White Sands

National Park Service
U.S. Department of the Interior

White Sands National Monument

Junior Dunes Ranger Activity Book

Become a Junior Dunes Ranger!

Welcome to White Sands friends! My name is Riley, and I am excited to share my favorite place with you today. We are going to have a great adventure exploring and learning about White Sands, the world's largest gypsum dunefield. My book has activities that are especially made for you depending on your age.

Kit Fox: Ages 6-8

Jackrabbit: Ages 9-12

Bobcat: Ages 13 and up

When you are finished with your activities, please return your book to a park ranger in the visitor center to be sworn in as an official White Sands Junior Dunes Ranger! If you have any questions, please ask a park ranger. Let's explore White Sands!

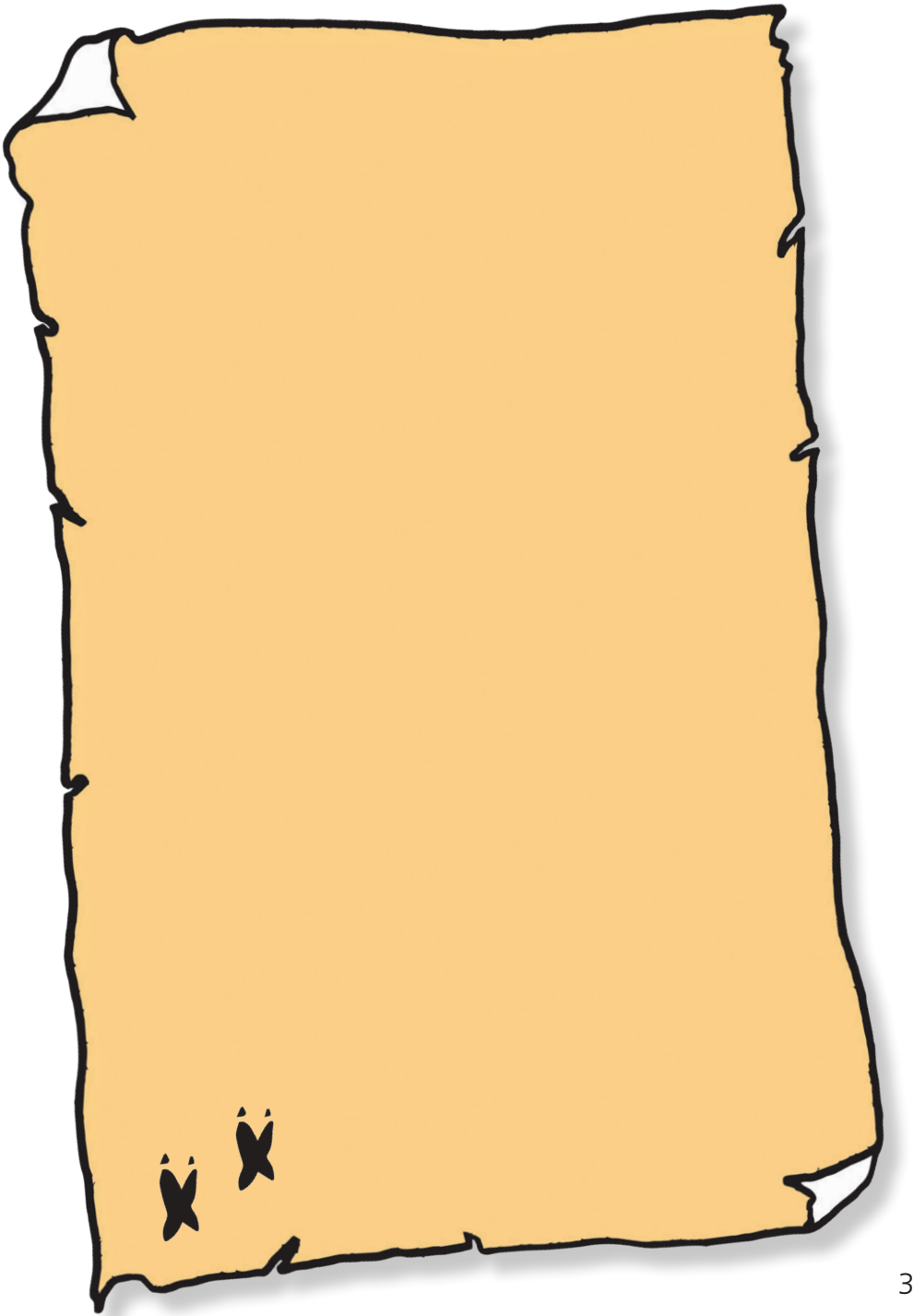
Riley

Parents: This is a family program. Feel free to help your aspiring Junior Ranger. We hope that your whole family learns about the monument.

Are you on a tight timeline and can't return your book today? Not a problem. Mail in your book to the address below and a ranger will take a look at it. Just make sure you let us know if you want a badge or patch.
Address: White Sands NM, PO Box 1086, Holloman AFB, NM 88330.

Recording Your Memories

As you explore White Sands, write or draw something in the journal below that you will want to remember about your visit today.



Having Fun and Being Safe

Leave No Trace

Riley loves being outside and having fun! She knows the best way to enjoy White Sands is to follow a few safety tips. Find and circle all the safe ways Riley is enjoying the dunes. Riley's safety tips:

- Drink lots of water
- Throw away trash in a trash can
- Wear a hat, sunscreen, & sunglasses
- Be prepared for your hike
- Keep pets on a leash
- Hike with a friend

Solving Riley's Riddles

Riley wrote a few riddles about her friends. Use the pictures below to help solve Riley's riddles. Fill in the blank with the number of the animal below that matches the riddle.

