

**NATURE Summer Academy 2015 (Student)**  
Plate tectonics & volcanoes  
By Michael Brown

**Description:**

This lesson will cover the theory of plate tectonics and volcanoes. There are research components and activities that will enhance the understanding of both topics. Students will gain knowledge how the two topics collide.

**Objectives:**

TSWBAT define plate tectonics

TSWBAT explain the different types of plate boundaries

TSWBAT define volcanoes

TSWBAT describe the different types of volcanoes

TSWBAT compose answers to respective questions in complete sentences

TSWBAT construct a replica of a volcano

TSWBAT research a specific topic to present on a poster board

**North Dakota State Standards:**

9-10.1.4.

9-10.5.4.

9-10.6.1.

11-12.6.1.

**Tentative Schedule:**

9:00am – 9:30am	cultural connection
9:30am – 9:45am	plate tectonics introduction
9:45am – 10:00am	activity 1
10:00am – 10:15am	activity 2
10:15am – 10:30am	volcano introduction
10:30am – 11:15am	activity 3
11:15am – 11:30am	activity 4
11:30am – 12:00pm	activity 5
12:00pm – 12:30pm	lunch
12:30pm – 1:00pm	activity 5 (continued)
1:00pm – 2:00pm	activity 6
2:00pm – 2:30pm	activity 7
2:30pm – 2:45pm	conclusion/assessment
2:45pm – 3:00pm	cleanup

## Activity 1

Plate Tectonics (9:45am – 10:00am)

Description: For this activity, you will work in groups of 2-3. You will need to use a computer to follow the link below for reading and help answering questions below. USE COMPLETE SENTENCES!

<http://www.livescience.com/37706-what-is-plate-tectonics.html>

### Materials:

Computers

Colored pencils/markers/crayons

Define the following terms using complete sentences.

1. Plate tectonics:
2. Lithosphere:
3. Continental drift:
4. Mid-ocean ridges:
5. Subduction zone or convergent margin:
6. Divergent margin:
7. Transform margin:

Answer the following questions in complete sentences.

8. What is the driving force behind plate tectonics? Explain how that works.

9. What can be found along subduction zones?

Illustrate the following plate boundaries in the boxes below.

<b>Subduction/convergent</b>	<b>Divergent</b>	<b>Transform</b>

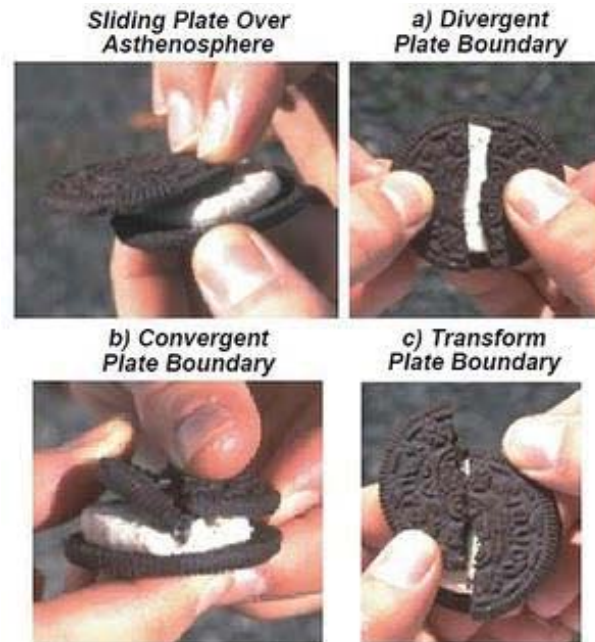
## Activity 2

Oreo plate boundaries (10:00am – 10:15am)

Description: For this activity, you will receive 4 Oreo cookies. DO NOT EAT THEM! Wait for everyone to receive his or her cookies and everyone will partake in the activity together.

### Materials:

Oreo cookies



The upper cookie is the lithosphere.  
The creamy filling is the asthenosphere.  
The lower cookie is the lower mantle.

### **Activity 3**

Volcanoes research (10:30am – 11:15am)

Description: For this activity, get into your same groups of 2-3. You will need a computer in order to follow the link below for reading and help in answering the questions below. USE COMPLETE SENTENCES! At the end, be sure to color your volcano and make it pretty!

<http://www.weatherwizkids.com/weather-volcano.htm>

#### Materials:

Computers

Colored pencils/markers/crayons

Answer the following using complete sentences.

1. What is a volcano?
2. When an eruption occurs, what is released?
3. What can eruptions cause?
4. An erupting volcano can trigger what kind of other natural disasters?
5. How are volcanoes formed?
6. What are the three main categories of volcanoes?

