ACTIVITY: Volcanic Rocks and Deposits (Evidence of Past Eruptions)

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Objective: Learners will use the locations of volcanic rocks, as well as ash and other volcanic deposits, as evidence for past volcanic activity.

Introduction: Volcanic rocks and deposits of volcanic ash and tephra offer valuable evidence of past eruptions, aiding scientists in reconstructing volcanic history and understanding future hazards. Highly explosive eruptions create features like obsidian flows and volcanic ash deposits. Volcanic deposits, such as pyroclastic flows, lahars, and tephra layers, provide critical insights into eruption dynamics and hazard potential. By studying these rocks and deposits, scientists can assess the frequency, magnitude, and style of past volcanic activity, contributing to better volcanic risk management and preparedness strategies.

Have learners:

1. Complete one or more activities to learn about igneous rocks, such as:
   a. **Modelling the formation of igneous rocks.**

   b. Comparing images of the most common types of volcanic igneous rocks.

   c. Observing igneous rock samples and minerals commonly found in igneous rocks.

2. Learn about ash and tephra deposits:
   a. Make a hypothesis on the map on the handout to indicate how far they think the ash spread from the largest Yellowstone eruption.

   b. Observe the **map of the three largest eruptions on the Yellowstone Plateau:**
      - Lava Creek Eruption (630,000 years ago), Mesa Falls Eruption (1.3 million years ago), Huckleberry Ridge Eruption (2.1 million years ago).
      - Indicate a point on the map where they could dig and find evidence of all three of these eruptions.

   c. Discuss:
      - ▸ *Which ash bed would be farthest beneath the surface? Why is this?*
      - ▸ *What factors might affect the spread of ash from a volcanic eruption?*

   d. Complete **an activity** to better understand the spread of ash and tephra.

3. Learn about gases emitted from volcanoes:
   a. Discuss:
      - ▸ *Why are gases are released by volcanoes? What is their source?*
      - ▸ *Why are gases released from some volcanoes even if it is not erupting?*
      - ▸ *What effects might these gases have on people and the environment?*
      - ▸ *How do gases released by volcanoes contribute to climate change?*

HANDOUT: Volcanic Rocks and Deposits (Evidence of Past Eruptions)

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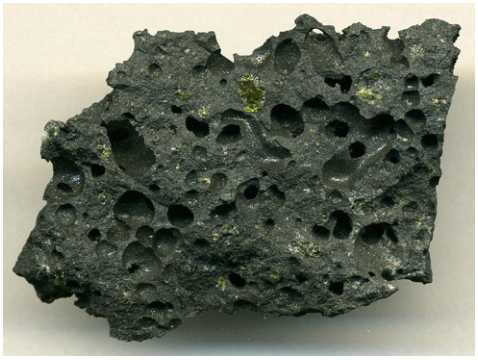
Basalt

Basalt is the most common volcanic rock formed from lava flows. Compare the two types of basalt:

BASALT

VESICULAR BASALT



Credit: both: James St. John via Flickr

- Similarities:

- Differences:

Other Volcanic Rocks

Compare other types of volcanic rocks formed by lava flows:

DACITE

RHYOLITE

ANDESITE

Credit: all: James St. John via Flickr

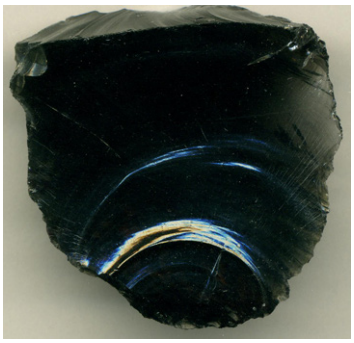
▶ Which of these rock types is most similar to basalt? What is your evidence?

▶ How do the other two volcanic rocks compare to basalt? How are they different?

Volcanic Glass

PUMICE

OBSIDIAN



SCORIA

Credit: all: James St. John via Flickr

▶ Compare the three main types of volcanic glass. Why do you think they differ?

Ash Spread

Volcanoes also often spew volcanic ash and tephra (rock fragments and debris) over a much wider range than lava flows.

- Three of the largest eruptions in the U.S. occurred on the Yellowstone Plateau, indicated by the red oval on the map. Use a colored pencil to indicate how far you think the ash from its largest eruption spread.

- What factors do you think affect the spread of ash?