

## Concepts of Science - Study Guide for Exam 3

Listed below are a number of concepts, people and techniques that you should be familiar with:

### Energy

Starting on page 133 - Light and the Special Theory of Relativity. The speed of light, Michelson and Morley, Einstein, the special theory of relativity, the concepts of relativistic mass, length, and time and their calculation using the formulae on P. 135 (like Prob. 20, p. 138)

Nuclear Energy: Nuclear reactions, fission, fusion, nuclear waste, half-life, nuclear accidents, Chernobyl and Three Mile Island.

Energy in Living Systems: Autotrophs, heterotrophs, photosynthesis, cellular metabolism, respiration, carbohydrates, ATP, global population.

### The Interaction of Structure and Energy over Time

Cosmology: geologic time, the big bang, age of the universe, red shift, expanding universe, evidence for the big bang, stellar evolution, evolution of the chemical elements, four forces of nature.

Geologic time: dating with radio isotopes, the concept of half-life, problems using half-life, carbon-14 dating, K-Ar dating.

The Evolution of Living Organisms: The origin of life, Stanley Miller, reducing and nonreducing atmospheres, definition of a living organism, the central dogma of molecular biology, amino acids, RNA world, biological evolution, creationism, intelligent design, natural selection, *The Origin of Species*, Charles Darwin, Alfred R. Wallace, Thomas Malthus, Charles Lyell, Bishop Usher, Jean-Baptiste de Lamarck, species, population, evolution, genetic diversity, fossil record, gradualism, punctuated equilibrium, mass extinctions, molecular genetics, Homo erectus, Lucy, Homo sapiens, chromosome, gene, allele, mutation, paleontology, "Creation Science".