My blood is cold, my rattle bold
If I'm in sight, stay clear! I bite!
But worry not; the taste I've got
Is for eggs, small birds, and rodents.

Who am I? _____

By day I sleep, by night I creep
To gather my favorite seeds.
I blend in at night to avoid any fights –
White fur makes me hard to see!

Who am I? _____

Eight legs have I, eight eyes to spy,
A trail my spinner leaves.
My fangs are meek, and only seek
To munch bugs smaller than me.

Who am I? _____

White I am not, so I'm easy to spot
As I crawl along the sand.
Stink I have plenty, so don't try to pet me!
Respect I must command.

Who am I? _____

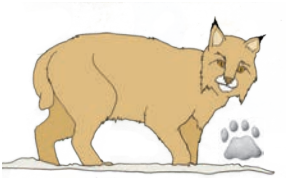
My beak is long, it's very strong,
Just ask the food I eat.
I run so fast, but in contrast,
I can truly fly!

Who am I? _____

My ears are pointy, tipped with black;
For my short tail I'm named.
I leave no claw marks in my track;
As a stealthy hunter I'm famed.

Who am I? _____

1. Western Diamondback Rattlesnake



2. Bobcat

3. Greater Roadrunner

4. Darkling Beetle

5. Apache Pocket Mouse

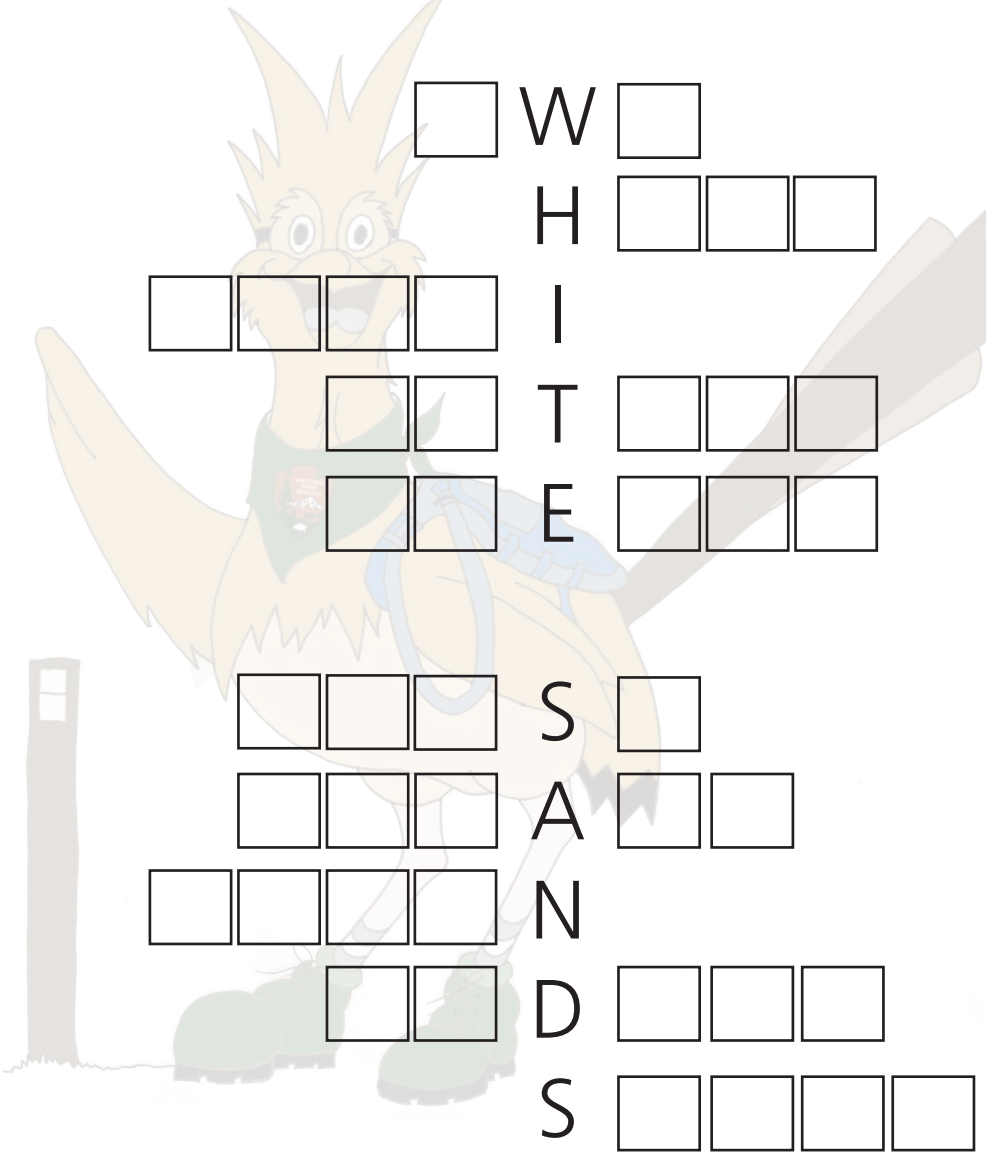
6. Tarantula

Discovering Who Lives Here

Riley made a list of plants and animals that live in her White Sands neighborhood. Use the words in the word bank to fill in the boxes below.

Word Bank:

BADGER	KIT FOX	CACTI	OWL	BEETLE
MOUSE	HAWK	RAVEN	LIZARD	SNAKE



Looking for Shapes

Riley is very good at finding shapes in nature like finding shapes in clouds. Have you ever seen shapes in the clouds? What shape do you see in the cottonwood leaf or in the cane cholla ?

