www.OKAGEweb.org

ARCHIPELAGO HOTSPOT

Glenda Sullivan, OKAGE TC Lawton,
Oklahoma
geobelle@att.net

Grade Level: Grade 6-7

Purpose/Overview:
Students will discover how the Hawaiian Islands were created. Students will learn how the volcanic eruptions affect humans and how they adapt and modify their environment.

National Geography Standards from *Geography for Life* Geographic Elements & Standards
Physical Systems –
7: The geographically informed person knows and understands the physical processes that shape the patterns of Earth's surface.
Environment and Society –
14: The geographically informed person knows and understands how human actions modify the physical environment.
Environment and Society –
15: The geographically informed person knows and understands how physical systems affect human systems.

Oklahoma Academic Standards for the Social Studies:

OAS 2012	OAS 2019
Grade 6: World Geography, Western Hemisphere	
Literacy Skills Standard 1: The student will develop and demonstrate Common Core Social Studies reading literacy skills.	Read Critically and Interpret Informational Sources: Students will engage in critical, active reading of grade-level appropriate primary and secondary sources related to key social studies concepts, including frequent analysis and interpretation of informational sources.
C.7 Integrate visual information (e.g., in charts, graphs, photographs, videos, or maps) with other information in print and digital texts.	**4.A.6-8.2** Integrate the use of visual information (e.g. maps, charts, photographs, videos, political cartoons) with textual information from primary and secondary sources.
Literary Skills Standard 2: The student will develop and demonstrate Common Core Social Studies writing literacy skills.	Engage in Evidence-Based Writing: Understanding the multiple purposes of the writing process. Students will develop written products designed for a variety of social studies related investigations. Students will use and integrate evidence to present knowledge and support opinion.
B.7 Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.	**5.B.6-8.1** Refine and formulate viable research questions related to social studies investigations, using well-developed theses or claims.
Content Standard 1: The student will analyze data from a geographic perspective using the skills and tools of geography.	**6.1** The student will analyze data from a geographic perspective using the skills and tools of geography.
6.CS1.2 Integrate visual information, draw conclusions, and make predictions from geographic data and analyze spatial distribution and patterns by interpreting that data as displayed on globes, graphs, charts, satellite and other forms of visual imagery including data from bar and line graphs, pie charts, thematic maps, population	**6.1.3** Integrate visual information, draw conclusions, and make predictions from geographic data and analyze spatial distribution and patterns by interpreting that data as displayed on geographic tools.

pyramids, climographs, cartograms, contour/relief maps, GIS systems and diagrams.	
Content Standard 3: The student will examine the interactions of physical systems that shape the patterns of Earth's surface.	**6.2** The student will analyze the physical systems of the major regions of the Western Hemisphere.
6CS3.1.B Integrate visual information in order to identify on a physical map and describe the major landforms and bodies of water of the Western Hemisphere including: B. Landforms – the Appalachian, Rocky, Andes, and Cascade Mountain Ranges, the Atacama and Sonoran Deserts, the Hawaiian and Antilles archipelagos, the Pampas and Great Plains, the Canadian Shield, the Yucatan Peninsula, the Isthmus of Panama, and the Great Basin.	**6.2.1** Use visual information to identify and describe on a physical map the landforms, bodies of water, climate and vegetation zones that are important to each region.
Grade 7: World Geography, Eastern Hemisphere	
Content Standard 1: The student will analyze data from a geographic perspective using the skills and tools of geography.	**7.1** The student will analyze data from a geographic perspective using the skills and tools of geography.
7.CS1.2 Integrate visual information, draw conclusions, and make predictions from geographic data and analyze spatial distribution and patterns by imagery including data from bar and line graphs, pie charts, thematic maps, population pyramids, climographs, cartograms, contour/relief maps, GIS systems and diagrams.	**7.1.5** Integrate visual information, draw conclusions and make predictions from geographic data and analyze spatial distribution and patterns by interpreting that data as displayed on geographic tools.

Geographic Themes:

Location, place, human environment interaction and region

Objectives:

1. Students will discover how the Hawaiian Islands were formed and continue to be formed today.
2. Students will learn how the eruption of Kilauea on the Big Island of Hawaii affects the lives of the people.
3. Students will understand how the Hawaiians have adapted to Kilauea eruptions and how they have modified their environment.

