

# Discover Wildlife Journeys

Student Workbook

*A field trip partnership at Lake Lowell between  
Deer Flat National Wildlife Refuge  
Canyon County Parks, Recreation, and Waterways  
Northwest Nazarene University*

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Workbook complete...  
but continue  
discovering at  
home!

**Discovery Boxes**  
Look for the discovery questions throughout the workbook!

  What kinds of journeys do animals make? Do plants make journeys?

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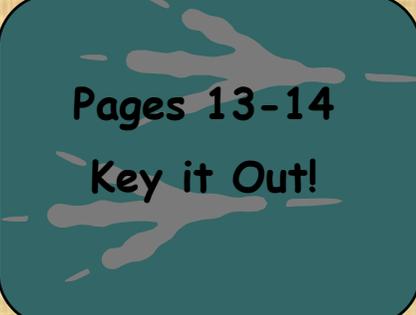
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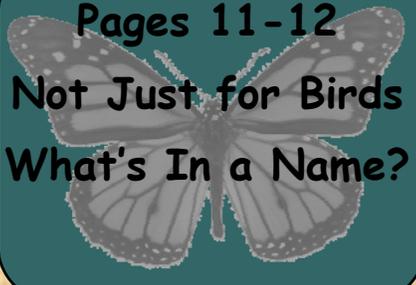
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# A Desert Oasis for Wildlife ...and People Too!



You will soon be visiting **Lake Lowell** at **Deer Flat National Wildlife Refuge** to *Discover Wildlife Journeys*. Lake Lowell was built more than 100 years ago to provide water to irrigate farmers' crops. Theodore Roosevelt, who was President of the United States at the time, foresaw that a lake in the desert would be an oasis for wildlife. He imagined thousands of ducks and geese quacking, honking, and whistling to and from Lake Lowell.

To help achieve this vision, in February 1909 President Roosevelt set aside Lake Lowell as Deer Flat National Wildlife Refuge. Deer Flat was the 21<sup>st</sup> refuge in the National Wildlife Refuge System, which now includes over 550 Refuges set aside specifically for wildlife.

The Refuge now provides homes for wildlife on nearly 12,000 acres, including the open waters and wetland edges of Lake Lowell, the sagebrush steppe around the lake and the grasslands and riparian forests on over 100 islands in the Snake River.

## *Some of What Happens at a Wildlife Refuge...*



Refuge staff and volunteers manage wildlife and their habitats. Here, wildlife biologists put a metal bracelet, or band, on a mallard duck to study where it travels during its migration.

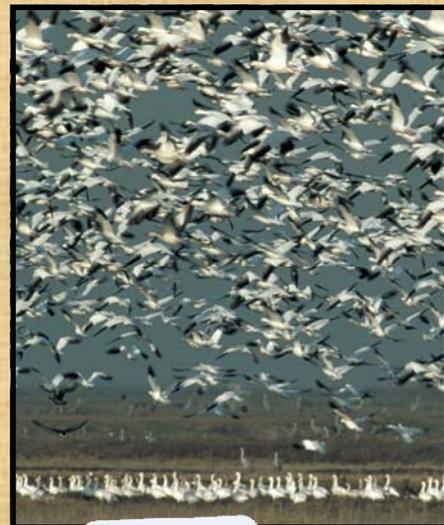


Refuge visitors can participate in wildlife-oriented recreation, including environmental education, fishing, hunting, and wildlife watching. Here, a young visitor uses binoculars to watch birds.

# Robin Restaurants and Hummingbird Hotels

Many animals **migrate**, or travel between different seasonal homes. Some migrate for days or weeks from a summer to a winter home. When people travel long distances, they can stop for a meal at a restaurant or spend the night at a hotel.

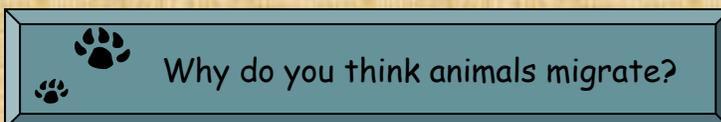
Migrating animals also need to find places to rest and refuel along the way so they have the energy to continue their journey. Although there aren't actually Robin Restaurants or Hummingbird Hotels, National Wildlife Refuges spread across the country serve as restaurants and hotels for millions of migrating birds, like these snow geese at a Refuge in New Mexico.



