

Review Topics for Exam I

Chapter 1: Introductory Material

- Origin of the solar system and the Earth; age of the Earth and how we know it.
- Earth's early history – chemical differentiation and formation of the core, mantle, and crust.
- Basic Structure of the Earth. Approximate dimensions of core, mantle, and crust.
- Basic ideas of plate tectonics and heat flow in the mantle.
- Know how science is performed – the scientific method

Chapter 19: Plate Tectonics

- Know Wegener's continental drift hypothesis. Be familiar with the various lines of supporting evidence.
- Know the concept of apparent polar wander and why it supported continent drift.
- Know Hess's seafloor spreading hypothesis and what discoveries were made on the seafloor that led to it.
- What are marine magnetic anomalies and polarity reversals and how did they support Hess's hypothesis.
- What did Glomar Challenger contribute to the growing body of evidence in support of seafloor spreading.
- Be able to discuss how all of the major evidence for continental drift and seafloor spreading was "unified" into the modern Plate Tectonic Theory.
- Definition of lithosphere and asthenosphere. Approximate dimensions and physical character (weak, strong, rigid, plastic, etc.).
- The approximate number of tectonic plates and a rough idea how fast they move.
- The 3 types of plate boundaries (transform, convergent, divergent) and characteristics of EQ's and volcanic eruptions at each. Know some geographic examples of each type.
- Major differences between subduction zones (ocean-ocean, ocean-continent) and collision zones (continent-continent). Physical processes that are occurring at each.

Chapter 16 Earthquakes

- Definition of fault, focus, and epicenter. Elastic rebound theory for earthquakes.
- Know details about the three basic types of seismic waves (P, S, surface).
- Know what the Richter scale is based on. Know the difference in terms amplitude and energy between EQ's with different Richter magnitudes.
- EQ distribution, depth, and size related to plate tectonic settings?
- Destructive effects of EQ (ground motion, liquefaction, tsunami); what parameters are important?
- Concept of seismic gaps and EQ probability and forecasts are derived.

Chapters 3 and 4: Volcanism and Magmas

- Definition of magma and physical properties (temperature, viscosity, SiO₂ content). Relation of physical properties to eruption characteristics.
- Types of volcanoes and volcanic structures; shield volcano, stratovolcano, cinder cone, caldera, volcanic dome, etc. Know which tectonic settings these are found and what type of magma they are associated with (ie. basaltic, andesitic, rhyolitic).
- Know the relation between the distribution of volcanoes, magma types, and eruption styles with different tectonic settings.
- Know what pyroclastic flows and lahars are physically. What tectonic setting?
- The origin of basaltic, andesitic, and rhyolitic magmas and their relation to tectonics.
- Concepts of partial melting and other secondary processes (e.g., crystallization, assimilation, etc.) as mechanisms to explain the chemical diversity of magma types.
- Causes of partial melting (decompression, fluid fluxing). Effect of water on the melting T°.