

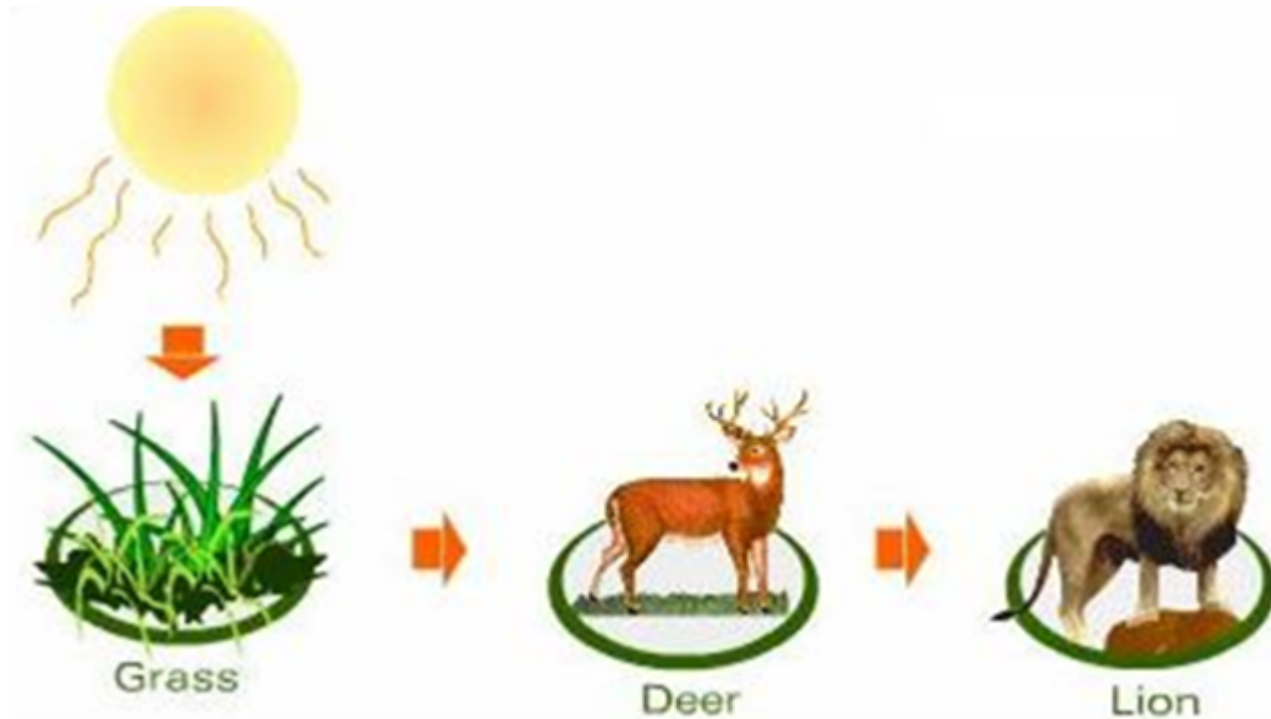
# Roles & Relationships of Organisms

## Learning Targets:

- Distinguish between an organism's niche and habitat.
- Classify community members as a producer or type of consumer.
- Identify and contrast biological relationships (predator-prey and symbiotic).

# Characteristic of Life

- Organisms need a constant supply of energy!



# Types of Organisms

```
graph TD; Root[Types of Organisms] --> Autotroph[Autotroph]; Root --> Heterotroph[Heterotroph]; Autotroph --- Text1[Use energy from the sun (or store it in chemical compounds) to make their own food.]; Autotroph --- Text2["Producers"]; Heterotroph --- Text3[Depend on autotrophs to get food (energy).]; Heterotroph --- Text4["Consumers"]; Heterotroph --> Herbivore[Herbivore]; Heterotroph --> Carnivore[Carnivore]; Heterotroph --> Omnivore[Omnivore]; Heterotroph --> Scavenger[Scavenger]; Heterotroph --> Decomposer[Decomposer];
```

## Autotroph

Use energy from the sun (or store it in chemical compounds) to make their own food.

“Producers”

## Heterotroph

Depend on autotrophs to get food (energy).

