**Vocabulary for Conservation and Biodiversity**

Below is a list of terms and definitions you should know by the end of the unit to be considered proficient in this unit’s standards. Further explanations of these terms can be found in the Environmental Systems & Societies text, Living in the Environment (in the classroom), or in selected readings and labs.

**Biodiversity:**  The amount of biological or living diversity per unit area. It includes the concepts of species diversity, habitat diversity, and genetic diversity (should also know the differences between genetic, species, and habitat diversity).

**Genetic:** The range of genetic material present in a gene pool or population of a species.

**Habitat:** The range of different habitats or number of ecological niches per unit area in an ecosystem, community or biome. Conservation of habitat diversity usually leads to the conservation of species and genetic diversity.

**Species:** The variety of species per unit area. This includes both the number of species present and their relative abundance.

**Carrying Capacity:** The maximum number of a species or “load” that can be sustainably supported by a given environment.

**Diversity Index:** A numerical measure of species diversity, derived from both the number of species (richness or variety) and their proportional abundance (evenness).

**Evolution:** The cumulative, gradual change in the genetic characteristics of successive generations of a species or race of an organism, ultimately giving rise to species or races different from the common ancestor. Evolution reflects changes in the genetic composition of a population over time.

**Isolation:** The process by which two populations become separated by geographical, behavioral, genetic, or reproductive factors. If gene flow between two subpopulations is prevented, new species may evolve.

**Plate tectonics:** The movement of the eight major, and several minor, plates of the Earth’s lithosphere in relation to each other and to the asthenosphere below.

**Speciation:** The process through which new species form.

**Species:** A group of organisms that interbreed and produce fertile offspring.

**Biodiversity & Conservation- Standards:**

1. **Explain the concept of diversity and calculate various ways to measure diversities. (2.3.2, 2.3.4-5, 4.1.1, 4.3.5)**
   1. **Cite** current estimates of number of species
   2. **Define** and **distinguish** between diversity, biodiversity, abundance, genetic diversity, species diversity, and habitat diversity.
   3. **Evaluate** the strengths and weaknesses of conserving the three types of diversity. (CITES)
   4. **Describe, measure, and evaluate** methods for estimating the abundance and diversity of organisms (Lincoln and Simpson’s Diversity Index)
      1. Students are not required to memorize this formula but must know the meaning of the symbols: *D* = diversity index, N= total number of organisms of all species found, *n* = number of individuals of a particular species. Evaluation: *D* is a measure of species richness. A high value of *D* suggests a stable and ancient site, and a low value of *D* could suggest pollution, recent colonization or agricultural management. The index is normally used in studies of vegetation but can also be applied to comparisons of animal (or even all species) diversity.

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1. **Evaluates historical and human-accelerated causes for extinction and speciation. (4.1.2-4, 4.2.1)**
   1. **Outline** evolutionary causes for speciation:
      1. isolation (creates the inability to interbreed or produce fertile offspring)
      2. plate movement (forms geographic barriers, separates gene pools, and creates new habitat)
      3. mass extinctions (opens new niches and habitats, but also new predators)
   2. **Compare and contrast** mass extinctions including background rate, current rate, causes, and affect on global diversity.
   3. **Identify** natural and human factors leading to the loss of diversity including: natural disasters, habitat degradation/loss/fragmentation, agricultural practices (farm, fishing, and hunting), non-native species.
   4. **Summarize** factors that make species more prone to extinction: 1) human awareness, 2) initial size, 3) degree of specialization, 4) reproductive potential, 5) trophic level
2. **Summarizes current biodiversity health and conservation measures (4.2.2-6)**
   1. **Outline** factors used to determine a species’ Red List status AND protection by ESA
      1. population size and reduction of size
      2. geographic range and degree of fragmentation
      3. quality of habitat and area occupied
      4. probability of extinction
   2. **Compare and contrast** with specific examples: extinct species, critically endangered species, and improved species.\*
   3. **Analyze** conservation efforts including preserves, zoos CITES, Red Lists, Endangered Species Act, and NGO’s.

***Biodiversity & Conservation Reading/Lecture Notes***

***Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_***

**Lecture Notes 1:** *Goes along with the pages listed in your textbooks SBS pages 282-95 and complete the following questions.*

*In Class: 1/8*

**DEFINING BIODIVERSITY (SBS pgs. 282-287)****1. The three types of biodiversity include:**

a. **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ diversity:**  the number, or variety, of species in a particular region. This has two components: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Create a way to tell these two components apart:

b. **Genetic diversity:** the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in DNA **among individuals within a population or species.** Populations without this diversity are vulnerable to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ like:

c. \_\_**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(aka: habitat) diversity:** the number or variety of habitats for species to meet their needs of life. Give an example of low and high habitat diversity:

i.

ii.

**2. Diversity (Variability):**

a. The most widely held estimate for the earth’s total number of species is \_\_\_\_\_\_\_ **million.**

b. 3 Reasons is it hard to calculate diversity:

i.

ii.

iii.

c. Normal variation depending on ­­­­­­­­\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

i. Example:

d. Human activities often simplify the three types of biodiversity, making them\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3. **Speciation (OX pgs. 100-105):**

a. **Species form \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (gradually).**

i. Evidence: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_,\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

b. **Natural Selection:** Populations \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ change over generations to be successful in their environment.

i. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ within population’s genetics

ii. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of offspring

iii. competition for limited \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

iv. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ pass along their genetics more frequently

c. **Artificial Selection:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ animals and plants for specific traits. Consider the concerns with this...

d. **Genetically Modified Organisms:** DNA of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ inserted into an existing species. (Talking about these concerns in Food & Soil Resources.)

e. **Causes of speciation:**

i. **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_:** One population divided into two smaller pop. - Examples:

ii. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: Changes climactic conditions and adds new

habitats

- Examples:

iii. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: Open new resources and niches

**4. EXTINCTIONS and EXTINCTION RATES (SBS 286- 290)**

a. Species richness increases the closer to the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. The **latitudinal gradient** is partially because tropical areas are so productive. Diverse habitats usually have more \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

b. Background rate of extinction

c. Our planet is currently in it’s \_\_\_\_\_\_\_ mass extinction with higher rates of extinction than the background rate. Decrease in population sizes are also significant b/c they signal loss of genetic/habitat diversity.

d. Millennium Ecosystem Assessment - current extinction rate is \_\_\_\_\_\_\_\_\_\_\_ times

greater than background rate.

