

Standard Set 3. Life Sciences

3. Living organisms depend on one another and on their environment for survival. As a basis for understanding this concept:

3.a. *Students know* ecosystems can be characterized by their living and nonliving components.

# Many Ecosystems

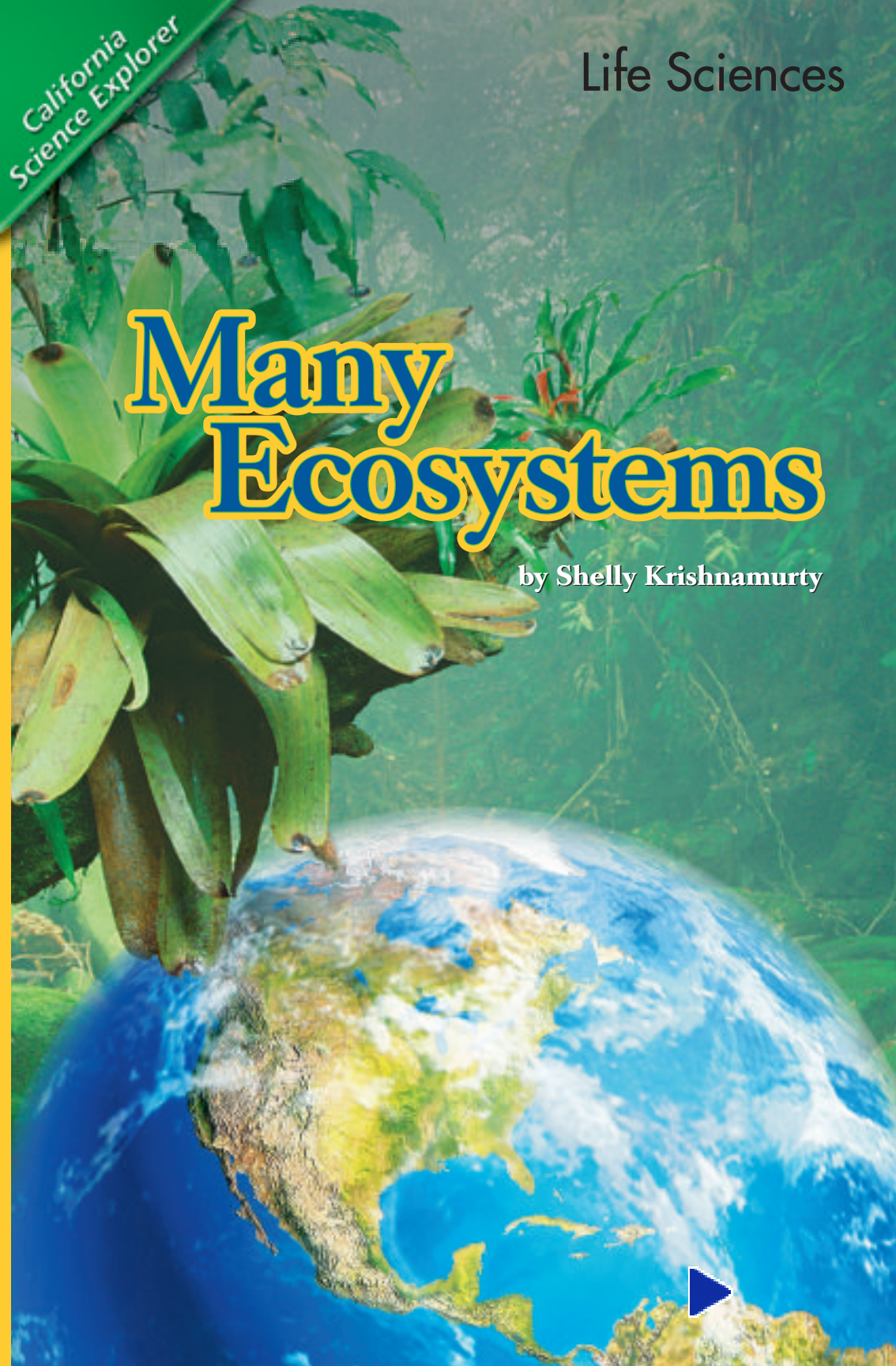
by Shelly Krishnamurty

Genre	Comprehension Skill	Text Features	Science Content
Nonfiction	Predict	<ul style="list-style-type: none"> <li>• Captions</li> <li>• Labels</li> <li>• Map</li> <li>• Glossary</li> </ul>	Ecosystems

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## Vocabulary

canopy  
climate  
coral reef  
desert  
rain forest  
symbiosis  
understory



# Many Ecosystems

by Shelly Krishnamurty



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## An Ecosystem's Parts

A system is formed by many parts working together for a purpose. Every part of a system is important, whether it is living or nonliving. A system will not work well if a part is missing or damaged. In a car, the driver works with parts of the car to form a system. Different parts work together to keep the system going. For example, the pedals and steering wheel let the driver control the speed and direction of the car.