“Consumers”

Herbivore

Decomposer

Carnivore

Scavenger

Omnivore

# what are the different types of consumers?

## **Herbivores:**

Feed only on plants.



what are the different types of consumers?

## **Carnivores:**

Kill and eat  
other animals.



# what are the different types of consumers?

## Scavengers

:

Feeds on  
carrion or  
other dead  
organisms.





# what are the different types of consumers?

## **Omnivores:**

Feed on both  
plants and  
animals.



# what are the different types of consumers?

## **Decomposers:**

Break down complex organisms of decaying organisms so simple molecules can be absorbed.





# What is the difference between predator and prey?

• **Predator**: the hunter.

• **Prey**: the hunted.



**Golden Eagle &  
Arctic Hare**



**Cheetah &  
Gazelle**

what is the difference between predator and prey?

- **Predation**

- an interaction in which one animal captures and feeds on another animal.

- **Herbivory**

- an interaction in which one animal feeds on producers.

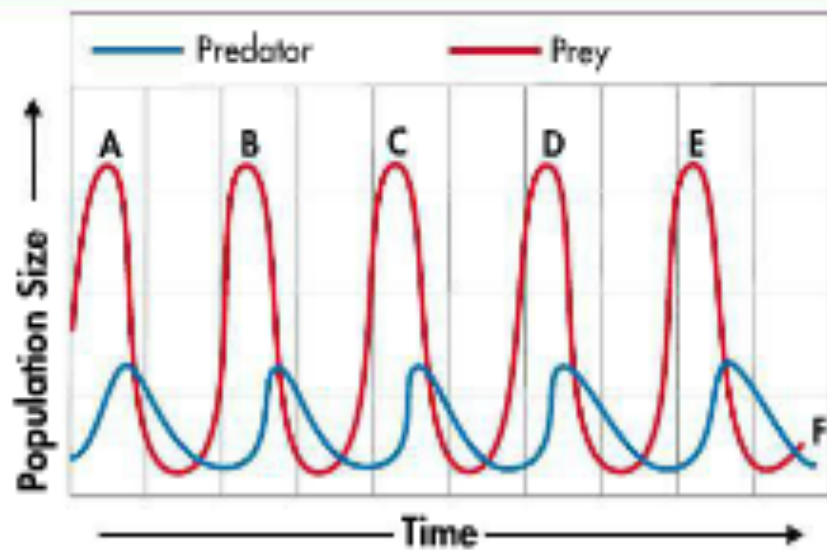
## Predator-Prey Dynamics

The relationships between predator and prey are often tightly intertwined, particularly in an environment in which each prey has a single predator and vice versa. The graph here shows an idealized computer model of changes in predator and prey populations over time.

**1. Predict** Suppose a bacterial infection kills off most of the prey at point B on the graph. How would this affect the predator and prey growth curves at point C? At point D?

**2. Predict** Suppose a sudden extended cold spell destroys almost the entire predator population at point F on the graph. How would the next cycle of the prey population appear on the graph?

## Predator-Prey Dynamics



**3. Relate Cause and Effect** Suppose a viral infection kills all the prey at point D on the graph. What effect would this have on the predator and prey growth curves at point E? What will happen in future years to the predator population? How could ecologists ensure the continued survival of the predators in this ecosystem?

# what is a keystone species?

- Sometimes changes in the population of a single species, often called a **keystone species**, can cause dramatic changes in the structure of a community.

# How do organisms interact?

**Symbiosis**: anytime there is a close and permanent association between organisms.

- Commensalism
- Mutualism
- Parasitism



# How do organisms interact?

- **Commensalism**: one organism benefits while the other is unaffected. (+,0)



**Red-breasted Geese &  
Peregrine Falcon**



**Beefsteak Fungi &  
Oak Tree**

# How do organisms interact?

- **Mutualism**: both species benefit. (+,+)



**Sea Anemone &  
Clown Fish**



**Acacia Tree &  
Ants**

# How do organisms interact?

- **Parasitism**: one organisms harms the other. (+, -)
- Parasite typically won't kill the organisms as it must balance its need for a host.



**Dogs &  
Ticks**



**Tomato Hornworm &  
Wasps**