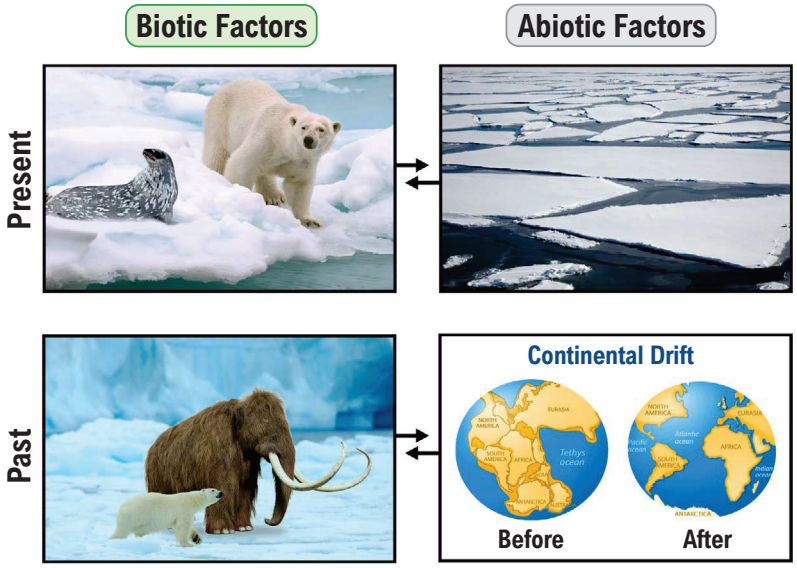
TOPIC: INTRODUCTION TO ECOLOGY

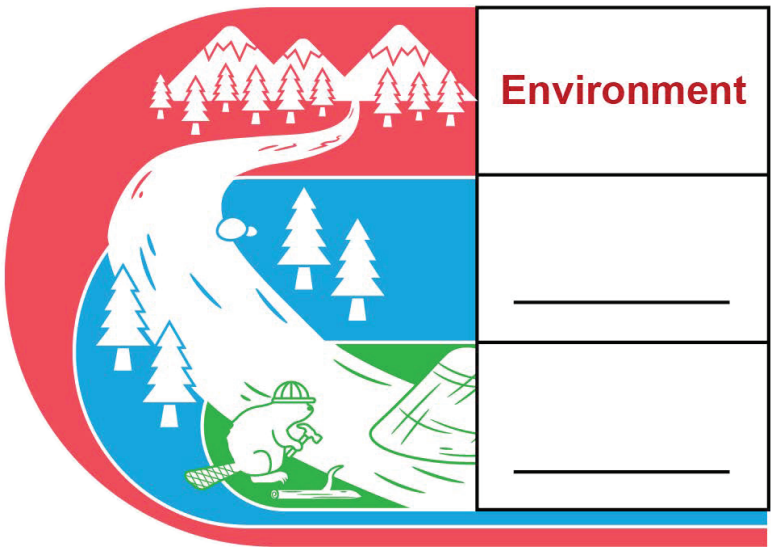
What is Ecology?

- **Ecology:** study of how organisms _____ with *living* & *non-living* parts of their _____.
  - **Biotic:** _____ components (e.g. trees, bacteria, any other life).
  - **Abiotic:** _____-living components (e.g. weather, mountains, bodies of water, rocks/soil).
- Ecological interactions are influenced by biotic and abiotic factors of both the *present* & the _____.



Environment vs. Habitat vs. Niche

- **Environment:** the total sum of _____ external biotic/abiotic factors surrounding an organism.
- **Habitat:** specific part of external environment & physical location where an organism _____/reproduces.
- **Niche:** the ecological _____ a species performs in its habitat, including how it utilizes resources & interacts.



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EXAMPLE

Which of the following scenarios best corresponds with the term “niche”?

a) A desert fox living in the Sahara Desert, specifically in the sandy dunes where it faces challenges such as extreme heat and scarcity of water.
b) A fish in a pond ecosystem surrounded by mountains where it coexists with frogs, aquatic plants, and algae.
c) A polar bear in the Arctic marine ecosystem, navigating the sea ice and serving as a top predator that primarily hunts seals and regulates their population dynamics.

PRACTICE

Which of the following scenarios best corresponds with the term “niche”?

a) A bird flying in the sky.
b) A fish swimming in a river.
c) A bee pollinating flowers.
d) A plant growing in the soil of a forest.

PRACTICE

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PRACTICE

Which of the following is NOT a biotic factor?

a) Vegetation density.
b) Soil pH.
c) Decomposers (e.g. bacteria, fungi).
d) Predators.

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Levels of Ecological Study

◆ Ecology can be studied at _____ varying levels of the biological hierarchy:

1. Organismal Ecology: focuses on behavior, physiology, & evolutionary adaptations of _____ organisms.

What is the diet of a capybara in this region?

2. Population Ecology: examines population dynamics of _____ species, including birth rates, death rates, & population size.

What happens to capybara population size over time?

3. Community Ecology: studies interactions between _____ species within a defined area or habitat.

How do caiman (predators) affect distribution of capybaras (prey) in a wetland ecosystem?

4. Ecosystem Ecology: investigates an ecosystem's flow of energy/nutrients and biotic-_____ interactions from present & past.

How does precipitation impact capybaras in a wetland ecosystem?

5. Landscape/Seascape Ecology: examines spatial arrangement & interactions across _____ nearby ecosystems.

How do forest & mountain ecosystems affect capybaras in nearby wetland ecosystems?

6. Global Ecology: explores interactions between _____ of Earth's ecosystems & their impacts on a global scale (Biosphere).

How does global climate change affect worldwide capybara distribution?

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EXAMPLE

Which of the following questions is one that would be asked & investigated by a community ecologist?

a) How does an individual species adapt to changes in its environment?

b) What are the physical and chemical properties of soil in a particular ecosystem?

c) How do interactions between different species influence the structure and dynamics of a forest ecosystem?

d) What are the genetic variations within a population of birds in a specific region?

PRACTICE

Which of the following is generally considered true of an ecosystem?

a) Ecosystems consist only of plants, animals & fungi in an environment.

b) Energy in an ecosystem is transferred from predators down the food chain to producers.

c) Ecosystems take up relatively small areas, always less than 1 square kilometer.

d) Ecosystems consist of biotic (e.g. plants, animals) & abiotic (e.g. water availability, soil composition) factors.