One kind of system is an ecosystem. An ecosystem is all the living and nonliving things in an environment and the many ways they interact. An ecosystem may be as large as a tundra. It may be as small as a decaying mushroom.

## Nonliving and Living Parts Together

An ecosystem is a type of system. It is made up of an environment's living and nonliving things. It is also made up of their interactions. Animals and plants, along with fungi, protists, and bacteria, are the living parts of an ecosystem.

The nonliving parts of an ecosystem include air, water, soil, and light. Temperature, landforms, and climate are also nonliving parts of an ecosystem. **Climate** is the average weather conditions in an area over a long period of time.



Climate changes can affect these lichen and mosses.



This Arctic fox is a living part of the tundra ecosystem.



# The Impact of Nonliving Parts on Living Parts

Organisms cannot live in an environment that does not meet their needs. Some plants and animals will live and grow better in certain environments than others. Others will not survive at all.

For example, tundra is very cold. Plants and animals that live there must be able to survive in the frigid climate. The Arctic willow lives in the tundra of Alaska and Canada. The ground is frozen in the tundra, so the roots of the Arctic willow do not grow straight down. Instead, its roots are shallow and spread out.



**Tundra**  
A tundra is a cold, dry region. It is so cold that the ground beneath the topsoil always stays frozen. Trees cannot grow in the tundra, but some grasses and other plants can.



**River**  
Rivers are freshwater ecosystems. Different organisms live in different parts of a river, but most are found where it is calm. Duckweed, algae, water moss, fish, and frogs live in rivers.



**Swamp**  
Swamps are wetlands. Wetlands are covered with water for some or all of the year. Willow, cypress, and cottonwood trees grow in some swamps. Animals such as alligators and cottonmouth snakes live in some swamps.



**Grassland**  
Grasslands are covered with grasses, such as purple needlegrass, buffalo grass, or blue grama. They get a medium amount of rain.



# Desert Ecosystems

A **desert** is an ecosystem that gets very little precipitation, usually less than 25 centimeters in a year. Deserts can have sand dunes, mountains, and other landforms. Many deserts have hot days and cool nights. Other deserts are cold.

To survive in the dry climate, desert plants have special structures. Some have large, shallow root systems. Since the roots are near the surface, they can take up rainwater quickly. Many kinds of bushes and shrubs grow in deserts. A *shrub* is a woody plant. Instead of having a single trunk like a tree, it often has branches that go out from its base.

Animals are also adapted to life in the desert. Many rest during the hot day. They move around more when it is cooler. Usually they hunt when it is nearly or completely dark.



Bighorn sheep live in both low deserts and high deserts.



# Low Desert and High Desert

California's Colorado Desert is a low desert. It ranges from below sea level to 915 meters above sea level. There are sandy areas, salt flats, and low mountains. It gets 5–15 centimeters of rain per year. The rain can cause floods. Jackrabbits, bighorn sheep, desert tortoises, roadrunners, and rattlesnakes live among shrubs and cholla cactus in the low desert.

California's Mojave Desert is a high desert. The Mojave ranges from about 915 to 3353 meters above sea level. It is hot in summer, but it can snow in winter. There are mountains, sand hills, and flat places in the Mojave. It gets between 7 and 26 centimeters of rain or snow per year. Bighorn sheep, coyotes, and bats live in the Mojave. So do plants such as Joshua trees, sagebrush, and pinyon pines.

Sagebrush



# Rain Forests

A **rain forest** is any ecosystem that has large amounts of rain and thick plant growth. Most rain forests are tropical. They are found in hot and humid places near Earth's equator. Some of these forests get over 3 meters of rain each year!

The rain forest's top level is the **canopy**. Tree branches and leaves tangle together to form it. Most rain forest animals live in the canopy. Monkeys, as well as birds such as the scarlet macaw, live there.



## Canopy

Animals that live in the canopy include monkeys, brightly colored birds, and butterflies. Some animals may spend their whole lives in the canopy.



Under the canopy is the **understory**. Orchids, vines, small trees, ferns, and other plants that need shade grow there.

The forest floor is the rain forest's lowest level. It can be bare or covered with a thin layer of dead and decaying leaves. Often the ground there is moist or soggy.

## Temperate Rain Forests

Have you ever visited the redwood forests along California's northern coast? They make up part of North America's temperate rain forest. This rain forest runs from Alaska down into Canada, and then through Washington, Oregon, and into northern California.

Temperate rain forests are cooler than tropical rain forests. But they still get a lot of rain. Like tropical rain forests, they also have a lot of plants and animals.



