

### Why do Volcanoes Erupt?

- Gases are dissolved in the magma fluid under the high pressures found at depth in the interior of the Earth.
- As the magma rises the pressures on it decrease and the gases start to come off the fluid.
- If that process happens rapidly it will cause an eruption

**Figure 12.5** Plinianic explosion on Niino-nima, a new volcano that rose above the sea in 1973 after a submarine eruption in the Pacific Ocean about 100 km south of Tokyo. [Hydrographic Department, Maritime Safety Agency Japan]

### Magma Erupts onto the Earth's Surface as:

1) Lava Flows    2) Pyroclastic Debris

**Figure 12.7** Pyroclastic eruption at Arenal volcano, Costa Rica. [Gregory C. Devineni/Photo Researchers]

### Lava Viscosity Controlled by:

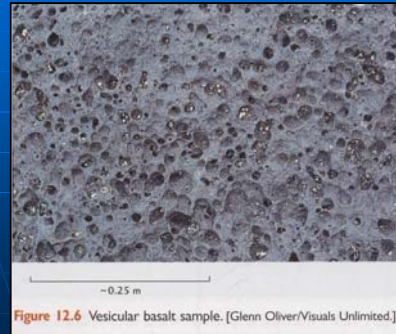
- 1) Temperature
- 2) Composition (silica content)
- 3) Gas content

**Figure 12.2** The central vent eruption from Kilauea shield volcano on the island of Hawaii, showing a river of hot, fast-flowing basaltic lava. [D. Griggs/AP/ISI]

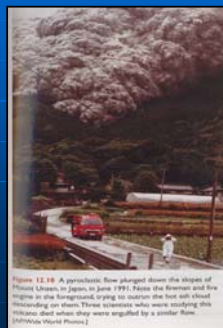
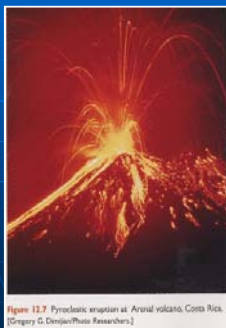
## Surface Texture of Lavas of Different Viscosity (pahoehoe & aa)



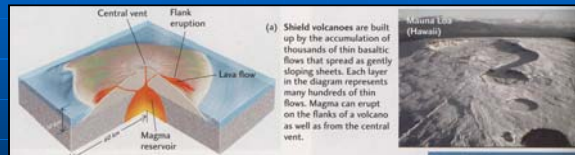
## Vesicular Texture in Lava Flow



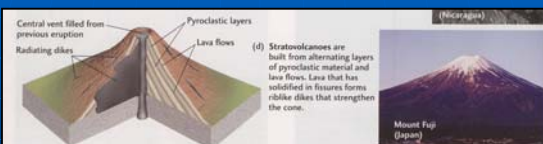
## Pyroclastic Debris: 1) Tephra 2) Pyroclastic flow



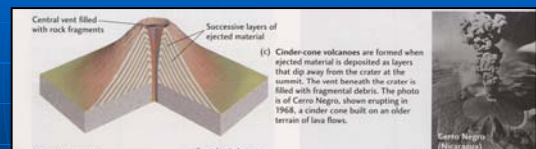
## Volcano Types: Shield Volcano



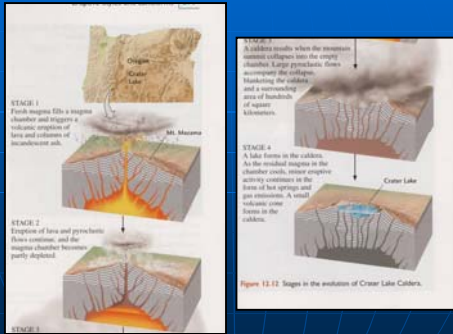
## Volcano Types: Stratovolcano



## Volcano Types: Cinder Cone



## Caldera Formation



## World Distribution of Volcanoes

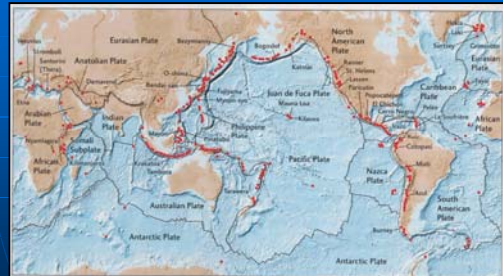
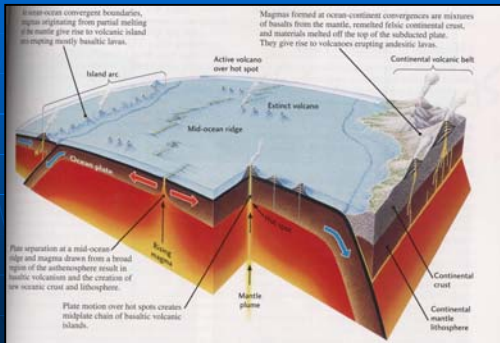


Figure 12.19 The active volcanoes of the world with vents on land or above the ocean surface (red dots). About 80 percent are found at boundaries where plates collide, 15 percent where plates separate, and the remaining few at intraplate hot spots. Black lines are plate boundaries. Not shown on this map are the numerous axial volcanoes of the mid-ocean ridge system below the water's surface.

## Plate Tectonic Model of Volcanism



## Hotspots

