

CALL OF THE WILD

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The 4-H Wildlife Biology project gratefully acknowledges the Minnesota Deer Hunters Association, who generously granted supporting funds for the production of these materials.

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The 4-H Wildlife Biology project also gratefully acknowledges the support of the following individuals, who contributed time and expertise to these materials:

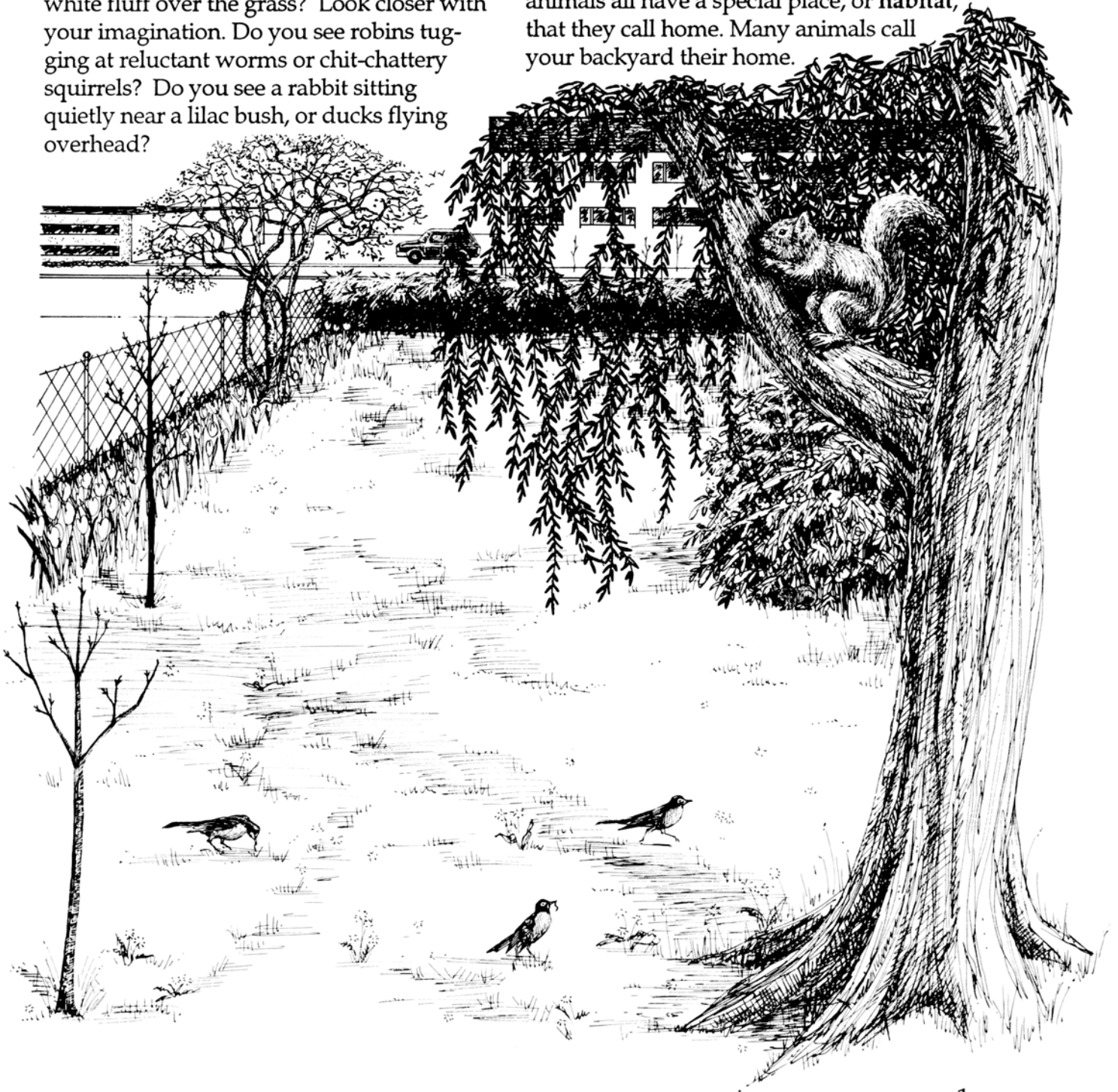
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Chapter 1

HOME-A PLACE TO HANG YOUR HABITAT

Close your eyes and picture your backyard. Can you see green willows sweeping the ground with their branches? Are there thousands of dandelions blowing white fluff over the grass? Look closer with your imagination. Do you see robins tugging at reluctant worms or chit-chatterly squirrels? Do you see a rabbit sitting quietly near a lilac bush, or ducks flying overhead?

Animals are everywhere! Polar bears lumber across the frozen Arctic. Roadrunners scurry over hot desert sand. Bighorn sheep rule mountain meadows. These animals all have a special place, or **habitat**, that they call home. Many animals call your backyard their home.



Me and My Habitat

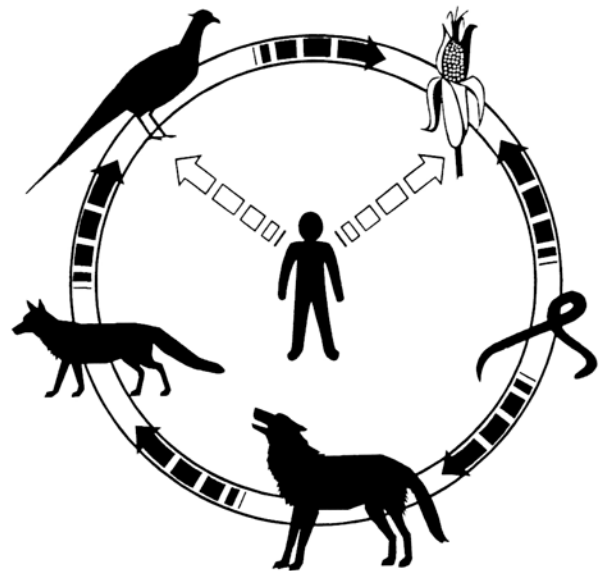
Your home has special qualities that help you live and grow. Whether you live in a tiny apartment or a big house, your place is your habitat. Animals have homes, too. Is your home made out of leaves and perched in a tree like a squirrel's home? Maybe not, but both you and the squirrel need the same types of things in your home. Draw (or write about) your home in the space below. What things are *in* your home that help you survive (such as your bed for sleeping)? Draw or describe these. What things *about* the house itself help you survive (such as the roof to keep out water)?

Animal Basics

All animals need four things in their habitat. These are **food**, **water**, **cover**, and **space**. Without these an animal cannot survive. These habitat parts must be near each other. Food can't be too far from cover, or animals (**prey**) may get caught by **predators** (animals that eat them).

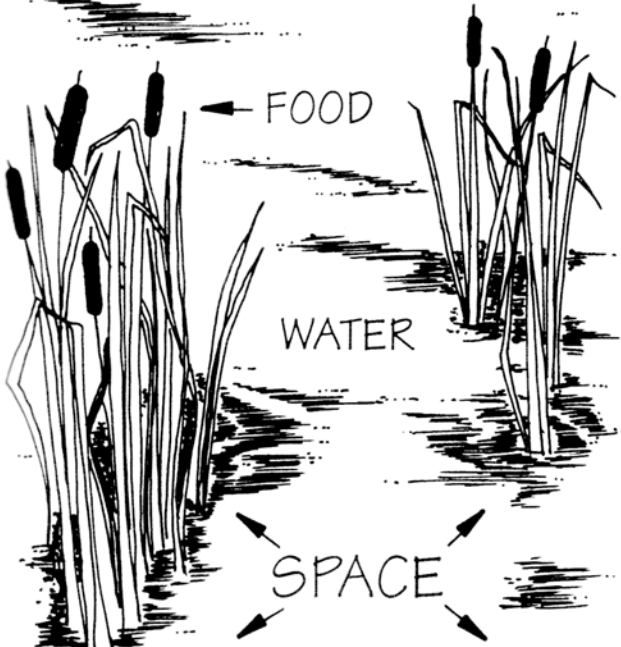
Food provides animals with the energy and nutrients they need to grow. Some animals eat plants; others eat animals. Raccoons eat just about anything in sight—garbage, corn, or insects. But the picky panda bear eats bamboo and not much else. A **food web** shows how energy and nutrients travel among plants and animals. The parts of the web can be divided into three main categories: **producers**, **consumers**, and **decomposers**.

Producers are green plants. They make their own food using water, carbon dioxide, and energy from the sun. Without producers, there would be no life on earth!





COVER ↗



FOOD

WATER

SPACE

Consumers can't make their own food—they eat plants or animals. Animals that eat plants are called **herbivores**. **Carnivores** eat meat. Some carnivores such as turkey vultures eat **carrion**—prey that is already dead. Many animals eat a wide range of food, including grasses, fruits, fresh meat, and carrion. These animals are called **omnivores**. Are you an omnivore, herbivore, or carnivore?

Decomposers include insects, bacteria, and fungi. They break down dead plants and animals, turning them back into water, carbon dioxide, and minerals. These materials are released into the soil or air and used by green plants to make food. Decomposers really know a lot about recycling!

Animals also must have water to live. Muskrats eat water plants and use them for building houses. Desert lizards get all the moisture they need from plant leaves or stems.

Wildlife need cover, too—a place to escape from predators or bad weather. Some animals hide underground. Others hide in trees. Some hang from the rafters (do you?). Animals also need space to grow, play, find food, and mate. Some animals need only a few feet of space, others need several square miles. How much space do you need to grow?

(write your answer here)



Have a Habitat

Different animals have different habitats. Many animals need more than one type of habitat to survive. Grizzly bears use dense forests for cover and open areas for gathering berries. Wildlife also may change their habitat needs depending on the season.

A ruffed grouse is a common bird found in or near aspen forests. Aspen trees provide food and cover for ruffed grouse. Aspen trees grow so close together that they protect grouse from hawks and other predators, and older aspen have buds and flowers that the grouse eats.

Forest habitats are areas covered mostly by trees. Wildlife that live in forests need trees for food or cover. Forest dwellers range from the crashing moose to the tapping woodpecker.

Prairie habitats are areas that are mainly grass. Animals that love grasses for food or cover live in prairies. Grasshoppers hop and bison nap in the short and tall grasses of the prairies.

Water habitats are extremely important to many types of wildlife. Ducks, geese, and other birds need wetlands—areas filled with water during at least part of the year—to survive. Aquatic (say ah-kwa-tick) habitats are lakes, ponds, rivers, and streams. These habitats provide everything a rainbow trout or busy beaver could want.

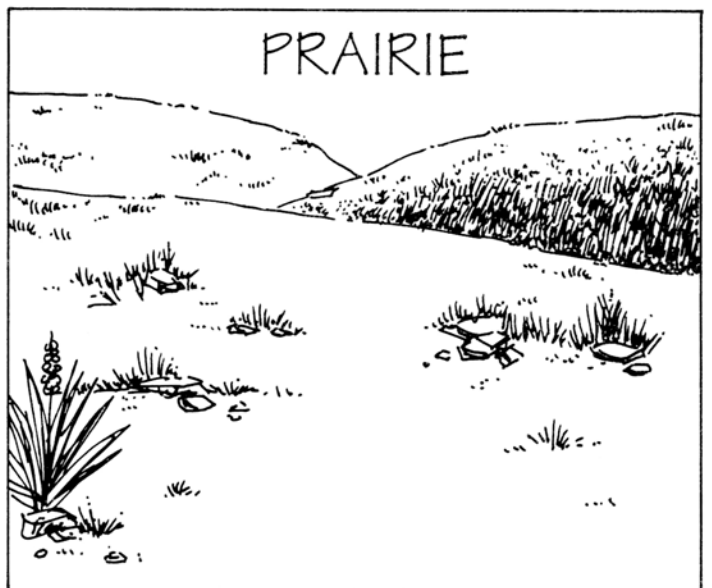
Most cities have grass, trees, cement, and buildings. There are many trees and bushes in cities, but they usually aren't very close together. Buildings are good cover for many animals, including gray squirrels, pigeons, mice, and raccoons. Even larger white-tailed deer find the things they need to survive in city habitat.

Urban areas can make excellent homes for raccoons. In forests, raccoons live in old tree trunks and in hollow logs. They eat small animals such as mice and crayfish. When they live near towns or cities, raccoons change the way they live. They use chimneys and abandoned buildings for homes and eat garbage or garden vegetables. Raccoons even use sewer pipes as subways!

"HABITAT HUNT"



Animals can be found in many different habitats. Some can live in more than one type of habitat. Can you draw lines from each animal to each habitat where it may be found?



Roaming Through My Home

The area that wildlife travel to find food, water, cover, and a mate is their **home range**. Shrews have small home ranges that cover less than a city block. Brown bears may travel hundreds of miles to fill their needs, so their home range is large. Grey wolves travel in packs and need more space and larger home ranges than the solitary porcupine.

In your neighborhood you know where to get food and water. You know where to go when you're sick and where to buy candy. This is your home range! You share your home range with many other animals.

An animal's home range also may vary with the season. White-tailed deer move from woods and fields to small winter home ranges in cedar swamps or state parks. Some predators change their home ranges with the seasons to follow their prey.

Within their home ranges, wildlife have special areas called **territories**. They defend their territories against animals of the same **species**, or kind. Dogs mark their territories with scents from their bodies. A male prairie chicken will fluff up his neck feathers and strut around when another male approaches. Your house, apartment, or backyard is a human territory.



Home, Home on the Map

Map your home range! Draw the places where you can be found!

Draw a map of your neighborhood in the space below. Include all the different spots you go to during a normal week—friends' houses, your school, stores, and meeting places. Then, for at least three days, mark an X where you were at:

7:00 A.M.

10:00 A.M.

1:00 P.M.

4:00 P.M.

7:00 P.M.

You probably will have lots of Xes on your home and school. There will be fewer Xes on places you go less often. On the map circle the area that has the most Xes (it should have about 10). Your home range includes every area on your map where there is an X.

A Niche in Time

If you look in your backyard, you'll notice many different animals live in the same habitat, but they don't all have the same needs. How can these animals live together? If they all ate the same food and lived in the same place, there would not be enough room for everyone. They can live together because each animal fills different "jobs" or **niches** (say nitches, sounds like witches).

People have different niches, too. In cities some people are bakers, others are truck drivers, and still others are lawyers, librarians, parents, or students. Like the animals, we all make our lives in different ways. What is your special niche?

Watch the animals in your backyard. The bats eat mosquitos, the robins eat worms, and the cats pounce upon sparrows. Some are active at night and others move during the day. Bats and birds fly, while cats creep. The niche that each animal fills depends on body size and shape, activity, and behavior.

All Together Now!

The birds, insects, snakes, turtles, plants, and other creatures living together in a habitat form a **community**. Each living thing fills a special niche in the community. Snowshoe hares eat shrubs and use them for cover. Insects eat leaves and crows eat insects. Owls eat mice and, when owls die, crows eat the owls. Bacteria grows on dead plants and animals, returning nutrients to the soil and air.

Communities can be very complex. When something happens to one member of the community, many other members may be affected, too.



Your community is complex, too. All the members of your community depend on each other in some way or another. If you live in an apartment, you depend on a caretaker to keep smoke detectors working. The caretaker depends on you to help keep the hallways and exits free of clutter that might block a quick exit. The firefighter depends on everyone to be a safe member of the community.

Habitat Helper

Over thousands of years, animal and plant species (and people!) have adapted to changing soil, water, and weather conditions. They also have adapted to living with each other.