**5. Hotspots & Keystone species** (OX: 97-99) - Uneven distribution & influence

a. About \_\_\_\_\_\_ recognized hotspots

b. These are areas that have \_\_\_\_\_\_\_\_\_\_\_\_\_\_ species (only found there)

c. Keystone species are those that have a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ on the

ecosystem   
i. function varies: top predators, base of food chain, and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

ii. Examples:



6. **Prone to extinctions? (OX 110-11)**

a. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

i. captive breeding and zoos preserve species, but do not address issue of lost

ecosystem function.

ii. Examples:

b. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

i. less genetic diversity does not allow them to adapt to change.

ii. Examples:

c. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

i. large animals are more rare to begin with (10% energy transferred) and often means low reproductive potential

ii. Examples:

d. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

i. require two habitats in good condition and have high needs as is

ii. Examples:

e. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

i. If human disturbance (or natural) occurs, difficult to adapt.

ii. Examples:

**7. CAUSES OF BIODIVERSITY LOSS (SBS Pgs. 290-296)**

a. Each of the five sources of biodiversity loss are intensified by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and consumption of resources.

b. **Habitat loss :**  the largest cause of biodiversity loss.

i. Give three examples:

ii. Define habitat fragmentation in your own words:

iii. Explain why species just don’t adapt to altered habitats.

c. **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_:** Examples include fertilizer run-off, car exhaust, sediment (dirt) after construction, and plastics.

d. **Overharvesting:** This is particularly bad when it comes to ocean fish. Some species

we eat may not be around in another 20 years. Strict regulations help, but more

needs to be done.

e. **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: READ TABLE 11.16.**  The harm in invasives can be economic as well - increased competition in farms, fire prone weeds increase road management costs, and changes to lakes can destroy recreational boating.

i. What are two ways species are introduced?

f. **Climate Change:** (Remember this doesn’t always mean warming, some places see more rain, snow, or a change in weather patterns.) Describe why the treat to biodiversity is so much different with climate change?

**Homework Reading Part 2:** *Read* SBS pgs 296-300 and OX pgs. 112-116 *and complete the following questions. Due: 1/10*

**BENEFITS OF BIODIVERSITY**

*1.*  If intrinsic value alone does not carry enough worth - then consider these benefits:

a. **Environmental services** - include processes the earth provides for free and may be worth \_\_\_\_\_\_ **trillion/year.** List four you find very important:

i. The means to adapt to change (ok, it may not be your most important now...)

ii.

iii.

iv.

b. **Ecosystem Function -** It increases the r\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of systems.

i. Explain why a **keystone** species importance may be greater than another species.

c. **Food security -** We get \_\_\_\_\_% of our food from \_\_\_\_\_ crops. If a plague wiped out all the most common variety of corn produced, this would mean no more feed for cattle, and no Doritos.

i. Give an example of a food found and the benefit it could provide.

d. **Drugs & Medicines**

e. **Ecotourism**

**f. Connections with Nature:**

2. For three species from those given in OX, pages 112-115, summarize the location, ecological role and extinction pressure.

|  |  |  |
| --- | --- | --- |
| **Species & location** | **Ecological Role** | **Extinction pressure** |
|  |  |  |
|  |  |  |
|  |  |  |

**Threatened/Endangered Species and Ecosystems**

**Campaign & Mini-Presentation**

***Biodiversity & Conservation Standard 3 Assessment***

**Task:**

You are part of a concerned group of citizens working to protect global biodiversity.  Research a critically endangered, or threatened, species or habitat and create an conservation campaign poster to rally support for that species.

**Directions:**

1. **Research one or more related species listed on the IUCN Red List or protected by the Endangered Species Act.**
2. **Fill in the background questions below.** 
   1. Outline factors that are increasing the vulnerability of this species or habitat (think back to factors making species more prone to extinction).
   2. Describe what level of conservation would be most effective in preservation. (Species, Habitat, or Genetic.)
   3. Evaluate if the conservation approach you stated in b the most effective for rallying support.
   4. What organizations, governmental and non-governmental, could be effective in partnering with?

1. **Create a one page campaign poster or two minute viral video to educate the public on the need to protect this species.  Include the following:**
   1. The species general and scientific name.
   2. A description or map of where the species can be found and estimates to population size.
   3. Factors increasing vulnerability (fragmentation, poaching, habitat loss, ect)
   4. Value of this animal in terms of economics or biodiversity.
   5. Human activities causing decline.
   6. Actions that need to be implemented to preserve the species or habitat.
   7. Resources for additional information

|  |  |  |  |
| --- | --- | --- | --- |
|  | Not Proficient (1) | Meets (4) | Exceeds (5) |
| Communication |  | * Limited grammatical errors * All material is typed or very easy to read. | Project is creative and exceptional at delivery a consistent message |
| Standard 3 - Summarizing current biodiversity health and conservation measures | Please correct and turn back in ASAP | * Answers to direction 2   are thoughtful and consistent with class concepts.   * 5 out of 7 of the answers to direction 3 are present and accurate. | Answers to #2 and #3 connect class topics or use exceptional research and examples. |