7. What is an active volcano?
8. What is a dormant volcano?
9. What is an extinct volcano?
10. Why do volcanoes erupt?
11. How many active volcanoes are there? How many are under the oceans?
12. List some active volcanoes within the United States.
13. What are the four different types of volcanoes?
14. Explain a cinder cone volcano.
15. Explain a composite volcano.
16. Explain a shield volcano.

17. Explain a lava volcano.

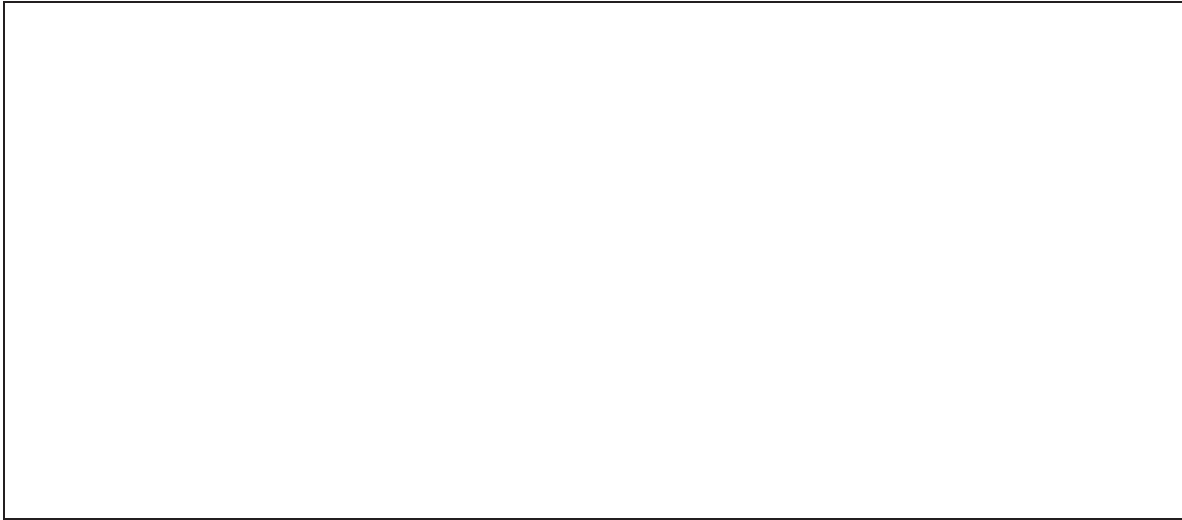
18. What is the difference between lava and magma?

19. Explain what a pyroclastic flow is.

20. What is the largest active volcano?

21. The ring of fire is home to what percentage of the world's active and dormant volcanoes?

Draw a picture of a volcano and then write a poem about it. Start each line of your poem with the letter on that line.



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#### **Activity 4**

Outdoor gathering (11:15am – 11:30am)

Description: For this activity, your group will go outside to collect twigs, leaves, grass etc to use for decoration in the next activity where your group will build a volcano!

#### **Activity 5**

Build a volcano (11:30am – 12:00pm) (12:30pm – 1:00pm)

Description: For this activity, your group will create your own volcano! After you use the modeling clay to make the sides of your volcano, be sure to use the items you gathered to decorate!

##### Materials:

1 – paper plate

1 – small bottle

2.5 pounds of modeling clay (half of the bucket) or play-doh

Directions to create volcano:

Step 1: Put the clean, empty bottle on the paper plate. Using the modeling clay or play-doh, make a volcano around the bottle. Leave the area around the top of the bottle open and do not get any clay inside the bottle. Decorate the volcano!

#### **Activity 6**

Poster boards or PowerPoints (1:00pm – 2:00pm)

Description: For this activity, your group will research a topic from the list the instructor has. You will research and present the information on a poster board or PowerPoint. This decision will be made by you site instructors.

Materials: (do not need listed materials if groups will create PowerPoints)

1 – Poster board

Markers, colored pencils

Construction paper

## **Activity 7**

Volcano eruption! (2:00pm – 2:30pm)

Description: For this activity, you will be in your same groups. Using the volcanoes you created, we will now make them erupt!

### Materials:

Built volcanoes

Safety goggles/glasses

Baking soda

Vinegar

Dish soap

Funnel

Measuring spoon and measuring cup

Red food coloring (optional)

### Procedure:

Step 1: Using the funnel, put 3 tablespoons of baking soda into the bottle.

Step 2: Add a few drops of liquid dishwashing detergent and about a half cup of water.

Step 3: Put a few drops of red food coloring into about one-half of a cup of vinegar.

Step 4: THE ERUPTION. Using the funnel, pour the vinegar mixture into the bottle and quickly remove the funnel!

When the vinegar reacts with the baking soda, carbon dioxide gas is formed and the bubbles push the “lava” out the volcano.