As the human population grows, its effect on habitats grows. The effects may be good or bad. We alter habitats to fit our own needs for food, materials, and space. Mining, filling in wetlands for buildings and farming, and making roads and new towns change wildlife habitat, often causing harm. When a wetland is filled, ducks can't feed or nest. Other animals lose their homes, too.

Habitat management is the science and art of changing habitat. The goal of habitat management is to increase wildlife populations. We must take care of the

Animals live in many unusual and harsh places. Some fish live in caves, while bacteria live in boiling hot springs. Some worms live inside the bodies of other animals!

habitat that is left so we don't lose plants and animals from the earth forever.

Habitat management includes building nest boxes. It includes planting trees and grasses in some places, and cutting trees in other places. Cutting trees to open forests helps white-tailed deer but not some owls, warblers, and woodpeckers. Burning prairie land helps prairie chickens, but not wild turkeys.

Wild Things Word Search

Find the following words hidden among the letters below.
Words may run up and down, across, or at an angle.

E S O S P A C E I T O C N I C H E I
R I A R P R N N Y A P H O V N X O O
O O R W E R O O S H O M E R A N G E
V E R P O N I D H C O S C R I I A L
I O D E I O D H U O C G C I V H L E
N I J I C M L F S C M A F H D R O S
R V H R T A N O S W E T L A N D V F
A E D I A E S O U M C R P S O D I Y
C T Y A I R G D B N S O D I O S O I
T O N R G I J W T C O N S U M E R C
R E T P R E T E X N C K S O T I O S
I U I O O X S B R Y R O T I R R E T
Y T I N U M M O C C H A B I T A T C

HABITAT
SPACE
WETLAND
FOODWEB

CARNIVORE
COMMUNITY
HOMERANGE
PRODUCER

NICHE
PRAIRIE
TERRITORY
CONSUMER

Career Considerations

Ecologists study the links between plants and animals and their environments. Some study habitat restoration (putting the habitat back together). Many habitats have been changed by humans through pollution, construction, mining, or farming. Some ecologists study different ways to restore and improve habitats so there will be homes for more animals.

Additional Activities

Build a home. Learn about the habitat needs of your favorite animal. Build a birdhouse or mammal shelter for this species. Where should you place the shelter to attract the animal? What are the animal's possible predators? Where does the animal nest or live when there aren't artificial boxes available?

More information about building birdhouses and shelters is available in the Minnesota Department of Natural Resources publication *Woodworking for Wildlife*. This book has plans for building bat and bird houses and other shelters. You can order this book through:

Minnesota's Bookstore
117 University Avenue
St. Paul, MN 55155
(612) 297-3000

Choose a community such as a prairie, wetland, forest, or desert. Draw a food web that shows which animals eat which other animals and plants. Label the producers, consumers, and decomposers. Include at least ten different animals and plants.

Fair Projects/Exhibit Ideas

Make a book that teaches people about six different habitats. You might want to have a theme, such as "Six Minnesota Wildlife Habitats," "Six North American Wildlife Habitats," or "Wildlife Habitats Around the World." Write about where the habitats are found and what

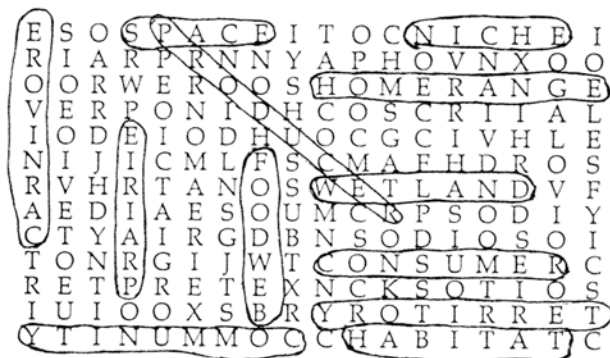
types of plants are found there. List the things that make that habitat different from others. Also describe some wildlife in each habitat and why they are there. Explain which habitats are most threatened by human action.

Make a display that teaches people about a habitat near your home. Collect plants that are common in the habitat. Learn their names and find out which animals use them for food or shelter. Include photographs or drawings of the area and of the animals that live there.

Answers to Me & My Habitat:
Things in your home: food, water, air, clothes, beds, etc. Things about your home: roof, walls, electricity, etc.

Answers to Habitat Hunt: Wetland habitat: mallard, great blue heron, frog, and otter. Forest habitat: caterpillar, white-tailed deer, pileated woodpecker. Urban habitat: pigeon, ladybug, grasshopper, frog, duck, white-tailed deer. Prairie habitat: pronghorn antelope, grasshopper, bison, duck, white-tailed deer.

Answers to Wild Things Word Search:



Chapter 2

AMAZING AVES AND FANTASTIC FOWL

Every animal is unique. A rainbow trout is special because it climbs waterfalls. A white-tailed deer is remarkable because it has hollow hairs that keep it warm. You are special because you use tools and write symbols that become words.

What else makes you special? Write down some things you can do that a mourning dove can't:

1. _____

2. _____

3. _____

4. _____



Mourning doves also are special. They have unique qualities that make them mourning doves. Doves are part of the world of amazing aves (say ay-vees) and fantastic fowl—birds.

Place an "X" in the correct column—the first one is done for you:

| | humans | snakes | birds |
|-------------------------------------|--------|--------|-------|
| What kind of animal: | | | |
| flies thousands of miles a year? | X | | X |
| takes a bath in dust? | | | |
| sings from dawn to dusk? | | | |
| "zips" up its feather coat? | | | |
| grinds food without teeth? | | | |
| builds homes the size of your hand? | | | |
| runs when it's a week old? | | | |

Look at your columns. If you marked an "X" under "birds" for every line, you are right! Birds do all the things above, and more!

What Is a Bird? Reptile Relatives

Birds belong to a group of animals called **vertebrates**. Vertebrates have backbones. Do you have a backbone? See if you can find it.

Are rattlesnakes and robins relatives? Well, maybe! Scientists think birds came from reptiles—animals such as snakes, turtles, and alligators—millions of years ago. Today birds and reptiles look different from each other but they still share traits. Both rattlesnakes and robins lay eggs and have partially hollow bones.

Baby birds can't control their body temperature. They must be warmed by their parents. As they grow they can keep warm on their own. Animals that keep their temperature steady (whether it's hot or cold outside) are called **warm-blooded**. Birds can live and grow in snowy places where cold-blooded reptiles can't.

Flurry of Feathers

Some birds (such as the ostrich) can't fly, but all birds have feathers. They help keep birds warm and dry. Aves are the only animals that have feathers. (Think about it. Does your dog have feathers? Do you have feathers growing from your ears? Have you ever seen a fish with feathers? No!)

Did you know that there are two kinds of feathers? If you've ever walked through a field and found a large feather, you have seen **contour** feathers. They are the strong, bendable feathers on the outside of the bird. They help them fly and protect them from wind and rain.

Birds also have **down** feathers. Down feathers are fluffy and soft. They lie snuggled next to a bird's body under the contour feathers. They help keep the bird warm.

BIRD BASICS

Watch a bird in your yard or on your block. (They're everywhere—look HARDER if you don't see one right away!) How are birds like you? How are they different? See how many traits can you list.

Birds are like me because:

1. we both have backbones

2. _____

3. _____

4. _____

5. _____

6. _____

Birds are different from me because:

1. birds lay eggs

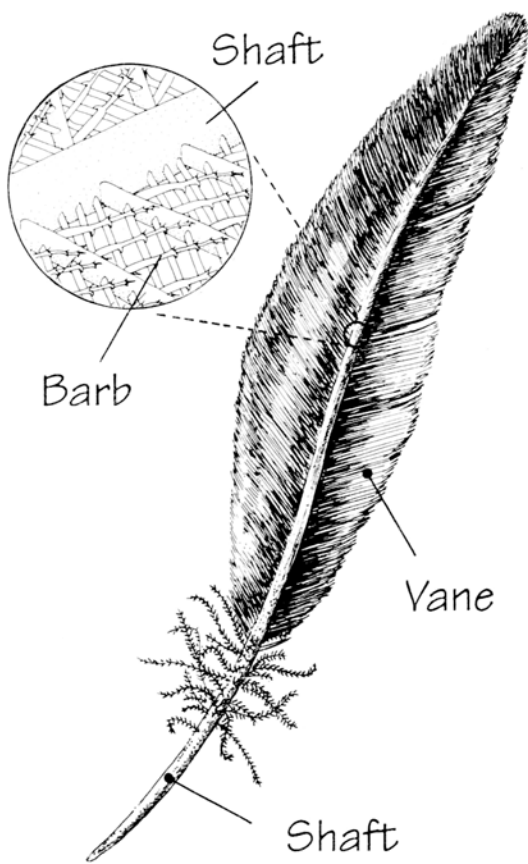
2. _____

3. _____

4. _____

5. _____

6. _____



A feather has two parts, the shaft and the vane. The shaft is the strong hollow “backbone” of the feather. The part around the shaft is the vane. The vane is made up of hundreds of barbs that look like skinny hairs. Each barb has tiny hooks that lock to hold them together. This allows the vane to stay flat while the bird is flying. If the barbs come apart, the bird can pull the feather through its bill to link them back together (like zipping your coat). Find a feather and try to pull apart the barbs and hook them back together.

Many birds, such as mallard ducks, use oil to make their feathers repel water. A gland just above the tail secretes oil. The mallard rubs the oil over its feathers with its bill. Besides keeping feathers water repellent, the oil keeps them flexible and clean.

Oil spills (pollution) are not a bird’s best friend! Though birds need oil to stay clean and dry, too much oil from pollution or spills can hurt the bird.

A big part of a bird’s daily routine is **preening**—pulling feathers through its bill, nibbling them, and fluffing them up. By preening, a bird “zips” together feathers that have separated. Preening also removes dirt and pests such as mites and lice. Whenever you shower, you are preening too, just like a bird.

Blue jays and other songbirds take part in a special kind of preening known as **anting**. They rub ants into their feathers or stand on anthills, letting the ants crawl through their bodies. Biologists think ants produce chemicals that kill pests. Some birds also use other insects, berries, and mothballs to clean their feathers! Still other species take an occasional bath in the dust to keep their feathers clean. (You should stick to showering in water!)

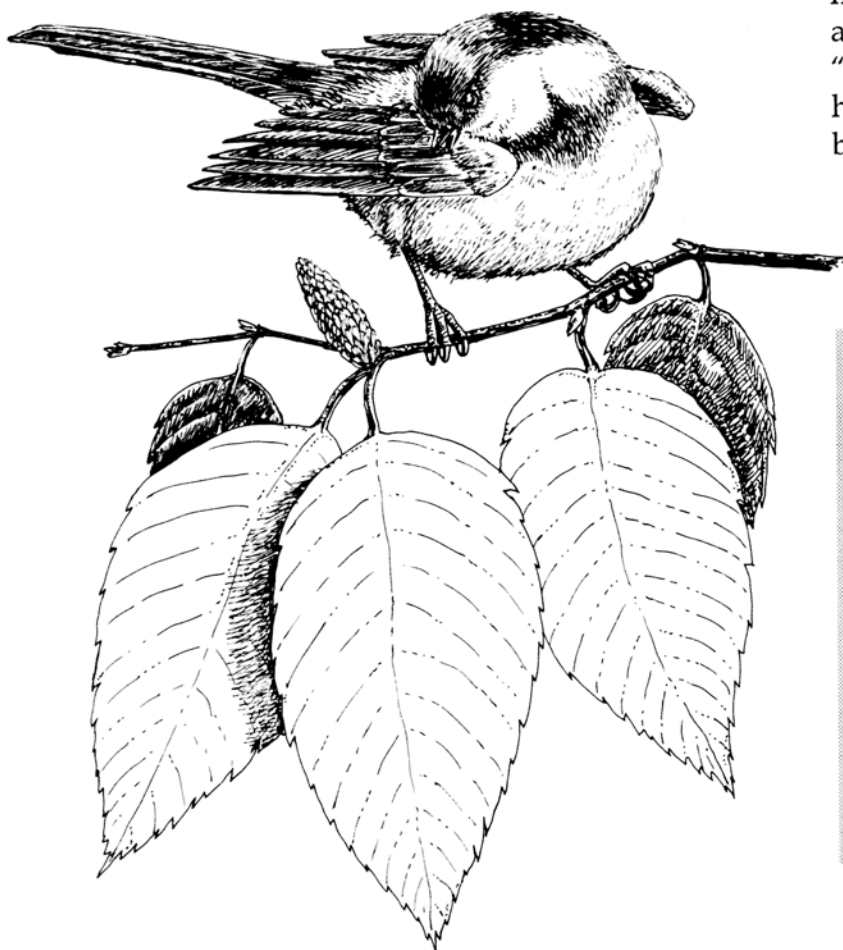
Oil & Water

To see how an oil gland works, try this experiment. Take two small pieces of cloth. Apply petroleum jelly, baby oil, or vegetable oil to one cloth. Then dip each cloth into a cup of water and remove the cloth. Notice how the water soaks into the cloth without the oil, but runs off the one with oil.

Your body produces oils that protect the skin, too. This is why your finger leaves prints on clear glass.

Winging It

All birds, from the least tern to the snowy owl, have wings. Wings help birds fly since they are streamlined, like an airplane wing. This shape gives the bird the “lift” it needs to stay off the ground. The hands (or tips) of the wings help steer the bird through the air.



A bird's wing is a lot like your arm. Both you and a bird have an upper arm bone connected to the shoulder, an elbow that connects the upper arm to the forearm, and a wrist that connects the forearm to the hand. Even though you and a bird have similar bones, you can't fly using your arms (don't even try!).

A blue jay's feathers get a lot of wear and tear. At least once a year all birds replace their old feathers with new ones in a process called **molting**. A bird loses only a few feathers at a time, so it isn't thrown off balance when it flies.

Baby birds don't necessarily stay the same color when they get older. Many have certain feathers, colors, or patterns of feathers (plumage) that change as they reach adulthood. Bald eagles don't have white feathers on their heads until they are about four years old.

The size and shape of a bird's wings are related to the type of flying it does. A goshawk has short, broad wings that allow it to fly through dense forests while dodging trees. A falcon needs to fly fast and far, so it has long, pointed wings. A turkey vulture has large, long wings to soar for hours without flapping. Hummingbirds have tiny wings that flap more than 70 times per second as they hover or even fly backward.

Look at the pictures of bird wings below and see if you can tell what type of flying each bird does.



A.



B.



C.



D.

Coming To Their Senses

Birds use their eyes to survive. A red-tailed hawk relies on sight to find a tasty mouse darting across a field. Sight also helps a hawk find a mate, define territory, travel, and escape danger. Birds have large eyes that can focus sharply on things close or far away. They even can see color.

Most birds have eyes on the sides of their heads. They can look at two separate scenes at the same time. This is **monocular** vision. Monocular sight gives a bird a wide field of vision that helps it see predators approaching. Warblers, ducks, and herons have their eyes set wide apart on their heads.

When a bird uses both eyes to focus on one image it is called **binocular** vision (this is the type of vision you have). Binocular vision helps a hawk figure out how far away the mouse is and to follow its movement.

Birds can't move their eyes like we can. Instead, they have to turn their heads to see in different directions. Some owls can twist their heads almost all the way around!

Yellow-billed cuckoos can see in front and behind without moving their heads. Their eyes are located on the side so they can look forward or backward. Wouldn't it be fun to see behind you without turning around? Isn't it great that your mom can't?

If you look for a red-tailed hawk's ears, you would be looking for a long time. Bird ears are just small holes below the eyes that are covered with feathers. They are very sensitive to both high- and low-pitched sounds.

