**Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Period\_\_\_\_\_\_\_Date\_\_\_\_\_\_\_\_\_\_\_\_\_**

Geology Guided Notes

Unit 4: Volcanoes and other Igneous Activity

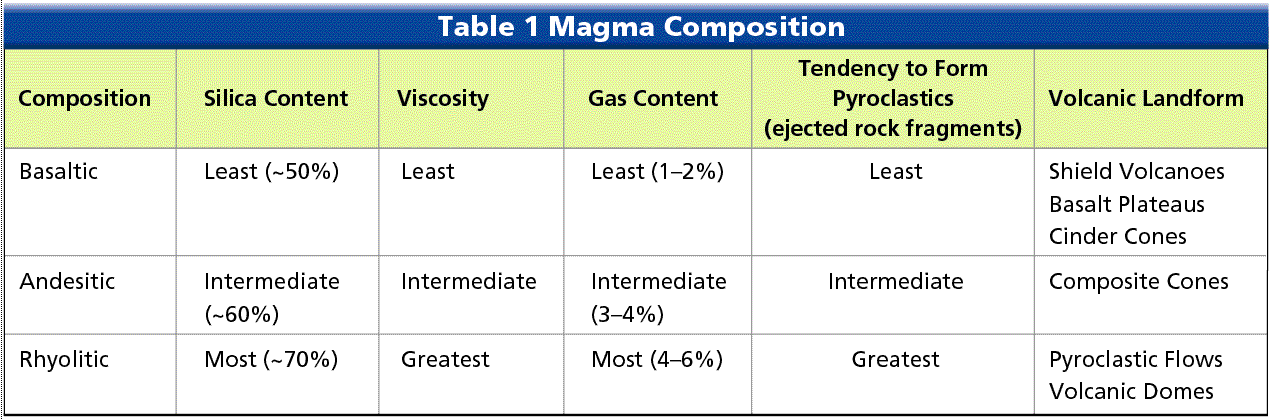
Text Reference: Ch 10-pg 279-299

Origin of Magma

* When solid rock located in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, partially melts
* Can form because of heat, pressure, or water
* Role of Heat:
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: the change in temperature with depth
* Role of Pressure: Pressure \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ with depth
* Role of Water: Water causes rock to melt at \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ temperatures
* Magma forms \_\_\_\_\_\_\_\_\_ ways
  + When heat is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_when a magma body from a \_\_\_\_\_\_\_\_\_\_\_\_ source intrudes and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_rock in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + A \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in pressure (\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_the addition of \_\_\_\_\_\_\_\_) can result in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ melting
  + Water can \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the melting temperature of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_rock to form magma

Factors Affecting Eruption

* Three factors:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* These factors actually control the \_\_\_\_\_\_\_\_\_\_\_\_\_of a given magma
* Viscosity
  + A substance’s \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + More viscous=\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Less viscous=\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + The \_\_\_\_\_\_\_\_\_\_\_\_\_ the temperature, the \_\_\_\_\_\_\_\_\_\_ it flows 🡪 \_\_\_\_\_\_\_viscous
  + High \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in magma=\_\_\_\_\_\_\_\_\_\_\_\_\_viscosity (\_\_\_\_\_\_\_\_\_\_\_\_\_\_lava)
  + Low silica in magma=\_\_\_\_\_\_\_\_\_\_\_\_viscosity (\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_lava)
* Dissolved Gases
  + Mostly \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Gases \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ near the surfaces
  + A \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_is an opening in the surface of the Earth through with \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are released
  + Gases trapped in magma provide the \_\_\_\_\_\_\_\_\_\_\_to eject molten rock from vents
* Violence of an eruption is related to how easily gases \_\_\_\_\_\_\_\_\_\_\_ from magma
  + Easily escape from \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Highly viscous magma produces \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Magma Composition



* \_\_\_\_\_\_\_\_\_\_\_\_\_\_lava=mild eruptions
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_lavas=explosive eruptions

