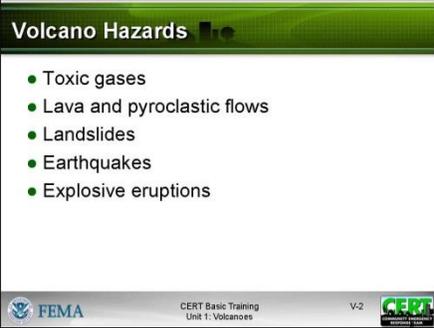


# Volcanoes

INSTRUCTOR GUIDANCE	CONTENT
 <p><b>Volcanoes</b></p> <p>CERT Basic Training Hazards</p> <p>FEMA citizenCorps</p> <p><b>Display Slide V-0</b></p>  <p><b>A Volcano...</b></p> <p>Is a vent through which molten rock escapes to Earth's surface</p>  <p>FEMA CERT Basic Training Unit 1: Volcanoes V-1</p> <p><b>Display Slide V-1</b></p> <p>A <b>lahar</b> is a type of mudflow composed of pyroclastic material and water that flows down from a volcano, typically along a river valley.</p>	<p><b>Introduction</b></p> <p>Explain that a <u>volcano</u> is a vent through which molten rock escapes to the Earth's surface. Unlike other mountains, which are pushed up from below, volcanoes are built by surface accumulation of their eruptive products—layers of lava, ashflows, and ash. When pressure from gases within the molten rock becomes too great, an <u>eruption</u> occurs.</p> <p>Tell the group that the United States is third in the world, after Japan and Indonesia, for the number of active volcanoes. Since 1980, as many as five volcanoes have erupted each year in the United States.</p> <p>Point out that eruptions are most likely to occur in Hawaii and Alaska. For the Cascade Range in Washington, Oregon, and California, volcanoes erupt on the average of one to two each century.</p> <p>Also, when Cascade volcanoes do erupt, high-speed avalanches of <u>pyroclastic flows (hot ash and rock), lava flows, and landslides</u> can devastate areas 10 or more miles away. Lahars can inundate valleys more than 50 miles downstream.</p>

**COMMUNITY EMERGENCY RESPONSE TEAM  
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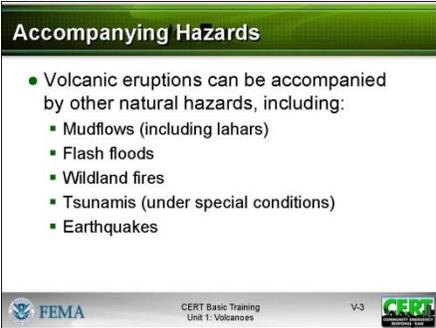
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<b>INSTRUCTOR GUIDANCE</b>	<b>CONTENT</b>
 <p><b>Volcano Hazards</b></p> <ul style="list-style-type: none"><li>● Toxic gases</li><li>● Lava and pyroclastic flows</li><li>● Landslides</li><li>● Earthquakes</li><li>● Explosive eruptions</li></ul> <p>FEMA CERT Basic Training Unit 1: Volcanoes V-2</p>	<p>Emphasize that the island of Hawaii (the largest of the Hawaiian Islands) experiences thousands of earthquakes associated with active volcanoes each year. While most of these are too small to feel, about once a decade a large quake shakes the entire island and causes widespread damage.</p> <p>Explain that volcanoes produce a wide variety of hazards that can kill people and destroy property. Large explosive eruptions can endanger people and property hundreds of miles away and can even affect the global climate.</p> <p><b>Volcanic Hazards</b></p> <p>Tell the group that volcanic hazards include:</p> <ul style="list-style-type: none"><li>▪ Toxic gases</li><li>▪ Lava and pyroclastic flows</li><li>▪ Landslides</li><li>▪ Earthquakes</li><li>▪ Explosive eruptions</li></ul> <p>Point out that eruptions can be relatively quiet, producing lava flows that creep across the land at 2 to 10 miles per hour (mph). Explosive eruptions can shoot columns of gases and rock fragments tens of miles into the atmosphere, spreading ash hundreds of miles downwind.</p> <p>Define <u>lava flows</u> as streams of molten rock that either pour from a vent quietly or erupt explosively as lava fountains. Because of their intense heat, lava flows are also great fire hazards. Lava flows destroy everything in their path, but most move slowly enough that people can move out of the way.</p>