You find a baby sparrow on the ground. You think you can't put it back into the nest because the parents will smell your human scent, right? Wrong! Most have a poor sense of smell. They rely on eyesight and hearing to find food and avoid predators—and recognize their babies. So, carefully put that baby bird back in the nest!

Birds don't have teeth to chew their food. Instead, they grind food up in a part of the stomach called the gizzard. Many swallow grit (small pebbles, stones, eggshells, etc.) to help grind up the food.

Make your own gizzard!
You will need:

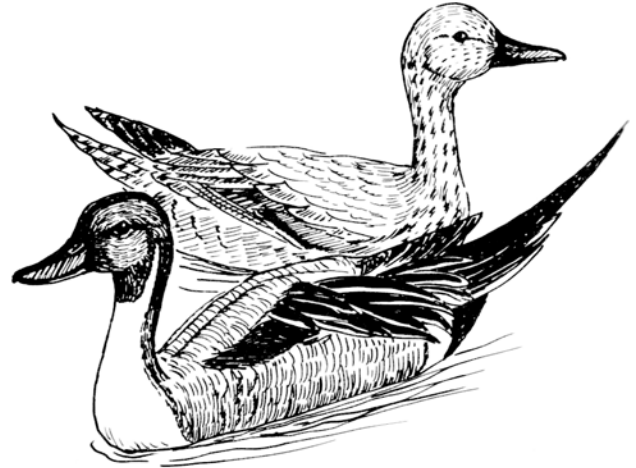
- A round balloon
- Some pebbles
- A kitchen towel
- Bread, sunflower seeds, marshmallows, and other small pieces of food

Place about 20 pebbles inside a deflated balloon. Then place several bits of food inside the balloon. Blow up the balloon to about 1/3 its full size. Tie a knot in the balloon. Wrap a kitchen towel around the balloon. (THIS STEP IS IMPORTANT! YOU NEED THE TOWEL TO PROTECT YOU IN CASE THE BALLOON BREAKS!) Grasp the towel-covered balloon with two hands, and gently shake it several times. (The more you shake, the more you will dissolve your food.) To get a look at how well you "digested" your food, slit the balloon near the knot (keep most of the balloon covered with the towel), let it deflate, and then cut it open and examine the contents. Did your pebble gizzard dissolve all types of food? Did it scrape seed coats? Was there any food that was hard to dissolve?

Bird Types

What kind of bird do you see when you think of a bird? A robin? A piping plover? An eagle? We can categorize birds into groups by the types of habitat or methods of feeding they use.

Waterfowl. Birds that spend most of their time living on water (ducks, geese, and swans) are waterfowl. Waterfowl have webbed feet for swimming. Many have bills for feeding on small plants and animals in the water.



There are two groups of ducks—dabblers and divers. Dabbling ducks gather food from shallow water with their bills. They often tip upside down when feeding. Diving ducks dive under water to feed on insects and plants deeper in the water. Is the duck in this poem a dabbler or a diver?

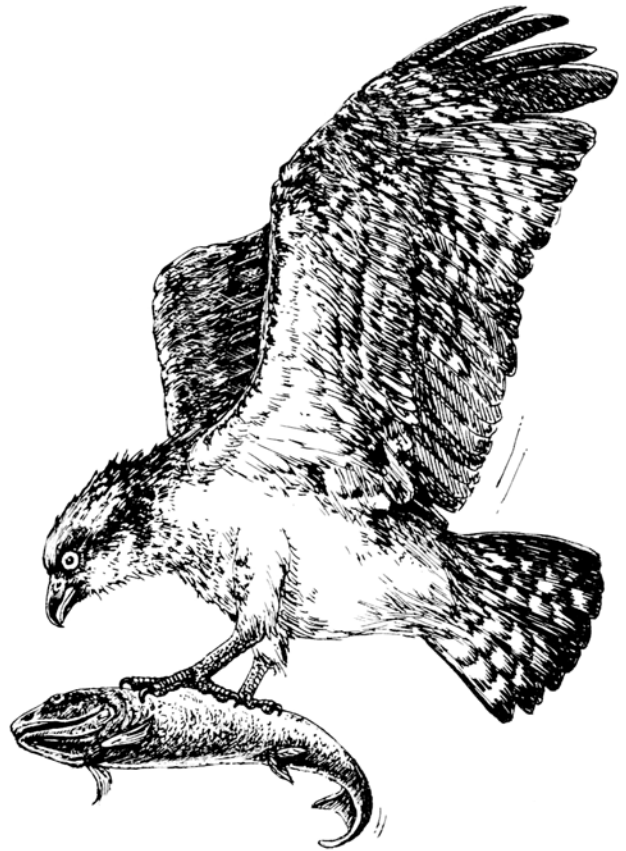
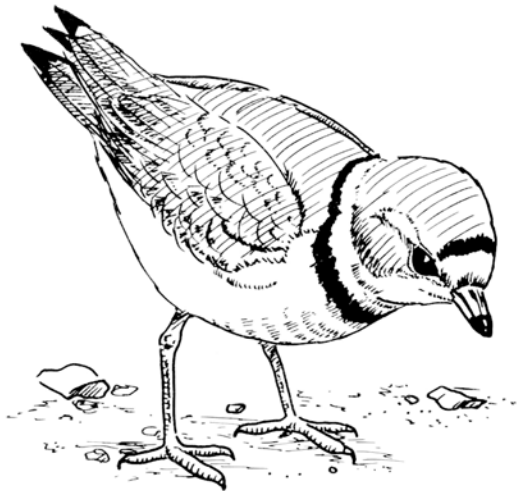
THE DUCK

Behold the duck.
It does not cluck.
A cluck it lacks.
It quacks.
It is specially fond
Of a puddle or a pond.
When it dines or sups,
It bottoms ups.

- Ogden Nash

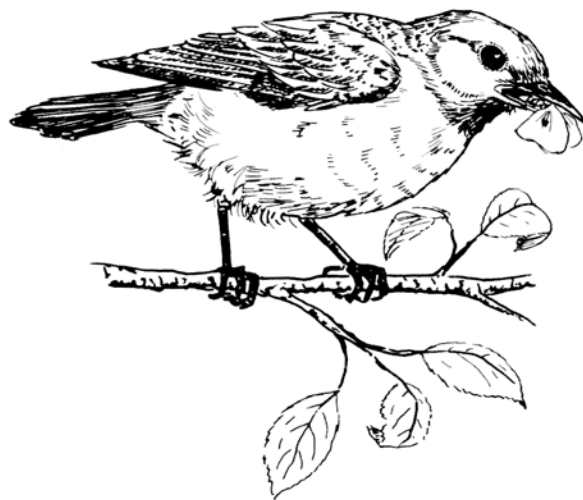
From: **I Wouldn't Have Missed It. Selected Poems of Ogden Nash.** 1975. Boston and Toronto: Little, Brown and Company (Canada) 1975.

Shorebirds and Wading Birds. These animals also live near or on the shores of lakes, streams, marshes, and oceans. Some wading birds, such as great blue herons and sandhill cranes, have long legs for stalking prey in shallow water. Others, like piping plovers and sandpipers, have short legs for running in very shallow water. Many wading birds also have long bills for probing into the wet earth for food.



Songbirds. If you look outside your window, you'll probably see a songbird. Warblers, cardinals, and robins are all songbirds. Songbirds eat seeds, fruits, and insects. Some fly to warmer places in the winter.

Upland Game Birds. Upland game birds such as grouse, turkeys, and pheasants often live in dry, wooded, or brushy habitats. Their feet are useful tools for scratching the ground to find seeds. Upland game birds aren't usually strong fliers—they fly very short distances at one time, so they don't migrate like songbirds or ducks.



Birds of Prey. Birds of prey, or raptors, are hunting birds. When it sees a rabbit in a field, a raptor will swoop toward it with great speed. Raptors have strong feet and claws (talons) for grabbing prey and sharp bills for tearing meat. Bald eagles, great horned owls, turkey vultures, hawks, and peregrine falcons are raptors.

Can you tell what type of birds these are?



Bird Behavior

During the spring as you wait for the school bus, you'll hear chirping and singing. Spring is the mating season for most birds, and males sing the same notes repeatedly to protect a nesting territory from intruders.

Not all birds sing. Many use noises or actions to protect homes or attract mates. The male ruffed grouse stands on a log and beats the air dozens of times per second with his wings to make a low, thumping sound. Woodpeckers "drum" with their bills on dead trees to declare their territories. What sounds do you make to protect your space? (How about: "Get out of my bedroom, please"; "Mom, make Michael leave, I have to do my homework"; "Hey, you!")

After birds have a territory and a mate they build a nest. Bald eagle nests can be up to eight feet wide and weigh several tons. Warbler nests fit into the palm of your hand and weigh less than a tennis ball. Some birds don't build nests at all. Owls and hawks use old crow or heron nests. Terns scrape out small holes in sand or soil. Bluebirds build their nests in cavities (holes) in dead trees.

After an egg is laid, most chicks still have lots of growing to do before they're ready for the outside world. Some chicks are born blind, featherless, and helpless. These chicks are called **altricial** (say all-trish-ul) young. They are fed several times a day by their parents. Gradually, the chicks develop feathers and can see. Altricial chicks usually stay in the nest until they learn to fly.

Other chicks, such as turkeys, loons, ducks, and geese, can see well and have down feathers when they hatch. These are **precocial** (say pre-co-shul) young. Within a few days they can run around and even find their own food.

Some birds don't even bother to build nests for their eggs. A cowbird finds a nest of another bird and sneaks eggs into the nest when the owner is gone. When the cowbird eggs hatch, the babies are fed and cared for by the nest owners. Sometimes the strange cowbird chicks will even push other babies out of the nest! Birds that lay their eggs in other bird's nests are called **nest parasites**.

Robin chicks are
ALTRICIAL



Killdeer chicks are
PRECOCIAL

Match That Bird

Drawing yellow warbler, pheasant, snow goose, great gray owl, upland sandpiper

Match the bird on the right with the category to which it belongs.

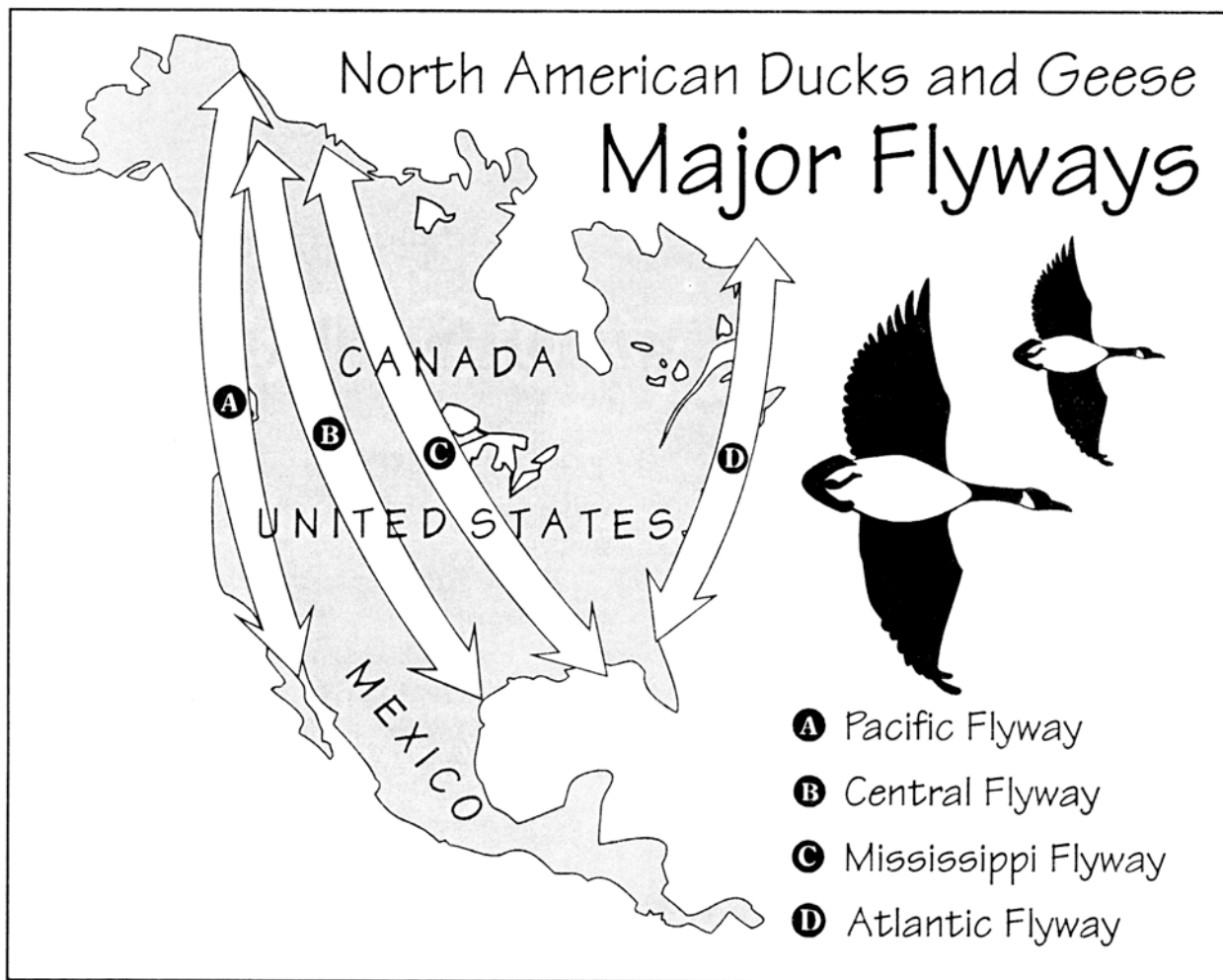
- | | |
|---------------------|---------------------|
| A. Songbird | 1. Yellow warbler |
| B. Raptor | 2. Pheasant |
| C. Upland game bird | 3. Snow goose |
| D. Shorebird | 4. Great gray owl |
| E. Waterfowl | 5. Upland sandpiper |

On the Move

Your grandmother might spend the winter in San Antonio, Texas, and the summer in St. Paul, Minnesota. But did you know that Canada geese make the same trip (by air instead of car!)? Many birds travel thousands of miles between summer and winter homes. These yearly trips are called **migrations**. Birds (and people!) usually migrate to escape cold winters.

How do birds know when, where, and how to migrate? For many, migration is instinctive. This means they are born with the “drive” to migrate. Somehow their bodies are programmed, like a computer, telling them where to go, when to stop, and how to get back.

In spring and fall you may see V-shaped flocks of Canada geese flying overhead. Scientists believe that this flock shape saves energy for individual geese. The lead bird pushes through the air and makes a draft that pulls the other geese. The geese take turns being at the front of the flock.



Amazingly, migrating birds return to the same places year after year. How they know where to go is still somewhat of a mystery. We do know they use various cues to guide them from one place to another. The sun and the stars are two cues. Some birds use landmarks such as rivers, lakes, and mountains. Others use the earth's magnetic pull to guide their way.

Each year, thousands of birds use the same paths between their summer and winter homes. These paths are called **flyways**. Biologists keep track of different species by following them along their specific flyways. The map above shows the major flyways for North American ducks and geese.

One of the fastest migrations ever recorded was by a shorebird called the lesser yellowlegs. It was banded in Massachusetts August 28 and shot on Martinique, an island in the West Indies, September 3. This bird (it weighed less than half a pound) traveled 1,930 miles in six days—an average of 322 miles a day!

