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SECTION: BC3MD SUBJECT: MST

THE-PRINCIPLE-MST (PRE)

1. What is the role of keystone species in an ecosystem, and how do they impact biodiversity?

By controlling populations, establishing habitats, and maintaining biodiversity, keystone species play a crucial and frequently irreplaceable role in ecosystems. For example, predators such as wolves manage herbivore numbers, preventing overgrazing and promoting plant diversity, while species like beavers engineer environments by constructing dams that form wetlands, which serve as vital habitats for a variety of organisms. The delicate balance of ecosystems can break down in the absence of these keystone species, which would result in a cascade of species reductions and a loss of biodiversity. As a result, their existence is essential to the resilience and general health of the ecosystem, not just the survival of individual species.

2. How do human activities, such as urbanization and agriculture, affect local ecosystems and the services they provide.

Local ecosystems are greatly impacted by human activities such as agriculture and urbanization, which modify natural habitats, decrease biodiversity, and interfere with ecological processes. These changes frequently result in the loss of ecosystem services like carbon sequestration, soil fertility, and water purification, which ultimately lowers the ecosystem's capacity to support human and wildlife populations.

3. Explain the Figure 1 and Figure 2: Levels of Organization inside and outside a living organism.

- Inside a living organism:
  - Cells: The basic unit of life, like a single brick in a wall.
  - Tissues: Groups of similar cells working together, like a team.
  - Organs: Structures made of different tissues performing a specific function, like a city's service department.
  - Organ Systems: Groups of organs that work together to perform complex functions, like the infrastructure of a city.
  - Organism: A complete living being capable of independent life, like the entire city itself.

- Outside a living organism:
  - Population: A group of organisms of the same species living in a specific area, like a neighborhood.
  - Community: Different species interacting in a shared environment, like the people in a city.
  - Ecosystem: A community of living organisms and their physical environment, interacting as a system, like the whole city, including its inhabitants, infrastructure, and environment.
  - Biome: A large community of plants and animals that occupy a distinct region, like all the cities in a specific climate zone.
  - Biosphere: The global sum of all ecosystems, like the entire planet with its cities, towns, and nature.

5. Provide pictures of your favorite biomes and a brief explanation of it.

The tundra biome is unique due to its extreme cold temperatures, which can plummet to as low as -30°C (-22°F) in winter, combined with short growing seasons that last only a few weeks during the summer months, leading to a specialized ecosystem where plants and animals have evolved remarkable adaptations; for instance, the presence of permafrost—a layer of permanently frozen ground—restricts root growth and creates waterlogged conditions in the brief thaw period, resulting in a landscape dominated by low-growing vegetation such as mosses, lichens, and small shrubs, while the region supports a diverse array of wildlife, including migratory birds, arctic foxes, and caribou, all of which have developed unique survival strategies to thrive in this harsh and fragile environment.