El Paso Water & SCIENCE

Science, Water and the Rio Grande:
MIGRATION STATION AT THE RIO BOSQUE

Grade 4th

Vocabulary

carnivore
omnivore
herbivore
producer
consumer
ecosystem
food chain
food web
photosynthesis
light energy
water
carbon dioxide
nocturnal
diurnal
crepuscular
migration
hibernation
brumation
estivation
model
habitat
energy transfer

Activity Overview

In this activity, students will understand the behaviors of the animals of the Rio Bosque Wetlands Park and how their behavior affects the ecosystem and food webs during different times in the day and different parts of the year.

TEKS Alignment

Science:
4.9 A The student is expected to: investigate that most producers need sunlight, water and carbon dioxide to make their own food, while consumers are dependent on other organisims for food.

4.9 B The student will describe the flow of energy through food webs, beginning with the sun, and predict how changes in the ecosystem affect the food web.

4.2 D The student will analyze and interpret patterns to construct resonable explanations from data that can be observed and measured.

4.8 B The student will represent and natural world using models such as the water cycle and stream tables and identify limitations including accuracy and size.

English Language Arts and Reading:
4.12 B The student will compose informational texts, including brief compositions that convey information about a topic; using a clear central idea using genre characteristics and craft.

4.3 C The student will determine the meaning of and use words with affixes such as mis-, sub-, -ment, and -ity/ty and roots such as auto, graph and meter.

THE SCIENCE BEHIND IT:

Changes in Ecosystems and Food Webs

During the teaching of standard 4.9 A, students learn that most producers need sunlight, water, and carbon dioxide to make their own food, while consumers are dependent on other organisms for food. Students should have a strong understanding of photosynthesis before moving on to concepts about food chains and food webs.

Understanding Photosynthesis

All living things need energy to survive, and this energy is given in the form of food. Things that consume food are called consumers, however, only some living things are able to seek and forage for food. Other living things, such as plants, cannot forage for food; they need to produce their own food through a chemical process called photosynthesis. Because plant life can produce its own food, they are known as producers rather than consumers.

Plants have parts located in their leaves called chloroplasts that have the ability to create a chemical change when the leaf absorbs light energy from the sun, carbon dioxide from the air, and water from the plants' roots. With the use of the light energy, a chemical change occurs at the molecular level, transforming the carbon dioxide and water into sucrose (sugar) that the plant can eat to survive. During this chemical change, oxygen is left over, and the plant respires (breathes out) oxygen into the air while it is creating its food.

Animals and plants have a beneficial relationship in this process because animals breathe out carbon dioxide during their breathing process and breathe in oxygen. Plants take in carbon dioxide and respire oxygen. This process is called the Carbon Dioxide/Oxygen cycle.

A Delicate Balance

Plants creating photosynthesis is a delicate balance for life on Earth. If the plant is missing any of the three stages of the process, photosynthesis cannot take place. It is not only a delicate balance for the plant to create its food but also a delicate balance for all of the living things that depend on plants as food, and for all living things that depend on oxygen to breathe and survive. For this reason, an over-abundance or shortage of water, light energy, or carbon dioxide can also tip the scales and affect the overall system of life.

Understanding Food Chains and Food Webs

In standard 4.9 B, the student will describe the flow of energy through food webs, beginning with the sun, and predict how changes in the ecosystem affect the food web.

To understand the concepts behind food chains and food webs, students will need to understand that all living things need energy to grow and live. The energy source for all life comes from the sun. Many children may have the misconception that food chains and food webs are part of a cycle (O2/CO2) that happens between animals and plants, when, in fact, food chains and food webs are a one-way system starting from the sun, each living thing taking from this energy until the energy dissipates.

The chain starts with energy from the sun. The sun gives its energy to plants. In turn, animals eat the plants to gain energy. There are animals that eat these animals to gain their energy and so on. When one living thing eats another living thing for energy, they are able to extract some of the original energy taken from the sun. This is why larger carnivores need many animals to keep them alive.

Food chain and food web models illustrate the flow of energy from the sun through all of the living things that use it. Students should understand that the arrows used in these models need to be pointing in the direction of the flow. Here is an example:

Sun → grass → kangaroo rat → snake → roadrunner → Hawk

In this food chain model, the sun's energy is traveling through living things to get to the hawk. The sun's energy can only travel through so many levels before it dissipates. Because hawk meat does not contain much energy from the sun, predators are not keen on eating a hawk. When students build their food chains and food webs, discussions about energy flow and levels traveled should be discussed for students to get a good understanding of how food chains and food webs work.

Predicting Changes in an Ecosystem

In most examples of standard 4.9B, the students will be presented with a situation in which an animal may disappear due to predation or pollution and the students are asked to predict what will happen to the rest of the chain or food web as a result. For example, a wolf population that may be hunted down in number in a forest may make the rabbit and deer populations grow higher, causing them to over graze an area.

In this unit, students will be able to create food chains and food webs using the Rio Bosque cards. These are a set of cards listing animals and plants that represent producers and consumers in the Rio Bosque food web. The deck also contains cards that represent the sun, water and carbon dioxide needed to create photosynthesis, which is the way most producers (plants) create their own food.

In this unit, students will be asked questions regarding changes in the environment due to the water filling the cells during winter and water evaporating out of the Rio Bosque Park in the summer. The Rio Bosque cards feature producers and consumers with symbols indicating what time of day the animals are active (diurnal, nocturnal and crepuscular), what time of year the species are present (migration, hibernation, estivation, and brumation) and what type of consumer they are (omnivore, carnivore or herbivore). All of these factors can determine natural changes in the environment that affect the food web and animal populations. The communities of ecosystems are constantly changing and reacting as food is taken and replenished within the system. Students will be able to easily see variables in the food webs by analyzing the data present in the Rio Bosque cards.

What Makes the Food Web in the Rio Bosque so Special?

El Paso is unique in that we live in a desert environment that offers very little rainfall for the area plants to create photosynthesis. In turn, these plants (and

animals for that matter) have had to acquire adaptations to survive the desert environment. However, environments along the Rio Grande River allow for water loving plants to be able to survive and create a unique environment within the desert. This means that a distinctly different set of animals can survive and thrive within the desert ecosystem.

Students will be amazed that the Rio Bosque wetlands have inhabitants, such as beavers and muskrats, as well as several species of waterfowl, such as ducks, coots, and herons. There are also specialized water plants, such as cottonwood trees, salt cedar and cattails that provide food and shelter for insects and animals in the wetland habitat.

Common Misconceptions about Rivers in the Desert Ecosystem

Students may have the misconception that the Rio Grande does not contain water anymore. When they look out to the Rio Grande they may notice that it is dry and empty for what seems like most of the year. In actuality, water from the Rio Grande is collected over a period of months and then released back into the river when it is time to irrigate the crops. For this reason, stretches of the Rio Grande may seem dried up during certain parts of the year. Even though the control of water in the Rio Grande through New Mexico and El Paso is a man-made effort, in nature a dried riverbed is a natural phenomenon as there are many rivers that are seasonal and recharge in the spring. This is very much a characteristic of rivers, creeks and streams that exist in desert environments. A river may also change in water flow as it travels across the land. This is because rivers may recharge throughout their route by tributaries along the land. Some students may not understand that the Rio Grande not only contains water but also does flow out to the Gulf of Mexico because it is recharged along its route through Texas by receiving water through tributaries.

What is a Bosque?

A bosque is a southwestern term used to describe a riparian wetland environment that is created when a river is flooded, usually during its rainy season. In valleys along the river, there are areas called floodplains that are prone to flooding during rains. These areas create ponds and small marshes that will attract wildlife. Water loving plants and trees will grow along this floodplain, creating a woody brush or cattail-filled area that allows plenty of hiding spaces, shade and water for animals that may not survive the desert otherwise. When this water evaporates after the rainy season, the animals may migrate or adapt to the changes of the dry environment while they are waiting for the next rain.

Human's Effect on the River and the Rio Bosque Wetlands.

People rely on water from the Rio Grande for drinking, plumbing and irrigation, which is why the Rio Grande River is dammed in areas and then released during irrigation season. Water from Elephant Butte Reservoir is released in spring and it will travel down the river into the El Paso area, where it will fill levees for irrigation. When this water is released, wildlife will come along for the ride and inhabit the river, the levees and the Rio Bosque Wetlands Park. The Rio Grande is not the only source of water for the park. It also receives reclaimed water from the Roberto Bustamante Water Treatment Plant during certain times of the year.

Rio Bosque Wetlands Park FACT SHEET

Rio Bosque Wetlands Park Fact Sheet
The 372-acre Rio Bosque Wetlands Park is located in El Paso County near the town of Socorro, Texas. Enclosed by irrigation canals and drains on three sides, the west side of the park is adjacent to the international border between the US and Mexico.

History tied to Meandering Rio Grande

The Rio Grande naturally changes its course through a process called “meandering”. Because of this phenomenon, there were disputes regarding land rights between two countries. The treaty of Guadalupe Hidalgo stated that the border between the US and Mexico would be divided by the Rio Grande River. As the river changed course several times over the years with many disputes as to who owned the land as a result, an agreement between both countries allowed for a cement channelization of the river through the El Paso area. This was called the Chamizal Agreement.

One casualty of the channelization was a wide bend of the river that was cut off and left to dry out. This is where the Rio Bosque Wetlands Park stands today. This land area that was once part of the Mexican territory was given to the City of El Paso in 1973 under the Federal Lands and Parks program with 9 more acres added in 1976 and 86 more acres added by the City later in that year. The City envisioned a natural park that could help with environmental education for the community, but it would be years before the City started to create a project that would revive the river habitat.

Bringing Back a Riparian Habitat

In 1997, with recommendations from the U.S. Fish and Wildlife Service, International Boundary & Water Commission and Ducks Unlimited, the Rio Bosque Wetlands Park was developed to rebuild the old river channel through the park and create a water system that would bring water to large shallow wetland cells. The land that had reverted to desert brush was cleared and graded to rebuild and re-create the wetland ecosystem.

Today the landscape is slowly changing. Cottonwood and cattails are now back to their original home, which is along their much-needed water source. Mammals, birds, reptiles, amphibians, insects, and fish that once inhabited the area are starting to return. The goal is to bring the environment back to how it might have looked during the pre-settlement era for people to explore and enjoy for years to come.

Currently migrating birds from the North looking for roosting areas in the Southwest, make their homes at the Rio Bosque Wetlands Park during the winter months. The cells fill with thousands of waterfowl, mostly ducks and coots, which change the food web during their temporary stay.

The Changing Behavior of Animals at the Rio Bosque Park

The Rio Bosque hosts two communities of animals, plants and insects: one native to the desert and another native to a desert riparian wetland. These two communities overlap and affect one another. Seasonal changes in the environment - in the form of climate temperatures, rainfall, and periodic flooding - dictate the activity. In other words, depending on the season, you will see different animals active at the park. Scientists, bird enthusiasts, naturalists, and visitors have logged sightings of the species of animals that live at the park and

keep these lists updated on the Rio Bosque website. The information from this website, as well research done on the most abundant species, were the basis of the Rio Bosque cards.

Active Research at the Park

The Rio Bosque Wetlands Park is managed through the University of Texas at El Paso (UTEP). The park hosts opportunities for citizen science, environmental studies, and conservation. Visitors who come to the park will readily see an active conservation program for the Burrowing Owl. Artificial burrows are established around the park to help support this species. Here is a link to a movie about the burrowing owls at the Rio Bosque: https://www.youtube.com/watch?v=BeKOm3DLu5g

Water at the Rio Bosque

For sustaining wetland and riparian ecosystems at the Rio Bosque Wetlands Park, water is essential. The Rio Bosque relies on three water sources: treated wastewater, groundwater, and water from the Rio Grande.

In the early years of the wetland project, water was only available in late fall and winter. During the growing season, the park was dry. However, in recent years, El Paso Water and the El Paso County Water Improvement District #1 partnered to provide additional water resources. Today, water is consistently available at all times of the year.

The availability of water during the growing season has greatly accelerated the development of wetland and riparian ecosystems at the Rio Bosque Wetlands Park

Field trips to Rio Bosque?

The Rio Bosque Wetlands Park is a great field trip destination for students. There are no admission fees to visit the park; however, you will need to make a reservation to bring students out to the park to ensure that bathroom facilities are available and to perhaps book a tour. For more information about the Rio Bosque, including free educational brochures regarding the plants, insects, amphibians, reptiles, birds and mammals of the park, please visit the UTEP Rio Bosque Website at: https://www.utep.edu/cerm/rio-bosque/rio-bosque-home.html
To the left of the website homepage is a directory of resources related to the Rio Bosque Wetlands Park.

Wildlife Cards and Animal Observation

ACTIVITY 1

ENGAGE: Migration Station Folded Booklet, Migration Station Video and Ernie and Carmen's Animal Observation Guide

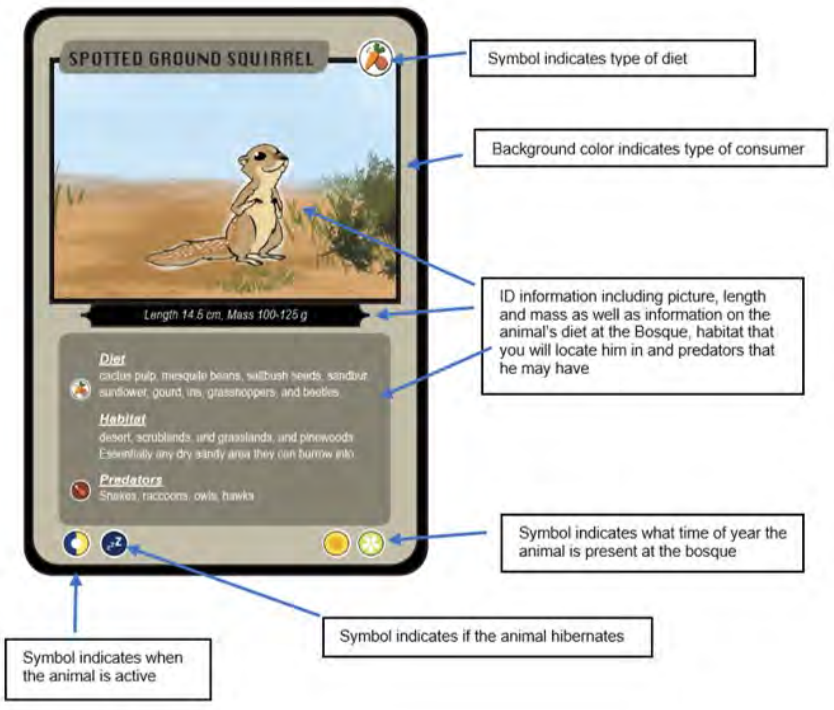
The students will read the Migration Station Folded Booklet (or the teacher may review with the class the Migration Station Slide Show presentation). The teacher should use the background information section of this lesson plan to answer any questions or provide more information regarding the Rio Bosque Wetlands Park. The teacher may use the Migration Station video to show the students movie footage of the park.

EXPLORE: Investigating the Rio Bosque Car

How to Read the Cards

For students to understand the dynamics of the Rio Bosque food web and how it changes, they should take into consideration when animals are present and active. Some animals migrate and are only present during certain months of the year. Others are present at the park year-round. Some forage for food during the day, only in the morning, afternoon or under the cover of night. To help students to build a food chain or web that is more realistic of what actually happens at the park, each card contains symbols in addition to facts about diet, predators and habitat.

For best results with the cards, we suggest that you allow your students to explore them first by sorting them to try to guess what the symbols and colors may mean.



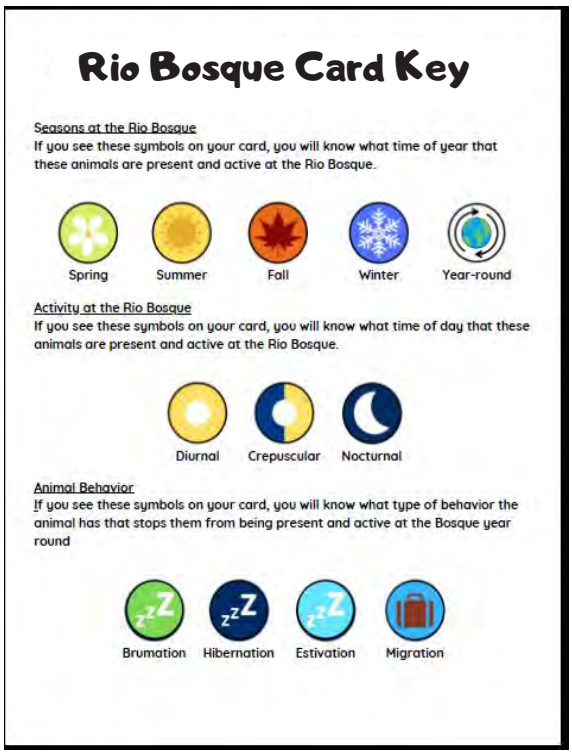
Only after sorting the cards, should the students receive the card key or Ernie and Carmen's Animal Observation Guide. Here is a sample card:

For a better understanding of the cards, please use the card key or Ernie and Carmen's Animal Observation Guide.

EXPLORE: Investigating the Rio Bosque Cards

Procedure:

1. Give each student group (four to five students) a set of the Rio Bosque Cards.
2. Have the students sort the cards by however they feel that they should be sorted, taking care to look at the cards for details and symbols
3. On a chart paper or board, have the students list the different ways that the cards could be sorted. A sample list could include:
   - Card color
   - Consumer, producers
   - Omnivore, herbivore, carnivores
   - Night, day symbols
   - Season symbols
   - Birds, mammals, insects, etc
   - Desert animal verses aquatic
   - Zzz symbols



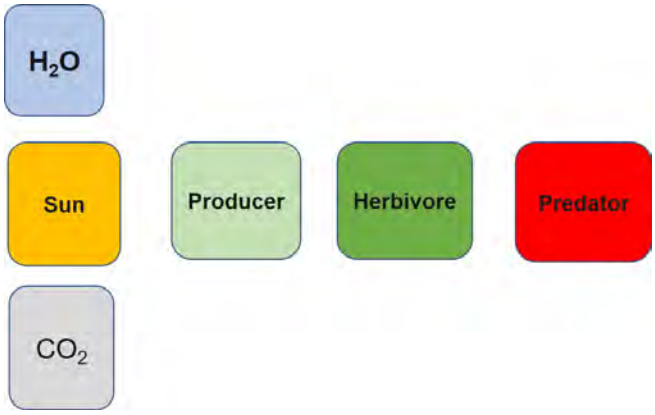
4. Have the students look at the Rio Bosque card key to decode the cards and what they mean.

5. Have the students each pull an herbivore from the cards. By examining the card, students should research what type of plants the herbivore may eat. Have the students look for plants in the deck that the herbivore may eat. They will place this card to the left of the herbivore card.

6. Have the students then research from the card what type of predators that the herbivore may have. Have the students look for the predator in the deck. Once they have found a predator have them place that predator to the right of the herbivore.

7. Explain to the students that they are making a food chain. A food chain is a model that shows how the flow of energy travels from one living thing to another. Ask the students where the plant would get their food. (Students should answer from photosynthesis or the sun) Have the students search the deck for the photosyn thesis cards (sun, water, carbon dioxide). Using the teacher background pages,

explain to the students about how these three elements must be present in order for photosynthesis to happen. Have the students place the sun card to the left of the herbivore. Water and carbon dioxide should line up directly below and above the sun card. It should look something like this



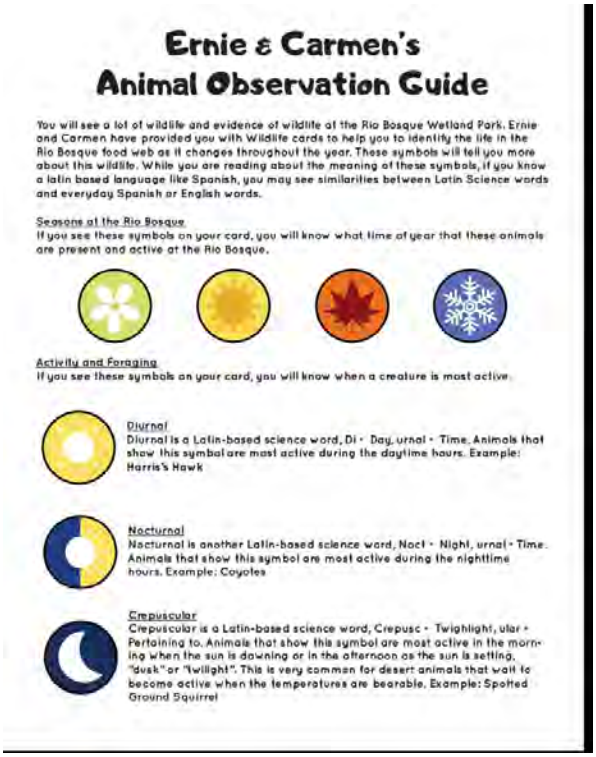
8. Using paper and pencil, have the students draw their food chains, naming the animals and plants from their card deck into their food chain. Can they add more predators to their food chains? What is the longest food chain that they can create? Have them place arrows to show the flow of energy from the sun to the predator. Call a few students from the groups to demonstrate their food chain to the class. Then have them present their food chains to each other in the group.

