

## Interdependence of Plants & Animals in Ecosystems Study Guide (5.L.2)

### Do you understand the Big Picture?

- An **ecosystem** is all of the organisms living in an area together with the nonliving parts of the environment. (5.L.2.1)
- There are different types of ecosystems on Earth that can be divided into either terrestrial or aquatic based on their characteristics.
- There are different types of **organisms** in ecosystems.
- The organisms in an ecosystem are connected to each other and their surroundings.
- A change in one part of the ecosystem can affect everything that lives there.
- **Terrestrial ecosystems** are land based and include forests. (5.L.2.1)
- **Forest ecosystems** include many trees (with needles or leaves), shrubs, grasses, ferns, and a variety of animals.
- Forests usually get more rain than grasslands.
- Temperatures of forests vary based on where they forest is located on Earth.
- **Deciduous** (leaves) and **coniferous** (needles) forests include diverse animals such as black bears, deer, red foxes, voles, rabbits, and cardinals.
- Rainforests include diverse animals such as panthers, monkeys, capybara, snakes, and spiders.
- Terrestrial ecosystems are land based and include grasslands. (5.L.2.1)
- **Grassland ecosystems** include fertile soil covered with tall grass and a variety of animals.
- Grasslands usually receive a medium amount of rain, but less than rain forests.
- Temperatures of grasslands vary based on where the grassland in located on Earth.
- Grasslands include diverse animals such as bison, prairie dogs, and grasshoppers.
- **Aquatic ecosystems** are water based and include freshwater lakes and ponds. (5.L.2.1)
- Lakes and ponds are bodies of freshwater surrounded by land.
- **Ponds** are usually shallower than lakes and the temperature of the water stays the same from top to bottom.
- Plants and algae usually grow along the edges of lakes and ponds where the water is shallow.
- **Lakes** and ponds include diverse types of fish, amphibians, turtles, and beavers.
- Aquatic ecosystems are water based and include saltwater oceans, estuaries, and salt marshes. (5.L.2.1)
- Oceans are large bodies of saltwater divided by continents.

- **Oceans** have many types of ecosystems depending on conditions (sunlight, depth, temperature, salinity) of that part of the ocean.
- **Estuaries** are bodies of water where rivers flow into the ocean and freshwater mixes with salty ocean water. Estuaries are rich in nutrients and provide a good environment for the young offspring of many types of fish and shellfish.
- **Salt marshes** are coastal wetlands that are regularly flooded by salty ocean water.
- Most organisms live where the ocean is shallow (from the shoreline to the continental shelf) because the sunlight can reach deep and the water is warm making food abundant.
- Some organisms that live in the shallow ocean are drifters (jellyfish and seaweed), swimmers (fish), crawlers (crabs), and those anchored to the ocean floor (coral).
- Some organisms live in the open ocean near the surface or down to the deep ocean bottom.
- Plankton float in the upper regions of the ocean while other organisms swim to the surface for food and air (whales, turtles, sharks). Some other organisms live closer to the ocean bottom (fish, octopus, tubeworms).
- Organisms within an ecosystem can be classified according to the function they serve and how they get their energy. (5.L.2.2)
- Organisms within an ecosystem are biotic (living) factors that can be classified as either producers, consumers, or decomposers.
- **Producers** make their own food (organic matter). They use carbon dioxide, water, and energy from sunlight to make food (in a process called photosynthesis). Plants and algae are examples of producers.
- **Consumers** cannot make their own food so they get energy by eating other organisms (plants and/or animals). All animals are consumers.
- Organic matter is used by both producers and consumers as food to provide the energy that fuels basic life processes.
- Producers and consumers produce waste as they perform their basic life processes and become waste organic matter when they die.
- **Decomposers** cannot make their own food so they get energy by feeding on decaying (nonliving) organisms and wastes. Mushrooms and other fungi, worms, some insects, and bacteria are examples of decomposers.
- Decomposers recycle nutrients that are necessary for producers to carry out their life processes.
- Visual and graphic representations of various ecosystems, food chains, food webs, energy pyramids, carbon and oxygen cycles, and nitrogen cycles, are models commonly associated with ecosystems. (5.L.2.1)
- A **food chain** is a model that traces the path of food energy from the sun, to the producer, to a series of consumers in an ecosystem.
- A **food web** is a system of several overlapping food chains in an ecosystem. It illustrates all the paths that energy can take in an ecosystem.
- An **energy pyramid** is a diagram that shows how much energy passes from one organism to another in a food chain. Organisms on each level of the pyramid get energy from the organisms below them.
- The **carbon and oxygen cycle** represents the flow of carbon and oxygen through an ecosystem. This cycle is important for every organism in an ecosystem.
- The **nitrogen cycle** represents the natural cycle in which nitrogen in the air is used by plants and animals, and is released into the air again.
- All organisms in an ecosystem have **interconnected relationships**. (5.L.2.3)

