

CH14 - Geology and Nonrenewable Resources

Earth Structure

- The earth's innermost zone, the core, is made mostly of _____
- The core is surrounded by a thick, solid zone called the mantle, which is rich in iron, silicon, oxygen, and magnesium
- The outermost and thinnest zone of the earth is called the _____
 - the continental crust underlies the continents
 - the oceanic crust underlies the ocean basins

Plate Tectonics

- The earth's crust and the rigid, outermost part of the mantle are called the lithosphere.
- The lithosphere floats and rides on top of the asthenosphere.
- The movement of lithospheric plates on top of the asthenosphere is called plate tectonics.
- Lithospheric plates have three types of boundaries:
 - at _____ plate boundaries, the plates move apart - this occurs at mid-ocean ridges
 - at _____ plate boundaries, the plates move together
 - at most convergent boundaries the oceanic plate is subducted, sliding underneath the continental crust
 - at _____ faults, the plates move in opposite parallel directions

Natural Hazards

- Stress in the earth's crust can cause solid rock to deform until it suddenly fractures and shifts along the fracture. The faulting or later abrupt movement causes an earthquake
 - Earthquakes are measured by the _____ Scale, which is a measure of its magnitude
- An active volcano occurs where magma reaches the earth's surface through a central vent or crack

Earthquakes

- Earthquakes are vibrations in the earth's crust caused by sudden shifts along a fault
- Earthquakes cause seismic waves, vibrations that travel through the earth.
 - P waves (primary waves), travel through liquids, solids and gases
 - S waves (secondary waves), travel only through solids and are slower than P waves
 - L waves (_____ waves) are the slowest and occur when P and S waves meet the surface
- _____ are tremors caused as seismic waves travel outward from an earthquake

Volcanoes

- Volcanism is any activity that includes the movement of _____ towards or onto the earth's surface
- Major volcanic zones include subduction zones, mid-ocean ridges, hot spots and the ring of fire
- Volcanoes erupt because magma under pressure at high temperatures causes the magma above to be pushed towards the surface and out the vent (opening of the volcano)
 - Once the magma hits the surface it becomes lava and begins to harden
- A crater is the funnel shaped pit at the top of the volcanic vent
- A _____ occurs when the magma chamber below collapses, creating a basin shaped depression

Rocks & Minerals

- A mineral is an element or _____ compound that occurs naturally and is solid
- Rock is any material that makes up a large, natural, continuous part of the earth's crust
 - Igneous rock can form below or on the earth's surface when molten rock material (magma) cools
 - Sedimentary rock forms from sediment that is weathered, transported, and deposited before pressure creates it
 - _____ rock is produced when a preexisting rock is subjected to high temperatures, high pressures, chemically active fluids, or a combination of these

Mineral Resources

- A mineral resource is a concentration of naturally occurring solid, liquid, or gaseous material in or on the earth's crust that can be extracted and processed into useful materials at an affordable cost.

Types of Mining

- Deep deposits are removed by subsurface mining where tunnels and chambers are excavated to reach deposits
- Shallow deposits are removed by surface mining
 - in open-pit mining, machines dig holes and remove ores
 - in _____, draglines scrape up underwater mineral deposits
 - in strip mining, overlying soil and rock is removed to access deposit
 - Contour strip mining – terraced strip mining
 - In _____ removal, the top of the whole mountain is removed!

Mineral Resource Supply

- We will never completely run out of any mineral. However, a mineral becomes _____ depleted when the costs of finding, extracting, transporting, and processing the remaining deposits exceed the returns. At that point we have five choices: recycle or reuse existing supplies, waste less, use less, find a substitute, or do without. The depletion time is the time it takes to use up 80% of the reserves at a given rate.

Effects of Extraction and Use

- The mining and processing of mineral resources can affect the environment in several ways:
 - scarring and disruption of the land surface
 - collapse or _____ of the land
 - air pollution from dust and toxics
 - _____ mine drainage
 - water pollution from sedimentation and toxics