9. As they present their food chain to their group, have the students note if there are any herbivores and carnivores that would be in competition with each other for the same food by comparing the different food chains made within their group. These group members can form a food web. The teachers will choose a group that has some competitions within their food chains. Have the group bring their cards from their chains to the front of the class. The teacher will then help the group build a food web to show competition for the same food sources. Using scotch tape and a chart marker, tape the cards onto the white board or chart paper. Demonstrate the levels of the web, starting with the sun at the bottom level, then building producers, herbivores, and predators. Draw arrows to show the flow of energy from the bottom level to the top predators. Once the students are clear on how to draw the levels, have each group build a food web with the cards and their own chart paper. Have the students post their food webs around the room.

EXPLAIN: Ernie and Carmen's Animal Observation Guide

In this reading and discussion activity the students will use their knowledge of a second language to help them to decode science vocabulary. Scientists often use words with Latin-based roots, prefixes and suffixes to help describe science. Since Latin is no longer spoken, the meaning of the words do not change. There are many students in the El Paso area that speak a second language that is Latin-based, Span-

ish. The use of Spanish or Latin cognates to help students to decode English words is an ESL strategy that not only helps students to bridge and become proficient in two languages but also builds confidence in second language learners as they realize that the language of science is very similar to the language spoken at home.



Ernie & Carmen's
Animal Observation Guide

You will see a lot of wildlife and evidence of wildlife at the Rio Bosque Wetland Park. Ernie and Carmen have provided you with Wildlife cards to help you to identify the life in the Rio Bosque food web as it changes throughout the year. These symbols will tell you more about this wildlife. While you are reading about the meaning of these symbols, if you know a latin based language like Spanish, you may see similarities between Latin Science words and everyday Spanish or English words.

Seasons at the Rio Bosque
If you see these symbols on your card, you will know what time of year that these animals are present and active at the Rio Bosque.

Activity and Foraging
If you see these symbols on your card, you will know when a creature is most active.

Diurnal
Diurnal is a Latin-based science word, Di = Day, urnal = Time. Animals that show this symbol are most active during the daytime hours. Example: Harris's Hawk

Nocturnal
Nocturnal is another Latin-based science word, Noct = Night, urnal = Time. Animals that show this symbol are most active during the nighttime hours. Example: Coyotes

Crepuscular
Crepuscular is a Latin-based science word, Crepusc = Twighlight, ular = Pertaining to. Animals that show this symbol are most active in the morning when the sun is dawning or in the afternoon as the sun is setting, "dusk" or "twilight". This is very common for desert animals that wait to become active when the temperatures are bearable. Example: Spotted Ground Squirrel

Procedure:
Each student will receive the **Ernie and Carmen Animal Observation Guide** to read with their group members. After reading the guide the teacher will bring the class back into whole class instruction to discuss the reading.

Teacher: Knowing a second language like Spanish can help you to better understand science words. Let your group members know if you understand or speak Spanish in your home. Your knowledge and the help of our dictionaries will help us to find words similar in meaning to the new vocabulary that we are studying in class. Let's refer to the section in the Guide that says Activity and Foraging. The first word that we learned about was the word Diurnal, which means active during the day. What Spanish or English words do we know that would help us to remember that Diurnal means refers to daytime?

Teacher guides students to possible answers such as the Spanish word Día or the English word Diary. These words will be written on the board or chart paper

Teacher: Let's look at the next word, Nocturnal, which means, active at night. What Spanish or English words do we know that would help us to remember that nocturnal refers to activity at night?

Students may respond with noche for Spanish and even though it may be difficult to locate a noct rooted English word, the word equinox (which is the first day of spring) means that both day and night are equal in time.)

The teacher will continue the discussion about Latin related words with the class to help discover other similarities between Spanish and science vocabulary and English and Science vocabulary. The class will create a chart and begin to fill in the vocabulary words and related words. Answers may vary. Here is an example of a possible chart and some of the examples of the words they may discuss:

Science Word	English related words	Spanish related words
diurnal	diary	día
nocturnal	equinox	equinoccio, noche
crepuscular	angular, muscular	angular, musculoso,
herbivore	rectancular, spectacular	rectangular, espectacular
	herb, herbicide	hierba, herbicida

Applying the Observation Vocabulary to Food Webs

Referring to the food webs that the groups built in the explore activity, give the students some post-it notes and the following questions to leave feedback for the groups during a gallery walk. A gallery walk is an activity where students can walk from one display to another to observe student work, much like a visitor to a gallery would view artwork. During the gallery walk the students would write feedback to the group using their post it notes and the questions that the teacher has posted on the board or chart paper. Here are the questions:

- Are the animals in this food web able to be in competition with each other year-round? If not, which animals would not be present for competition in the food web?
- Would the animals in this food web be active at the same time during the day or night? If not, which animals would not be active during this food web?
- What season best describes this food web? Are there any animals that would be hibernating, estivating, or bromating during this food web? Would any be migrating?

Extension Activities to the Cards

Students can play these games to familiarize themselves with food webs and food chains at the Rio Bosque Wetlands:

Seasonal Webs:
The teacher assigns a season to the entire class and sets a timer. The student groups have 15 minutes to build a food web with animals and plants present at the Bosque for that season. The first group to complete a food web that contains photosynthesis and at least 4 additional levels for this season will be the winner.

Card Wars (one deck per pair of students):
Students will play in partners, shuffle the cards, and then split the cards evenly between each student. The students will flip the first card from their pile. If one animal can consume the other animal or plant, the student card doing the consuming gets to keep the cards. If there is no match, the cards remain in the middle until a living thing is consumed. The students will continue to flip a new card until they find a consumer. The student holding the consumer card gets to keep all of the cards in the middle. This game can be timed for 15 minutes or until one student loses all of his or her cards. The player with the most cards wins the war.

Bosque Mystery Scene Writing and Craft Project

ACTIVITY 2

Materials Per Group:

- Rio Bosque Cards
- Ernie and Carmen's Animal Observation Guide
- dictionary (Spanish/ English or English)
- markers
- chart paper
- Rio Bosque Animal Footprint Sheets
- paper and pencil
- thick cardboard (like from a cardboard box)
- plastic or styrofoam cups
- 5 different colors of tempera paint (except brown)
- flat trays, paper plates
- scissors
- foam modeling clay
- miscellaneous materials to create stamps such as pipe cleaners
- foam plates or recycled foam take-out boxes
- water
- roll of brown or tan butcher paper (craft paper) 10ft
- roll of blue butcher paper (craft paper) 10ft
- pen

ELABORATE: What happened at the Rio Bosque?

Water is a precious resource that all animals need to survive. Many animals at the Rio Bosque Park come to the water's edge to drink, and others do their hunting while they are there. In this activity students will work in groups to compose a composition about A Day (or Night) at the Bosque. Imagining that they have the ability to visit the Rio Bosque at any time, day or night of the year. They will write a short story (2-4 paragraphs) about the animals that they see coming to the edge of the water at one of the Bosque's cells. Students will then create a scene based on this composition, showing the footprints of the animals that visited the water's edge. Once each group has created their footprint scene, the groups will read the anonymous stories and then try to guess which composition matches which scene based on the footprints and clues left in the scenery created.

Creating the Group Composition

1. The Teacher will divide students into groups of 4-5 students. Students will close their eyes and imagine a particular time of year (season) that they would like to visit the bosque. Based on what they already know about El Paso, what is the weather like? Temperature? How would the plants look? Would they be green or brown and dormant? Would they be flowering? What is the water like at the Bosque this time of year? Are the cells filled with water or are they only small ponds? Remember that the cells are filled with water for the winter. The winding river and the smaller water cells are the focus for the water in the summer months. This will be the setting of a group composition about a day (or night) at the bosque.
2. Students will choose 4-6 animals that will visit the edge of the water at the bosque at the time of year that they choose.
3. Using the information from the cards they will note what time of day the animals are active and what time of year they are present at the Rio Bosque.

4. Students should be careful to select animals that would

Foam Clay Footprint Stamps

1. Cut out the footprint stencil for the animal, being careful not to cut out the individual shapes that make up the print
2. Using the foam clay, create the shape of the footprint on the stencil be present and active at the park for the time of year that they have selected.
5. Once they have chosen 4-5 animals (one per student in the group), the students will then begin to compose their composition using all the information that they have gathered. Here is a sample composition:

The sun is dawning at the Rio Bosque Wetlands park, and even though the beaver is just settling in for a rest after a night of eating cattails, a jackrabbit emerges from his burrow and hops quickly to the edge of the water, his ears moving back and forth trying to detect sounds from the brush. He hears a twig snap and leaps away quickly to a safe hiding place. A raccoon emerges from out of the shadows of the tall cattails. In his hands he has the egg of a northern shoveler from a nest that he found among the reeds. He eats the egg and then wanders to the edge of the water feeling around for anything that he might find in the water.

The raccoon hears a low growl and freezes in his tracks as a gray wolf leaps down from a nearby tree and chases after a small kangaroo rat making his way towards his burrow. Although he pounces, he misses, and the kangaroo rat pops into his burrow as the sun begins to rise and another day begins at the Rio Bosque.

Once the group has written their composition, they will use the story to create a scene to match the action that took place.

Creating the Mystery Scene

Before class prep:

- Each group will need a 10ft pre-measured roll of blue craft paper and brown craft paper to be used to create the bank along the water.
- To save time, the teacher can pre-cut the cardboard circles that will be mounted on the paper/plastic cups. The circles should be larger than the circumference of the mouth of the cup. Each student may need to make up to four stamps depending on the animal.
- A supply area can be created for students that would contain glue bottles, scissors and premeasured paper plates containing tempera paint.

Student groups will create a Mystery Scene at the bosque that matches the story that the group has written. To make the mystery scene, students will use

colored craft paper, footprint stamps and tempera paint. For a demonstration of how to create this mystery scene, please refer to the Mystery Scene video.

Students will search the footprint sheets for a set of the footprints to the animals described in their story. Each student in the group will create footprint stamps for their chosen animal.

Students can create the footprint stamps in one of two ways: with recycled meat trays or takeout boxes made of Styrofoam or by using foam clay that can be purchased at any dollar store.

3. Create a circular foam backing and apply that shape to the footprint shape to create a stamp
4. Allow the foam clay to dry (about 24 hours)
5. Once the foam clay has dried, using tacky glue, glue the foam backing onto the center of a cardboard circle. Once this glue is dry, glue the cardboard circle to the lip of a plastic cup. The plastic cup will serve as a handle for the stamp.
6. Repeat this process to create left and right foot stamps as well as front and hind foot stamps. Take care to label the stamps so that it is clear which is the right and left foot.

Recycled Styrofoam Stamps

1. Cut out two footprint stencils for each print of the animal, being careful not to cut out the individual shapes that make up the print.
2. If using recycled foam plates, boxes or meat trays, wash and dry the Styrofoam first before using it to make the stamp.
3. Place the footprint stencil on the Styrofoam. It can be taped in place to stop the stencil from moving. Trace the shape of the footprint with a pen to leave an indented image of the footprint on the Styrofoam.
4. Glue the second stencil onto the cardboard circle using the tacky glue.
5. Remove the stencil from the Styrofoam and using scissors, carefully cut out the foot print shapes.
6. Glue the Styrofoam shapes onto the cardboard circle matching up the Styrofoam shapes to the stencil. If using thin Styrofoam, you can glue an additional shape layer to the stamp to create height.
7. Label the stamps for the left foot and right foot of the animal.
8. Repeat the process to create left and right foot and front and hind feet.

Creating the Bosque Mystery Scene

1. Students will roll out the brown and blue craft paper onto the floor, being careful to overlap the blue paper over the brown paper. The blue paper represents the water at

the Bosque and the brown paper represents the ground.

2. To give the water a more realistic effect, the blue paper can be shaped in a curvy fashion along the banks of the cell (or river),
3. Using the tacky glue, the student will glue the blue paper overlapping the edge of the brown paper.
4. The students will read the passage that they wrote and then proceed to use the animal stamps to create the footprints of the animals in the order they are described. Each animal will be assigned its own tempera paint color. Allow each set of footprints to dry before adding another layer of footprints. Footprints may overlap depending on the story and the layering may actually help the groups determine which animal came first, second, etc.
5. Students may use markers or crayons to create pictures of grass and shrubs in the scene
6. Remember to not create footprints in the water area.
7. Once all of the mystery scenes are created, the teacher can read the stories to the class and the students can investigate each scene and try to determine which story went to each mystery scene.

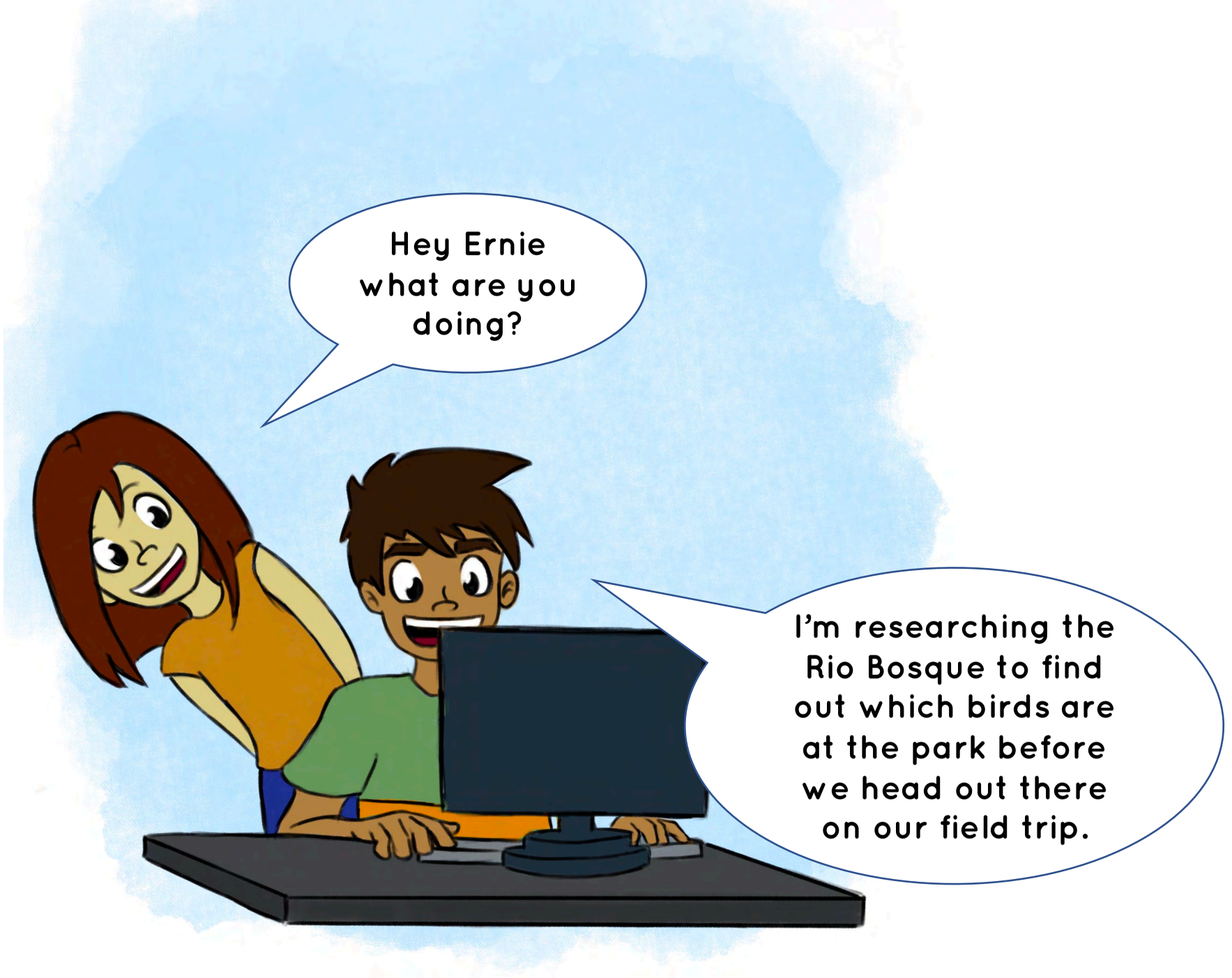
Alternative ideas for stamps:

Small bird and insect stamps may be hard to recreate with Styrofoam or foam clay. Other materials for making stamps may include: toothpicks, pipe cleaner, rice, spaghetti or any material that can be glued onto the cardboard circles to create shapes of bird feet, insect leg imprints or tail imprints.

EVALUATE:

Teacher will use their own testing materials to evaluate the learning of standards 4.9A and 4.9B.

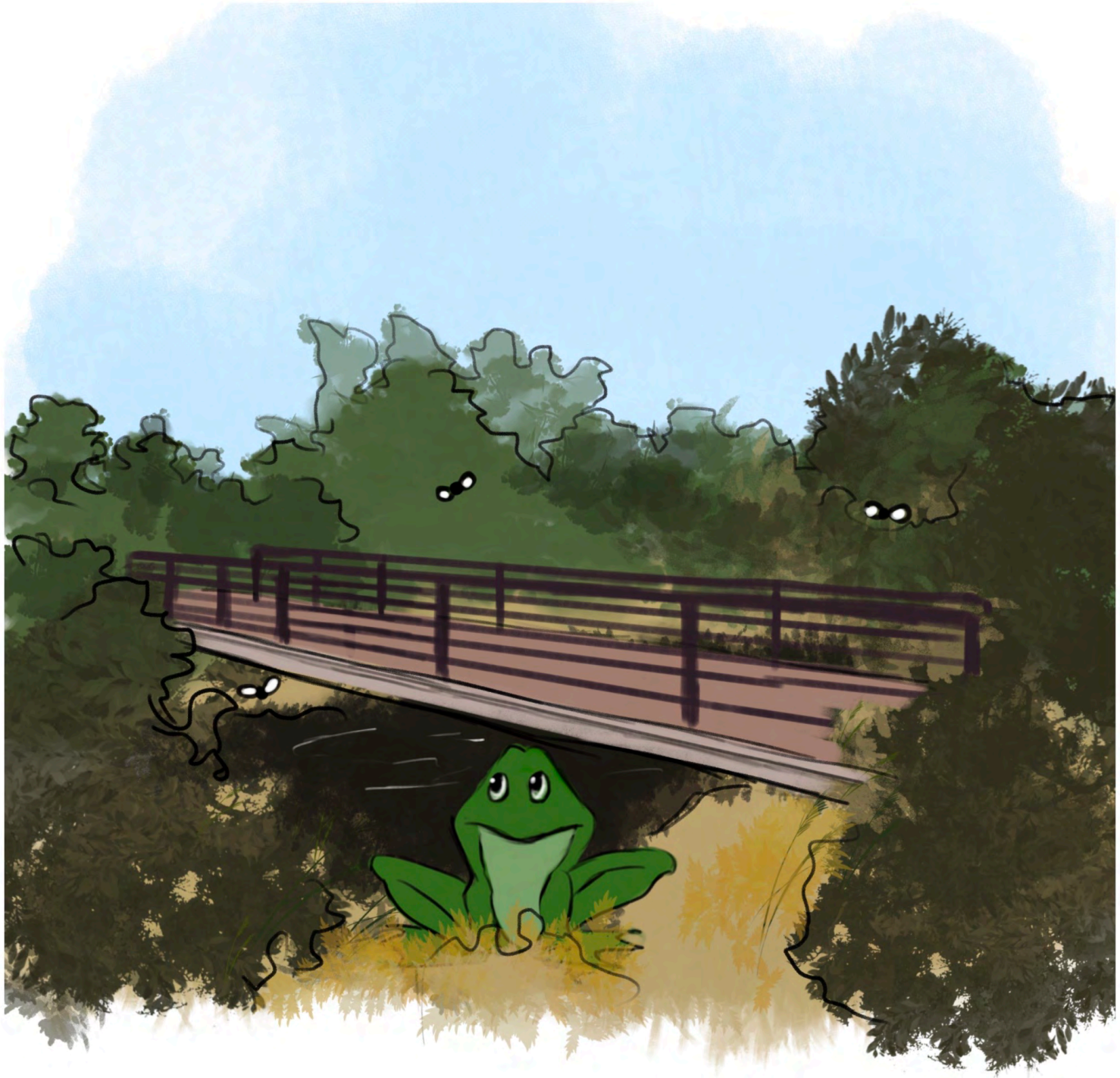
Migration Station at the Rio Bosque


Hey Ernie what are you doing?
I'm researching the Rio Bosque to find out which birds are at the park before we head out there on our field trip.

