**University of Arkansas**

**College of Education**

**Lesson Plan Format**

**COE Course**

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| **Unit Title: Plate Tectonics** | **Lesson Title: Volcanism and the Ring of Fire** |
| **Subject Area: Science** | **Grade Level:    6th Grade** |

1. **Pre-assessment and Planning**

 The students have been previously instructed upon plate tectonics and earthquakes. This lesson is intended to address Arkansas SLE's related to volcanism and its effects on the Earth. A clicker-quiz will be utilized to determine student's prior knowledge of volcanoes and their effects.

1. A gently-sloped volcano with fast moving lava flows.

 A. Stratovolcano

 B. Cinder volcano

 C. Shield volcano

2. Which of the following pairs of countries lies along the Ring of Fire?

 A. South Africa and India

 B. Russia and Brazil

 C. Japan and Chile

3. When volcanoes erupt does the global temperature,

 A. Stay the same

 B. Decrease

 C. Increase

Grouping will be regulated by tables in order to evenly distribute ability levels.

1. **Objective(s)**

\*I will conduct investigations to identify the variables within volcanoes that cause different types of eruptions.

\*I will diagram and explain how volcanoes work.

\*I will connect short-term changes in climate with volcanic activity.

\*I will map patterns of earthquake and volcanic activity.

\*I will investigate patterns of earthquake and volcanic activity.

ESS.8.6.4 Conduct investigations to identify the variables within volcanoes that cause different types of eruptions

ESS.8.6.5 Diagram and explain how volcanoes work

ESS.8.6.7 Connect short-term changes in climate with volcanic activity.

ESS.8.6.11 Investigate and map patterns of earthquake and volcanic activity

**Assessment**

 Observe groups to make sure the concepts are understood, continuously ask questions to random students to check for misconceptions.

 Journal Activity: Answer the essential questions within their science notebooks. Notebooks will be evaluated after class to check for comprehension and guide tomorrows lesson. If less than 75% of the class appears to understand the effects of volcanoes on the earth as well as how and why they are formed, remediation will occur.

 Essential Questions:

What causes different types of volcanoes?

The viscocity of the magma and pressure above the magma chamber dictate the type of volcanic eruption.

How do volcanoes work?

Answers vary dependent upon the many different types of volcanoes. Volcanoes occur then the correct pressure and lithospheric conditions allow magma from the mantle to cause eruptions at Earth's surface. Check for diagrams.

What effect do volcanoes have upon the short-term climate?

(Check for misconception, some students may believe that temperatures increase due to the "hot" nature of volcanoes) Global climate temperatures typically decrease due to volcanic dust in the atmosphere reflecting solar energy back into space and preventing it from warming the Earth's surface.

Where do volcanoes occur?

Along tectonic plate boundaries or hotspots.

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|   | **5** | **3** | **1** |
| Science Content | Accurate; Connected to big ideas in science | Mostly accurate; Connections to big ideas are not clear | Inaccurate; Not connected to big ideas in science |
| Organization & Presentation | Main ideas are clearly presented; Ideas are presented in an appropriate order; Ideas are supported by information and logic; Appropriate conclusions are based upon evidence presented; Effective use of models, diagrams, charts, and graphs | Main ideas are presented to some extent; Ideas are not presented in an order that adds clarity; Some ideas are supported by information and logic; Conclusions do not follow from ideas presented; Some appropriate use of models, diagrams, charts, and graphs | No main idea presented; Ideas are presented in an order that distracts from clear communication; Ideas are not supported by information and are illogical; Inappropriate conclusions are presented No use of models, diagrams, charts, and graphs |

1. **Engaging the Learner**
	* Play the following video for the students to introduce the lesson http://www.youtube.com/watch?v=jpqUu0PLkmM
	* Connect plate tectonics and earthquakes to volcanoes.
	* Introduce the essential questions, post them on the board for students to copy into their science notebooks
		1. What causes different types of volcanoes?
		2. How do volcanoes work? (Draw a diagram)
		3. What effect do volcanoes have upon the short-term climate?
		4. Where do volcanoes occur?

Emphasize the writing rubric for science journals to help ensure participation.

1. **Methods, Activities and Resources**

**Methods**

Given the multiple objectives for today's lesson, whole group instruction will be the dominate method for today's lesson. Students will participate in whole group discussion at certain points in a multi-media presentation. They will also engage independent practice as they take detailed notes and answer the essential questions in their science notebooks.

* Classroom management concerns- talking will be allowed during specific Q&A times during the
* Closure
	+ Review of lesson referring to the objectives
	+ Solicit summary of learning from students/feedback to students
	+ Preview of next lesson- how landforms are made
	+ Turn in science notebooks for assessment.
	+ Connect to future learning and real-world experiences

**Activities**

* + - Play embedded video on volcanoes and earthquakes (2 min)
		- Pre-assessment, getting clickers and taking clicker quiz (5 min)
		- Introduce essential questions and make learning connections (5 min)
		- Multimedia presentation produced by Mr. Nucleus, formative assessment during presentation (15-20 min)
		- Play video on climate change and volcanoes, allow students time to answer essential question (4 min)
		- Play video on Ring of Fire, allow students to answer essential question. (4 min)
		- Ask students to produce their plate boundary maps and longitude and latitude maps. Students will complete the mapping activity given during a previous lesson. AR 27 in the *Arkansas Science* book will be utilized if students need additional coordinates to plot. (Remaining time)

**Resources**

* Computer, overhead projector, document camera, internet access
* *Arkansas Science* textbooks
* "Plate Boundaries" and "Earthquake and Volcano Mapping" (Previously distributed)

References

CBS News. (2011). *Earthquakes on the pacific "ring of fire".* Video retrieved from http://www.youtube.com/watch?v=jpqUu0PLkmM .

CBS News. (2010). *Volcano could impact climate*. Video retrieved from http://www.youtube.com/watch?v=2QENyRWdImY .

Discovery. (2010). *Raging planet: Ring of fire.* Video retrieved from http://www.youtube.com/watch?v=Y7Z1cvXszac&feature=player\_embedded .

Blueford, J. & Raia, D. (2010). *Volcano*. [PowerPoint slides]. Retrieved from http://www.msnucleus.org/membership/slideshows/volcano.html

1. **Potential Adaptations to the Lesson {PAL}**

***What if:***

* Technology fails- present the students with information on the white board
* Material grasped or completed faster or slower than expected- faster than expected, utilize Brain-pop video and vocabulary. slower than expected- moderate the pace of instruction, allow shoulder partners to assist answering concept questions if necessary.
1. **Collaboration**

Lesson plan was developed with collaboration from my mentor teacher.