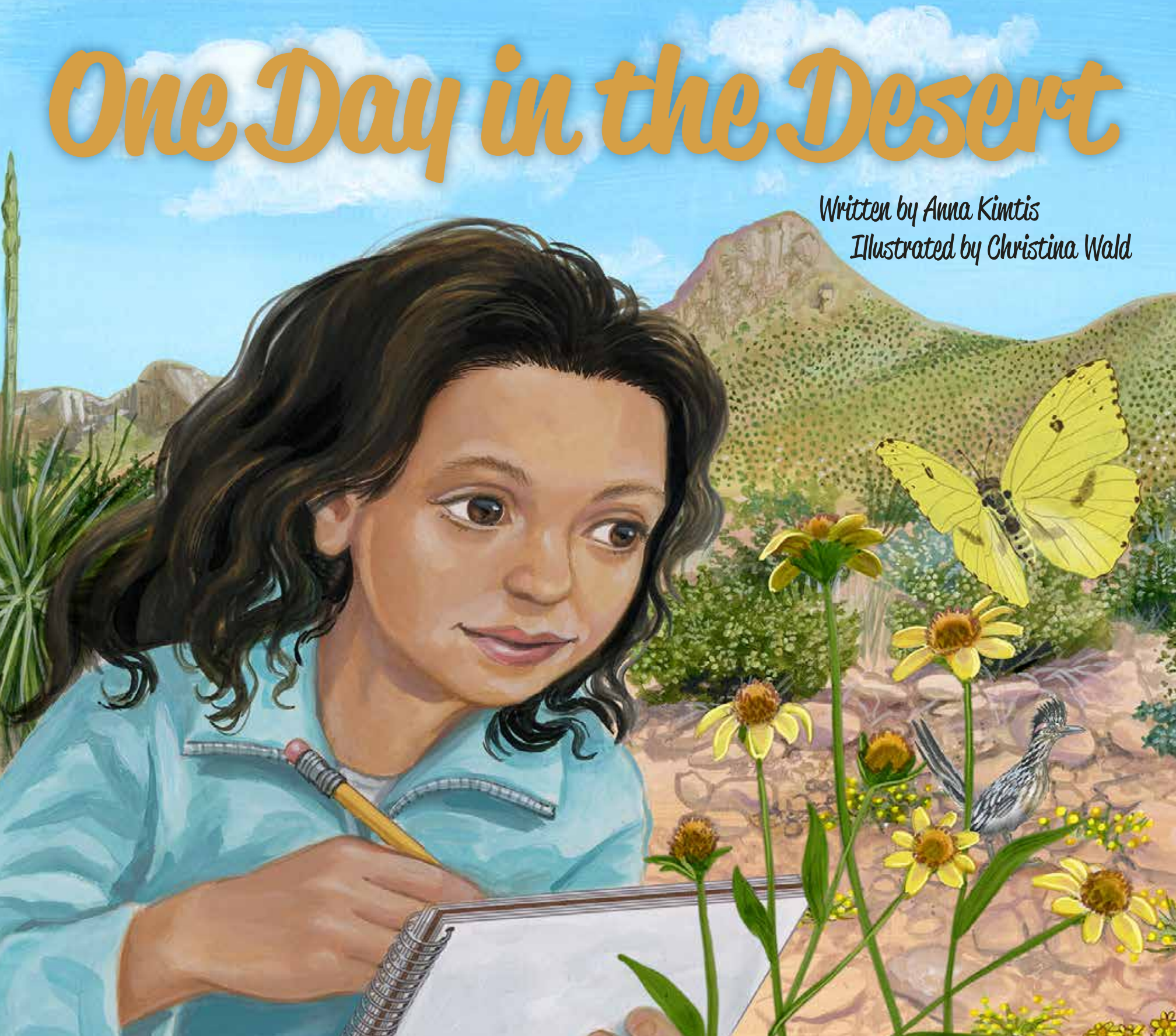
One Day in the Desert

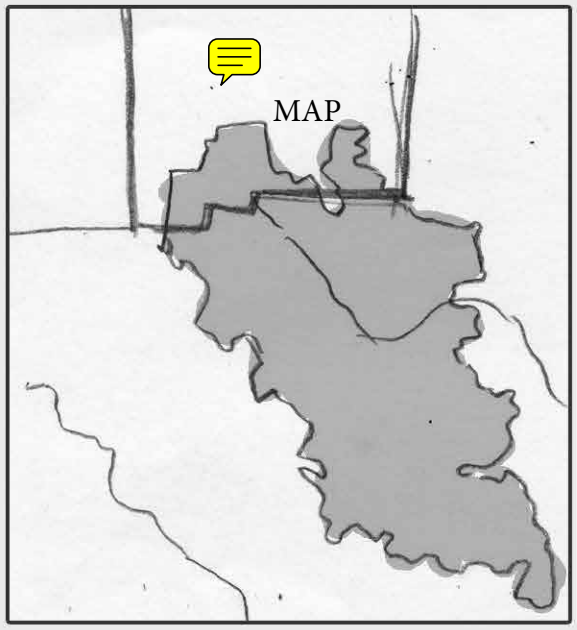
Written by Anna Kimtis
Illustrated by Christina Wald



