



Topic: Building a Volcano

Grade : 4 to adult

An integrated lesson plan covering
sessions of approximately ... hours each.

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Lesson-Planning Approach

Some learners perceive their “world” as a whole, where all things are interconnected and dependent upon each other. These “integrated” students face major challenges in coping with our dominant educational, social, and economic systems, which tend to present information in a linear fashion without the necessity of integration into meaningful context. Integrated students are at-risk of failing as they attempt to grasp information in ways that do not match their experience. Among large populations of at-risk students are many from Native American and similar cultures who do not regard their world as a sum of parts but as a blend of all that they experience.

This lesson plan does include some traditional, linear approaches to delivering information (checklists, rules, analysis, problem solving and organization). In addition to the traditional, linear delivery of information, this lesson plan also includes some of the following strategies, designed to appeal to at-risk students as they learn academic/life skills:

- ❖ Integration of technology
- ❖ Story telling/anecdotal information
- ❖ Non-competitive group and team work
- ❖ Performance-based assessment and rubrics
- ❖ Visual presentations and practice through technology and other means
- ❖ Project-based assignments that integrate family and community
- ❖ Activities appealing to multiple intelligences (Gardner)

Lesson Overview

This project will instruct students how to do volcano research on the Internet, build their own volcano, and write an instruction text guiding others to build a volcano. First, students will use a research worksheet to find volcano facts on the Internet. Next, they will follow instructions to build their own miniature volcano. Finally, the students will write a set of instructions that would allow others to build one as well. The writing of the instructions comes after the actual building so that students will be writing from a hands-on experience.

Lesson Objectives

Name of Project: Building a Volcano

Project Objective: When students complete this project, they will be able to build a volcano out of salt-dough.

Integration of Other Functional/Academic Skills: (Critical thinking is required throughout the lesson.) Students will be able to...

Reading	Students will be able to find main ideas in expository text on volcanoes.
Writing	Students will be able to write sequential steps to building a volcano. Students will use correct grammar, spelling, and style for their writing.

State/National Standards

Reading and Writing Standards

- Standard 1: Students read and understand a variety of materials.
- Standard 2: Students write for a variety of purposes such as telling stories.
- Standard 3: Students write using conventional grammar, usage, sentence structure, punctuation, capitalization, and spelling.

Websites

Required:

<http://volcano.und.nodak.edu/vwdocs/msh/msh.html>

<http://www.ezinfo.ethz.ch/ezinfo/volcano/verschiedenes/walk/walk0e.html>

Support:

<http://www.usgs.gov/education/learnweb/volcano/>
<http://volcano.und.nodak.edu/vw.html>

Pre-requisites (Skills required to process project)

Students will need to be able to do the following:

- **Read at a 4th grade level**
- **Write instruction text**

Required Materials

Flour
Salt
Water
Cone-shaped water cups
Baking soda
Vinegar
Styrofoam platters

See Volcano Instructions for exact quantities of materials.

Handouts (Included at the end of this document)

Handout 1: Research Guide
Handout 2: Volcano Instructions
Handout 3: Instruction Text Guide

Required Equipment/Technology

A computer with Internet access.

THE LESSON

Note: Students do not learn from what you do but from what you have them do.

Preparation

Activity	Instructor Notes	ET
Volcano Research	Students should use Handout 1 to guide them in their research on Mount St. Helens and Stromboli.	30 min.

Presentation

Activity	Instructor Notes	ET
Preview the steps of building the volcano using Handout 2.	<p>During the presentation, show handout 2 and discuss how the model and an actual volcano will be similar. For example:</p> <ol style="list-style-type: none"> 1. The magma chamber will be formed on the inside of a cone-shaped cup. 2. Cutting the tip off of the cup will make the crater of the volcano. 3. The Styrofoam platter will represent the Earth's crust. 	20 min.

Performance and Practice

Instructions for students	Teacher notes	ET
Students build their volcanoes.	Using Handout 2 , the students will follow the steps in order to build their own volcano out of salt-dough.	20 min.
Volcanoes need to dry.	The salt-dough may take as long as one week to fully dry.	
Painting the volcanoes.	Many types of paint are available; acrylic is suggested. The colors brown, green, and red should be popular among the students.	30 min.

