***Performance Task Bundle 2, Unit 1: History of the Earth, Part 1***

*Task:*

Apply scientific reasoning and evidence from ancient Earth materials, meteorites, and other planetary surfaces to construct an account of Earth’s formation and early history.

*Goal:*

There are two parts to this assignment:

1. As a group you will create a three-dimensional model of the Earth’s formation and early history. You may create a single model or multiple ones to represent different events. Label your model to aid you in part 2.
	1. Supplies:
		1. Modeling dough. You may color it as needed but you only get one sample.
		2. Fuzzy sticks. You may use up to five fuzzy sticks
		3. Any other supplies you or your teacher provides
	2. Time: You will have one period to plan and one period to construct.
2. As an individual you will write a description of the Earth’s formation and early history. You should include both evidence and scientific reasoning and reference your model. Use the background/reminders to guide your thinking.

*Rubric*

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| --- | --- | --- | --- | --- |
|  | Emerging | Approaches Expectations | Meets Expectations | Advanced |
| **1** | **1.5** | **2** | **2.5** | **3** | **3.5** | **4** |
| Apply scientific reasoning and evidence from ancient Earth materials, meteorites, and other planetary surfaces to construct an account of Earth’s formation and early history. | Identifies or otherwise applies irrelevant content OR relevant content with major errors or omissions |  | Identifies or otherwise applies relevant content with minor errors or omissions. |  | Explains or otherwise applies relevant and accurate content. |  | Explains and applies relevant and accurate content. |
| Empirical evidence is needed to identify patterns. Much of science deals with constructing explanations of how things change and how they remain stable. | Identifies or makes connection to irrelevant crosscutting concept(s) OR to relevant crosscutting concept with major errors or omissions.  |  | Identifies or makes connection(s) to relevant crosscutting concept with minor errors or omissions. |  | Explains OR makes accurate connections to relevant crosscutting concept(s). |  | Explains and makes accurate connections to relevant crosscutting concept(s). |
| Develop a Model | Designs and explains a model that generates data to support explanations, predict phenomena, analyze systems, and/or solve problems. Design or explanation of the model includes major errors or omissions. |  | Designs and explains a model that generates data to support explanations, predict phenomena, analyze systems, and/or solve problems. Design or explanation of the model includes minor errors or omissions. |  | Designs and explains a model that generates data to support explanations, predict phenomena, analyze systems, and/or solve problems |  | Designs, explains, and evaluates a model to generate data to support explanations, predict phenomena, analyze systems, and/or solve problems. |

Background/Stuff You Know:

1. Can you explain how crustal materials of different ages are arranged on Earth’s surface? How can that be attributed to plate tectonic activity?
2. What other relevant evidence should you include:
	1. measurement of rock age using radioactive decay?
	2. age and location of continental rocks?
	3. age and location of sea floor rocks around mid-ocean ridges?
	4. types and locations of plate boundaries and how that impacts age and location of crustal rocks?
3. What patterns of evidence support the age of crustal rocks?
	1. Is there a pattern for which is older, continental crust or oceanic crust?
	2. Is there a pattern of age in continental crust? In oceanic crust?
4. What is the evidence to describe the relationship between the motion of continental plates and the patterns in the ages of crustal rocks?
	1. At boundaries where plates move apart?
	2. At regions furthest from plate boundaries?
	3. At boundaries where plates move together?

Reminders/Guides/Hints:

1. Claim
	1. The Earth and solar system formed 4.6 billion years ago
	2. The early Earth and solar system were bombarded by impacts.
	3. Much of the evidence of this bombardment was destroyed on Earth.
2. Evidence
	1. What evidence is needed to support the age of the Earth and solar system?
	2. What evidence is needed to support that there was a bombardment?
	3. What evidence exists that could show both that the Earth was bombarded and that could also explain the destruction of most of this evidence on Earth?
3. Can you use reasoning to connect the evidence to construct an explanation of Earth’s formation and early history?
	1. How do we determine the age of rocks on Earth and in the solar system?
	2. How do we know there was a bombardment?
	3. How do we know the Earth was bombarded? And, how could the evidence have been destroyed?