Mariana pored over her two Eco Pen Pal postcards that had just arrived in the school mail. She and her new friends Kupe and Ellie shared their adventures in their different ecosystems through a postcard exchange.

Kupe lived on Moorea, a volcanic island in French Polynesia ringed in coral reefs. Ellie lived in a pine forest of Washington state. Mariana was amazed by these places.

Soon it would be her turn to write back to her pen pals. They wanted to know about the place she lived. She worried they would be disappointed by the desert. How could it be as beautiful or as full of life as the places they lived?



Chihuahuan Desert

The Chihuahuan Desert covers parts of New Mexico, Arizona, Texas, and Mexico. It is a high-altitude desert that gets most of its average 9.5 inches of rainfall in July through September, the desert's monsoon season. Life in the desert relies on these rains and on using water from rivers like the Rio Grande, which are fed by melting mountain snowfall. Temperatures in the desert change dramatically from day to night and from season to season. The hottest temperatures in June are around 97 degrees Fahrenheit, and the coldest temperatures in January are at or below freezing.

Mariana's teacher told the class about their upcoming field trip to the Chihuahuan Desert Nature Park. Mrs. Locke was always an animated talker, but today she merrily flung her arms over the projected photos from last year's trip. There were no houses or buildings in any of the photos. There was only the lonesome desert plains and mountains.

"We will go on a nature walk through the Chihuahuan Desert all the way to the top of an extinct volcano," Mrs. Locke said. "We'll see the plant and animal life that is special to this desert."

The field trip to the desert didn't sound as exciting a coral reef or a pine forest, but Mrs. Locke's enthusiasm gave Mariana hope. Maybe she would have something interesting to share when she wrote to her friends.

That night at dinner, Mariana explained that she was going on a field trip to the Chihuahuan Desert Nature Park.

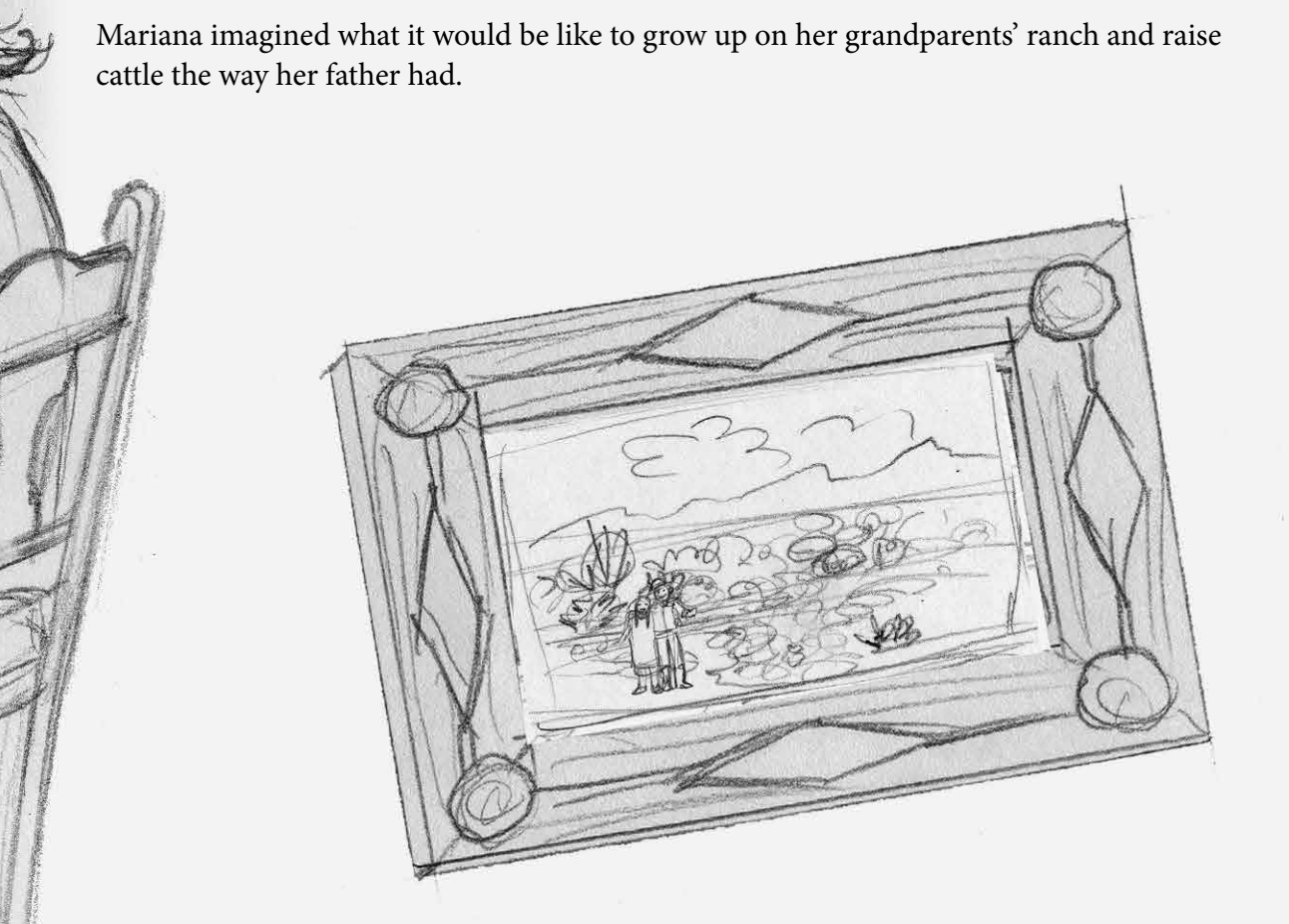
"I think that park is close to our old ranch," Father said. "It's a beautiful place."

