Core Knowledge® SCIENCE

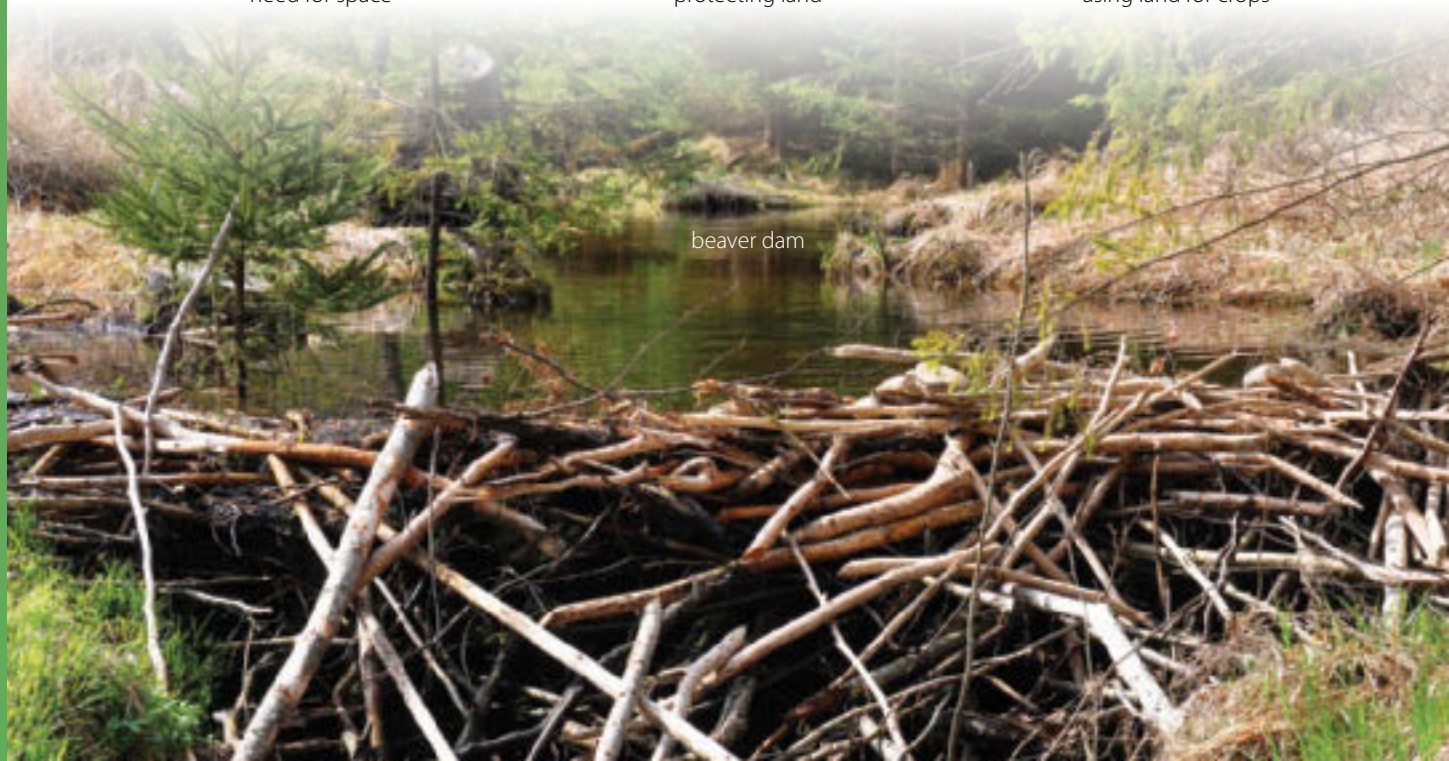
Changing Environments

beaver

need for space

protecting land

using land for crops



