Answers to Discovery Education Interactive Video on VOLANOES

1. FOUR PLACES WHERE VOLCANOES CAN FORM:

a. **Ocean to Ocean Divergent Boundary-** most volcanoes form here where two oceanic plates are moving apart from each other; this forms a mid-ocean ridge with volcanoes, and new sea floor as the seafloor spreads.

b. **Continent to Continent Divergent Boundary-** land is pulled apart or stretched and becomes thin or weak in the middle (like stretching a piece of gum). Volcanoes form in the shallow, weak areas of the crust. Great Rift Valley is a good example of where volcanoes form at a divergent boundary.

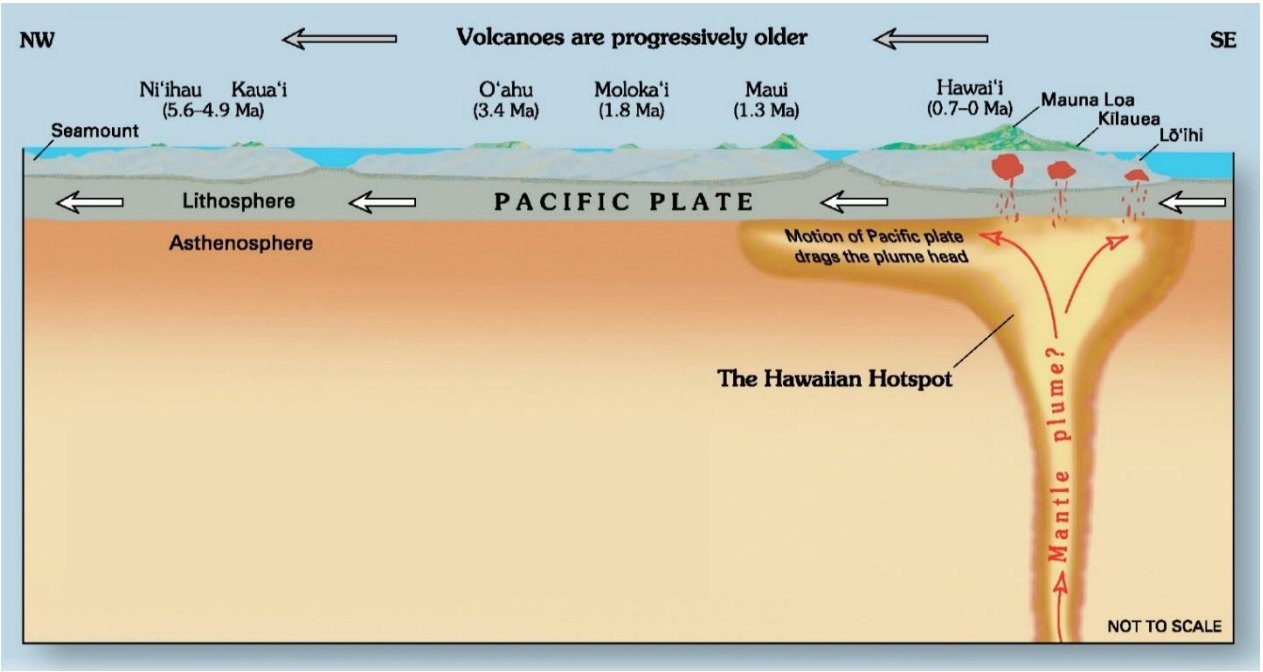
c. **Ocean to Continent Convergence- Subduction Zones-** the oceanic plate subducts (sinks) under the continental plate; the plate melts and magma rises on the west coast of the continental plate forming volcanoes. This is how the Cascade Range of volcanoes formed on the west coast of the United States.

d. **Over a HOT SPOT-** Hot spots are places within the mantle where rocks melt to generate magma. *Magma* generated by the *hot spot* rises through the rigid plates of the *lithosphere* and produces active volcanoes at the Earth's surface. As oceanic volcanoes move away from the hot spot, they cool and subside, producing older islands, atolls, and seamounts. As continental volcanoes move away from the hot spot, they cool, subside, and become *extinct*. Some examples of this include the Hawaiian volcanoes within the Pacific Plate. The Hawaiian hot spot has been active at least 70 million years, producing a volcanic chain that extends 3,750 miles (6,000 km) across the northwest Pacific Ocean. Hot spots also develop beneath continents. The Yellowstone hot spot has been active at least 15 million years, producing a chain of calderas and volcanic features along the Snake River Plain that extends 400 miles (650 km) westward from northwest Wyoming to the Idaho-Oregon border.

