
My NASA Data - Lesson Plans

Volcanic Eruptions Story Map



Purpose

This story map is intended to be used with students who have access to a computing device in a 1:1 or 1:2 setting. Features included in this story map may be used by the instructor in isolation to support lesson plans and related activities. By using the various visualizations (i.e., images, charts, and graphs) in this story map, students will explore *volcanic eruptions featuring* volcano and aerosols data. Throughout the lesson, students will investigate how ash and aerosols produced from volcanic eruptions are hazardous to the human ecosystem and will analyze concentrations of aerosols from a volcanic eruption over time.

Volcanic Eruptions Story Map

Introduction Engage Explore Explain Elaborate Evaluate NASA Connection Teacher Resources

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Volcanic Eruptions

Purpose:
Students will explore the formation and impacts of ash and aerosols from volcanic eruptions around the world. They will investigate how ash and aerosols produced from volcanic eruptions are hazardous to the human ecosystem. In the Elaborate stage, students will graph the concentrations of aerosols from a volcanic eruption over time.

Grade Level: 7-12

Essential Questions:

1. How do volcanoes influence changes in the atmosphere?
2. How do aerosols and ash produced from volcanoes influence the human ecosystem?
3. How are volcanoes formed?

Estimated Time for Completing Activity:
Two 50 minute class periods

Tasks:

- Students will analyze maps and time series data to understand changes from volcanic eruptions.
- Students will construct data-based explanations and conclusions.



[CLICK HERE](#)

Learning Objectives

- Students will analyze maps and time series data to understand changes from volcanic eruptions.
- Students will construct data-based explanations and conclusions.
- Students will compare multiple variables as they analyze aerosol data from volcanoes.
- Students will consider the impact of volcanoes on the human ecosystem.

Why Does NASA Study This Phenomenon?

When a volcano erupts, it can wreak just as much havoc in the air than on land. The expanding plume of ash that rises into the atmosphere is a danger to aircraft and can damage engines, causing them to fail mid flight. Because the plumes often look like ordinary rain clouds on radar and to a pilot's eye, they can be difficult to detect. Out of caution, smoke-spewing volcanoes are given a wide berth, leading to costly flight delays and cancellations.

To help improve the flow of air traffic, NASA scientists are using data collected by the Earth-observing Suomi NPP satellite to map the full three-dimensional structure of volcanic clouds. By measuring the location and height of particles within the cloud, as well as the amount of sulfur dioxide gas in the air, scientists can create improved models of weather patterns, allowing a more accurate forecast of where the hazardous ash is spreading—information air traffic managers can use to reroute flights and keep passengers out of harm's way.

Essential Questions

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Cross-Curricular Connections

National Geography Standards:

- How to use maps and other geographic representations, tools, and technologies to acquire, process, and report information from a spatial perspective.

Materials Required

Resources Needed Per Student:

- Student Data Sheet - [Link](#)

Resources Needed Per Group:

- Computer/Tablet
- Internet Access
- Link to the "*Volcanic Eruptions*" Story Map - [Link](#)

Technology Requirements

- Internet Required
- One-to-a-Group
- Visualization Tool Required

Teacher Background Information

A volcano is an opening on the surface of Earth that allows material warmer than its surroundings to escape from its interior. When this material escapes, it causes an eruption. An eruption can be explosive, sending material high into the sky, or it can be calmer, with gentle flows of material. Volcanoes can be active, dormant, or extinct. Active volcanoes are volcanoes that have had recent eruptions or are expected to have eruptions in the near future. Dormant volcanoes no longer produce eruptions, but might again sometime in the future. Extinct volcanoes will likely never erupt again. Volcanoes occur when material significantly warmer than its surroundings is erupted onto the surface of a planet or moon from its interior. On Earth, the erupted material can be liquid rock ("lava" when it's on the surface, "magma" when it's underground), ash, cinders, and/or gas.

To learn more, visit:

- The [MND Volcano Phenomena](#) page for background information
- [Explain](#) tab found in the Story Map for more information

Prerequisites Student Knowledge

- Familiarity with finding coordinates on a map
- Familiarity with line plots and bar graphs
- Basic concepts of energy transfer

Procedure

Visit the [Story Map](#) to access the 5 E Lesson.

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Teacher Answer Key

Teachers who are interested in receiving the answer key, please contact My NASA Data from your school email address at larc-mynasadata@mail.nasa.gov.

Extensions



If your students need additional practice with data analysis, consider incorporating this story map with the My NASA Data [Data Literacy Cubes](#).