

SOL LS.8 ECOSYSTEMS, COMMUNITIES, POPULATIONS CHANGE OVER TIME

- a. ORGANISMS RESPOND TO DAILY, SEASONAL, AND LONG-TERM CHANGES
- b. CHANGES IN THE ENVIRONMENT MAY INCREASE OR DECREASE POPULATION SIZE
- c. LARGE-SCALE CHANGES SUCH AS EUTROPHICATION, CLIMATE CHANGES, AND CATASTROPHIC DISTURBANCES AFFECT ECOSYSTEMS

ORGANISMS RESPOND TO DAILY, SEASONAL, AND LONG-TERM CHANGES

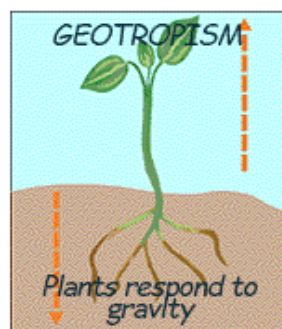


- To survive, plants require **light** and water for **photosynthesis**.
- Plants have developed responses, called **tropisms**, to help ensure they grow toward adequate sources of light and water (i.e., **phototropism** and **geotropism**).



- Some plants and animals can better survive **adverse environmental conditions** through periods of **dormancy**.
- **Dormancy** occurs when normal physical functions are **slowed down** or suspended.

- A **circadian rhythm** is a roughly **24-hour cycle** in the physiological processes of living things, including plants, animals, fungi, and cyanobacteria.
 - This cycle aids **life processes**



POPULATION SIZE RESPONDS TO CHANGES IN THE ENVIRONMENT

- Systems are **dynamic** and change in response to inputs and outflows of energy and matter.
- Factors can **positively** and **negatively** affect the cycles of matter and the life processes of living things within an ecosystem.
- **Disruptions** to any component of an ecosystem can lead to shifts in the **size** and/or **distribution** of its **populations**.
- Changes in the living and nonliving components of an ecosystem can accelerate or decelerate natural processes.
- Many factors such as **pollution**, **habitat destruction**, **disease**, and **over-harvesting** can increase or decrease **population size**.

EUTROPHICATION, CLIMATE CHANGES, AND CATASTROPHIC DISTURBANCES AFFECT ECOSYSTEMS

- Systems are comprised of a group of **interacting** and **interdependent** elements forming a complex whole.
 - Systems change in response to inputs and outflows of energy and matter.
 - A change in one part of the system affects **other parts** of the system.
 - Long-term changes may affect entire **communities** and **ecosystems**.



- When **excess nutrients** flow into an **aquatic ecosystem**, a chain of events may take place which leads to a **low dissolved-oxygen level** in the water.
 - This is called **eutrophication**.
- **Natural disasters**, such as forest fires, floods, and tornados are **disruptive** factors that **shift the balance** with in an ecosystem and initiate a process of **gradual change** from one community of organisms to another.

You should be able to:

- categorize **responses** as **daily, seasonal, or long-term** and explain the **benefits** of particular responses to long-term survival.
- predict the effect of **long-term, short-term, or seasonal changes** on the size and distribution of **populations** in an ecosystem
- compare the **factors** that increase or decrease **population size**
- predict the **environmental effects** of **large-scale changes**, such as climate change, ocean acidification, and sea-level rise

SOL LS.9 HUMAN ACTIVITY AND ECOSYSTEMS

- CHANGES IN HABITAT CAN DISTURB POPULATIONS
- DISRUPTIONS IN ECOSYSTEMS CAN CHANGE SPECIES COMPETITION
- VARIATIONS IN BIOTIC AND ABIOTIC FACTORS CAN CHANGE ECOSYSTEMS

CHANGES IN HABITAT CAN DISTURB POPULATIONS

- Changes in the interactions among the living and nonliving components of an ecosystem cause change in the system.
- Factors (natural and human-caused) can positively and negatively affect the cycles of matter and the life processes of living things within an ecosystem.
- **Humans** are a **natural part** of the **ecosystem**.
- **Humans** use the ecosystem to meet their **basic needs**, such as to obtain **food** .

DISRUPTIONS IN ECOSYSTEMS CAN CHANGE SPECIES COMPETITION

- **Human** input can **disturb the balance** of populations in a **habitat**.
- These **disturbances** may lead to a decrease or increase in a **population's size**.
- Since **populations** in an ecosystem are **interdependent**, these disturbances can have a **ripple effect** throughout the larger **ecosystem**.

VARIATIONS IN BIOTIC AND ABIOTIC FACTORS CAN CHANGE ECOSYSTEMS

- The interaction of humans with the dynamic ecosystem may lead to **changes in climate, water supply, air quality, energy production, ocean acidification, and waste management** .

You should be able to:

- describe ways that **human** interaction has altered **habitats** positively and negatively.
- describe the relationship between human food harvest and habitat stability.
- debate the pros and cons of **human land use** vs. **ecosystem stability**.
- compare **population disturbances** that affect **competition** among species and species **survival**.
- use evidence to describe the **impact of human activity** on the biotic and abiotic factors within an ecosystem.