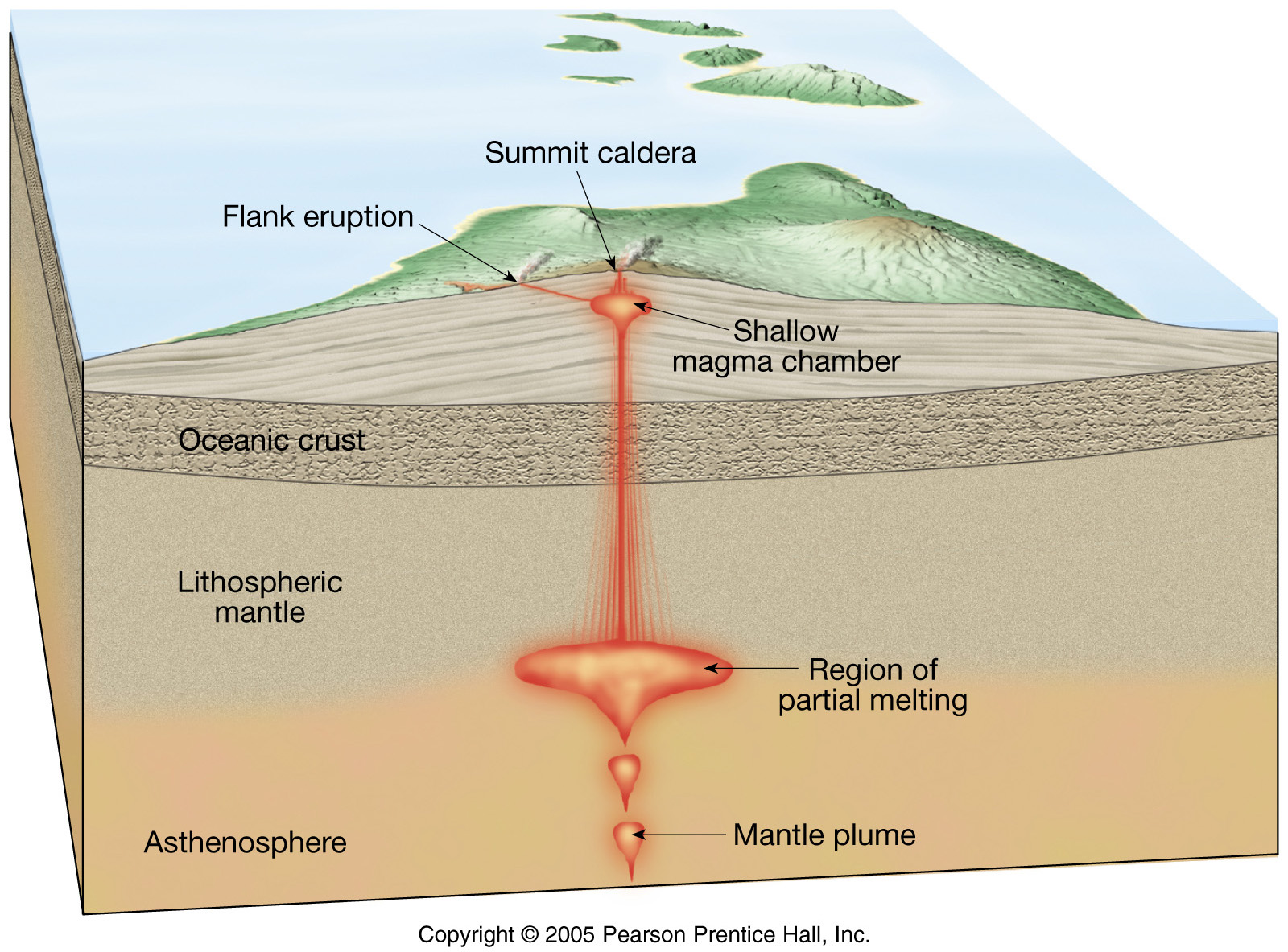