Grandpa pulled an old photo off the shelf. "When we had our ranch," he said, "We used to take picnics up into the foothills of the mountains. From there we could see the whole valley, our ranch, and the city growing up along the river. You will be able to see the land where we used to live."

"The flowers are beautiful," Mariana said. It looked like Grandma and Grandpa were standing on a golden rug.

"Those are lemonscent flowers," Grandma said. "I remember how green it was that year. The grass was thick and the cattle were fat and the desert smelled of lemon. We had so much rain that year. We don't get wet years like that very much anymore."

Mariana imagined what it would be like to grow up on her grandparents' ranch and raise cattle the way her father had.



Ranching

When Spanish explorers arrived in the valleys of southern New Mexico in the late 1500s, they described grass high enough to reach the bellies of their horses. European settlers who remained in the region initially raised sheep on these grasslands. It wasn't until after the Civil War in the 1870s that ranchers introduced cattle in large numbers to the region. New laws encouraging settlement in the west, a growing demand for beef, and technologies like the railroads and windmills allowed ranchers to increase livestock numbers. But large herds caused over-grazing, where livestock eat the grass faster than it can grow back. Low grass cover harms the soil so grasses are slow to recover or never recover. Droughts that happen naturally in the desert reduced the grass even further. Ranchers were forced to sell their cattle before they starved, and many could not afford to ranch after that. Today, ranchers own fewer cattle and raise their animals on a mix of land they own and public lands. Although they have a better understanding of good rangeland management than ranchers did in the 1800s, ranching still proves to be a risky business that depends on favorable weather and good grazing land.

"Welcome to the Chihuahuan Desert Nature Park," said Dr. _____, the nature park scientist. She wore a wide brimmed hat and an easy smile.

"I challenge you to find as many signs of animals living along the trail as you can during our hike," she said.

Mariana clutched her field journal, which held the photo Grandpa had given her. At first she didn't see any signs of animal life. But when she learned to look more closely, she was amazed. Animals were all around her even if she couldn't see them. Some were hiding underground, while others were difficult to spot because of camouflage. Their adaptations made them hard to find, but helped them survive here. She wrote a quick list and made some sketches of the animal signs she found along the trail as they continued their hike.

Mariana's class climbed the extinct volcano, and cloudless sulfur butterflies lifted from the shrubs at their arrival on the top. One landed on Mariana. She smiled and noticed that the view from the top of the hill was similar to the one from her grandparents' photo. She showed the photo to Dr. _____, Mrs. Locke, and the class.

"This is a great example of an ecosystem that has shifted," said Dr. _____. She explained how most of the land they could see used to be covered in grass just like in this photo. Now it is mostly covered in shrubs like creosote bush and mesquite. "The land is always changing," she said.

She helped Mariana find a small lemonscent flower, only one of three plants they could find growing on the hill this year. In years with more rain, like in the photograph, the hills would be covered in the sweet smelling plant. Mrs. Locke took a group photo of them so that Mariana could show her family how much the valley had changed.

