SI Geology - Full Discipline Demo

Volcanoes

Final Report - Answer Guide

Institution	Science Interactive University
Session	SI Geology - Full Discipline Demo
Course	SI Geology - Full Discipline Demo
Instructor	Sales SI Demo

Test Your Knowledge

Classify each statement as true or false.

Ashfall from volcanoes rarely endangers humans, but can cause significant damage to buildings, agriculture, and infrastructure.

Death and injuries caused by lava flows are common, due to the high speed at which lava flows move.

Hot or cold mixtures of water, mud, and volcanic rock that flow rapidly down channels that drain from volcanoes are called pyroclastic flows.

Hot spots are not located on tectonic plate boundaries.

Over 80% of active centers of volcanism are located along the mid-Atlantic ridge.

Volatile gases emitted by volcanoes include carbon dioxide, sulfur dioxide, and hydrogen sulfide.

True	False
1	2

Correct answers:

1

Ashfall from volcanoes rarely endangers humans, but can cause significant damage to buildings, agriculture, and infrastructure.

Hot spots are not located on tectonic plate boundaries.

Volatile gases emitted by volcanoes include carbon dioxide, sulfur dioxide, and hydrogen sulfide.

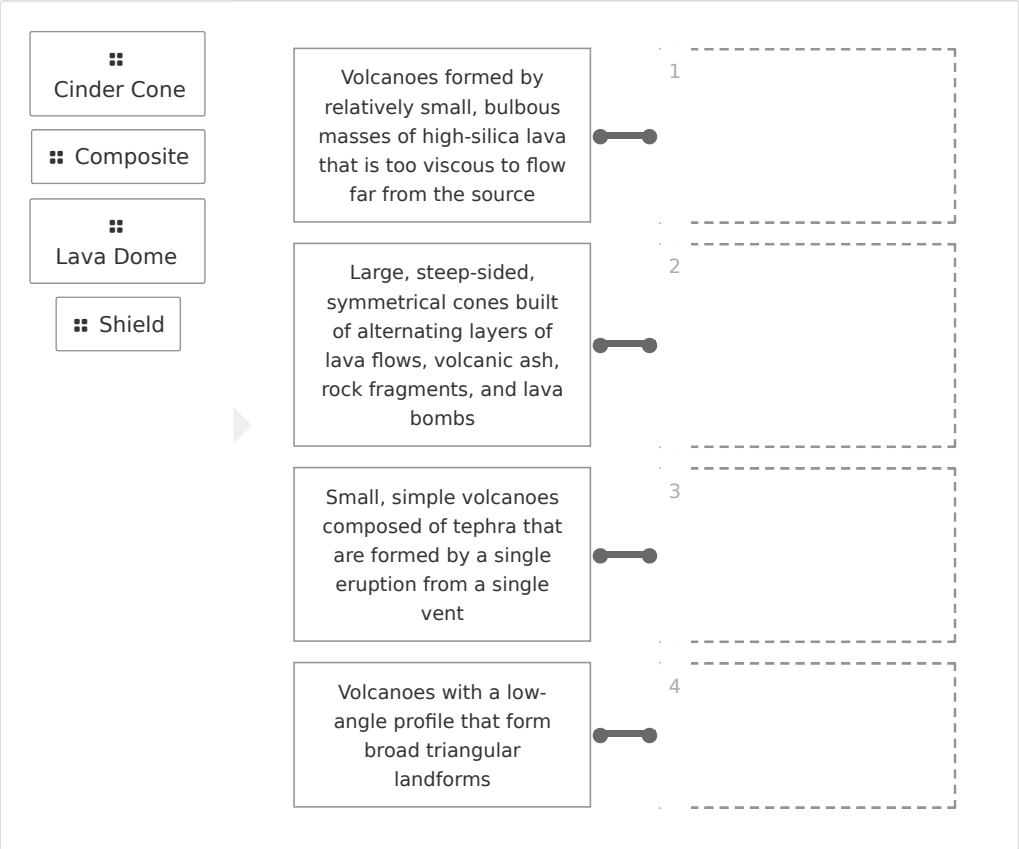
2

Death and injuries caused by lava flows are common, due to the high speed at which lava flows move.

Hot or cold mixtures of water, mud, and volcanic rock that flow rapidly down channels that drain from volcanoes are called pyroclastic flows.

Over 80% of active centers of volcanism are located along the mid-Atlantic ridge.

Match the type of volcano to its description.



Correct answers:

1 Lava Dome 2 Composite 3 Cinder Cone 4 Shield

Exploration

Volcanic activity only occurs at convergent plate boundaries.

- True
- False ✔

_____ volcanoes tend to form at subduction zones and are characterized by a conduit system through which magma from within the Earth's crust pushes its way into the interior of the volcano.

- Cinder cone
- Composite ✔
- Shield
- Lava dome

The type of volcanic eruption that occurs is impacted by the _____ and _____ of the magma.