*Trace the flock's journey on the map!*



A flock of Canada geese flying over your school in fall is probably on the way from nesting to wintering grounds. After stopping to rest and feed at Lake Lowell, they may continue their journey by flying to the marshes of Lower Klamath National Wildlife Refuge (NWR) in southern Oregon. Once they have fattened up at Lower Klamath, they may then fly to their wintering grounds at Sacramento River NWR in northern California.



# Home, Home on the Refuge...

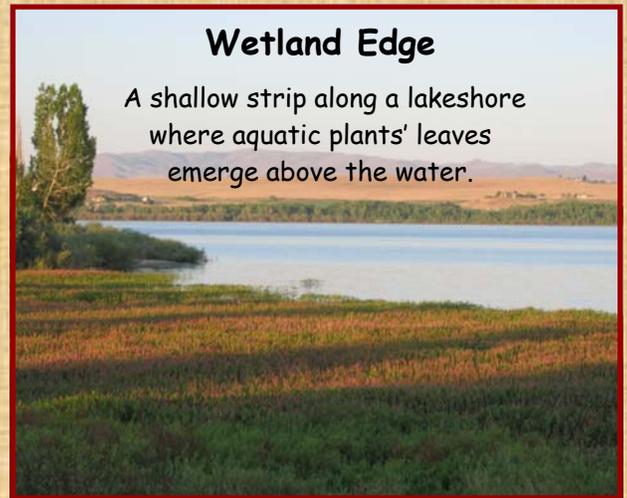
The Deer Flat National Wildlife Refuge **ecosystem** is made up of many habitats. Within an ecosystem depend on each other. Plants use the sun and soil to grow, ecosystems are dependent upon one another. If one part changes, the whole

## Refuge Habitats

All animals need a **habitat**—a home that provides the food, water, shelter and



**Open Water**



**Wetland Edge**

A shallow strip along a lakeshore where aquatic plants' leaves emerge above the water.

## Refuge Wildlife

An **adaptation** is a characteristic that helps an organism survive and reproduce. It survives, and whether it needs to migrate to survive the winter. An animal's

**American White Pelican**  
(*Pelecanus erythrorhynchos*)



What do I eat with my huge bill?

**Habitat:** Open Water

**Food:** Fish

**Can they stay in Idaho all year?**

**NO!** They fly south for the winter to lakes that do not freeze.

**Muskrat**  
(*Ondatra zibethicus*)



My waterproof fur keeps me warm!

**Habitat:** Wetland Edges

**Food:** Wetland plants like cattails

**Can they stay in Idaho all year?**

**YES!** They live in a lodge and travel under the ice to collect food.

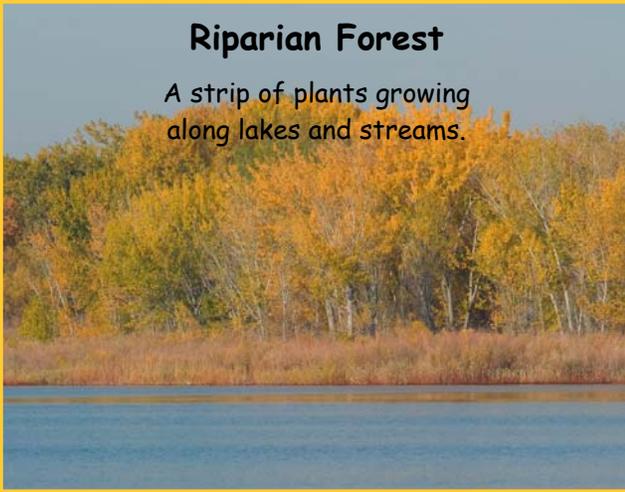
# Where the Pelican & the Oriole Fly

It includes all the living organisms and the non-living stuff too. Plants and animals herbivores eat the plants, and carnivores eat the herbivores. All parts of an ecosystem changes.

space they need to grow and reproduce.

