

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:

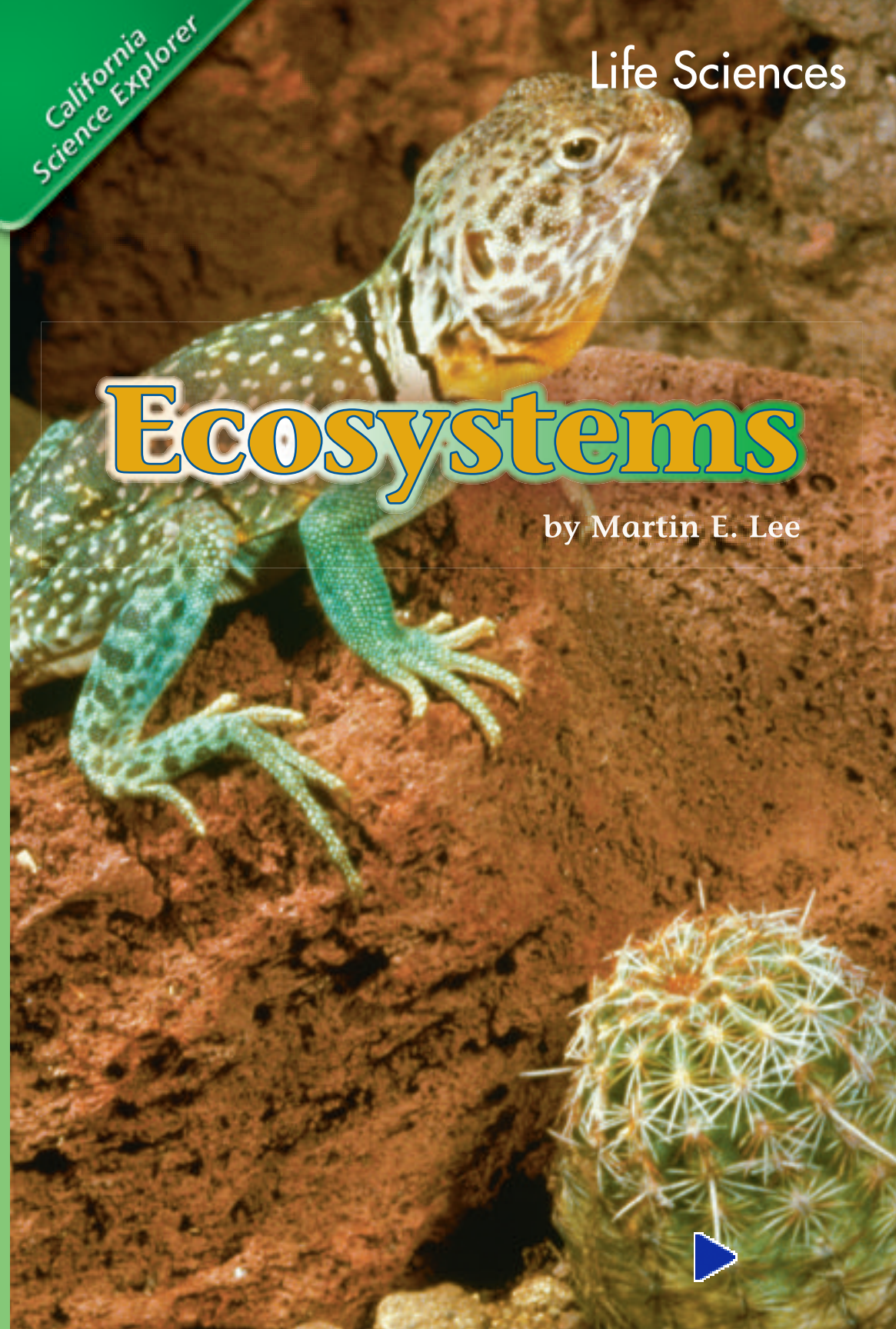
3.a. Students know ecosystems can be characterized by their living and nonliving components.

Ecosystems

by Martin E. Lee

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

Scott Foresman Science 4.4



Vocabulary

canopy
climate
coral reef
desert
rain forest
symbiosis
understory



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ISBN: 0-328-23550-4

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What are the parts of an ecosystem?

What a System Is

A system is made up of many parts. A system can have living parts and nonliving parts. Each part is important in some way. The system will not work as well if any part is missing or damaged.

Think about what it takes to ride a bicycle. Parts of the system interact with other parts. The handlebars, pedals, gears, frame, and you must all work together. You have to pedal and brake for the bicycle to work. You may have to change gears. The frame has to hold the bike together, and the handlebars have to turn.



This desert's living and nonliving parts form a system.



Nonliving and Living Parts of an Ecosystem

An ecosystem is a special system. It is all the living and nonliving things in an environment. The interactions between these things also make up an ecosystem. An ecosystem may be as large as a desert. It may be as small as a rotting cactus.

Animals and plants are some of the living things in an ecosystem. So are fungi, protists, and bacteria. These living things interact with one another and the system's nonliving parts. These nonliving parts include air, water, light, soil, temperature, landforms, and climate. **Climate** is the average weather conditions in an area over a long period of time.



A desert ecosystem is affected by climate and the interactions of its living and nonliving things.





