Ecological and Biological Concepts

Cell Structure
- Cells surrounded by plasma membrane
- Nucleus
- Membrane bound organelles
  - Mitochondria, vacuoles, ER, chloroplasts
- Procaryotes vs. eucaryotes
  - Pro - have cell wall, no membrane bound nucleus, include bacteria and cyanobacteria

Reproduction
- Asexual vs. sexual
- Asexual
  - Cellular division
  - Fission of multicellular organism (corals)
  - Budding of multicellular organism (anemone)
  - Parthenogenesis
- Sexual
  - Requires meiosis
  - Separate sexes
  - Hermaphrodites (simultaneous or sequential)

Homeostasis
- Osmosis and tonicity
  - Isotonic, hypertonic and isotonic
  - Osmoconformer vs. osmoregulator
- Temperature
  - Ectotherms (poikilotherms) vs. endotherms (homeotherms)
    - Tuna and billfish are special
  - Stenthermal (limited temp range) vs. eurythermal
    - Temperature tolerance
    - Effect on metabolism

Trophic Levels
- Autotrophs
  - Photosynthesis or chemosynthesis
- Consumers
  - Herbivores
  - Carnivores
- Decomposers
- Food chain vs. web
- Energy transfer 6-20% to next trophic level
- Nutrient transfer - biogeochemical cycles
Symbiotic Relationships
- Relationship between 2 or more species
- Mutualism - both benefit
- Commensalism - one benefits
- Parasitism - one benefits while other suffers

Spatial Distribution
- Nekton vs. plankton
- Benthos - epifauna vs. infauna

Diversity
- Range of organisms categorized by taxonomic classification
- Taxonomic relationships suggest evolutionary (phylogenetic) relationship
- Five Kingdoms
  - Monera - procaryotes, bacteria and cyanobacteria
    - Single celled
    - Lack nucleus, multiple chromosomes, chloroplasts and mitochondria
    - Bacteria are decomposers
    - Cyanobacteria are photosynthetic and important phytoplankton
- Protista - single-celled or aggregated eucaryotes,
  - Other major phytoplankton
  - Also include protozoans
- Fungi
  - Few species by comparison
  - Also serve as decomposers
- Plantae
  - Multicellular
  - Photosynthetic
  - Cellulose cell walls
  - Alternating gametophyte and sporophyte generations

Even More Diversity
- Animalia
  - Multicellular
  - Non-photosynthetic
  - No cell walls

Other Levels of Classification
- Phylum
- Class
- Order
- Family
- Genus
- Species - a population of similar individuals that can or normally do interbreed and produce fertile offspring