



Rock Cycle Lesson 2: *The Make*

Student Handout

Directions:

Look down. Chances are, the floor below you is sitting on top of rock. In fact, the majority of Earth's crust is made up of rock. Rock has been an important natural resource throughout time and has been used to make things like weapons, buildings, roads and monuments.

We learned in Mosa Mack's mystery that there are three types of rock that each form in a different way. Think back to the mystery and the different rock types Mosa encountered on her quest to find the Sunset Topaz.

Your "Make" task today is to:

1. Complete the Crayon Rock Journey in order to model each phase of the rock cycle.
2. Create an annotated diagram that depicts each type of rock and how each type of rock transforms throughout the cycle.



Planning Organizer

Journey of a Crayon “Rock”: Part 1

Your journey today begins with a Crayon “Rock.” This Crayon Rock was created from hot wax that has cooled into this pure and unique structure. Each crayon located in Crayon Valley is unique in color based on the pigments dissolved with the paraffin wax.

Directions:

If you are doing this virtually:

1. View [this video clip](#)

If you are doing this in-person:

1. Unwrap your crayon to begin your journey today.
2. Draw and describe your crayon below.

Drawing of your Crayon Rock:

Make observations about your Crayon Rock. *(Include information about its structure and texture):*

What type of rock is the crayon representing at this phase of the Crayon Journey? Explain.



Journey of a Crayon Rock: Part 2

While in Crayon Valley, your Crayon Rock experiences many natural forces.

- Wind carries sand particles through the air that hit against your crayon's surface.
- Rainwater falls against the surface of your crayon.
- Rainwater seeps into the cracks in your Crayon Rock. When temperatures drop, water freezes into ice, wedging the Crayon Rock apart.

These forces have caused your crayon to weaken and break down over time.

Model these forces on your crayon by following the directions below:

If you are doing this virtually:

1. View [this video clip](#)

If you are doing this in-person:

1. Stand your crayon upright on a sheet of wax paper.
2. Use a plastic knife to shave portions of your crayon.
3. Draw and describe your Crayon Rock after it's been shaved with the knife.

Drawing of your Crayon Rock:

Observations of Crayon Rock:

How do the activities that you've done at this station successfully model how weathering works? *Tip: Use your mind map for reference.*

Describe the small crayon pieces that have been created as a result of the rock shaving. What does this represent?



Journey of a Crayon Rock: Part 3

Heavy rain falls over Crayon Valley. Sediments from the crayons wash into the nearby river and travel downstream and are deposited at the base of the river. Over time, more sediments travel this same path and continue to pile on top of each other. The sediment layers grow heavy, creating pressure that causes sediment to stick together.

Directions:

If you are doing this virtually:

1. View [this video clip](#).

If you are doing this in-person:

1. All teammates move your crayon shavings onto the same piece of wax paper so that all shavings are in one large pile.
2. Fold the wax paper over the pile.
3. One teammate firmly presses down on the folded wax paper so that the crayon shavings to stick together.
4. Carefully open the wax paper and examine the new Crayon Rock that has formed.
5. Draw and describe your Crayon Rock below.

Drawing of your newly created Crayon Rock:

Description of newly created Crayon Rock:

How does this newly created Crayon Rock compare to the original Crayon Rocks that your team started with?

What type of rock do you think you have created with your crayon shavings above? Explain.



Journey of a Crayon Rock: Part 4

Millions of years pass and your Crayon Rock experiences more and more pressure and heat because of the many layers of rock building up above it. The increased pressure also pushes your Crayon Rock down closer to the hot magma below. This heat and pressure causes the minerals in your Crayon Rock rock to change, which changes its appearance.

Directions:

If you are doing this virtually:

1. View [this video clip](#).

If you are doing this in-person:

1. Use a small piece of aluminum foil to create a foil boat large enough to hold your new Crayon Rock.
2. Place your team Crayon Rock into the foil boat.
3. As a team, place the boat into a container of hot water at the front of the classroom as directed by your teacher.
4. Observe the Crayon Rock as it floats in the hot water bath and make observations in your data chart below.
5. When you notice the rock changing form, remove your newly formed Crayon Rock from the hot water bath and allow the Crayon Rock to cool completely.
6. Carefully remove the newly formed Crayon Rock from the aluminum foil boat.
7. Draw and describe your transformed Crayon Rock below.

