Unit 2 The Living World: Biodiversity AP Exam Review

Levels of Biodiversity

- 1) Define Genetic Diversity.
- 2) Define Species Diversity.
- 3) Define Ecosystem Diversity.





4) Describe how the picture to the left relates to genetic and species diversity.

Specialist vs Generalist Species

5) Compare a specialist to a generalist species. Give an example of each type of species.

6) Is a generalist or specialist more likely to survive in a changing environment? Explain.

7) Match the following:

- a. generalist species
- b. specialist species
- c. invasive species
- d. keystone species
- e. indicator species
- f. endemic Species
- _____ Zebra mussel
 - Galapagos tortoise
 - American Alligator
 - Tiger salamander
 - Norway rat
 - ____ Giant Panda

Species Richness and Relative Abundance

8) Define Species Richness. How is it calculated?

9) Define Relative abundance. How is it calculated?

10) What do these two things reveal about an ecosystem? Why?

Ecosystem Services

11) Fill in the chart below on the different types of ecosystem services

Service Type	Define	Give a Real World Example
Provisioning		
Regulating		
Cultural		
Supporting		

12) Complete the following table:

Ecosystem Component	Ecosystem Services
honey bee	
water cycle	
forest	
bat	
bacteria	
coral reef	
wetland	

Anthropogenic Effects on Ecosystem Services

13) Describe 5 ways that humans have disrupted ecosystem services on earth:



Island Biogeography Theory

14) Two islands, different distances from the mainland have different rates of extinction, this is explained by the theory of island ______.

15) Describe the trends observed in the image to the right.

16) Why are island specialists susceptible to extinction?



Ecological Tolerance

17) What is the range of tolerance? How can one determine what it is?

18) Define the terms in the picture below:



- a) Zone of Intolerance
- b) Zone pf physiological stress
- c) Zone of optimum

Natural Disruptions

- 19) What are some examples of natural disruptions to the environment?
- 20) Compare resistance to resilience in terms of ecosystems.

Plant Adaptations to Fire

- 21) What biomes need fire for plant germination?
- 22) How have plants adapted to fire? Give at least two examples.

Ecological Succession: Primary vs Secondary

- 23) Compare and contrast primary to secondary succession. Give examples of each.
- 24) Define pioneer community.
- 25) Define climax community.



26) What type of succession is illustrated above? How can you tell?

Species: Indicator and Keystone Species

27) Define a keystone species. Give at least two examples.

28) Define an indicator species. Give at least two examples.

Sample FRQ's

29) Biological diversity, or biodiversity, has become a topic of great concern among conservationists. Biodiversity is often used by scientists and policy makers to help determine the health of ecosystems.

- (a) Describe TWO characteristics shared by ecosystems that have high biodiversity.
- (b) Identify TWO specific human activities that result in a loss of biodiversity, and explain how each activity lowers biodiversity.

(c) For each human activity you discussed in (b), propose a practical strategy (other than simply banning the activity) to reduce the loss of biodiversity.

(d) Describe ONE naturally occurring factor that could lead to a loss of biodiversity.

(e) Describe TWO ecological benefits that greater biodiversity provides.

30) Read the following article from the Fremont Inquirer and answer the questions that follow.

Fremont Inquirer

May 1, 2010

BEETLES BOOM BUT BEES BUST

We share our world with millions of insect species that we tend to overlook in our daily lives. Yet once in a while, some insect species do make the front page — sometimes because their populations are exploding and other times because they seem to be performing a disappearing act. Examples of such species are the mountain pine beetle and the European honeybee.

In the western United States, outbreaks of forest destruction caused by mountain pine beetles have been recorded since the late 1880s. But in the past few decades, mountain pine beetles have been killing mature trees (preferred targets of the beetles) at accelerated rates, and now millions of acres of pine forests have been affected. Fire-suppression policies, the practice of clear-cutting, and lowered winter mortality of beetle larvae have all been implicated in causing the epidemic proportions of the beetles' forest-destroying activities.

While mountain pine beetle populations are booming, European honeybees are in trouble. Many valuable food crops are dependent on pollination by honeybees, yet the number of managed honeybee colonies has dropped significantly since the 1970s due to colony collapse disorder (CCD), which is characterized by the sudden disappearance of all the worker bees in a colony. Recent scientific research suggests that many stress factors of anthropogenic origin are the culprits in CCD. Some farmers are trying to use fewer colonies to pollinate their crops, some are hoping that other natural pollinators (e.g., native wild bees, other insects, bats) will do the job of pollination for them.

(a) As mentioned in the article, there are several possible explanations for the increase in mountain pine beetles.

(i) Provide one reason why fire-suppression policies lead to increased beetle activity.

(ii) Reduced winter mortality of beetle larvae is likely a consequence of global climate change. Describe TWO ways that the activities of the beetles might enhance climate change.

(b) The widespread death of trees leads to a series of changes in a forest ecosystem. Identify TWO physical changes that occur in the forest ecosystem as the result of the death of mature trees. For each physical change you identify, describe an impact of that change on the forest ecosystem.

(c) As the article states, the number of managed honeybee colonies has dropped significantly over the past few decades. Describe TWO specific economic consequences of the collapse of the managed honeybee colonies.

(d) Pollination by native insects is considered an ecosystem service. Identify a different ecosystem service and explain how that service benefits human society.

