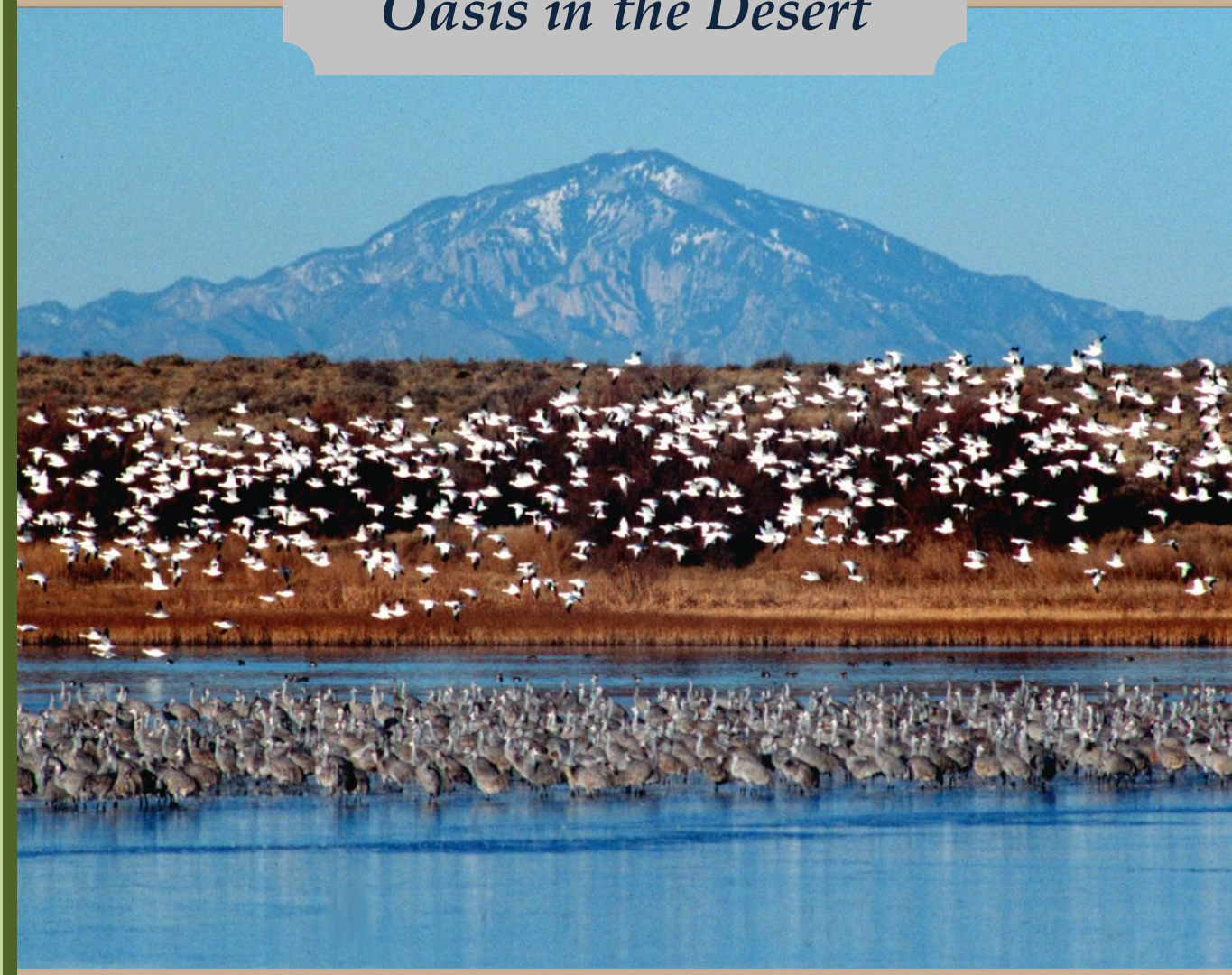
Junior Wildlife Ranger

Bitter Lake National Wildlife Refuge

Oasis in the Desert



This Adventure Booklet belongs to

_____

Activity Checklist

- ❑ Activity 1: Explore the Visitor Center
- ❑ Activity 2: Amazing Aquifers
- ❑ Activity 3: Count those birds!
- ❑ Activity 4: Go Hiking!
- ❑ Activity 5: Design Your Own Invertebrate!
- ❑ Activity 6: Tracking Evidence
- ❑ Activity 7: Life of a Dragonfly
- ❑ Activity 8: Protect Nature!