Find your own shapes in nature. Draw at least two shapes below that you find on your adventure today.

Meeting a Ranger

Riley has a lot of park ranger friends, and each one of them has a different story on how he/she decided to become a park ranger.

Ask one of Riley's ranger friends why he/she became a park ranger. Write his/her response below.

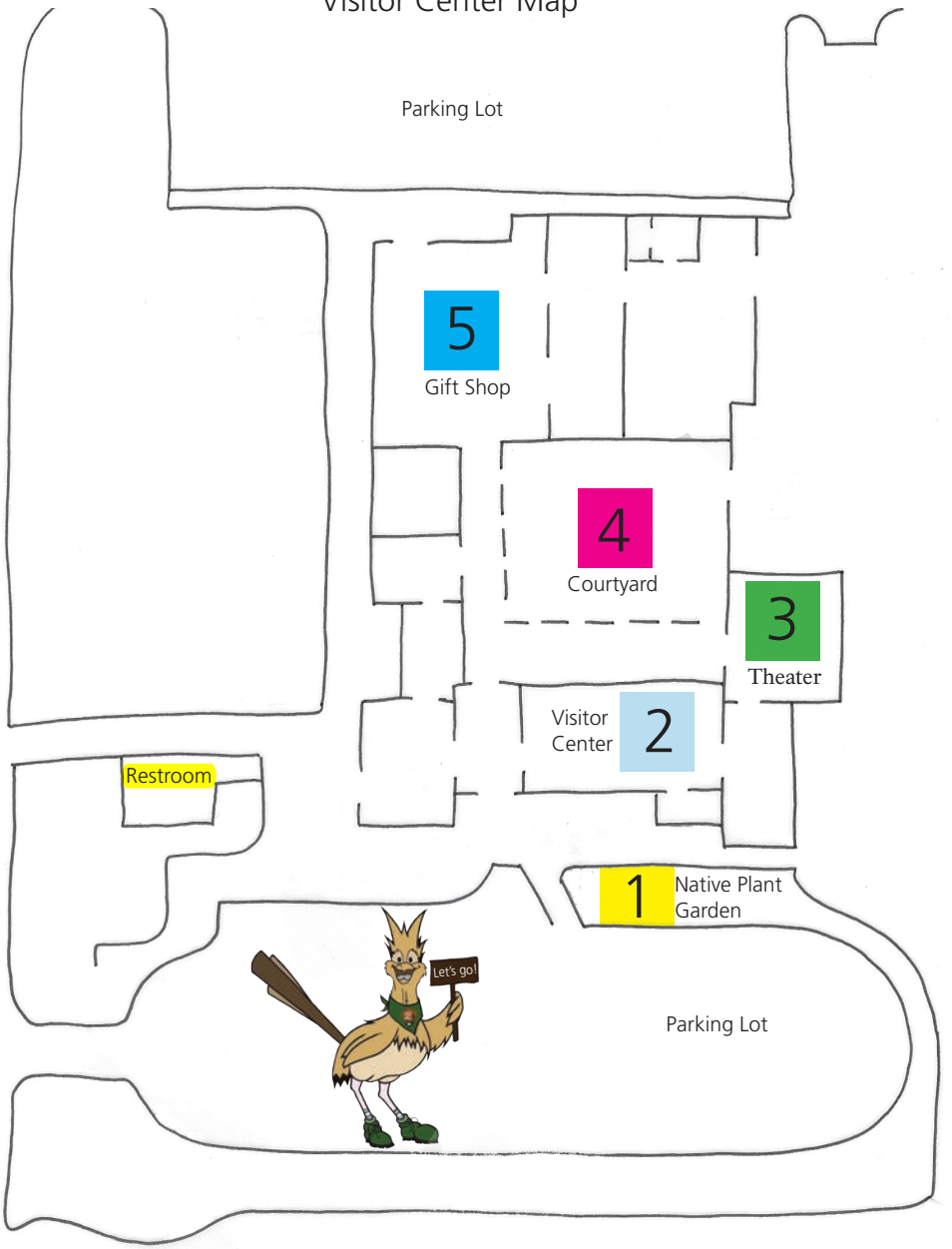
Riley knows she is in a national park when she sees the National Park Service arrowhead. Have you seen an arrowhead? If not, look around the visitor center or on the front cover of this book.

Each of the pictures in the arrowhead, like the mountain, mean something important. Draw your favorite part of the arrowhead below. Why did you choose to draw that item? Write your response next to the arrowhead.

Finding Your Way

One of Riley's safety tips is to always know where you are. Help Riley find her way around the visitor center and answer the activity on the next page.

Visitor Center Map



Find the numbered items on the map to the left, then answer the statements below.

1. **Native Plant Garden**. Name two plants and how they were/are used by American Indians.

2. **Park Store**. List the items that could be used to help you learn about White Sands.

3. **Theater**. The orientation video about the monument is shown here. What fact about White Sands presented in the video surprised you?

4. **Courtyard**. Read some of the signs. List one new fact or anything interesting that you found in the courtyard.

5. **Gift Shop**. There are many handcrafted items for sale in this store. Name one artist, what he/she made, and where he/she is from.