## Riparian Forest

A strip of plants growing along lakes and streams.



## Sagebrush Steppe

Dry areas with shrubs (including sagebrush) and grasses.



in its habitat. Adaptations, like beak or foot shape, offer clues to what an animal eats, how adaptations affect its role within an ecosystem, or its **niche**.

## Bullock's Oriole

(*Icterus bullockii*)



My bill is the perfect shape for catching insects.

**Habitat:** Riparian Forests

**Food:** Insects and ripe fruit

**Can they stay in Idaho all year?**

**NO!** They fly south in search of insects and fruit.

## Side blotched-lizard

(*Uta stansburiana*)



My colored scales help me blend in!

**Habitat:** Sagebrush Steppe

**Food:** Any smaller animal!

**Can they stay in Idaho all year?**

**YES!** They are active on warm winter days and sleep when it's cold.



What adaptations do these animals have? What about you?

# How Do You Collect...

Here are some tricks scientists use to get closer to animals and find out more about them!

## *Aquatic Invertebrates?*

Animals without a backbone are called **invertebrates**. Examples include insects, spiders, and jellyfish. How could you collect **aquatic** invertebrates—those that live in the water?

A **sieve** is a simple tool that can be used for capturing aquatic invertebrates by filtering out the water. To use, sweep it quickly through the water. Do you think you are more likely to catch invertebrates near vegetation or in open water?



What do people use a sieve for in the kitchen?

A **D net** is used to collect aquatic invertebrates in shallow water. To use, sweep it across the bottom or through plants and debris. After a few sweeps, examine the net for all kinds of aquatic invertebrates.



Why do you think this is called a “D” net?

## *Terrestrial Invertebrates?*

You can also use nets to trap **terrestrial** invertebrates—those that live on land. Another technique used to trap terrestrial invertebrates is a pitfall trap.

**Pitfall traps** collect ground-dwelling invertebrates—and sometimes vertebrates! A small container is sunk into the ground so that the rim is level with the soil. The animals fall right into the trap and are unable to escape. Scientists use forceps to examine them more closely.



You might catch an earwig like me or another insect.



Have you collected invertebrates? What tools have you used?

# How Do You See...

## *Birds in the Sky?*

**Binoculars** help magnify distant objects like this osprey to make them appear closer.



## *Bugs in the Grass?*

A **magnifying glass** gets you a closer look at small things like this darkling beetle.



## *Things Invisible to the Naked Eye?*

A **microscope** gets you an even *closer* look at small objects than a magnifying glass. When you look through a microscope, you can see details that weren't visible before! What are some differences between these two kinds of microscopes?

A **dissecting microscope** helps you see small details on large objects, like the hairs on the leg of a bee. The light needed to see the object comes from above the object to be viewed.