beaver dam

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Changing Environments

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Changing Environments

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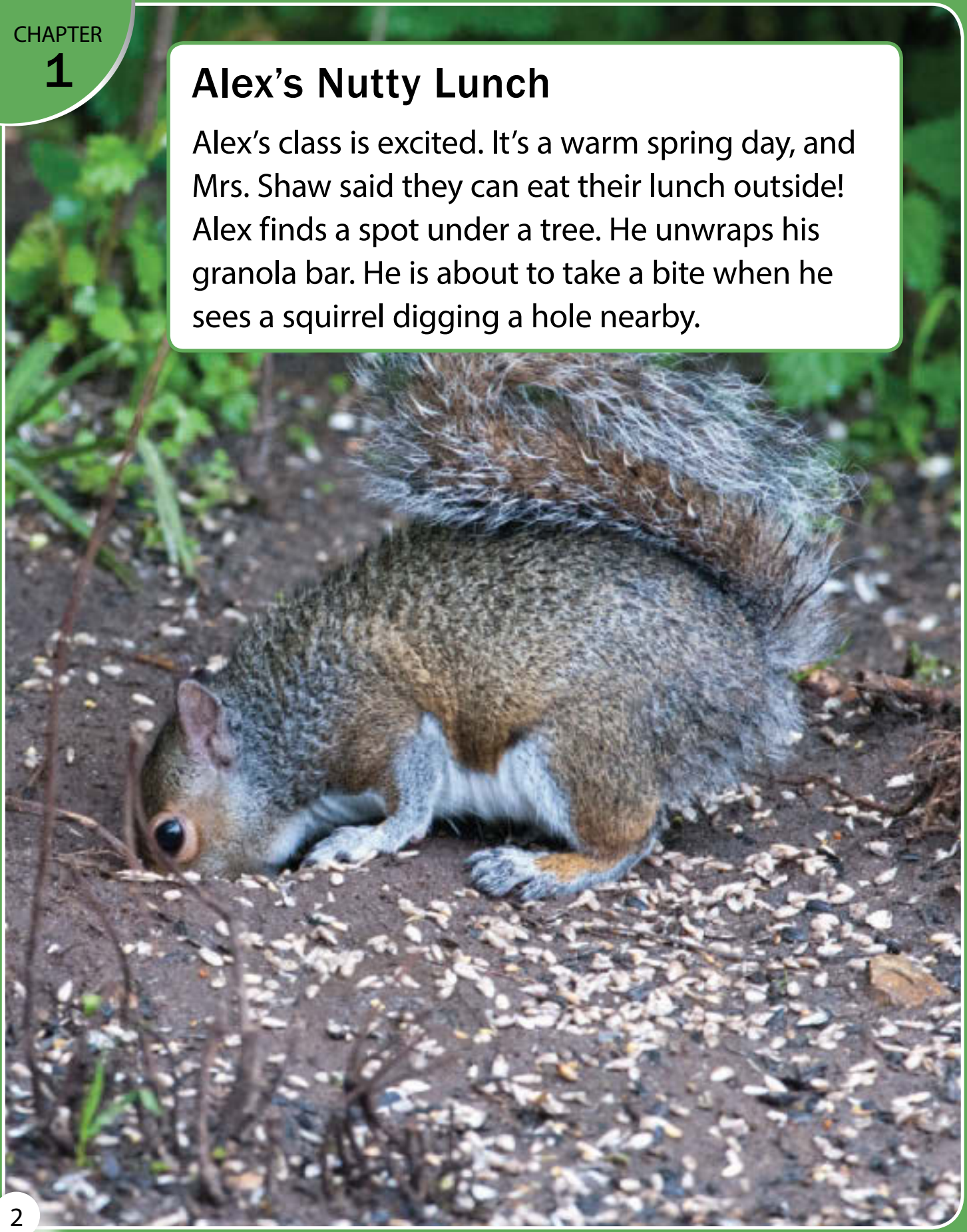
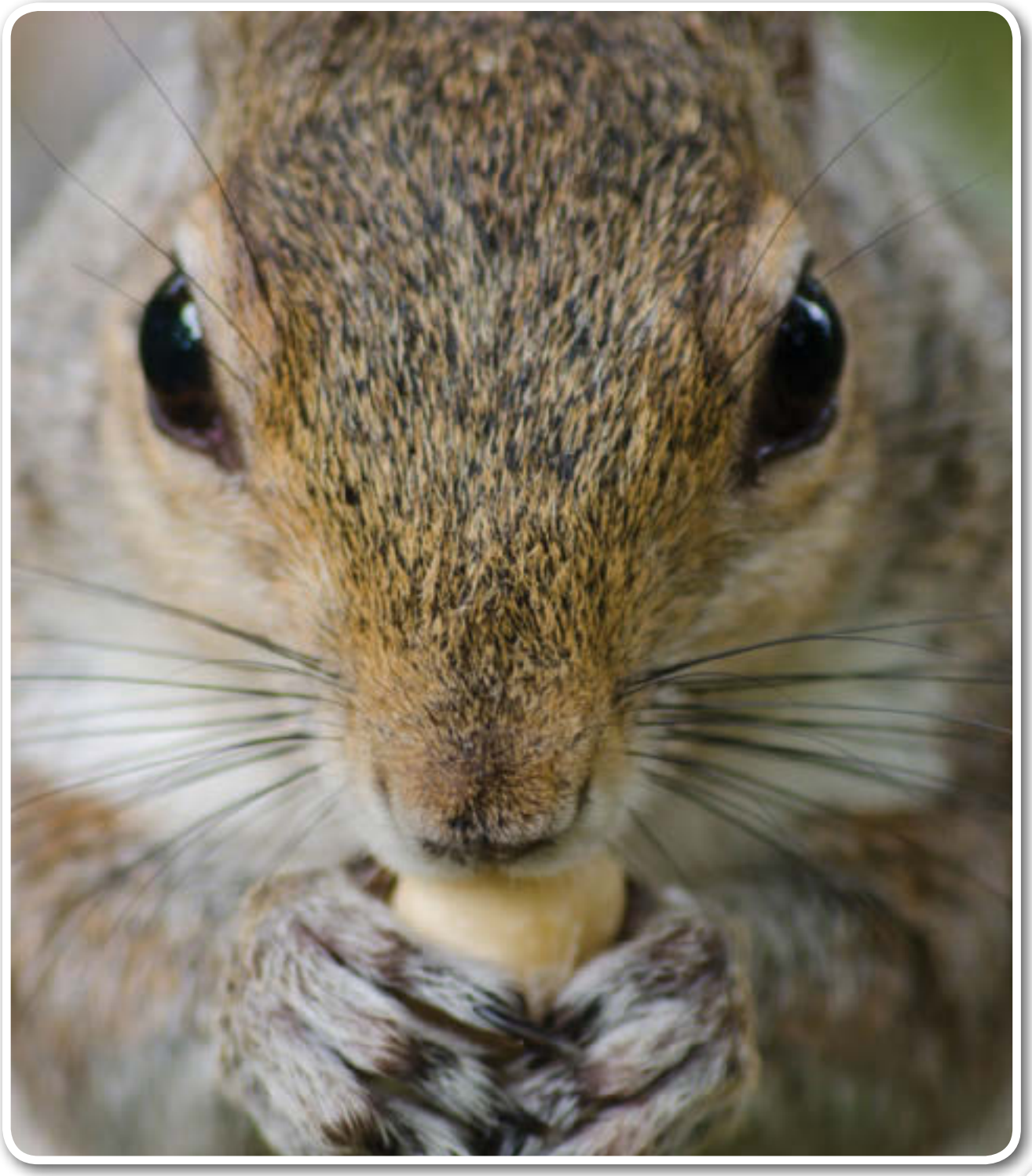
1