Dining in the Desert

A food chain shows how each living thing gets its food. Some animals eat plants, and some animals eat other animals. Plants are called **producers** because they combine sunlight, water, and carbon dioxide in a process called photosynthesis. Through photosynthesis, plants produce oxygen and carbohydrates—a simple sugar (food). Animals cannot make their own food so they must eat plants and/or other animals. They are called consumers. Consumers come in three tiers, primary, secondary, and tertiary. **Primary consumers** eat only plants (herbivore). **Secondary consumers** can eat both plants and other animals (omnivore). **Tertiary consumers** eat only other animals (carnivore). Then there are **decomposers** (bacteria and fungi) that feed on decaying matter. These decomposers speed up the decaying process by releasing mineral salts back in to the food chain for absorption by plants as nutrients.

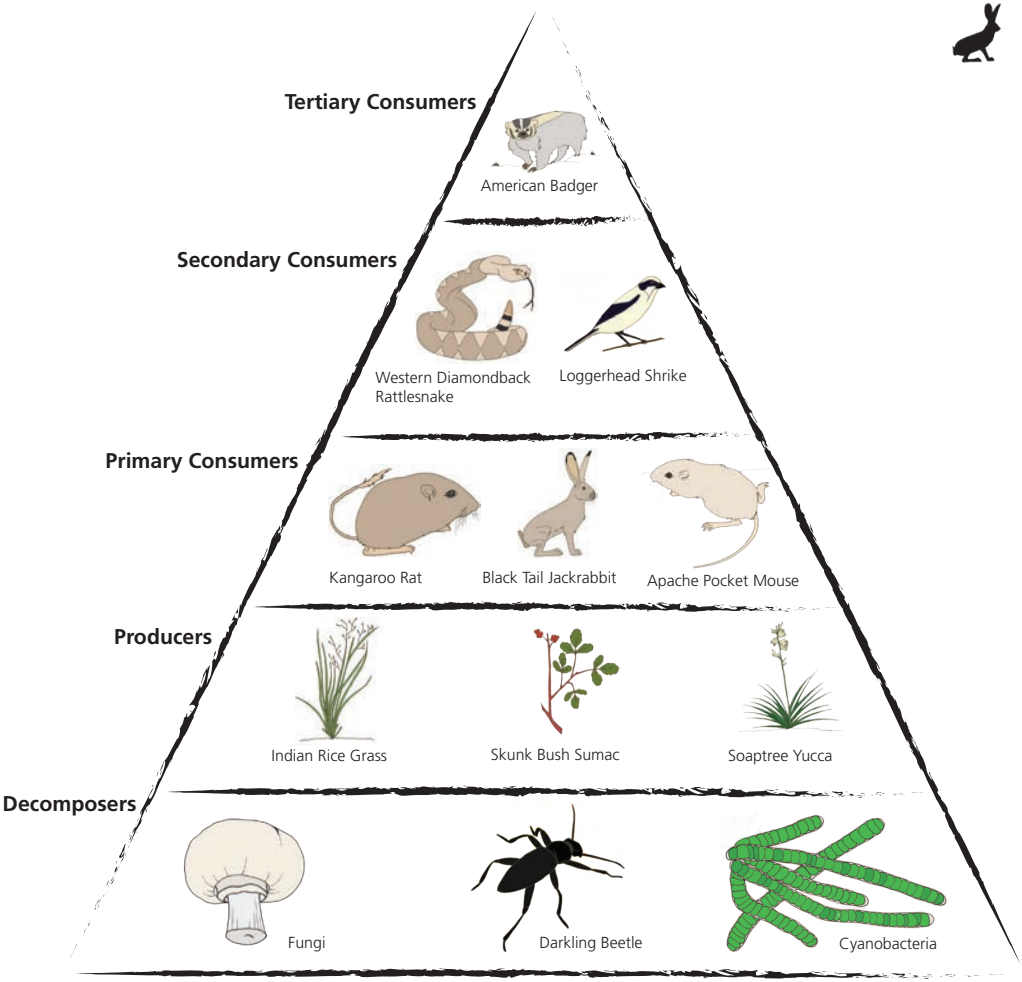
Unscramble the letters to fill in the blanks with the correct word. Use the word bank on the right if you need help.

Soil, _____, (aibctera) and fungi capture nitrogen from the air and make it _____ (busela) for plants. Otherwise, most desert plants could not grow.

Plants like the _____ (uyacc) and _____ (nidain) rice grass provide food and shelter for moths, ants, _____ (orgaknoa) rats, Apache _____ (oktpce) mice, and other animals. These plants are called _____ (rmpiyar) producers because all life on the dunes _____ (pnededs) on them.

Spiders, _____ (cropsonsi), and lizards eat insects.

Badgers, _____ (eyscoto), kit foxes, and snakes eat mice and other _____ (stderon).



