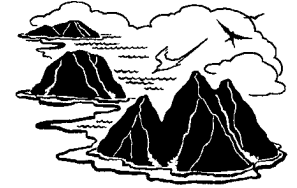


## 'Ōhi'a Project Geology Unit



## Exploring the Islands Grade 4

| HCPS Content Standards/Benchmarks   | HCPS Performance Indicators  |
|---|--|
| <p>Science: Forces That Shape the Earth</p> <ul style="list-style-type: none"> <li>• Explain the causes and effects of volcanoes.</li> <li>• Examine various rock samples and describe what they are composed of.</li> <li>• Describe the effects of waves, wind, and water on the surface of the Earth.</li> </ul> | <ul style="list-style-type: none"> <li>• Describe the causes and effects of volcanoes.</li> <li>• Observe the rock is composed of different combinations of minerals and/or living things.</li> <li>• Describe the effects of waves, wind, and water on the surface of the Earth.</li> </ul> |
| <p>Social Studies: Physical Systems</p> <ul style="list-style-type: none"> <li>• Explain how physical processes affect formation of <i>volcanoes</i>.</li> </ul>  | <ul style="list-style-type: none"> <li>• Explain the Earth's physical processes (e.g., erosion, earthquakes, lava flows)</li> <li>• Explain formation of volcanic islands and atolls.</li> </ul>   |
| <p>Social Studies: Historical Perspectives &amp; Interpretations</p> <ul style="list-style-type: none"> <li>• Identify and describe some of the beliefs/values and education/learning of pre-contact Hawai'i.</li> </ul>  | <ul style="list-style-type: none"> <li>• Identify and describe some of the beliefs/values and education/learning of pre-contact Hawai'i.</li> </ul>  |

## Culminating Activity

Students produce a volcano booklet or computer presentation that compares a Hawaiian shield volcano to a volcano in another part of the world. The booklet or presentation addresses each of the essential questions and compares and contrasts a Hawaiian volcano with another volcano according to the:

- causes and effects of the volcanoes
- types of rocks
- effects of erosive forces (waves, wind, and water)
- cultural beliefs/values related to the volcano

Work that students complete for each *‘Ōhi‘a Project* activity in the unit will contribute to the development of their booklets or computer presentations. Additional work to complete their final geology booklets could be assigned as homework. The rubric for this culminating activity should be shared with students at the beginning of the unit so that they know what they will need to do to meet the standards.

## Unit at a Glance

| Content Standards  | OP Lessons & Telecasts  | Essential Questions  | Key Concepts  | Assessment  |
|--|---|--|---|---|
| <p>Science: Forces That Shape the Earth</p> <p>Social Studies: Physical Systems</p> <p>Social Studies: Historical Perspectives &amp; Interpretations</p> | <p>OP Activity: Hot Spot!</p> <p>Exploring the Islands (ETI) Program: On the Hot Spot</p>       | <p>How was the Hawaiian Island chain formed? (scientific and cultural perspectives)</p>  | <p>According to the hot spot theory, the Hawaiian volcanoes are formed when the Pacific Plate moves over a hot spot. The effect of this volcano formation is a chain of islands that extends from the Lō`ihi seamount in a northwesterly direction to the oldest Emperor Seamount.</p> <p>According to some Hawaiian <i>mo`olelo</i>, the Hawaiian Islands were formed when Maui pulled them up with his fishhook and secondary cones were formed when Pele dug them with her 'ō`ō.</p> | <p>Matrix with “retell” of <i>mo`olelo</i> and hot spot theory</p> <p>Activity sheet with accurate answers</p>  |
| <p>Science: Forces That Shape the Earth</p> <p>Social Studies: Physical Systems</p>  | <p>OP Activity: Getting to Know a Volcano</p> <p>ETI Program: Hawaiian Volcanoes Inside Out</p> | <p>What’s inside a Hawaiian volcano and how does the volcano work?</p> <p>What are the most common forms of lava in Hawai‘i and what are they made of?</p> | <p>The most common forms of lava in Hawai‘i are <i>pāhoehoe</i> and ‘<i>a`ā</i>, which are composed of basalt. Common minerals in Hawaiian lava are feldspar and olivine.</p> <p>Magma flows to the surface and emerges as lava along rift zones or fractures in the volcano’s surface.</p>   | <p>Volcano drawing accurately labeled with written summary using all vocabulary introduced in activity</p> <p>Rock collection accurately labeled with written descriptions of types of lava</p> |

