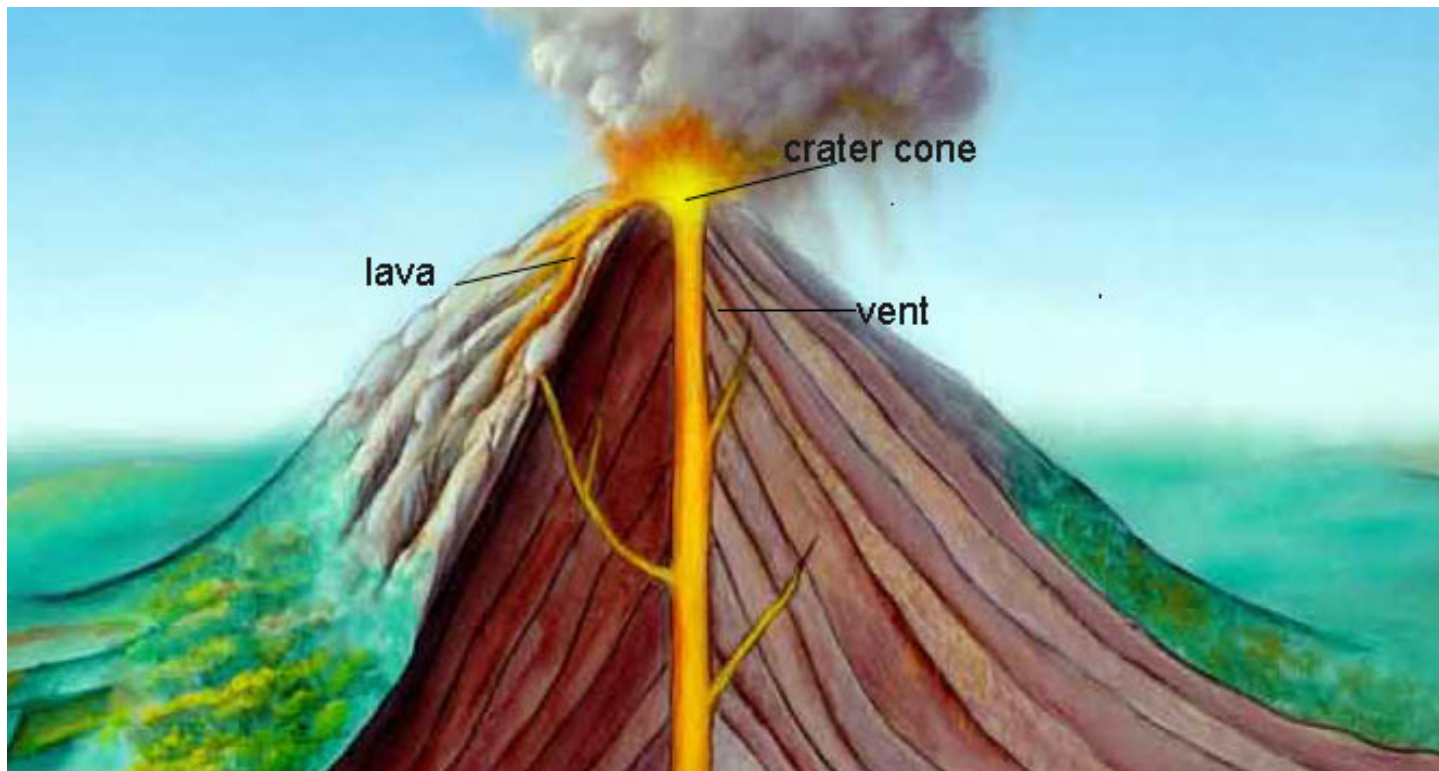


## Chapter 11 Section 2

# VOLCANOES

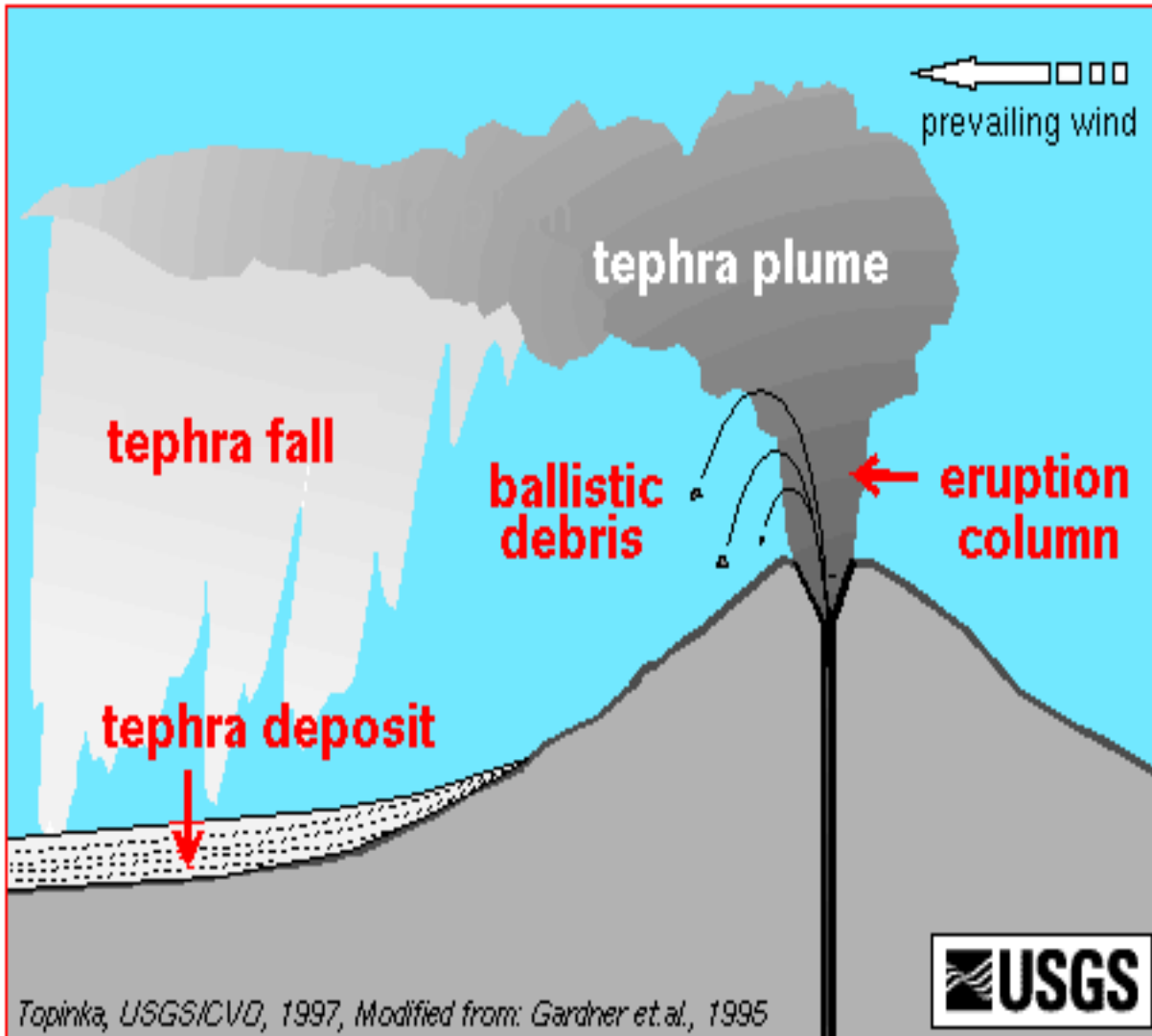
## TB 337



<http://www.brainpop.com/science/earthsystem/volcanoes/>

# I. How do volcanoes form?

- Rising Magma leads to eruptions. Magma (solids and gases) are spewed out to form cone-shape volcano
- Magma flows through vent or opening to surface (lava)
- Circular holes near summit- crater