Alex's Nutty Lunch

Alex's class is excited. It's a warm spring day, and Mrs. Shaw said they can eat their lunch outside! Alex finds a spot under a tree. He unwraps his granola bar. He is about to take a bite when he sees a squirrel digging a hole nearby.



The squirrel finds a walnut and begins to nibble. Alex's granola bar has nuts in it, too! He and the squirrel are eating nuts at the same time. Alex thinks this is quite funny.



Alex wonders how the squirrel's nut got there. Where did it come from? How did it get buried? And how did the squirrel know where to find it? Then he looks at his own food. He didn't have to dig a hole in the ground to find his lunch. He knows it came from the grocery store, but where did it come from before that? He is eating nuts just like the squirrel, but how did his get into a granola bar and also inside a plastic wrapper?

Think about your lunch. Where did the parts of it come from?

Soon, the squirrel finishes eating and runs away. Bits of shell are left behind next to a hole in the ground. It looks a little messy. “How long will that hole and nutshell stay like that?” Alex wonders.

Alex decides that he will be neater than the squirrel. He will throw away his trash. Where does the trash go next?

There is always a story of where a meal came from. After each meal, there is a story of what is left over and what happens to it.

CHAPTER
2

Living Things Have Needs

Alex thinks about how both he and the squirrel got hungry. A hungry feeling means you have a need for food. And a thirsty feeling means you have a need for water. People and other animals need food and water to stay alive. All plants and animals have needs.

Animals need food to stay alive.

Animals need water and air to stay alive.

Animals need shelter to stay alive.

Plants need water to stay alive.