Nonliving Parts Affect Living Parts

Living things can survive only where they can meet their needs. Picture your own environment. Some kinds of plant and animals survive there better than others. Some would not survive there at all. Temperature, soil, water, air, light, and climate affect life in an ecosystem.

A desert is very dry. It has little water. It may be very hot too. Plants and animals that do well in a desert have special body structures. These structures help them store water and stay cool. The stem of a giant saguaro cactus can expand to hold water. It can store lots of water until the next time rain falls.



River

Moss, duckweed, algae, insects, fish, frogs, and birds are part of river ecosystems. Most of these living things live in areas where the water moves more slowly. They might make their homes in pools or under rocks.



Tundra

A tundra is a cold, dry area. The ground beneath the surface stays frozen all year. Some plants can grow in a tundra. But trees cannot. Arctic foxes and caribou live in the tundra.



Grassland

Grasslands are filled with grasses. They get a medium amount of rain. Hawks, grasshoppers, and deer live in the North American grasslands.



Swamp

A swamp is a kind of wetland. Wetlands are covered with water for some of the year. Some wetlands have water lilies, vines, and cypress trees. Insects, water birds, and alligators also live in wetlands.





What are some ecosystems?

Desert

A **desert** is an ecosystem that receives very little precipitation. It can be hot during the day and cool at night. Deserts have sand dunes, mountains, and rocks.

Desert Life

Some desert plants have large root systems. The roots spread out near the surface. They quickly take in water. Shrubs can be found in deserts. A *shrub* is a woody plant. Its branches usually spread from its base.

Many desert animals rest during the hottest part of the day. They are more active when it is cooler. They may hunt at dawn or dusk. Or they will hunt at night.



The Colorado Desert is a low desert. It is part of the Sonoran Desert.



The Low Desert

The low desert has flat sandy areas, salt flats, and low mountains. Southern California's Colorado Desert is a low desert. Parts of it are as low as 71 meters below sea level. The low desert gets little water. It averages between 5 and 15 centimeters of rainfall a year.

Low desert shrubs include ocotillo and creosote. Cholla cactus also grows there. Bighorn sheep, bobcats, lizards, and birds live among these plants.

The High Desert

The high desert has mountains, basins, sand dunes, and tablelands. California's Mojave Desert is a high desert. It gets very hot in summer. The Mojave gets from about 7 to 25 centimeters of rain or snow a year.

Joshua trees, giant juniper bushes, sagebrush, and pinyon pines live in the high desert. So do desert kit foxes, bighorn sheep, coyotes, and kangaroo rats.



The Mojave is part of a high desert ecosystem.





Tropical Rain Forest

A **rain forest** is an ecosystem that has large amounts of rain and thick plant growth. Many rain forests are found near Earth's equator. Some tropical rain forests get more than 3 meters of rain each year!

The rain forest **canopy** is made of tangled leaves and tree branches. It leaves little space between the treetops. Butterflies, birds, and many other animals live in the canopy. Shade-loving plants grow in a zone beneath the canopy. This zone is called the **understory**. Small trees, vines, orchids, and ferns grow in the understory. Below the understory lies the forest floor. The ground there may be moist. It might even be soggy. A few dead leaves may cover the forest floor.



Canopy

This toucan spends its life in the tropical rain forest canopy.



Temperate Rain Forest

Not all rain forests are found in hot and steamy tropical climates. Some are found in cooler, or *temperate*, areas. The northern coast of California has forests of giant redwood trees. They are part of a temperate rain forest ecosystem. Temperate rain forests are cooler than tropical rain forests. They still get great amounts of rain. Temperate rain forests are home to many kinds of plants and animals.



A temperate rain forest's cooler climate affects its living things.





Coral Reef

Many of the ocean animals you have heard of live in warm shallow waters near coral reefs. A **coral reef** is a ridge or mound formed by the skeletons of tiny sea animals called coral polyps. As the coral die, their skeletons pile up. This forms the reef.

Coral reefs are home to many forms of *marine*, or ocean, life. This is why coral reefs may be called the “rain forests of the oceans.” Fish, sharks, clams, crabs, clownfish, eels, sea anemones, and many other animals live in and near them.



Reef-building coral need algae to grow. Algae are one-celled organisms. They live inside the coral. They produce food and oxygen that the coral use. In return, the coral give the algae carbon dioxide and nutrients. Coral and algae are not just neighbors. They depend on each other to survive. This kind of tie between organisms is called symbiosis. In **symbiosis**, the relationship helps one or both of the organisms.

You have read that algae are the main producers in marine ecosystems. Algae grow only in warm shallow waters. There they can get lots of sunlight. They cannot grow in the deep ocean. So you find coral reefs only in warm shallow waters.



Clownfish live among sea anemones. The sting of the sea anemone does not harm them.



Sea anemones give shelter to clownfish. They live in a kind of symbiosis with clownfish.






Glossary

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

What did you learn?

1. What does the giant saguaro cactus do to survive in the desert?
2. What do many desert animals do during the day and during the night?
3. What ocean ecosystem is known as “the rain forest of the oceans”?
4. **Writing in Science** Suppose you took a field trip to a California temperate rain forest. Use specific details to write about the trip to a friend.
5.  **Predict** Suppose you went swimming past a bed of sea anemones. What do you predict you would find living there?