A Junior Wildlife Ranger is a person who:

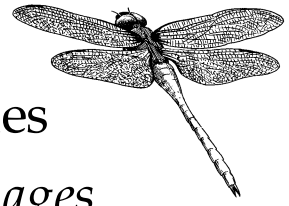
- Cares about the conservation of native wildlife and its habitat.
- Is knowledgeable about the wildlife and plants that the refuge is protecting.
- Recognizes the importance of refuges for both wildlife and the community.
- Is environmentally conscious – acts in a way that is good for nature.
- Is ready to share this information with others to make a difference!

Refuge Map


The upper portion of Bitter Lake NWR, north of Refuge Headquarters is closed to public use.
Bitter Lakes Road
Locked Gate
Hike / Bike Trail (2 Miles)
Pecos R.
285
Salt Creek Wilderness
70
Pine Lodge Road
Red Bridge Rd
70 380
Roswell
380
Butterfly Trail (0.2 Miles)
Visitor Center & Admin Offices
Pine Lodge Road
Auto Tour Loop 8.5 Miles
Dragonfly Overlook
Observation Blind (0.2 Miles)
Sandhill Crane Overlook
Pecos River
Goose Hill Overlook
Desert Upland Trail (0.3 Miles)
Oxbow Trail (0.3 Miles)
Oxbow Loop (2 Miles)
N
W
E
S
Legend
Visitor Center/Admin Office
Hiking Trail
Auto Tour Loop
Observation Areas
Restrooms
Parking Areas
Handicap Accessible
Wetlands

How to Become A Junior Wildlife Ranger and Earn Your Badge

- Ages 7 and under complete 3 activities
- Ages 8-10 complete 4 activities
- Ages 11 and up complete 5 activities

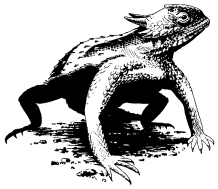


Just for Fun activities are optional for all ages

All done?

Sign the pledge at the end and bring your completed adventure booklet to the front desk to receive your Junior Wildlife Ranger Badge and a prize.

You can also mail this booklet to the address below and we will send you your badge:



Junior Wildlife Ranger Program
Bitter Lake National Wildlife Refuge
4200 E Pine Lodge Road
Roswell, NM 88201

Want to Explore More?

To find new places to explore, learn more about nature, or log your progress, visit JuniorWildlifeRanger.org

This program is produced by Junior Wildlife Rangers, a project of the Earth Island Institute, a 501(c)3 in partnership with Bitter Lake National Wildlife Refuge.

What is a Refuge?

A wildlife refuge is a home for wild animals and plants. Refuges give wild creatures a place where they can have plenty of space, food, water, and shelter- all elements that make up **habitat**.

Bitter Lake National Wildlife Refuge protects and provides habitat for some of New Mexico's most rare and unusual creatures- keep reading to find out more about them!

Hi there, I'm Ronnie the Roadrunner! Bitter Lake National Wildlife Refuge is home for me!

Fun Fact: The roadrunner is the state bird of New Mexico. They can fly, but usually don't. Instead, they run at speeds up to 15 mph!

Activity 1: Explore the Visitor Center

You can learn a lot about the refuge at the visitor center. Take some time to explore the exhibits and read about the refuge.

What is one interesting fact you learned at the visitor center?

_____

_____

_____

Can you find me at the visitor center?

Next, take a look at the fish tank. You can find all of the fish in the tank living in creeks, sinkholes, and marshes on the refuge. Some of these fish are only found in the Pecos River watershed! **DRAW** one of the fish in this box.