You must really love birds to want to research that type of information.

I watch birds for a hobby Carmen, but actually keeping track of the birds at the park tells us a lot of information about the ecosystems there and how they have a pattern of change.

How can a park change? Isn't it the same throughout the school year? Same trees, same bushes, same trails, same water, same animals? Last year when we went to the Rio Bosque in April, the park had lots of life along the waterways. It was beautiful.



Yes it was Carmen. Life at a river environment can seem like an oasis in our desert, but it wasn't always like this, Carmen. This park is actually a re-creation of an environment that had disappeared.

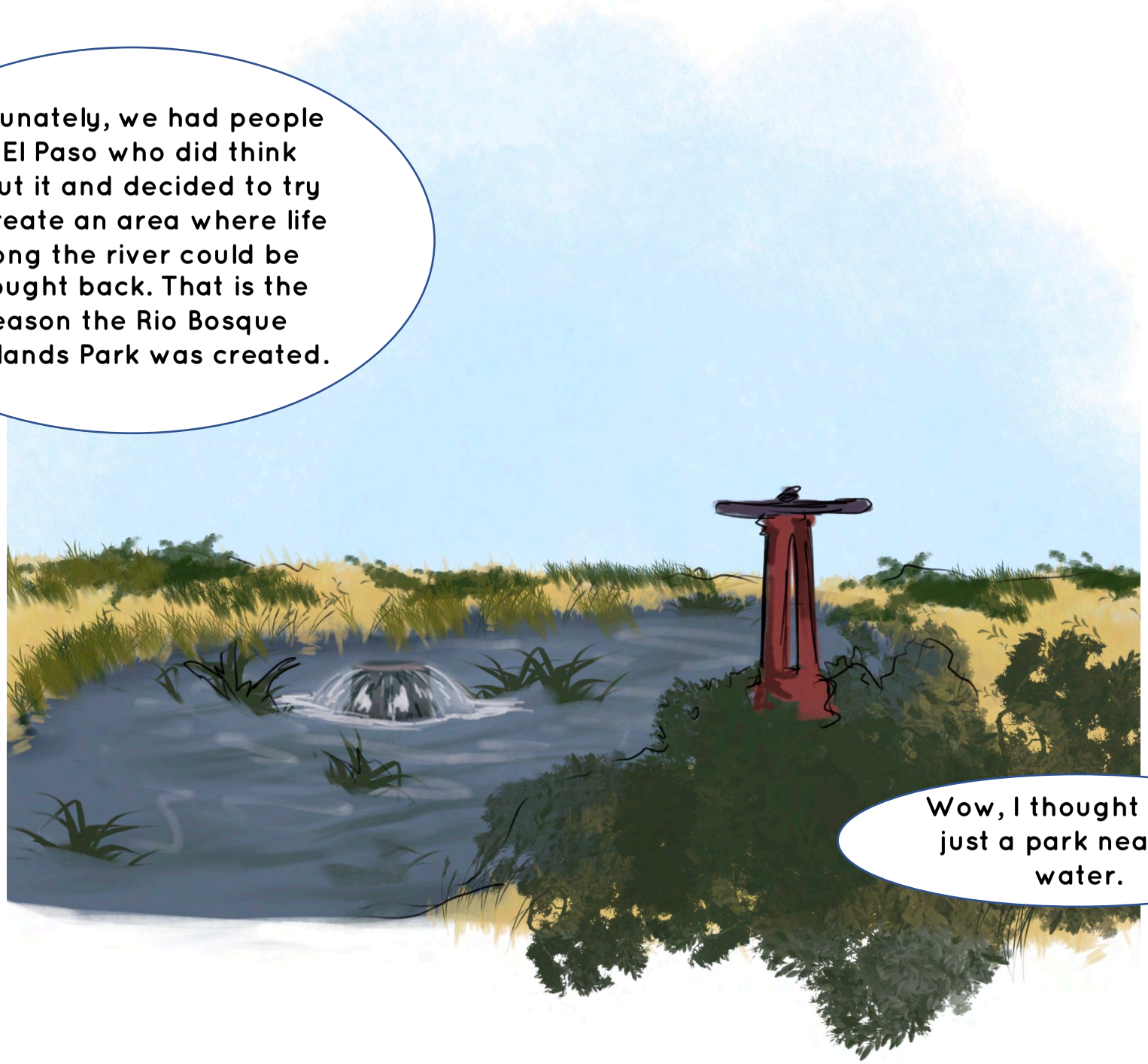
Remember when you told me about how our river meandered and we had to cement it in in order to stop it from meandering? Well when we created the channel, all of the life that lived along the river in that area disappeared.

Rio Grande Today

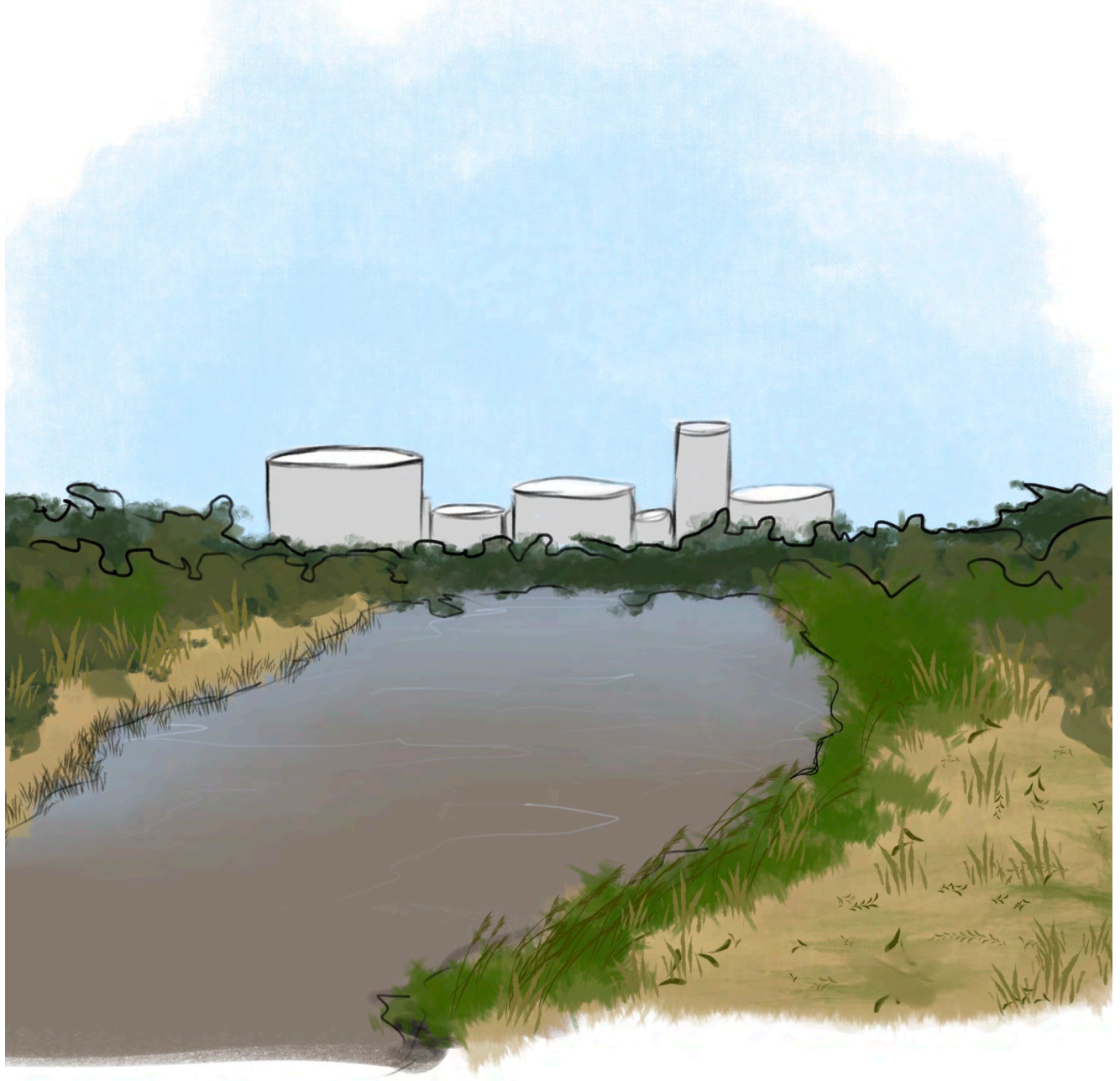
Rio Grande Pre-1934

Oh no! I didn't think about that...

Fortunately, we had people in El Paso who did think about it and decided to try to create an area where life along the river could be brought back. That is the reason the Rio Bosque Wetlands Park was created.

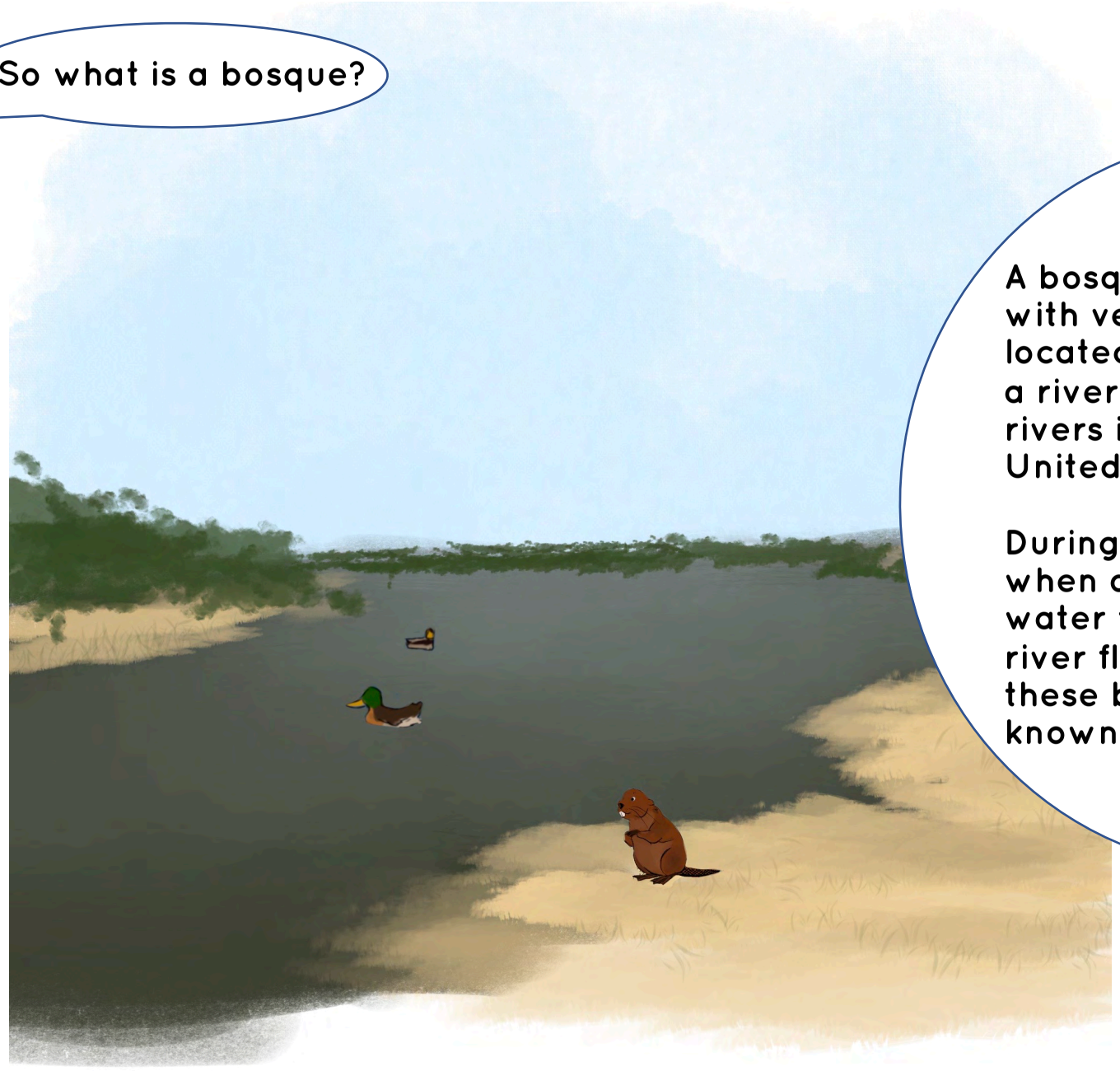


Wow, I thought it was just a park near the water.



Three water sources provide the critical water for the wetlands to thrive: river water, groundwater, and reclaimed water, which comes from the nearby Bustamante Wastewater Treatment Plant.

So what is a bosque?

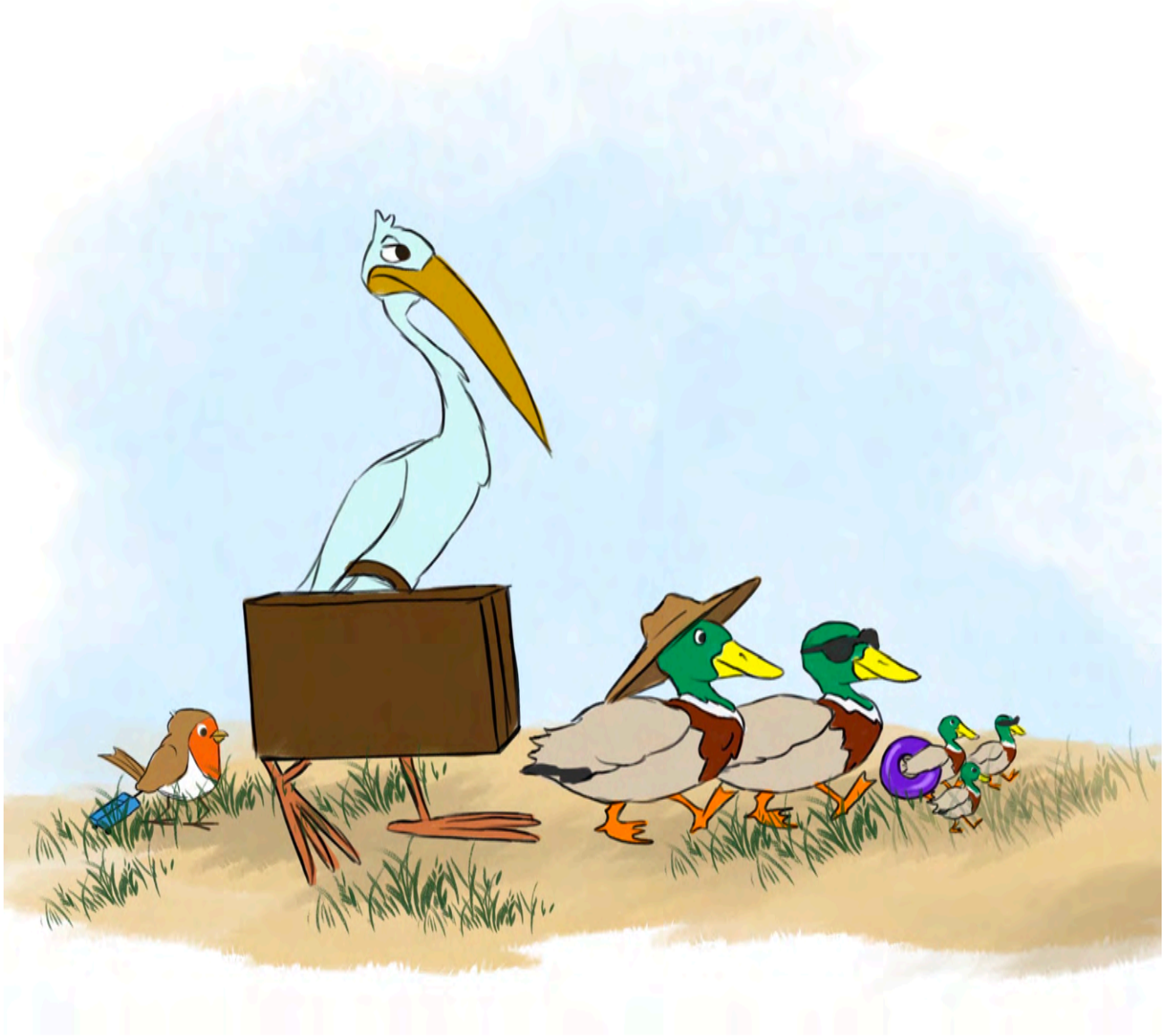


A bosque is an environment with vegetation and trees located in the floodplain of a river. They are found near rivers in the Southwestern United States.

During certain seasons when a river receives more water than it can move, the river floods and creates these bosque habitats also known as riparian wetlands.

Because the amount of water changes during the seasons, riparian environments change as well. When the rivers flood, they create cells of water where ducks, geese and other water birds can gather.

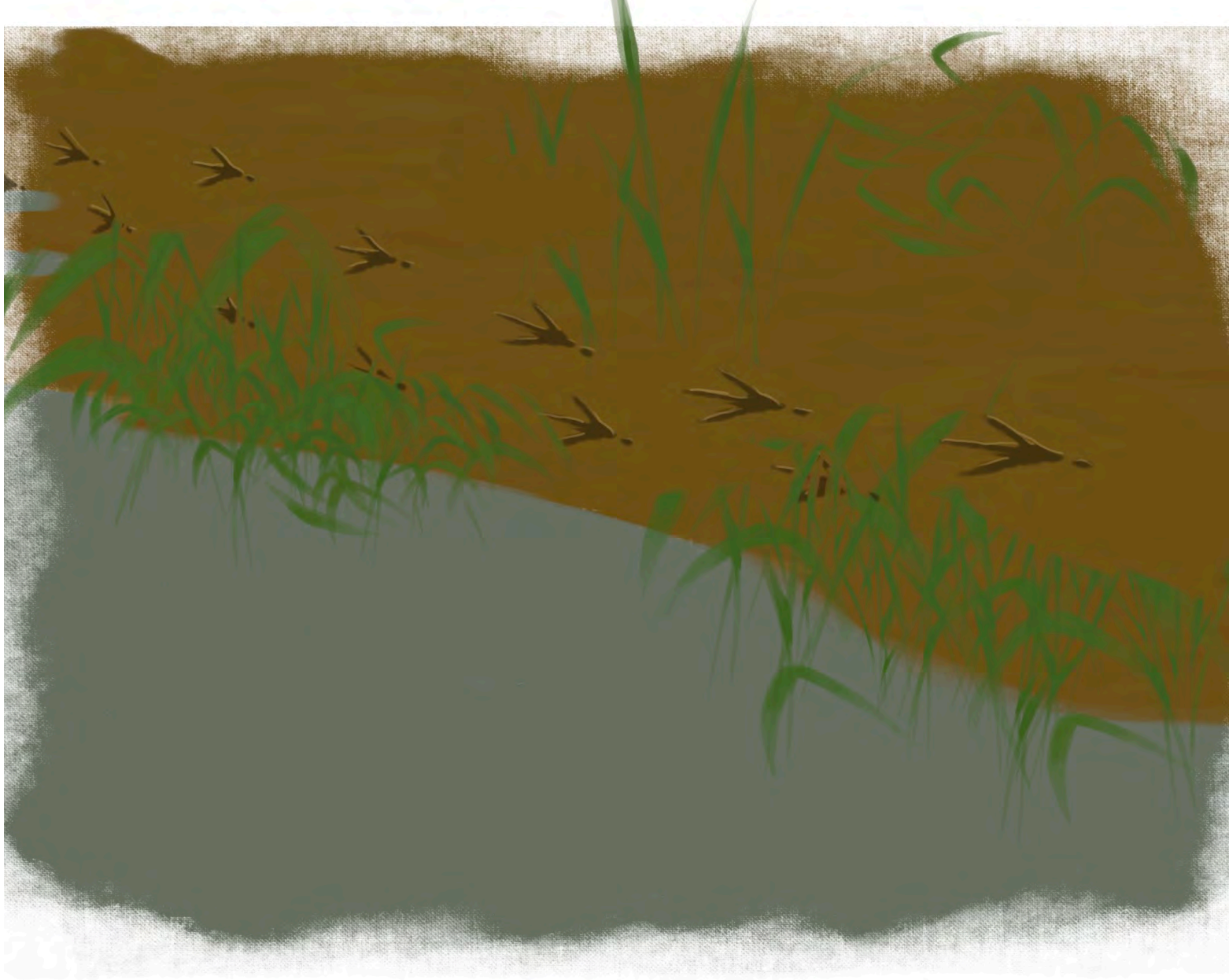
Birds that normally live as far North as Canada, come down here for the winter when it is warmer here. Our bosque is an important place for birds to rest for short periods while they travel south or nest for an entire season.



