

ACTIVITY: Lava Flows



Objective: Learners will understand how viscosity impacts the shape of lava flows, and the features formed during volcanic eruptions.

Introduction: Lava flows occur during effusive eruptions. Characteristics of the lava being erupted (most prominently its composition and viscosity) strongly impact the size and shape of lava flows.

Basalt is the most common type of volcanic rock because most lava flows are made of basalt. Basaltic lavas have low silica and low viscosity, meaning that they form thin lava flows that may travel many miles from the vent. Basaltic lava flows have two types of characteristic surfaces—ropy (Pāhoehoe) or rough ('A'ā)—that result from minor variation in viscosity and temperature. Features found in solidified lava flows provide important information of the dynamics that occurred while they were active. Andesite and rhyolite are progressively more viscous than basalt, and they form shorter and steeper flows. Andesite lava usually make block flows. Rhyolite is so viscous that sometimes lava erupted from a vent is unable to travel away from it, and instead forms a lava dome over it.

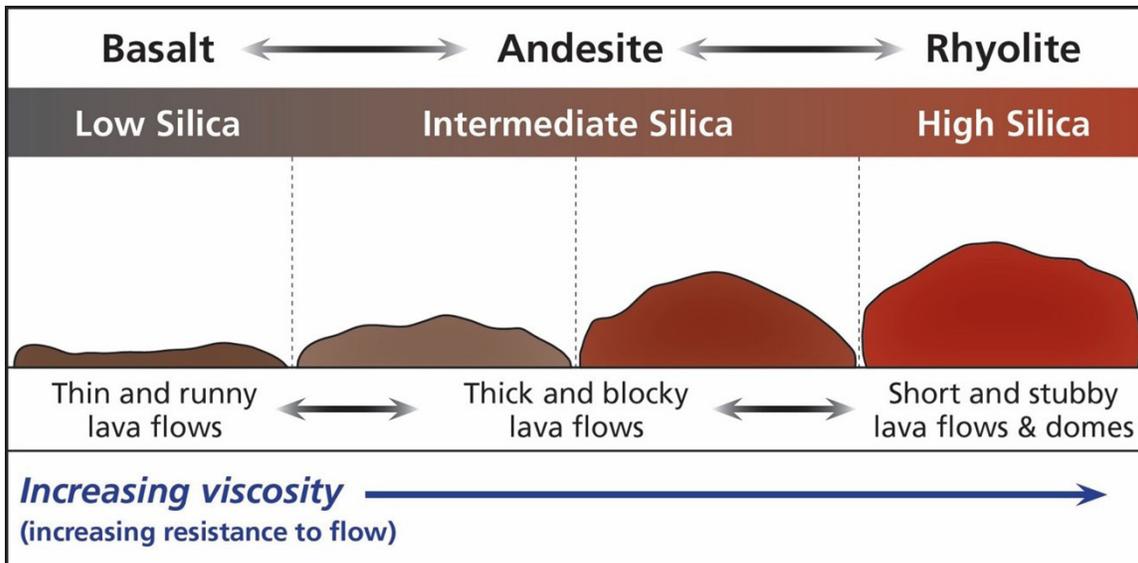
Have learners:

1. Discuss viscosity and how the viscosity of magma and lava can affect volcanic eruptions.
2. Work in groups to complete an [activity on viscosity](#).
3. Identify the likely composition of some lava flows erupted from national park volcanoes.
4. Learn about the main characteristics of lava flows of different compositions.
5. Learn about the forms of basaltic lava flows, as basaltic lava is the most common type.
6. Complete an activity to [investigate how layers of lava build up](#) after volcanic eruptions.
7. Revisit their comparisons of the volcanic eruptions to describe how the viscosity of the magma likely affected the eruptions.
8. Watch a video of [lava moving through a lava tube](#) and consider how they form.
9. Analyze images of lava flows to determine the direction of flow and how some areas can be spared during an eruption ([kīpukas](#)).

HANDOUT: Lava Flows



The composition and viscosity of lava ranges, and can affect how it flows:



Credit: NPS

- ▶ Which type of lava flow has the potential to spread over the widest area? Explain your answer.

► Identify the likely composition of the following lava flows. Explain your answers.



Credit: [NPS](#), Lassen Volcanic National Park



Credit: [USGS](#)



[NPS](#), Novarupta, Katmai National Park

Lava Flow Forms

Most basaltic lava flows are of one of two main types:

- Pāhoehoe: Lava flows with smooth, billowy, or ropy surfaces
- 'A'ā: Lava flows with rough or jagged surfaces

They form due to small differences in temperature, viscosity, and other characteristics.

The image below shows lava from a current eruption moving over hardened rock from a previous eruption.



Credit: NPS, Hawai'i Volcanoes National Park

- ▶ Make an argument about the lava— is the current eruption the same type of lava as the previous eruption? How can you tell? Use observations from the image to support your argument.

- ▶ What else would you want to know about the lava and the rocks to add to your argument?

Lava Tubes

Lava tubes are channels in the interior of lava flows through which molten lava travels:



Credit: USGS

► How do you think lava tubes form?

► Why do you think some lava tubes are empty after an eruption ends?

Direction of Lava Flows



Credit: [NPS](#)

- ▶ Draw an arrow showing the direction of flow in the photo. Describe how you were able to determine the direction of flow.

Kīpukas

Kīpukas are areas that do not get buried by a lava flow:



Credit: [USGS](#)

- ▶ Why do you think these areas were not buried by lava?
- ▶ How do you think that kīpukas are important to the ecology of volcanic areas?