

Review for 2nd Exam

- Attributes of life
 - Organization
 - Homeostasis
 - Growth and development
 - Reproduction
 - Metabolism
 - Response
 - Evolutionary adaptation
- Evolution
 - History
 - Lamarckian
 - Darwinian
 - Modern synthesis/genetics
- Evidence for evolution
 - Fossil record
 - Comparative anatomy
 - Biogeography
 - Embryology
 - Unity of life
- Catastrophism/Uniformitarianism
- Creationism objections
- Major Domains of Life: Why 3?
- Cells and Metabolism
 - Hetero, Auto, Photo, Chemo
- Abundances of elements
- Building blocks of life
 - monomers and polymers
 - amino acids, sugars, bases
 - proteins, nucleic acids
 - selectivity
- Handedness and isomers
- Polymerization, mass action
- Genetic code (why 3 base-pairs?)
- Reproduction, protein synthesis
- Unity of Life and common ancestor
- Extremophiles
- Adaptations to extremes
 - domains of life
 - parsimony
 - thermophiles most primitive
 - hydrothermal vents
 - sterilization of early earth
- Early geologic record of life
 - Chemofossils
 - Microfossils
- Chemical evolution theory
 - Miller-Urey/Early Earth
 - Polymer formation and clays
 - Droplet formation/protocells
- RNA world hypothesis
- Genetic takeover hypothesis
 - Problems with organic origin
 - Clues from Darwin tree
 - Scaffolding, self-assembly
 - Reversible bonds
 - Crystals and bubbles
 - Information
 - Role of organic molecules
- Panspermia
- Complexity and catastrophes
- Smallest organisms and nanobes
- Major stages of evolution
 - Evolution of eukaryotes and multi-cellular organisms
 - Role of iron in evolution
- Evidence for meteoritic impacts
 - Iridium and rare earths
 - Spherules and shocked quartz
 - Soot (worldwide fires)
 - Chixulub crater
- Hazards of impacts
 - Relative risks, mitigation plans
- Information capacity: DNA and brain
- Evolutionary implications
- Other possibilities for life
 - forces
 - structural elements/solvents
 - convergent/divergent evolution
 - bilateral/radial symmetry
 - information capacity of life
 - extreme environments
 - roles of math and language
 - artificial life and intelligence