- Tephra-bits of rock or solidified lava
- Tephra varies in size from ash to cinders to larger rocks called bombs or blocks



Topinka, USGS/CVO, 1997, Modified from: Gardner et al., 1995



# Start Here!

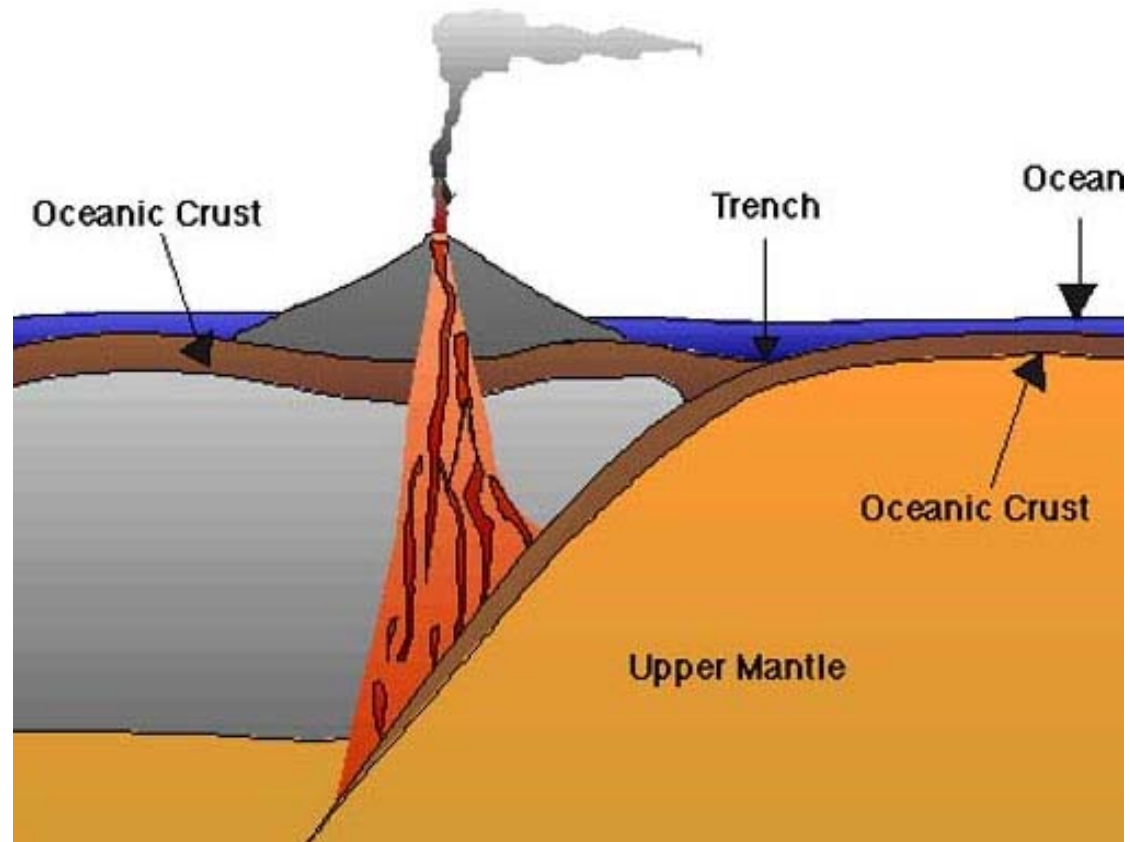
- Review what you learned yesterday about volcanoes. How do they form? Put it on your white board.
- <https://www.youtube.com/watch?v=Be7o6BYVOzA&safe=active>