Materials:

PowerPoint presentation "Archipelago Hotspots"
Laptop computer and LCD Projector (or equivalent)
Research materials such as encyclopedias, internet, almanacs and atlases
Volcano booklet pattern

Time Frame:

2 class periods

Procedure:

1. Ask students where and how most volcanoes are formed. Show the class "Archipelago Hotspot" PowerPoint slide #3 which illustrates the "Ring of Fire". Discuss the fact that this map shows that most volcanic activity occurs along plate tectonic boundaries.
2. Next have students locate the Hawaiian Islands on this map. Are they located near a plate boundary? No, where are they located?
3. Tell the students to look at the word "Hot Spot" that is written next to Hawaii and ask them what they think the word means. Show PowerPoint slide #4, read and discuss the meaning of hot spot.
4. Show the remaining PowerPoint photographs and maps. Encourage the students to interpret the maps and speculate on what they see as they view the PowerPoint. (Teachers, notes to accompany some of the PowerPoint slides are included at the end of this lesson.)
5. The volcanic soil in the Hawaiian Islands provides valuable mineral deposits, very fertile soils and geothermal energy. Due to this generous gift from nature, there are many animals, birds and plants that thrive in the islands.
6. Have each student choose a native Hawaiian animal, bird or plant to research and create a nature volcano booklet. The following are suggested topics to include in their volcano booklet. (The volcano booklet pattern is attached to this lesson.)
    a. A description of the habitat of the species, accompanied by drawings or pictures
    b. Resources of the Hawaiian Islands that aid in the species survival, e.g., what the animals eat, their shelter, minerals in the soil that help plants grow, heat from the geothermal activity, climate, etc.
    c. Is the species threatened or endangered? Have humans played a role in endangering the plant or animal?

d. How have humans modified the environment to grow a particular plant?
e. A diagram, graph, chart or a map
f. The Hawaiian Islands are very unique, so be creative and add something special or out of the ordinary.

Assessment:
Information in volcano booklet

Resources:
Internet
Volcano Activities
http://volcano.oregonstate.edu/kids/index.html

Volcano Images http://volcano.oregonstate.edu/ikonos/index.html

How to Build a Volcano
http://chemistry.about.com/es/howtos/ht/buildavolcano.htm

How to Build a Volcano **http://pubs.usgs.gov/gip/dynamic/hotspots.html** (scroll down and click on "Prominent World Hotspots")

Earth Observatory **http://www.earthobservatory.nasa.gov**

Extension and Enrichment:

1. Ask students to research another of the prominent world hotspots as Labeled on the map at the following website:
http://pubs.usgs.gov/gip/dynamic/hotspots.html (scroll down and click on "Prominent World Hotspots")

2. Have students do the "USA Matching Volcano" and simulate an erupting volcano activity at the following website :
http://volcano.und.edu/vwdocs/kids/kids.html

3. Build a Baking Soda Volcano as a class project. Instructions are on the following website:
http://chemistry.about.com/es/howtos/ht/buildavolcano.htm (Click on baking soda volcanoes under "Substituting Baking Powder and Baking Soda".)

Connections:
Science
Writing

Notes to Accompany a Few PowerPoint Slides

Slide 4—Blue satellite image of Hawaiian Islands—In 1963, J. Tuzo Wilson, a Canadian geophysicist came up with the "hotspot" theory.

Slide 11—Mauna Loa and Kilauea Dual Eruption—Kilauea has had 55 eruptive episodes in the 24 years since 1983. It has the longest record in continuous lava flow in recorded history.

Slide 12—Kilauea Eruption—Thousands of visitors come to watch Kilauea erupt, but some residents live with the boiling lava every day knowing that their homes and lives are subject to the whims of earth's awesome underground forces.

Slide 14—Mauna Loa-Kilauea Dual Eruption— Mauna Loa and Kilauea are shield volcanoes, oozing lava from fissures in the sides. This gives residents at least a few hours' warning before the hot lava reaches their property. In the 25 years of Kilauea's latest eruption, lava has not directly caused any deaths.

Slide 17—Cool Hardened Lava—These people get their power from solar panels, their water from rain and some of their food from gardens planted between lava rocks. Why do they build here? One lady said, "I have the best view of anyone in town. Either she comes or she doesn't. If she comes we'll pick up and leave." Property atop lava rock that could be overrun again at any time does not sell for much. This lady only paid $3000 for six acres in 2000. (Today an acre of land in Hawaii may sell for as high as $450,000 to $1,000,000.)