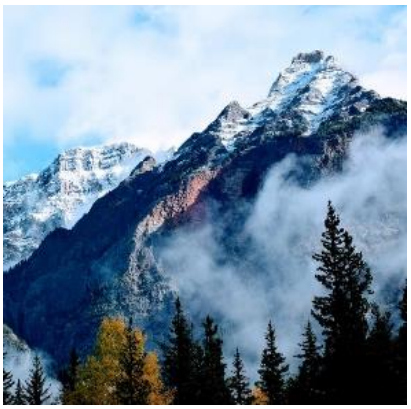
Use the plaque next to the tank to identify your fish. Ask the volunteers at the front desk if you need some help.

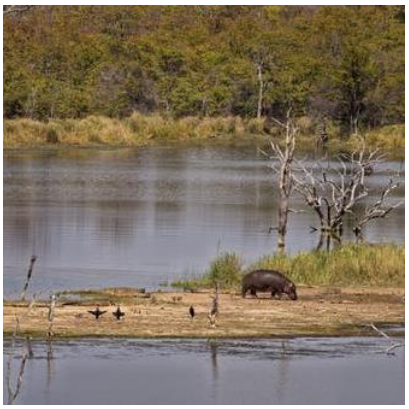
The fish I drew is a _____

Wetlands in the desert

The refuge provides wetland habitat for plants and animals. A wetland is a place where the soil is soaked by water some of the time or all the time. Because the refuge is in the middle of a dry desert where water is scarce, many animals come here for fresh water and food. That means you can find a mix of desert and wetland animals here. Wetland habitat can be found at the edges of rivers, oceans, and ponds.

