

# Physiological Ecology

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## Contents

### Section 1: Trade-offs and Species Distributions

Global distributions of biomes. Whittaker's diagram. The relation between temperature and water, and climate diagrams. Resource limitation and Liebig's law of the minimum.

- The Fundamental Tasks of Living
- Do Species Distributions Form Patterns?
- Whittaker's Diagram: Biomes
- Temperature vs. Water
- Potential and Actual Evapotranspiration
- Climate Diagrams
- Tolerances Define Species Ranges
- Law of the Minimum
- Shifts in Species Ranges
- Section Summary
- Ask Your Instructor

### Section 2: Adaptation and Acclimation

The difference between adaptation and acclimation to changing environments, and how to distinguish between them.

- Trout Respond to Temperature Changes
- Activity Curves
- Acclimation
- Adaptation Through Evolution
- Managing Dams
- Adaptation vs. Acclimation
- Irreversible Acclimation
- Section Summary
- Ask Your Instructor

### Section 3: Homeostasis

Heat balance and water balance, including the equations governing each.

- Facing a Basic Challenge
- Surface to Volume Ratio
- Temperature Regulation
- Exercise: Homeostatic Kangaroo Rat
- Heat Balance Equation
- Adaptations for Controlling Internal Temperature
- Water Balance
- Adaptations for Water Conservation
- Why Be A Mammal?
- Section Summary
- Ask Your Instructor

### Section 4: Metabolism

C3, C4, and CAM photosynthesis. Water uptake in plants. Nutrient ratios and ease of digestion.

- Physiology Requires Energy
- Photosynthesis
- Photorespiration
- C4 Photosynthesis
- Water Potential
- Controlling Water Flow
- CAM and Water Conservation
- Ingestion by Heterotrophs
- Scaling of Metabolic Rates
- Section Summary
- Ask Your Instructor