Tricks of the Trade

Birds have to face many dangers every day. But they have acquired ways of protecting themselves from these dangers.

Pigeons don't live alone. They gather in groups, called **flocks**. When birds are in a group, it's harder for a predator to single out just one bird. Flocking also means that there are many pairs of eyes looking out for trouble.

Predators look for movement when they are hunting for a meal. Some birds "hide" from their enemies by "freezing" (becoming still) when a predator flies overhead. This is especially true for nesting birds. If you are walking near shoreline, you might come close to stepping on ducks "frozen" on their nests.

When birds spot danger, many give a short, sharp call to alert others in the area. They then scatter into the brush and wait for the danger to pass. Most bird species have their own special alarm calls. Different species living in the same habitat often understand each other's alarm calls.

Did you ever wonder why a grouse was such a dull, brown color? That dull, brown color helps the grouse hide from hungry enemies. Blending into the surroundings is called **camouflage**.

Sometimes a bird can't fly away from an enemy. Trapped, the bird may try to look bigger and meaner to scare away the enemy (like gritting your teeth and clenching your fists). It may puff out its feathers, hold out its wings, and open its bill. It also may make hissing sounds or other noises. (Did you ever get a goose angry? A goose will hiss first, and then chase, and then . . . snap!)

Have you ever heard the calls and screeches of a group of crows chasing an owl? This is called **mobbing**. Birds use mobbing to try to drive away a predator from their territory. They dive at the intruder, scold it, and try to chase it from the area.



Me and My Bird

Birds are an important part of natural communities. Some eat harmful pests and weed seeds. Others are scavengers that feed on dead and decaying animals. All birds are food for other animals.

People have caused the loss of many bird species. The passenger pigeon, heath hen, dodo, and California condor are bird species that no longer live in the wild. Habitat destruction is one of the major reasons for declines in bird populations. When we drain wetlands and clear forests for new buildings, parking lots, and farm fields, we take habitat away from birds.

People also harm birds by causing pollution. We need to think about what we throw away into our environment. Sometimes it winds up in ponds and waterways. Chemicals from landfills sometimes leak into the soil and get into the ground water supply. Eventually the chemicals wind up in lakes and rivers. The chemicals poison birds and other animals.

Look, listen, touch, and taste. Everywhere you turn you'll find that birds are a part of our lives. We paint pictures of them, watch cartoons about them, and whistle like them. Birds inspire us to write, to fly, and to dream. They also inspire us to watch our world, and to protect our environment.

Bird Word Search

S A U I P Q U P R E E N I N G T N I
R O T P A R I E O C R O S I O T R O
T I P I P P N I N G T I W E N R P M
S S C K E T S A G I Z Z A R D R I E
O E E O W A T E I W A N C A B G K E
F I W N R O I E E W W A L E R F O W
L M O L T R N T P T I S S A I I D R
O F I T I C C L B I L L T I Y A Y P
C I F A D S T I Z N R I R T I C A A
K P P L C L O I T R O E G V G Y W Q
I E S O F E A G T N O I A B B D E T
N N C N S C A M O U F L A G E N G I
G D I S S P M O L T I N G G L L I B

Find the following words hidden among the letters above.
Words may run up and down, across, or at an angle.

RAPTOR
MOLTING
TALONS

MOLT
FLOCKING
GIZZARD

MIGRATION
CAMOUFLAGE
NEST

PREENING
BILL
INSTINCT

Career Considerations

People who study birds are called **ornithologists**. Ornithologists may study birds in a laboratory or in the wild. They may study bird migration, reproduction, breeding, and habitat. If you want to know more about ornithology, talk to people who work with birds.

Additional Activities

Go on an early morning bird walk. Bring binoculars and a bird book. Identify the birds you see and hear. You can take your bird walk on your block or in your backyard, or you can take a trip to a zoo, wildlife refuge, or state park. What habitats do birds need? What do they eat? What kind of nests do they build?

Make a bird feeder. You can make a simple bird feeder with the following items:

- Cardboard tissue paper roll
- Peanut butter
- Seeds, such as sunflower and millet
- String

Punch a small hole at the top of the tissue paper roll. Spread the roll with peanut butter that has been mixed with a little water to make it spread easier. Sprinkle bird seed over the roll. Pull a piece of string through the hole, and tie it to form a hanger. Put your bird feeder outside near a tree, and watch the birds feast!

Make a bird feeder II. Follow these easy instructions to make a bird feeder.

You will need:

- A one-gallon plastic milk bottle (clean and dry)
- A nail for punching holes in the bottle
- Sharp scissors
- A wooden dowel, 1/4 inch in diameter and about 9 inches long
- A jar lid, 2 inches in diameter
- A wire clothes hanger or similar wire
- Wire cutters
- An adult to help you if you need it

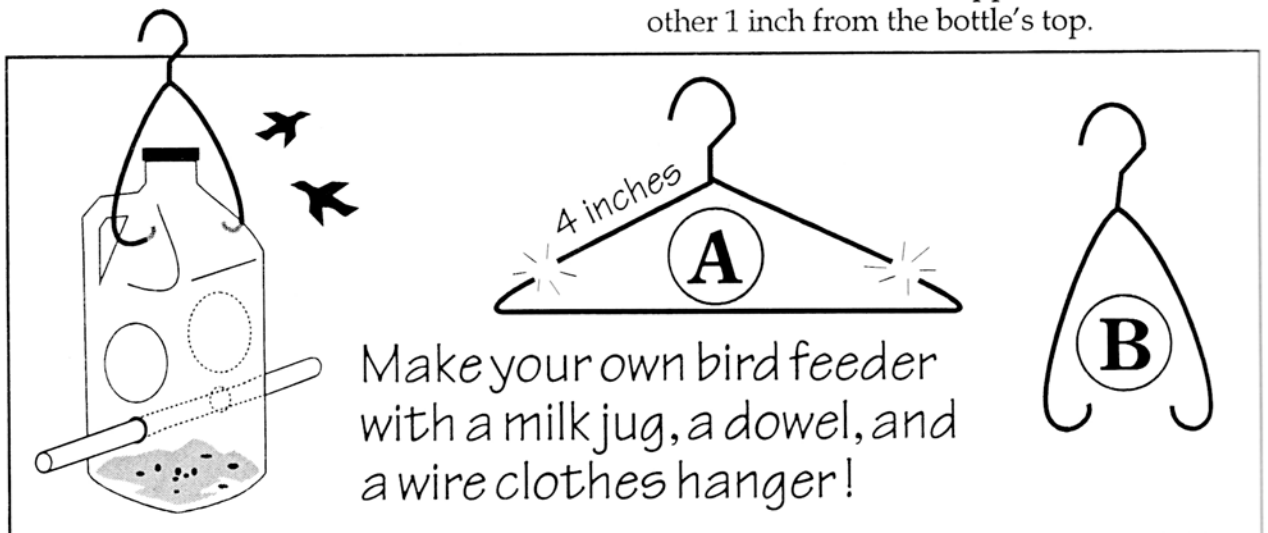
1. Trace the outline of the lid onto two opposite sides of the plastic jug, at least 2 inches from the bottom. Use the scissors to cut out the circles. These holes are the windows through which the birds will gather seeds.

2. To make a place for the birds to perch, or sit, use the nail to poke a hole 1/2 to 1 inch under each window. Insert the dowel so that it passes through one hole, through the feeder, and out the other small hole.

3. Poke five to seven small holes in the jug bottom so rainwater can drain.

4. Make a hook for the bird feeder by cutting a clothes hanger in two places with the wire cutters (see Diagram A). Cut the hanger at least 4 inches below the base of the hook. Bend the hanger so it looks like Diagram B.

5. Poke two holes opposite one another 1 inch from the bottle's top.



6. Push the ends of the hanger into the holes. Bend the hanger so that the feeder is balanced. Make sure the feeder is securely attached to the hanger so that it won't fall if a wind blows or a bird sits on it.

7. Put the lid on the bottle. Fill your feeder with bird seed mix or create your own mix with sunflower seeds, safflower seeds, millet, and other seeds and grains. Put only the amount of food in the feeder that can be eaten in a few days. Be sure to keep the feeder and the surrounding areas clean. Place the feeder near bushes or trees in an area protected from the wind.

(A list of the seeds that different bird species eat is available from: Duncraft, Wild Bird Specialists, Penacook, NY 03303.)

You also might want to place a bird bath nearby. Use a clay saucer at least 24 inches in diameter. Fill it with 1-1/2 inches of water and set it on the ground.

Birds should start to use your feeder after it has been in place for a few days. Keep a list of the different ones that come to your feeder. How do they act toward each other? Do blue jays frighten others away? Do the biggest birds usually get to eat first?

Build a bird blind. Many birds are hard to watch because it's easy to frighten them away. One way to observe birds without disturbing them is to hide in a blind. Most wild animals will get used to an object (you) and will not be frightened if given time to adjust. You will need:

- A large cardboard box (big enough to sit inside)
- Scissors
- Paint (optional)

Cut a door in one side of the box and small windows in the others. Depending on the type of habitat, you may want to paint the box or cover it with brush to camouflage it. Start by placing the blind about 75 yards away from the site you want to view, then move it up about 25 yards a day. This will give the birds and other animals time to get used to the box.

When you get into the blind it may take 10 to 20 minutes for the animals you're watching to become active again. Remember to stay quiet! Keep track of the animals you see and what they are doing.

Participate in a bird count. Contact the National Audubon Society chapter in your area and find out about the Christmas and spring bird counts. People all over the country gather together to count birds twice a year. It's exciting to be a part of a large effort to learn about birds. For more information write:

The National Audubon Society
950 Third Avenue
New York, NY 10002

Fair Projects/Exhibit Ideas

Build for birds. Build a birdhouse, nest box or nesting platform for a bird that lives in your area. Research the nesting habits of the bird and find a good place to put the nest site in your neighborhood. Plans for building bluebird houses are available from:

North American Bluebird Society
P.O. Box 6259
Silver Spring, MD 20906

Audubon Naturalist Society
8940 Jones Mill Road
Chevy Chase, MD 20815

The Minnesota Department of Natural Resources Nongame Wildlife Program also has an excellent book available about birds and bird boxes:

Woodworking for Wildlife
Minnesota's Bookstore
117 University Avenue
St. Paul, MN 55155

Plant or draw plans for a bird garden. By planting trees, shrubs, and wild flowers that provide food and shelter, you can attract different kinds of birds. Make a three-sided display that shows your planted garden and the type of birds that came to visit. For more information, order:

Landscaping For Wildlife
 Minnesota's Bookstore
 117 University Avenue
 St. Paul, MN 55155

Watch a nest. You probably know a lot about your family life. But how much do you know about the family life of birds? The best way to get to know birds is to watch a pair of nesting birds near your home for a long time.

You will need:

- A notebook and pencil
- Binoculars (optional)

Search for a nest to observe (this activity works best in the spring). Remember that these birds are raising their young! Start observing from a distance and move in slowly over several days. If you disturb the birds, they may leave the nest, or call loudly. These are signals that you are too close. Write down the following information:

- Date
- Location
- Habitat
- Time it takes to build the nest
- Species
- Materials used to make the nest
- Number of eggs laid
- Number of young
- Which parent cares for eggs
- Time it takes for eggs to hatch
- Days young stay in nest after hatching

Photograph or draw the birds you are watching. After the chicks have flown for the first time, prepare a report and a three-sided display with the information you gathered. Remember, do not collect bird feathers, eggs, or nests for display—they are protected by Federal law.

Answers to Bird Basics (some possibilities): Birds and humans both have two legs, are warm blooded, have a backbone and have color vision. Birds are different from humans because they have partly hollow bones, have feathers, have a bill, have wings, and have scales on their feet.

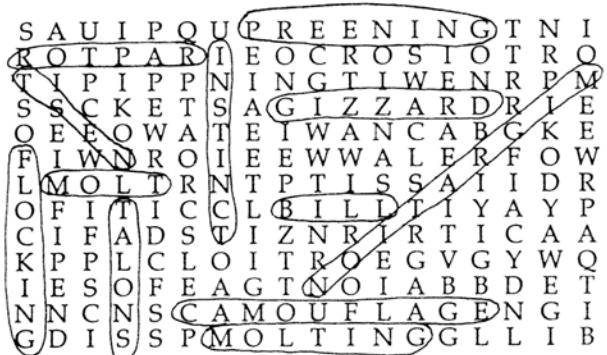
Answers to Wing Test:

- A. Soars for hours.
- B. Flies long distances.
- C. Flies far and fast.
- D. Flies and dodges.

Answers to Match That Bird:

A-1, B-4, C-2, D-5, E-3.

Answers to Bird Word Search:



Chapter 3

MARVELOUS MAMMALS

Can you run 60 miles an hour? Or jump across a basketball court with one leap? Have you ever built a dam with your long, yellow teeth? Maybe you can't do these feats, but you are part of a group of animals that can do all of these things. These animals are **mammals**.

What is a Mammal???

The first mammals roamed the earth with the dinosaurs about 200 million years ago. Most scientists think they developed from reptiles—snakes or crocodiles. Mammals are vertebrates (have a backbone). They are also warm-blooded (like birds). Mammals have three traits that make them different from any other animals:

- their young are born, not hatched from an egg;
- they have fur;
- and they nurse their young.

Like anything in nature, there are exceptions to the rules—some mammals lay eggs, for instance. But animals that have all or most of the mammal traits are put into the mammal group.



Eagles, Blanding's turtles, perch, and dragonflies lay eggs. Baby mammals grow inside the body of their mother, not inside an egg.

Mammals are the only animals with fur or hair. Brown bears and beagles have a thick coat of fur that keeps them warm. Whales (yes—whales are mammals!) have just a few coarse hairs on their faces. Besides providing warmth, hair also gives protection. A prickly porcupine is actually just a hairy porcupine. Whiskers and hairs on the head, cheeks, and lips help star-nosed moles feel their way around home and sense intruders. Your lashes and brows protect your eyes from dust and dirt.

The hairs on white-tailed deer and pronghorn antelope are hollow. These hollow spaces are filled with air that acts as insulation. This helps them survive cold winters.

Female mammals have mammary glands that produce milk for their young. The milk provides nutrients that help the young grow. The milk also protects babies from disease. No other group of animals have these special glands that help them take care of their babies.

Like birds, mammals are warm-blooded. Their body temperature stays the same even if the air temperature changes. Warm-blooded raccoons can be active during cold or hot weather, while cold-blooded snakes stay curled under cover. Warm-blooded animals must eat more than cold-blooded animals to keep their temperature even.

Mammal Parts

Arms, legs, feet, hands, and tails are important body parts to mammals. When animals have special body parts to help them swim, fly, dig, or run, they often lose the ability to do other things. Bats can fly, but they aren't good at walking on land. You can move on land, but you can't hang from the ceiling of a cave!

The arms and legs of mammals come in all different shapes and sizes. As mammals have adapted to different kinds of

habitats, their arms and legs have changed. Bats have arm and finger bones that spread out to make wings. Horses and deer have long, slender legs for running quickly. Dolphins have arms that shortened to flippers to move them through water.

The hands and feet of mammals are adapted to their lifestyle. Beavers have flaps of skin between their toes and fingers to help them swim. The feet of the American bison have a hard material to help them walk on rough, uneven ground. Both a river otter and you can hold food, branches, or tools in your paws!

Most mammals have tails. Tails help an animal balance, protect itself, and communicate. Gray squirrels use their tails for balance to climb high trees. Porcupines swing their prickly tails at attackers. White-tailed deer raise their tails to let other deer know there is danger.