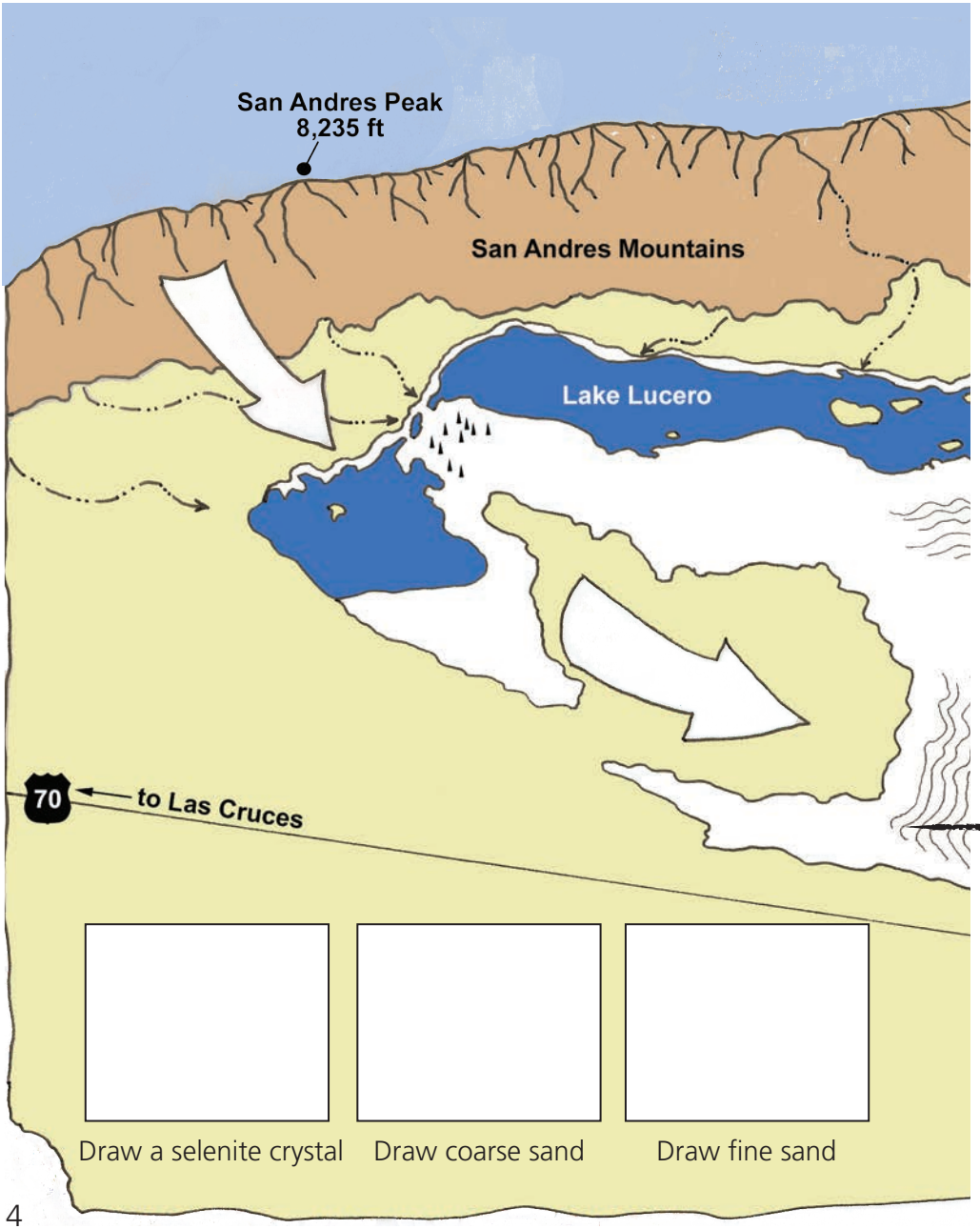
Word Bank:
usable
yucca
bacteria
rodents
scorpions
coyotes
pocket
depends
primary
indian
kangaroo

What would happen to the badger population if the pocket mouse and kangaroo rat caught a disease and many of them died?

Transforming Rock into Sand and Dunes

Riley has a question for you. Where did all this gypsum sand come from? This activity will help you answer Riley's question.

Take a look at the exhibits in the museum and label the three white arrows on the map as either water or wind.



