How does magma’s composition affect a volcano’s eruption?

Volcanoes are powerful displays of Earth in action. Scientists have determined that three forces within Earth can create a volcano. Volcanoes can occur where two of Earth’s plates converge, or rub together. Volcanoes can also occur where two plates diverge, or move apart. Hot spots, areas in Earths’ mantle that are hotter than neighboring areas, are also the sites of volcanoes.

There are three different forms of volcanoes. The form of a volcano depends on the composition of its magma and the amount of water vapor and other trapped gases. These two things control the force of a volcano’s eruption.

Shield volcanoes have sides with gentle slopes. They are made of basaltic lava. Cinder cone volcanoes have steep sides. They are made of tephra, lava cooled into different size pieces. Composite volcanoes have steep sides and are made of silica-rich lava and tephra. Their eruptive forces vary.

In this Virtual Lab you will explore some volcanoes in the United States to learn about their composition and their eruptive forces.

Objectives:

* Explore different forms of volcanoes
* Explain the effect of magma composition on the eruptive force of a volcano.
* Predict the eruptive force of a volcano

Procedure: Prepare a Data Table … See below

1. Click the Video button. Watch the video about volcanoes.
2. Click A, B, or C on the map of the United States to select a volcano you want to investigate.
3. Click the Form Reference button to review the three different forms of volcanoes.
4. Click the arrow below Volcano Form to select the form of the volcano shown. Record the form you selected in the Table.
5. Click the arrow below Silica Content to select the content of silica in the magma. Record your selection in the Table.
6. Click the arrow below Water Content to select the content of water in the magma. Record you selection in the Table.

NOTE: If you have selected the correct volcano form and silica and water content of the magma, an arrow displays below Eruptive Force. If no arrow displays, review your choices and adjust your selections.

1. Click the arrow below Eruptive Force to select the fore of the volcanic eruption. Record your selection in the Table.
2. Click the Erupt button. If you have selected the correct Eruptive Force, watch the volcano erupt. If no eruption occurs, adjust your eruptive force selection. Record your observations.
3. Click the Map button to return to the main screen and select another volcano to explore.
4. Continue until you have explored all the volcanoes on the map.
5. Answer the Journal Questions.

Data Collection: Prepare a Data Table like the one shown below….

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Volcano | Type of volcanic occurrence | Volcano Form | Silica Content | Water Content | Eruptive Force |
| A |  |  |  |  |  |
| B |  |  |  |  |  |
| C |  |  |  |  |  |

Journal Questions:

1. How do you think the location of a volcano affects the magma composition?
2. Which magma composition causes the most violent volcanic eruptions?
   1. Why?
3. Describe how magma composition and the resulting eruption affect the form of a volcano.