Drawing of your newly formed Crayon Rock:

Description of Crayon Rock while floating in hot water:

Description of newly formed Crayon Rock (*after cooling*):



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Explain how heat from the hot water transforms the crayon at this phase of the crayon journey.

What type of rock do you think you created in this phase of the Crayon Journey? Explain.

If the crayon was not allowed to cool but remained under constant heat, what do you think would happen to the crayon? What Earth material would this represent deep inside of the Earth?

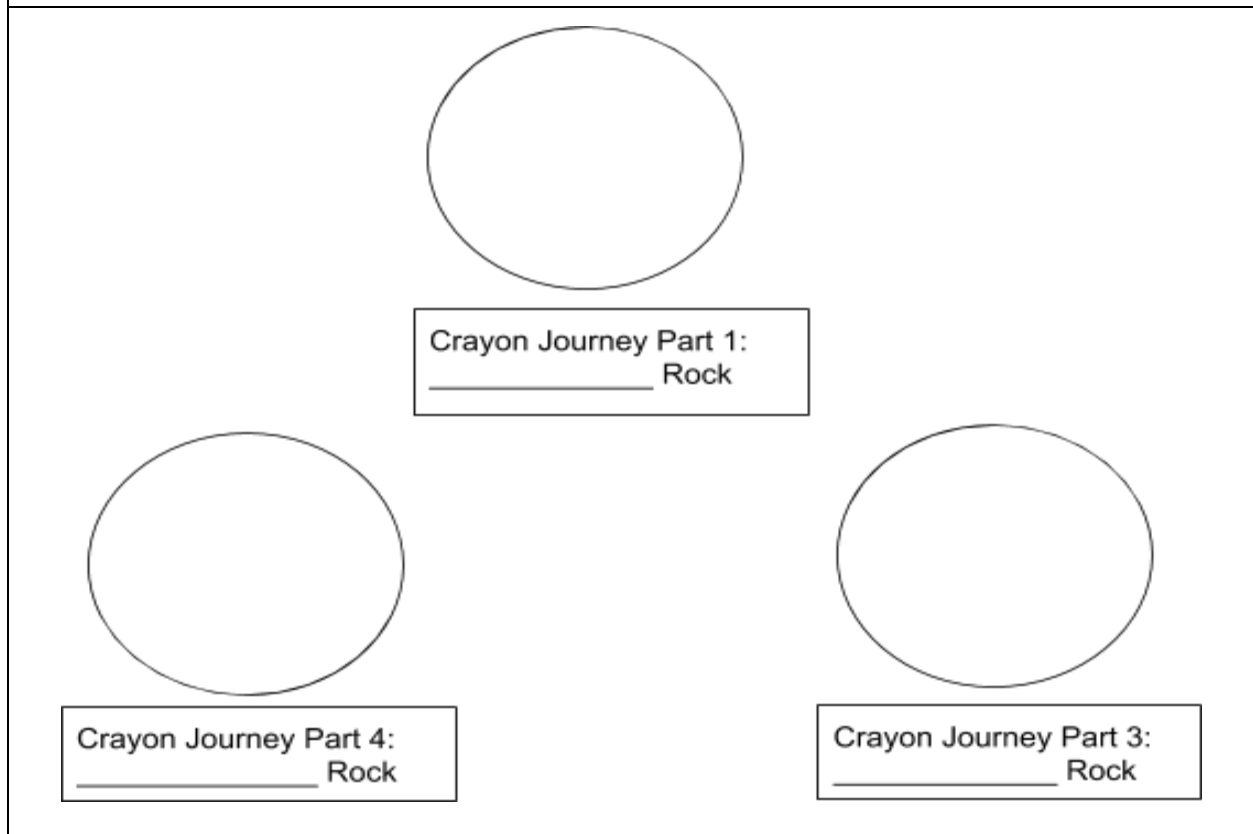
How could a Metamorphic Crayon Rock turn back into an Igneous Crayon Rock?