- The organisms in an ecosystem are connected to each other (biotic/living things) and to their surroundings (abiotic/nonliving things).
- A change in one part or one population of the ecosystem can affect everything that lives there.
- We can infer the effects that may result from the interconnected relationships of plants and animals to their ecosystem. For example, if all the trees in a rainforest are cleared, some of the animals will survive, others will die or move to new locations.

### Can you answer the “Guiding Questions”?

- How would you compare the characteristics of several common ecosystems (estuaries, salt marshes, oceans, lakes, ponds, forests, grasslands)? (5.L.2.1)
- How might you classify the characteristics and functions of producers, consumers, and decomposers in an ecosystem? (5.L.2.2)
- How do plants and animals interact with one another in their ecosystems and what is the effect of their interactions? (5.L.2.3)
- What happens to an ecosystem when the environment changes? (5.L.2.3)
- How and why do organisms (plants and animals) interact with their environment and what are the effects of these interactions? (5.L.2)
- How are organisms in an ecosystem connected? (5.L.2)

### Key Vocabulary: Can you explain these terms in your own words and tell how they are related?

Understand organisms interdependence plants animals Ecosystem Compare characteristics common ecosystems estuaries saltwater marshes Oceans Lakes ponds Forests Grasslands Classify function Producers Consumers decomposers biotic factors Infer Effects Result interconnected relationship	Rainforest Panther Monkeys Capybara Snakes Spiders Temperatures vary fertile soil tall grasses Located Prairie dogs Bison Grasshoppers Water-based ecosystems freshwater Saltwater Land Shallower algae Edges Fish Amphibians Ducks Turtles Beavers	open ocean Ocean surface deep ocean bottom Plankton Float upper regions of the water Swim Food Air Whales Turtles Sharks Octopus tubeworms typical visual representations graphic representations food chains Webs Cycles energy pyramids convert energy from the sun organic matter Process Photosynthesis Provides
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Terrestrial Aquatic Land-based ecosystems trees Needles Leaves Shrubs Grasses Variety rain Deciduous black bear Deer red fox Vole Rabbit Cardinal	large bodies of saltwater divided by continents conditions ( <i>sunlight, temperature, depth, salinity</i> ) Shallow ( <i>from the shoreline to the continental shelf</i> ) sunlight deep Abundant drifters ( <i>jellyfish or seaweed</i> ) swimmers ( <i>fish</i> ) crawlers ( <i>crabs</i> ) anchored to the ocean floor ( <i>corals</i> )	Energy fuels basic life processes Consume food source Waste materials Perform organic matter fuel recycle nutrients necessary factors impact
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### “I Can...” Check off each bullet once accomplished.

- ☐ **I can explain** that an ecosystem is all of the organisms living in an area together with the nonliving parts of the environment. (Understand, Key Concept 1)
- ☐ **I can describe** the different types of ecosystems on Earth as either terrestrial or aquatic based on their characteristics. (Understand/Analyze, Key Concept 1)
- ☐ **I can explain** that there are different types of organisms in ecosystems. (Understand, Key Concept 1)
- ☐ **I can compare** how organisms in an ecosystem are connected to each other and their surroundings. (Analyze, Key Concept 1)
- ☐ **I can discuss** that a change in one part of the ecosystem can affect everything that lives there. (Analyze, Key Concept 1)
- ☐ **I can describe** that terrestrial ecosystems are land based and include forests. (Understand, Key Concept 2)
- ☐ **I can explain** that forest ecosystems include many trees (with needles or leaves), shrubs, grasses, ferns, and a variety of animals. (Understand, Key Concept 2)
- ☐ **I can explain** that forests usually get more rain than grasslands. (Analyze, Key Concept 2)
- ☐ **I can discuss** that temperatures of forests vary based on where they forest is located on Earth. (Understand, Key Concept 2)
- ☐ **I can explain** that deciduous (leaves) and coniferous (needles) forests include diverse animals such as black bears, deer, red foxes, voles, rabbits, and cardinals. (Analyze, Key Concept 2)
- ☐ **I can explain** that rainforests include diverse animals such as panthers, monkeys, capybara, snakes, and spiders. (Analyze, Key Concept 2)
- ☐ **I can explain** that terrestrial ecosystems are land based and include grasslands. (Analyze, Key Concept 3)
- ☐ **I can describe** that grassland ecosystems include fertile soil covered with tall grass and a variety of animals. (Understand, Key Concept 3)
- ☐ **I can explain** that grasslands usually receive a medium amount of rain, but less than rainforests. (Understand, Key Concept 3)
- ☐ **I can describe** that temperatures of grasslands vary based on where the grassland is located on Earth. (Understand, Key Concept 3)
- ☐ **I can explain** that grasslands include diverse animals such as bison, prairie dogs, and grasshoppers. (Understand, Key Concept 3)
- ☐ **I can describe** that aquatic ecosystems are water based and include freshwater lakes and ponds. (Understand, Key Concept 4)