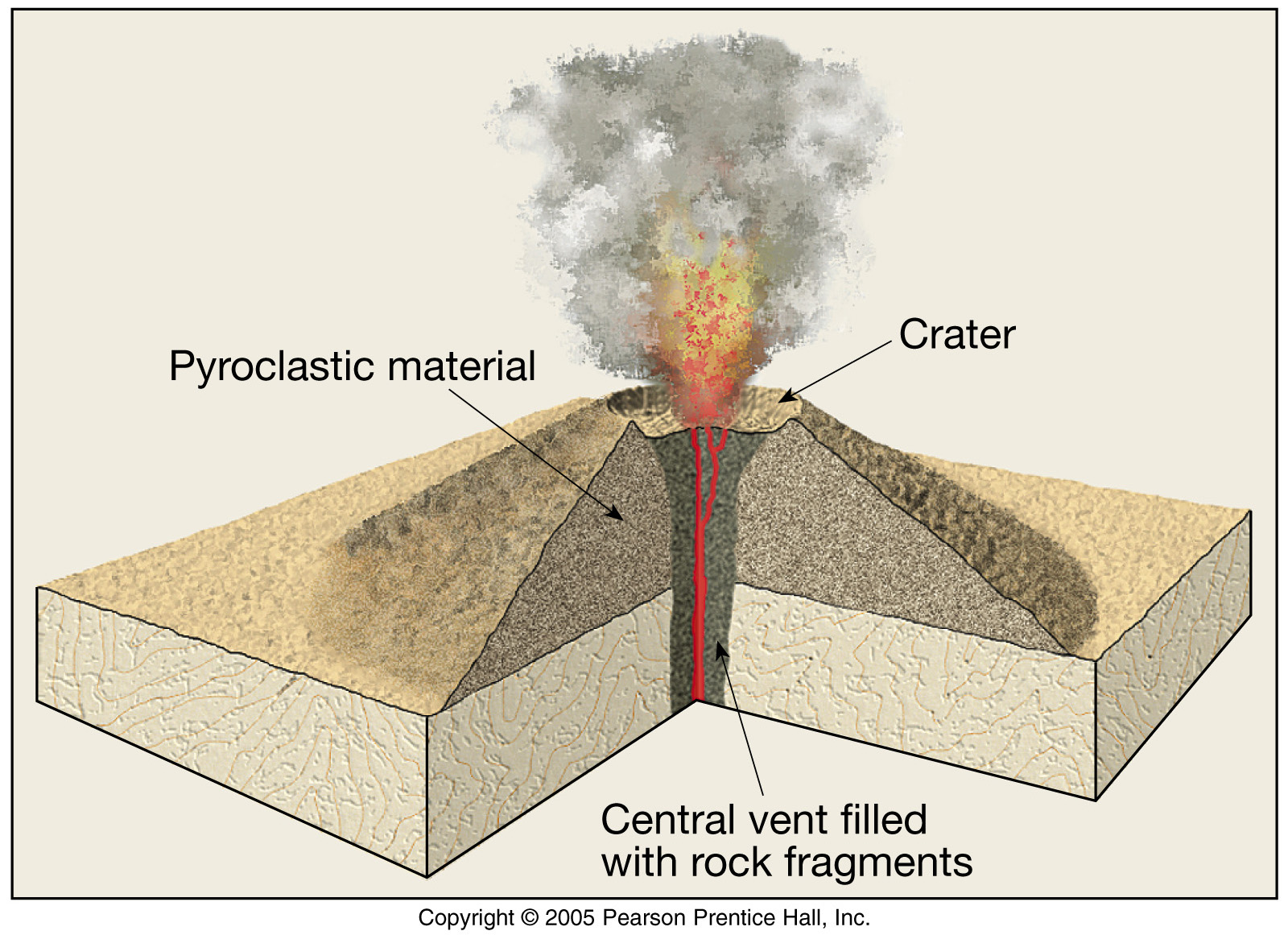
Volcanic Material