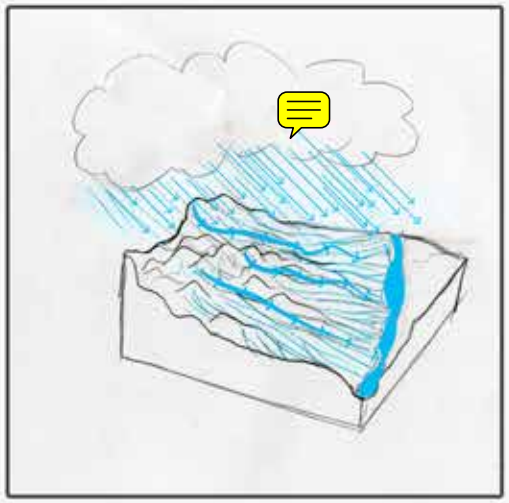
Desert Changes Over Time

The Chihuahuan Desert looks very different now than it did 150 years ago. Today some areas that were once grasslands are mostly covered in shrubs (plants with woody stems). Other areas changed from shrubland to grassland. These shifts from one plant type to another are called state changes. Because the change in one type of plant leads to changes in other parts of the ecosystem—such as erosion of the topsoil that carries the nutrients plants need to grow—it is very difficult for the first type of plant to come back to that same area. Scientists can't always see these changes by watching the land because they happen too slowly. Scientists rely on data that past scientists have collected to tell them about how rainfall, temperature, and land cover have changed. These long-term data sets help scientists to understand how ranching, natural shifts in climate, and man-made climate change have all influenced state changes. Take a look at the photos scientists took in the early 1900s compared to the same area now. What changes do you see?

The storm came up with little warning. Wind kicked up sand that peppered Mariana's skin. "Everyone back to the bus!" called Dr. Garza. Her voice was stolen by the wind. A curtain of grey rain fell from the clouds.

"Quickly kids!" yelled Mrs. Locke. They rushed back onto the bus as the rain began to plink against the roof and then drum so loudly that the children could no longer hear each other talk. A fresh, clean smell filled the air.

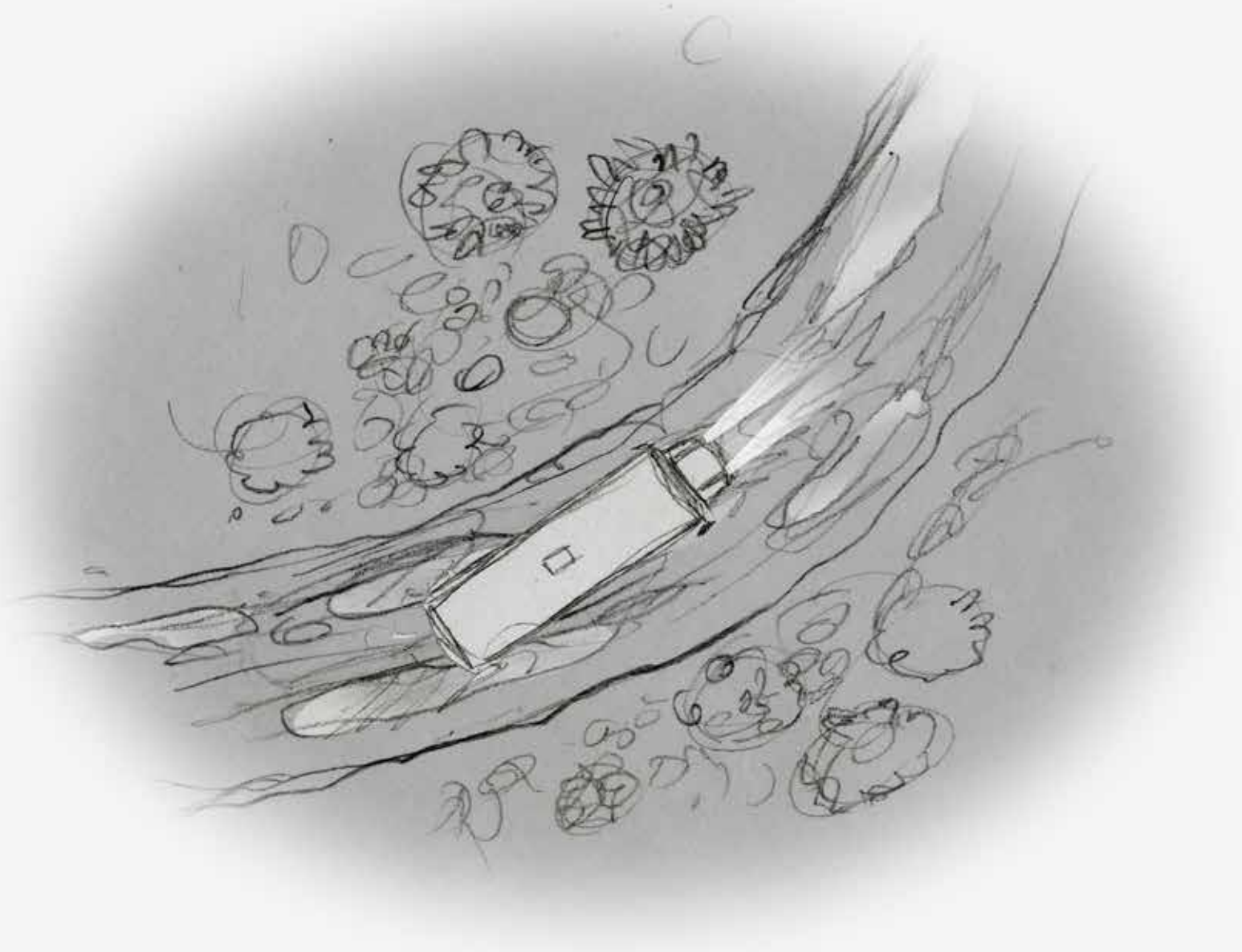
The rain had come too fast to soak into the soil. Small channels formed and washed downhill into arroyos that emptied into to the bottom of the basin.