**Display Slide V-2**

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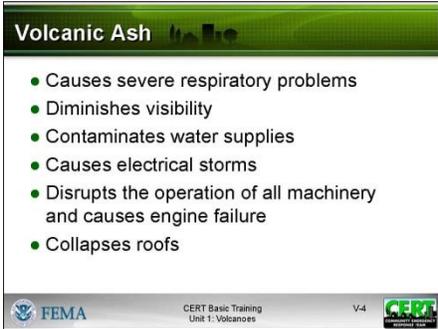
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<b>INSTRUCTOR GUIDANCE</b>	<b>CONTENT</b>
 <p><b>Accompanying Hazards</b></p> <ul style="list-style-type: none"><li>● Volcanic eruptions can be accompanied by other natural hazards, including:<ul style="list-style-type: none"><li>▪ Mudflows (including lahars)</li><li>▪ Flash floods</li><li>▪ Wildland fires</li><li>▪ Tsunamis (under special conditions)</li><li>▪ Earthquakes</li></ul></li></ul> <p>FEMA CERT Basic Training Unit 1: Volcanoes V-3</p>	<p>Explain that, it is, however, almost impossible to channel the lava flow away from towns and neighborhoods. Do not attempt to divert a lava flow; ultimately, it will destroy anything in its path. The speed at which lava moves across the ground depends on several factors, including the:</p> <ul style="list-style-type: none"><li>▪ Type of lava that has erupted</li><li>▪ Steepness of the ground</li><li>▪ Rate of lava production at the vent</li></ul> <p>Remind participants that the lava flow on the surface cools faster than the lava trapped inside the crust. NEVER climb on a lava crust unless it has been deemed safe by a proper authority.</p> <p><b>Accompanying Hazards</b></p> <p>Explain that volcanic eruptions can be accompanied by other natural hazards, including:</p> <ul style="list-style-type: none"><li>▪ Mudflows (including lahars)</li><li>▪ Flash floods</li><li>▪ Wildland fires</li><li>▪ Tsunamis (under special conditions)</li><li>▪ Earthquakes</li></ul>

**Display Slide V-3**

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<b>INSTRUCTOR GUIDANCE</b>	<b>CONTENT</b>
<p data-bbox="188 926 267 999"></p> <p data-bbox="188 1037 594 1104"><b>Allow the participants time to respond.</b></p> <div data-bbox="188 1180 626 1509"><p><b>Volcanic Ash</b></p><ul style="list-style-type: none"><li>● Causes severe respiratory problems</li><li>● Diminishes visibility</li><li>● Contaminates water supplies</li><li>● Causes electrical storms</li><li>● Disrupts the operation of all machinery and causes engine failure</li><li>● Collapses roofs</li></ul><p>FEMA CERT Basic Training Unit 1: Volcanoes V-4</p></div> <p data-bbox="188 1547 448 1581"><b>Display Slide V-4</b></p>	<p data-bbox="657 373 1446 621">Emphasize that historically, <u>lahars</u> have been one of the deadliest volcano hazards. Lahars are mudflows or debris flows composed mostly of volcanic materials on the flanks of a volcano. These flows of mud, rock, and water can rush down valley and stream channels at speeds of 20 to 40 miles per hour and can travel more than 50 miles.</p> <p data-bbox="657 663 1430 806">Caution the group that lahars can occur both during an eruption and when a volcano is quiet. The water that creates lahars can come from melting snow and ice, intense rainfall, or the breakout of a summit crater lake.</p> <p data-bbox="657 848 854 882"><b>Volcanic Ash</b></p> <p data-bbox="657 924 1390 991"><b>What are some hazards associated with volcanic ash?</b></p> <p data-bbox="657 1150 1430 1293">Use the slide to elaborate on the hazards. Explain that <u>volcanic ash</u> is actually fine, glassy rock fragments that can affect people and equipment hundreds of miles away from the cone of the volcano. Volcanic ash will:</p> <ul data-bbox="657 1314 1406 1680" style="list-style-type: none"><li>▪ Cause severe respiratory problems</li><li>▪ Diminish visibility</li><li>▪ Contaminate water supplies</li><li>▪ Cause electrical storms</li><li>▪ Disrupt the operation of all machinery and cause engine failure, which is particularly problematic for aircraft</li><li>▪ Collapse roofs</li></ul>