# I. How do volcanoes form?



## A. Where Plates Collide

- Islands form as oceanic crust plates and mantle collide
- Oceanic plate-denser/older subducts beneath the mantle
- Rock in and above sinking plate melts (forms magma chamber)
- Magma chamber is the source for volcanic eruptions



# I. How do volcanoes form?

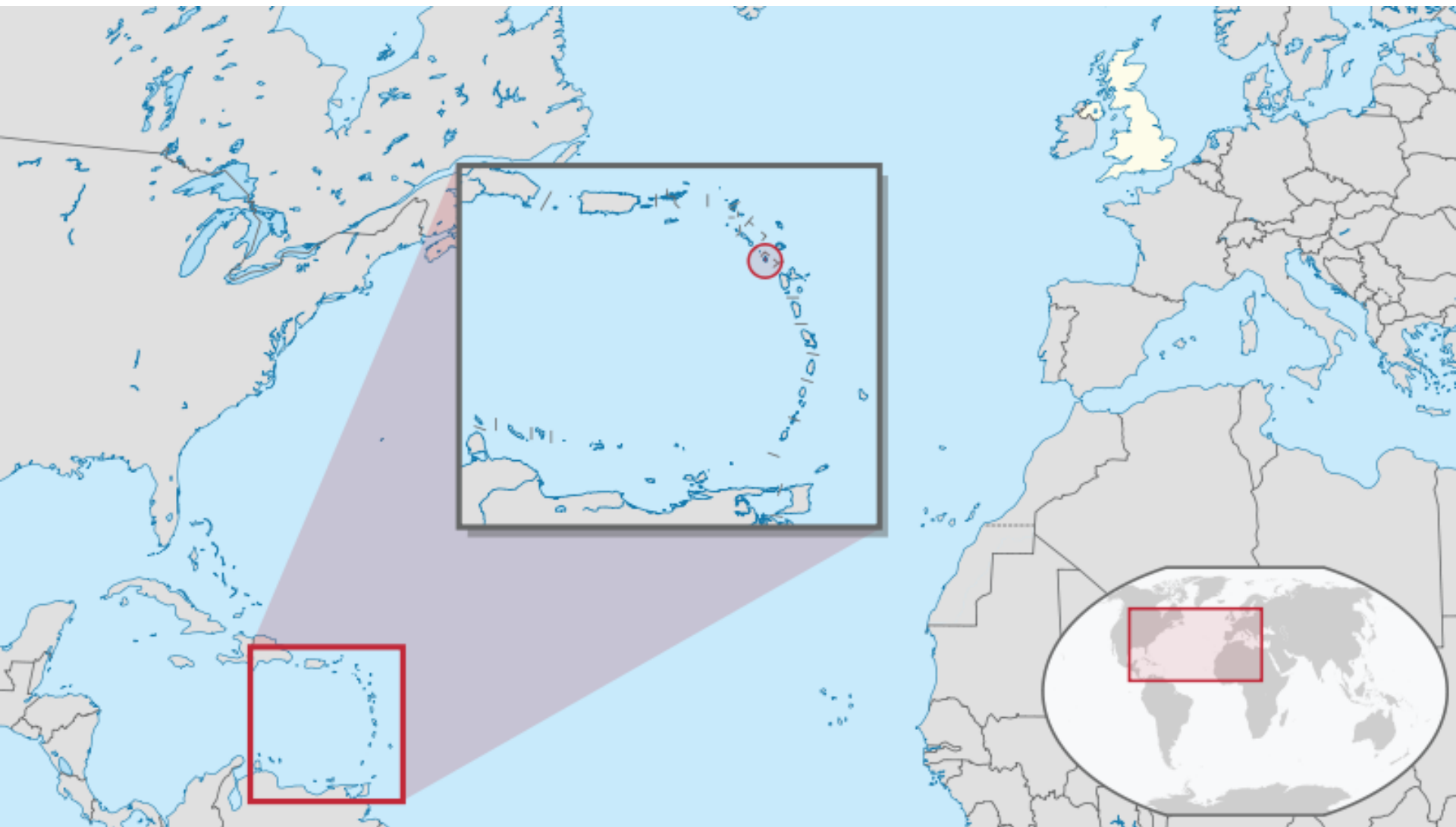