2. HOW DO HOT SPOT VOLCANOES FORM IN HAWAII?

a. The pacific plate is moving over a hot spot. Volcanoes form on the part of the plate that is sitting over the hot spot. As the plate moves, like a conveyer belt, the volcanic mountains move with it, but those volcanic mountains become extinct as they move away from the hot spot. New volcanoes form over the hot spot. See diagram to help you understand:

3.



4. **THREE THINGS FOUND IN MAGMA BESIDES HOT ROCK:**
    a. Gases such as Carbon Dioxide (CO_2) – the more gas, the more explosive
    b. Water- the more water, the more explosive
    c. Silica- glassy mineral that makes magma sticky; plugs vents; the more silica, the move explosive
5. **SILICA-** a glass-like mineral found in 95% of rocks that makes magma sticky and viscous; plugs up vents
6. **VISCOSITY-** a measure of the resistance to flow; a measure of how a liquid flows; in class you observed that Dawn dish detergent is more viscous than water. Honey is more viscous than water. Magma with high silica content is more viscous than magma with low silica content.
7. **MAGMA WITH LOW SILICA CONTENT:**
    a. Not as sticky
    b. Low in gases
    c. Flow more easily; not as viscous
    d. Creates "quiet" volcanic eruptions
8. **MAGMA WITH HIGH SILICA CONTENT:**
    a. Makes magma very sticky
    b. It tends to be high in dissolved gases
    c. Thick; does not flow easily; very viscous
    d. Creates explosive eruptions
9. **PYROCLASTIC FLOW:**
    a. A deadly avalanche of hot rock, ashes, microscopic silica fragments and toxic gases that travels 62 miles per hour down the volcanic mountain during an explosive eruption.
    b. It is deadly and very destructive because it is extremely hot (1,300°F) and you can't out run it. The amount of matter and the velocity at which it travels is overwhelming; enough to knock down buildings and melt or burn most materials.
10.

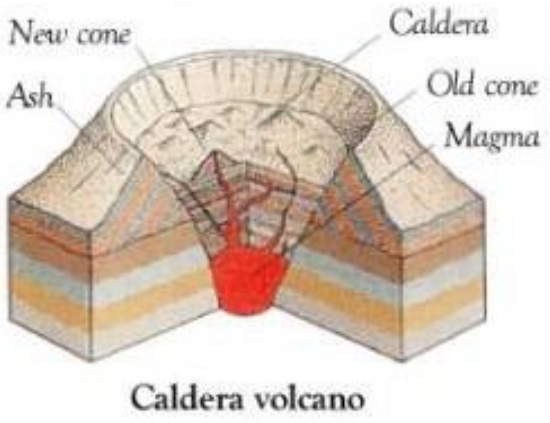
Three Main Types of Volcanoes

The three main types of volcanoes differ in shape, size, and make-up; the differences partly result from the different types of eruptions.