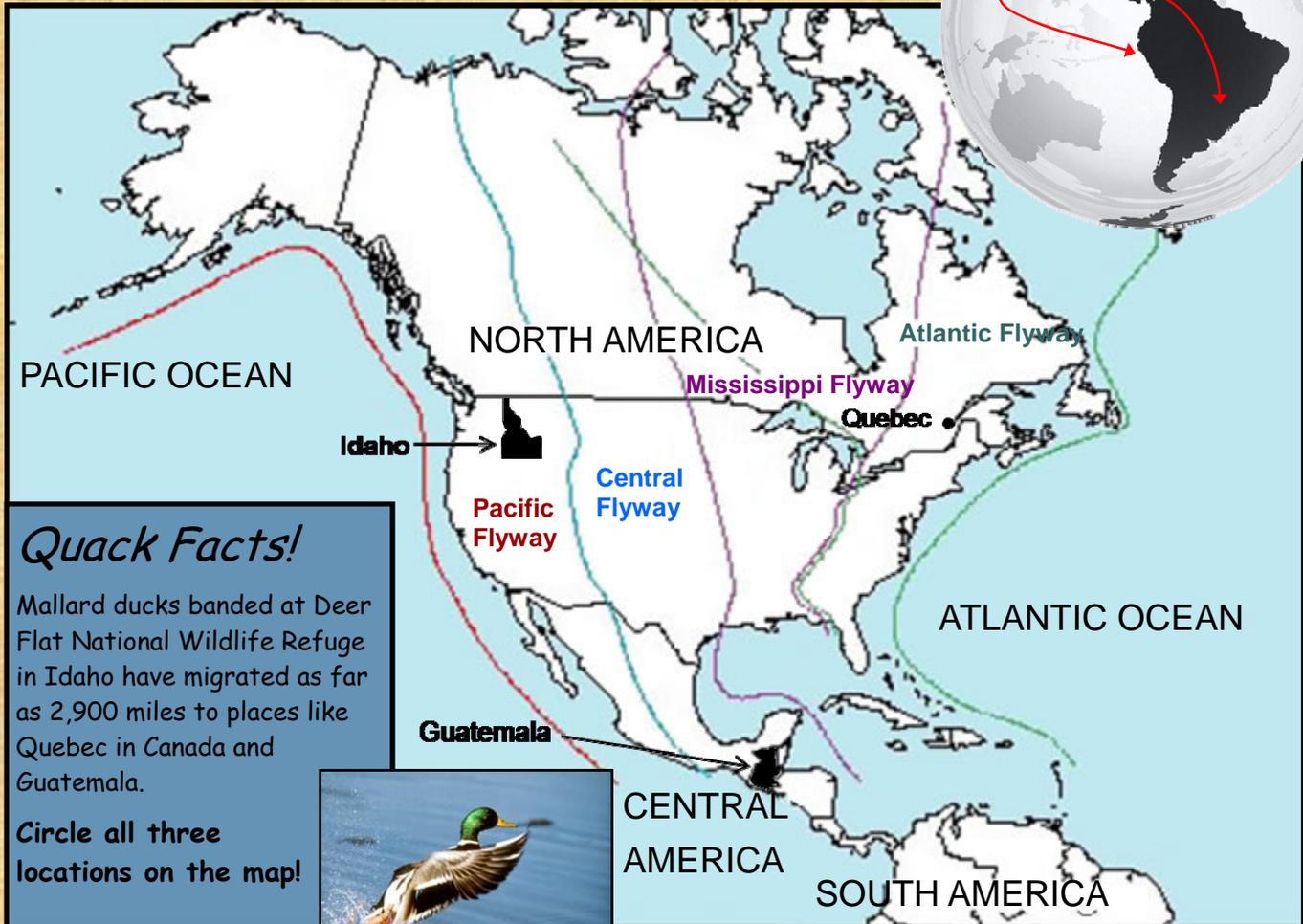


A **compound microscope** helps you see animals and plants so small that they are invisible to the naked eye! The light needed to see the object comes from a mirror and actually passes through the object.



# Just Traveling Through...

Birds worldwide migrate along "highways in the sky" called **flyways**. In North America there are four flyways. Birds flying over Idaho use the **Pacific Flyway**. Check it out below. Some migrating birds use the Pacific Flyway in fall and the Central Flyway in spring!



## Quack Facts!

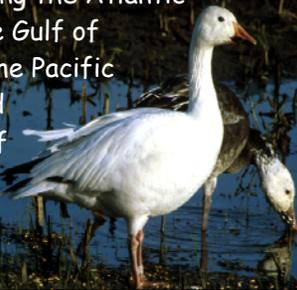
Mallard ducks banded at Deer Flat National Wildlife Refuge in Idaho have migrated as far as 2,900 miles to places like Quebec in Canada and Guatemala.

Circle all three locations on the map!



## Amazing migrations!

Snow geese use all 4 flyways! They nest in the high arctic and winter along the Atlantic Coast, the Gulf of Mexico, the Pacific Coast, and in parts of Mexico.



Golden eagles that nest above about the middle of Canada migrate south for the winter. Most eagles that nest in Idaho do *not* migrate. When only some members of a species migrate, it is called **partial migration**.



All lazuli buntings—males, females, young and old—leave the nesting grounds and fly to Mexico for the winter. When all members of a species migrate, it is **complete migration**.