## B. Eruptions on a Caribbean Island

Soufriere Hills Volcano: Island of Montserrat

<https://www.youtube.com/watch?v=7h5XOS7uaWA>

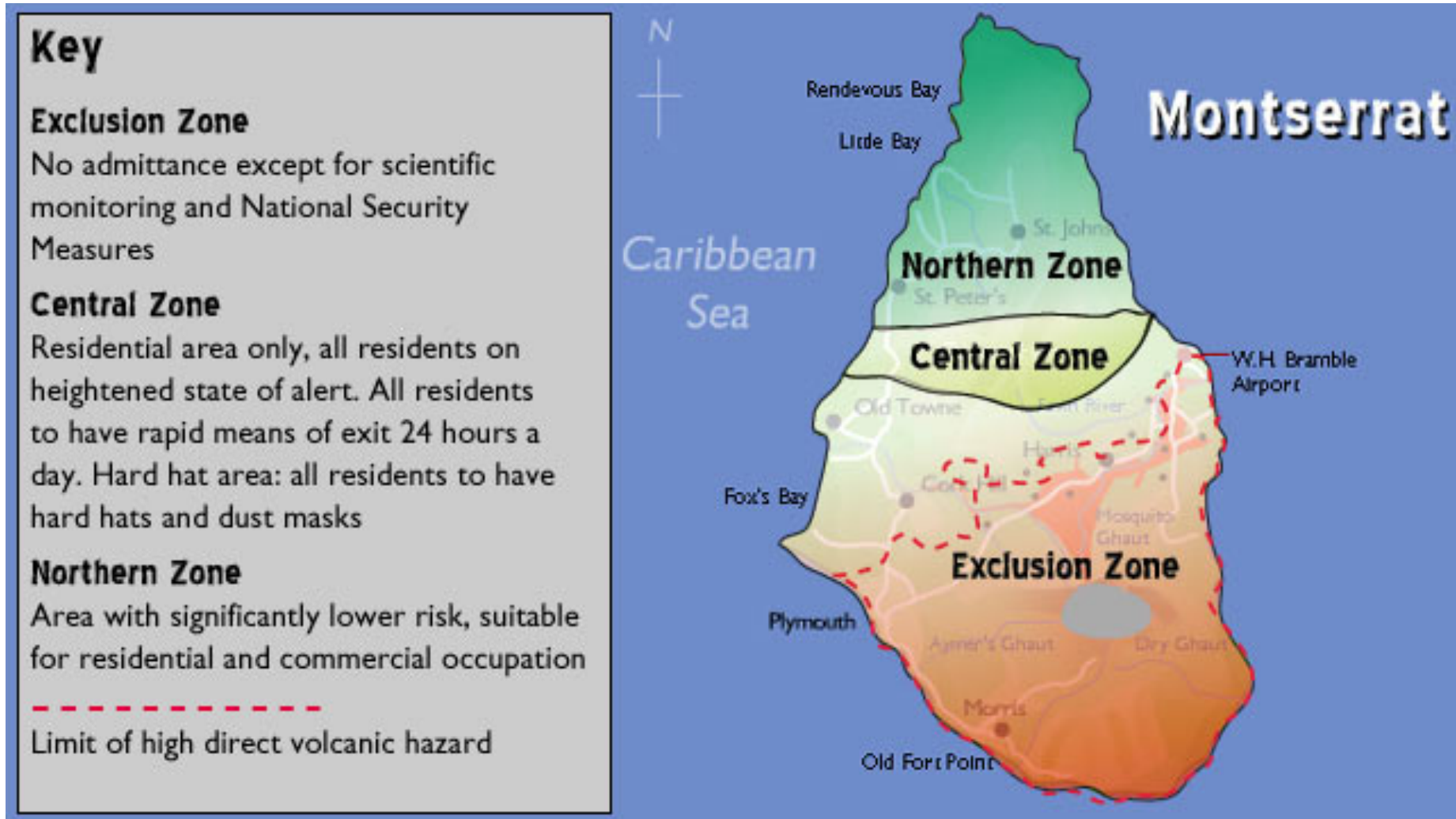
- Glowing avalanches and hot/boiling mudflows destroyed villages
- Volcanic ash-covered island, followed by mudflows
- Pyroclastic Flows- massive avalanches of hot, glowing rock flow on cushion of hot gases
- Island = wasteland
- Volcanoes create and destroy