When the cells dry out, the animals migrate back to their summer home, and desert river animals that were hibernating come out to live along their summer river home.

Can you find out which species of animals are visiting the Rio Bosque right now?

By using clues such as scat, footprints, bird sightings, and animal calls, you can?



Migration Station at the Rio Bosque

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So what is a bosque?
A bosque is a wooded environment located in the floodplain of a river. They are found near rivers in the Southwestern United States.
During certain seasons when a river receives more water than it can move, the river floods and creates these bosque habitats also known as riparian wetlands.

Yes it was Carmen. Life at a river environment can seem like an oasis in our desert, but it wasn't always like this, Camen. This park is actually a recreation of an environment that had disappeared.

Three water sources provide the critical water for the wetlands to thrive: 1) river water, 2) groundwater, and 3) reclaimed water, which comes from the nearby Bustamante Wastewater Treatment Plant.

Remember when you told me about how our river meandered and we had to cement it in in order to stop it from meandering? Well when we created the channel, all of the life that lived along the river in that area disappeared.

Oh no! I didn't think about that...

Fortunately, we had people in El Paso who did think about it and decided to try to create an area where life along the river could be brought back. That is the reason the Rio Bosque Wetlands Park was created.

Wow, I thought it was just a park near the water.

Ernie & Carmen's Animal Observation Guide

You will see a lot of wildlife and evidence of wildlife at the Rio Bosque Wetland Park. Ernie and Carmen have provided you with wildlife cards to help you to identify the life in the Rio Bosque food web as it changes throughout the year. These symbols will tell you more about this wildlife. While you are reading about the meaning of these symbols, if you know a Latin-based language like Spanish, you may see similarities between Latin Science words and everyday Spanish or English words.

Seasons at the Rio Bosque

If you see these symbols on your card, you will know what time of year that these animals are present and active at the Rio Bosque.




Activity and Foraging

If you see these symbols on your card, you will know what time of day or night a creature is most active.

Diurnal

Diurnal is a Latin-based science word, Di = Day, urnal = Time. Cards that show this symbol feature animals that are most active during the daytime hours. Example: Harris's Hawk

Nocturnal

Nocturnal is another Latin-based science word, Noct = Night, urnal = Time. Cards that show this symbol feature animals that are most active during the nighttime hours. Example: Coyotes

Crepuscular

Crepuscular is a Latin-based science word, Crepusc = Twighlight, ular = Pertaining to. Cards that show this symbol feature animals that are most active in the morning when the sun is dawning or in the afternoon as the sun is setting, "dusk" or "twilight". This is very common for desert animals that wait to become active when the temperatures are bearable. Example: Spotted Ground Squirrel

Ernie & Carmen's Animal Observation Guide (cont.)

Types of Consumers

If you see these symbols on your card, you will know what type of food your creature eats.

Herbivore

Herbivore is a Latin-based science word, Herbi = Plant, vore = One who eats. Cards that show this symbol feature animals that forage and eat plant-based foods, including seeds, leaves, bark, wood, stems, roots and bulbs. *Note: Some species of birds may be herbivores most of the time; however, all birds will eat insects during mating season so that they can produce eggs. Herbivore Example: Beavers

Carnivore

Carnivore is a Latin-based science word, Carni = Meat or flesh, vore = One who eats. Cards that show this symbol feature animals that capture and eat other animals. Carnivore Example: Bobcats

Ominivore

Omni is a Latin-based science word, Omni = all, vore = One who eats. Cards that show this symbol feature animals that don't necessarily eat everything in a food web, but they are more versatile because they will eat both plants and animals. All animals in the dog family, such as wolves, coyotes and foxes, are considered omnivorous. There are many animals that do both, but usually they sway more towards one type of food than the other when food is plenty. Omnivore Example: Raccoons

Animal Behavior

If you see these symbols on your card, you will know what type of behavior the animal has that stops them from being present and active at the Rio Bosque year-round.

Brumation

Brumation is a Latin-based science word, Brumate = winter, ation = State. Reptiles, amphibians and other cold-blooded animals may slow down their bodies during winter because of lack of heat. Brumation Example: King snake

Brumation

Hibernation is a Latin-based science word, Hibern = winter sleep, ation = State. Mammals may slow down their bodies during winter in a den and enter a sleeping state until spring. Since the Rio Bosque is in the desert, it is rare for mammals to completely go into hibernation and may only do so for very short periods. Hibernation Example: spotted ground squirrel

Ernie & Carmen's Animal Observation Guide (cont.)

Estivation

Estivation is a Latin-based science word, Estiv = spend the summer, ation = State. One way desert animals survive harsh summer heat is to burrow during hot temperatures and slow down their body activity. During estivation amphibians can stay alive during dry summer months until the next rain. Estivation examples: the Woodhouse and Spadefoot toads.

Migration

Migration is a Latin-based science word, Migr = to move to a new place, ation = action. You may have noticed that there is a certain type of animal that has members that migrate in and out of the Rio Bosque and these are BIRDS. Our desert may seem cold to us in the wintertime, but to a northern bird, like a Heron or Egret, our winter temperatures may be paradise! However, our summer may be way too hot, so in the spring as temperatures begin to rise, many birds will pick up and go home. Migration Example: Great Egrets

Other Observation Terms

While at the Rio Bosque you may see other clues that let you know what animals have been active.

SCAT

Scat is animal poop. You may see it along the trails at the park. The shape, size and what seems to be in it will give you a clue as to who left it. For example, some scat is comprised of seeds and plant material. Others may contain fur or pieces of bone.

PELLETS

Pellets are packets of animal bones, fur and feathers regurgitated by birds of prey such as owls and hawks. Sometimes mistaken for scat, pellets can be dissected to find out what type of animal was eaten by a bird.

Nests and Burrows

Be on the lookout for nests and burrows around the park. Nests can be in trees and bushes or even on the ground. Burrows come in all shapes and sizes. Never put your hand inside a burrow!

Ernie & Carmen's Animal Observation Guide (cont.)

<u>Sights and Sounds</u>

Other types of clues are there at the park if you use your senses. Listen for bird calls, warning signals from animals, rustling in the bush, bubbling at the water surface, and other signs of life. Look for scratches on tree trunks and animal tracks of all shapes and sizes.

No matter where you go to explore, remember to be safe and respect nature.

Rio Bosque Card Key

Seasons at the Rio Bosque

These symbols indicate what time of year that these animals are present and active at the Rio Bosque.

Activity at the Rio Bosque

These symbols indicate what time of day that these animals are present and active at the Rio Bosque.

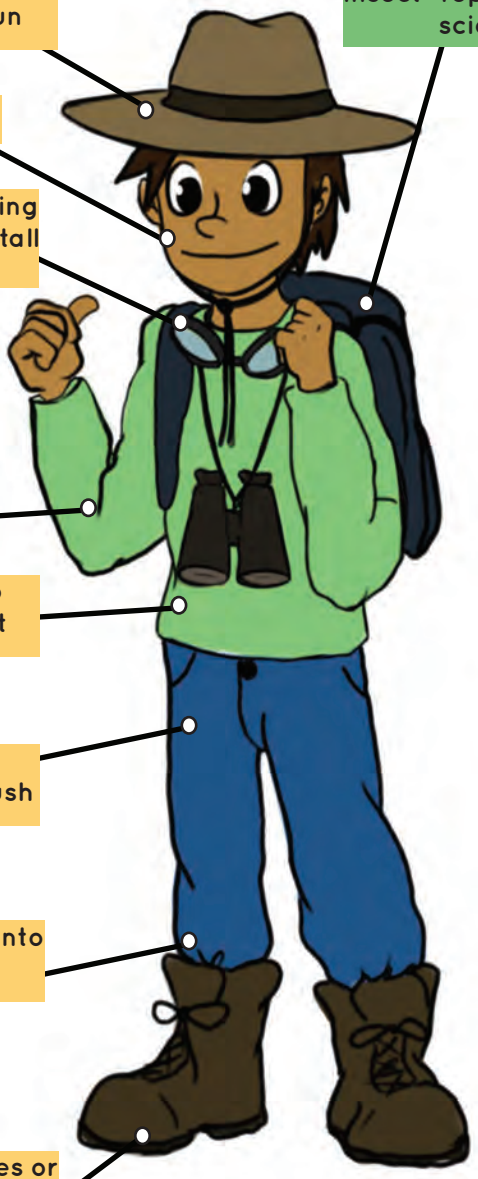
Animal Behavior

These symbols indicate what type of behavior the animal has that stops them from being present and active at the Rio Bosque year-round.

WHAT TO WEAR ON A DAY HIKE IN EL PASO

Spring/Summer

Fall/Winter



Light backpack to hold layered clothing, sunscreen, insect repellent and light science gear

Large brim hat to block the sun

Sunscreen SPF 50

Goggles if you are going to be walking through tall brush or trees

Long sleeves (cotton material to protect from sun)

Light colors to reflect sunlight

Long pants to protect from brush

Tuck pants into your socks

Closed-toe shoes or hiking boots

Large brim hat to block the sun

Sunscreen SPF 50

Long sleeves (cotton material to protect from sun)

Dark colors to absorb sunlight in cool or cold weather

Layered clothing for changes in temperature. Cool to hot and hot to cool

Long pants to protect from brush

Tuck pants into your socks

Closed-toe shoes or hiking boots

REMEMBER SAFETY FIRST!

-Take a water bottle with you if you will be away from a source of drinking water.
-Never hike or explore on your own, and always let an adult know where you will be.
-Let adults know about any medical conditions or allergies that might keep you from participating.
-Know where the safety equipment is and how to use it.

MALLARD

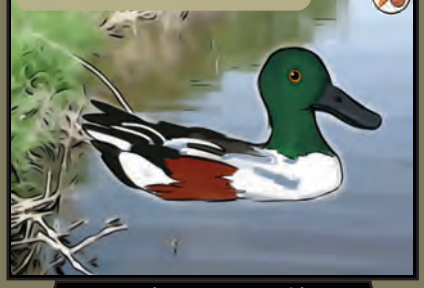
Length 50-65 cm, Mass .7-1.6 kg

Diet
seeds, insects, frogs, small fish, and fish eggs

Habitat
salt and freshwater wetlands including rivers, lakes, and ponds

Predators
raccoons, skunks, hawks, ravens, and snakes.

NORTHERN SHOVELER



Length 44-51 cm, Mass .8 kg

Diet
minnows, insects, insect larvae, crustaceans, mollusks, aquatic plants, and seeds

Habitat
salt and freshwater wetlands including rivers, lakes, and ponds

Predators
foxes, raccoons, hawks, skunks, coyotes, and ravens

AMERICAN COOT

Length 44-51 cm, Mass .8 kg

Diet
fish, tadpoles, insects, crustaceans, mollusks, and leaves

Habitat
freshwater wetlands such as ponds and marshes

Predators
foxes, raccoons, hawks, skunks, coyotes, and ravens

BLACK NECK STILT

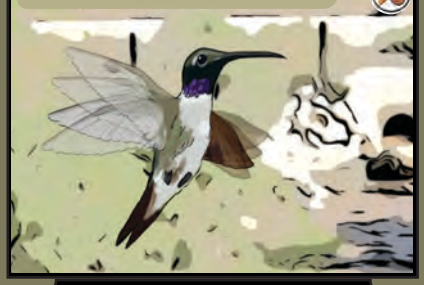
Length 35-39 cm, Mass 150-170 g

Diet
aquatic invertebrates, small fish, tadpoles, and seeds of aquatic plants

Habitat
salt and fresh shallow water such as mudflats, salt pans, marshes, and flooded fields

Predators
foxes, skunks, coyotes, and hawks.

BLACK CHINNED HUMMINGBIRD



Length 9 cm, Mass 2.3-4.5 g

Diet
nectar, spiders, and small insects

Habitat
riparians, nesting in salt-cedar, gray oak, willow, sycamore, cottonwood, and sugarberry trees

Predators
fish, frogs, snakes, lizards, cats, squirrels, ravens, crows, hawks, spiders, bees, and wasps

CRISSAL THRASHER

Length 30 cm, Mass 53-70 g

Diet
grasshoppers, beetles, ants, caterpillars, spiders, scorpions, centipedes, small lizards, seeds, and berries

Habitat
low scrubby vegetation such as desert and foothill scrub, and riparian brush

Predators
snakes and roadrunners

CHIHUAHUAN RAVEN

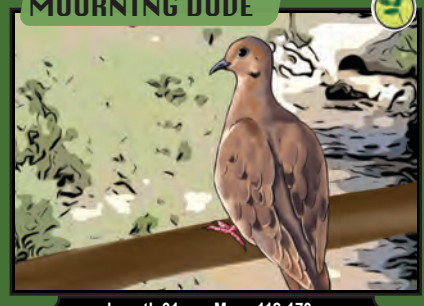
Length 46-53 cm, Mass 442-667 g

Diet
large insects like grasshoppers and beetles, amphibians, reptiles, small mammals, bird eggs, young birds, grains, and fruit

Habitat
grasslands and deserts with yucca and small trees like mesquite

Predators
peregrine falcons, great horned owls, eagles, and hawks

MOURNING DOVE



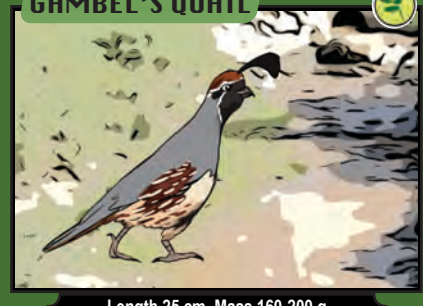
Length 31 cm, Mass 112-170 g

Diet
seeds and grasses such as sunflowers, pigweed, and ragweed

Habitat
found all over the US especially in the southwest region

Predators
hawks, owls, blue jays, starlings, crows, snakes, squirrels, and humans

GAMBEL'S QUAIL

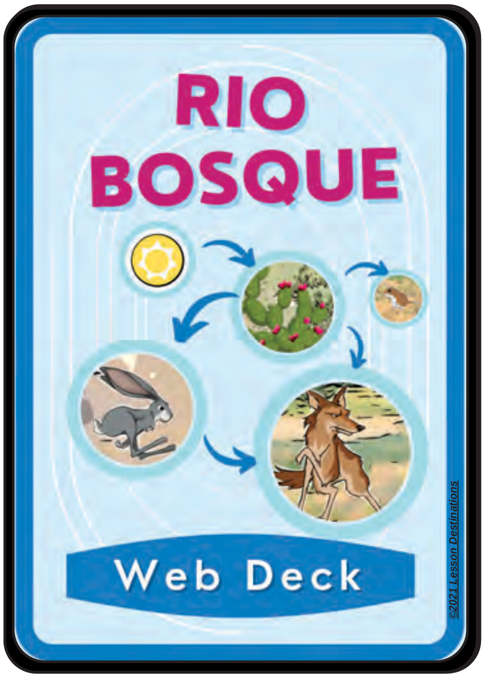


Length 25 cm, Mass 160-200 g

Diet
the leaves, buds, flowers, sprouts, and fruit of wolfberry, desert willow, tarbush, Apache plume, prickly pear cacti, and mesquite

Habitat
woody thickets near riparian areas as well as desert scrub land, canyon, and brushy, open county

