

Study Guide for Mid-Term Examination – REVIEW SESSION WILL BE ON MONDAY MARCH 2 from 1200-130pm.

Readings in the text: (Stanley) everything up to Thursday February 26th 2009.
Lecture notes, homeworks and the quiz solutions.

Understand the following:

- What is the principle of Uniformitarianism? How is it in contrast to Catastrophism? What do these principles tell us about the rate of geological processes? How do we use these principles to understand past events in the rock record?
- What is an element? How is an isotope related to an element? What is a rock, and what are minerals? How are these things useful in understanding the past?
- How do the various circuits of the Rock Cycle represent means for the crust to recycle itself?
- What is a fossil and how are they formed? What makes them so rare?
- How are the *relative* and *absolute* ages of rocks determined?
- What is the structure of the Earth's crust? How are continents different from ocean basins? Why? How does Archimedes Principle explain the crustal dichotomy?
- Why is the Earth's interior hot? What keeps the Earth's interior hot and how is this related to plate tectonics?
- How are the Rock Cycles and the Water Cycles related? What does this have to do with Plate Tectonics?
- What is radioactivity? How do we use radioactivity and the D/N relationship in radiometric age determinations? What is the principle of the *half-life*?
- Explain how the Geologic Time Scale was originally constructed. Did they have absolute ages at the time this was first done?
- What is an index fossil? What makes it useful in the context of Steno's Laws?
- Why are correlations between rock units that use index fossils more accurate than using radiometric data?
- What is the theory of Natural Selection? What were some lines of evidence used by Darwin to formulate his theory of Natural Selection? What is the difference between a Theory and a Guess?
- How is variability in the gene pool of a population established? Why is genomic variability advantageous for survival of natural species?
- What are some mechanisms that are thought to give rise to new species?
- What is the significance of mass extinctions in the geologic record?
- Do the rates of evolution (speciation and extinction) of various groups of organisms vary greatly? Can they be gradual or exhibit punctuated equilibrium? What is the difference between these two hypotheses?
- What is an example of evolutionary convergence? How is this problematic in cladistics?
- How does the theory of Plate Tectonics account for the way the landmasses of the Earth appear?
- How were arguments formulated in early versions of the Plate Tectonics theory to account for geologic observations of common phenomena on different continents?
- What is the "Ring of Fire" and why is it where it is?
- How do mid-ocean ridges form?

- When slabs of subducted lithosphere go down, how do they contribute to the water, carbon and rock cycles?
- How do changes in burial and oxygen concentration in depositional environments affect the reservoirs of CO₂ and O₂ in the atmosphere? How is this reflected in the isotopes of carbon (C) and oxygen (O) in sediments?
- How are photosynthesis and respiration related? What is the photosynthetic reaction? How does this relate to the previous point on this list?
- How have changes in environmental conditions in the past by plate tectonics affected the global cycles of CO₂ and O₂?
- What are the different types of unconformities? How are they recognized?
- What is phylogeny? Explain how The Phylogenetic Tree of Life was constructed.
- Phenotype and Genotype, what are they? How does one relate to the other in an organism?

Some terms to know

α (alpha, Helium nucleus)

Actualism

Adaptation

Angular unconformity

Asthenosphere

Autotroph

β (beta, electron)

Base Pairs

Chemoautotroph

Chemosynthesis

Chordate

Chromosome

Clade

Crust

Crystallization

Cyanobacteria

Diagenesis

Diatoms

Diversity

DNA

electron

Eukaryote

Extremophile

Facies

Feedback

Fossil

Fossilization processes

Gene

Gradualism

Half-life

Halophile

Heterotroph

Homology

Hyperthermophile

Hypsometry

Intrusive relationships

Isotope

Isostasy

Lateral continuity

Limestone

Lithification

Magma

Mantle

Mass extinction

Mass spectrometer

Metamorphism

Moho and lithosphere

Mutation

Natural selection

Neutron

Original horizontality

Outcrop

Parent (N) and Daughter (D)

Permineralization

Photosynthesis

Plate tectonics

Prokaryote

Proton

Radioactive decay

Radiometric dating

Reservoir

Stratigraphy

Subduction

Superposition

Taxon

Unconformity – disconformity –
nonconformity

Uniformitarianism

Vestigial forms