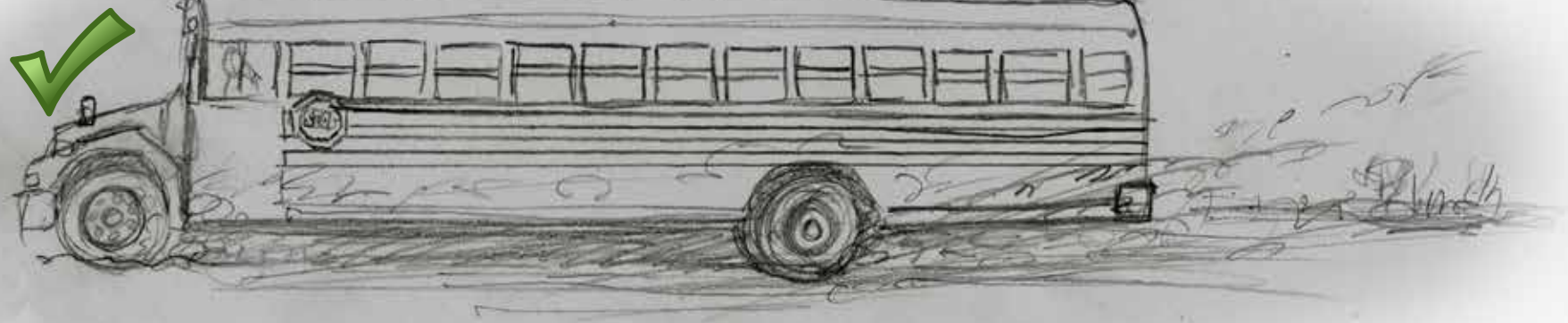
Water in the Desert

The Chihuahuan Desert Nature Park is located in a closed basin. All the water that falls in the valley stays there, seeps into the earth, and is stored in tiny spaces in the soil and rocks. This storage is known as an aquifer. Water from the surrounding mountains flows down through a system of arroyos. Arroyos are stream beds that are dry most of the time. Most of the rain that the desert gets comes in the late summer, during the North American monsoon season. When the monsoon rains arrive, the arroyos gush with fast-moving water for a short period during and after a rainstorm. A storm elsewhere can make an arroyo downstream fill with water in minutes, which means it's not safe to play in arroyos if there are approaching storms, even if it isn't raining where you are. The water from arroyos empties into playas (or ephemeral lakes) at the bottom of the basin.


SCHOOL BUS



After the rain became softer, the bus driver delivered the bad news. They would have to leave the nature park early, before the dirt road became impassable from the mud, if it wasn't already. Mariana was disappointed. They had only just begun to explore.



The bus driver navigated down the road until the bus suddenly stopped. It was stuck.

The class got off and stood by to watch as the driver tried to move the bus forward. The wheels spun and SPLAT! Mariana and her classmates were covered in mud. Even Mrs. Locke and Dr. Garza were splattered.

"Good news!" Dr. Garza said, after she called for help. "Some nearby ranchers can help us, but it looks like we'll be hanging around for a while until they can get a tractor over here to pull us out."

Mariana laughed. Even though she was covered in mud, she was secretly glad to have the opportunity to stay in the desert a bit longer.