Predators
hawks, bobcats, skunks, coyotes, snakes, and ground squirrels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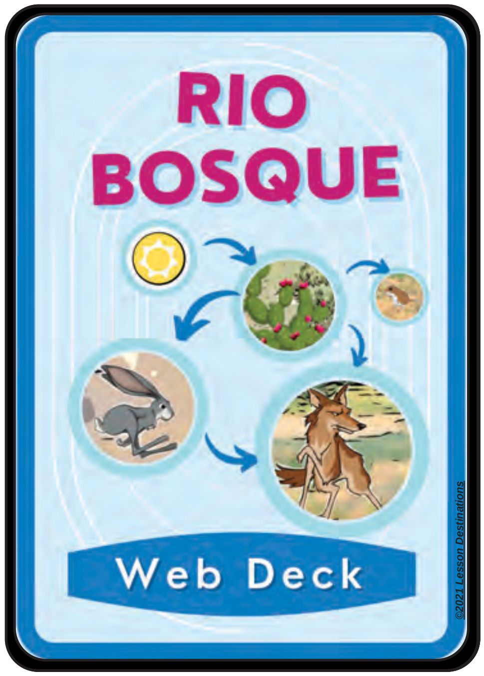
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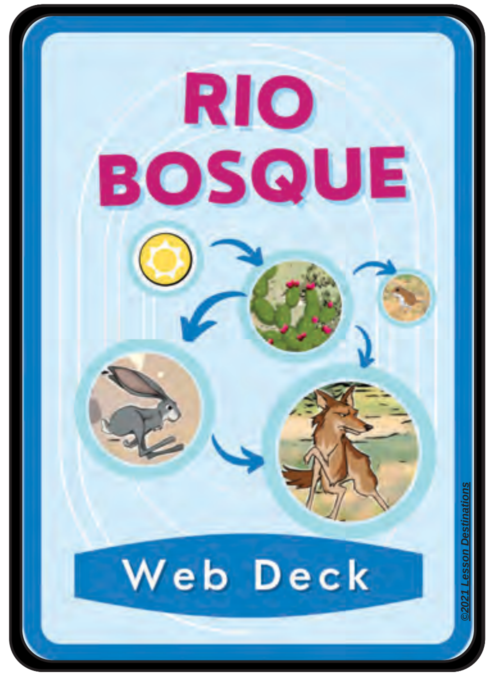
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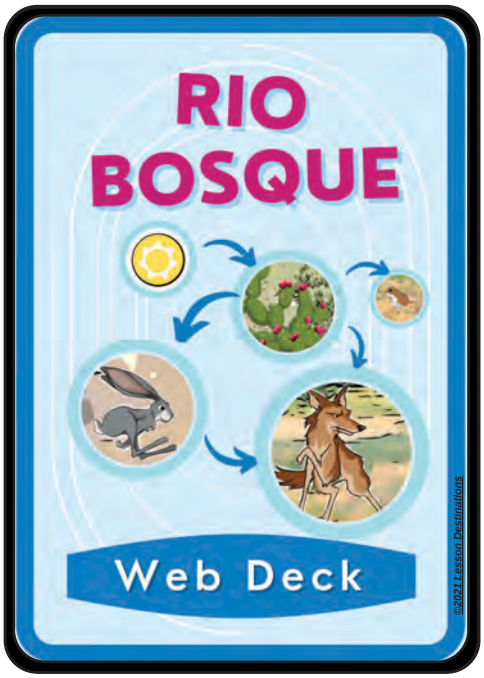
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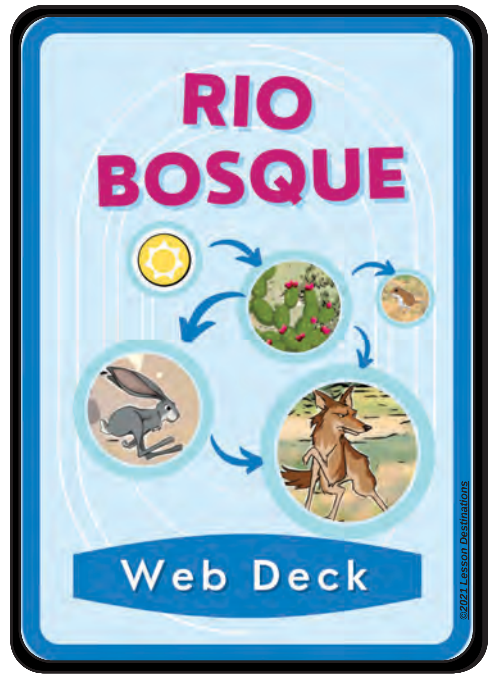
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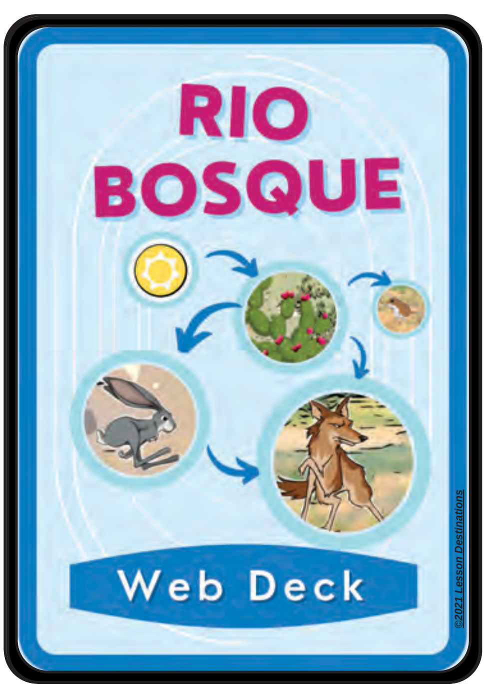
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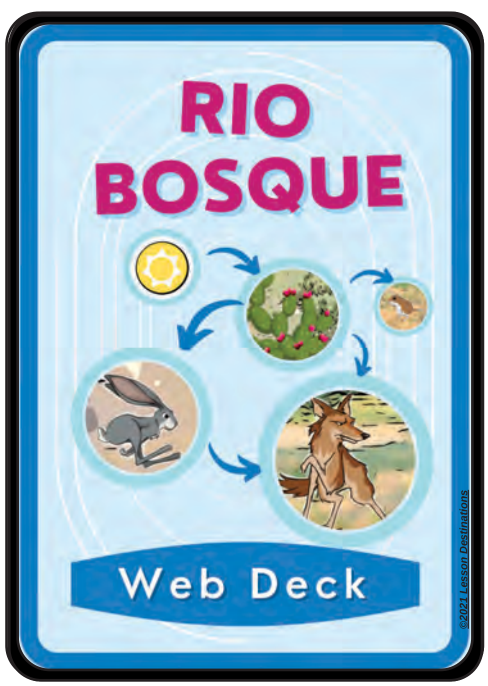
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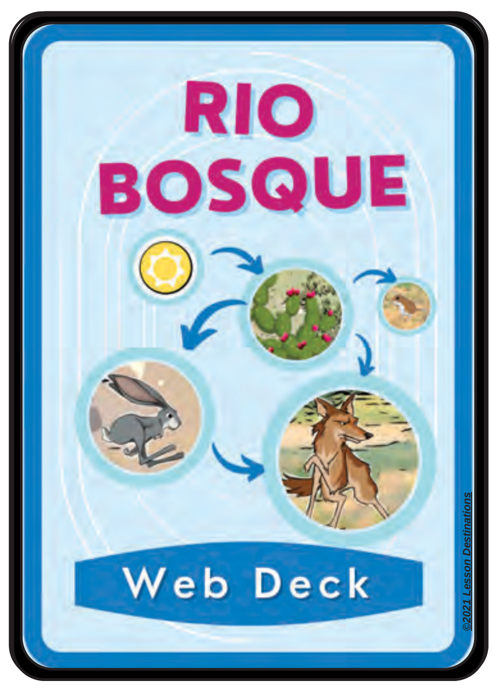
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HOUSE FINCH

Length 13-14 cm, Mass 16-27 g

Diet
the seeds, buds, and fruit of plants like mulberry trees, poison oaks, and cacti

Habitat
both deserts and desert grasslands, chaparrals, oak savannas, and open coniferous forests

Predators
hawks, ravens, grackles, crows, squirrels, rats, skunks, snakes, and raccoons

GREAT BLUE HERON

Length 91-137 cm, Mass 2.09 kg

Diet
crabs, shrimp, small fish, aquatic insects, small mammals, reptiles, amphibians, and small birds like ducklings

Habitat
salt and freshwater areas such as marshes, mangrove swamps, flooded meadows, lake edges, and shorelines

Predators
Harris's hawk and bald eagle

GREAT EGRET

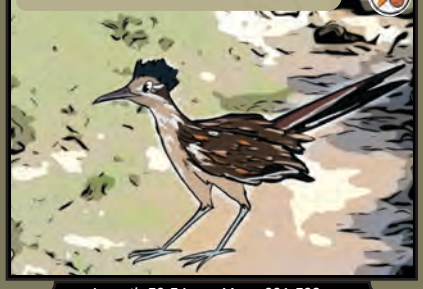
Length 80-104 cm, Mass .7-1.5 kg

Diet
crabs, shrimp, small fish, aquatic insects, small mammals, reptiles, amphibians, and small birds like ducklings

Habitat
salt and freshwater areas such as marshes, mangrove swamps, flooded meadows, lake edges, and shorelines

Predators
Harris's hawk and bald eagle

GREATER ROADRUNNER



Length 52-54 cm, Mass 221-538 g

Diet
horned lizard, small rattlesnakes, tarantulas, scorpions, centipedes, mice, ground squirrels, baby quails, sparrows, bats, hummingbirds, snails, cactus fruit, and seeds

Habitat
bushland such as desert scrub, chaparrals, savannas, as well as woodlands and wooded stream corridors

Predators
raccoons, hawks, and coyotes

NORTHERN HARRIER

Length 46-50 cm, Mass 300-750 g

Diet
rodents as small as mice or as large as hares, songbirds like doves and small ducks, grasshoppers, snakes, lizards, toads, and frogs

Habitat
found in undisturbed tracks of wetlands and grasslands

Predators
coyotes, striped skunks, raccoons, and red foxes

HARRIS'S HAWK

Length 46-59 cm, Mass 515-880 g

Diet
rabbits, ground squirrels, kangaroo rats, woodpeckers, large lizards, insects, and large, dead animals

Habitat
Mesquite brushlands and along rivers

Predators
bobcats and coyotes

BURROWING OWL

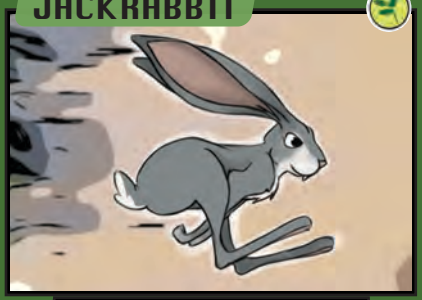
Length 19-25 cm, Mass 150 g

Diet
insects such as grasshoppers, beetles, dragonflies, and worms, rodents such as mice, squirrels, and young rabbits, reptiles like snakes, lizards, and turtles, toads and frogs, and birds such as ducklings

Habitat
open, treeless areas such as grasslands and deserts

Predators
snakes, hawks, badgers, skunks, foxes and weasels

JACKRABBIT



Length 61 cm, Mass 1.81-2.7 kg

Diet
alfalfa, cacti, clover, mesquite, and dry, woody vegetation

Habitat
desert scrubland, prairies, meadows, and farmlands

Predators
mountain lions, bobcats, coyotes, foxes, eagles, hawks, owls, and snakes

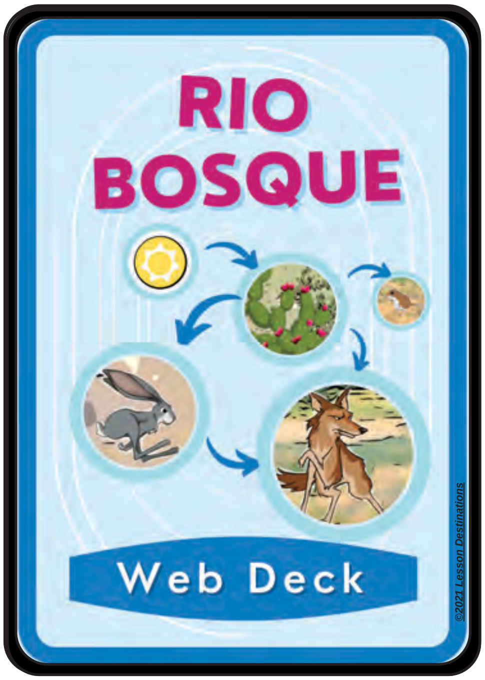
COTTON TAIL RABBIT

Length 36-42 cm, Mass .700-1.2 kg

Diet
grasses, prickly pear cacti, mesquite leaves and beans

Habitat
desert grasslands, juniper forests, and riparian wetlands

Predators
coyotes, bobcats, foxes, hawks, and large snakes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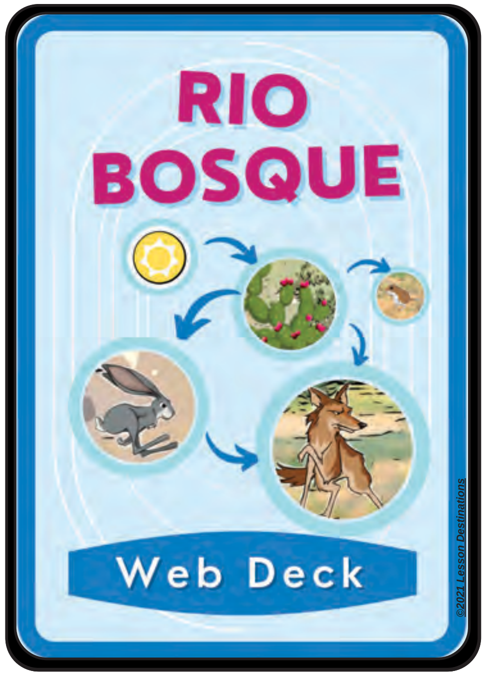
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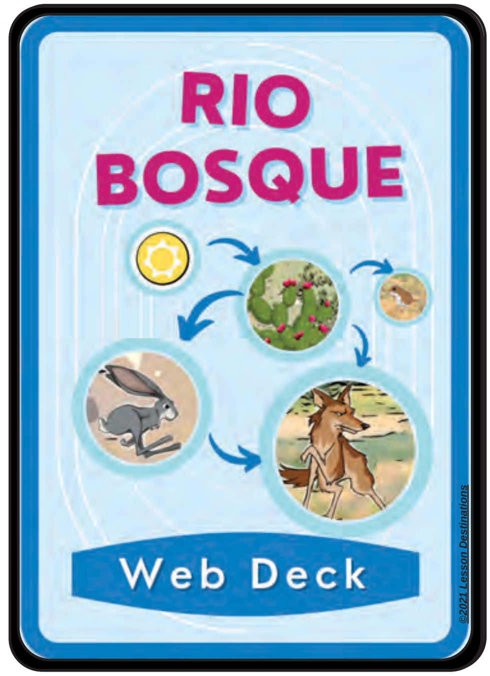
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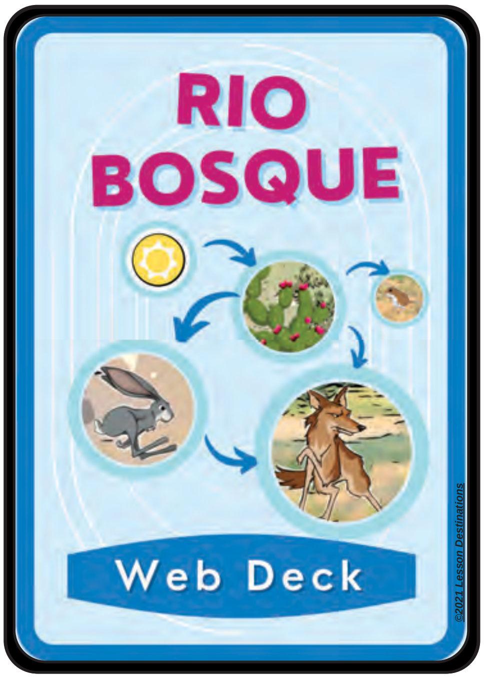
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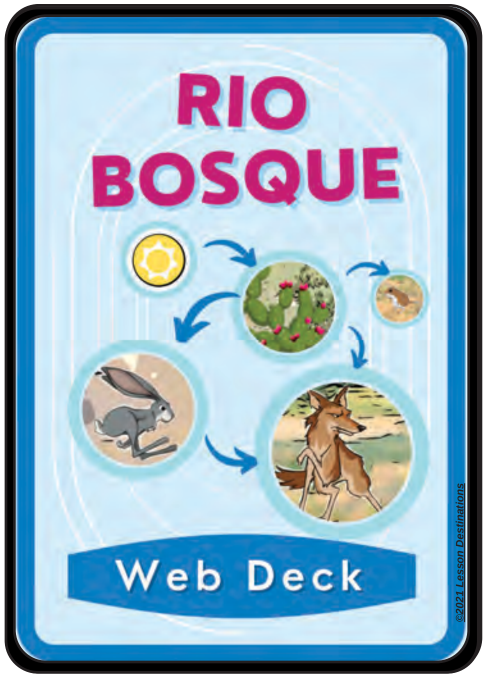
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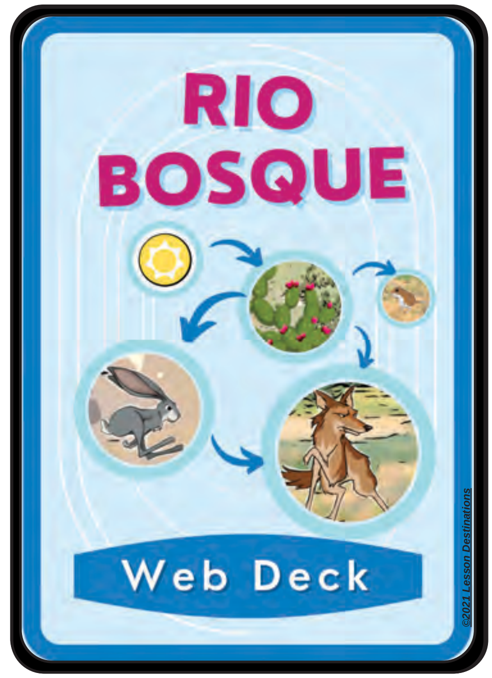
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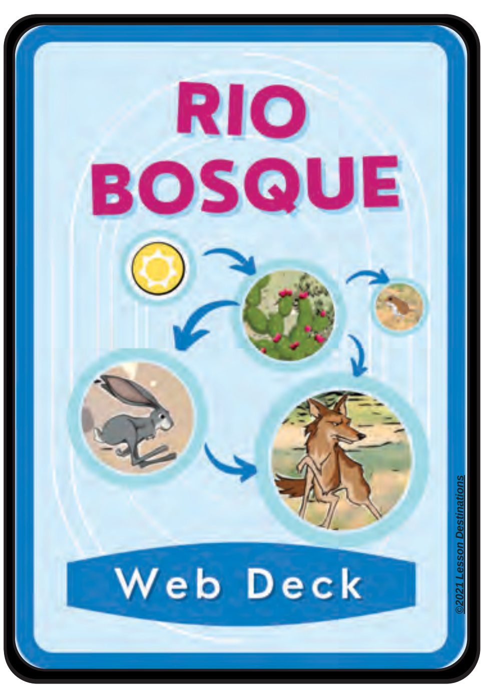
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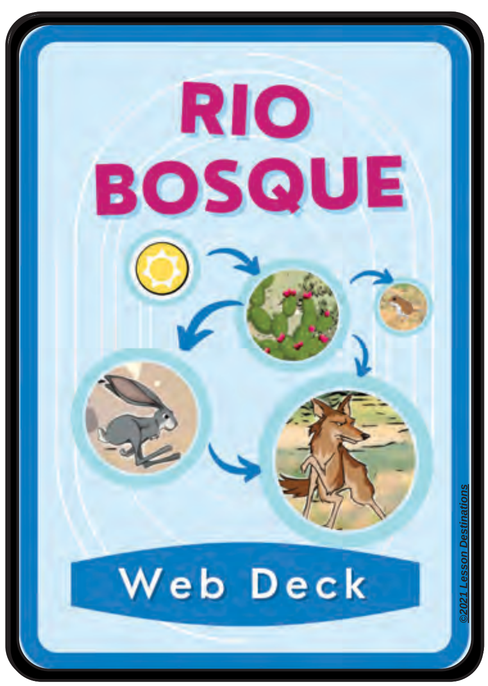
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BEAVER

Length 74-90 cm, Mass 17-32 kg

Diet
leaves, twigs, and bark of trees including willows, mesquite, cottonwoods, junipers, and pecans, grasses, and water plants like cattails and water lilies

Habitat
wooded areas along ponds, lakes, rivers, marshes, and streams

Predators
foxes, coyotes, mountain lions, and bobcats

KANGAROO RAT

Length 21-36 cm, Mass 55-96 g

Diet
mesquite beans and desert grass seeds

Habitat
open areas with sandy soils and some brush

Predators
owls, snakes, bobcats, coyotes, and foxes

COLLARED PECCARRY

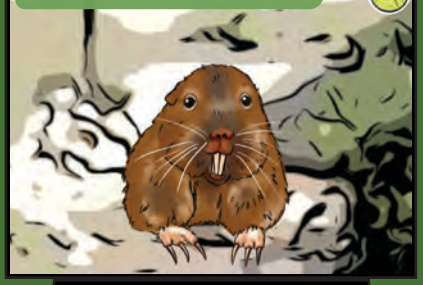
Length 88 cm, Mass 16-27 kg

Diet
fruit, nuts, berries, agave and prickley pear cacti, grass, roots, fungi, bulbs, insects, reptiles, and amphibians

Habitat
brushy deserts and rocky canyons near water sources

Predators
cougars, Mexican wolves, coyotes, and bobcats

BOTTA'S POCKET GOPHER



Length 18-27 cm, Mass 160-250 g

Diet
shoots, grasses, roots, tubers, bulbs, and seedlings of almost any plant

Habitat
cottonwood woodlands

Predators
coyotes, snakes, bobcats, skunks, and hawks

MUSKRAT

Length 60 cm, Mass 1.8 kg

Diet
the roots, leaves, stems, and fruit of aquatic plants like southern cattails as well as fish, insects, and amphibians

Habitat
along rivers, ponds, and wetlands

Predators
bobcats, coyotes, gray fox, and large hawks

SPOTTED GROUND SQUIRREL

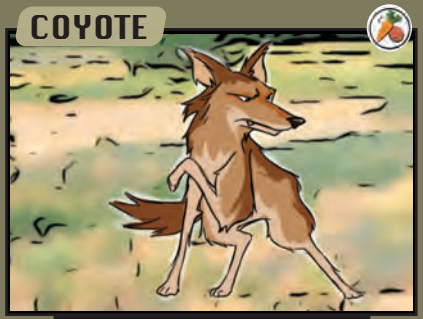
Length 14.5 cm, Mass 100-125 g

Diet
cacti pulp, mesquite beans, saltbush seeds, sandbur, sunflowers, gourds, irises, grasshoppers, insects, small lizards, and kangaroo rats

Habitat
dry, sandy areas were they can burrow in places such as deserts, scrublands, arid grasslands, and pinewoods

Predators
foxes, raccoons, hawks, skunks, coyotes, burrowing owls, and ravens

COYOTE



Length 85 cm, Mass 8-20 kg

Diet
raccoons, rabbits, mice, rats, squirrels, raccoons, birds, snakes, lizards, insects, flowers, cacti fruit, and mesquite beans

Habitat
can be found just about anywhere but prefer the open prairie and desert

Predators
wolves, mountain lions, and bears

GRAY FOX

Length 76-112 cm, Mass 3.6-7 kg

Diet
mice, voles, rabbits, birds, crickets, grasshoppers, berries, grass, and nuts

Habitat
brushlands and wooded areas

Predators
bobcats and coyotes.

