

# AP BIOLOGY CHEAT SHEET

## Unit 8: Ecology

### Quick Overview

- **Focus:** how organisms interact with each other and their environments, energy transfer across trophic levels, and population/community dynamics.
- **Exam lens:** expect data-based questions on population graphs, energy pyramids, and ecosystem disruptions.

### Ecosystem Organization

- **Levels:** Organism → Population → Community → Ecosystem → Biome → Biosphere

**Mnemonic:** “Old People Can Eat Big Burgers.”

### Energy Flow

- **Producers (autotrophs):** convert solar → chemical energy.
- **Consumers (heterotrophs):** eat others for energy.
- **Decomposers:** recycle nutrients.
- **10% Rule:** only ~10% of energy passes to next trophic level.

**Mnemonic:** “Energy decreases up the chain — 10% train.”

### Trophic Levels

- **Producers (plants) → Primary consumers (herbivores) → Secondary consumers (carnivores) → Tertiary consumers (top predators).**
- **Energy pyramid:** wider at the bottom because energy is lost as heat each step.

### Common exam pitfalls

- **Forgetting energy flows, matter cycles.**
- **Confusing exponential and logistic growth.**
- **Ignoring abiotic factors in population questions.**
- **Mixing up primary and secondary succession.**

#### Mini formula box

- **Energy transfer efficiency:** ~10%.
- **Population growth equation:**  $\Delta N/\Delta t = rN$ .
- **Carrying capacity symbol:** K.

### Integrated Tutor Tip

Always connect graphs to real-world examples, the AP exam loves asking about population data, carrying capacity, and human impacts.

Explain why a curve levels off or a population crashes to earn reasoning points.

### Population Ecology

#### Key Terms:

- **Population density:** number per unit area.
- **Carrying capacity (K):** max sustainable population size.
- **Exponential growth:** J-shaped, unlimited resources.
- **Logistic growth:** S-shaped, limited resources.
- **Density-dependent factors:** competition, disease.
- **Density-independent factors:** natural disasters.

#### Formula:

$$\Delta N/\Delta t = rN$$

(change in population = growth rate × population size)

**Mnemonic:** “J before S — growth slows as space shrinks.”

### Community Interactions

- **Competition (-/-)**
- **Predation (+/-)**
- **Mutualism (+/+)**
- **Commensalism (+/0)**
- **Parasitism (+/-)**

**Mnemonic:** “Crazy Predators Make Clever Parasites.”

### Ecological Succession

- **Primary succession:** begins on bare rock (no soil).
- **Secondary succession:** follows disturbance but soil remains.
- **Pioneer species:** first colonizers (lichens, mosses).

### Biogeochemical Cycles

- **Carbon:** photosynthesis & respiration balance CO<sub>2</sub>.
- **Nitrogen:** fixed by bacteria → used by plants.
- **Phosphorus:** cycles through soil and rock (no gas phase).
- **Water:** powered by evaporation & precipitation.

**Mnemonic:** “Can Never Pass Water — Carbon, Nitrogen, Phosphorus, Water.”

### Human Impact

- **Climate change:** due to CO<sub>2</sub> buildup.
- **Eutrophication:** nutrient pollution → algal blooms.
- **Deforestation:** reduces biodiversity.
- **Invasive species:** disrupt native populations.

**Book a free consultation  
on our website now**

[www.northamericantutors.com](http://www.northamericantutors.com)