"Everyone gather 'round!" called Mrs. Locke. "Dr. Garza wants to show us a very special kind of lake while we wait. It's called a *playa.* It only has water in it when it rains; the rest of the year, it's dry."

They hiked off the road in single file toward the playa, the lake that appears and vanishes in the desert. The playa was much bigger and shallower than Mariana had imagined. The water was the color of cocoa. They heard the constant thrum of the cicadas and the call of spadefoot toads that sounded like rapid knocking on a door.

"Since we're already covered in mud, let's go wading," suggested Mrs. Locke. "Be sure to wear your shoes and don't go in above your knees."

While some of her classmates shied away, Mariana headed into the water. The mud squelched and sucked at her feet.

Mrs. Locke tossed her an empty water bottle and called, "See what you can catch for us to examine!"

Mariana walked out to where the water was still. She could see small animals swimming near the surface. They weren't fish because they had legs that propelled them through the water. They looked more like brown bugs with pink undersides. She scooped a few up in the bottle and carefully waded back to the shore.

Desert Climate Change

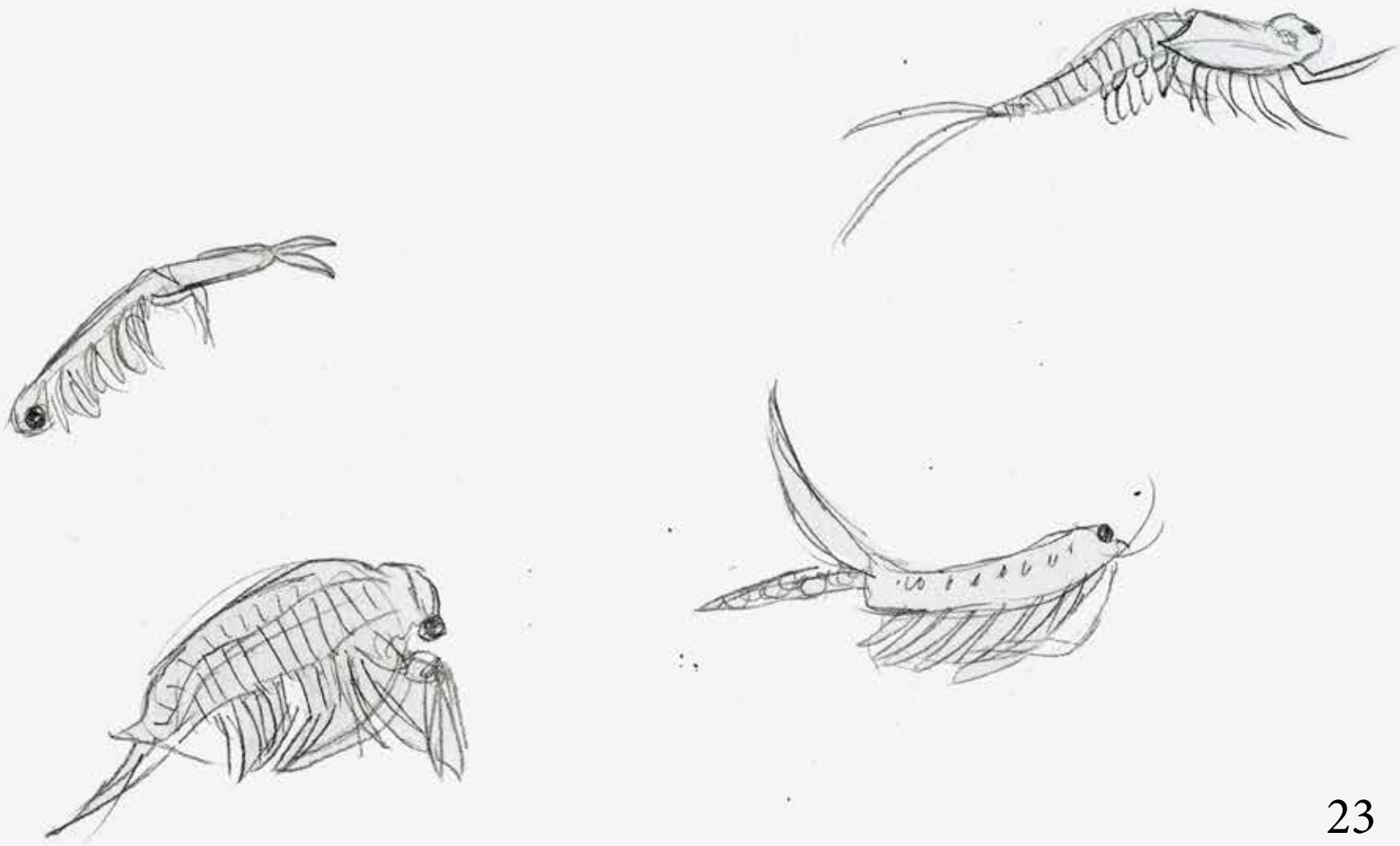
Climate change is causing warmer temperatures in the Chihuahuan Desert. It also creates less predictable patterns of rain and snow. There are longer and more frequent periods of drought and more intense storms that can cause flooding. Less predictable amounts of rain and snow make it more challenging for the animals and plants to have enough water to live. Scientists study how living things in the desert, like the tadpole shrimp, continue to react to climate change.