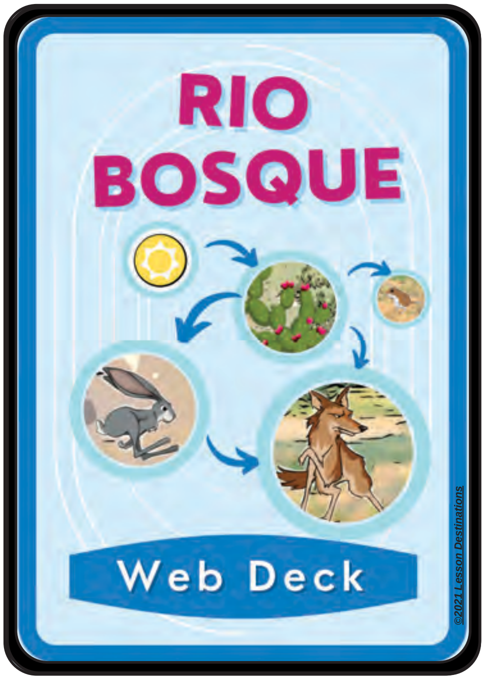
RACCOON

Length 40-70 cm, Mass 5-26 kg

Diet
parts of plants such as fruit, nuts, and berries, smaller rodents, frogs, eggs, insects, and crayfish

Habitat
forested areas near a river or stream, but have adapted to various habitats, especially near humans

Predators
bobcats, cougars, and coyotes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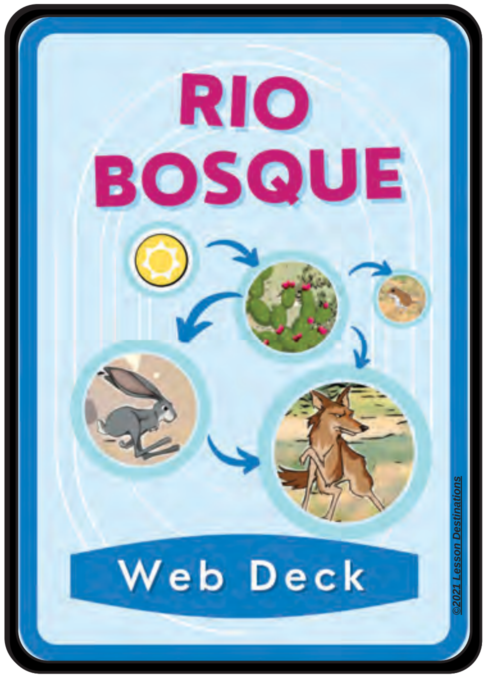
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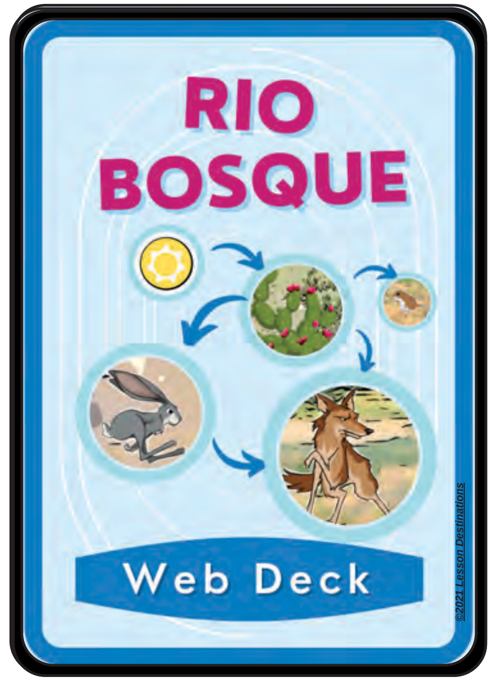
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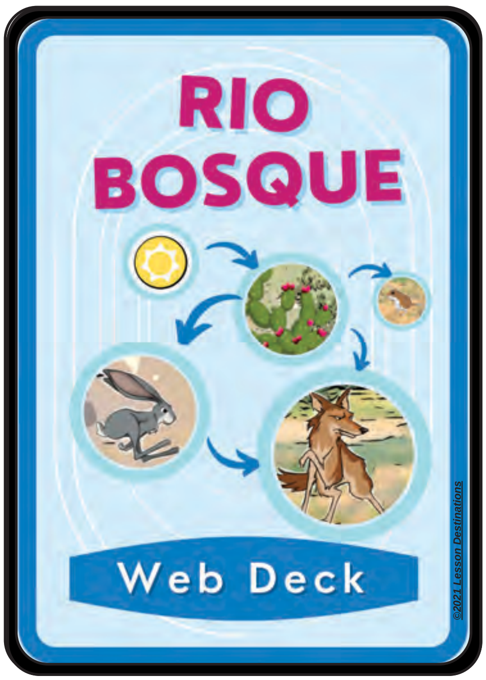
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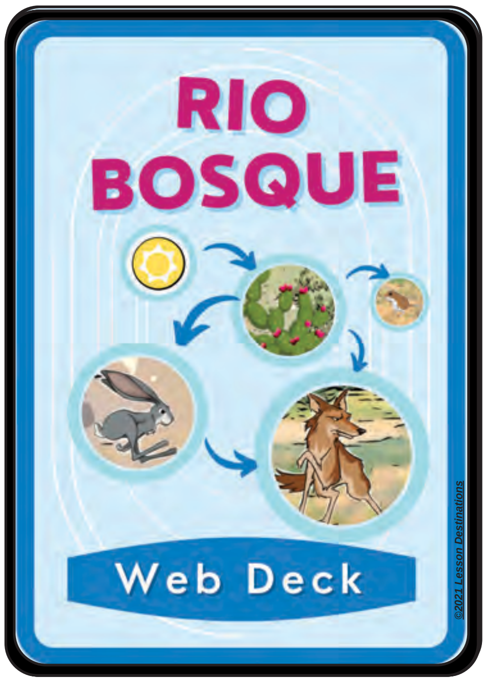
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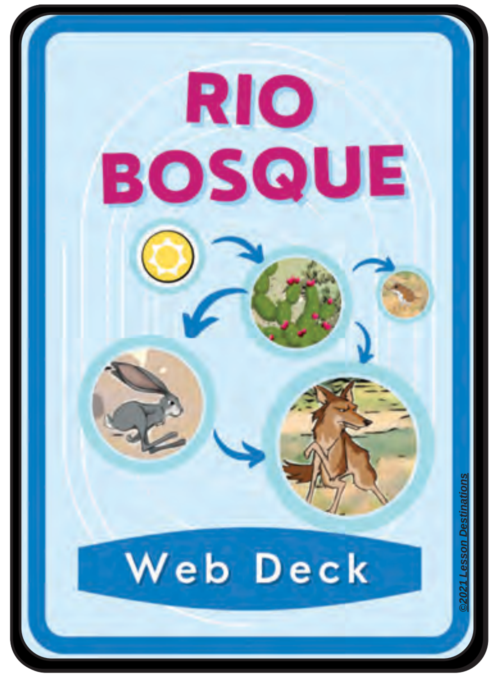
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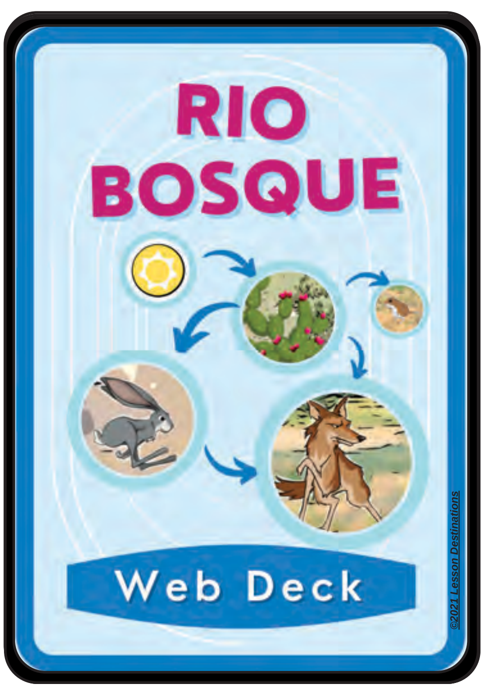
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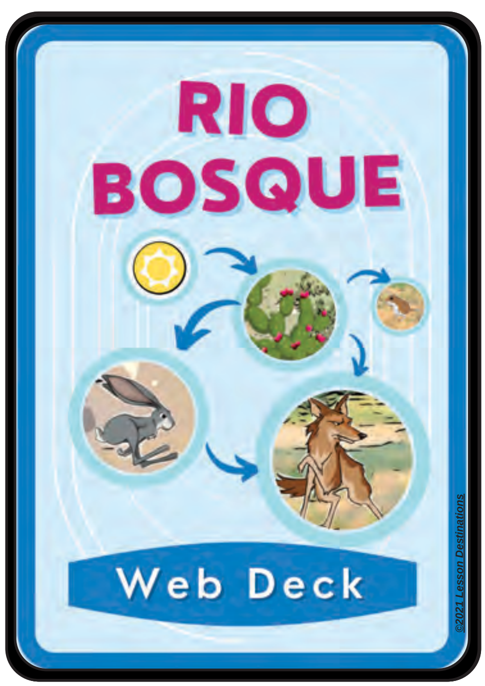
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BOBCAT

Length 47.5-125 cm, Mass 6.4-18.3

Diet
deer, birds, bats, snakes, lizards, and rodents such as rabbits

Habitat
mountains, forests, brushland, and semi-deserts

Predators
coyotes, wolves, foxes, owls, and mountain lions

YELLOW MUD TURTLE

Length 165 mm, Mass 391 g

Diet
aquatic life such as insects, fish, tadpoles, frogs, crayfish, fairy shrimp, and other invertebrates as well as vegetation like algae, duckweed and decaying plant matter

Habitat
near the shores of muddy or sandy rivers, sloughs, ponds, streams, flooded fields, and marshes

Predators
skunks, raccoons, water snakes, larger turtles, and large fish

SPINY SOFTSHELL TURTLE

Length 18-48 cm, Mass 130 g

Diet
anything in water that will fit in its mouth including insects, crayfish, and the occasional fish

Habitat
fresh water rivers and streams with muddy or sandy bottoms, as well as lakes and reservoirs

Predators
raccoons, skunks, red foxes, herons, and large fish

SPOTTED WHIPTAIL LIZARD

Length 24-31.75 cm, Mass 120 mg

Diet
termites, caterpillars, grasshoppers, beetles, ants, other insects, spiders, the leaves and flowers of plants such as dandelions

Habitat
arid and semi-arid grounds with scattered vegetational cover such as in prairies, dunes, and deserts

Predators
larger lizards, snakes, roadrunners, and other predatory birds

TEXAS HORNED LIZARD

Length 69-144 mm, Mass 25-90 g

Diet
mainly harvester ants as well as other small insects

Habitat
arid and semi-arid grounds with scattered vegetational cover such as in prairies, dunes, and deserts

Predators
canids, snakes, falcons, kestrels, shrikes, hawks, and greater road runners

DESERT KING SNAKE

Length 1200-1520 cm, Mass 1.4-2.3g

Diet
birds, lizards, turtles, snakes, eggs, and small mammals

Habitat
riparian corridors in grasslands, deserts, woodlands, and low mountains

Predators
roadrunners, hawks, raccoons, badgers, snakes, coyotes, and foxes

GOPHER SNAKE

Length 91-213 cm, Mass .90-1.81 kg

Diet
small animals such as pocket gophers, mice, rats, and other rodents, lizards, snakes, frogs, and eggs

Habitat
woodlands, deserts, prairies, fields, and shrublands

Predators
hawks, foxes, and coyotes

WOODHOUSE TOAD

Length 6.4-10.7 cm, Mass 50-100g

Diet
bees, moths, scorpions, spiders, sowbugs, ants, insect larvae, and earthworms

Habitat
wetlands including canyons, marshes, riverbanks, irrigated farmlands, and gardens

Predators
fish, herons, snakes, skunks, and raccoons

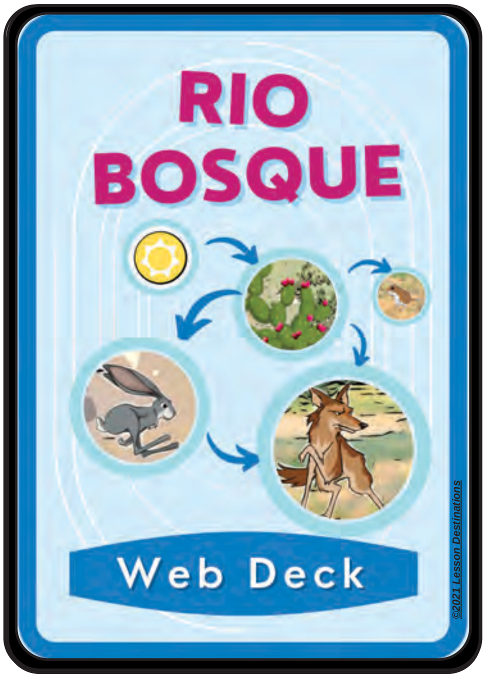
COUCH'S SPADEFOOT TOAD

Length 8.9 cm, Mass 50-100 g

Diet
insects such as termites, beetles, bugs, ants, grass-hoppers, and crickets, as well as spiders

Habitat
marshlands, prairies and floodplains

Predators
yellow mud turtles, grackles, and snakes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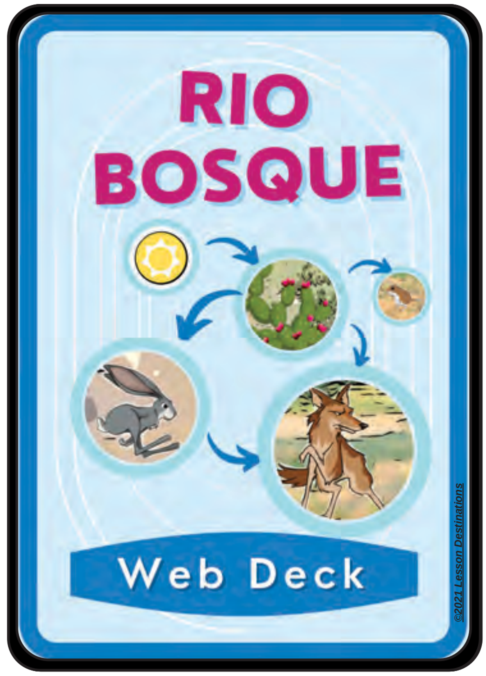
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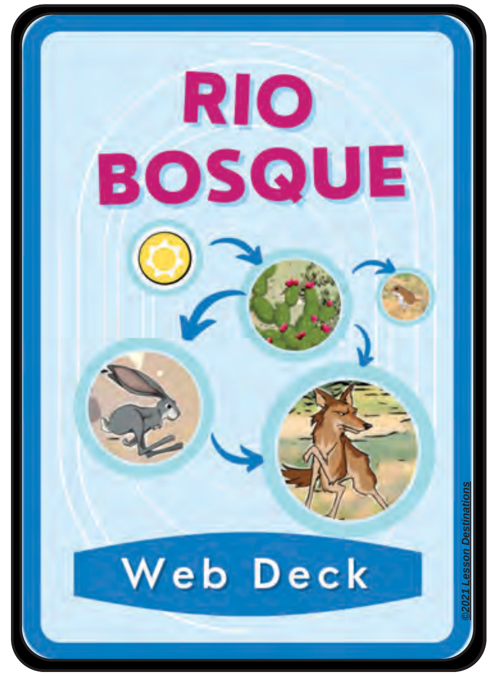
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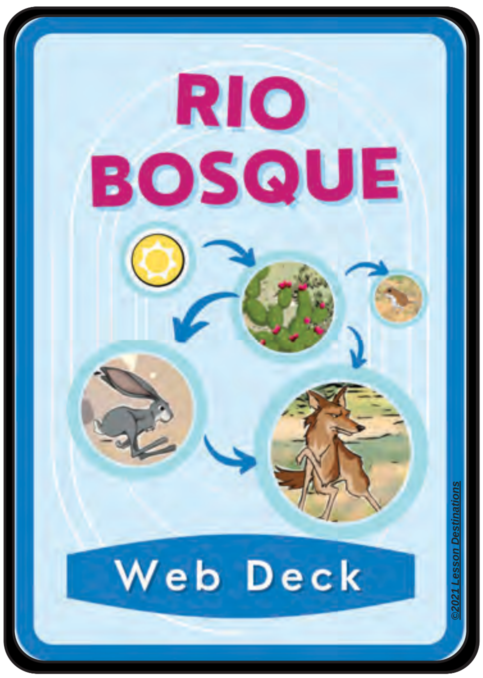
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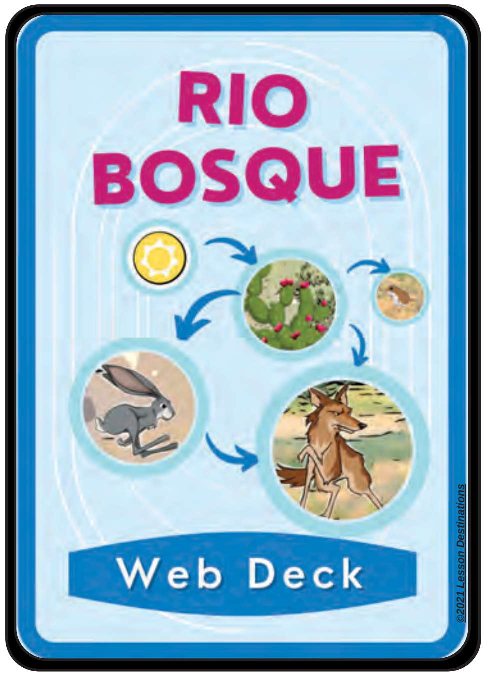
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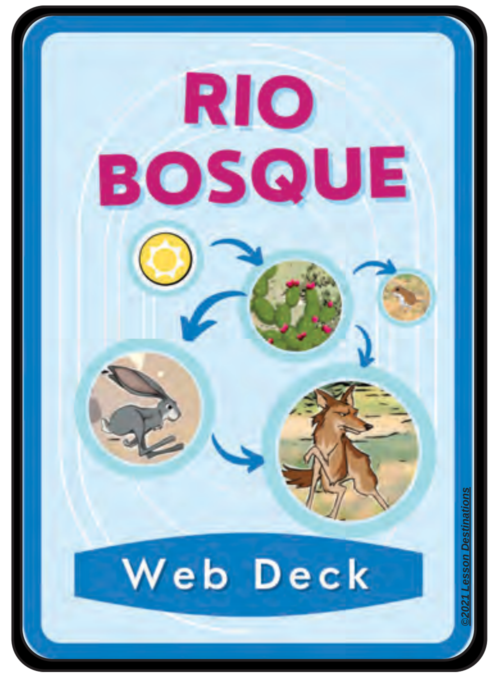
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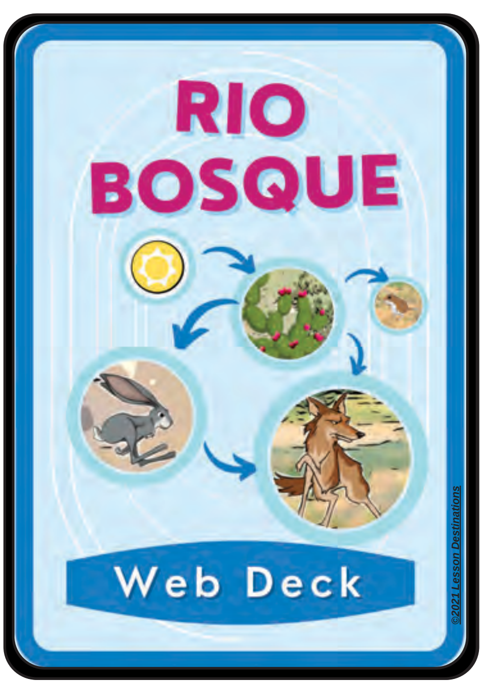
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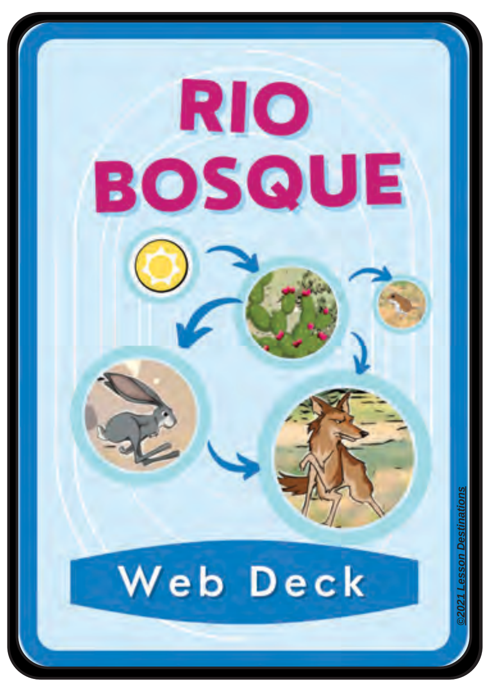
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BULLFROG

Length 20.32 cm, Mass .9-1.36 kg

Diet
worms, insects, snails, crayfish, fish, frogs, tadpoles, aquatic eggs, rodents, birds, and small reptiles like snakes and turtles

Habitat
mostly woodland, but can be found in all types of habitats including deserts

Predators
aquatic insects, crayfish, frogs, aquatic turtles, snakes, fish, birds such as herons and great egrets, and mammals such as raccoons

CHIHUAHUAN DWARF CRAYFISH

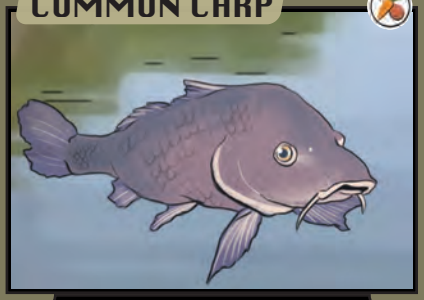
Length 5 cm, Mass .05g

Diet
bloodworms, mosquito larvae, algae, leaves, snails, shrimp, and small fish

Habitat
slow-flowing rivers, lakes, and small streams

Predators
large fish, raccoons, and blue herons

COMMON CARP



Length 85 cm, Mass 8-20 kg

Diet
aquatic plants and seeds, insects, crustaceans, mollusks, and fish eggs

Habitat
stagnant and slow-flowing waterways such as rivers, lakes, and lagoons

Predators
larger fish such as the large mouth bass, and birds like great blue herons

MOSQUITO FISH

Length 40-70 cm, Mass 5-26 kg

Diet
primarily mosquito larvae, but also small water insects, algae, and detritus material

Habitat
shallow, salt or freshwater slow flowing ponds, lakes, streams, and rivers

Predators
raccoons, egrets, and herons

HARVESTER ANT

Length 5-7 mm, Mass 6.7-17 mg

Diet
mostly desert grass seeds, and occasionally dead insects

Habitat
open areas, no vegetation 3-6ft from their nest.