Plants need air and sunlight to stay alive.

Plants need land and space to stay alive.

Plants and animals live where they can get what they need. The place around a living thing is called an environment. Plants and animals live in many kinds of environments.

The desert is a dry environment.

A pond is a wet environment.

A forest floor is a shady environment.

An environment has many parts. The parts work together. Some parts of an environment are alive. Plants and animals are living parts of an environment. Other parts are not alive. Rocks and water are not alive, but they make up parts of environments.

What are some parts of this environment?

Environments can change. Seasons are one kind of change. Fall, winter, spring, and summer happen every year. Weather can change every day. It can get warmer or colder. It can become wet, dry, sunny, or cloudy. Changes affect the living things in an environment. Plants and animals do things that help them survive.

Some trees drop their leaves in the fall. This helps them when there is less sunlight in winter.

Some animals sleep all winter. This helps them when there is less food available.

This fox's fur changes from brown to white in winter. This helps the fox hide when its environment becomes snowy.

Some changes happen suddenly. Plants and animals cannot get ready for them. Food and water may be hard to find after a sudden change. Animals can lose their homes. Wildfires are a sudden change. Movement of rock and dirt can be a sudden change.

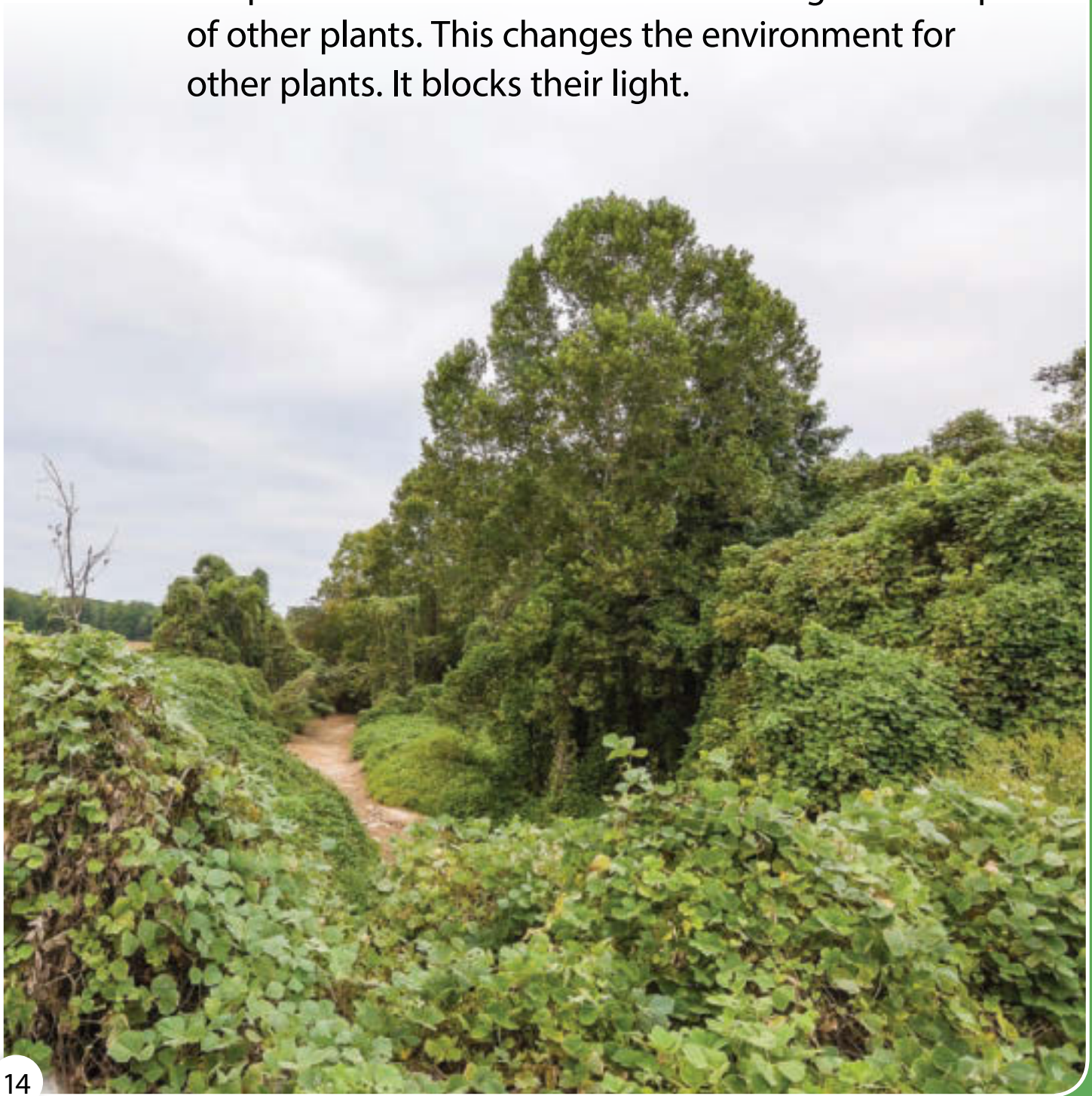
Sometimes an environment changes too much. Living things in the area cannot survive. A change can be so big that it can even kill a whole group of living things. They become extinct. Extinct plants and animals will not live anywhere on Earth again.