## Unit at a Glance (continued)

| Content Standards   | OP Lessons & Telecasts  | Essential Questions                            | Key Concepts   | Assessment   |
|---|---|--|--|--|
| <p>Science: Forces That Shape the Earth</p> <p>Social Studies: Physical Systems</p> | <p>OP Activity: Volcanoes on Stage</p> <p>ETI Program: Volcanoes on Stage</p> | How does a Hawaiian volcano change as it ages? | Most Hawaiian volcanoes go through 10 stages. Stream action and wave action and wind on high islands will eventually erode all volcanic rock and the islands will become atolls and then guyots as they sink (subside) below the surface of the ocean. | Storyboard of volcanic stages. Accurate labels for each volcanic stage |

## Rubric for Culminating Activity

| Performance Indicators for Geology Unit Culminating Activity (student booklet or computer presentation comparing volcanoes)                           | Exceeds Standards   | Meets Standards   | Standards Not Yet Met  | I Noticed.... |
|---|---|---|--|---------------|
| <p><b>Science: Forces That Shape the Earth</b></p> <p>✓ Observe that rock is composed of different combinations of minerals and/or living things.</p> | Writing accurately describes what <i>'a'ā</i> and <i>pāhoehoe</i> are made of and compares the lava and minerals in Hawaiian volcanoes with a volcano from another part of the world. Comparisons include descriptions of a few different minerals from each volcano. | Writing accurately describes what <i>'a'ā</i> and <i>pāhoehoe</i> are made of and compares the lava and minerals in Hawaiian volcanoes with a volcano from another part of the world. | Writing includes only descriptions of lava rocks; lacks comparisons of the different types of volcanoes. |               |

## Rubric for Culminating Activity (continued)

| <b>Performance Indicators for Geology Unit Culminating Activity</b> (student booklet or computer presentation comparing volcanoes) | <b>Exceeds Standards</b>  | <b>Meets Standards</b>  | <b>Standards Not Yet Met</b>  | <b>I Noticed....</b> |
|--|---|---|---|----------------------|
| ✓ Describe the effects of waves, wind, and water on the surface of the Earth.  | Writing accurately describes and compares how waves, wind, and water erode volcanoes, giving examples of local landforms and comparing them to a volcano elsewhere.   | Writing accurately describes and compares how waves, wind, and water erode a volcano in Hawai‘i and a volcano elsewhere.  | Writing describes only one or two erosive forces and lacks comparisons of the different types of volcanoes. |                      |
| ✓ Describe the causes and effects of volcanoes.  | Writing accurately describes how the hot spot creates the island chain and compares this to the cause and effect of a volcano from another area. Description includes details (i.e., extent of the chain, location of oldest seamount, comparison of spectacular eruptions) | Writing accurately describes how the hot spot (cause) creates the island chain (effect) and compares this to the cause and effect of a volcano from another area. | Writing accurately describes only cause or effect for one type of volcano.                                  |                      |

## Rubric for Culminating Activity (continued)

| Performance Indicators for Geology Unit Culminating Activity (student booklet or computer presentation comparing volcanoes)                                | Exceeds Standards   | Meets Standards   | Standards Not Yet Met  | I Noticed.... |
|--|---|---|--|---------------|
| <b>SS: Physical Systems</b><br>✓ Explain the Earth's physical processes<br><br>✓ Explain formation of volcanic islands and atolls.                         | Writing and drawings include the volcanoes' features and stages accurately labeled with additional details (e.g., names of specific vents or craters, sizes of features compared) | Writing and drawings includes volcanoes' features (magma chamber, dikes, cones, rift zones, caldera) and stages accurately labeled and compared | Writing and drawings include some of the volcanoes' features and stages.                             |               |
| <b>SS: Historical Perspectives and Interpretation</b><br>✓ Identify and describe some of the beliefs/values and education/learning of pre-contact Hawai'i. | Hawaiian <i>mo'olelo</i> and a legend about volcanic activity from another culture are accurately summarized and compared. Both legends are compared with scientific theory.      | Hawaiian <i>mo'olelo</i> and a legend about volcanic activity from another culture are accurately summarized and compared.                      | Hawaiian <i>mo'olelo</i> are not accurately summarized or compared to a legend from another culture. |               |

## Additional Standards Addressed in the Unit

### Language Arts: Writing, Reading and Literature

- Writing to create understanding of ideas and information for self.
- Writing to communicate information
- Compare own ideas with ideas in text and analyze similarities and differences.

