

## Science Concept:

Magma is found in volcanoes.

(NOTE: This lesson should be completed after students have learned about the parts of a volcano.)

## Objectives:

The student will:

- identify parts of a volcano;
- describe the parts of a volcano; and
- write a paragraph about magma.

## GLEs Addressed:

### Science

- [4] SD2.2 The student demonstrates an understanding of the forces that shape Earth by identifying causes (i.e., earthquakes, tsunamis, volcanoes, landslides, and avalanches) of rapid changes on the surface.
- [3] SA1.1 The student demonstrates an understanding of the process of science by asking questions, predicting, observing, describing, measuring, classifying, making generalizations, inferring and communicating.

### Writing

- [3] W1.2.2 The student writes for a variety of purposes and audiences by using expressive language when responding to literature or producing text (e.g., journals, pictures supported by text or poetry).

## Vocabulary:

*cinder cone* – simplest type of volcano; built from particles and blobs of thickened lava ejected from a single vent.

*eruption* - the ejection of molten rock, steam, etc., as from a volcano or geyser

*lava* - lava is the word for magma (molten rock) when it erupts onto Earth's surface. Geologists also use the word to describe the solidified deposits of lava flows and fragments hurled into the air by explosive eruptions (for example, lava bombs or blocks). Lava comes from the Italian word for stream, which is derived from the verb lavare—to wash

*main vent* - openings in Earth's crust from which molten rock and volcanic gases escape onto the ground or into the atmosphere. Vents may consist of a single circular-shaped structure, a large elongate fissure and fracture, or a tiny ground crack. The release of volcanic gases and the eruption of molten rock will result in an assortment of constructional features ranging from enormous shield volcanoes and calderas to fumaroles and small rootless hornitos

*magma* - molten or partially molten rock beneath Earth's surface. When magma erupts onto the surface, it is called lava. Magma typically consists of (1) a liquid portion (often referred to as the melt); (2) a solid portion made of minerals that crystallized directly from the melt; (3) solid rocks incorporated into the magma from along the conduit or reservoir, called xenoliths or inclusions; and (4) dissolved gases

*magma chamber* - a magma chamber, or reservoir is a storage area of magma (molten rock) beneath a volcano. Magma moves into it from a deeper source, below, and conduits lead up to a lava dome at the surface

*pressure* - the exertion of force upon a surface by an object, fluid, etc., in contact with it

*volcano* - a volcano is a vent at Earth's surface through which magma (molten rock) and associated gases erupt, and also the cone built by effusive and explosive eruptions

# MAGNANOMOUS TARTS

INSTRUCTIONS  
Grade 3



## Materials:

- Bowls
- Clear plastic bottle of clear soda or seltzer
- Chart paper (one piece)
- Food coloring
- Refrigerated pastry dough
- Wax paper
- Jam (one teaspoon per student)
- Oven mitts
- Plastic knives and spoons
- Muffin pan with twelve sections, enough pans to provide one section per student
- Access to oven
- *Pompeii: Buried Alive* by Edith Kunhardt Davis, 1987
- STUDENT WORKSHEET: "Volcano Diagram"

## Resources:

- Franden, J. (1992). *How the Earth works*. Reader's Digest Association.

## Activity Preparation:

1. Prepare a vocabulary list with definitions on chart paper.
2. Just prior to activity, preheat oven to 375°F.

## Activity Procedure:

Please refer to the assessment task and scoring rubric located at the end of these instructions. Discuss the assessment descriptors with the class before teaching this lesson.

### Gear up

#### **Process Skills: observing and communicating**

1. Ask students what they know about magma and list responses on the board.
2. Unscrew the cap of a bottle of soda or seltzer to reduce pressure, noting that bubbles appear; tighten the cap and they disappear. Take off the cap and add food coloring to the soda or seltzer (makes it easier to see the bubbles). Screw the cap on tightly and give the bottle a gentle shake to make sure that lots of gas is dissolved. Unscrew the cap a little, holding the bottle away from your face. The soda or seltzer will erupt from the bottle as the pressure drops.
3. Ask the class the following questions and discuss.
  - a. What part of a volcano is similar to the demonstration?
  - b. How is a real volcano the same as our exploding gas bottle?
4. Review vocabulary by sharing the prepared list of words on chart paper.

### Explore

#### **Process Skills: observing and describing**

5. Explain students will make an edible volcano.
6. Cover the desks or tables with wax paper. Give each student a small handful of dough. As a large group, direct students to flatten the pastry dough on their piece of wax paper with their fingers.
7. Instruct each student to use a plastic knife to cut out two circles: one for the top and one for the bottom of a tart.
8. Ask students to place a circle of pastry in each bowl of the muffin tin. Add a teaspoon of jam to each cup. Put a pastry lid on each tart and press down to seal the edges. Make a small hole in the center of each tart with a knife. The teacher will place the tarts in the oven and bake at 375°F. The tarts are done with the jam (magma) has erupted.

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**Teacher's Note:** Make sure each student is able to determine which tart belongs to him or her. One way to do this is to depict the muffin tins with a chart on the board. Have students label the corresponding section on the chart. Make sure the top and bottom of each pan is labeled so they don't get reversed.

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9. Instruct students to describe in their science journal what happened when they baked their tart and how it compares to what happens in a volcano.
10. While the tarts are cooling, read *Pompeii: Buried Alive* and discuss the book. Eat the tarts!