A big change may have happened to the environment when dinosaurs lived. A meteor hit the Earth. It caused changes to the air and land. Many living things could not survive this sudden change.

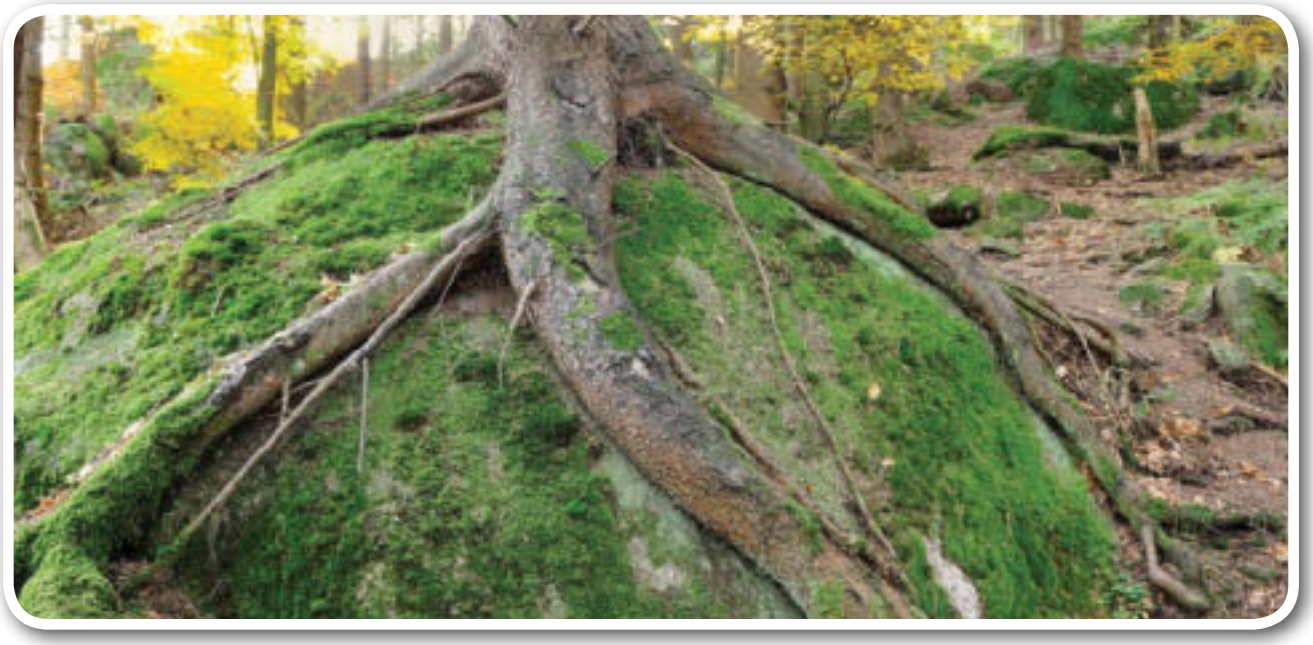
CHAPTER 3

Plants Can Change Environments

A squirrel can change the environment. It can dig a hole and bury a nut. The nut can grow into a tree. Can a plant change the environment? Think about the plant called kudzu. It can climb and grow on top of other plants. This changes the environment for other plants. It blocks their light.



Trees can begin growing in small cracks in rocks. When they run out of room, they can grow around the rocks. The roots stretch out into the space they need.



Sometimes the space where a tree is growing does not have enough room for the tree's roots. The tree roots keep pushing. They can break sidewalks apart.

Plants need sunlight. Trees that grow large make it shady below them. This changes an environment that used to be sunny. Vines that need sunlight climb to where they can get it. They can shade other plants when they grow on top of them.

Plants that have always lived in an area are called native plants. Other plants can start growing in areas where they are not native. If these plants grow and spread so quickly that they invade the space of native plants, they are called invasive plants. Water hyacinths are invasive plants in this lake. What will happen if they are allowed to continue growing?

CHAPTER
4

Animals Can Change Environments

Animals can change environments as they live to meet their needs. Do you remember the squirrel Alex saw when he was eating lunch? Squirrels bury nuts so that they can always find food. Nuts contain seeds that can grow into new trees if they are left in the ground. Squirrels don't mean to plant new trees. It is just a change that can happen.

Other animals change their environments on purpose to help them meet their needs. For example, birds build nests to lay eggs in. Ants hollow out wood so they can live in large groups. Inside, the ants build many rooms.

The beaver is one animal that changes its environment to meet its needs. Beavers chew through trees to cut them down. They drag the trees into piles in streams. The pile in the stream is called a beaver dam. The dam blocks the stream water.

The blocked water floods the surrounding land. It makes a deep pond. The beaver swims and finds food in the pond. From beneath the water, the beaver can climb up inside a pile of trees and sticks and make a room inside. The room inside the pile is called a lodge. It is the beaver's home.

When a beaver changes the environment to meet its needs, it does not mean to harm other living things. However, a beaver dam changes a stream environment so much that some other living things can't survive there anymore.

Certain fish need the running water of a stream to lay their eggs. They cannot survive in the still water of a beaver pond. Many plants that live near a stream cannot survive the change when the land is flooded with water.

CHAPTER
5

Humans Can Change Environments

Alex now knows how plants and animals can change environments. Maybe by making things like granola bars, people can change environments, too. Changes that people make can have big impacts on other living things.

What do you think was here before these houses?

Alex thinks about the granola bar. He wonders about how the granola bar came to be inside a package.

Foods like granola bars are packaged in factories. Stores have foods in boxes, metal cans, glass jars, and plastic bottles. The materials used to package food came from the environment.

Paper, plastic, and glass come from natural materials. Plants and oil are some natural materials used to make these packages. Humans gather these materials to package things like granola bars.

Humans change environments to meet their need for food. Humans farm. Farmers grow crops like corn, soybeans, wheat, and oats. When some farms are built, they use a lot of land. Huge areas of land are cleared. Animals that lived on the land cannot live there anymore. Trees and other plants that lived there naturally are replaced with crop plants. In meeting our need for food, people change the environment.

Some farmers spray crops with materials that help their crops grow or kill bugs that might harm the plants. When it rains, some of the spray can run into nearby streams. The streams can become dirty. Then animals that live in the streams might become sick. Some may even die. Meeting our need for food can sometimes create important changes in our environment.