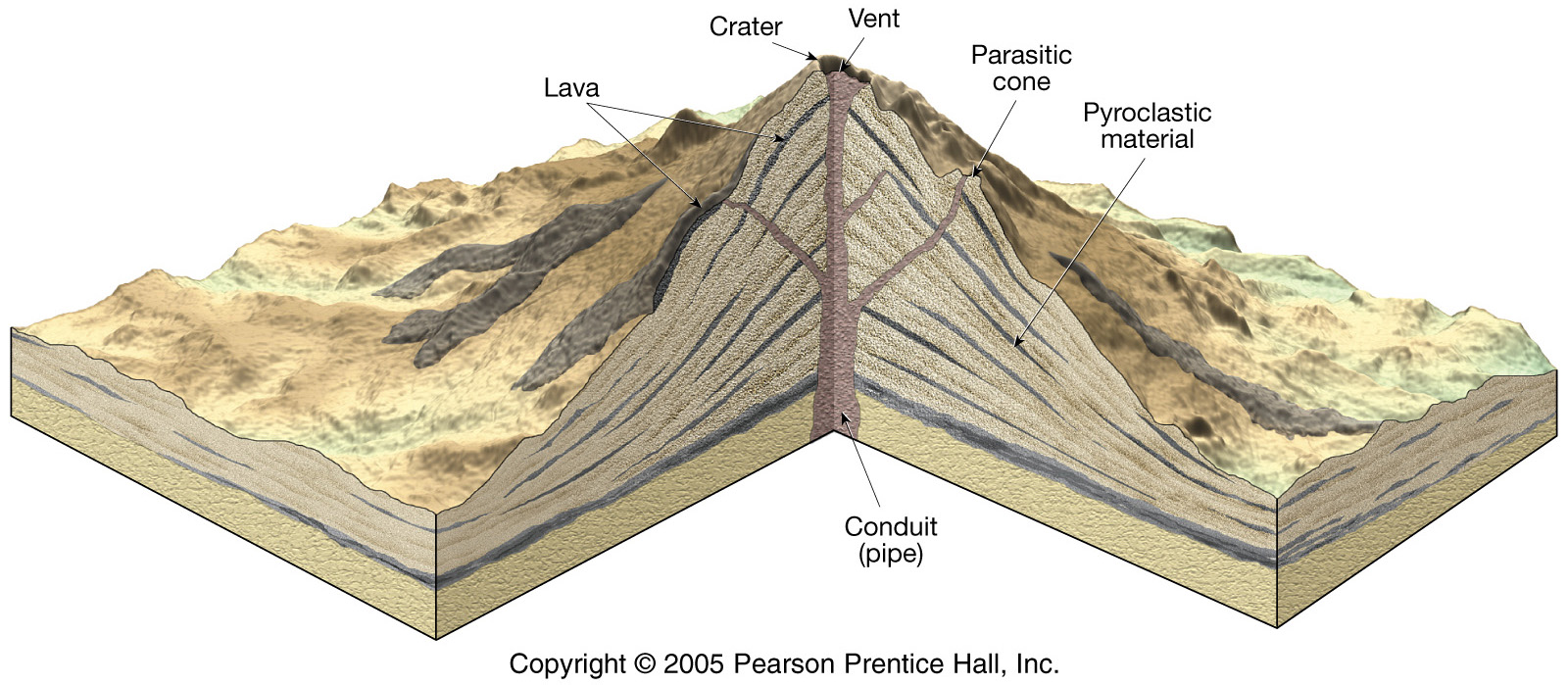
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_lavas are more fluid, \_\_\_\_\_\_\_\_\_silica content
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_lavas are less fluid, \_\_\_\_\_\_\_\_ silica content
* Types of Lava
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_lava (resembles braids in ropes
  + \_\_\_\_\_\_\_\_\_\_\_\_(rough jagged blacks)
* Gases
  + Gas portion of most magmas is about \_\_\_\_\_\_\_\_\_\_\_of total weight
  + Usually in the form of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Composition of gases is important because they have contributed to the gases in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_materials-“\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_”
* Types of pyroclastic debris
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Particles larger than lapilli
    - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
    - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Features of Volcanoes