Just for fun: *Circle the pictures that you think show wetland habitat.*







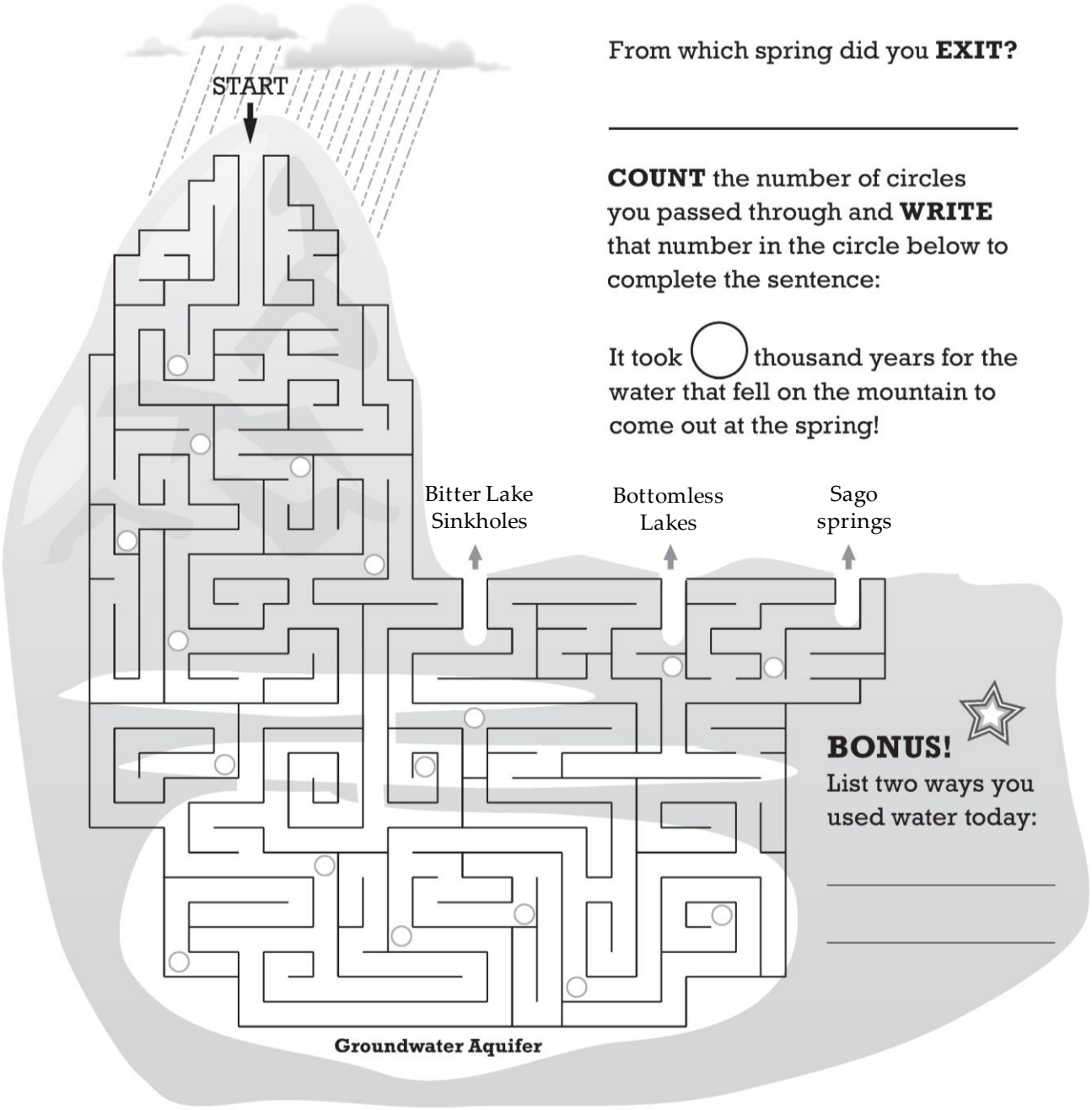


Activity 2: Amazing Aquifers

How does water get underground in the desert to form wetlands? When rain or snow falls on the mountains, it slowly finds its way through the rocks and goes deep underground.

There it can wait for thousands of years in a groundwater **aquifer**. We get some of the water we use every day from aquifers. Sometimes this ancient water is pushed to the surface, forming natural **springs**.

FIND YOUR WAY through the maze, starting as rain on top of the mountain, then follow the water's path through the rocks into the aquifer, and exit from a spring.



From which spring did you **EXIT?**

_____

COUNT the number of circles you passed through and **WRITE** that number in the circle below to complete the sentence:

It took ◯ thousand years for the water that fell on the mountain to come out at the spring!

BONUS!

List two ways you used water today:

_____

_____

What are waterfowl?

Waterfowl are certain species of birds that can be found in wetlands. Only 3 types of birds are considered waterfowl:

1. Ducks

2. Geese

3. Swans

So, what makes these birds special? Why are they considered waterfowl and other birds aren't?

Scientists put animals into special groups because they have similar traits. Waterfowl have certain body parts that help them survive in their habitat. Let's take a closer look...

All waterfowl have:

FLAT BILLS
