

## **UNIT 2: BIODIVERSITY REVIEW SHEET**

### AP UNIT 2 LIVING WORLD: BIODIVERSITY

- Explain levels of biodiversity and their importance to ecosystems (2.1)
  - *ecosystem stability*
    - *resistance* - **Handle disturbance and change without having to change themselves**
    - *resilience* - **Able to bounce back from change**
  - Genetic diversity (**Differences in DNA among individuals**)
  - Species diversity (**Variety of species in a given area**)
  - **Species richness -vs- species evenness** (richness - total # of species, evenness - how even the species are distributed)
  - Ecosystem diversity (**Variety of habitats, ecosystems and communities**)
  - Specialist -vs- generalist (3.1) - **Specialists are good at one thing and generalists are relatively good at a variety of things**
- Describe ecosystem services (2.2) - **Help People**
  - Provisional services - **Food, Fiber, Wood, Clean Water, Medicine**
  - Regulating services - **Climate regulation, Pollination of crops, Stored carbon, Control flooding**
  - Supporting Services - **Soil formation, Biodiversity, Primary production, Habitat**
  - Cultural services - **Cultural preservation, Inspiration, Recreation, Aesthetic, Education**
- Describe the results of human disruptions to ecosystem services (2.2)
- Describe island biogeography (2.3)
  - endemic species
  - *competitive exclusion* (from unit 1)
  - *extinction*
  - *evolution*
    - *genetic drift*
      - *bottleneck effect* (**genetic diversity gets low**)
      - *founder effect*
- Describe ecosystem tolerance/ species range of tolerance (2.4)
  - range of tolerance
    - *limiting factors* (from unit 1)
  - Ecological niche
    - *fundamental niche -vs- realized niche*
  - geographic range
  - mass extinction
- Explain how natural disruptions, both short- and long-term, impact an ecosystem (2.5)
  - periodic, episodic, or random changes
    - ice ages
- Describe how organisms adapt to their environment (2.6)
  - Adaptions

- selective pressure
  - relative fitness
- Ecological niche
- range shifts
- migration patterns
- Describe ecological succession (2.7)
  - primary succession
  - secondary succession
  - pioneer species
  - disturbance
  - keystone species - **species with a niche who are essential to ecosystem**
  - indicator species
  - *climax community*

### AP UNIT 3: POPULATION

#### *Determine population size and health*

- *Conservation biology*
  - *tag and recapture*
  - *transects/ quadrat sampling*
  - *wildlife camera*
- Identify differences between generalist and specialist species (3.1)
- Identify differences between K and r-selected species (3.2)
  - population density - **How many are concentrated in a certain area**
    - *Density-dependent factor*
    - *Density-independent factor*
  - population growth rate = **Crude birth rate/1000 - crude death rate/1000 x 100. If immigration, add to CBR, emigration add to CDR**
  - **biotic potential**
  - **if given change, do percent change formula**
  - reproductive strategies
    - K-selected species (**few babies**) - **carrying capacity**
      - *Logistical growth curve/S-shaped curve (carrying capacity)*  
→ **resources, disease**
    - r-selected species - (**lots of babies**) - **rate of Growth of population**
      - *Exponential growth curve/ J-shaped curve*
- Explain survivorship curves (3.3)
  - Survivorship curve (Type I, II, and III) - be able to interpret graph
- Describe carrying capacity ; and its impact on ecosystems (3.4)
  - carrying capacity
    - **Overshoot - Species fluctuate around carrying capacity**
    - *Dieback/die-off*

- Explain how resource availability affects population growth (3.5)
    - *limiting factors (Density Dependent, Density independent)*
      - *Dependant - **based on pop size (Competition, food, disease)***
      - *Independent - **not based on population (natural disasters)***
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#### AP UNIT 9: GLOBAL CHANGE:

- Explain the environmental problems associated with invasive species and strategies to control them (9.8)
  - Explain how species become endangered and strategies to combat the problem. (9.9)
    - endangered species
    - Threatened species
    - HIPPOC
      - Habitat loss/destruction
      - Invasive species
      - Pollution
      - Overexploitation (over harvesting, poaching-
      - Climate change
  - Explain how human activities affect biodiversity and strategies to combat the problem. (9.10)
    - Endangered species Act
      - (Endangered species list)
    - CITES (*Convention on the International Trade of Endangered Species*)
    - IUNC (*International Union for Conservation of Nature*)
      - (Redlist)
- Restoration (of habitats)  
 Biosphere reserves  
 Edge effect  
 Wildlife corridor

#### UNIT 2: BIODIVERSITY

- **Levels of biodiversity and their importance to ecosystems (2.1):**  
 Biodiversity has three main levels: genetic, species, and ecosystem diversity,

all of which contribute to ecosystem stability, resilience, and the ability to withstand changes or disruptions.