* Opening at the summit of a volcano
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: summit depression \_\_\_\_\_\_\_\_\_\_\_in diameter
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: summit depression \_\_\_\_\_\_in diameter
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: surface opening connected to the magma chamber
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: emit only \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Types of Volcanoes

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Volcano
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_-shaped
  + Generally cover \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_areas
  + Produced by \_\_\_\_\_\_\_\_\_\_\_\_\_ eruptions of large volumes of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ lava
  + Have \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_openings
  + Example: Mauna Loa on Hawaii
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Built from ejected lava (mainly cinder-sized) fragments
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_slope angle
  + \_\_\_\_\_\_\_\_\_\_\_\_\_size
  + Frequently occur in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Only active for \_\_\_\_\_\_\_\_\_\_\_\_\_ period of time (weeks-few years)
  + Pyroclastic material: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_magma
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_)
  + Most are located adjacent to the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ ocean (e.g. Fujiyama, Mt. St. Helens)
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, classic-shaped volcanoes (1000s of ft. high and several miles wide at base)
  + Composed of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Most \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_type of activity
  + Magma mostly \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_



Volcanoes in the US

* Cascade Volcanoes
  + There are \_\_\_\_\_\_\_\_ potentially active volcanoes in the Cascade Range of the Northwestern United States
* Mt. Saint Helens
  + Big eruption in \_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + A \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_reduced lateral and vertical confinement, triggering the eruption
  + Ashfalls from the eruption covered most of the country, even parts of NM (but not Bloomfield)
  + The eruption shot volcanic ash to an altitude of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_feet

Volcano Features

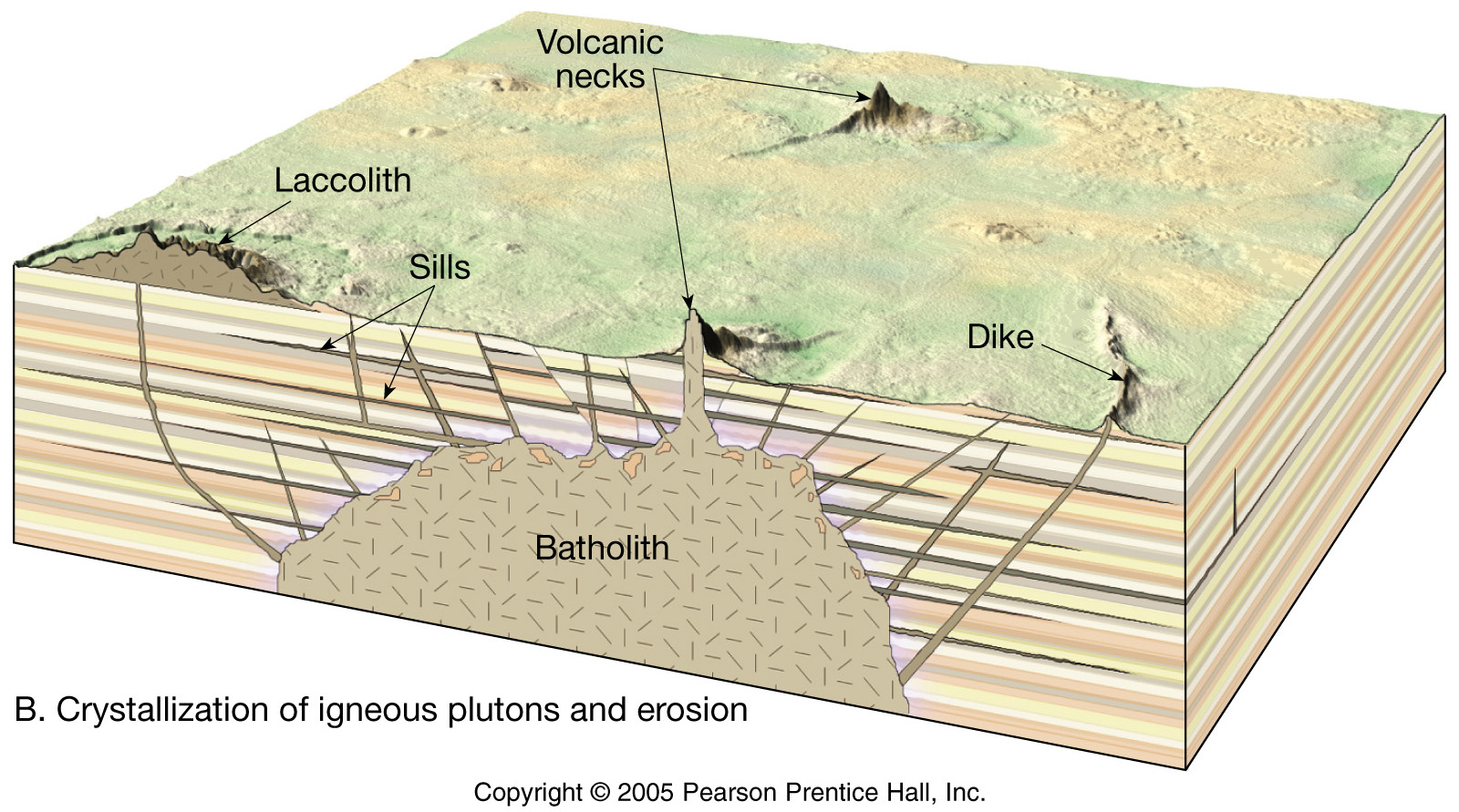
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_-a deadly \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_flow
  + Fiery pyroclastic flow made of hot \_\_\_\_\_\_\_\_\_\_\_infused with \_\_\_\_\_\_\_\_\_\_\_\_\_ and other \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Also known as glowing avalanches
  + Move down slopes of a volcano at speed up to \_\_\_\_\_\_\_\_\_\_\_\_\_ per hour
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_-volcanic \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Mixture of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Move down \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, often with destructive results