## Generalize

### *Process Skills: describing and communicating*

11. Ask students to the following questions as a group and discuss. Instruct them to record their answers in their science journal.
  - a. What part of the tart represents the volcano?
  - b. What part of the tart represents the magma?
  - c. What part of a volcano is the hole in the tart?
  - d. Why does the jam in the tart erupt?
  - e. What do we call magma after it has erupted?

## Apply

### *Process Skills: communicating and describing*

12. Instruct students to investigate an Alaska volcano on the Internet. Instruct students to write a paragraph describing the volcano in their science journal. Students should cite their sources.

# MAGNANOMOUS TARTS

# RUBRIC

## Assessment Task:

Complete the STUDENT WORKSHEET: “Volcano Diagram” by using the word box to correctly label three or more parts of the volcano. Choose at least two parts of the volcano to describe. Write a paragraph that explains the difference between lava and magma. Be sure to include at least two supporting details.

## Rubric

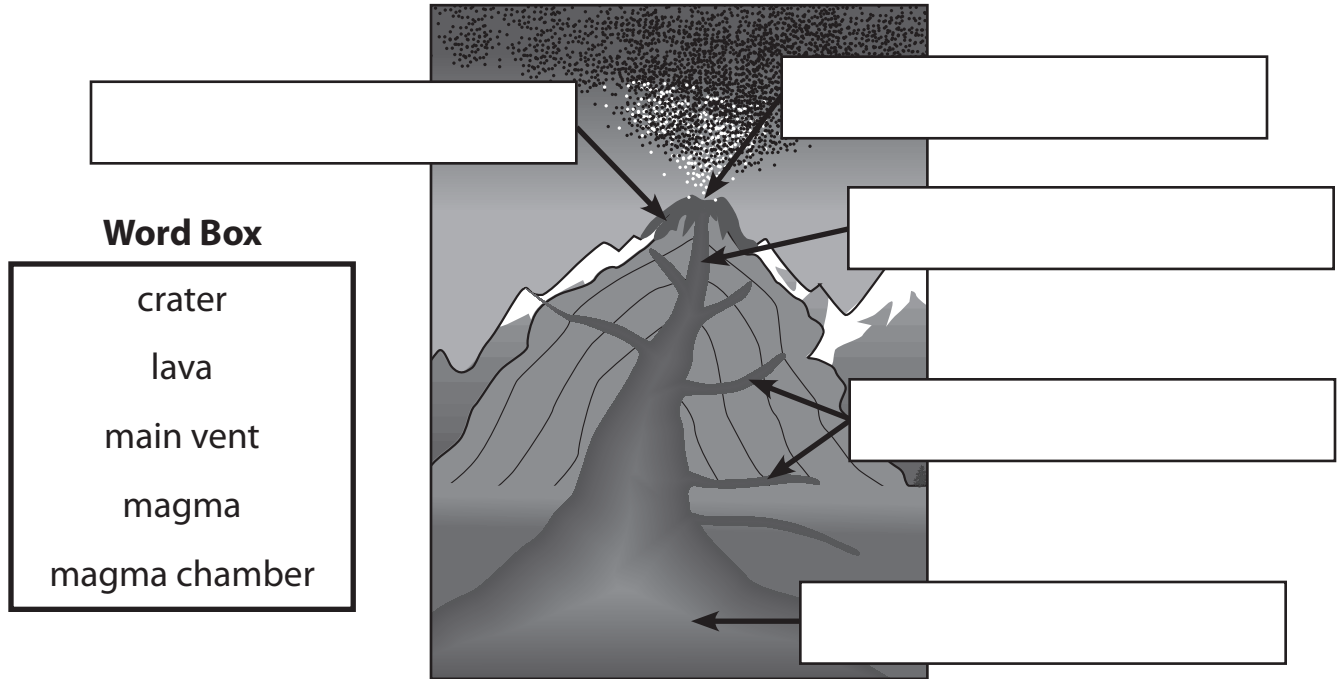
Objective	GLE	Below Proficient	Proficient	Above Proficient
The student will identify parts of a volcano.	[4] SD2.2	The student identifies two or less parts of a volcano.	The student identifies three parts of a volcano.	The student identifies four or more parts of a volcano.
The student will describe parts of a volcano.	[3] SA1.1	The student describes one or fewer parts of a volcano.	The student describes three parts of a volcano.	The student describes four or more parts of a volcano.
The student writes a paragraph about magma.	[3] W1.1.2	The student writes a paragraph explaining the difference between lava and magma. The paragraph includes one or fewer supporting details.	The student writes a paragraph explaining the difference between lava and magma. The paragraph includes two supporting details.	The student writes a paragraph explaining the difference between lava and magma. The paragraph includes three or more supporting details.



NAME: \_\_\_\_\_

# VOLCANO DIAGRAM

**Directions:** Use the word box to label the features of the volcano.



2. Describe at least three parts of the volcano:

- A. cone \_\_\_\_\_
- B. lava \_\_\_\_\_
- C. main vent \_\_\_\_\_
- D. magma \_\_\_\_\_
- E. magma chamber \_\_\_\_\_

3. Write one paragraph explaining the difference between lava and magma. Your paragraph should have two supporting details.

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