# Bird Migrations in Idaho

Tundra swans migrate in family groups from their nesting sites in the high arctic to their wintering grounds in California. Tundra swans stop at Lake Lowell every year to rest and eat.



Snowy owls migrate from the arctic to north Idaho almost every winter, but visit south Idaho about once every five years when food sources are very low. Such unpredictable movements are called **irruptive migration**.



Canada geese use the refuge during all stages of migration! Some spend the winter or the summer, and others only use the refuge as a resting spot during migration.



Mountain quail walk to migrate instead of flying! They move down the mountain in the winter to get away from deep snow and move back up as the snow melts. This is called **altitudinal migration**.



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Common goldeneyes spend the winter in Idaho, where they find food along the Snake and other rivers. They nest in Canada and Alaska.



Osprey nest in Idaho and migrate south to Central and South America for the winter.



## IDAHO

# Why Migrate at All?



*I am a blackpoll warbler.*

*When I migrate, I fly 80-90 hours without resting!*

*Boy, that sure is tiring.*

## *Migrating is hard work!*

Imagine if each year you had to leave your home and travel hundreds or thousands of miles on foot—maybe without eating. For you to perform the equivalent of the blackpoll warbler's amazing migration feat, you would have to keep running a 4-minute mile for 80 hours!

Migration requires a huge amount of energy, so birds fatten up before migrating. Before leaving for their marathon flight, blackpoll warblers nearly double their body weight. Other birds can even triple their body weight in a matter of weeks. Birds fatten up by eating more, storing fat more efficiently, and switching to foods that can be easily converted to fat.

## **YOUR MIGRATION MENU**

- Eat all regular meals
- Eat one McDonald's hamburger  
...every 10 minutes  
...all day and all night!
- Repeat every day for 2 weeks.

This menu would help you double your body weight like a warbler does before migrating.

Don't try this at home!

## *So...why migrate at all?*

Do you think that warblers can find caterpillars during cold winters? Or that osprey (a.k.a. fish hawks) can catch fish swimming under the ice? Many animals live in habitats that are difficult to survive in all year, so they travel elsewhere to find sufficient food and space. To survive the winter, warblers travel to South America where they can find plenty of insects for lunch.



Can you predict whether a particular bird species will migrate?

# How Does a Bird Navigate...

## *During the Day?*

When we want to find our way from one place to another, we might use tools like street signs, maps, and compasses to **navigate**. For a bird to migrate successfully, it too must use navigational tools. Birds migrating during the day rely on visual landmarks such as mountains, coastlines, the position of the sun, and rivers.



Sawtooth Mountains



Pacific Coastline



Position of the sun



Snake River

## *During the Night?*

It is a little more difficult for us to navigate at night, when most visual landmarks are hard to see. At night, boaters depend on lighthouses to travel safely along a shoreline. Many birds migrate at night, so how do they navigate? Like ancient mariners, some migrating birds use the movements of the moon and stars as navigational tools.



What are some navigational tools you use?



# Migration Is Not Just for the Birds!



Migration helps many kinds of animals—not just birds—to survive and reproduce. Here are just a couple of examples:

## *Elk and Mule Deer*

Herds of elk and mule deer are **altitudinal migrants**. They travel to valleys in winter because food is difficult to find in the deep mountain snows.



## *Monarch Butterflies*

Monarch butterflies migrate thousands of miles on their delicate wings to wintering sites in California and Mexico.



## *A Journey for You*

Research one of the following migratory animals that live in the United States. Why does your animal migrate?

- |        |                        |                   |           |
|--------|------------------------|-------------------|-----------|
| Bison  | Green Darner Dragonfly | Humpback Whale    | Pronghorn |
| Salmon | Green Sea Turtle       | Monarch Butterfly | Caribou   |

Questions to consider:

- Where does your animal live in the winter? In the summer?
- Describe its winter and summer habitats. In what ways are they different?
- What does your animal eat? Describe its feeding or hunting methods?
- What preys on your animal?

 What characteristics must all migratory animals have?

