1 ☐ Ecology

Sustaining the Balance

2 ☐ What is an ecosystem?

- An ecosystem is a grouping of plants, animals, and microbes interacting with each other and their environment such that the ENTIRE GROUPING PERPETUATES ITSELF.

3 ☐ Distinguish abiotic from biotic factors.

- Biota: living organisms or derived from living organisms
- Abiotic factors: factors that are independent from living things; NONLIVING, physical features or characteristics

4 ☐ What is ecology?

- The study of any and all aspects of how organisms interact with each other and their environment.

5 ☐ Explain the significance of sustainable development.

- Sustainable development is meeting the needs of the present without compromising those of the future.

6 ☐ Contrast biotic potential with environmental resistance.

- Biotic potential: potential of a species for increasing its population and or its distribution
- Environmental resistance: totality of factors (regulators) such as adverse weather conditions, shortage of food, etc. that tend to cut back populations and keep them from growing or spreading (colonizing).

7 ☐ How do these concepts help to sustain an ecosystem?

8 ☐ Explain the concept of tolerance and give examples from the field.

- Each species in a community has certain tolerance with respect to all environmental factors.
- If the limit of tolerance is exceeded (or deficient) in some area by a given factor then the species will be absent.

9 ☐ Apply Leibig's law of the minimum to Spartina alterniflora in freshwater.

- Leibig's Law of the Minimum: Even if all other factors are favorable, if one limit of tolerance has been exceeded or insufficient, then the species will be absent.
- The range of tolerance for Spa alt is 0 ppt to 40+ppt salinity.

10 ☐ Determine methods to assess sustainable development.

11 ☐ Apply our research to evaluation of sustainable development.

12 ☐ Analyze some of the categories of interactions occurring in the ecosystem.

- Mutualism; commensalism; parasitism;
- prey/predator

- parasite/host
- competition: interaction among organisms for a necessary resource that exists in short supply

13 ☐ Examine trophic structure of a community or ecosystem.

- autotrophs Herbivores, herbivory
- heterotrophs Carnivores
- autoheterotrophs blue green algae
- Saprophytes
- trophic structure: arrangements of autotrophs and succeeding levels of heterotrophs
- trophic levels: each successive layer of the trophic structure

14 ☐ Suggest methods to study trophic structure.

15 ☐ Identify relationships within communities.

- Niche: occupation, role in community, in ecosystem
- Specialized? Generalist? Spartina alterniflora, Anchoa mitchelli, Menidia beryllina
- habitat: address, where they live
- population: group within a single species-location, geographical or physical boundaries
- community: several different species populations that tend to occur together in a particular geographical area

16 ☐ Distinguish between intraspecific and interspecific competition and give examples from the field.

- Intraspecific competition: within species-food, mates, somewhat space, social hierarchy
- 
- Interspecific competition: between species-food if not resource partitioning, space
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- competitive exclusion-one species eliminates another by out competing it

17 ☐ Resource Partitioning

- resource partitioning: specializing to share resources available
- Doesn't overlap niche

18 ☐ Distinguish between abundance and diversity.

- dominants: numerically abundant species
- species richness: simple listing of the total number of species in a community or trophic level
- species diversity: measure that combines into a single figure both the number of species and distribution of total number of individuals among the species

19 ☐ Explain how the relationship between abundance and diversity are related to perpetuation of an ecosystem (sustainable development).

- If low diversity, no resistance
- If low abundance, not reproduce in sufficient # to maintain population

20 Describe the two life history strategies and relate these life styles to niche and habitat.

- life styles-of the wet or muddy
- called life history strategies 2 types
- opportunistic- "r" selected have short life spans, rapid development to reproductive maturity, many reproductive periods / year, larvae present in the water during much or all of the year, and high death rates.
- equilibrium or "K selected" long life spans, relatively long development time to reach reproductive maturity, one or more reproductive periods/year, low death rates

21 Explain the significance of biogeochemical cycling to the concept of sustainable development.

- biogeochemical cycling: this is the transport and transformation of chemicals in ecosystems They involve physical, chemical, and biological processes.

22 Describe the carbon cycle.

http://www.biosci.uga.edu/almanac/archive/1996/spring_96/bio_104/notes/june_5.html

23 Describe the nitrogen cycle.

http://users.rcn.com/jkimball.ma.ultranet/BiologyPages/N/NitrogenCycle.html

24 eutrophication

- If N and P are added to aquatic ecosystems, eutrophication can occur
- N and P, which are usually limiting nutrients of ecosystems, are now available in large quantities and the algae (phytoplankton) grows prolifically in response
- The algae blocks sunlight and contributes to the loss of submerged aquatic vegetation (SAV)
- As the algae decomposes, the bacteria use all the available oxygen in the water and facultative anaerobes switch to anaerobic pathways for further decomposition
- The water is depleted of oxygen, anoxic water, resulting in fish kills

25 Eutrophication

- http://www.cord.edu/faculty/landa/courses/e103w00/sessions/water/eutrophication.jpg

26 Eutrophication

- http://www.italocorotondo.it/tequila/module2/pollution/effects_pollution.htm

27 Describe the phosphorous cycle.

http://www.dsbn.edu.on.ca/edtech/Grassroots/SouthLincoln/Grade10Ecology/matter%20cycles/phosphorus_cycle.htm