Draw a selenite crystal

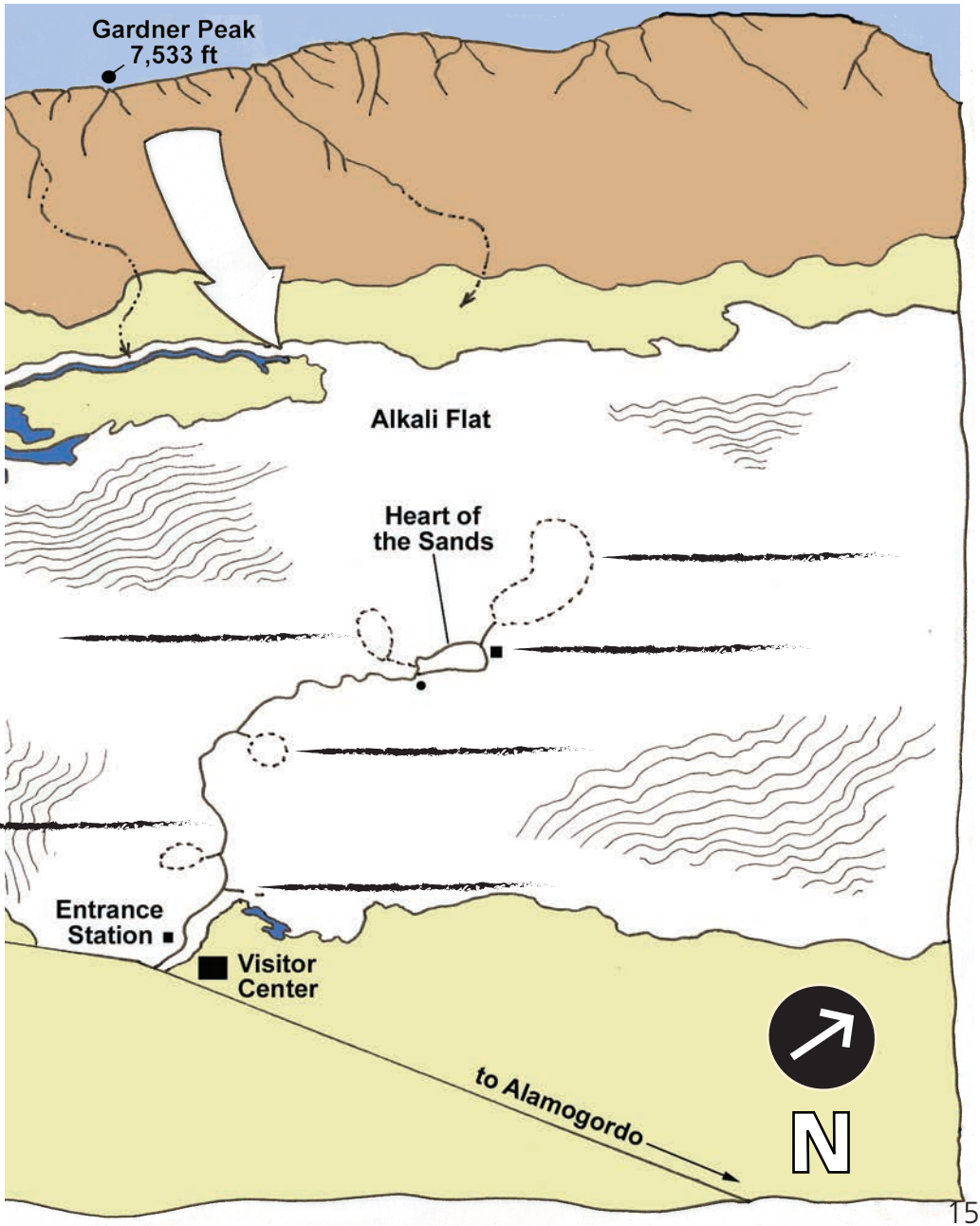
Draw coarse sand

Draw fine sand

Looking at a map of Dunes Drive below, label the map using the numbers next to the words below.

Word Bank:

1.Playa Trail
2.Interdune Boardwalk
3.Dune Life Nature Trail
4.Alkali Flat Trail
5.Amphitheater
6.Backcountry Trail



Exploring the Soaptree Yucca

One of the most common plants at White Sands is the soaptree yucca. This yucca is one of only four plants that can grow on the moving dunes. The plant is able to do this because of its ability to grow through the dunes as they move. The other amazing thing about the soaptree yucca is that every part of the plant can be used in some way.

Riley wrote several interesting facts about the soaptree yucca below. Use the words in bold to fill in the boxes to the right.

The yucca has beautiful white **flowers** that bloom after it rains. The flowers can be eaten.

The flowers grow on flower **stalks** that move water through the plant. These stalks can be used as walking sticks.

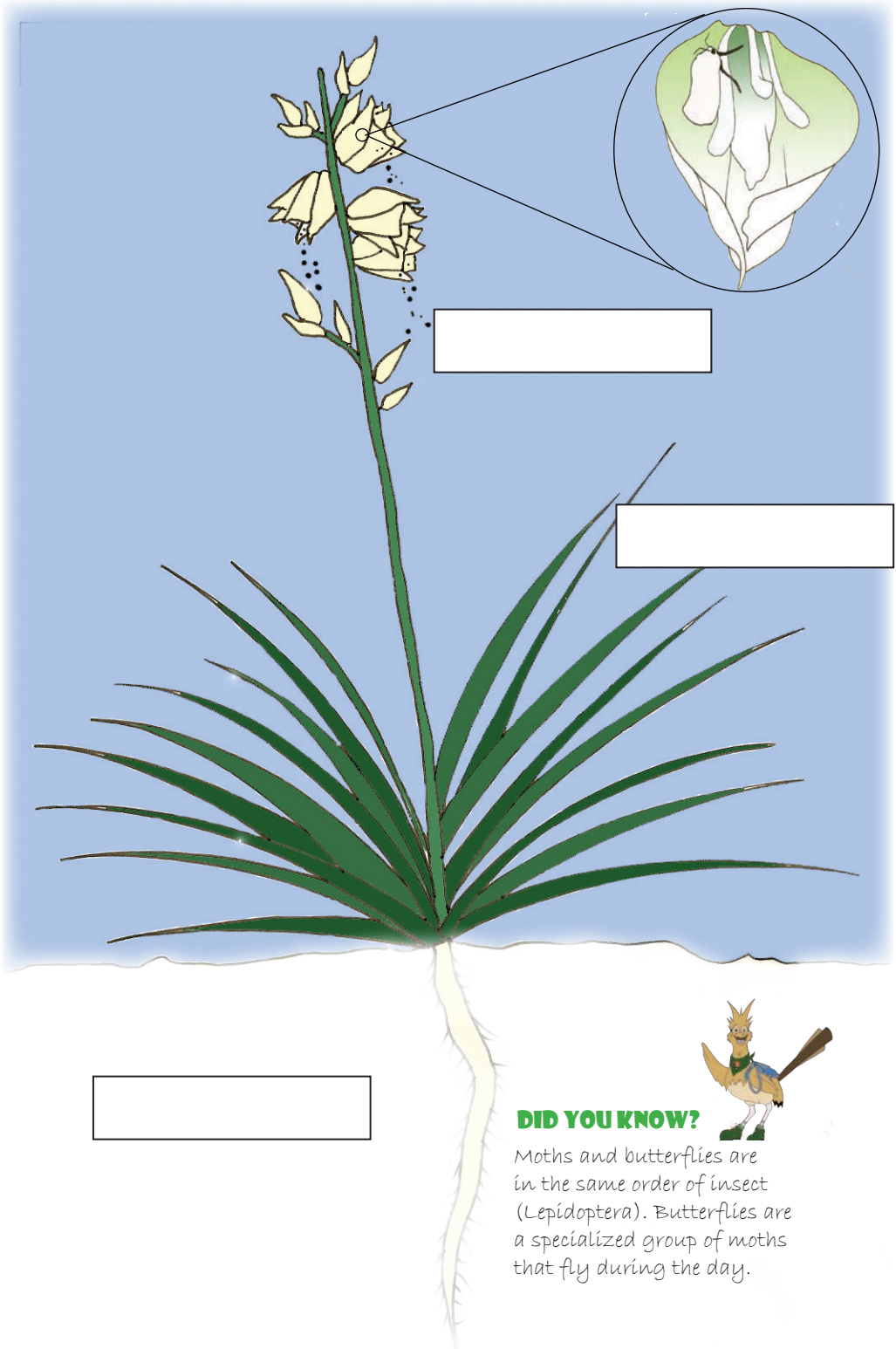
The leaves of the yucca are called **bayonet leaves** because they are so sharp and pointy. The sharp tips can be used as needles.