# What's In a Name?

## *What Would You Call This Animal?*

Panther or puma? Cougar, catamount, or mountain lion? Depending on where you grew up, you might call it any one of these names, but they are all the same animal! Having many names can be confusing when scientists try to talk to each other—no one is quite sure whether they are talking about the same thing.



## *Puma concolor... The Scientific Name Solution*

Over 300 years ago, Carolus Linnaeus, an 18<sup>th</sup> century doctor and botanist, solved the common name problem. He developed a scientific naming system (**scientific nomenclature**) in which all living things are divided into two kingdoms—plants and animals. Each organism is then given two names—one general (**genus**) and one specific (**species**). Similar organisms are lumped into the same genus. Each organism then has a unique scientific name taken from its genus and species. The puma's scientific name is *Puma concolor*.

## *Carl or Carolus?*



Linnaeus used Latin as the basis for scientific names because it was considered the language of learning in the 18th century. In fact, Linnaeus liked Latin so much that he changed his given name from Carl von Linne to Carolus Linnaeus!

## *King Philip Came Over For Green Soup*

The science of classification, **taxonomy**, has come a long way since Carolus Linnaeus' time. We now recognize five kingdoms (Monera, Protista, Fungi, Plantae, and Animalia), and there are seven taxonomic categories instead of three.

The seven taxonomic categories:

Kingdom, Phylum, Class, Order, Family, Genus, and Species

A good way to remember:

King Philip Came Over For Green Soup

## *A Key to Identity*

If you find a plant or animal, how do you figure out what its name is? Scientists use a **dichotomous key** to identify organisms. Dichotomous means divided into two parts. At each level of a key, you are given two choices and only one is correct. With each two-pronged choice, you get closer and closer to a unique identity. For example, if you were keying out fruit, a key might ask: "Is the skin fuzzy?" (Yes: Peach or kiwi fruit) or "Is the skin blue?" (Yes: Blueberry or huckleberry)