Predators
Texas horned lizard, birds, and reptiles.

DARKLING BEETLE

Length 3cm, Mass 300 mg

Diet
leaves especially those of saltbush and iron blossom

Habitat
desert mountains, scrub, and dunes

Predators
birds such as burrowing owls and crissal thrashers, as well as reptiles, and predators that don't mind the stink

DIGGER BEE

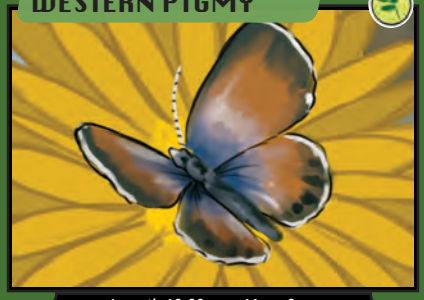
Length .5-2.5 cm, Mass 10 mg

Diet
pollen and nectar

Habitat
bare soil areas and banks of rivers

Predators
dragonflies, robberflies, wasps, skunks, birds, and spiders

WESTERN PIGMY



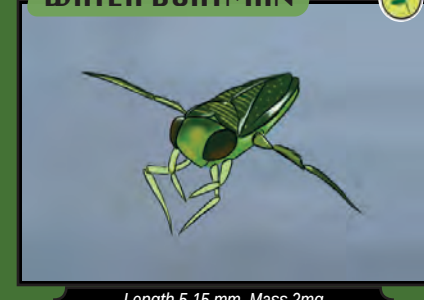
Length 12-20 mm, Mass 3mg

Diet
Larvae: pigweed and saltbushes
Adult: flower nectar

Habitat
salt marshes, deserts, and wastelands

Predators
spiders, mantis, dragonflies, toads, lizards, and birds

WATER BOATMAN

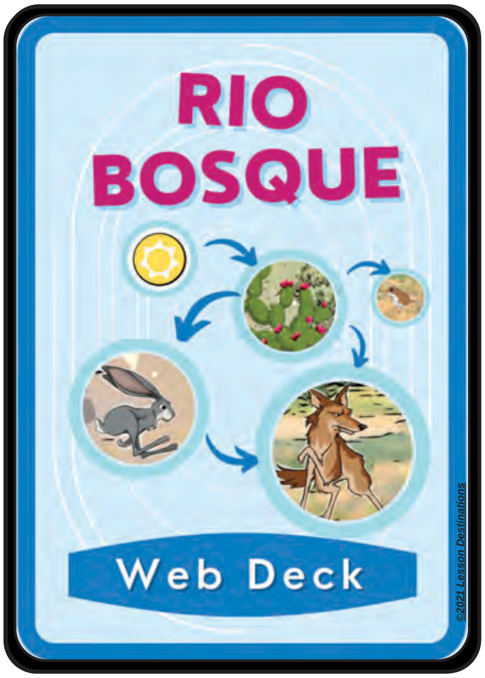


Length 5-15 mm, Mass 2mg

Diet
aquatic plants, algae, and detritus

Habitat
wetlands such as ponds, waterways, and marshes

Predators
dragonflies, birds, frogs, fish, and spiders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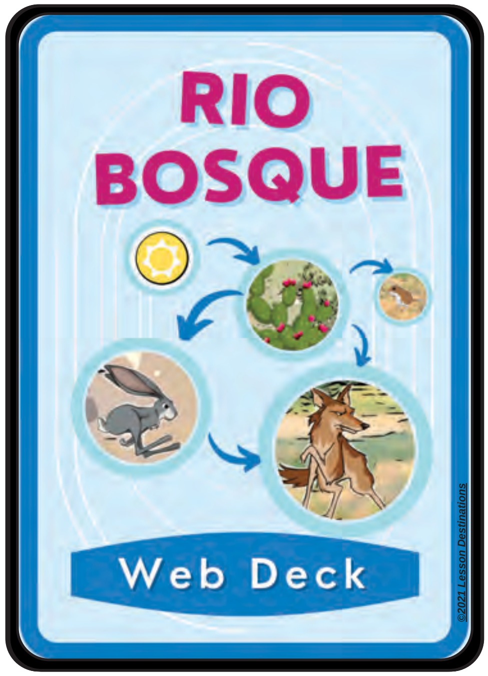
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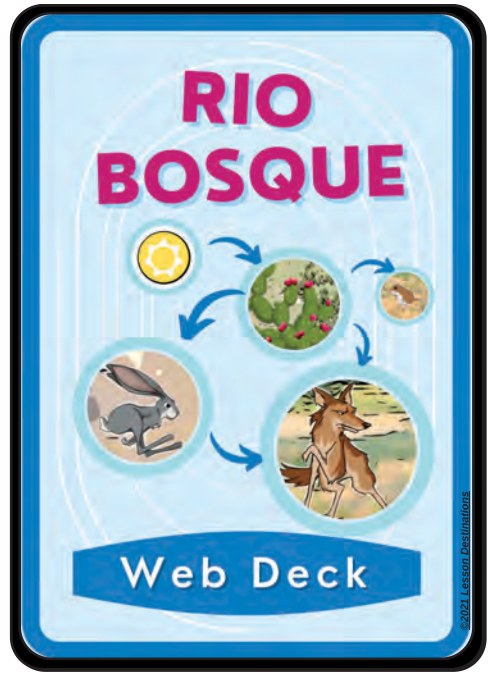
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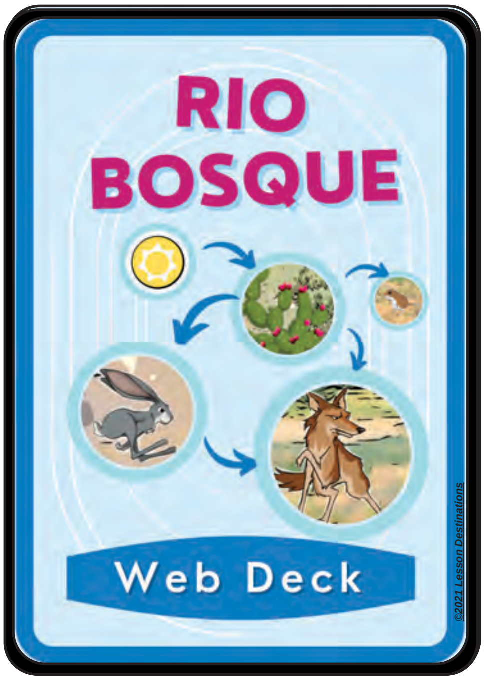
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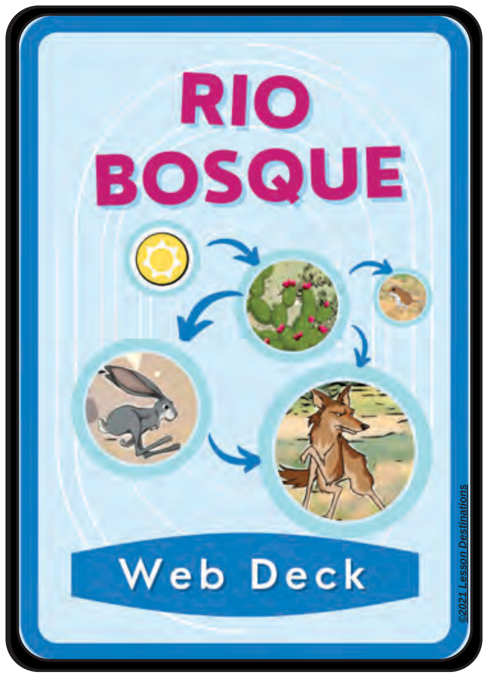
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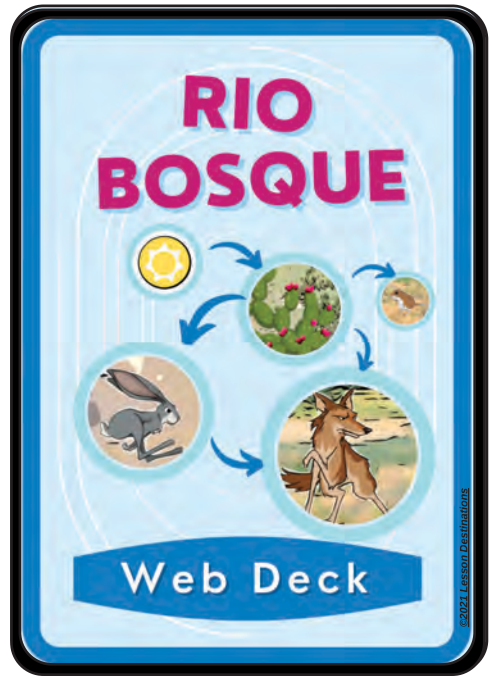
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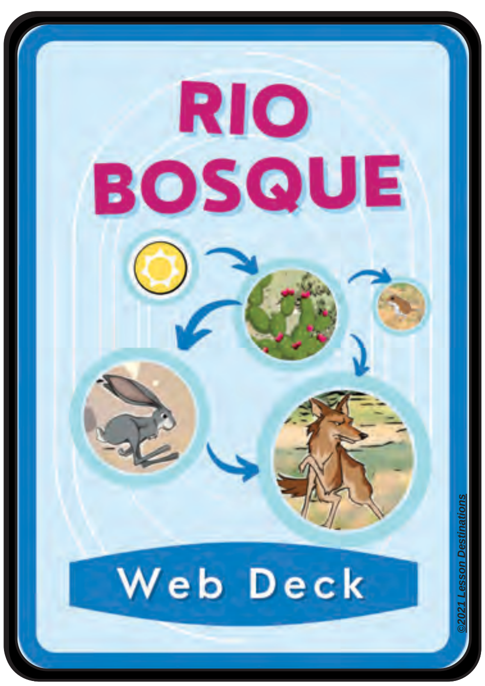
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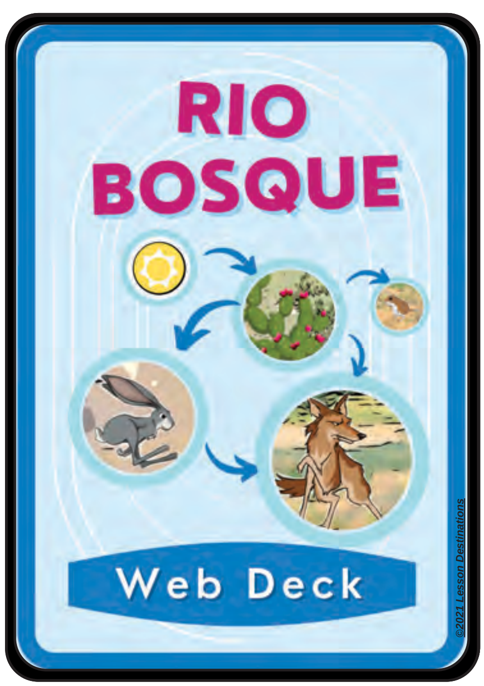
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WATER FLEA

Length 1-5 mm, Mass 1 mg

Diet
algae and other microscopic water particles

Habitat
fresh water sources such as ponds, wetlands, rivers, and lakes

Predators
small fish, frogs, insect larva such as damsel flies, and newts

MOSQUITO

Length 3-6 mm, Mass 5 mg

Diet
males and females: nectar, plant sap, and honeydew off of insects such as aphids; females: animal blood

Habitat
any area with standing freshwater ranging from an area as large as a swamp to something as small as a bottle cap

Predators
bats, birds, fish, turtles, dragonflies, mosquitoes, spiders, frogs, and toads

GREEN DARNER DRAGON FLY

Length 68-80 mm, Mass 1 g

Diet
fairy shrimp, small fish, tadpoles, and insects such as mosquitoes, flies, butterflies, and other dragonflies

Habitat
riparian corridors in forests, deserts, and grasslands

Predators
tiger salamander larvae, robber flies, birds, spiders, dragonflies, frogs, and fish

BLUET DAMSELFLY

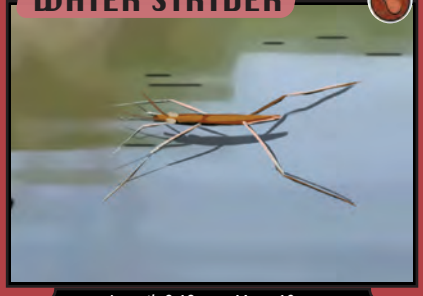
Length 30-40 mm, Mass 3mg

Diet
aquatic insect eggs and larvae, mayflies, mosquitoes, moths, flies, flying ants, and termites

Habitat
freshwater shallow lakes and ponds

Predators
frogs, birds, spiders, bees, lizards, and carnivorous plants

WATER STRIDER



Length 2-12 mm, Mass 10mg

Diet
any insect, alive or dead, in water including mosquitoes, dragonflies, and their larvae, as well as tadpoles

Habitat
slow moving fresh water from ponds to mud puddles

Predators
birds, especially water fowl, and fish

SOUTHERN CATTAIL

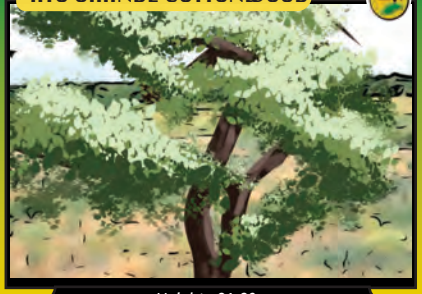
Height: 1.5-4m

Plant type
grass

Habitat
wetlands

Consumed by
muskrats, beavers, snails, ducks, coots, and shovelers

RIO GRANDE COTTONWOOD



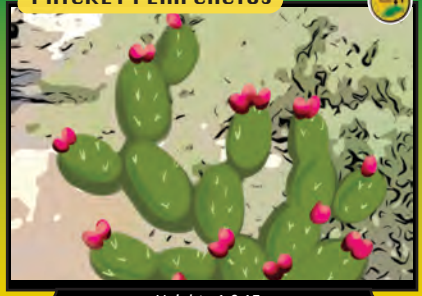
Height: 21-30m

Plant type
tree

Habitat
the moist soil along streams and in wetlands

Consumed by
seeds and buds: rodents, grouse, and quail; twigs and leaves: rabbits and deer; bark and wood: beavers and porcupines

PRICKLY PEAR CACTUS



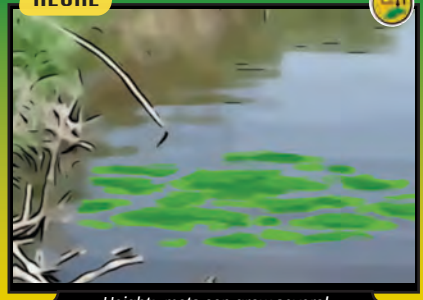
Height: 1-2.15m

Plant type
cacti

Habitat
desert

Consumed by
jack rabbits, peccaries, deer, squirrels, tortoises, rodents, birds, beetles, and coyotes

ALGAE



Height: mats can grow several

Plant type
photosynthetic protist

Habitat
nearly any salt or freshwater source from ponds and rivers to swamps and oceans

Consumed by
mosquitofish, carps, crayfish, frogs, waterboatmen, water fleas, waterfowl such as ducks, coots, and shovelers, and mammals such as muskrats, and beavers

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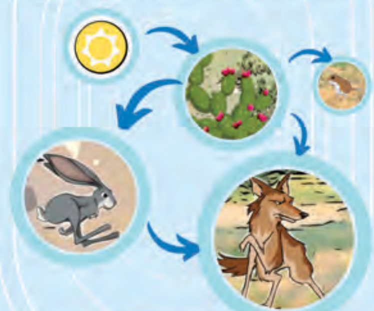

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WOLFBERRY

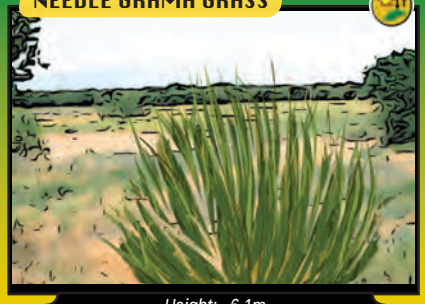
Height: 1.-2.5m

Plant type
shrub

Habitat
sandy and rocky areas specifically near prickly pear cactus and mesquite trees

Consumed by
birds, rodents, raccoons, foxes, and coyotes

NEEDLE GRAMA GRASS



Height: .6-1m

Plant type
grass

Habitat
deserts and plains

Consumed by
insects, birds, rodents, rabbits, and grazers such as deer and cattle

TORNILLO MESQUITE

Height: 3-7.6m

Plant type
tree

Habitat
deserts along streams and creeks in sandy and rocky soils

Consumed by
seedpods are eaten by birds, rodents, deer, and coyote

FOUR WING SALT BUSH

Height: 1-2.15m

Plant type
shrub

Habitat
rangelands

Consumed by
bees, butterflies, birds, rabbits and other rodents, deer, and cattle

COYOTE WILLOW

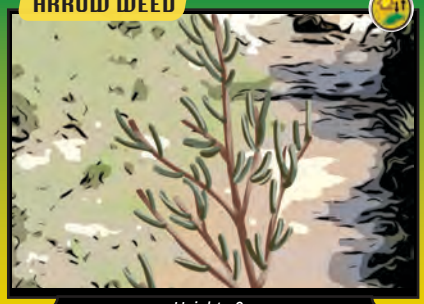
Height: 1-2.15m

Plant type
shrub

Habitat
riparian habitats such as along the banks of streams, rivers, ponds, and lakes

Consumed by
buds: birds; foliage: rabbits and deer; branches: beavers

ARROW WEED



Height: 3m

Plant type
shrub

Habitat
riparian desert areas such as floodplains and washes

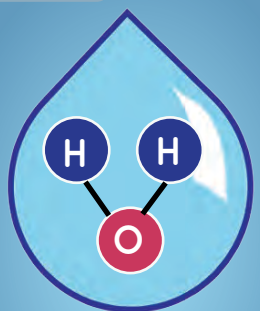
Consumed by
butterflies, moths, small rodents, and grain eating birds

SUNLIGHT

Light Energy

Source: The sun
Info: Our Sun produces light energy, "photons", that travel to the Earth's surface. This provides the light energy necessary to create photosynthesis in plants.