“Crayon Rock Cycle” Diagram

Construct a full-color annotated diagram of your “Crayon Journey” below. Be sure to include the following:

- Drawing of each “type” of Crayon Rock.
- Arrows showing direction of Crayon Rock cycle
- Description of force(s) used to change one type of crayon into the next included next to arrow(s).
- Incorporate the following vocabulary terms within the diagram in order to relate the “Crayon Rock Cycle” to the actual rock cycle:
 - Igneous rock
 - Weathering
 - Erosion
 - Sedimentary Rock
 - Metamorphic Rock
 - Heat and Pressure





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Name: _____ Date: _____

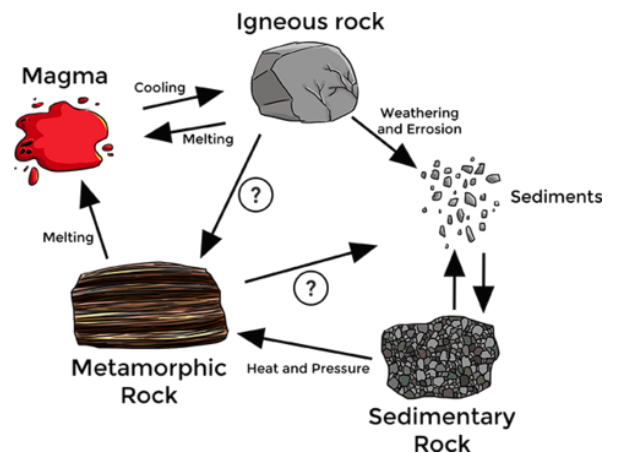
Exit Ticket: Connection to the Design

1. Study each rock picture below and explain the characteristics. Which rock is igneous? Sedimentary? Metamorphic?

Characteristics:	Characteristics:	Characteristics:
Type of Rock:	Type of Rock:	Type of Rock:

2. The rock cycle does not exist in just one direction. Explain how the following transformations could occur:

- How would igneous rock become metamorphic rock?
- How would metamorphic rock create sediments?





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3. What type of forces in nature can cause weathering and erosion of rock?
4. Why are the forces of heat and pressure essential to the rock cycle? Explain.
5. Does the rock cycle have a beginning and end, or is it a continuous cycle? Explain your answer.



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Make Assessment

Use the checklist and Science & Engineering Practices rubric to ensure you have addressed all aspects of the “Make” with quality work.

Rock Cycle Make Checklist: Content Concepts and Practices

Your Challenge: Complete the Crayon Rock Journey in order to model each phase of the rock cycle and how rock transformations occur.

Project Completeness:

- Completes the “Journey of a Crayon” activity and includes:
 - Drawing of the Crayon Rock at each phase
 - Description of the Crayon Rock at each phase
 - Answers to question(s) at each part of the journey
- Final Crayon Rock Cycle Diagram Includes:
 - Drawing of each “type” of Crayon Rock.
 - Arrows indicating direction of Crayon Rock cycle
 - Description of force(s) used to change one type of crayon into the next included next to arrow(s).
 - Diagram design is well-organized, neat, and in color with relevant annotations

DCI Standards Checklist:

- Crayon Rock Cycle Journey includes:
 - Accurate Crayon Rock diagrams reflecting each type of rock.
 - Accurate answers to question(s) at each part of the journey that are based on data collected at the station
- Final Crayon Rock Cycle Diagram:
 - Accurately depicts how rocks can transform due to heat and pressure and weathering and erosion
 - Accurately applies vocabulary terms within diagram:
 - Igneous rock
 - Weathering
 - Erosion
 - Sedimentary Rock
 - Metamorphic Rock
 - Heat and Pressure



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Science & Engineering Practices Assessed

	Emerging (1)	Developing (2)	Proficient (3)	Advanced (4)
Developing and Using Models	Drawings, diagrams, or visual models include major misconceptions or has missing parts. Explanation of the model is minimal or not present.	Drawings, diagrams, or visual models include minor misconceptions or has missing parts. Explanation of the model is minimal.	Drawings, diagrams, or visual models are complete, but contain a minor misconception. Explanation of the model is complete but lacking complexity.	Drawings, diagrams, or visual models have no misconceptions and contain all details. Explanation of the model is complete and complex.
Constructing Explanations or Arguments From Evidence	Constructs an explanation with no clear sources of evidence.	Uses scientific principles and/or data from at least one source to construct or evaluate an explanation, but explanation contains minor misconceptions.	Uses accurate but incomplete scientific principles and/or data from multiple sources to construct or evaluate an explanation.	Uses accurate and complete scientific principles and/or data from multiple sources to construct or evaluate an explanation.