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MAGMA AND LAVA
TYPES OF ERUPTIONS
NOTES

Magma

- Magma:
  - Molten rock _____
  - Forms wherever _____ and _____ are high enough to melt rock (asthenosphere, plate boundaries)
  - Melted rock has a greater _____ and less _____ than un-melted rock
  - Causes magma to move _____
- Felsic magmas:
  - High _____ content, _____, light colored, slow moving
- Mafic magmas:
  - Low _____ content, _____, dark, flow more easily

Gases in Magma

- Main gases:
  - _____, _____, _____
- Other gases:
  - Hydrogen, carbon monoxide, hydrogen sulfide, sulfur dioxide, chlorine, fluorine
- The amount of gas _____ in magma influences the kind of _____ that results

Lava

- Lava:
  - Magma that reaches the _____
  - The composition of lava is slightly different from magma:
    - Gases have _____
    - New materials added from other _____ that have _____
- Mafic lava:
  - thin and _____, _____ escape easily, lava _____
- Felsic lava:
  - Thick and _____, gases get _____, _____ eruption

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Lava Fragments

- Tephra:
  - _____ fragments of lava produced by explosive _____
- Types of tephra:
  - _____: 2mm
  - _____: 64 mm
  - _____: more than 64 mm
    - Blocks are erupted as _____ pieces
    - Bombs are ejected as _____ and harden as they fall
- Tephra can combine with _____ to form a _____ cloud that travels _____
  - Responsible for _____ deaths in St. Pierre when Mount Pelee erupted in _____

Rift Eruptions

- Rift eruptions:
  - Occur at long, narrow _____ in the _____
  - Ocean or on _____
    - Ocean: - occur at mid-ocean ridges
      - The lava oozes out and cools _____ into rounded shapes called _____ _____
    - Land: - may spread lava evenly over _____ of square kilometers
    - Form _____ _____: mountain with broad base and gently sloping sides
  - May form a unique pattern of closely packed, six-sided columns called _____ _____
    - Thought to form as cooling lava _____ and _____

Subduction boundary eruptions

- Subduction boundary eruptions:
  - The result of magma that forms at _____ _____
  - Magma tends to be _____ and contain large amounts of _____
  - Eruptions usually _____
  - Erupted material mostly lava fragments (_____)
- Forms _____ _____ _____: cone with very steep sides
- Most of the world's _____ volcanoes occur at subduction boundary eruptions
- Also associated with young _____ ranges

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Hot Spots

- Hot spots:
  - Areas of volcanic activity in the middle of _____ plates
  - Lava usually flows _____ over the surface
  - Form _____ _____: broad and have gently sloping sides
- Hawaiian Islands:
  - The island of Hawaii is currently directly over the _____ _____
  - The northwest chain of islands are _____ volcanoes
  - Caused by the _____ plate moving over the hot spot

Plutonic Activity

- Plutons (a.k.a igneous intrusions):
  - Rock masses that form when magma cools _____ other rocks
- Dikes:
  - Sheets of igneous rock that _____ _____ the layers they intrude
  - Form when magma is forced into _____ cracks

Plutonic Activity

- Sills:
  - Sheets of igneous rock that are _____ to the layers they intrude
  - Form when magma is forced along _____ planes between rock layers
- Laccoliths:
  - _____ masses due to magma bulging upwards
- Batholiths:
  - _____ igneous intrusion
  - Form the _____ of many of Earth's _____ ranges

Eldfell

- Volcanic mountain off the coast of _____
- _____ eruption
- Formed over five months in _____ from lava and tephra that flowed or was ejected from a newly opened fissure on the island
- Tephra covered nearly _____ the island
- Burned or buried _____ homes in its only village
- The other homes had to be continually swept to prevent collapse
- The flowing lava threatened to block the entrance of the village _____

Mount St. Helens

- Subduction boundary volcano (Juan de Fuca Plate and the North American Plate)

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- Located in _____
- One of _____ major volcanoes in the Cascade Range
- Erupted in _____ (and 1921 before that)
- Signs of activity began two months before the 1980 eruption
    - _____ earthquake activity increased
    - A bulge in the north side of the cone grew _____
    - Small eruptions of _____ and _____ occurred
- <u>Final eruption:</u>
    - 1. Earthquake broke the _____
    - 2. The bulge became a _____
    - 3. Explosion of _____ and _____ ash
    - 4. Mudflows formed when ash mixed with the melted _____ and ice on the mountain
- Explosion blew down threes _____ away and rattled windows _____ away
- Very little _____, but large amounts of _____ and gases

Kilauea

- _____ volcano on the island of Hawaii
- Results from a _____ _____
- Erupts at least once a year since _____
- Magma is thought to come from a depth of at least _____ below the surface
- After rising, it is stored in an irregular reservoir about _____ below the top of the volcano

Extraterrestrial Volcanism

- <u>Moon:</u>
    - Lava flows on the moon erupted through cracks in the surface of the _____ _____
    - Cracks and heat needed to form lava thought to be the result of the bombardment by huge _____ from space
- <u>Mars</u>:
    - *Olympus Mons* is the _____ known volcanic cone in the solar system
    - Cone is _____ high and _____ across
- <u>Jupiter:</u>
    - _____ is a moon of Jupiter that has more than _____ active and inactive volcanoes