WATER



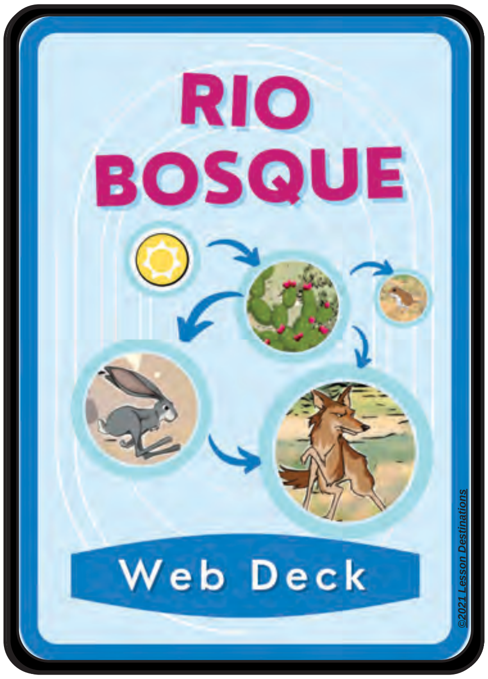
H_2O

Source: 70% of Earth's surface is water
Info: You must have water, H_2O, to complete photosynthesis. Water helps to create the sugars needed in food for plants. Plants can live in water as well as in areas that provide water.

CARBON DIOXIDE

CO_2

Source: Respiration from humans and animals, the burning of fuels (wood, coal, gas, oil), volcanic activity, and cement manufacture
Info: You must have Carbon Dioxide to complete photosynthesis. The carbon provides the matter that will become the bark, stem, leaves, and roots of plants.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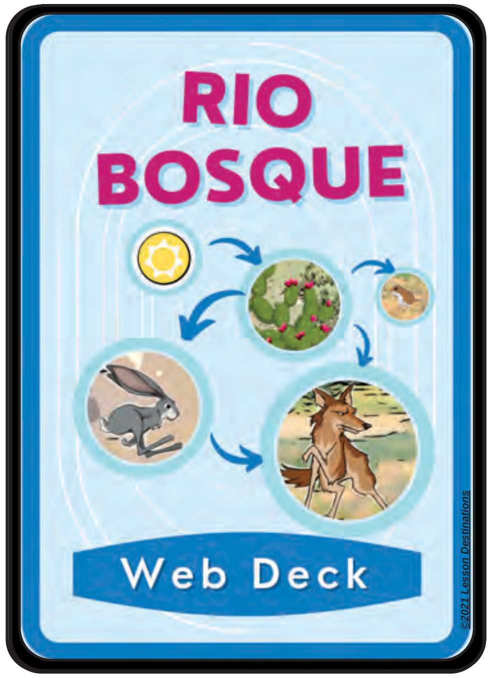
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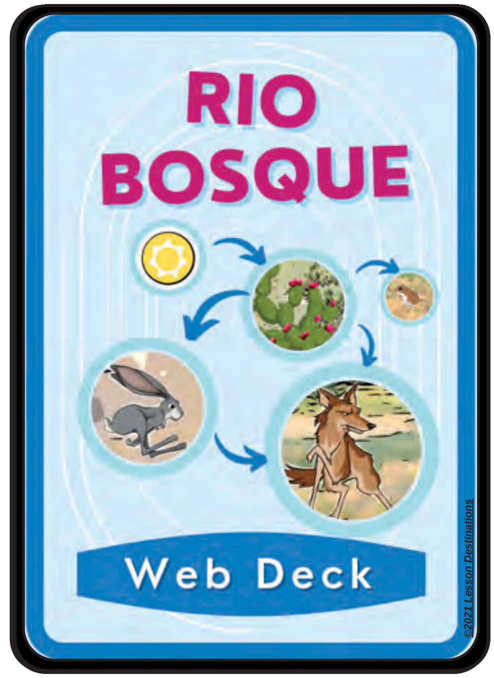
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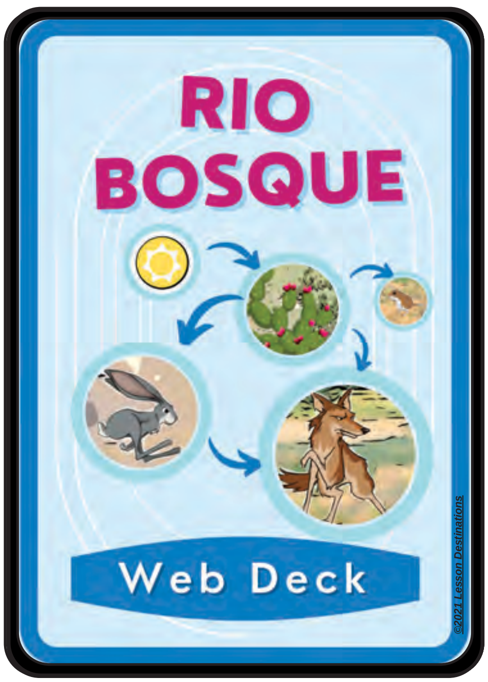
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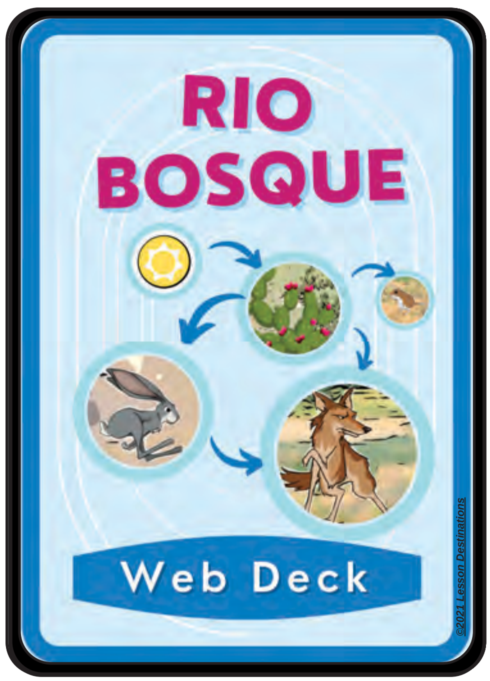
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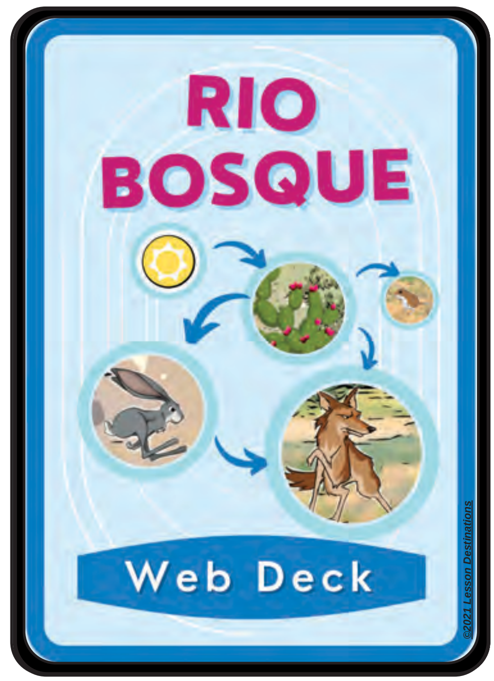
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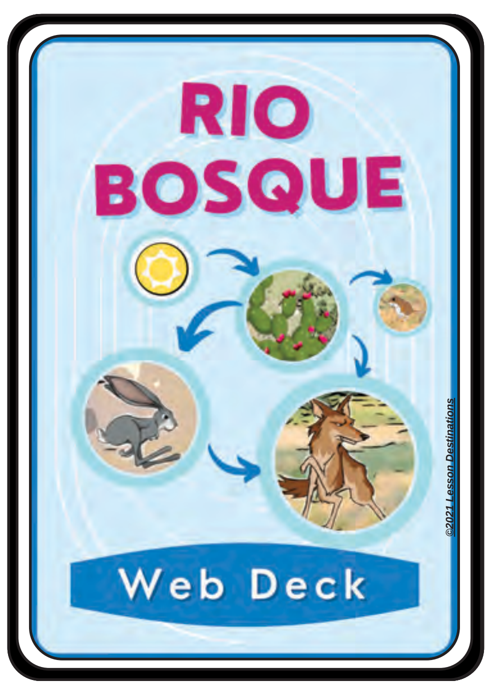
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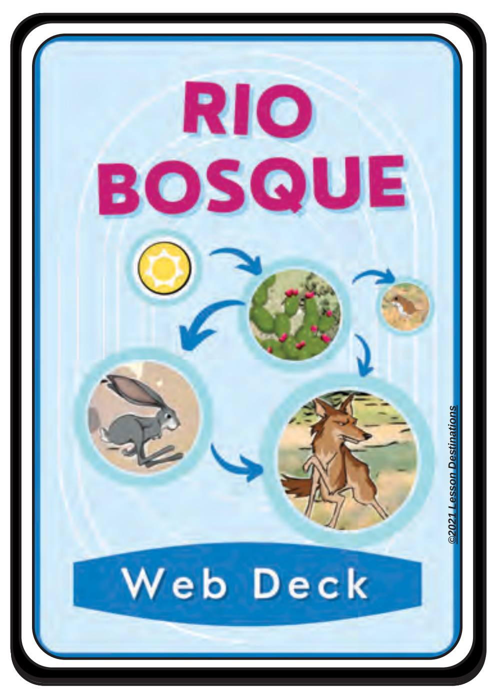
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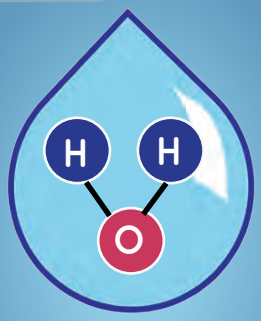

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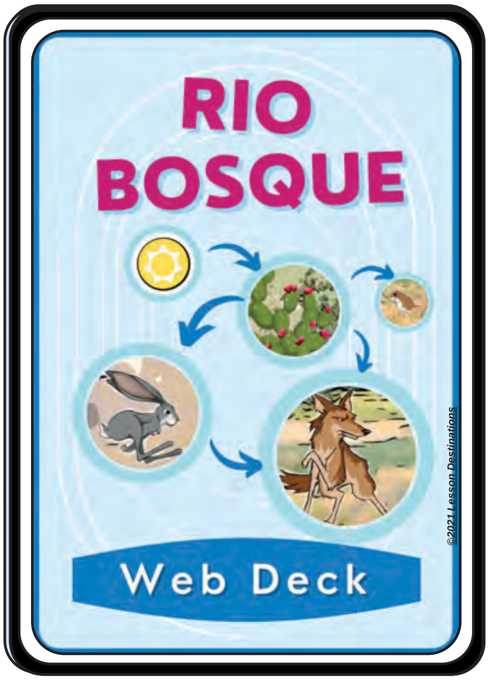
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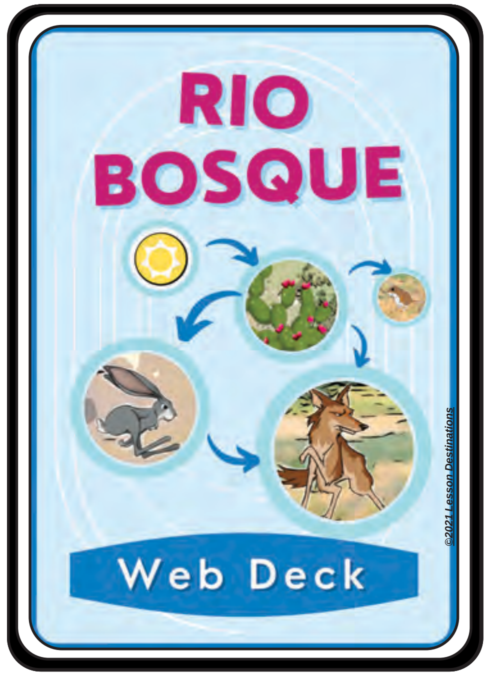
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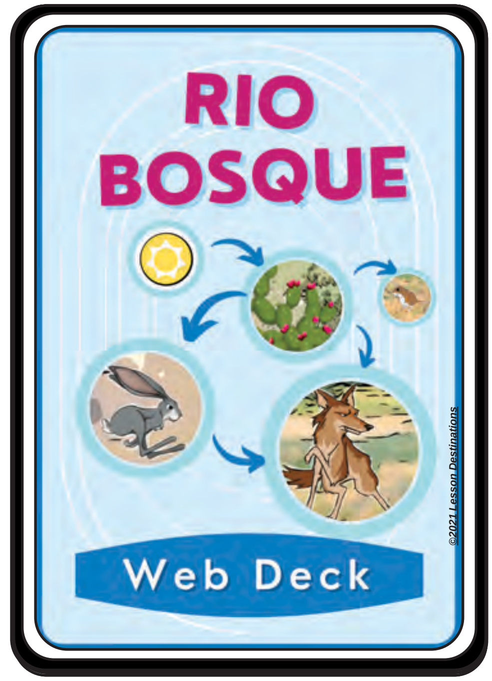
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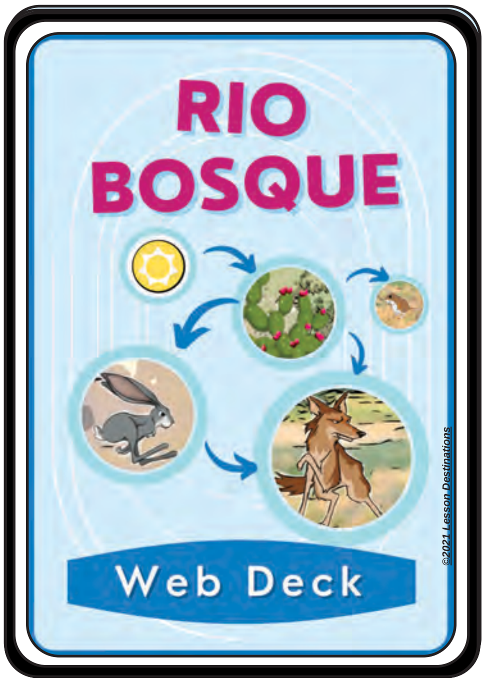
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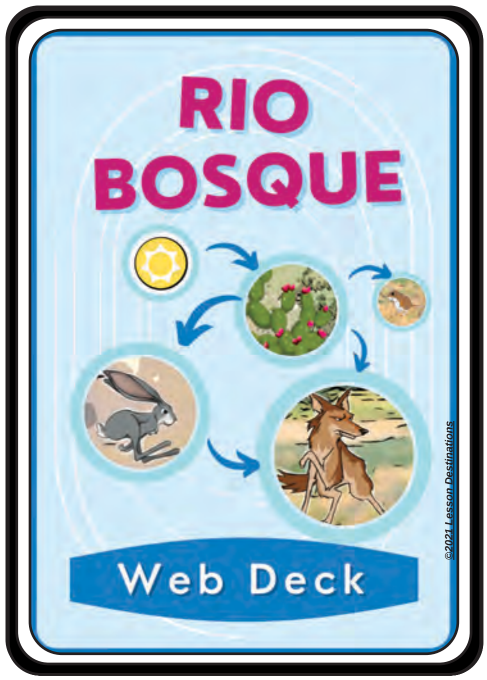
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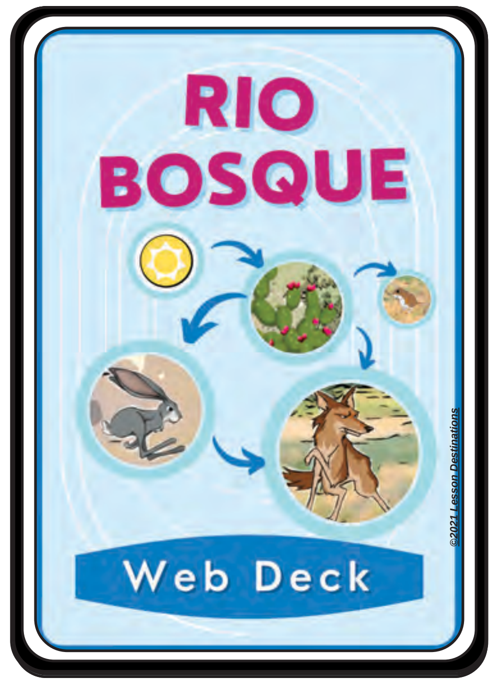
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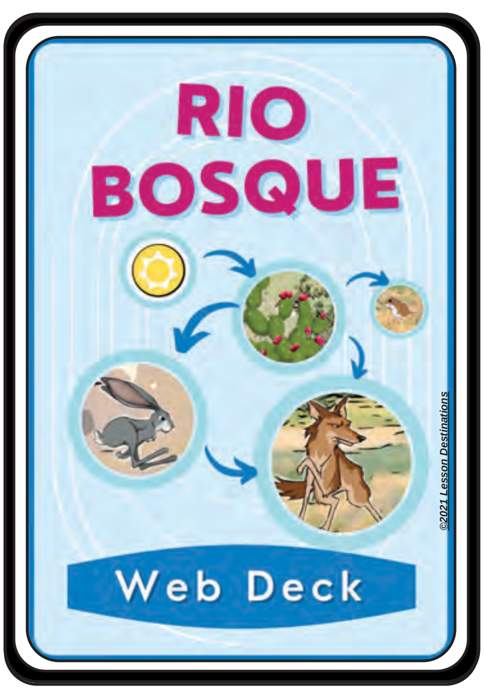
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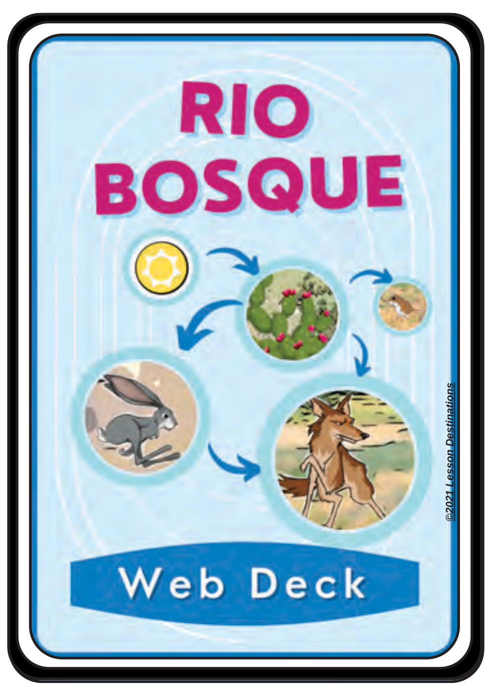
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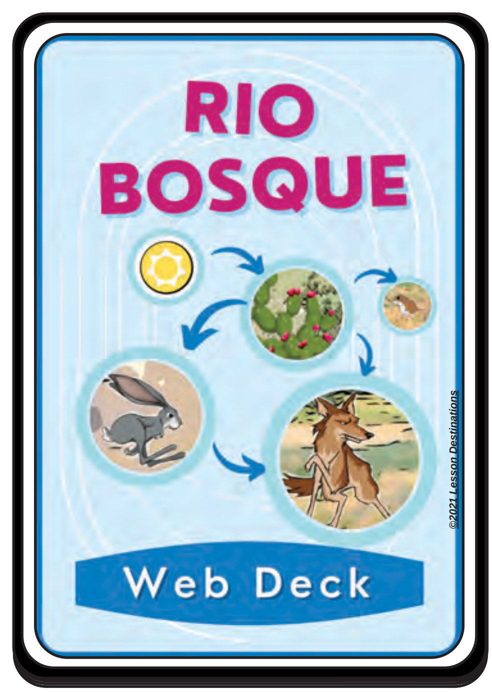
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Video links to accompany Migration Station at Rio Bosque

TecH2O Migration Station at the Rio Bosque: https://youtu.be/1LTgPDeFSg8

TecH2O A Day or Night at the Rio Bosque: https://youtu.be/8f6cSDgd3F0

TecH2O Rio Bosque Footprint Lab: https://youtu.be/QZElr_xwmf8