### Educational Technology: Technology as Tool for Productivity (optional culminating activity)

- Use technology tools (e.g., multimedia authoring etc.) for individual and collaborative writing, communication, and publishing activities to create knowledge products for audiences inside and outside the classroom.

| <b>Performance Indicators for Geology<br/>Unit Culminating Activity</b> (student<br>booklet or computer presentation)   | <b>Exceeds<br/>Standards</b>  | <b>Meets<br/>Standards</b>  | <b>Standards Not<br/>Yet Met</b>                 | <b>I Noticed....</b> |
|---|---|---|--|----------------------|
| <b>Science: Forces That Shape the Earth</b><br>Observe that rock is composed of different combinations of minerals and/or living things.<br>(Getting to Know a Volcano) | Writing compares and contrasts different types of lava and other rocks. | Writing accurately describes what 'a'a and <i>pāhoehoe</i> are made of. | Writing only describes 'a'a or <i>pāhoehoe</i> . |                      |

## Rubric for Culminating Activity (continued)

| <b>Performance Indicators for Geology Unit Culminating Activity</b> (student booklet or computer presentation) | <b>Exceeds Standards</b>   | <b>Meets Standards</b>   | <b>Standards Not Yet Met</b>                       | <b>I Noticed....</b> |
|--|--|--|--|----------------------|
| Describe the effects of waves, wind, and water on the surface of the Earth. (Volcanoes on Stage)               | Writing accurately describes how waves, wind, and water erode volcanoes, giving examples of local landforms.   | Writing accurately describes how waves, wind, and water erode volcanoes.                 | Writing describes only one or two erosive forces.  |                      |
| Describe the causes and effects of volcanoes. (Hot Spot)   | Writing accurately describes how the hot spot creates the island chain and includes details (i.e., extent of the chain, location of oldest seamount) | Writing accurately describes how the hot spot (cause) creates the island chain (effect). | Writing accurately describes only cause or effect. |                      |

## Rubric for Culminating Activity (continued)

| <b>Performance Indicators for Geology Unit Culminating Activity</b> (student booklet or computer presentation)   | <b>Exceeds Standards</b>  | <b>Meets Standards</b>  | <b>Standards Not Yet Met</b>  | <b>I Noticed....</b> |
|--|---|---|---|----------------------|
| <p>SS: Physical Systems<br/>           Explain the Earth's physical processes<br/>           (Getting to Know a Volcano)</p> <p>Explain formation of volcanic islands and atolls.<br/>           (Getting to Know a Volcano)</p> <p>(Volcanoes on Stage)</p> | <p>Drawing includes all volcano features (magma chamber, dikes, cones, rift zones, caldera) accurately labeled with additional details (e.g., names of specific vents or craters)</p> <p>Writing uses all vocabulary words to accurately describe how volcano works and applies the knowledge to other situations</p> <p>Sequence of pictures and writing accurately describes the 10 volcanic stages and includes examples of local landforms.</p> | <p>Drawing includes all volcano features (magma chamber, dikes, cones, rift zones, caldera) accurately labeled</p> <p>Writing uses all vocabulary words to accurately describe how volcano works</p> <p>Sequence of pictures and writing accurately describes the 10 volcanic stages.</p> | <p>Drawing includes some features</p> <p>Writing uses some vocabulary to accurately describe how volcano works</p> <p>Sequence of pictures and writing are not complete and/or accurate</p> |                      |

**Rubric for Culminating Activity (continued)**

| <b>Performance Indicators for Geology Unit Culminating Activity</b> (student booklet or computer presentation)   | <b>Exceeds Standards</b>  | <b>Meets Standards</b>                    | <b>Standards Not Yet Met</b>                   | <b>I Noticed....</b> |
|--|---|---|--|----------------------|
| SS: Historical Perspectives and Interpretation<br>Identify and describe some of the beliefs/values and education/learning of pre-contact Hawai'i. (Hot Spot) | <i>Mo'olelo</i> are accurately described and compared with hot spot theory. | <i>Mo'olelo</i> are accurately summarized | <i>Mo'olelo</i> are not accurately summarized. |                      |