## Anatomy of a Volcanic Eruption:

Case Study: Mt. St. Helens

Materials Included in this Box:

Teacher Background Information 3-D models of Mt. St. Helens (before and after eruption) Examples of stratovolcano rock products: Tuff (pyroclastic flow), pumice, rhyolite/dacite, ash Sandbox crater formation exercise Laminated photos/diagrams

## Teacher Background

There are several shapes and types of volcanoes around the world. Some volcanoes occur on . But there are also volcanoes

that occur in the middle of tectonic plates like the Yellowstone volcano and Kilauea volcano in Hawaii.

type of volcanoes that form as a result of subduction zones are composite volcanoes (a.k.a. stratovolcanoes). Highly viscous magma creates these high relief cylindrical mountains that are made up of layers of lava, ash, pumice, and tephra (rock fragments). The magma underneath these volcanoes has a greater viscosity, this means it moves more slowly towards the surface and increasing the pressure build up. But as the magma moves up that pressure decreases. This causes the dissolved gasses to be released in a sometimes-explosive manner.

In the months leading up to its eruption, geologists were closely monitoring Mt. St. Helens. A crater had formed at the mo ash. Small earthquakes and sensitive gps data showed that the north side of the mountain was Lesso

## Crater/Caldera Class Activity

When a magma chamber fills up with magma it pushes the ground upward. Just like the bulge on the side of Mount St. Helens in the months leading up to its eruption. When the volcano erupts and the magma chamber empties, the ground above is no longer supported and collapses into the now empty space.

Materials Needed:

Balloon Bin filled with sand Bicycle tire pump

Procedure:

- 1. Unscrew the end of the tire pump.
- 2. Affix the balloon over the end of the pump.
- 3. Dig a hole in the sand and place the empty balloon inside.
- 4. Cover balloon completely with sand. You should have several inches of sand over the balloon.
- 5. Sowly inflate the balloon until you see the sand is push upwards.
- 6. Once you stop pumping the bicycle tire the air should slowly leak out of the balloon and deflate your magma chamber.
- 7. Class Discussion:

Discuss how this crater formation is different than the eruption that took place on Mt. St. Helens. Mt. St. Helens erupted after a massive landslide. The crater that formed is mostly due to the landslide and lateral explosion. Can your students think of other famous craters (a.k.a calderas)? Here are some others you can talk about: Crater Lake,

## Extensions:

Exploring Mt. St. Helens on Google Earth

If you do not already have it, download the Google Earth desktop version onto

Here: <u>https://www.google.com/earth/versions/#earth-pro</u>

Open Google Earth and search for Mt. St. Helens in the upper left search bar.

- You can explore the image by holding the left dick on the mouse and dragging the picture in the direction you wish to move. You can also use the tools on the right side of the picture to adjust your view.
- The top circle will change the view angle.
- The circle below that will also move the picture left, right, up, or down.

- Clicking and dragging the person to a location will put you in ground-level view, the image will appear as though you are standing on the ground in that location.
- The slide zoom beneath that will zoom in and out of the image, you can also do this using the roller on the mouse.

Zooming into the volcano, observe some of the different parts to the volcano. You can see and explore the caldera, lava dome (inside the crater). Look for lahars (volcanic mud