Erupting the volcanoes.	Pour one tablespoon of baking soda into the center of the volcano. Keeping face clear of the opening, pour one tablespoon of vinegar into the center.	15 min.
Writing the Instruction text.	Students should use Handout 3 to plan for their instruction text.	30 min.

Lesson Assessment Strategy (Formative – As the lesson progresses)

Preparation, Presentation and Overall Implementation (Instructor)

Did the questions on handout 1 facilitate the students to become more familiar with volcanoes? (Assess through discussion)

Were the students able to follow the steps of building the volcano?

Performance and Practice (Student)

Did the student follow the sequential steps of building the volcano?

Did the students ask questions to clarify steps?

Was the plan for the instruction text utilized?

Could the students navigate the Internet to find the websites.

Technology

Was the Internet accessible?

Could students explain the steps of finding a website?

Handouts

Research Guide to Mount St. Helens and Stromboli

Mount St. Helens <http://volcano.und.nodak.edu/vwdocs/msh/msh.html>

1. Draw one of the maps from the website below:

2. Write a brief descriptions of one of the stories from someone who was there when the volcano erupted.

Stromboli: <http://www.ezinfo.ethz.ch/ezinfo/volcano/verschiedenes/walk/walk0e.html>

3. What island chain is Stromboli in? _____

4. What are the current eruption conditions of this volcano?

5. What was your opinion of the virtual climb to the summit (did you like it? Why or why not?)?

How to Build a Salt-Dough Volcano

Making the salt-dough

Ingredients: 1 cup flour
1 cup salt
 $\frac{3}{4}$ cup water

Steps:

1. Mix flour and salt in a container
2. Add water and mix until dough is smooth

Making the volcano

Materials: Salt-dough
Cone-shaped cup
Film canister
Styrofoam platter

Steps:

1. Cut tip off of cone-shaped cup
2. Place film canister on top of Styrofoam platter
3. Put the cup upside down over the canister
4. Cover cup with salt-dough
5. Let the dough dry (may take a whole week)

Painting the volcano

Materials: Paint (acrylic works well)
Colors: brown, green, red
Paintbrush

Steps:

1. Paint to your liking
2. Let it dry

Erupting the volcano

Materials: 1 tablespoon baking soda
1 tablespoon vinegar

Steps:

1. Pour baking soda through opening in volcano into the film canister.
2. Pour in vinegar (make sure to keep your face away from the volcano).

Writing an Instruction Text

Instruction texts are written sequentially; the steps are written **in order**. Make sure to keep this in mind while planning for your writing.

Plan your instructions below by writing phrases or drawing pictures. Use the [directions for making](#) the volcano if you need help:

What is the **first** main step in making the volcano? (Include what ingredients were used.)

What is the **next** main step in making the volcano? (What did you use to build with?)

What is the **third** main step in the project? (Include the colors used.)

What is the **final** step in working with the volcanoes? (What materials did you use for this step?)

Activity Checklist

Activity	Check when finished.
Handout on Mount St. Helens and Stromboli is finished.	
Salt-dough is made according to recipe.	
Volcano is constructed following steps.	
Volcano has been 'erupted' following directions.	
Planning for instruction text has been completed.	
Instruction text has been written using the plan for a guide.	

Technology Checklist

- ✓ Brochure template has been loaded for student use.
- ✓ Printers are ready and communicating with the computer.

Lesson Rubric

1	2	3	4
The volcano was completed with more than two steps done incorrectly.	The volcano was completed with two steps done incorrectly (ex: tip not cut off cup and not completely covered with salt-dough)	The volcano was completed with only one step done incorrectly (ex: tip not cut off of cup)	The volcano was completed with all steps completed in order.
The plan has more than 2 areas not completed.	The plan has 1 or 2 areas not completed.	The plan is filled out completely, but one of the steps seems to be disjointed.	The plan is completely filled out and the events flow together.
The instruction text does not follow the plan at all.	The instruction text follows the idea of the plan, but the order is mixed up.	The instruction text follows the plan for the most part with only 1 event out of order.	The instruction text is written from the plan and flows together well.
Writing is hard to understand because of major errors in spelling and/or grammar.	Writing contains many errors that interfere with the reader's understanding.	Writing is done with only a few spelling or grammar errors that don't interfere with understanding.	Written components follow all grammar and spelling rules.