NO PREP

Biomes & Ecosystems

Life Across Earth's Habitats

Includes: Student reading, case study, differentiated questions, teacher key

Name: Period: Date:

Biomes & Ecosystems: Life Across Earth's Habitats

What Are Biomes?

Biomes are large-scale ecological zones characterized by distinct climate, vegetation, and wildlife. Each biome, whether it's a rainforest, desert, grassland, or tundra, hosts life forms adapted to its unique conditions. Climate plays a major role in determining which plants grow, and in turn, which animals can survive. In hot, wet biomes like tropical rainforests, you'll find dense canopies and remarkable biodiversity. In contrast, deserts, with their sparse rainfall, support specialized flora and fauna adept at conserving water. Scientists classify biomes to better understand global patterns of life and how ecosystems function within them. An ecosystem refers to the interactions among living organisms—plants, animals, microbes—and abiotic components such as soil, water, and temperature. While a biome is a broad category (like a tropical

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Biodiversity and Adaptations

Biodiversity, the variety of life in a particular habitat, tends to be highest in tropical regions. Warm temperatures, abundant rainfall, and extended growing seasons provide ample niches for plants and animals. In these areas, intense competition drives organisms to specialize. Meanwhile, biomes with harsh conditions, like the desert or tundra, boast fewer species overall, but those that do exist exhibit incredible adaptations. Desert plants, for instance, might have thick, waxy skins or deep root systems to store and find water. Tundra animals often have insulating fur and layers of fat to endure freezing temperatures. Adaptations can be

structural (body shape, coloration) or behavioral (migration, hibernation). Ecosystems depend on these adaptations for balance: predators control prey populations, pollinators facilitate plant reproduction, and decomposers recycle nutrients. When an invasive species arrives without natural predators or controls, it can disrupt this equilibrium, outcompeting local species and altering entire ecosystems. Biodiversity is not just about having many species; it's about maintaining functional relationships that enable life to flourish.

Human Impact and Conservation

Human activities like deforestation, urbanization, and climate change threaten biomes worldwide. In tropical rainforests, logging and agriculture drive alarming rates of deforestation, fragmenting habitats and pushing many species toward extinction. Deserts face desertification—a process where overgrazing and poor land management degrade semi-arid regions into barren landscapes. Polar biomes grapple with melting sea ice, changing ocean currents, and diminished hunting grounds for polar bears or walruses. Industrial pollution and overfishing put marine ecosystems under stress, reducing fish stocks and harming coral reefs. Conservation efforts aim to balance human needs with environmental stewardship. Protected areas, sustainable agriculture, and restoration projects help preserve critical habitats. International agreements, like the Convention on Biological Diversity, encourage nations to set aside ecologically valuable regions and reduce harmful practices. Public education also plays a role: when communities understand how local ecosystems function and why they matter, they're more likely to support preservation initiatives. Ultimately, safeguarding biomes is about more than preventing extinctions—it's about maintaining the ecological processes that sustain life on Earth, including the resources humans depend upon for food, water, and medicine.

Key Information: Quick Reference Table

Biome	Climate	Key Features
Tropical Rainforest	Hot, wet year-round	High biodiversity, dense canopy
Desert	Low rainfall, extreme temperatures	Specialized flora & fauna

Biome	Climate	Key Features
Savanna (Tropical Grassland)	Seasonal rains, warm climate	Grasslands with scattered trees
Tundra	Cold, short summers, permafrost	Low vegetation, adapted animals
Marine (Ocean)	Varies with depth, generally stable	Coral reefs, diverse fish

Case Study Excerpt (Community-Led Conservation in the Maasai Mara)

In southwestern Kenya, the Maasai Mara savanna stands as one of the world's most iconic wildlife destinations, home to lions, elephants, and the spectacular wildebeest migration. Yet rapid population growth, fencing of land for agriculture, and shifting rainfall patterns threaten this ecosystem's delicate balance. Community-led conservation initiatives have emerged as a response, involving local Maasai landowners in efforts to protect wildlife corridors and sustainable grazing practices. The Maasai people have historically managed their lands communally, moving livestock seasonally to prevent overgrazing. However, modern pressures have led to increased land subdivision. Conservation groups collaborate with Maasai elders to establish conservancies—jointly managed areas that balance grazing, tourism, and habitat protection. Tour operators pay fees that compensate landowners for restricting certain activities, ensuring wildlife can roam. This approach fosters economic incentives aligned with ecological goals. Maasai herders also receive training to improve livestock health, reducing the need for large herds that intensify land pressure. Early results show a rebound in wildlife numbers and reduced human-wildlife conflicts. The Maasai Mara case illustrates that when communities and conservationists work together, even heavily used ecosystems can be revitalized.

1. What are two key challenges facing the Maasai Mara savanna ecosystem?

_____

_____

2. How are Maasai communities balancing economic needs with conservation efforts?

_____

_____

Multiple Choice

1. Which biome typically has the greatest biodiversity?
    a) Tundra, the frozen frontier biome
    b) Tropical rainforest
    c) Desert, an extremely arid biome
    d) Savanna

2. A characteristic adaptation for desert plants is
    a) Deep root systems to reach water
    b) Bright flowers that bloom year-round
    c) Large leaves that lose water quickly
    d) Thin, easily evaporated sap

3. One major threat to marine biomes is
    a) Rising ocean pH (making it less acidic)
    b) Complete immunity to global warming
    c) Total absence of biodiversity
    d) Overfishing and coral reef destruction

Matching

Write the letter of the correct definition on the line next to each term.

Term	Definition
1. ___ Biodiversity	A) Non-native organism that disrupts local ecosystems
2. ___ Invasive Species	B) Large-scale removal of trees, reducing habitat
3. ___ Carrying Capacity	C) Single, specific community of organisms plus environment
4. ___ Ecosystem	D) Variety of life in a given area
5. ___ Deforestation	E) Controls the number of organisms an environment can support

Fill-in-the-Blank

1. _____ refers to the large-scale ecological regions sharing similar climates, such as deserts or rainforests.

2. _____ is the process where natural habitats are broken into smaller, isolated patches, often due to human activities.

3. An organism's _____ can be physical features or behaviors that help it survive in its environment.

Short Answer

Answer each question in 2-4 complete sentences.

1. Why is preserving biodiversity essential for ecosystems and human well-being?

_____

_____

_____

2. In what ways can invasive species impact native ecosystems?

3. How do community-led conservation efforts differ from government-imposed protected areas?