Objectives

- Identify and describe 6 different species interactions.
- Evaluate a relationship and define what type of relationship it is.
- Predict the effects of the introduction of an alien species into an environment.
- Explain the importance of biodiversity to an ecosystem.
- Distinguish between renewable and non-renewable resources and how to live sustainably.

Species Interactions

- There are 3 major types of interactions/ relationships among species:
  - Predator/Prey (Predation)
  - Interspecific Competition
  - Symbiosis

Predator/Prey (Predation)

- In a **Predation** relationship, the species that is hunted or eaten is called the **prey** and the species that does the hunting is called the **predator**.
- The population size of predators and their prey are connected (as we learned in the Lynx and Hare Lab.)

Adaptation

- Some predators have adapted to become better hunters like spiders using webs to catch prey, and snakes using venom to stun their prey.
- Some prey have adapted by developing defense mechanisms like a chameleon changing color to match his environment (**mimicry**) or the developing of sharp quills like a porcupine.

Interspecific Competition

- **Interspecific Competition** is a relationship in which 2 or more species compete for the same resource.
- Because of this relationship, some organisms have developed mechanisms that make them better competitors.
  - **EXAMPLES:** Changing habitat, climbing.

Symbiosis

- **Symbiosis** refers to a close relationship between two organisms that tends to be long term.
- There are 3 types of symbiotic relationships:
  - Parasitism
  - Mutualism
  - Commensalism

Parasitism

- **Parasitism** is a relationship between 2 organisms in which one benefits from the relationship and the other is harmed by the relationship.
- Examples of parasitism include fleas and dogs, pigs and intestinal worms.
- Parasites that live outside another organism are called **ectoparasites** (fleas) and those that live inside another organism are called **endoparasites** (worms).

Mutualism

- **Mutualism** describes a relationship between 2 organisms where both organisms benefit from the relationship.
- Examples of mutualism include bees and flowers, ants and trees, etc.
- The benefits from these relationships include protection, pollination, dispersion, and more.

Commensalism

- **Commensalism** describes a relationship between 2 organisms where one organism benefits from the relationship and the other is neither helped nor harmed by the relationship.
- Examples of commensal relationships include egrets and cattle, orchids and trees, etc.

Stability and Equilibrium

- An environment reaches a state of equilibrium, or balance, because of the dependable relationships between the organisms in that environment.
- Interruptions or changes in these relationships can have a drastic effect on the ecosystem.
- Some causes of change include density-independent factors like climate change or the introduction of an alien species.

Alien Species

- An **Alien Species**, or **Non-Native Species** is a species that is not from that particular ecosystem.
- Non-Native species are often introduced by accident or carelessness on the part of humans.
- Non-Native species can sometimes adapt and out compete other organisms in the area for resources.
- As the amount of resources go down, so do the populations of other organisms. The populations that depend on the affected organisms also decline.

Biodiversity

- Biodiversity refers to the number of different species in a given area.
- Because organism depend on each other, generally speaking, the richer the biodiversity, the more stable an ecosystem.
- Each species has a value to its ecosystem in terms of:
  - Providing food for other organisms
  - Providing shelter (trees)
  - Increase nutrient cycling
  - Others…

Natural Resources

- Not only do organisms provide a resources, but so do abiotic factors.
- Biotic and abiotic factors that provide a service to an ecosystem are considered natural resources.
- Soil provides a place for plants to grow.
- Rivers, streams, oceans, and lakes provide essential water of organisms to use.
- Everything in an ecosystem plays a role, and that role has a value to balance of that ecosystem.

Humans & Sustainability

- Since everything in an ecosystem is a resource, those resources must be shared among the organisms that share the ecosystem.
- Humans often over-use resources and resulting in a depletion.
- Some resources can renew themselves through matter cycles and are called Renewable resources.
  - Plants, most livestock, carbon dioxide, etc.
- Other resources can be used up or can be used faster than they can be replenished and are considered Non-renewable resources.
  - Fossil fuels, land, water.
- Living sustainably means to use resources in a way that will not deplete them beyond their ability to replenish.

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