- viscosity; temperature
- volatile content; composition
- composition; temperature
- viscosity; volatile content ✔

Which of the following does not impact the speed at which lava flows?

- Composition of the lava
- Rate of lava production
- Type of eruption ✔
- Steepness of the terrain

_____ are hot density flow mixtures of volcanic rock, volcanic ash, and gas that can race away from vents at great speeds.

- Pyroclastic flows ✔
- Lava flows
- Lahars
- Tephras

Exercise 1

What type of lava flowed at Location A?

What is the term for the area around Location A where many volcanoes occur in the same place?

Does the volcano at Location B occur near a plate boundary, or on a hot spot?

Which island at Location C experienced an eruption more recently: Santa Cruz or Isabela? How do you know?

What do you think is the biggest volcanic threat to the McMurdo Research Station?

What type of lava would you expect at Location E: basalt or silica-rich?

What type of eruption is the volcano at Location F likely to exhibit?

What can you see inside of the crater at Location G (notice the cracked pattern along the surface)?

What type of lava flowed at Location H?

Data Table 1: Types of Volcanoes and Volcanic Landforms
(SAMPLE ANSWER BELOW)

Location	Type of Volcano	Largest Town Nearby	Hazards
A	Cinder Cone	Medina (or Alyutamah)	Large populated areas, with historical significance. Potential for widespread damage and loss of life. Lava flows and gas are major hazards.
B	Composite	Mexico City	Very large population center and metropolitan area means risk of significant loss of life, property, infrastructure, etc. Explosive eruptions with ash/tephra, pyroclastic flows, lahars, and possibly lava flows are hazards.
C	Shield	Puerto Ayora	The Charles Darwin Research Station is on this

			island, so in addition to the threat to the towns on the island, there is also the risk to scientific research (and rare organisms). Lava flows, gas, and landslides are hazards.
D	Composite	McMurdo Research Station	Scientific research base lies at the base of the volcano. Loss of life and property a large threat. Explosive eruptions with ash/tephra, lahars, and pyroclastic flows are potential hazards.
E	Lava Dome	Variable, but Taipei is nearby	A major metropolitan area is just a few kilometers from the volcano, so there is a risk of massive damage. Landslides, lahars, gas, and ash/tephra are risks.
F	Shield	Husavik	The area is sparsely populated, but there are large agricultural areas that could be damaged. Lava flows are lahars are the biggest hazard in this area.
G	Composite	Goma (other answers possible)	This area is contains densely populated areas and is incredibly hazardous. The volcano is currently active and explosive volcanism, lava flows, gas, landslides, and lahars are all serious hazards.
H	Cinder Cone	Fillmore	The area is not heavily populated, but there are several towns and large agricultural areas. Based on the dark color and lack of vegetation, this area erupted quite recently. Lava flows and gas are the biggest hazard.

Data Table 2: Currently Active Volcanoes
(SAMPLE ANSWER BELOW)

Name of Volcano	Location	Key Features
Student responses will vary based on volcanoes selected		

Competency Review

Which type of eruption is characterized by great volumes of basaltic magma flowing as a sheet over large areas, building up plateaus?

- Hawaiian
- Vulcanian
- Icelandic ✔
- Vesuvian

Lahars can only form during eruptive episodes.

- True
- False ✔

_____ are vents in the Earth's surface found near convergent plate boundaries and hot spots that periodically eject columns of hot water and steam above ground.

- Tephra
- Lahars
- Hydrothermal vents
- Geysers ✔

In Exercise 1, which hazard(s) would be associated with the volcano at location B?

- Pyroclastic flows
- Lahars
- Lava flows
- All of the above ✔

In Exercise 1, what type of volcano is present at location F?

- Shield ✔
- Composite
- Lava dome
- Cinder cone

_____ volcanoes are usually formed by a single eruption from a single vent, and are characterized by bowl-shaped craters.

- Shield
- Cinder cone ✔
- Lava dome
- Composite

_____ are isolated plumes of magma that rise from within the mantle away from plate boundaries.

- Geysers
- Hot spots ✔
- Hydrothermal vents
- Tephra

Which volcanic hazard poses a high risk for aviation?

- Volatile gases
- Lava flows
- Ash ✔
- Lahars

Extension Questions

On May 18, 1980, a Plinian eruption on Mount St. Helens resulted in what has been called the most disastrous volcanic eruption in US. History. Research the eruption of Mount St. Helens. What volcanic hazards occurred during the eruption? What was the impact of these hazards on the area surrounding the volcano? (SAMPLE ANSWER BELOW)

The eruption of Mount St. Helens was associated with numerous volcanic hazards, including ash clouds, landslides, lahars, and pyroclastic flows. These volcanic hazards resulted in 57 deaths and over one billion dollars in damages in the state of Washington.