“What have we here?” asked Dr. Garza.

“I don’t know,” said Mariana. “What swims this way and has so many legs?”

“Tadpole shrimp!” shouted Mrs. Locke with glee. “My goodness, what a find!”

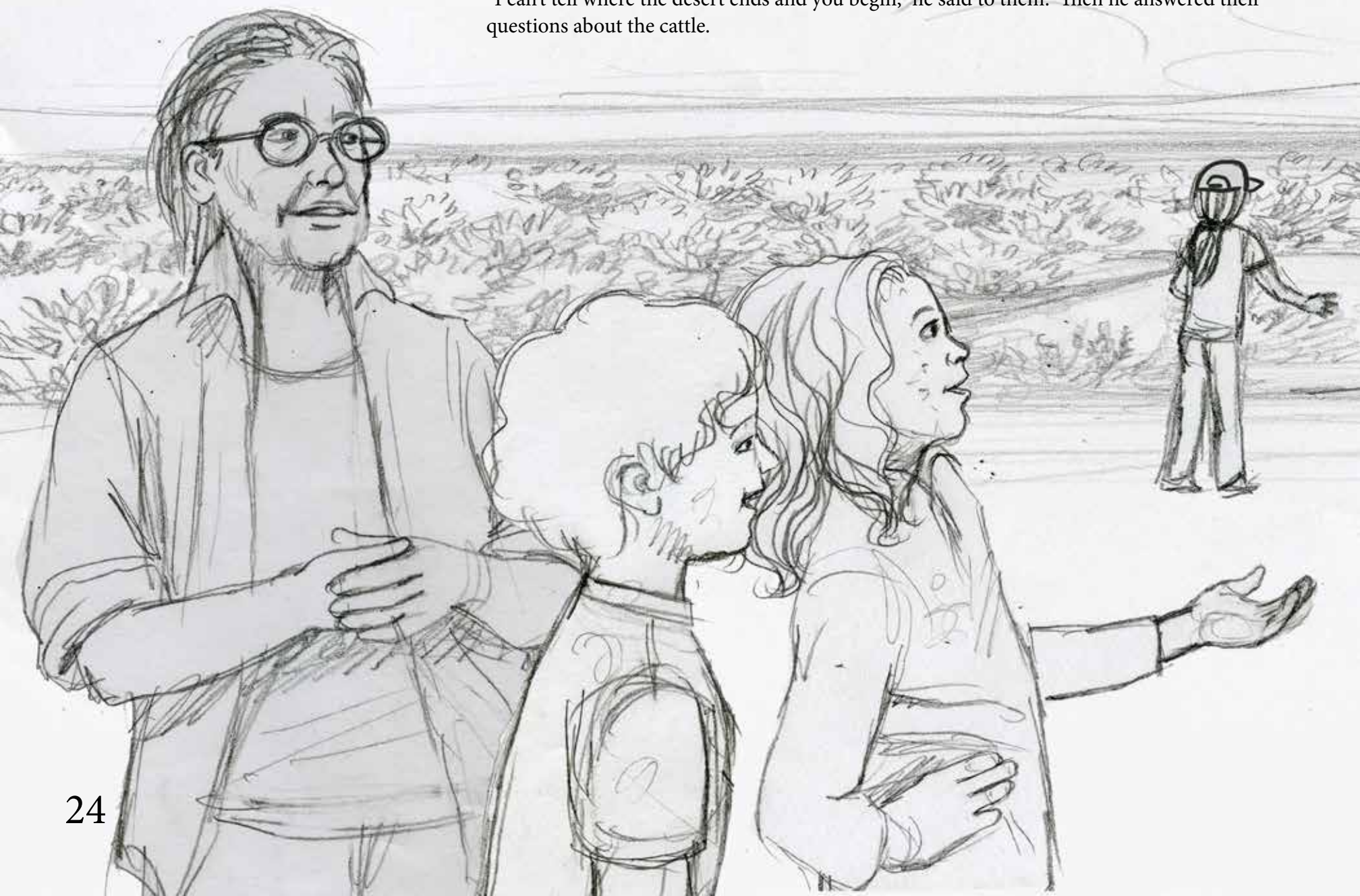
Her classmates passed around the bottle, as Mrs. Locke and Dr. Garza explained about the different kinds of shrimp that hatch only when water fills the playas. The shrimp lay eggs in the mud, and those eggs wait through the dry season, or for many years in dry soil, until the rains return and they hatch again.



