

**GEOLOGY 111**  
**EXAM 3**  
**STUDY QUESTIONS**  
**Covers lectures and readings Nov 16 –Dec 13**

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What does it mean that the earth has an GAD magnetic field? What is the G, A and D in GAD? What does it mean that the field "reverses"?

What is secular variation? Does the geographical pole wander? Does the magnetic pole wander?

What is a magnetic anomaly? How do they arise? Why do anomalies over the ocean floor occur as bands? Are there stripes on the ocean floor?

What is paramagnetic behavior? What is ferromagnetic behavior? What kind of materials are paramagnetic? What materials are ferromagnetic? How does a rock become permanently magnetized? What is the "Curie temperature"?

What kind of structures are produced at a rifting continent?

What rock sequences are produced during the rift phase of continental divergence? During the drift phase?

Why can't continents remain a part of an active divergent boundary?

What is the difference between a mountain belt and an orogenic belt?

What kind of structures are produced during continental collision? What kind of rocks are drawn into continental collision zones? What kind of rocks are produced in continental collision zones?

The origin of granites is linked to the development of metamorphism in orogenic belts. How?

Can you draw an idealized cross section of an orogenic belt? Which rocks were once part of the down going plate? Which rocks were once part of the over-riding plate? How would we recognize the "suture" between the two? What would you see in the "core" of the orogenic belt?

What is the most abundant volcanism on earth?

How is oceanic crust made at divergent boundaries? Why is it considered a "chemical derivative" of the mantle?

What are the rocks and igneous structures that make up an ophiolite?

How does the lithosphere mature as it moves away from a mid-ocean ridge?

How does a transform boundary between two ridge segments work? What is the bathymetric expression of a transform boundary between two ridge segments?

The bathymetric expression of a transform boundary can commonly be seen many 100's of km away from related mid-ocean ridges. Why? Why is the transform only seismically active between the ridge segment and not away from the ridge?

What are fracture zones? Are they active faults?

What is the bathymetric expression of a subduction zone?

Why do volcanic arcs form where the subducting plate reaches 100 km depth?

Why don't subducting plates melt? If they don't melt, where does the magma in the arc come from?

If the parent magma below an arc is basaltic (and it is!) why are andesites so common in arcs? Why is a volcanic arc called an arc?

What types of igneous rocks are common in an arc built on ocean crust? What types are common in an arc built on a continent? How and why do they differ?

What is an accretionary wedge? What kind of rocks are found in an accretionary wedge? What is a melange?

What is a hot spot? Name three presently active hot spots. What kind of igneous rocks are made at hot spots.

Can you name the most common setting or settings of formation for each of the six main types of igneous rocks (basalt, gabbro, andesite, diorite, rhyolite and granite)?

Where would you go on earth today to find each of the following features: divergent plate boundary; rifting continent; convergent plate boundary with ocean crust on the over-riding plate (an island arc); convergent plate boundary with continental crust on the over-riding plate (a continental arc); continental collision?

Do you still know the names of the periods of the Geologic Time Scale (in order) and the dates (in Ma) of the major (era) time boundaries?

How are fracture zones and magnetic anomalies used to determine paleo-spreading rates for mid-ocean ridges?

What can we learn about plate kinematics from hot-spot tracks?

How do continental margins form? What is the continental shelf? Continental slope? Continental rise?