Make a Mammal

Make a mammal! You will need:

- Scissors
- Paper
- Glue
- Mammal Parts Worksheet (see page 29).

Make your own mammal by choosing parts from the mammal parts worksheet. Use the space on the next page to put your mammal together. Name your mammal, and fill in the blanks below. (See end of book for Make A Mammal Parts.)

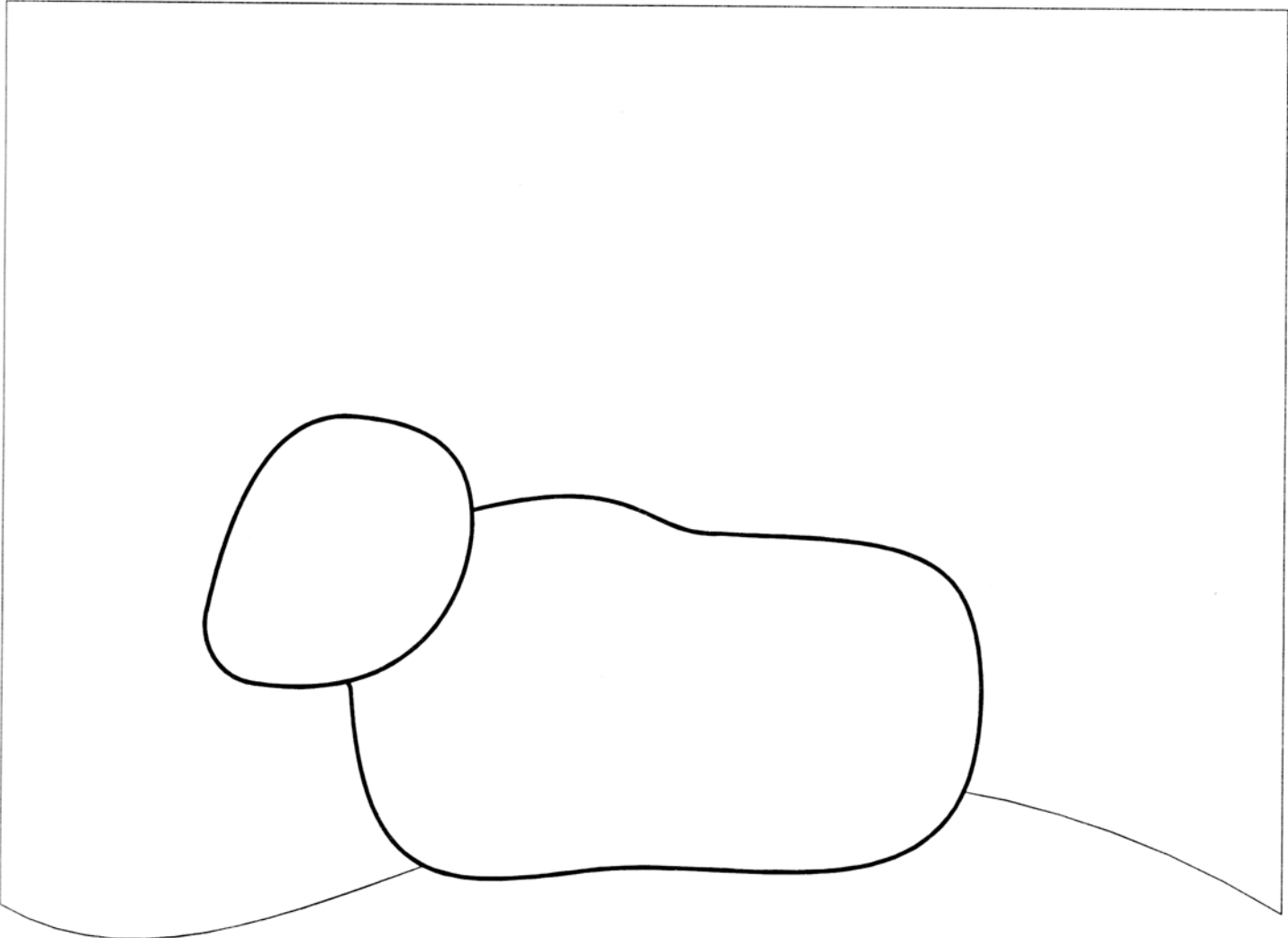
Mammal name: _____

Where it lives: _____

What it eats: _____

Write something about your mammal that makes it special:

MAKE - A - MAMMAL WORKSHEET



Mammal Groups

Mammals are divided into groups. Animals in the same group look like one another and are thought to be closely related.

Primitive primates. Humans, gorillas, and monkeys belong to the group of mammals called **primates**. The primate's thumb is different from that of other mammals because it can touch the finger tips. The thumb allows a primate to pick up small objects, peel a banana, or play video games. Other mammals can't do these things.

To see just how important your thumbs are, tape them to the palms of your hands and try to do the following things:

- Pick up a dime
- Button a sweater or shirt
- Open a door
- Eat with a spoon or fork
- Peel a banana
- Write with a pencil

Primates can see colors. They also have a well-developed sense of touch and good eyesight. The brains of primates also are more advanced than those of most other animals.



Monkeys are
PRIMATES



Bison have
HORNS



Moose have
ANTLERS

Oh Give Me a Home, Where the Ungulates Roam

Deer, antelope, cows, horses, and other hoofed mammals are called **ungulates**. Their hooves are made of the same material as our fingernails.

Ungulates eat plants. Have you ever tried to eat grass or twigs? It's not easy! Animals that eat lots of plants have special stomachs to help them get energy from food. Cows and many other ungulates chew their food more than once. They chew, swallow, and then regurgitate their food and chew it again (called chewing their cud). They also have bacteria in their stomachs to help them digest plants. This type of digestion is slow; it takes ungulates several days to digest one meal.

Ungulates often have horns or antlers that they use for fighting. Antlers grow quickly and fall off each year. Horns grow slowly and usually do not fall off an animal.

Rodent Rumors

Beavers are busy, industrious little . . . rodents? That's right! Beavers, like their relatives the mouse and muskrat, have sharp front teeth that grow continuously. These teeth are for chewing (gnawing) on wood and other hard food. Rodents must use their teeth often or they will grow too long!

Rodents make up the largest group of mammals. There are more than 1,500 types of rodents! The biggest rodent is the capybara. It weighs close to 150 pounds. (Which weighs more—you or the capybara?) The smallest rodent is the harvest mouse, which weighs less than half an ounce (the weight of a pencil!).

Lemmings are small rodents famous for great population changes. Whenever their numbers grow too large, they leave their normal habitat. Sometimes when they reach the coast they just jump into the water. The lemmings are found everywhere, even in habitats where there is no food or cover. This doesn't last long and after several months there are very few lemmings left.

Rodents are famous for having many babies. Mice, for example, can have babies fourteen times a year and can have eight babies at once! Not all these offspring grow to have babies of their own, however. Many become tasty meals for owls, snakes, hawks, and foxes.



Beaver
have typical
rodent's teeth

Lions and Tigers and Minks, Oh My!

Lions, tigers, minks, and wolves belong to the mammal group **carnivores**. The name "carnivore" means meat-eater. Most, but not all, of the animals in this group actually eat meat. Carnivores hunt for food or eat dead animals.

Teeth are important for most carnivores. The ones that hunt and kill animals for food have sharp cutting teeth. Carnivores also have claws. Claws help them climb trees and protect themselves from danger. Cats have folding claws that they can tuck away when not in use. Carnivores also have a great sense of smell, sharp hearing, and good eyesight.

THE PANTHER

The panther is like a leopard,
Except it hasn't been peppered.
Should you behold a panther
crouch,
Prepare to say Ouch.
Better yet, if called by a panther,
Don't anther.

—Ogden Nash

(From: **The Birds and the Beasts
Were There, Animal Poems Se-
lected by William Cole, 1963.**
Cleveland and New York: The
World Publishing Company, 1975.

Insectivores (Say It Three Times Fast)

Insectivores are the smallest mammals. They depend on insects for food. They also eat other small animals, such as spiders, lizards, and mice. They're hard to find because they're nocturnal (active at night) and hide during the day.

Shrews are the smallest insectivores, weighing less than a dime! They look like small mice with pointed noses and heads and tiny eyes. Because shrews are so tiny they have to eat constantly to stay warm. Shrews have venom in their bite that paralyzes small prey.

Marine Mammals

Thousands of years ago, the relatives of marine mammals lived on land. Then they changed to survive in the ocean. Now, more than 100 kinds of mammals live in the sea.

Dolphins, whales, and other marine mammals can dive (and hold their breath) for a long time. They store more oxygen than land mammals. Dolphins also save oxygen by slowing their blood flow to the skin and other “less important” organs. Have you ever been swimming outside in December? Porpoises do it all the time! They stay warm in the cold ocean water with the help of a special fat called blubber.

Strange But True Mammals

There are many interesting and unusual mammals that don't seem to belong to any of the other mammal groups. Some



mammals, like the platypus and two kinds of spiny anteaters, even lay eggs! They are considered mammals because they have other mammal traits like fur and mammary glands.

Members of another group of unusual mammals have pouches where they keep their young until they are old enough to be on their own. This group, known as the marsupials, includes kangaroos, opossums, and koalas.

Did you think that only birds can fly? Well, now you know that bats, can fly too! They also can climb, walk, swim, and hang upside down for long periods of time. There are almost a thousand kinds of bats that live all over the world. Bats find their way through the world using **echolocation**—a radar system of sorts that help bats locate objects around them.

Bats eat a variety of foods. Fruit bats eat fruit, nectar, or pollen from plants. Some of them have long tongues to slurp nectar from flowers. Most other bats eat insects. A few have special hook-like claws for grabbing fish. Vampire bats (not found in North America) have special parts on their face that help them find blood in animals.

Koalas, natives of Australia, eat nothing but leaves from eucalyptus trees. They have very long intestines to help them get energy from the leaves. Koalas sometimes spend 18 to 22 hours a day sleeping because the leaves don't have much energy in them (and may contain a mild narcotic).

Making Tracks

Some animals are active at night (nocturnal) or run when they hear you coming. So how do you learn about these animals? Studying animal tracks can give you information. A long line of tracks made by one animal is like a sentence. If you follow a set of tracks you can learn more about the animal.

The best place to find animal tracks is in mud, sand, soft soil, or fresh snow. Use field guides (available at your public library) or the tracks on the wildlife cards at the end of this book to help you identify tracks you find. Patterns of tracks will be different depending on if the animal is running or walking. If the track is in deep snow or mud it may lose some of its shape.

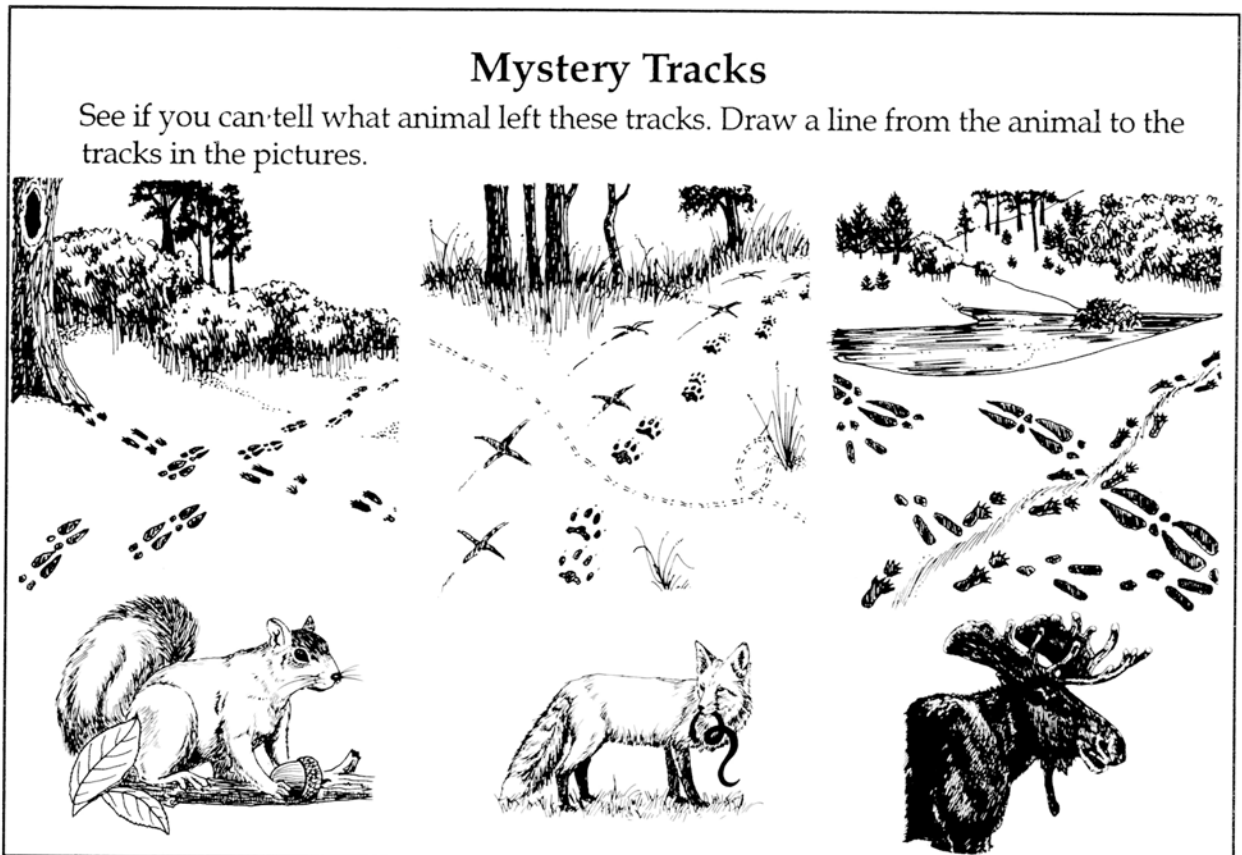
Tracking Tricks—Things to Look for When Sleuthing Animals: Does the animal have claws? Does it walk or hop? Where was it going? Are the tracks of paws or of hooves? Are there other animal signs, animal holes, or feeding places around?

What Do I Do Now?

It's a tough world out there for mammals. They are chased by enemies and have to survive long, cold winters. How do the mammals of the world cope with all the dangers and demands? They have a few tricks up their sleeves (er, fur).

Fight or Flight. When a mammal is about to become a hungry animal's meal, it has two options—stay and fight, or run away. Most mammals try running away. Gophers run to a safe place such as a hole in the ground. Larger mammals usually try to outrun their enemies. If an animal decides to fight it may bite, scratch, or kick for protection.

Tricks of the Trade. Some mammals use special defense tricks on nosy predators. A porcupine's quills keep most enemies at a distance. A skunk sprays a stinky liquid on unwelcome guests. By changing color with the seasons, a snowshoe hare can keep itself hidden from enemies. An opossum's habit of playing dead fools most animals into leaving it alone.



Sticking Together. Prairie dogs live together in colonies. Wolves in packs cooperate in hunting and raising young. For other animals, living in a group offers protection from danger. If one animal sees an enemy it signals to the others. Then all can escape the danger.

Chill Out. Instead of traveling when the weather gets bad or food becomes scarce, bats hibernate through the bad times. A mammal's whole system slows down when it is hibernating. The energy it does use to stay alive comes from fat stored in the fall. If you chase bats in a cave during the winter, you can cause them to use up all of their stored fat, and they may die before spring.

Migration. Just like birds, many mammals migrate. Bighorn sheep may only migrate short distances from summer pastures in the mountains down into the valleys for the winter. Other mammals may travel hundreds or thousands of miles to find what they need to survive.