Temperate rain forests grow on the northwest coast of North America, from Alaska to California.

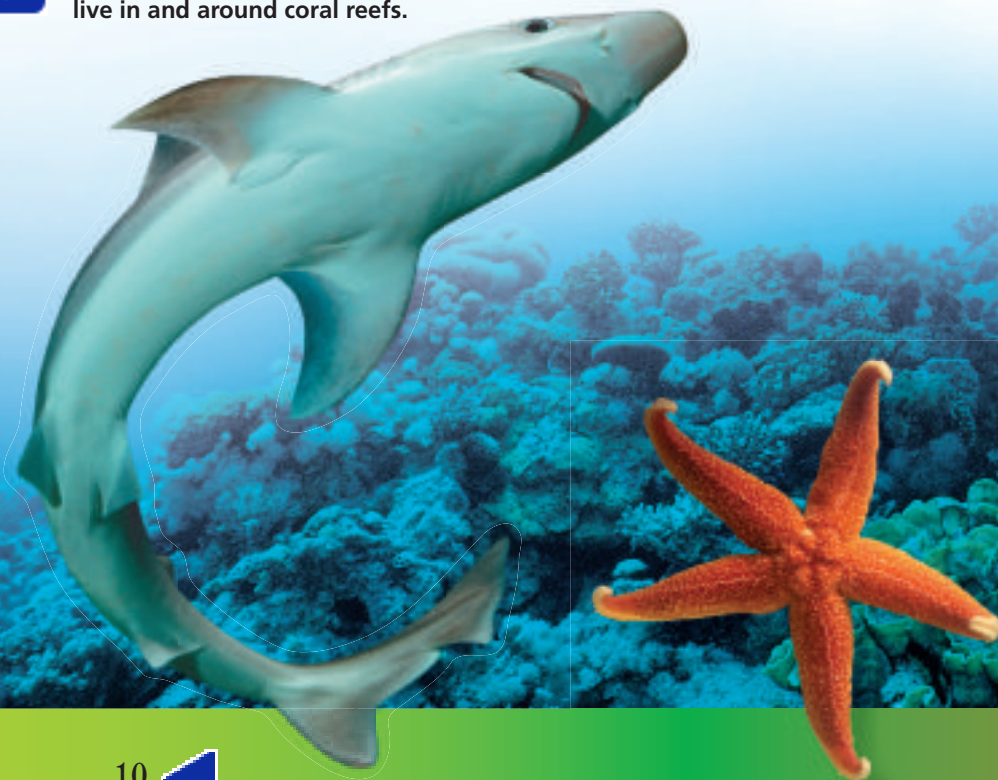


# Coral Reef: “Rain Forest of the Ocean”

A **coral reef** is a ridge or mound formed by the skeletons of certain tiny sea animals called coral polyps. Coral grows and then dies. Coral skeletons build up the reef over time.

Coral reefs have a lot of *marine*, or ocean, life. Sea turtles, clownfish, starfish, and sponges live in coral reefs. So do sea worms, clams, oysters, sea slugs, algae, and seagrass. These many species show why coral reefs are sometimes called the “rain forests of the oceans.”

Certain kinds of sharks and starfish live in and around coral reefs.



The coral that form reefs need plantlike algae to survive. This algae lives inside the coral and makes oxygen and food the coral can use. The algae benefit too. They get carbon dioxide and shelter from the coral. This kind of relationship between two organisms is called symbiosis. In **symbiosis**, the relationship helps one or both of the organisms.

One-celled algae are the main producers in marine ecosystems. Some algae can only grow in warm, shallow waters where there is a lot of sunlight. Coral that grows in shallow water need these algae in order to live. This is one reason why certain corals grow better in warm, shallow water.



Without symbiosis, coral would not be able to survive. This would harm the many organisms that depend on coral.





# Glossary

<b>canopy</b>	the top level of a rain forest, formed by tree branches, leaves and vines tangled together
<b>climate</b>	the average weather conditions in an area over a long time
<b>coral reef</b>	a ridge or mound in warm, shallow ocean waters formed by the skeletons of certain tiny sea animals called coral polyps
<b>desert</b>	an ecosystem that receives very little precipitation
<b>rain forest</b>	an ecosystem that has large amounts of precipitation and thick plant growth
<b>symbiosis</b>	a relationship between two organisms that helps one or both of the organisms
<b>understory</b>	the area of a rain forest below the canopy

# What did you learn?

1. What makes up an ecosystem?
2. What are two types of ecosystems?
3. How do coral and algae live in symbiosis?
4. **Writing in Science** Suppose you just visited one of the ecosystems described in the book. Write a description of what you saw, smelled, felt, or heard. Include details to make readers feel like they were there.
5. **Predict** Predict what would happen if the algae in a coral reef died.