How can you tell this stream is not healthy?

Some things grown on farms are used to make food in factories. Like farms, factories are built on land that was once home to living things. Land is cleared to make room for both farms and factories. If we are not careful, our factories can pollute the air and water around them. Pollution can make nearby environments unsafe for plants and animals.

What happens when food leaves the factories? Trucks and trains transport it to stores all around the country. Highways and train tracks run through environments. This affects the places where animals live. Sometimes animals cannot safely cross busy roads. They can have a hard time getting what they need to survive.

CHAPTER 6

Humans Can Help Environments

People change environments to meet their needs. But people can make choices that help environments too! You probably help the environment in small ways every day. You help when you throw away your trash after lunch, like Alex did. You help when you walk or ride your bike someplace instead of riding in a car. Alex met his need for food. Then he protected the environment from damage.

People can help the environment by saving water. If you turn the water off while you brush your teeth, less clean water goes down the drain. Then your city has less dirty water to clean. This helps the environment.

Another way to save water is to do a few full loads of laundry instead of many small loads.

People can help environments by producing less trash. The trash we put into garbage cans is collected and taken to garbage dumps. Trash from many, many people piles up there. It changes the environment. We can do things to make less trash. For example, we can take our own bags to the grocery store. We can reuse bags instead of throwing them away.

We can find ways to reuse other containers instead of throwing them away.

We can recycle plastic, paper, cardboard, metal, and glass. Recycling means turning the material into something new.

People can help environments in big ways, too. They can replant trees or prairies on large areas of land that have been changed by human activity. When old buildings or farmland are no longer used, people can return the land to what it was like before.

Farmers can care for the environment. They can find ways to use less water. They can allow other plants and animals to use the land to make the soil healthy. They can avoid using materials that cause pollution. Some farmers grow food indoors and without soil. This way of growing food means less harm to the environment.

Some farmers use hay or straw to control weeds. This way they do not need to use sprays that can wash into streams when it rains.

Alex wonders what he could do to help the environment where he lives. Perhaps he will plant a garden for bees and butterflies. This kind of garden can help replace lost homes for these animals. They lose their homes whenever people clear land to build buildings and roads. Or maybe Alex's class can set up recycling bins at school during lunch.

Alex can also pick up litter around his neighborhood. You can, too!

Science in Action

Meeting a Soil Tester

Since Alex saw the squirrel while he was eating his lunch, he learned more about the needs of plants and animals. He knows that people and animals get what they need from their environments. He also knows that he shares his environment with other living things.

Alex now tries to take care of the environment. He always throws away his trash. He picks up litter in the park with his family every Saturday. He got other families interested in recycling. He even convinced his teacher to create a classroom recycling bin.

One day in class, Alex asks his teacher how people know whether the land and water are healthy. She explains that scientists test the water to find out what is in it. They test soil, too. They find out if soil or water contains chemicals that could hurt living things. Scientists test soil to find out whether it has the nutrients that plants need to grow.

The students want to know more. Alex's teacher takes them to a farm. A soil scientist will show them how he tests the soil. He collects data about what he finds. His data help farmers know whether the soil needs more nutrients. If the soil is missing nutrients that plants need, farmers can add them. Plant fertilizers can help plants grow better.

The scientist uses a sharp tool to take soil samples from deep in the ground. Then he takes the samples to a lab. In the lab, special equipment looks for metals, nutrients, and other chemicals in the soil. The scientist collects data again and again over time. He compares the data. He shares his results with farmers.

How do these data help farmers? Sometimes soil does not have enough nutrients. Sometimes it has too much. This scientist will use the data to balance the nutrients in soil. He will use data to find out whether soil has enough water. Data will help him find out if the level of any chemicals in the soil is too high or too low. Data from soil samples help farmers grow healthy plants.

George Washington Carver

Alex asks the scientist how he got interested in studying soils. He tells Alex that when he was a boy he learned about a man named George Washington Carver.

Professor Carver was a scientist who studied plants and soil. He used the data he collected to develop ways to keep soil healthy. He taught farmers a method called crop rotation. He showed them how planting different crops each year could keep the soil from losing nutrients. As a result, farmers grew healthier plants.

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