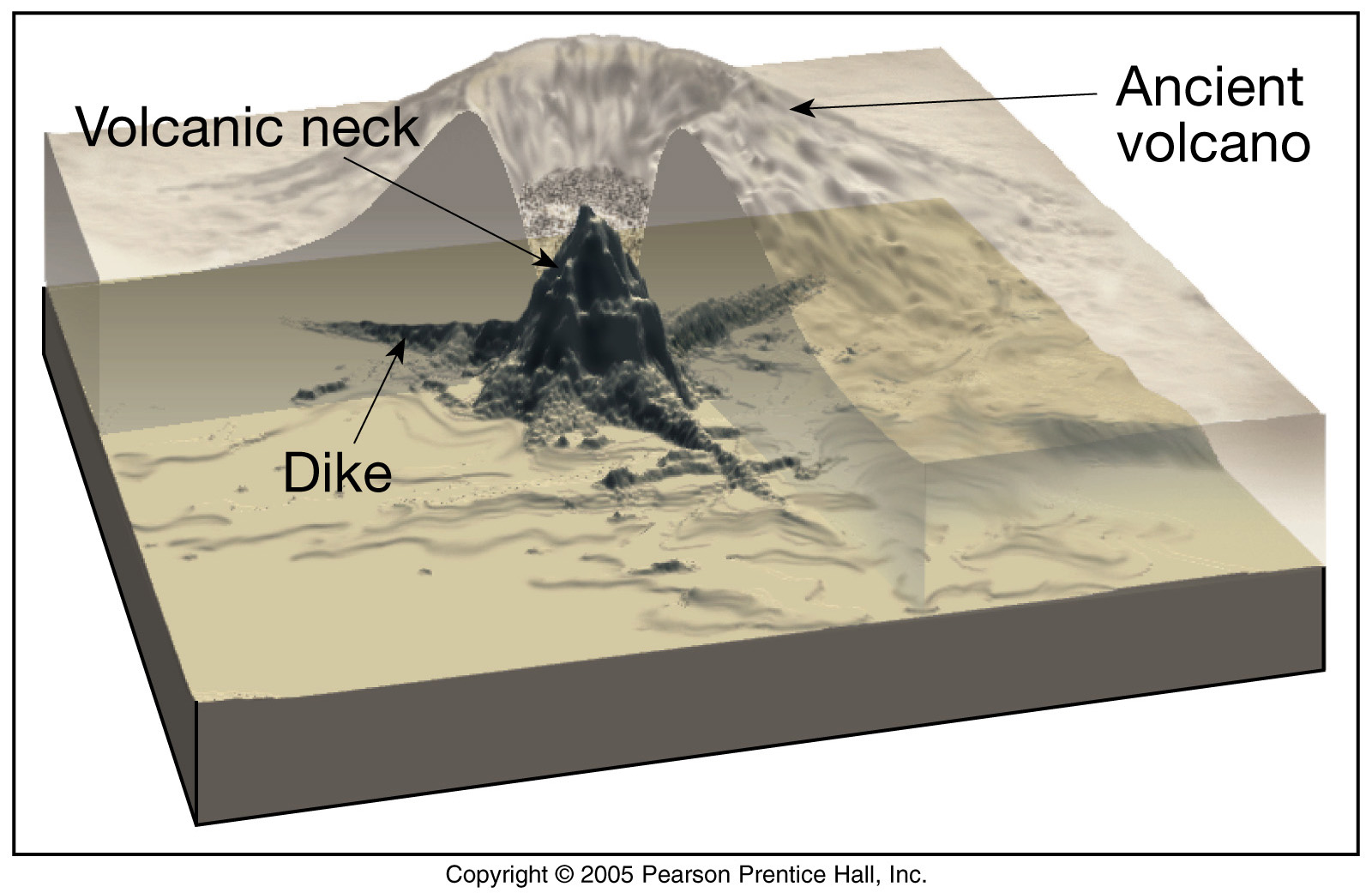
Other volcanic landforms

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Fluid \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ lava extrude from \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_fractures called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Example: Columbia River Plateau
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Bulbous mass of congealed lava
  + Associated with \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_eruptions of \_\_\_\_\_\_\_\_-rich magma

Intrusive Igneous Activity

* As magma \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, it will begin to \_\_\_\_\_\_\_\_\_\_\_\_ within the Earth’s crust
* Once \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, these masses of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_igneous rocks are referred to as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* We will talk about several types of igneous plutons
* Nature of plutons
  + Shape-\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Orientation with respect to host (\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_)\_\_\_\_\_\_\_\_\_
    - Concordant vs discordant
* Types of Intrusive igneous features
  + \_\_\_\_\_\_\_\_\_\_\_\_: a relatively \_\_\_\_\_\_\_\_\_\_\_\_\_igneous intrusion formed as mamga \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ rock fractures and solidifies into \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, like dikes, but they tend to be much \_\_\_\_\_\_\_\_\_\_\_\_\_, and form as magma intrudes in between layers of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ rock, then cools. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: begins as a \_\_\_\_\_\_\_\_\_\_\_\_\_\_, since material fills in between rock layers
    - Because of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, some sills can \_\_\_\_\_\_\_\_\_\_\_\_\_ the overlying sediments, creating a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_shaped rock body
    - Tend to form at \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
    - \_\_\_\_\_\_\_\_\_\_\_plutons \_\_\_\_\_\_\_\_\_\_\_\_\_\_ a specific \_\_\_\_\_\_\_\_\_\_\_\_\_\_
    - Form as huge quantities of magma intrude into country rock, \_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_, and \_\_\_\_\_\_\_\_\_\_\_their way towards the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
    - Most remains\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
    - Largest batholiths can be over \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Short conduit(connections) that connect a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(e.g. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_)
  + Resistant vents left standing after \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_has removed the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_





Volcanoes & Plate Tectonics

* Most volcanoes occur in a region known as the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Volcanoes can form at \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_plate boundaries
* Volcanoes can also occur \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_a plate which can result in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and form island chains like \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Volcanoes & Climate

*Take your own notes below:*