That help them eat plants and bugs

LONG NECKS
That help them reach food at the bottom of ponds

WEBBED FEED
That help them swim faster

Activity 3: Count Those Birds!

Hundreds of species of birds visit our refuge each year. The refuge is located on the **Central Flyway,** which is a **migration route** for birds. You can think of the Central Flyway as a highway for birds.

The refuge acts as a rest stop for birds, where they can recharge on the way to and from South America and Alaska. If the refuge didn't exist, the birds wouldn't have a place to refill on food and water or to rest. It would be like taking a week-long road trip without stopping for a break!

Thousands of sandhill cranes stop at the refuge on their way from Alaska and Siberia to Mexico.

Part 1. Bird Tally Find a spot where you can see birds (Hint: try looking at one of the wetland impoundments from the wildlife loop drive). Stay in that spot for **5 minutes** and **COUNT** all the birds you see. Look on the next page to help you figure out what birds you're counting.	***TALLY** your birds here:*

The Birds

American Coot

I spend my time in wetland ponds. Look out for my black body, white bill, and red eyes.

Great Blue Heron

Northern Shoveler

You can find me in marshes and ponds. Us guys have green heads and a brown patch on our sides.

Great Egret

American Avocet

Northern Harrier

Part 2. Bird Identification

Choose one bird that you saw today.

1) Draw the shape of the bird in the box to the right.