# C. Volcanic Risks pg. 339

## Figure 10





## II. Forms of Volcanoes

### A. What determines how a volcano erupts?

- Composition of magma, water vapor, and other gases
- More Silica (silicon and oxygen) = Thicker lava, more resistant to flow (traps water vapor and other gases)
- More Iron and Magnesium, Less Silica = Thinner lava, flows easily
- Steam builds up pressure in magma, pressure released, and magma rises towards Earth's surface



Silica rich lava (Thick)



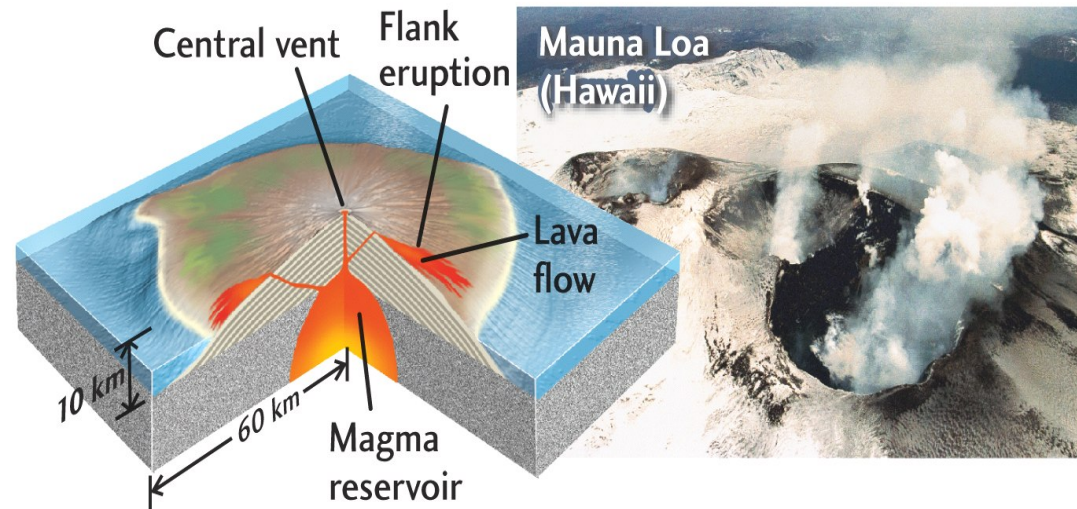
Iron/Magnesium Lava (Thin)

# II. Forms of Volcanoes



## B. Shield Volcanoes Shield volcano

- Largest type of volcanoes
- Basaltic lava- High in iron/magnesium, LOW in silica
- Lava flows in broad, flat layers
- Broad base, gently sloping sides
- Formed when magma is forced up from extreme depths in Earth or at divergent boundaries



# Shield Volcano



The summit of La Cumbre, a shield volcano on Fernandina Island, Galapagos Islands, as seen from Earth orbit (credit: NASA/SPL)