Modified by A. Willis from David Hong's AP Environmental Science Review Packets (Diamond Bar HS). FRQ's are College Board Released.

Unit 2 The Living World Biodiversity Review Videos

Mr. Andersen, Bozeman Biology

009 - Ecosystem Diversity 010 - Natural Ecosystem Change 055 - Biodiversity

Ted Ed

Why is Biodiversity So Important? https://www.youtube.com/watch?v=GK_vRtHJZu4

Dead Stuff: https://www.youtube.com/watch?v=KI7u_pcfAQE

How Long Will Human Impacts Last? https://www.youtube.com/watch?v=Zsc8G0NnMTs

A Threat of Invasive Species: https://www.youtube.com/watch?v=spTWwqVP_2s

Mrs. Campbell's APES

Range of Tolerance: <u>https://www.youtube.com/watch?v=Eo9bJVx6iyI</u>

Island Biogeography: <u>https://www.youtube.com/watch?v=8e_C4QWy_pI</u>

Fuse School

Generalist vs Specialist Species: https://www.youtube.com/watch?v=bswS-Ooe4iQ

California Academy of Science

Ecosystem Services: https://www.youtube.com/watch?v=BCH1Gre3Mg0

HHMI BioInteractive

Keystone Species: Some Animals are More Equal Than Others: Trophic Cascades https://www.youtube.com/watch?v=hRGg5it5FMI

Crash Course

Ecological Succession: Change is Good Crash Course Ecology #6: https://www.youtube.com/watch?v=jZKIHe2LDP8&list=PL8dPuuaLjXtNdTKZkV_GiIYXpV9w4WxbX&index=6

Ecosystem Ecology: Links in the Chain Crash Course Ecology #7: <u>https://www.youtube.com/watch?v=v6ubvEJ3KGM&list=PL8dPuuaLjXtNdTKZkV_GilYXpV9w4WxbX&index=7</u>

Khan Academy

Ecological Succession: <u>https://www.youtube.com/watch?v=d7xbyNSxxrI&list=PLbjyLFA2XFZyvLJTz-oWEUURQtwnf32eP&index=11</u>

Unit 2: The Living World: Biodiversity: II-I2% of AP Exam

Unit Enduring Understandings: 1. Ecosystems have structure and diversity that change over time. Learning Targets 2.1 Explain levels of biodiversity and their importance to ecosystems. 2.2 Describe ecosystem services and describe the results of human disruptions to ecosystem services. 2.3 Describe island biogeography and describe the role of island biogeography in evolution. 2.4 Describe ecological tolerance. 2.5 Explain how natural disruptions, both shortand long-term, impact an ecosystem. 2.6 Describe how organisms adapt to their environment. 7 Describe ecological succession and describe the effect of ecological succession on ecosystems.

Barron's Review Chapters, 7th Edition

Chapter 4: Ecosystems (Pg 91)

Chapter 5: Natural Biogeochemical Cycles (Pg 145)

Chapter 7: Land and Water Use, Forest Fires (Pg 213-213)

Unit 2 The Living World: Biodiversity Vocabulary

species richness : The number of different species in a community.

Relative abundance: The number of how many individuals are present for each species.

Ecology: study of living organisms in their nonliving world

Biotic factor: living item (ex: bacteria)

Abiotic factor: not living item (ex: rock)

Ecosystem service: the many and varied benefits to humans gifted by the natural environment and from healthy ecosystems.

Ecological Hierarchy: species \rightarrow population \rightarrow community \rightarrow ecosystem \rightarrow biome \rightarrow biosphere

Population: a group of individuals of the same species

Community: a group of populations interacting together

Ecosystem: a group of communities interacting together

Biosphere: another name for earth

Natural Selection: survival of the fittest

Salinity: level of salt in the water

Brackish: medium levels of salinity. Often occurs in wetlands where salt and fresh water mix.

Gaia hypothesis: organisms interact with their inorganic surroundings on Earth to form a synergistic self-regulating, complex system that helps to maintain and perpetuate the conditions for life on the planet

Range of Tolerance: range of environmental conditions that are tolerable for survival in a species

Ecological footprint: a measure of human impact on Earth's ecosystems. It's typically measured in area of wilderness or amount of natural capital consumed each year.

Primary Succession: community change that occurs with new land formation: lichen \rightarrow moss \rightarrow small shrubs \rightarrow small trees \rightarrow large trees \rightarrow climax community

Secondary Succession: community change that occurs with land already formed.

Bottleneck Effect: cut down of genetic diversity due to loss of individuals in a population.

Non-native species: a species that is not known historically in an area. Ex: cane toads in Australia

Species diversity: a count of how many species are in an area.

Ecotone: a transitional zone between two communities. Ex: intertidal zone.

Niche: an organism's job in a community.

Hybrid: the offspring of two different species.

Lichen: a symbiotic relationship of a fungus and an algae

Germination: sprouting of a seed

Competitive Exclusion Principle: species with the same niche in the same area cannot coexist

Keystone Species: often a dominant predator whose removal allows a prey population to explode and often decreases overall diversity. Ex: sea otter

Predation: the preying of one animal on others.

Mimicry: the close external resemblance of an animal or plant (or part of one) to another animal, plant, or inanimate object

Aerobic: using oxygen

Anaerobic: using no oxygen