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INSTRUCTOR GUIDANCE	CONTENT
<p data-bbox="191 451 267 520"></p> <p data-bbox="191 562 597 625">Allow the participants time to respond.</p> <div data-bbox="191 667 626 995"><p data-bbox="199 684 467 709"><b>Preparing for an Eruption</b></p><ul data-bbox="215 737 492 869" style="list-style-type: none"><li>• Understand the risk</li><li>• Talk to your insurance agency</li><li>• Prepare disaster supply kit</li><li>• Develop evacuation plan</li><li>• Develop shelter-in-place plan</li></ul><p data-bbox="199 968 618 989">FEMA CERT Basic Training Unit 1: Volcanoes V-5</p></div> <p data-bbox="191 1037 448 1066"><b>Display Slide V-5</b></p> <p data-bbox="191 1325 267 1394"></p> <p data-bbox="191 1436 597 1499">Allow the participants time to respond.</p>	<p data-bbox="659 373 1149 403"><b>Volcanic Eruption Preparedness</b></p> <p data-bbox="659 449 1341 478"><b>How can you prepare for volcanic eruptions?</b></p> <p data-bbox="659 674 1455 703">Emphasize key steps in volcanic eruption preparedness:</p> <ul data-bbox="659 726 1466 1184" style="list-style-type: none"><li>▪ <u>Understand the risk</u>. Take time to learn about the risk from volcanic eruption in your area.</li><li>▪ <u>Talk to your insurance agent</u>. Find out what your homeowner's policy will or will not cover in the event of a volcanic eruption.</li><li>▪ <u>Prepare a disaster supply kit</u>, including goggles and dust mask for every family member.</li><li>▪ <u>Develop an evacuation plan</u>. Everyone in your family should know where to go if they have to leave.</li><li>▪ <u>Develop a shelter-in-place</u> plan if you determine that the central risk relates to ash rather than lava flows.</li></ul> <p data-bbox="659 1247 1065 1276"><b>During a Volcanic Eruption</b></p> <p data-bbox="659 1323 1390 1352"><b>What should you do <u>during</u> a volcanic eruption?</b></p>

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INSTRUCTOR GUIDANCE	CONTENT
<div data-bbox="191 369 626 697"><p><b>During an Eruption</b></p><ul style="list-style-type: none"><li>● Follow evacuation orders</li><li>● Avoid areas downwind and river valleys downstream of the volcano</li><li>● If outside, protect yourself from ashfall</li><li>● Be prepared for accompanying hazards</li></ul><p>FEMA CERT Basic Training Unit 1: Volcanoes V-6</p></div> <p data-bbox="191 735 448 768"><b>Display Slide V-6</b></p> <div data-bbox="191 1243 269 1314"></div> <p data-bbox="191 1352 594 1423">Allow the participants time to respond.</p>	<p data-bbox="659 369 1455 441">Summarize the discussion using the information from the slide below. Be sure to make the following points:</p> <ul style="list-style-type: none"><li>▪ <u>Follow evacuation orders.</u> Staying at home to wait out an eruption, if you are in a hazardous zone, could be very dangerous. Take the advice of local authorities.</li><li>▪ <u>Avoid areas downwind and river valleys downstream of the volcano.</u> Debris and ash will be carried by wind and gravity. Stay in areas where you will not be exposed further to volcanic eruption hazards.</li><li>▪ <u>If outside, protect yourself from ashfall.</u> Volcanic ash will cause severe injury to breathing passages, eyes, and open wounds, and irritation to skin. In addition, ashfall will often make travel impossible as it limits visibility and can cause engine failure.</li><li>▪ <u>Be prepared for accompanying hazards.</u> Know how to respond to reduce your risk.</li></ul> <p data-bbox="659 1163 1032 1197"><b>After a Volcanic Eruption</b></p> <p data-bbox="659 1239 1357 1272"><b>What should you do <u>after</u> a volcanic eruption?</b></p>

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INSTRUCTOR GUIDANCE	CONTENT
<div data-bbox="191 369 626 697"><p><b>After an Eruption</b></p><ul style="list-style-type: none"><li>● Stay away from volcanic ashfall areas</li><li>● Avoid driving in heavy ashfall</li><li>● If you have a respiratory ailment, avoid contact with any amount of ash</li></ul><p>FEMA CERT Basic Training Unit 1: Volcanoes V-7 CERT</p></div> <p data-bbox="191 735 448 772"><b>Display Slide V-7</b></p> 	<p data-bbox="659 369 1463 441">Summarize the discussion using the information from the slide below. Be sure to make the following points:</p> <ul data-bbox="659 462 1455 928" style="list-style-type: none"><li>▪ <u>Stay away from volcanic ashfall areas.</u> The fine, glassy particles of volcanic ash will increase the health risk to children and people with existing respiratory conditions such as asthma, chronic bronchitis, or emphysema.</li><li>▪ <u>Avoid driving in heavy ashfall.</u> Driving will stir up volcanic ash that can clog engines and stall vehicles. Moving parts, including bearings, brakes, and transmissions, can be damaged from abrasion.</li><li>▪ <u>If you have a respiratory ailment, avoid contact with any amount of ash.</u> Stay indoors until local health officials advise that it is safe to go outside.</li></ul> <p data-bbox="659 982 1430 1054"><b>Does anyone have any additional questions, comments, or concerns, about volcanic eruptions?</b></p>

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