# 15.1 Life in the Earth Systems

**Objectives**

* **Describe the interactions of the biosphere, hydrosphere, and geosphere**
* **Describe the interactions of biotic and abiotic factors in the biosphere**

Vocabulary

* Atmosphere
* Biosphere
* Biota
* Geosphere
* Hydrosphere

The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the portion of Earth that is inhabited by \_\_\_\_\_\_\_\_\_\_\_\_.

* The biosphere includes all \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* includes the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, all the living things in the biosphere
* There are three other Earth systems.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ factors interact in the biosphere.

All four Earth systems are interconnected. The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ considers Earth as a kind of living organism.

* + Earth systems interact to yield a biosphere capable of supporting life.
	+ It was developed by James Lovelock and Lynn Margulis.
1. What is the relationship between the biota and the biosphere?
2. How does the Gaia hypothesis explain the interaction between biotic and abiotic factors in the biosphere
3. The interactions between the atmosphere, geosphere, biosphere, and hydrosphere are like the interactions of an organisms vital organs
4. How might a rise in global temperatures affect the biosphere?
5. Explain how feedback loops, such as those described by the Gaia hypothesis might apply to predator prey relationships

# Climate

**Objectives**

* **Differentiate between weather, climate, and microclimates**
* **Identify factors that determine Earths climate zones**

Vocabulary

* Microclimate
* Climate

Climate is the prevailing weather of a region.

* Climate is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
	+ average \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ relative \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Key factors shape an area’s climate:
* A \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the climate of a small specific place within a larger area.

Earth has three main climate zones. The three main zones are the polar, tropical, and temperate climates.

* + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: the far northern and southern regions of Earth
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: surrounds the equator
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: the wide area in between the polar and tropical zones



* The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ help determine an area’s climate.
* Earth’s \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ on its axis plays a role in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ change.
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ precipitation

Oceans shape coastal climates.

* + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Mountains have an effect on climate.

* + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ occurs on the side of the mountain facing the \_\_\_\_\_\_\_\_.
	+ On the downwind side, drier and cooler air produce a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. A rain shadow is an area of decreased precipitation
* Many organisms survive in a specific climate due to their \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
1. What is the difference between climate and weather
2. What are the 3 different climate zones, and where are they located?
3. Would areas along the shores of the Great Lakes have warmer summers and colder winters than other inland areas? Explain.
4. Would you expect an area with several microclimates to have more or fewer ecological niches? Explain.

# 15.4 Marine Ecosystems

**Objectives**

* **Identify the 4 major ocean zones and organisms unique to each zone**
* **Describe the unique habitats of coastal waters**

Vocabulary

* Intertidal zone
* Neritic zone
* Abyssal zone
* Plankton: a tiny free floating organism that lives in the water
* Zooplankton
* Phytoplankton
* Coral reef
* Kelp forest
* Bathyal zone
* The ocean can be divided into zones.
	+ neritic zone—\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ bathyal zone—\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ abyssal zone –\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ zone harbors more \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ than any other zone. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ make up most of the biomass.
	+ Zooplankton\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ Phytoplankton\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Coastal waters contain unique habitats.
* Coral reefs are found in warm waters.
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ climate zone
	+ great amount of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Kelp forests are found in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, nutrient-rich waters.
1. What criteria do scientists use to divide the ocean into different zones?
2. What conditions account for the development of highly diverse habitats in coastal waters?
3. A red tide occurs when a bloom of plankton causes a reddish discoloration of coastal ocean waters. What might cause such an increase in plankton populations?