2) Circle one choice for each:
   - Is the bird **chunky** or **slim**?
   - Is its tail **short** or **long**?
   - Is its beak **short** or **long**?
   - Are its legs **short** or **long**?
   - Is its beak **flat and dull** or **pointy and sharp**?

3) Is the bird a **waterfowl**? (Hint: look back at page 6) _____

4) Coloring: What is the color of its beak?_____
   Its legs?_____

5) Any other noticeable patterns or colors?_____

6) Look at the pictures and descriptions above and see if your bird is a match. If not, the front desk can help you identify your bird based on the information you filled out above.

I think my bird is a _____

Ruddy Ducks

Draw bird shape here:

Activity 4: Go Hiking!

Taking a walk is a great way to see the plants and animals that live on the refuge. There are **3** walking trails on the refuge for you to try.

1. Choose a trail from the map on page 1 of this booklet (the trails are highlighted in red). We suggest the **Desert Upland Trail** or the **Butterfly Trail** for young explorers ($^1/_4$ mile each). For a longer trek (~2 miles), try the **Oxbow Trail.**
2. Make sure to bring a full bottle of water, wear good hiking shoes, and use sun protection!

What trail did you take? _____ Date___/___/_____

*In the space below, **DRAW** a picture of a **PLANT** you saw on the hike. Try to make careful observations in your drawing. What shape are the leaves? Are the leaves in groups? How many in each group?*

Imperiled Invertebrates

Invertebrates are animals that have no backbone. The refuge is home to many invertebrates like dragonflies, snails, tarantulas, and beetles. There are four **endangered** invertebrates on the refuge. Endangered animals need extra special protection because they are at risk of going extinct. The four endangered invertebrates on the refuge are:

Noel's amphipod

Koster's springsnail

Roswell springsnail

Pecos assiminea

Bitter Lake is the only place in the **WHOLE WORLD** where you can find Noel's amphipod, Koster's springsnail, and the Roswell springsnail, making it a very special place for these invertebrates!

Even small animals like amphipods and snails are an important part of the ecosystem. Invertebrates are a tasty food source for me and other animals like mice, fish, and lizards. Without invertebrates, I would starve! That's why we need to take care of all living things, even the teeny-tiny ones.

Activity 5: Design Your Own Invertebrate!

Every animal has **adaptations**, or special traits that evolved over a long time, that help it survive in its environment. Let's look at some invertebrate adaptations:

Some **butterflies** are brightly colored to warn predators that they taste bad.

Snails have hard shells to protect them from predators.

Dragonflies have 4 wings to help them fly around fast and pincers to help them grab prey.

Vinegaroons can release an acidic spray to ward off predators.

Part 1. How does your invertebrate live?

IMAGINE a new invertebrate that could live at Bitter Lake. Circle your answers to these questions about your invertebrate to help you think of what kind of adaptations it will need:

1. Is your invertebrate ***aquatic*** or ***terrestrial***?
2. Is your invertebrate a ***predator***, ***herbivore***, or ***detritovore***?
3. How does your invertebrate get around?

   Walking ***Flying*** ***Swimming*** ***Burrowing***
4. Does your invertebrate live ***alone*** or in a ***colony***?

Glossary

- **Aquatic** – animals that live in the water
- **Terrestrial** – animals that live on land
- **Predator** – animals that eat other animals
- **Herbivore** – animals that eat plants
- **Detritovore** – animals that eat things that are already dead
- **Colony** – a group of animals that live together and work together

Activity 5: Design Your Own Invertebrate!

Part 2. Bring your invertebrate to life
DRAW your invertebrate in the box below. Think about where your invertebrate lives, what it eats, and how it moves around. **DRAW AND LABEL** at least **4 ADAPTATIONS** that will help your invertebrate do these things.

What do you call your invertebrate? _____

Plant Spotlight:
Pecos Sunflower

The Pecos sunflower is an **endangered** plant on the refuge. It loves the salty wetland habitat and is found only in the Pecos River watershed. You can see its beautiful yellow flowers when it blooms in the fall.

Help the bee get here!