How do you cope with a bad situation? Fight or flight? Migration? Sticking together? Or do you just chill out?

Mammal Word Search

R D B A T S D E A I D E N U H E R N T
 O G H E E E A F D U T B I S R D E N S
 R A N Y H I B E R N A T E E N U N G U
 I W A L M B L D S G R I O T E E N O C
 N A F I O E I L R U E R E R T D U Y P
 S F L S D K O A P L E R P A E L E R O
 A X D O D I E N U A C O N K N T R R U
 R Q P W O T F R S T O R E C G T H L C
 M I I O A R A U E E E R I A M I L G H
 G H T M E E T T S B A U E P O S I E A
 A I I I O D I C I M B G T S I D O F R
 A R M H E R D O U I C I O R O D E N T
 P O Y S D D I N U H A I R C H I G H T

Find the following words hidden among the letters above.
 Words may run up and down, across, or at an angle.

HAIR
 BATS
 HERD

ANTLER
 RODENT
 PACK

PRIMATE
 POUCH
 HIBERNATE

UNGULATE
 DEN
 NOCTURNAL

Career Considerations

Naturalists often work with mammals and people. They may teach at a school, zoo, nature center, or park. They may raise animals or show people how to find mammals in the wild. To be a good naturalist you need to be excited about mammals!

Additional Activities

Play the Great Mosquito Chase. To learn more about echolocation, get six or more players together. Form a circle about 10 to 15 feet wide.

Choose one person to be the bat. Blindfold the bat, and have him or her stand in the middle of the circle. Choose three players to be mosquitoes. The mosquitoes will join the bat in the middle.

The object of the game is to have the bat tag as many mosquitoes as possible. Both the bat and the mosquitoes may move, but they must stay inside the circle. (Once a mosquito is tagged it must sit outside the circle.) Whenever the bat calls out "bat," the mosquitoes must answer "mosquito."

Each time the bat calls out "bat," it copies a real bat sending out a high-pitched noise. The noise bounces off the mosquitoes and comes back to the bat (copied by the mosquitoes calling out "mosquito"). You also can add obstacles for the bat. Make some players "trees." When the bat calls out "bat," the mosquitoes must call out "mosquito," and the trees must call out "tree." If the bat runs into a tree, the bat is out.

Hold a mammal bowl. A bowl is a quiz contest between two teams. You need two teams of three to six people. You also need a moderator and a judge. Finally, you'll need 15 to 20 questions about mammals.

The moderator asks the questions. There are a few different ways to ask the questions, as follows:

- An open question. Anyone on either team can answer. The person who first raises his or her hand gets to answer the question.
- An ordered question. Only one person from each team gets to answer. The first question only may be answered by player number one from each team. The second question may be answered by player number two from each team. This continues until all the players get to answer a question.
- A toss-up question. Toss-up questions have two parts. The first part can be answered by either team. The second part may be answered only by the team that gets the first part right.

Scoring is the same for all types of questions. Points go to the team that answered the question correctly. If a wrong answer is given, the other team gets to answer that question. Each question is worth ten points. The team that scores the most points is the winner.

Manage a piece of land for wildlife. By planting native trees, bushes, and grasses, you can attract more animals. Leave brush piles for rabbits and snags for cavity nesters in woodlands.

Fair Projects/Exhibit Ideas

Study the behavior of a mammal that lives near you. Watch it every day for 15 minutes (if possible) for about two weeks. Observe the animal at different times of the day. Take notes. How many babies did the animal have, if any? What does it eat? Where does it sleep? What does it do when you get near? What does it do when other animals or birds approach? Construct a three-sided display with pictures describing the animal's behavior.

Build a bat box. Bats are losing many of their natural roosting areas. By building a bat box you can provide more habitat for bats. You can send for plans to build a bat box at the following address:

Bat Conservation International
P.O. Box 162603
Austin, TX 78716

Keep a record of the tracks you collect—where you found them, what type of animal, and the date. Display your track casts with your record in a display box.

Make a diary of a mammal. Make a three-sided display that shows the life cycle of a mammal you are curious about from your area. Draw or make a model of different parts of the mammal's life (the den, nest, and its young, etc.). Show the type of habitat where the mammal is found and some important foods of the animal. Show some natural predators, the average life span, how it survives the winter, and any other interesting information.

Answers to Mystery Tracks:



Answers to Mammal Word Search:

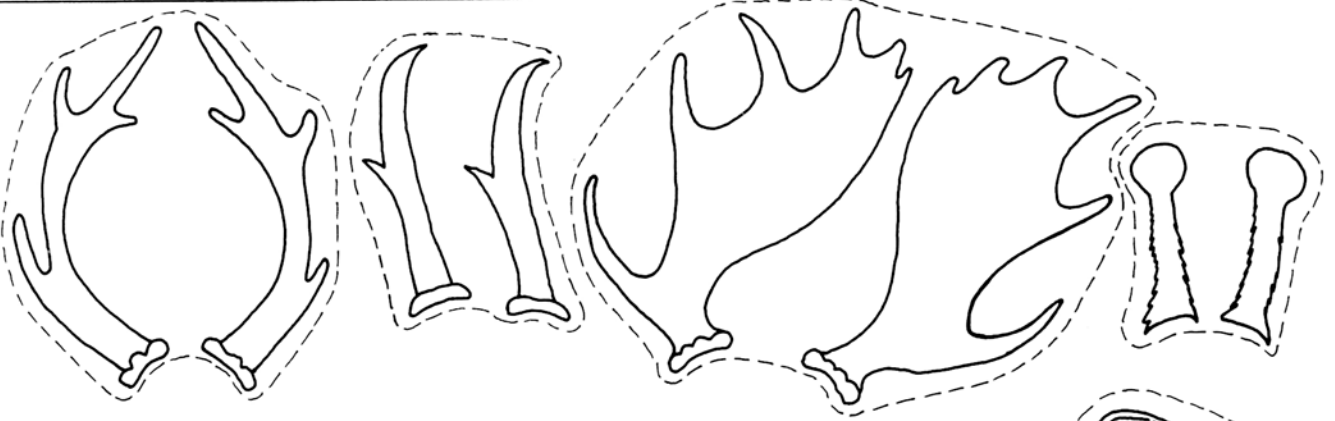
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R Q P W O T F R S T O R E C G T H L C
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A R M H E R D O U I C I O R O D E N T
P O Y S D D I N U H A I R C H I G H T

Make Track Casts

You will need:

- Dry plaster mix or molding plaster (available at a hardware or craft stores)
 - Milk carton, with top 3 inches and bottom cut out to form a frame
 - Water
 - A fork
 - A spray bottle with water (if track is in the snow)
1. Find some well-formed animal tracks.
 2. Mix plaster according to the package directions (it should be as thin as pancake batter).
 3. If the track is in the snow, spray it lightly with water. Let the water freeze to harden the track.
 4. Place the milk carton around the track. Push it firmly into the ground.
 5. Pour plaster into the frame until the frame is filled to at least 1/2 inch deep.
 6. Allow plaster to harden completely for about 40 minutes.
 7. Pick up the plaster cast of the track from the ground with the fork and remove the frame. Save it to use again.
 8. Brush or wash off extra sand or mud.
 9. Write the date and track type on the back of the plaster cast with a marker.
 10. If you'd like, you can paint the plaster around the track so it stands out better.

ANTLERS AND HORNS



EARS



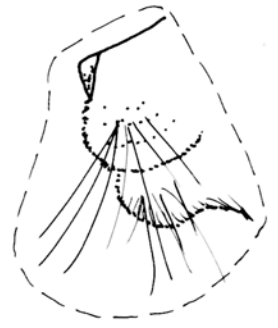
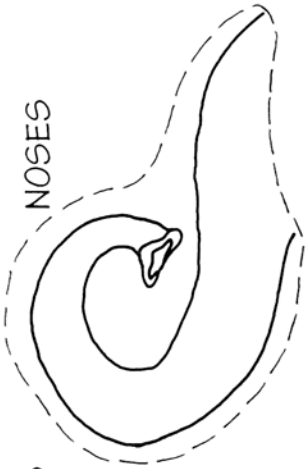
EYES



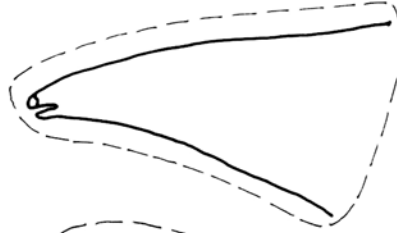
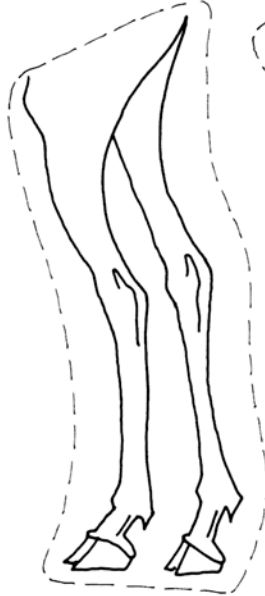
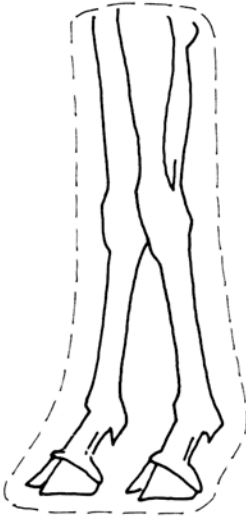
LIMBS



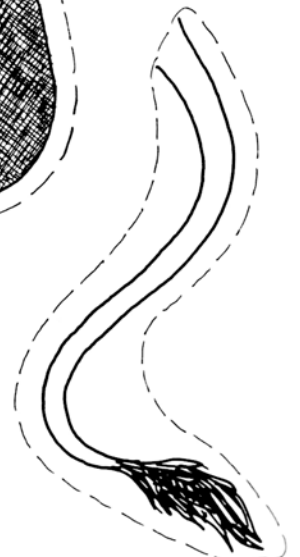
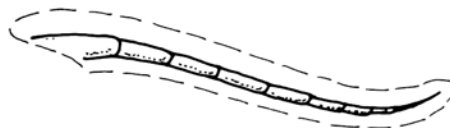
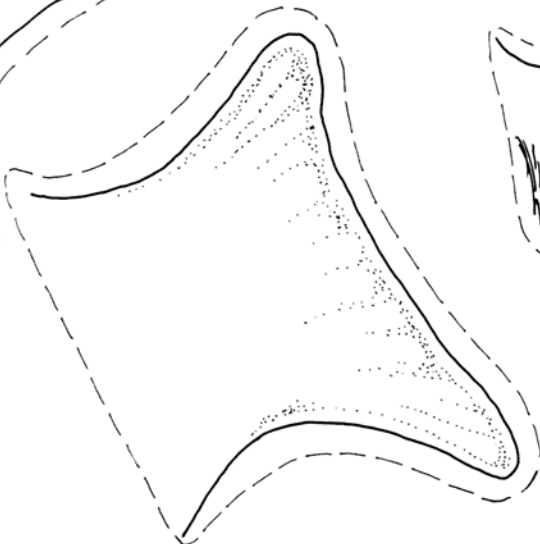
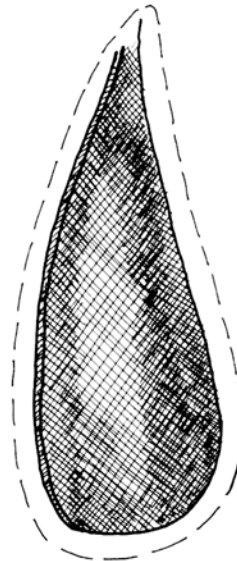
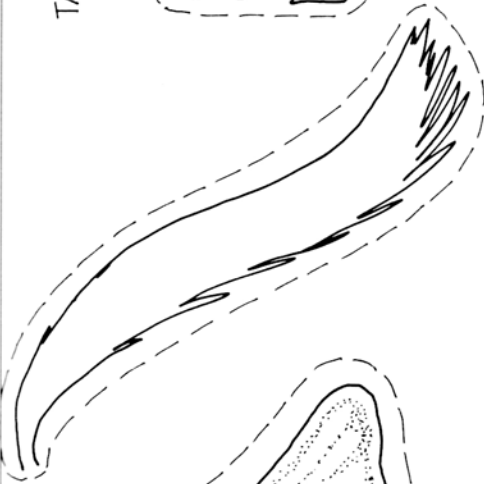
NOSES



LIMBS



TAILS



Lake States Wildlife Card Games

Wildlife Fact or Fiction

Object of the Game: To test knowledge of common animals and plants in the Lake States. The player with the most correct answers (the most cards total) is the winner.

Number of Players: Two or more.

How to Play: Start the game by shuffling the cards and laying them face down in a pile. The first player draws the top card and asks the player to his or her right a question based upon the information on the card. For example, the player might ask, "What does a raccoon eat?," "What type of habitat does a mallard prefer?," or "True or false, a moose is a good swimmer." The question must have an answer that is given on the card. If the question is answered correctly, the person who answered the question gets the card. If the question is not answered correctly, the player who asked the question gets the card.

Next, the person who was asked the question picks up a card and asks a question of the player to the right. Continue until you have used up all the cards in the pile. The player with the most cards wins.

If there is disagreement about the question or the answer, put the card face down into the pile and draw another card.

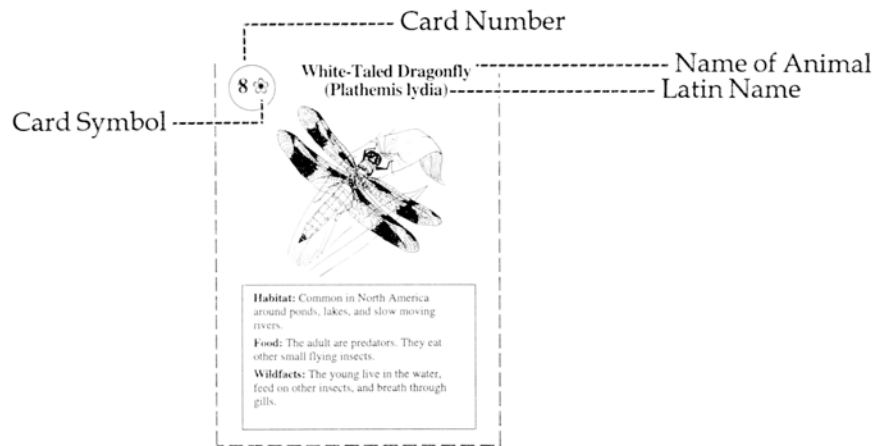
Spin a Web of Life

Object of the Game: To create a food web with animals and plants. The winner of the game is the first person to use all of his or her cards building a food web.

Number of Players: Two or more.

How to Play: You will need a flat area for the cards (tabletop, floor, etc.). Shuffle the cards and deal each player six. Each player should look at his or her cards but not allow others to see them. Place the remaining cards face down in a pile where everyone can reach them. Turn the top card face up—this is the start of the food web.

Each player in turn tries to add as many of their cards to the food web as possible by playing cards depicting animals/plants that are directly connected in the food web to the animals or plants already in the web. For example, if the first card is a great horned owl, the player may place a mouse, a turkey, a duck, or a decomposer next to the owl card. (Place the cards so they slightly overlap the card they are connected to in the web.) If the player does not have a card that will fit in the food web, he or she must draw a card until one turns up that fits or until five cards have been drawn.