# Shield Volcano

## Kohala Mountain - Hawaii

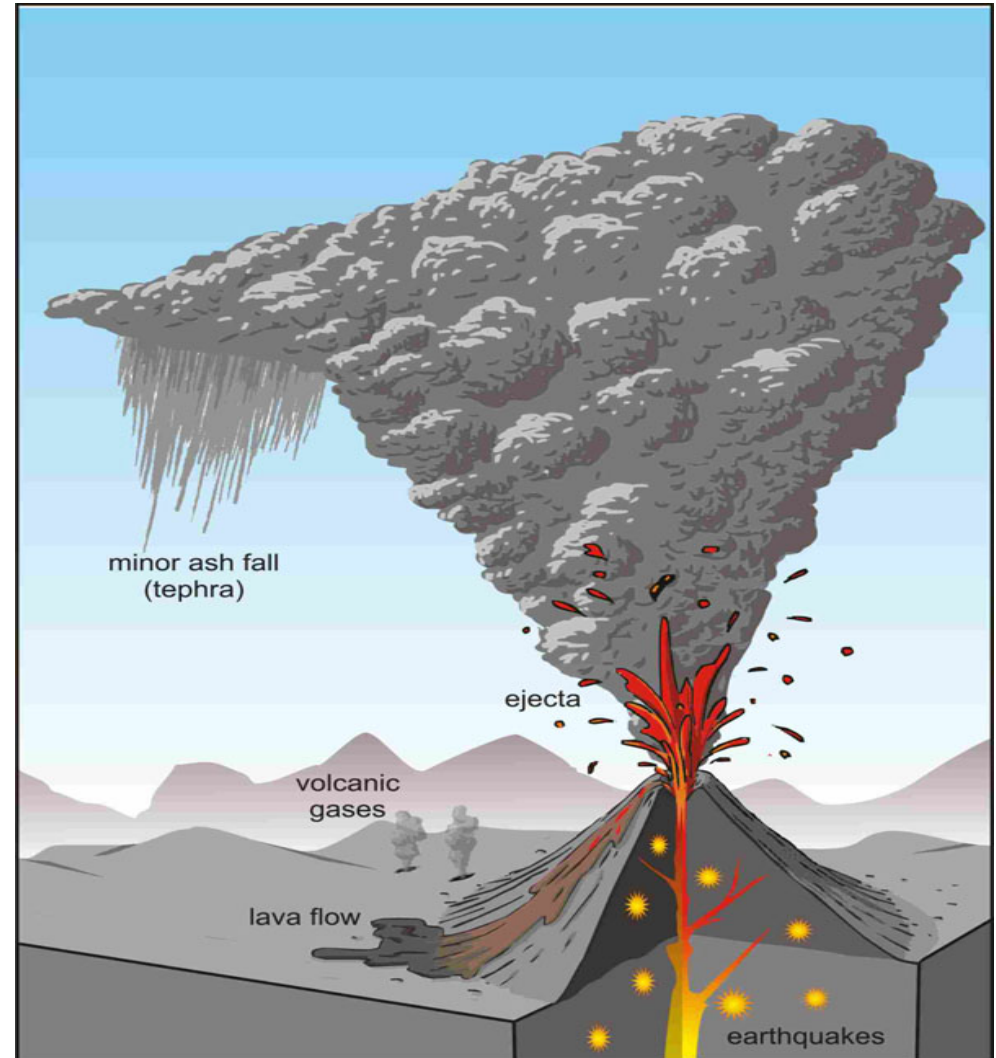


## II. Forms of Volcanoes

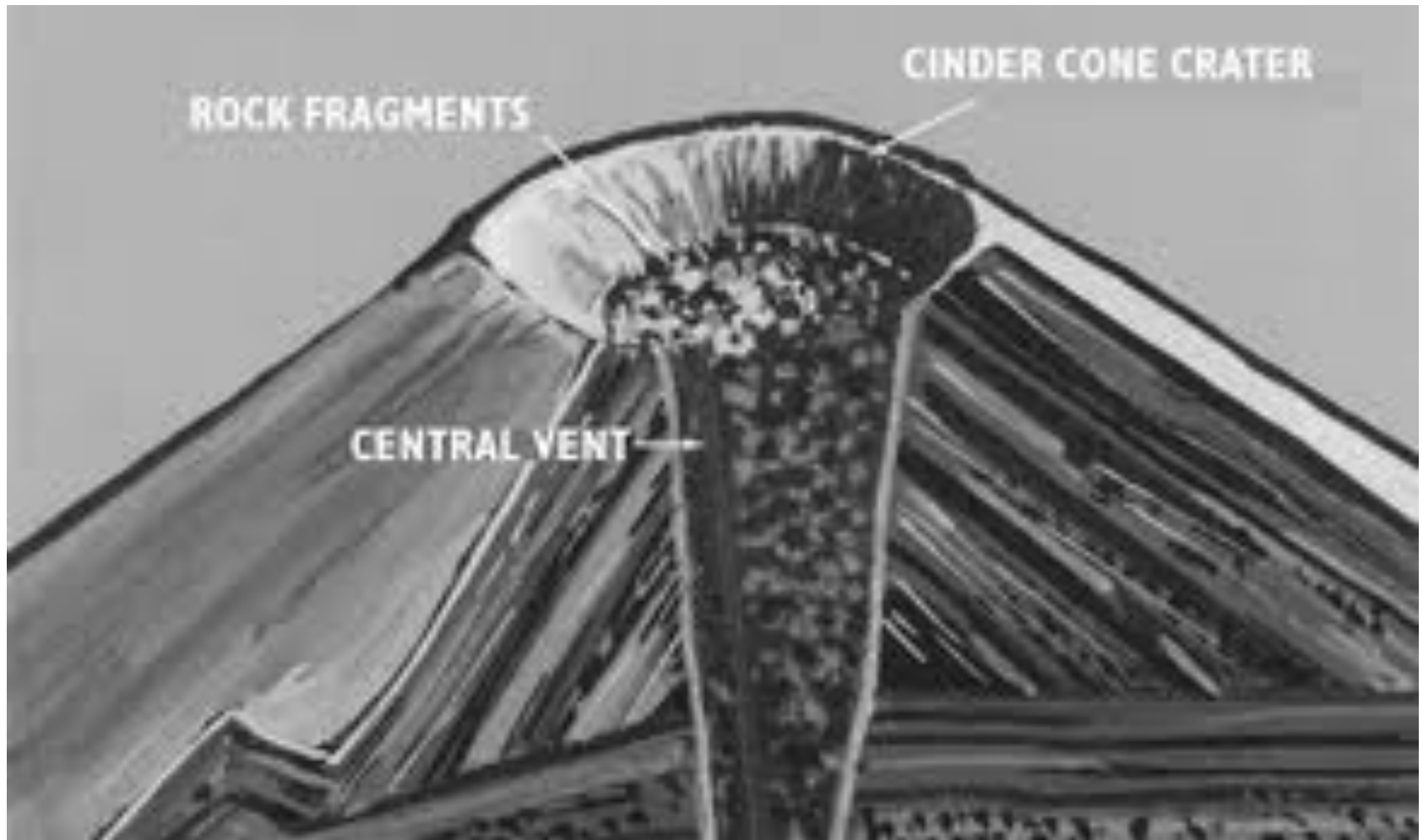


### C. Cinder Cone Volcanoes

- Smaller than other volcanoes
- Rising magma accumulates gases
- When gases build up enough pressure, volcano erupts
- Moderate/Violent eruptions throw ash, cinder, and lava high in air.
- Tephra solidifies mid-air and falls to form volcano
- Eruptions powered by high gas content, eruptions don't last long.



