

Ecological and Biological Concepts

Cell Structure

- Cells surrounded by plasma membrane
- Nucleus
- Membrane bound organelles
 - Mitochondria, vacuoles, ER, chloroplasts
- Prokaryotes vs. eukaryotes
 - 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
 - Stenothermal (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

Spacial 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

More Diversity

- 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