The yucca produces thousands of **seeds** that provide food for mice and other rodents. Humans can also use the seeds to make a black dye.

The **taproot** finds water in the gypsum to keep the plant alive. The root can be used like a potato but make sure to remove the toxic skin.

DID YOU KNOW?

Another cool part of the soaptree is how the plant is pollinated. Yuccas of all types are pollinated by yucca moths. These moths blend in to the coloring of the flower so they can be difficult to see.



DID YOU KNOW?

Moths and butterflies are in the same order of insect (Lepidoptera). Butterflies are a specialized group of moths that fly during the day.

Meeting the Dunefield

Dear Junior Dunes Ranger,

Let me introduce myself! The white gypsum sand you feel in between your toes as you walk barefoot on a dune is a part of me. I wanted to take the time to tell you my story and how it is that I ended up here.

My journey started when I was gypsum mineral dissolved in the Permian Sea about 250 million years ago. Life was much different then. Millions of years later, the tectonic plates started to shift and collide. The sea level rose and fell, and I was pushed up in the mountains you see around you today. About 10,000 years ago, I was dissolved by rain and snowmelt, and I washed down into a lake and evaporated into my new form, selenite crystals!

Life as a crystal was nice. Wind and water broke pieces of the crystals down into smaller particles and they hitchhiked with the wind across the basin to form me, the dunefield, that you may experience!

Most people who visit for the first time are surprised by the great variety of plants and animals that survive and thrive in the unique environment created by my dunes. Scientists from around the world come here to study me, the dunefield, and my friends, the plants and animals. The animals living here now are only the latest in a long parade of creatures who have adapted to massive changes in geology and climate. Fossilized footprints of dire wolves, ancient camels, mammoths, smilodons, and giant ground sloths are all hidden within my sand!

Dividing the earth's geological history into twelve hours on a clock, I would have surfed with the trilobites in the Permian Sea about three hours ago, watched the dinosaurs about one hour ago, and met you, the humans during the last minute. I want to welcome you, the newcomers of life on earth, to this amazing planet!

I've watched humans for a while now, and I have learned that peoples' capacity to care about and preserve the environment has sometimes been overshadowed by their ability for destruction and carelessness. Humans have great power on this planet. In order to take care of my friends, the plants and animals, for many generations to come, humans must use their power and intelligence wisely. Will you be a good caretaker of the earth and my sand, plants, and animals? At the bottom of this letter let me know how you can be a good caretaker of the earth.

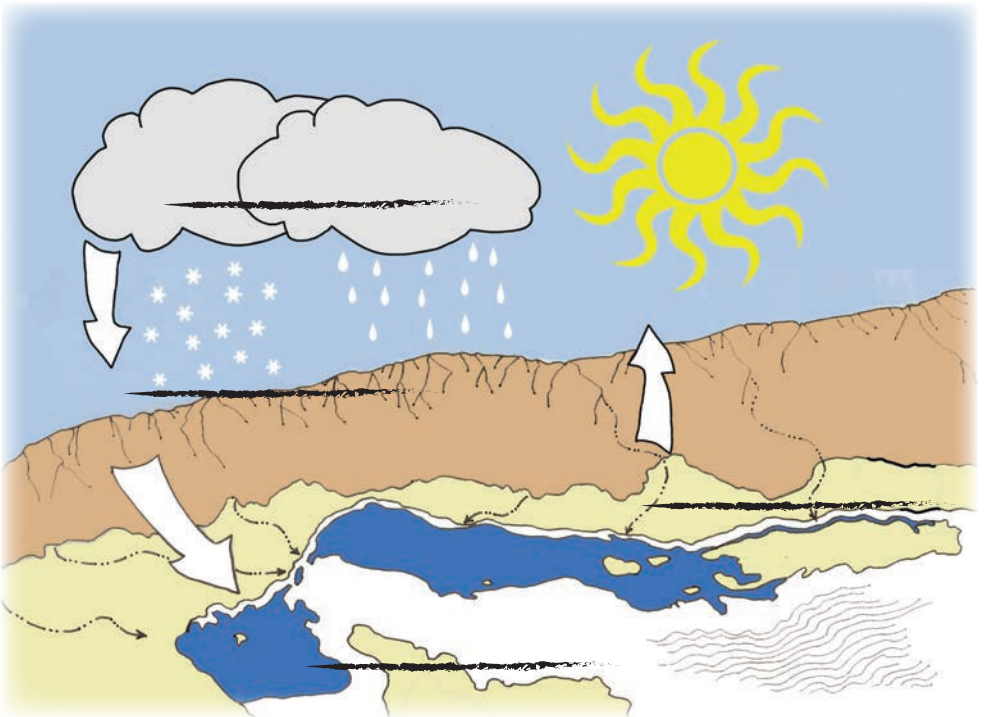
Sincerely,
The Dunefield

Holding the Dunes Together

One of Riley's safety tips is to drink plenty of water. Water is important for us as well as the dunes. Without water, the dunes would blow away. Water is the glue that holds the dunes in place. Throughout a calendar year the water goes through all steps of the water cycle.