- **Ecosystem stability, resistance, resilience:** Stability refers to an ecosystem's ability to remain balanced; resistance is its ability to withstand disturbances, while resilience is its ability to recover after disturbances.
- **Genetic diversity:** Variation in genes within a species, which helps populations adapt to environmental changes.
- **Species diversity:** The variety of species in an ecosystem, contributing to its resilience.
- **Species richness vs. species evenness:** Richness is the number of species; evenness is the relative abundance of each species. Both impact ecosystem stability.
- **Ecosystem diversity:** Variety in ecosystems within a region, supporting diverse habitats and species interactions.
- **Specialist vs. generalist (3.1):** Specialists thrive in specific environments with narrow niches, while generalists can survive in a wide range of conditions.

#### **Ecosystem Services (2.2):**

- **Provisioning services:** Resources directly obtained from ecosystems, like food, water, and timber.
- **Regulating services:** Benefits from ecosystem processes like climate regulation, water purification, and pollination.
- **Supporting services:** Basic ecosystem functions like soil formation and nutrient cycling that support other services.
- **Cultural services:** Non-material benefits, like recreation, aesthetics, and spiritual value.
- **Human disruptions to ecosystem services:** Pollution, deforestation, and climate change reduce the ability of ecosystems to provide essential services.

#### **Island Biogeography (2.3):**

- **Endemic species:** Species found only in a specific geographic location, often vulnerable to extinction.
- **Competitive exclusion:** When one species outcompetes another, leading to niche separation.
- **Extinction, evolution, genetic drift, bottleneck effect, founder effect:** Processes affecting species survival and genetic variation.
- **Wind, Waves, Wind**

#### **Ecosystem Tolerance/Species Range of Tolerance (2.4):**

- **Range of tolerance:** Conditions under which a species can survive and reproduce.

- **Limiting factors:** Environmental factors that limit species' growth, abundance, or distribution.
- **Ecological niche, fundamental vs. realized niche:** Role and position of species in an ecosystem, with the realized niche being narrower due to competition.

### **Natural Disruptions Impacting Ecosystems (2.5):**

- **Periodic, episodic, random changes:** Disturbances occurring at different intervals that can alter ecosystems, like ice ages.

### **Adaptations and Environmental Change (2.6):**

- **Adaptations, selective pressure, relative fitness:** Traits that improve survival and reproduction, influenced by environmental pressures.
- **Range shifts, migration patterns:** Movements or shifts in species distribution due to environmental changes.

### **Ecological Succession (2.7):**

- **Primary and secondary succession:** The development of ecosystems over time; primary begins on barren land, secondary occurs after a disturbance.
- **Pioneer species, disturbance, climax community:** Initial colonizers, disruptions, and the final, stable stage of succession.

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## **UNIT 3: POPULATION**

- **Population size and health indicators:** Conservation biology techniques like tag-and-recapture, transects, and wildlife cameras help assess population health.
- **Generalist vs. specialist species (3.1):** Generalists adapt to varied environments, specialists need specific conditions.
- **K-selected vs. r-selected species (3.2):** K-selected species grow slowly, have fewer offspring, and stable populations, while r-selected species reproduce quickly with less parental care.
- **Population density, density-dependent/independent factors:** Density-dependent factors are influenced by population size, like disease; density-independent factors, like weather, affect populations regardless of size.
- **Population growth rate, biotic potential, reproductive strategies:** Rate of population increase, maximum reproductive capacity, and strategies vary by species.

- **Logistic (S-shaped) vs. exponential (J-shaped) growth curves:** Logistic growth stabilizes at carrying capacity; exponential growth increases rapidly without limit.
  - **Survivorship curves (Type I, II, III) (3.3):**
  - Graphs show survival rates by age; Type I has high early survival, Type II has medium Type III has high juvenile mortality.
  - **Carrying capacity and its impact (3.4):**
  - Maximum population an environment can support sustainably; overshoot leads to dieback.
  - **Resource availability and population growth (3.5):**
  - Limited resources restrict population growth; abundance allows it to thrive.
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## UNIT 9: GLOBAL CHANGE

- **Invasive species and control (9.8):** Invasive species disrupt ecosystems; strategies include physical removal, biological control, and prevention policies.
- **Endangered species and protection strategies (9.9):** Species face threats like habitat loss, pollution, and overexploitation; solutions include conservation laws and habitat restoration.
- **Human impact on biodiversity and mitigation (9.10):** Humans reduce biodiversity through habitat destruction and climate change; strategies include the Endangered Species Act, CITES, IUCN Red List, biosphere reserves, and wildlife corridors.