Animal sidekicks: **Pollinators**

Pollinators, like the **bumblebee**, help sunflowers and other plants make new seeds by spreading **pollen** between their flowers. The flowers provide the pollinators with **nectar** in return.

Just for fun: *Draw a line from the bee to the sunflower to help it find tasty nectar. See how many flowers you can stop at along the way, and avoid the hungry loggerhead shrikes!*

Activity 6: Tracking Evidence

There's a lot of wildlife at Bitter Lake! You may not always see the animals, but if you keep your eyes open, you can find evidence that shows they are there. Footprints, or tracks, are one type of evidence you can find on the refuge. **DRAW A LINE** from the **NAME** of each animal to its **PICTURE**, then **DRAW A LINE** from the **ANIMAL** to the **TRACKS** you think it leaves behind. Look out for these animals and tracks when you explore the refuge!

Coyote

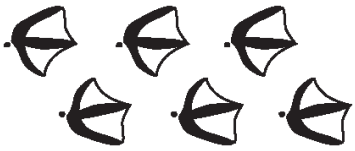
Mule Deer

Mallard

Western Diamondback Rattlesnake

Raccoon

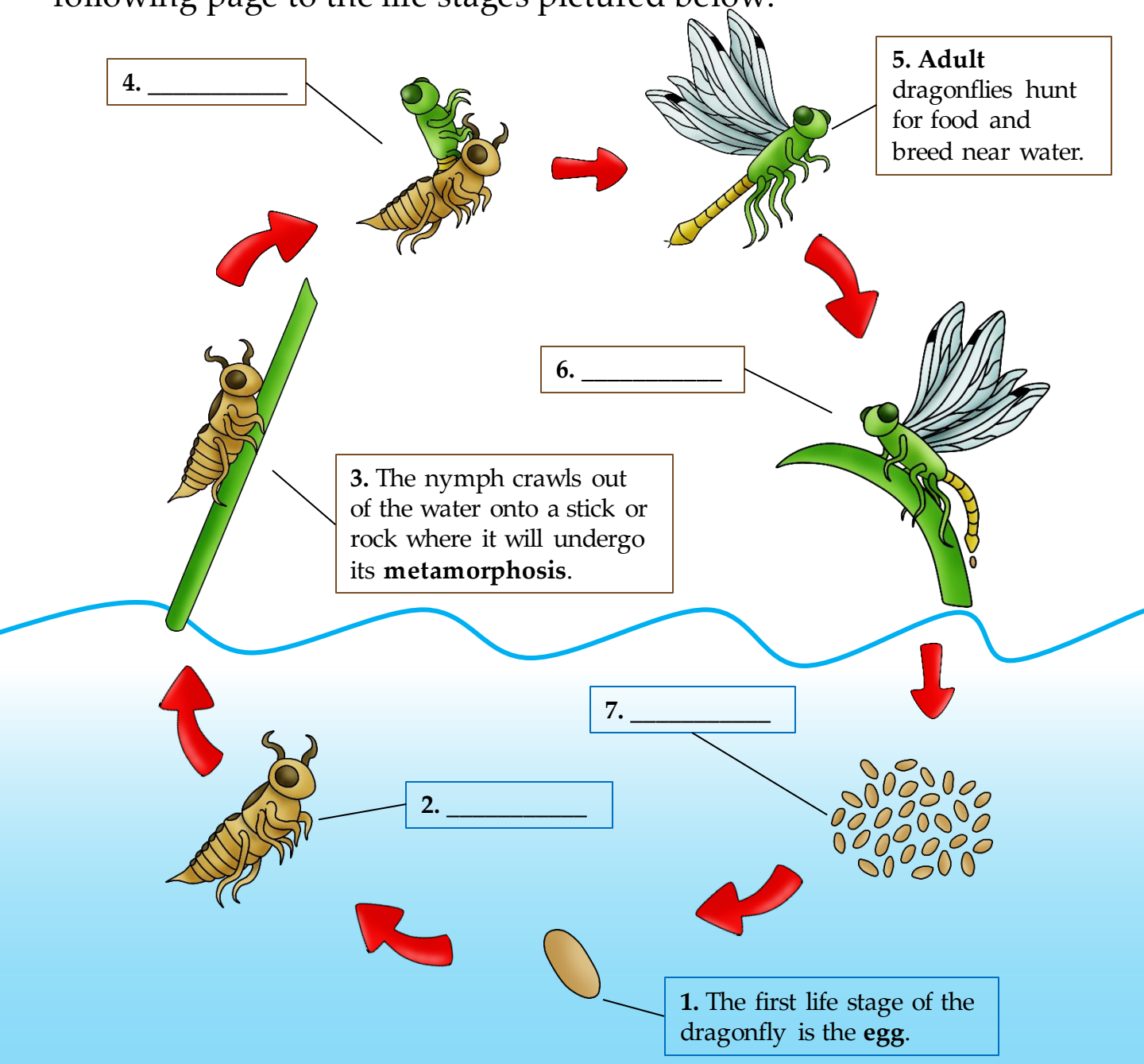
Black-tailed Jackrabbit



Bonus: What other types of evidence would show an animal has been there?_____

Activity 7: Life of a Dragonfly

With over 100 species, Bitter Lake National Wildlife Refuge has among the highest diversities of dragonflies and damselflies in North America! It's easiest to spot colorful dragonflies darting through the air around ponds, but did you know that dragonflies actually spend most of their lives **underwater?** Dragonflies go through multiple **life stages**. **MATCH** the descriptions on the following page to the life stages pictured below:



Activity 7: Life of a Dragonfly

Match these descriptions to the life stage pictures on the previous page

A. A female **adult** dragonfly lays her eggs either onto plant material or in the water. She can lay hundreds of eggs during her adult life.

B. The dragonfly crawls out of its egg to begin its second life stage as a **nymph** (also called a **larvae**). A nymph will live underwater eating other small critters for up to four years.

C. **Eggs** lay in the water for 2-5 weeks before they hatch. During this time, they may become food for fish or aquatic invertebrates.

D. The dragonfly breaks out of its larval skin and emerges as an **adult** dragonfly. It can take a few hours before the dragonfly's wings are strong enough to fly.