# Cinder Cone



# Cinder Cone

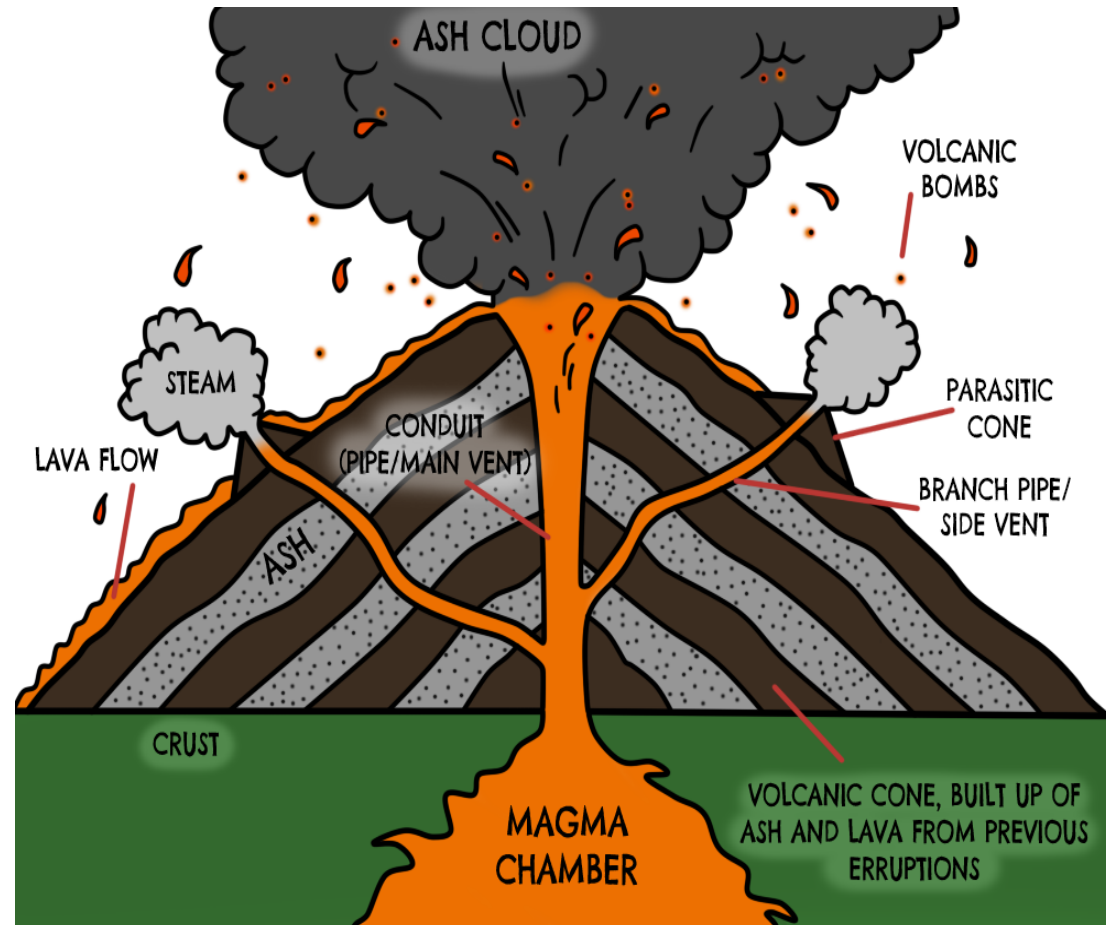


## II. Forms of Volcanoes



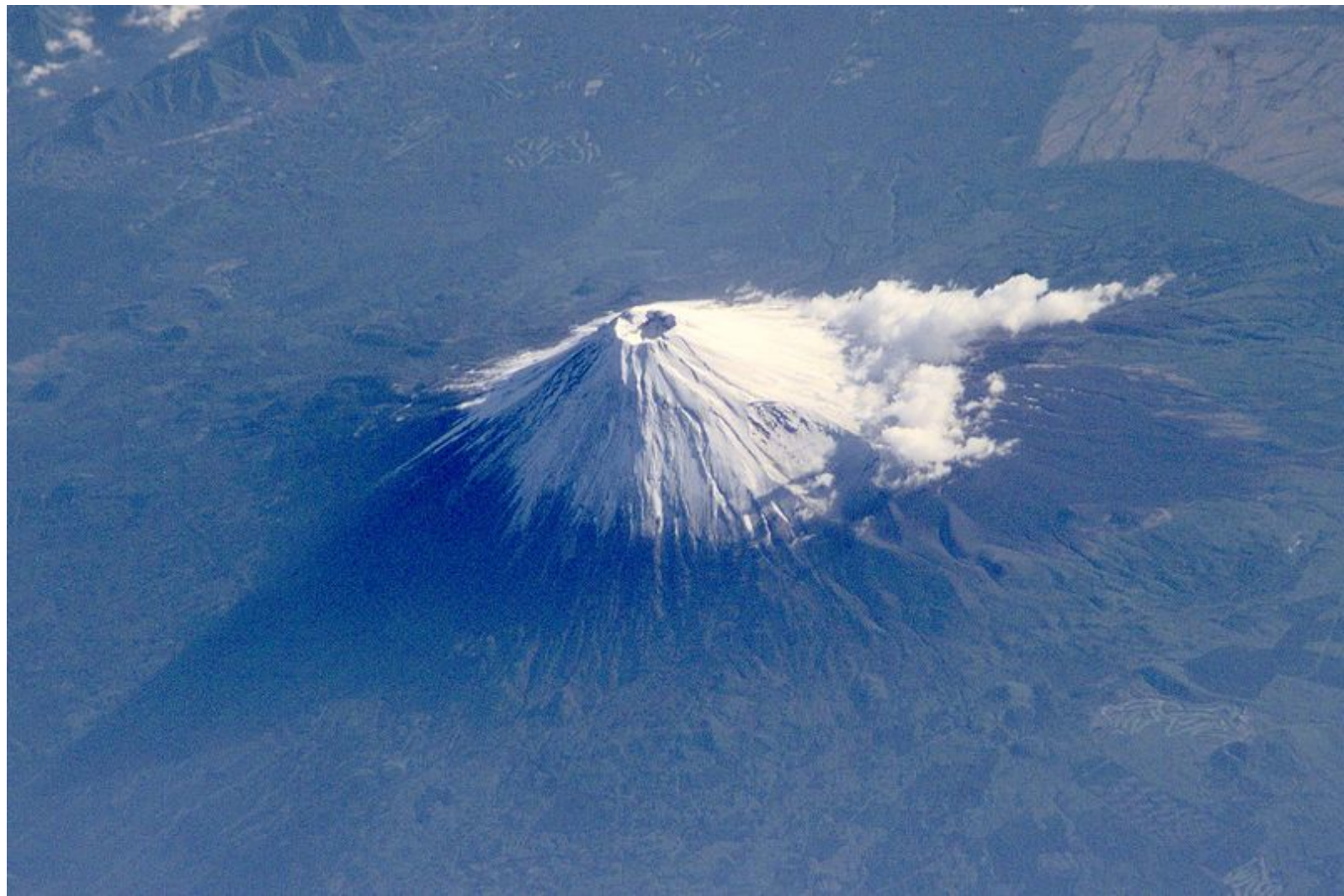
### D. Composite Volcanoes

- Larger than Cinder-Cones, Smaller than Shields
- Steep-sided
- Alternating layers of lava and tephra
- Violent eruptions form a tephra layer of solid materials
- Quieter eruptions form a lava layer
- Form where 1 plate sinks under another





# Composite Volcano – Mt. Fuji, Japan



Popocatepetl, an active composite volcano in Mexico (credit: Peter Menzel/SPL)





[https://www.youtube.com/watch?v=g7OTVUY\\_PdQ](https://www.youtube.com/watch?v=g7OTVUY_PdQ)

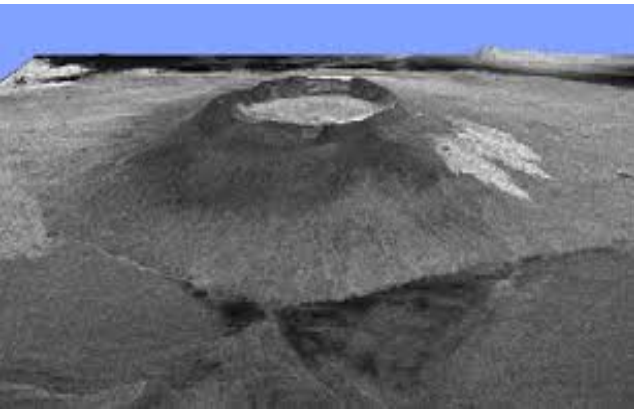
11:30 – 14:00

Composite Volcanoes are also known as Strata Cones.

# RECAP: Volcano Comparisons

## Shield

- Largest in Size
- Broad base, gently sloping sides
- Basaltic Lava = low in silica, high in iron/magnesium
- Slow, oozing eruptions



## Cinder-Cone

- Smallest in Size
- Small, but steep sides
- Creates tephra
- Moderate to violent eruptions



## Composite

- Medium in Size
- Steep-sided
- Layers of lava and tephra
- Quiet to violent eruptions



Why do we need to know about volcanoes?

Where will we see this in the real world?

Write down three key words for each of the three volcanoes.

- Reflect in your journal.



Stop



## II. Forms of Volcanoes

### E. Fissure Eruptions

- Magma that is highly fluid oozes from cracks or fissures
- Magma has low viscosity- flows freely across land to form flood basalts
- Flood basalts that have been exposed to erosion for millions of years- Lava Plateau
- EX. Columbia River Plateau

