Explain your answer choice.

3. I understand the role of energy in creating the rock formations in the Rocky Mountains and Great Plains. (check one)

yes not yet

Explain your answer choice.

Name: _____

Date: _____

Homework: Check Your Understanding (continued)

4. I understand how the movement of plates is important for the connection between the Rocky Mountains and Great Plains. (check one)

yes not yet

Explain your answer choice.

5. I understand how rock from one of the study regions (Great Plains or Rocky Mountains) could have transformed into rock from the other study region. (check one)

yes not yet

Explain your answer choice.

6. What do you still wonder about the rock samples from the Great Plains and Rocky Mountains?
