

Activity Guide for Students: Volcanoes, Erupting Now?

Directions for students: Individually read the article assigned by your teacher and answer the questions that follow as a group. Be prepared to present a summary to the class.

Earthquake group: Read "Monitoring earthquakes in Hawaii" at <u>https://volcanoes.usgs.gov/observatories/hvo/hvo_monitoring_earthquakes.html</u>.

1. What did you learn from the first three paragraphs about the seismic network?

2. What types of seismic instruments are used to record waves of sound and motion?

3. What characteristics of earthquakes do Hawaiian Volcano Observatory seismologists analyze and why?

4. How does the Hawaiian Volcano Observatory report seismic activity?

5. What can you learn from the earthquake data at <u>https://volcanoes.usgs.gov/volcanoes/kilauea/monitoring_kilauea.html</u>? What patterns do you

see in the data and how does this relate to the volcanic activity at the time the data was collected? Is there a relationship that you can draw between the data and volcanic behavior?

Deformation group: Read "Deformation monitoring tracks moving magma and faults" at https://volcanoes.usgs.gov/observatories/hvo/hvo_monitoring_deformation.html.

1. What did you learn from the first two paragraphs about deformation monitoring?

2. In what level of detail can Global Positioning System (GPS) sites record ground motion?

3. How do tiltmeters record precise changes in ground slope?

4. How does Interferometric Synthetic Aperture Radar (InSAR) provide a snapshot of volcano deformation from air and space?

5. What can you learn from the deformation data at

https://volcanoes.usgs.gov/volcanoes/kilauea/monitoring_kilauea.html (click "Deformation Data" on the left side of the screen)? What patterns do you see in the data and how does this relate to the volcanic activity at the time the data was collected? Is there a relationship that you can draw between the data and volcanic behavior? **Volcanic gas group:** Read "Monitoring volcanic gas in Hawaii" at https://volcanoes.usgs.gov/observatories/hvo/hvo_monitoring_gas.html.

1. What did you learn from the first three paragraphs about monitoring volcanic gas in Hawaii?

2. How are sulfur dioxide (SO₂) rates measured in real time at the Kilauea summit?

3. How is the chemical composition of gas emissions measured by Fourier transform infrared (FTIR) spectroscopy?

4. How are CO₂ and SO₂ measured at Mauna Loa Volcano?

5. What can you learn from the graph of the amount of SO₂ released annually during the period 1979–2016?

6. Click on the links at the bottom of the page and describe any useful additional information you

find there. What patterns do you see in the data and how does this relate to the volcanic activity at the time the data was collected? Is there a relationship that you can draw between the data and volcanic behavior?

Geology group: Read "Geological monitoring of Hawaiian eruptions" at <u>https://volcanoes.usgs.gov/observatories/hvo/hvo_monitoring_geology.html</u>.

1. What did you learn from the first two paragraphs about field operations for tracking eruptions and assessing hazards?

2. How do lava-flow maps show the history of Hawaiian eruptions?

3. How does measuring lava volume over time help to forecast hazards?

4. How do webcams and time-lapse cameras improve interpretation and situational awareness?

5. How does monitoring lava and tephra chemistry identify changes in magma sources?

6. Study the <u>webcams</u> at

https://volcanoes.usgs.gov/volcanoes/kilauea/multimedia webcams.html that show what Kilauea looks like in real time from many different angles. What patterns do you see in the data and how does this relate to the volcanic activity at the time the data was collected? Is there a relationship that you can draw between the data and volcanic behavior?