Dragonfly

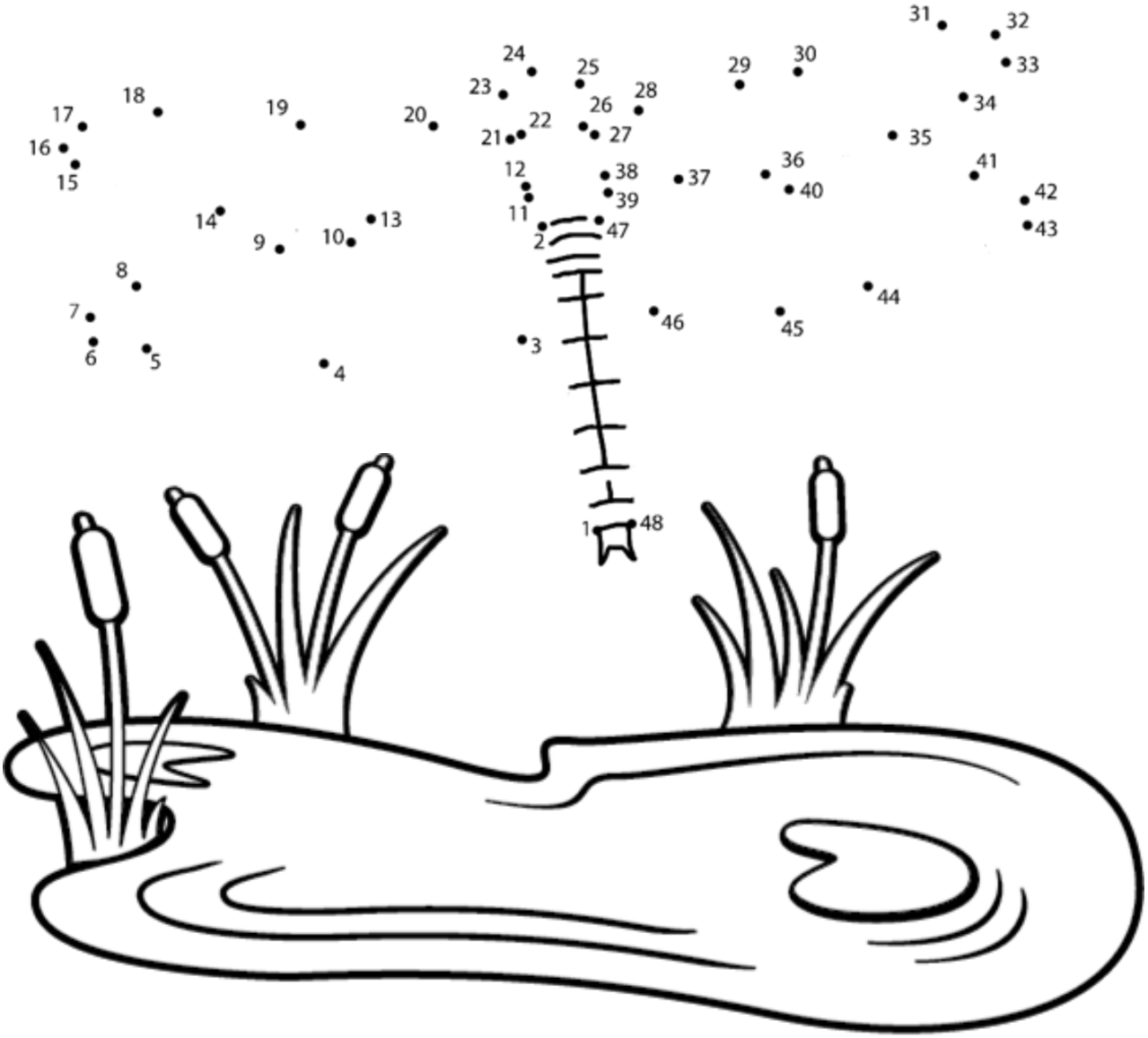
Damselfly

Spot the Difference!

- **Dragonflies** hold their wings **out to the side** when they're at rest, and have **big eyes** that are **connected** in the middle.
- **Damselflies** hold their wings **together** over their backs and have **smaller**, **separated** eyes.

Just for Fun: Connect-the-Dots

Connect the dots in order to reveal the mystery animal!



Bonus: Is this a dragonfly or a damselfly? _____

Activity 8: Protect Nature!

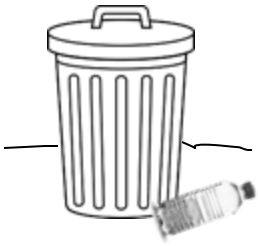
As a junior ranger, it will be your responsibility to do your best to protect nature. Plastic items that we use once and then throw away like straws, water bottles, and bags often end up in nature where they take a long time to break down and can harm wildlife. **DRAW A LINE** between the **ITEM** below and the **ALTERNATIVE** that is better for the environment to learn ways YOU can help protect nature and animals.

Bad for nature

Plastic Straws

Disposable plastic water bottles

Plastic bags



Leaving thrash on the ground

Better alternative

Reusable shopping bags

Cups without straws or reusable straws

Putting trash in bins and recycling when possible

Reusable water bottles

Another way I can help conserve nature is:

_____

Bitter Lake National Wildlife Refuge

Junior Wildlife Ranger

This certifies that _____ completed the

Junior Wildlife Ranger Program on (date) _____

JUNIOR WILDLIFE RANGER PLEDGE

As a Junior Wildlife Ranger, I promise to do all that I can to respect, protect, and enjoy our wildlife refuges in New Mexico. I will do my best to keep nature clean and safe for the plants and animals that call it home. I will visit another park or refuge near where I live and will share what I learn with others.

_____

Junior Wildlife Ranger Signature

_____

Ranger Signature

National Wildlife Refuges of New Mexico

Bitter Lake National Wildlife Refuge
4200 E Pine Lodge Road
Roswell, NM 88201
https://www.fws.gov/refuge/bitter_lake/
(575) 622-6755