When the player has placed all the cards he or she can on the food web, or drawn five cards, then the next player takes a turn. The game is over when the remaining cards cannot fit into the food web, when there are no cards in the stack, or when one player has played all of his or her cards onto the food web. The player with the fewest cards at the end is the winner.

Spin a Web of Life—Solitaire

Object of the Game: To create a food web with animals and plants, and use many cards to create the largest web possible.

Number of Players: One or more (can be played alone).

How to Play: Mix the cards and make one pile. Take the top six cards for your hand. Place the card from the top of the deck face up on the table. Play according to the rules of the game above. You win if you are able to use all the cards in your hand. Another way to play is to see how big a web you can create. Is it possible to make a web of life that includes all of the cards?

Sly As A Fox

Object of the Game: To get rid of all cards as quickly as possible.

Number of Players: Three to six.

How to Play: This game is similar to one called "I Doubt It." Four categories are important for this game: decomposers, producers, herbivores, and carnivores. To begin the game, deal all the cards. (Some players may have one more card than the others.) The first player places from one to four cards that fit the category "carnivores" face down in the middle. The same player states how many cards and what category they are in. (For example, a person playing a fox and a hawk would say, "Two carnivores.") The next player must play herbivores, the next plays producers, the next, decomposers. Then the players start again with carnivores. The played cards are all placed face down in a central pile.

If a player doesn't have any cards in the category, then he or she must bluff, playing a card that is not in the category, but pretending that it is. For example, if you don't have any producers, you might choose a hawk and put it down saying, "One producer." A player also may add cards that do not fit into the category with cards that do. For example, a player may say, "Three producers," and discard two plants and one otter.

After a player puts down his or her cards, the other players may challenge by saying, "You're sly as a fox." When challenged the player turns the played cards face up to show the other players whether or not he or she was bluffing. If it was a bluff, the player must take all of the cards in the central pile. If he or she was not bluffing, the player who challenged must take the pile of cards.

A challenge may be made only after the player puts the cards on the stack in the middle. The player must say which cards are being played before he or she puts them down on the table. The winner is the person is the first run out of cards.

If there are four people playing the game you'll need to adjust the categories so that the players aren't playing the same category in each round of the game. An easy way to do this is to add a category, such as omnivore, bird, or mammal.

1 ♦

Cottontail Rabbit (*Sylvilagus floridans*)



Habitat: Open areas with shrubs, grasses, and small trees in the eastern U.S.

Food: Grasses, leaves, and garden vegetables are summer foods. Twigs and bark of shrubs are winter foods.

Wildfacts: A female cottontail has four to six young at a time. They are born blind without hair, but they grow fast and are on their own in just one month.

2 ♦

White-Tailed Deer (*Odocoileus virginiana*)



Habitat: Open shrubby areas and fields across the U.S.

Food: Grasses and flowering plants are summer food. Winter foods are twigs, stems, and evergreens.

Wildfacts: White-tailed deer have scent glands between their toes. These help a female deer find her young when they wander too far.

3 ♦

Moose (*Alces palces*)



Habitat: Northern forests with wetlands, streams, and ponds.

Food: Leaves of trees, shrubs, and flowers are summer foods. In winter moose eat twigs and shrubs.

Wildfacts: Moose are very good swimmers. Grown moose can swim five or ten miles. Calves can swim two days after they are born.

4 ♦

Southern Flying Squirrel (*Glaucomys volans*)



Habitat: Hardwood forests in the eastern U.S. Oaktrees and cavities (holes).

Food: Acorns and nuts, flowers, buds, insects, and small birds.

Wildfacts: These night-loving squirrels don't really fly, but they can glide through the air because of flaps of skin attached to their legs and body.

5 ♦

Fox Squirrel (*Sciurus niger*)



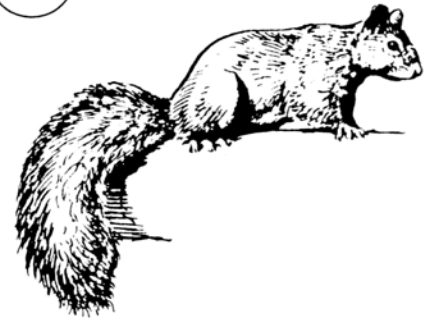
Habitat: Open woods, shelterbelts, and towns with trees in the eastern U.S. Fox squirrels nest in cavities or in leaf nests.

Food: Acorns and other nuts, corn, insects, and small vertebrates.

Wildfacts: Fox squirrels usually are orange, but sometimes come with totally black fur.

6 ♦

Gray Squirrel (*Sciurus carolinensis*)



Habitat: Forests (mostly older) in the eastern U.S.

Food: Acorns, seeds, buds, berries, and small birds.

Wildfacts: Gray squirrels bury nuts during the fall to eat in the spring and winter. Sometimes, they forget where they hide the nuts, and these nuts grow into trees.

7 ♦

Beaver (*Castor canadensis*)



Habitat: Lakes, streams, and wetlands.

Food: In summer, water plants, tree buds, and inner bark. In winter, branches from aspen, willow, and other trees and shrubs.

Wildfacts: Beavers live in colonies of four to ten. Before the Europeans trapped so many, they could be found almost all across North America, except in deserts and in the Arctic.

8 ♦

Muskrat (*Ondatra zibethicus*)



Habitat: Lakes, streams, or wetlands across the U.S.

Food: Cattails, rushes, corn, dandelions, and other plants.

Wildfacts: Muskrats live in lodges made of plants or in burrows in the banks of lakes and streams. Mink are their most important predator.

9 ♦

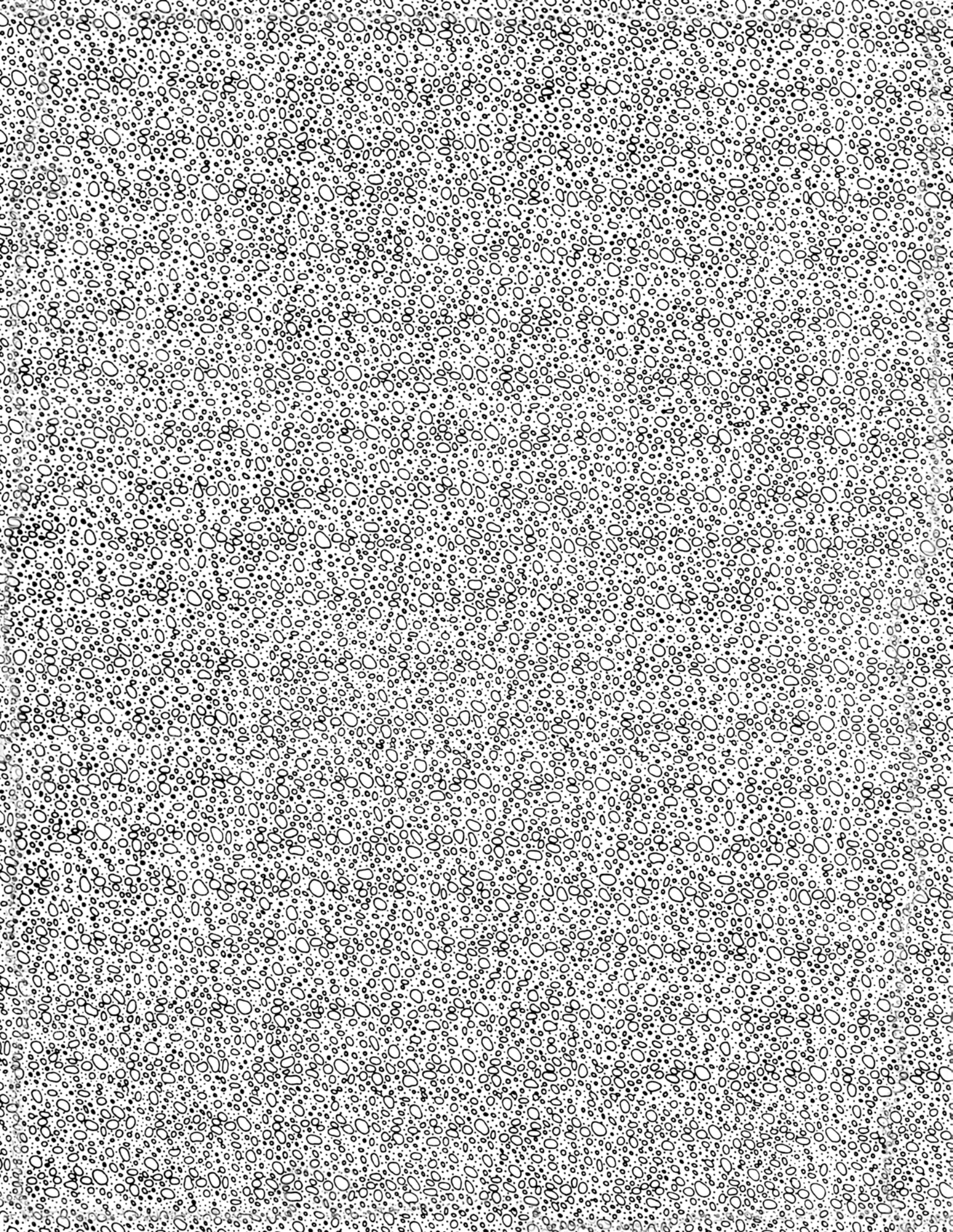
American Woodcock (*Philohela minor*)



Habitat: Marshy/wooded meadows and upland with small woody plants.

Food: Earthworms.

Wildfacts: Males dance and make a nasal "twange" noise to attract females.



10 ♦

Black Bear (*Ursus americanus*)



Habitat: Mostly forested areas away from people.

Food: Berries, nuts, carrion, honey, and ants.

Wildfacts: Black bears are born in the winter, weighing less than a pound!

11 ♦

Badger (*Taxidea taxus*)



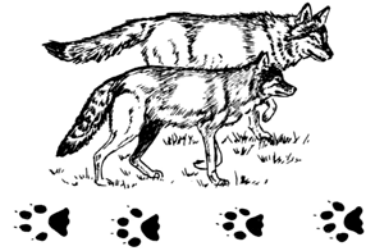
Habitat: Prairies, meadows, and farmland in central and western U.S.

Food: Pocket gophers, ground squirrels, birds, reptiles, and insects.

Wildfacts: Badgers are nocturnal and live underground in a mazing system of tunnels.

12 ♦

Timber wolf (*Canis lupis*)



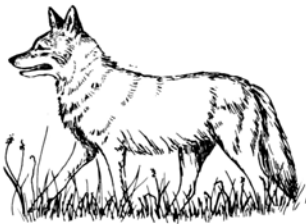
Habitat: Isolated northern forests and mountainous areas.

Food: Deer, moose, beaver, carrion, and fruit.

Wildfacts: Wolves travel in packs of two to ten (they are usually related). Only one male and female produce young, and the other wolves help raise these young.

13 ♦

Coyote (*Canis latrans*)



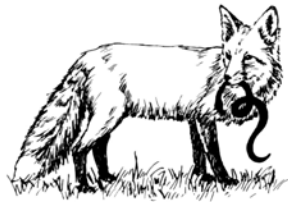
Habitat: Open and shrubby areas in the U.S.

Food: Mice, squirrels, rabbits, birds, carrion, and sometimes deer.

Wildfacts: Wolves usually chase coyotes away from areas they both use.

1 ☀

Red Fox (*Vulpes fulva*)



Habitat: Forests and open brushy areas.

Food: Woodchucks, squirrels, rabbits, snakes, ducks, insects, and fruits.

Wildfacts: In winter, red foxes curl into a ball to protect their faces and heads from cold.

2 ☀

Raccoon (*Procyon lotor*)



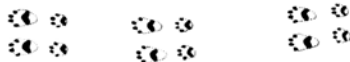
Habitat: Open prairie, farmland, and urban areas.

Food: Corn, garden vegetables, birds, eggs, fish, and other small animals.

Wildfacts: Raccoons use deserted buildings, caves, and hollow trees for dens.

3 ☀

Long-tailed Weasel (*Mustela frenata*)



Habitat: Woodlands, open and brushy areas, near water.

Food: Almost exclusively meat, such as moles, mice, and rabbits.

Wildfacts: In northern areas the fur of the weasel turns white in the winter, but the tip of the tail stays black.

4 ☀

River Otter



Habitat: Most parts of North America where there is water that supports fish.

Food: Fish, frogs, crayfish, and turtles.

Wildfacts: The river otter can swim faster than a trout.

5 ☀

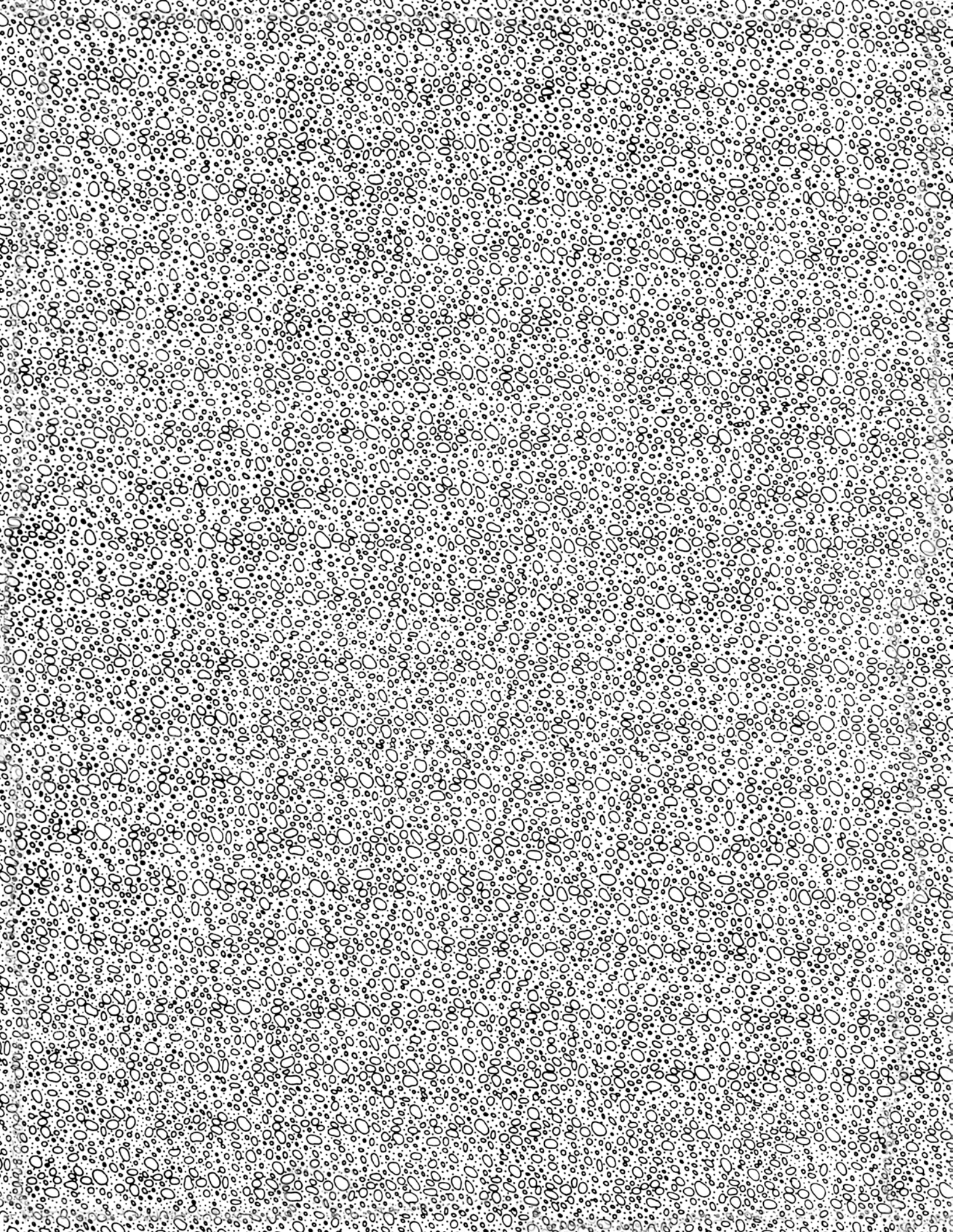
Little Brown Bat (*Myotis lucifugus*)



Habitat: Caves, hollow trees and vacant mines in North America.