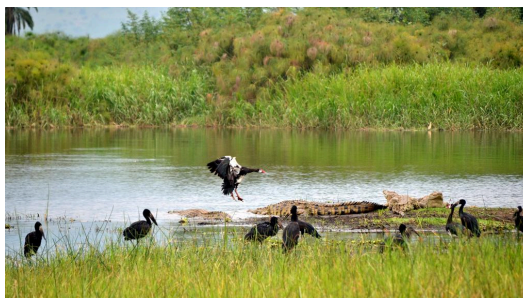
- ❑ **I can discuss** that lakes and ponds are bodies of freshwater surrounded by land. (Understand, Key Concept 4)
- ❑ **I can compare** that ponds are usually shallower than lakes and the temperature of the water stays the same from top to bottom. (Analyze, Key Concept 4)
- ❑ **I can discuss** that plants and algae usually grow along the edges of lakes and ponds where the water is shallow. (Understand, Key Concept 4)
- ❑ **I can explain** that lakes and ponds include diverse types of fish, amphibians, turtles, and beavers. (Understand, Key Concept 4)
- ❑ **I can distinguish** that aquatic ecosystems are water based and include saltwater oceans, estuaries, and salt marshes. (Understand, Key Concept 5)
- ❑ **I can explain** that oceans are large bodies of saltwater divided by continents. (Understand, Key Concept 5)
- ❑ **I can determine** that oceans have many types of ecosystems depending on conditions (sunlight, depth, temperature, salinity) of that part of the ocean. (Evaluate, Key Concept 5)
- ❑ **I can summarize** that estuaries are bodies of water where rivers flow into the ocean and freshwater mixes with salty ocean water. Estuaries are rich in nutrients and provide a good environment for the young offspring of many types of fish and shellfish. (Understand, Key Concept 5)
- ❑ **I can explain** that salt marshes are coastal wetlands that are regularly flooded by salty ocean water. (Analyze, Key Concept 5)
- ❑ **I can summarize** that most organisms live where the ocean is shallow (from the shoreline to the continental shelf) because the sunlight can reach deep and the water is warm making food abundant. (Understand, Key Concept 5)
- ❑ **I can compare** that some organisms that live in the shallow ocean are drifters (jellyfish and seaweed), swimmers (fish), crawlers (crabs), and those anchored to the ocean floor (coral). (Analyze, Key Concept 5)
- ❑ **I can compare** that some organisms live in the open ocean near the surface or down to the deep ocean bottom. (Analyze, Key Concept 5)
- ❑ **I can compare** that plankton float in the upper regions of the ocean while other organisms swim to the surface for food and air (whales, turtles, sharks). Some other organisms live closer to the ocean bottom (fish, octopus, tubeworms). (Analyze, Key Concept 5)
- ❑ **I can explain** that organisms within an ecosystem can be classified according to the function they serve and how they get their energy. (Understand, Key Concept 6)
- ❑ **I can describe** that organisms within an ecosystem are biotic (living) factors that can be classified as either producers, consumers, or decomposers. (Evaluate, Key Concept 6)
- ❑ **I can classify** that producers make their own food (organic matter). They use carbon dioxide, water, and energy from sunlight to make food (in a process called photosynthesis). Plants and algae are examples of producers. (Classify, Key Concept 6)
- ❑ **I can classify** that consumers cannot make their own food so they get energy by eating other organisms (plants and/or animals). All animals are consumers. (Classify, Key Concept 6)
- ❑ **I can explain** that organic matter is used by both producers and consumers as food to provide the energy that fuels basic life processes. (Understand, Key Concept 6)
- ❑ **I can compare** that producers and consumers produce waste as they perform their basic life processes and become waste organic matter when they die. (Analyze, Key Concept 6)
- ❑ **I can classify** that decomposers cannot make their own food so they get energy by feeding on decaying (nonliving) organisms and wastes. Mushrooms and other fungi, worms, some insects, and bacteria are examples of decomposers. (Classify, Key Concept 6)
- ❑ **I can classify** that decomposers recycle nutrients that are necessary for producers to carry out their life processes. (Classify, Key Concept 6)
- ❑ **I can compare** visual and graphic representations of various ecosystems, food chains, food webs, energy pyramids, carbon and oxygen cycles, and nitrogen cycles, are models commonly associated with ecosystems. (Analyze, Key Concept 7)
- ❑ **I can distinguish** that a food chain is a model that traces the path of food energy from the sun, to the producer, to a series of consumers in an ecosystem. (Analyze, Key Concept 7)