Soaked, but happy, the class walked back to the road, where they found a group of ranchers pulling the bus out of the mud with a tractor. One rancher stood near his trailer, which was full of buff-colored cattle with tremendous horns.

The rancher chuckled at the kids' appearance.

"I can't tell where the desert ends and you begin," he said to them. Then he answered their questions about the cattle.



Raramuri Criollo

The Raramuri Criollo bloodline of cattle originated in a semi-arid environment in North Africa. They have been living in the hottest regions of Copper Canyon, Mexico, for 400 years, and are well adapted to the desert climate. Criollo cattle are smaller and require less food than breeds of cattle that ranchers traditionally raise in the United States. Criollo appear to travel farther from watering holes to find food, reducing the amount of strain on any one part of a grassland. They may also eat a wider variety of plants. Scientists at the US Department of Agriculture's Jornada Experimental Range brought Criollo cattle to the southwestern United States to study their impact on the ecosystem, in hopes that they can help ranchers adapt to desertification.


SCHOOL BUS

A cheer went up as the back wheels of the bus rolled free of the mud. The class thanked the ranchers, the heroes of the day.

The mountains glowed a vivid pink in the last rays of sunlight as they rode home. Mariana watched a coyote cross the road in front of the bus, its eyes glowing in the headlights.

Jackrabbits scattered and common nighthawks swept past in their hunt for insects.

Marianna wondered how she missed all the incredible life in the desert before today.

When she got back home, Mariana ran inside to tell her family about her amazing day. They were shocked by her muddy clothes, but were soon smiling as she described her adventure.

"Now I can't wait to write to Kupe and Ellie and tell them about the desert!" she said. "There is so much to share."

After she finished writing her postcards to her friends, Mariana thought about the owl Ellie saw right outside her house. What might she find just outside her own door?

She put on her damp, dirty shoes. She had worked hard to wash them, but some of the soil had settled into the fabric. The desert stayed with her.

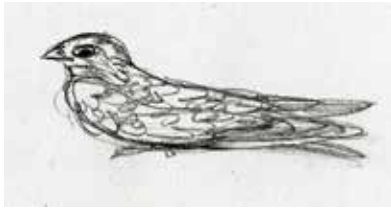
She went outside to play, pausing at the gate that led to the little arroyo behind her house. It was not as green as Ellie's forest, and it was not as exotic as Kupe's reef. But it was her home, and there was so much to explore.

Whenver something dies

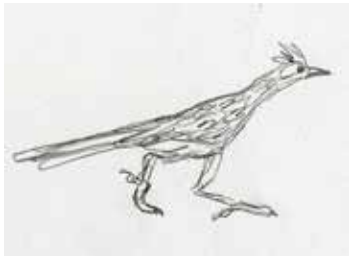
SECONDARY CONSUMERS

Texas Horned Lizard

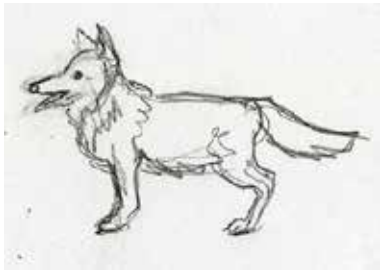
Common Nighthawk



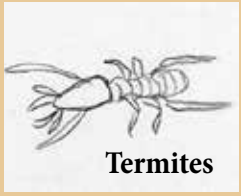
Roadrunner



Coyote

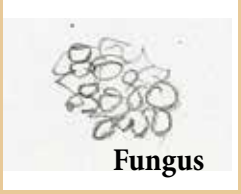


DECOMPOSERS



Termites

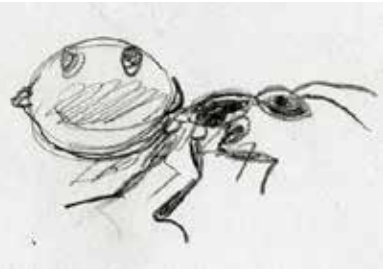
Bacteria



Fungus

PRIMARY CONSUMERS

Honey Pot Ant



Cloudless Sulphur Butterfly

Creasote Walking Stick

Kangaroo Rat

Soil Nutrients

PRODUCERS

Black Gamma Grasses

Creasote Bushes

Honey Mesquites