

## Volcano Variations 1 – Student Activity

Volcanoes change the surface of the earth. They create classic conical volcanic mountains like Mt Fujiyama and low rising domes like Kilauea in Hawaii.

There are two main types of volcanoes:

### 1. Strato (or composite) volcanoes E.g. Mt Fujiyama in Japan & Vesuvius in Italy



Where two tectonic plates are pushed together at a **zone of convergence**, continental crust may be pushed down and partially melted. Magma formed from melting crust along with water and sediment pulled down with it, will be rich in silica creating explosive, sticky lava and explosive eruptions. These are the most dangerous volcanoes. They produce clouds of super-heated steam and poisonous gas. They can belch out clouds of red-hot volcanic ash (pyroclastics) that can instantly smother and burn the countryside.

### 2. Shield volcanoes E.g. Mt Kilauea in Hawaii

When plates pull apart at **a zone of divergence**, continental crust thins and hot melted oceanic crust rises to the surface. At hot spots the mantle also punches up through the crust. There is much less likelihood of earthquakes as tectonic plates are not rubbing together. Most of these eruptions occur under the sea. This silica poor magma is free flowing. Layer upon layer of basalt flows out to form new ocean floor.



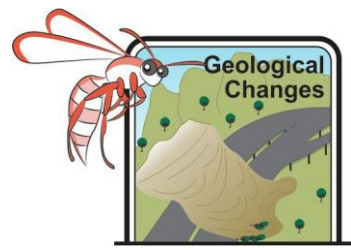
Volcanos can be described as active (erupt frequently) dormant (presently inactive but liable to erupt again) and extinct.

### Viscosity and Lava Flow - Student Activity

**Viscosity describes the reluctance of a material to flow.**

We cannot work with molten rock but we can observe how liquids with different viscosities behave.





## Volcano Variations 1 – Student Activity

### Materials per group or teacher

- A plate, dish or student tray
- Spoons
- Samples of liquids of different viscosities
- Newspaper to protect the table top

### Method

1. Place one teaspoon of each liquid onto the plate.
2. Observe the shapes the different liquids make on the plate.
3. Describe the shapes of the materials on the plate after one minute in the table below.
4. Place another (second) spoonful of the same material on top of the original ones.
5. Place a third spoonful on top of the pile.
6. Write your observations in the table provided.

### Observations

Material	First spoon	Second spoon	Final shape	Viscosity
1				
2				
3				

Volcanos erupt layer upon layer of lava. Do you think the viscosity of lava will control the shape of the volcano? Explain your answer.

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Stratovolcanoes have high conical peaks and do not extend over great areas. What kind of lava would build a stratovolcano like Mt Fujiyama or Vesuvius?

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Shield volcanoes are low rounded mounds, which extend for many tens of kilometres. What kind of lava would build a shield volcano like Mt Kilauea?

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### OPTION

Perhaps the result would be different if these materials were flowing down a slope. Design an experiment to find out what would happen.

HINT This must be a "Fair Test"

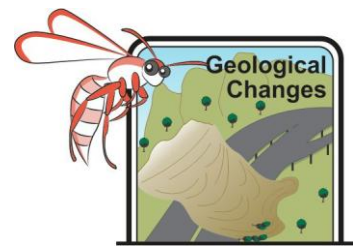
What materials are required?

What method will be used?

Which variables will you keep the same?

Which variable or variables will you change?

How will you report your observations?



## Volcano Variations 1 – Student Activity



The speed lava travels at depends on its viscosity and the slope it is travelling down.  
Low viscosity lavas can move at 40-60km/h if a channel has been cut downhill.  
Over flat lying ground, viscous lava flows move only a few metres an hour.  
Less viscous basalts move at about 6km /h  
Could you run faster than a viscous lava flow? \_\_\_\_\_

Most people can get out of the way of flowing lava. Deaths occur only when they get too close to the lava and become burned or their escape route is cut off.

**Vocabulary** Strato volcano, convergence, shield volcano, divergence, lava and viscosity