Look at the diagram below. It shows the four major steps of the water cycle. Label each process in the water cycle using the numbers next to the words and then circle one or more of the processes that you observe in the dunefield.

Word Bank: 1.collection 2.precipitation
3.evaporation 4.condensation



Precipitation - Rain or snow coming down from clouds.
Evaporation - Puddles on the ground that dissappear when the sun heats up the water.
Collection - Water that pools in low lying areas.
Condensation - As water evaporates, the moisture condenses and forms clouds in the sky.

When you are in the dunes, do the following actions and answer the questions below.

Touch the sand on the surface. What did it feel like? Was it hot or cold?

Dig down a few inches in the sand. What is the difference between the top of the sand and down a few inches? What do you think makes this difference?

DID YOU KNOW?

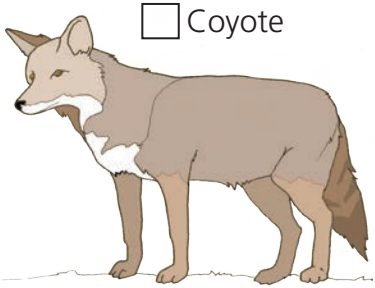
This illustration shows us that two feet below the surface, in a low area, you will find our water table, which is very unusual for a desert.

Nature and Geology Checklist

This is a checklist of some of Riley's favorite things. As you visit the monument, check off any of them that you find. Some of the critters only come out at night so don't be discouraged if you can't find them all.

Mammals

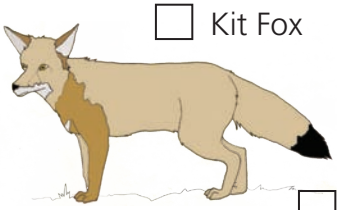
☐ Coyote

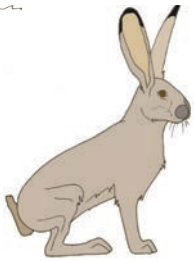


☐ American Badger

☐ Apache Pocket Mouse

☐ Kit Fox



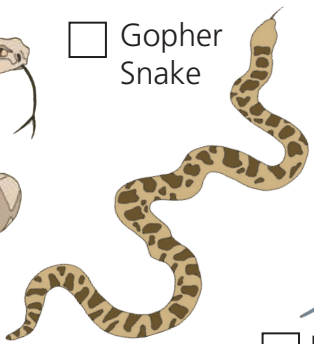


☐ Kangaroo Rat

☐ Blacktail Jackrabbit

Reptiles

☐ Gopher Snake

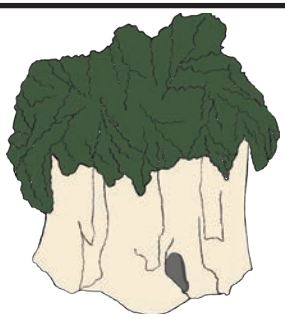


☐ Bleached Earless Lizard

☐ Western Diamondback Rattlesnake

☐ Little striped Whiptail

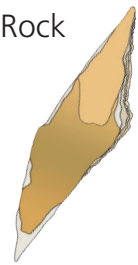
Geology



☐ Plant Pedestal

☐ Gypsum Rock

☐ Sand



☐ Selenite Crystal

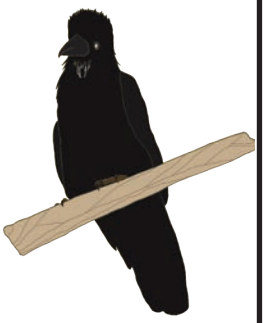
Did you see something that's not on the list? Draw or describe it in the space below. Ask a ranger if he can help identify it.

Birds

☐ Barn Swallow

☐ Loggerhead Shrike

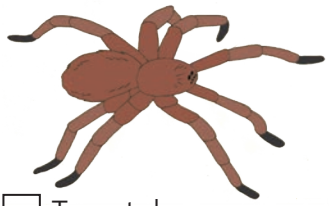
☐ Greater Roadrunner



☐ Raven

Insects

☐ Tarantula Hawk Wasp



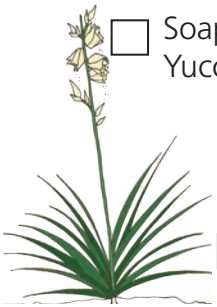
☐ Tarantula

Darkling Beetle ☐

☐ Scorpion

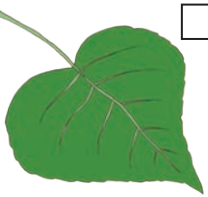
Plants

☐ Soaptree Yucca



☐ Indian Rice Grass

☐ Cottonwood Tree Leaf



Skunk Bush Sumac ☐

Junior Ranger Pledge

I promise to,

- Learn about other National Parks;
- Help keep special places clean, safe, and beautiful for everyone;
- Not disturb or collect objects I see and leave them for others to enjoy;
- Become a Junior Ranger in other National Parks.

Certificate of Achievement

This certifies that

_____

has met the requirements of a
White Sands Junior Dunes Ranger.

_____

Ranger Signature