- ❑ **I can distinguish** that a food web is a system of several overlapping food chains in an ecosystem. It illustrates all the paths that energy can take in an ecosystem. (Analyze, Key Concept 7)
- ❑ **I can distinguish** that an energy pyramid is a diagram that shows how much energy passes from one organism to another in a food chain. Organisms on each level of the pyramid get energy from the organisms below them. (Analyze, Key Concept 7)
- ❑ **I can distinguish** that the carbon and oxygen cycle represents the flow of carbon and oxygen through an ecosystem. This cycle is important for every organism in an ecosystem. (Analyze, Key Concept 7)
- ❑ **I can distinguish** the nitrogen cycle represents the natural cycle in which nitrogen in the air is used by plants and animals, and is released into the air again. (Analyze, Key Concept 7)
- ❑ **I can infer** that all organisms in an ecosystem have interconnected relationships. (Analyze, Key Concept 8)
- ❑ **I can infer** that organisms in an ecosystem are connected to each other (biotic/living things) and to their surroundings (abiotic/nonliving things). (Analyze, Key Concept 8)
- ❑ **I can infer** that a change in one part or one population of the ecosystem can affect everything that lives there. (Analyze, Key Concept 78)
- ❑ **I can infer** the effects that may result from the interconnected relationships of plants and animals to their ecosystem. For example, if all the trees in a rainforest are cleared, some of the animals will survive, others will die or move to new locations. (Analyze, Key Concept 8)