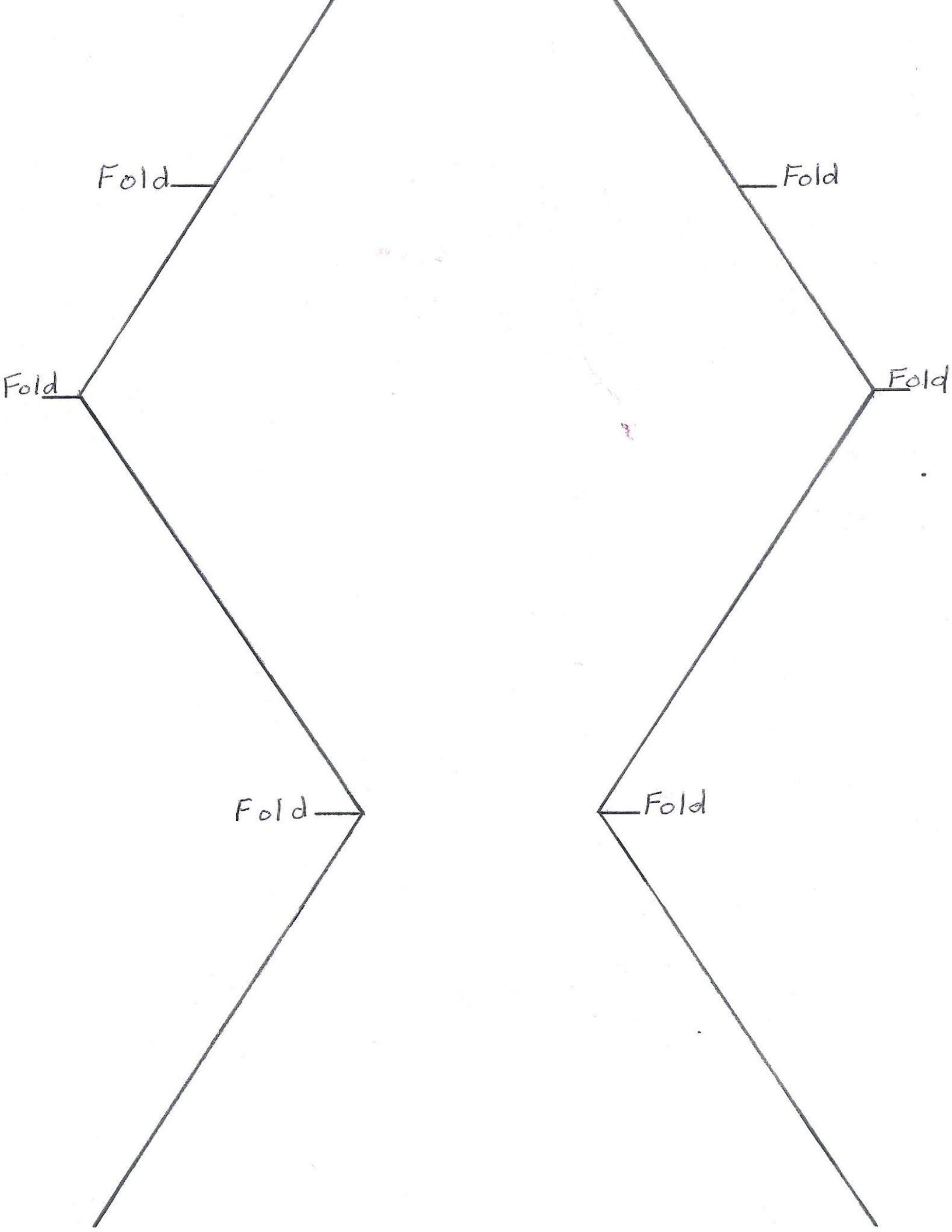
Slide 18—Hot Lava Flows From Tube Into Cold Ocean—People are advised to hold a handkerchief over nose when near the plume.

Slide 31—Taro Fields— Poi, a popular staple for the Hawaiians, is made from the taro root. The taro plant requires an abundance of water, therefore thrives in the rich lava soil and the tropical climate.

Slide 38—Silver Sword –Early Hawaiians used the tough fiber of the silver sword plant to make ropes and nooses.

Slide 39—Hawaiian Monk Seal—The species has been reduced by human interaction due to hunting, loss of habitat, food limitation, and entanglement in abandoned fishing gear.

Slide 44—Nene—An estimated 25,000 Nene geese were in Hawaii when Captain Cook arrived. Humans bringing animals such as goats, cattle, dogs, cats and the mongoose to the islands played a role in their decline.


Fold
Fold
Fold
Fold
Fold
Fold