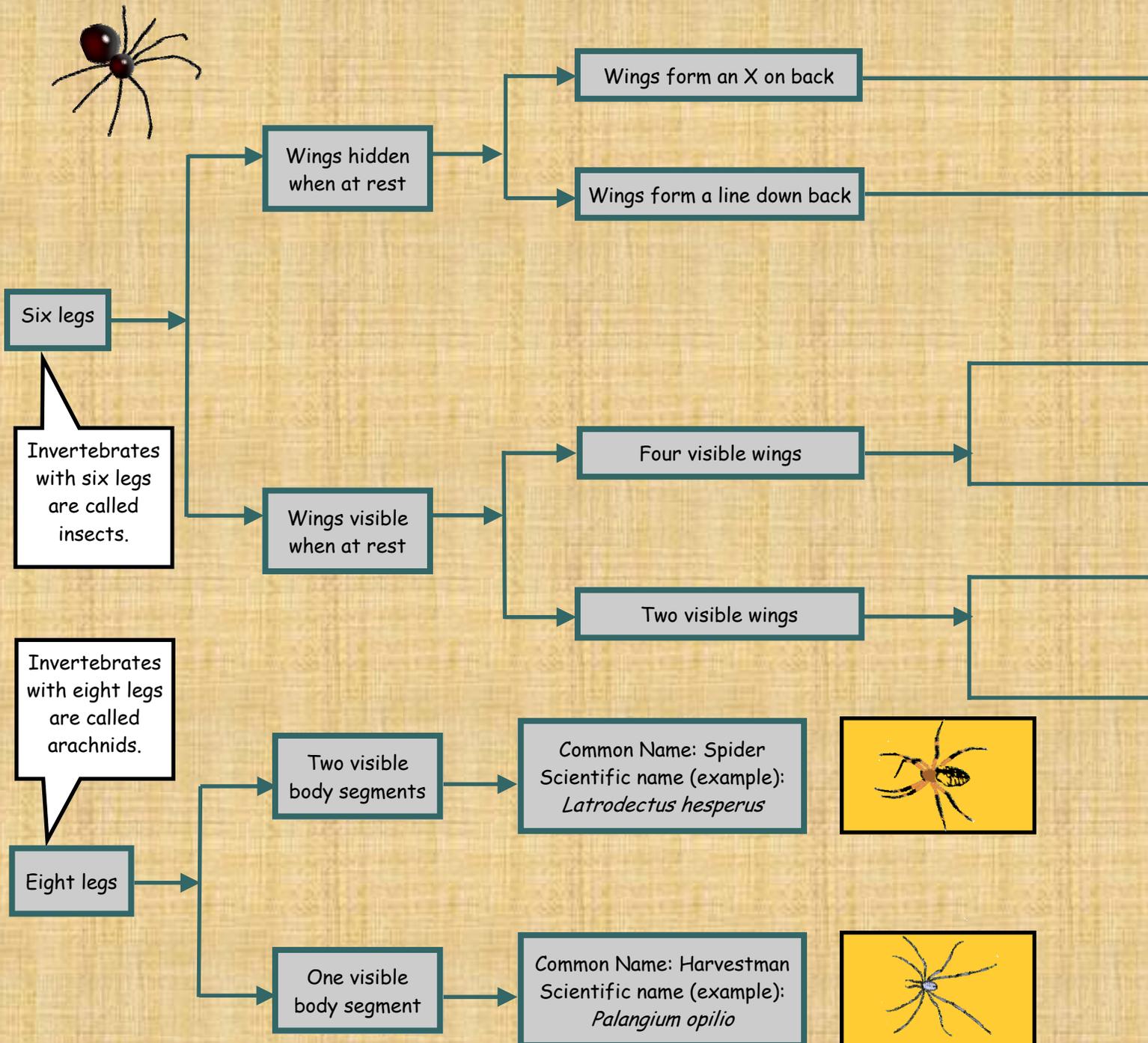


What are some features that make you different from your classmates?

# Key It Out...

## What Kind of Animal Did You Find?

The dichotomous key on these pages can help you figure out what kind of invertebrate you have found. At each level, figure out which characteristic your animal has. For example, start by counting the legs. If your animal doesn't seem to be on this key, you may need to find it on a more in-depth key.



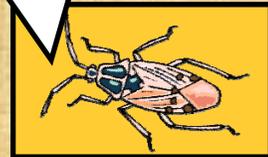
## Who Am I?

Use the key to figure out who I am! You can also use a key to identify other invertebrates you find..



Some people call all creepy-crawlies bugs, but members of the Order Hemiptera, like me, are the only "true bugs."

Common Name: Bug  
Scientific name (example):  
*Halyomorpha halys*



Common Name: Beetle  
Scientific name (example):  
*Eleodes hispilabris*



Solid, colorful wings

Common Name: Butterfly  
Scientific name (example):  
*Pontia beckerii*



Clear wings

Common Name: Dragonfly  
Scientific name (example):  
*Leucorrhinia hudsonica*



Small, hairless antennae

Common Name: Mosquito  
Scientific name (example):  
*Culex pipiens*



Hairy antennae

Common Name: Midge  
Scientific name (example):  
*Chironomus plumosus*



Many people think I am a mosquito, but please don't swat at me if I have hairy antennae. I'm a midge and I don't bite!



Can you create a dichotomous key like this to identify different types of fruit?

# Bulletin Board Trivia

*Did You Know...?*



## *Mud Birds?*

*The ancient Greeks believed that small birds called swallows buried themselves in the mud at the bottom of lakes to get through the winter. Nope. Instead, they migrate to find insect lunches!*

## *Bacteria Can Be Tasty!*

*Do you like milk, cheese, and yogurt? How about bread? Or pickles? All of these foods are made with the help of bacteria! Bacteria get a bad rap because they can make people sick. Most bacteria are really useful, from making foods, to helping ski resorts make snow, to helping police catch criminals. Bacteria are awesome!*



## *Day Length Triggers Migration*

*As the days become shorter in the fall, migratory birds get restless and begin to prepare for their migration to wintering grounds. As days become longer in the spring, they prepare for the trip back to nesting grounds. Day length, or photoperiod, is a great example of a migration cue.*

## Goose Taxis?

Some people have thought that hummingbirds migrate on the backs of geese. They don't—they migrate on their own tiny wings! Amazingly, ruby-throated hummingbirds migrate across the Gulf of Mexico, as much as 500 miles, without stopping to rest or refuel. That trip may take as long as 20 hours and consume almost all of their stored body fat!