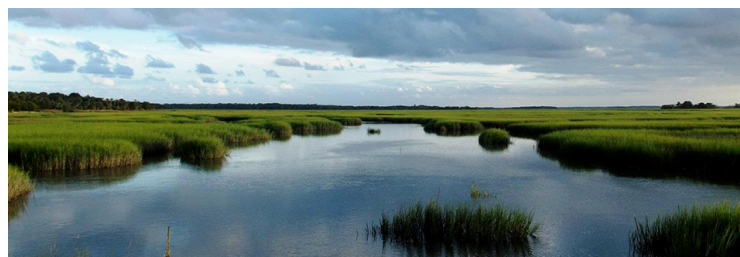
**Ocean Ecosystem**



**Lake Ecosystem**



**Pond Ecosystem**



**Saltwater Marsh Ecosystem**



**Estuary Ecosystem**



**Forest Ecosystem**



**Grasslands Ecosystem**



**Rainforest Ecosystem**



**Producer**

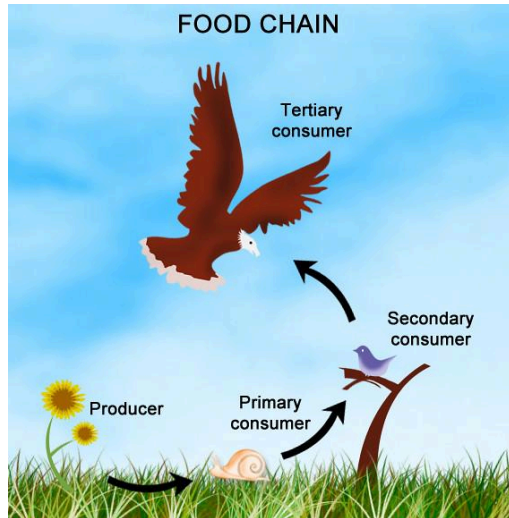


**Consumer**

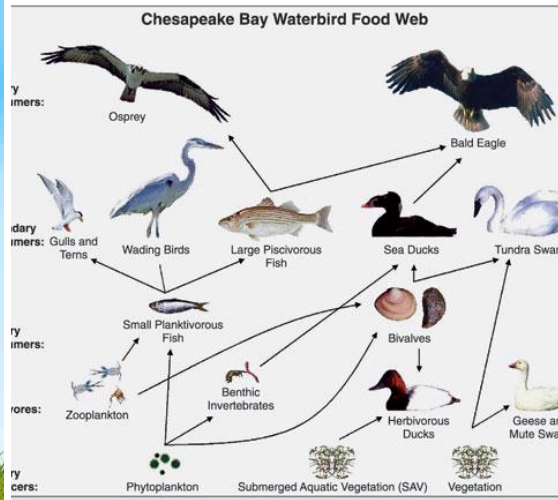


**Decomposer**

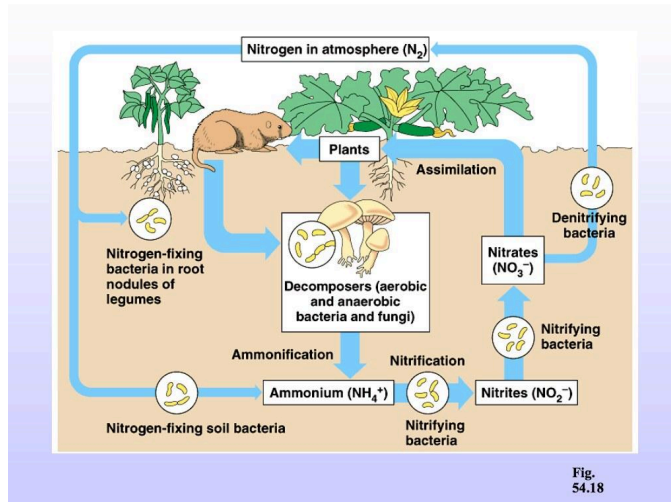




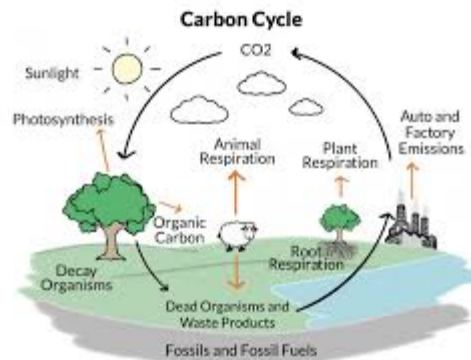
Food Chain



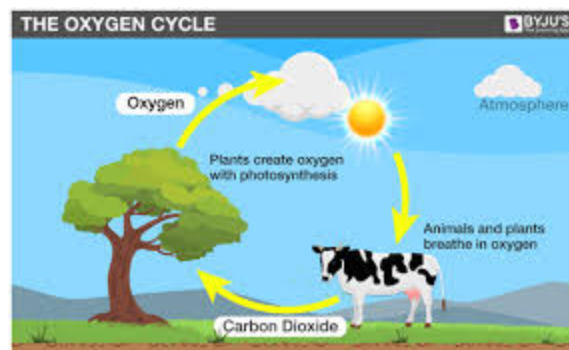
Food Web



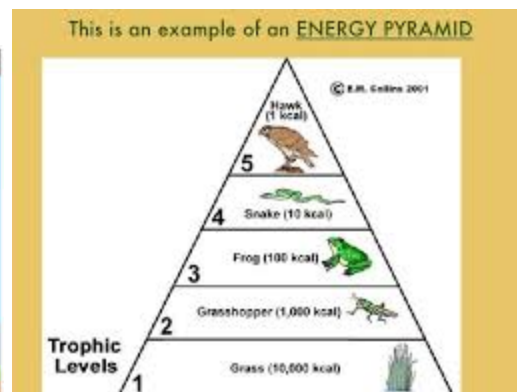
Nitrogen Cycle



Carbon Cycle



Oxygen Cycle



Energy Pyramid