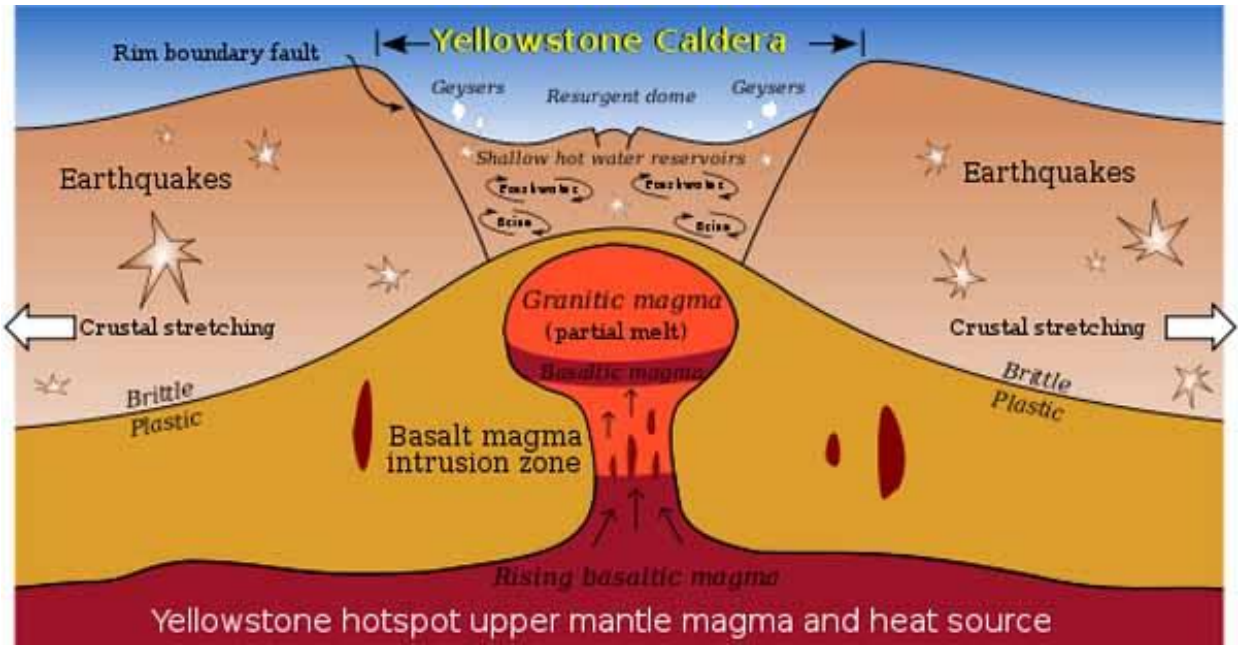
Volcano Type	Volcano Shape	Volcano Size	Volcano Materials	Eruption Type	Examples
Cinder Cone	 Steep **conical** hill with straight sides	***Small*** less than 300m (984 ft) high but steep sides	-Cinders -Creates Scoria	Explosive	**Paricutin**, grew out of a corn field in Mexico in 1943 from a new vent. Eruptions continued for 9 years, built the **cone** to a height of 424 meters, and produced lava flows that covered 25 km²
Shield Volcano	 Very gentle slopes; **convex** upward (shaped like a warrior's shield)	***Very wide but not high-*** (6.2miles)=10km across Dome shaped	-Fluid lava flows -Creates Basalt	Quiet	Hawaiian Volcanoes such as Mona Loa and Kilauea
Stratovolcano (also called Composite Volcano)	 Gentle lower slopes, but steep upper slopes; **concave** upward	***Large-tallest*** • 1-10 km (0.62 miles to 6.2 miles) in diameter on avg • can rise 8,000 feet above their base	-Numerous layers of lava and pyroclastics (ash, dust, rocks etc.)	Explosive	Cascade Range Volcanoes in western U.S. such as Mount St. Helens, Mt. Rainier, Mt. Shasta, Mt. Hood / Mt. Vesuvius in Pompeii, Italy

11. **CALDERA-**

a. A large crater formed when the top of a volcano collapses.



b. **Yellowstone National Park** was the first National Park to be established. The entire park is a caldera. The caldera at the park is 30 miles wide by 45 miles long! When you visit the park you are in an ***active volcano*** and in a ***caldera!***

c. 

12. **THREE MEASUREMENTS VOLCANOLISTS TAKE TO TRY TO PREDICT ERUPTIONS:**

a. Volcanologists measure the expansion of the volcano's vent using a tilt meter; it expands some before an eruption.

b. They measure the ground temperature of the volcano; it increases before an eruption

c. They measure seismic activity; there are often many earthquakes prior to an eruption; Yellowstone National Park has 1,000-3,000 earthquakes per year; in December 2008, Yellowstone had 500 earthquakes (in one month)!