## A Migration Alternative

Some animals don't migrate to avoid times of year that are difficult to survive. Instead, they just avoid the difficult season by sleeping through it! For example, marmots (a.k.a. rockchucks) in southwest Idaho sleep through most of the dry summer when they would not be able to find enough food. This is called estivation. Do you know what it's called when animals sleep through the winter?

## A Built-In Compass!

Wouldn't it be handy to have a built-in compass? Some birds are able to detect—and navigate by—the earth's magnetic field! For example, when European robins are placed in an artificial magnetic field in the lab, they change the direction that they want to migrate according to the changed magnetic field. How exactly they detect the magnetic field is still unknown!



Why do animals have adaptations?

# What Happened at the Lakeshore?

Today I explored the lakeshore at Deer Flat National Wildlife Refuge and found...



How was your experience different from what you expected?

Did you hear, smell, or feel anything that surprised you?

A challenge I faced was...



# Acinonyx jubatus... What?

Design and name a new animal!

What type of animal will you create? Draw it below...

*Acinonyx jubatus*



...is the scientific name for a cheetah!

Things to consider....



What defenses does your animal have?



What kind of food would your animal eat?



What type of habitat does your animal live in?



Does your animal migrate?



How could your animal be caught? What kinds of tools would you use?

Now develop a 2-part scientific name for your new animal. Animals are often named after the person who discovered them! Scientific names are always italicized. If they are handwritten, they are underlined. The genus name is capitalized and the species is not.

\_\_\_\_\_



This Idaho woodpecker is called Lewis's woodpecker. Its scientific name is *Melanerpes lewis*. It was named by Merriwether Lewis—of Lewis and Clark fame!



How does the design of your animal fit its food source and habitat?

# Word Match

*Match the term to its definition*

A structural or behavioral trait that helps an organism survive and reproduce in a particular environment.

**Flyway**

A route taken by migratory birds during their flights between breeding and wintering grounds.

**Refuge**

An animal's role within an ecosystem, including what it eats and how it interacts with other organisms.

**Niche**

Growing in, living in, or frequenting water.

**Aquatic**

**Adaptation**

Animals that live on land.

**Migration**

A safe place to live. Sometimes used to describe an area set aside to provide a home for wildlife.

**Terrestrial**

The living and non-living things in an environment, including their interactions with each other.

**Habitat**

An animal without a backbone

**Invertebrate**

An animal's home. It must provide the food, water, shelter, and space it needs to survive.

**Ecosystem**

Annual seasonal movements made by birds and other animals, often for feeding and reproduction.

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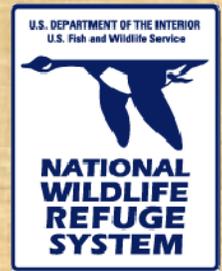
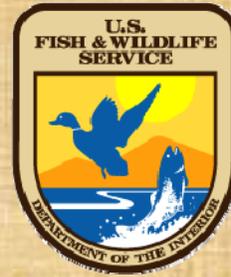
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The *Discover Wildlife Journeys* Student Workbook was developed and designed by: Tom Bicak, Brittany Jones, Susan Kain, Kathy Kershner, Katie McVey, and Christa Sandidge.



## ***Directions to Deer Flat National Wildlife Refuge***

- Take Exit 33A (west-bound) or Exit 33 (east-bound) off of I-84.
- After exiting the freeway, head west on Highway 55/Karcher Road.
- Follow Karcher Road about 3.5 miles to Lake Avenue.
- Turn left onto Lake Avenue and drive about 2.5 miles to the intersection with Roosevelt Avenue.
- Turn right onto Roosevelt Avenue.
- At Indiana Avenue at the top of the hill, turn left into the refuge and follow the road to the Visitor Center.

Deer Flat National Wildlife Refuge  
13751 Upper Embankment Road, Nampa, ID 83686  
Phone 208-467-9278, E-mail: [deerflat@fws.gov](mailto:deerflat@fws.gov)