Food: Insects, moths, mayflies, and beetles.

Wildfacts: During hibernation, a bat's temperature drops to 56° F (humans maintain a temperature of 98.6° F!).



6

Star-Nosed Mole (*Condylura cristata*)



Habitat: Northeastern states in moist soils.
Food: Worms, insects, and small fish.
Wildfacts: This mole stores fat (energy) in his tail for when food is scarce.

7

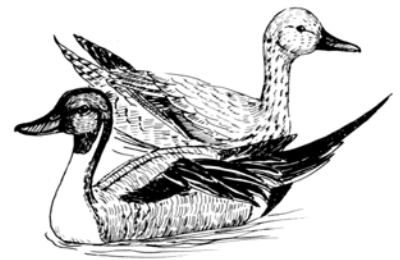
Mallard (*Anas platyrhynchos*)



Habitat: Shallow ponds and marshes across North America.
Food: Seeds of water plants, crop seeds, and invertebrates.
Wildfacts: Mallards can be identified by their green head with white band around the neck.

8

Pintail (*Anas acuta*)



Habitat: Lakes, ponds, and bays across North America.
Food: Seeds of native water plants, wheat, corn, and rice seeds.
Wildfacts: The pintail is aptly named. It's tail is long and thin and gives the bird an elegant appearance.

9

Wood Duck (*Aix sponsa*)



Habitat: Eastern U.S. and western coastal states in small lakes and ponds.
Food: Acorns, wild grapes, mulberries, and insects.
Wildfacts: Wood ducks also go by the names squealer, swamp duck, woodie, and acorn duck.

10

Canada Goose (*Branta canadensis*)



Habitat: Freshwater and saltwater marshes, lakes, and ponds across North America.
Food: Leaves and seeds of plants such as corn and grasses.
Wildfacts: There are different subgroups of Canada geese. The giant Canada goose is the biggest, the cackling Canada is the smallest.

11

Trumpeter Swan (*olor buccinator*)



Habitat: Lakes, ponds, and marshes in Alaska and western U.S.
Food: Mostly stems, leaves, and seeds of water plants such as pondweeds, duckweed, and duck potato.
Wildfacts: The trumpeter swan is the largest of all North American birds. There are few left in North America, but their numbers are slowly increasing.

12

Northern Flicker (*Colaptes auratus*)



Habitat: Woodlands near open areas, particularly places with dead trees.
Food: Mostly ants and ant eggs, termites, beetles, and berries.
Wildfacts: Flickers and starlings often fight over the same cavity in a tree. Starlings usually win and take over the nest.

13

Great Blue Heron (*Ardea herodias*)



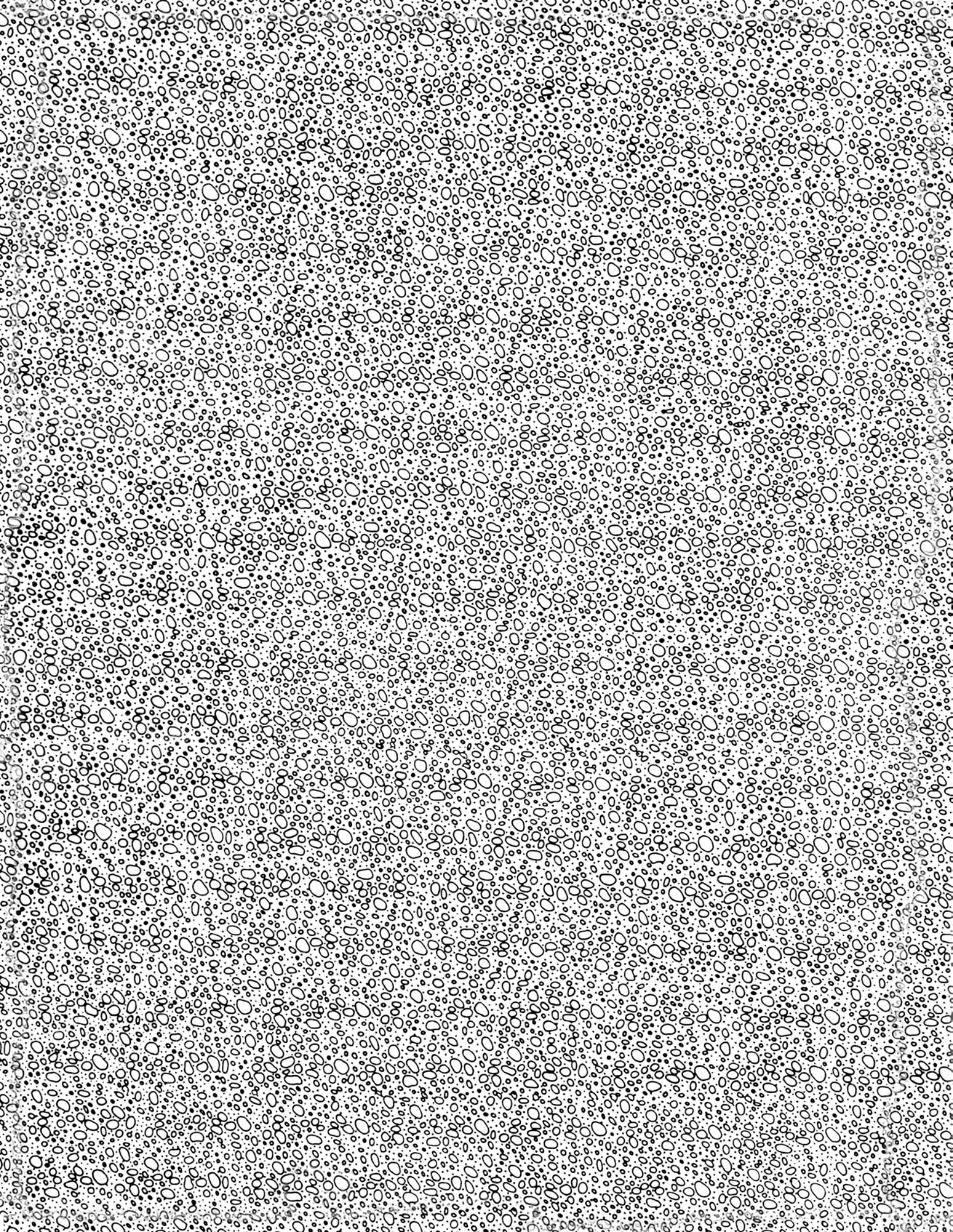
Habitat: Lakes, rivers, and wetlands in U.S. and Canada.
Food: Frogs, fish, crayfish, and other invertebrates.
Wildfacts: Great blue herons nest in colonies in the tops of tall trees. They are able to live in cities if there are wetlands available for feeding.

1

Piping Plover (*Charadrius melodus*)



Habitat: East coast and central portions of the U.S.; sandy beaches on rivers and lakes.
Food: Worms and other tiny invertebrates.
Wildfacts: The piping plover is very rare. Their nesting places have been taken over by people.



2 ★

American Bittern (*Botaurus lentiginosus*)



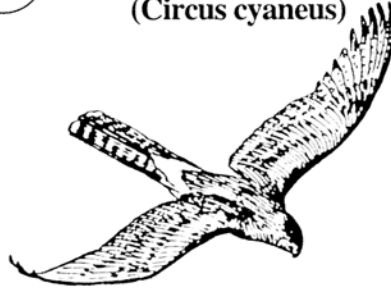
Habitat: Central and southern U.S. in lakes, rivers, and wetlands.

Food: Small animals in the water, fish, insects, and crayfish.

Wildfacts: The song of the American bittern sounds like an old rusty pump.

3 ★

Northern Harrier Marsh Hawk (*Circus cyaneus*)



Habitat: Marshes and grasslands.

Food: Voles, rats, mice, rabbits, insects, and other small animals.

Wildfacts: The marsh hawk will somersault, dive, and do U-turns to attract a mate.

4 ★

Bald Eagle (*Haliaeetus leucocephalus*)



Habitat: Many areas across North America, especially near water.

Food: Fish and carrion.

Wildfacts: The bald eagle takes several years to mature. It is dark brown with white speckles until it is three or four years old.

5 ★

Peregrine Falcon (*Falco peregrinus*)



Habitat: Areas with high cliffs near lakes or rivers.

Food: All kinds of birds including ducks, songbirds, and sea birds.

Wildfacts: Peregrines nest successfully in large cities on top of tall buildings.

6 ★

Great Horned Owl (*Bubo virginianus*)



Habitat: Forests, deserts, canyons, and plains across the U.S.

Food: Cottontail rabbits, skunks, and other birds and small mammals.

Wildfacts: The great horned owl uses nests of other birds instead of building their own.

7 ★

Turkey (*Meleagris gallopavo*)



Habitat: Hardwood forests near prairies, shrubby areas, or farmland in the U.S. and northern Mexico.

Food: Acorns, hickory nuts, berries of dogwood, sumac, and wild grapes, and crops.

Wildfacts: Turkeys can run up to 30 miles an hour and can fly up to 55 miles an hour.

8 ★

Ring-Necked Pheasant (*Phasianus colchicus*)



Habitat: Northern U.S. and southern Canada in open woods and fields.

Food: Farm crops such as corn and soybeans, seeds from native plants, and some insects.

Wildfacts: Pheasants are originally from Asia and were introduced as a new game species during the late 1800s.

9 ★

Ruffed Grouse (*Bonasa umbellus*)



Habitat: Forests, usually near aspen.

Food: Winter buds and flowers of aspen, willow, and hazel, also acorns, seeds, and berries.

Wildfacts: On cold days in winter ruffed grouse rest in burrows in the snow called winter roosts.

10 ★

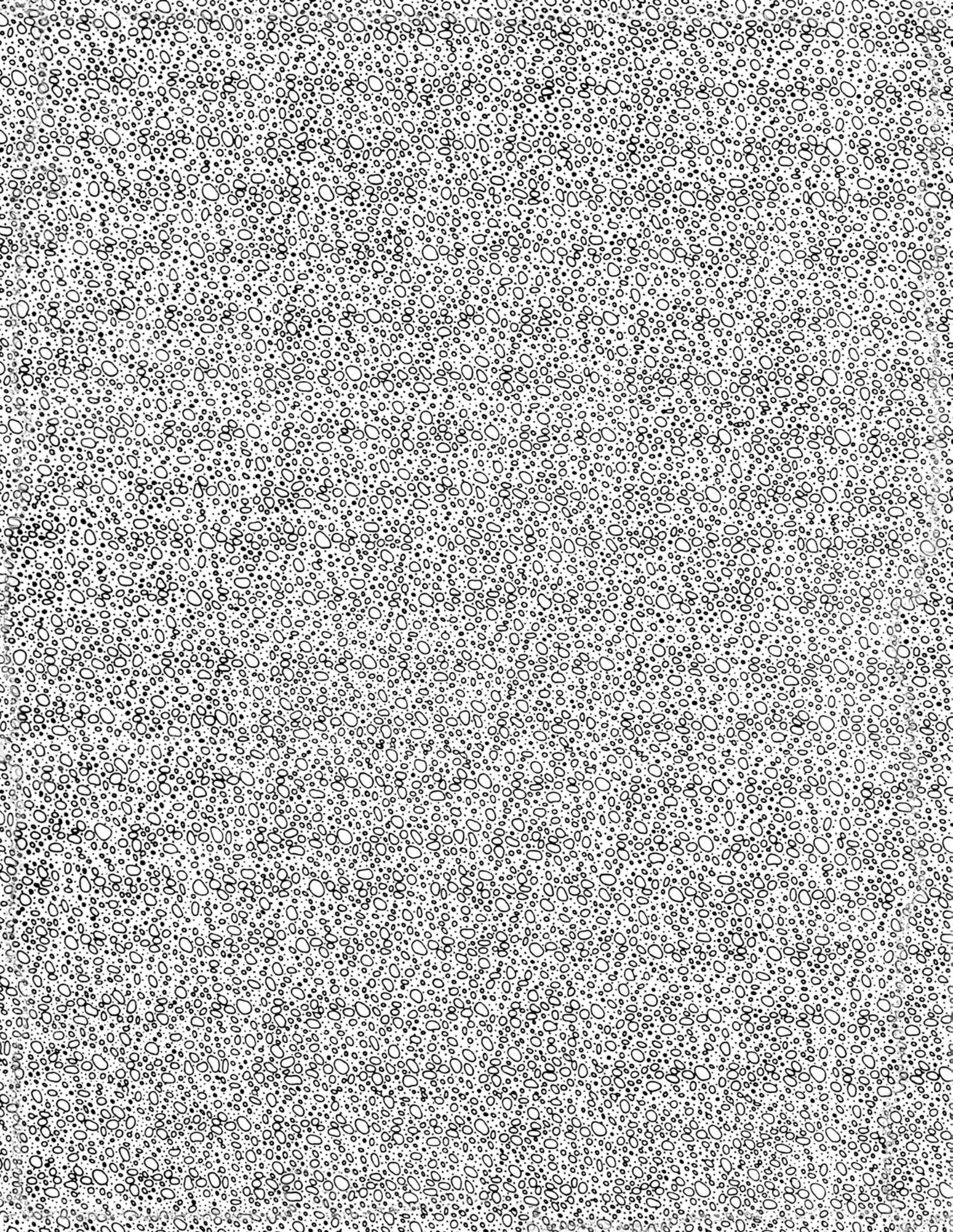
Mourning Dove (*Zenaida macroura*)



Habitat: Across the U.S. and Mexico, in prairies, deserts, urban areas, and farmlands.

Food: Seeds of wild plants and farm grain.

Wildfacts: The mourning dove is commonly hunted. They have a haunting call that sounds like a ghost.



11 ★

American Robin (*Turdus migratorius*)



Habitat: Open woods, grassy lawns, and fields.

Food: Earthworms, berries, and insects.

Wildfacts: Robins lay 3 to 4 eggs at a time, and once hatched, they are able to fly when they are 14 days old.

12 ★

Red-Winged Blackbird (*Agelaius phoeniceus*)



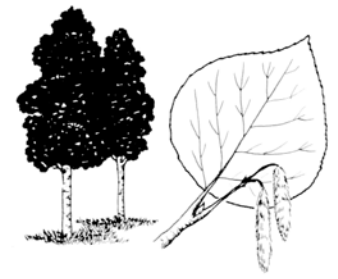
Habitat: Marshes and fields across North America.

Food: Insects and invertebrates.

Wildfacts: The female red-winged blackbird is dull brown, while the male is black with bright orange-red patches on his wings.

13 ★

Quaking Aspen (*Populus tremuloides*)



Habitat: Northern forests in the Lake States.

Wildlife uses: The stems, leaves, or buds are eaten by grouse, deer, moose, beaver, and other animals.

Wildfacts: After logging or fire new trees sprout from the roots of the old aspens.

1 ☼

Bur Oak (*Quercus macrocarpa*)



Habitat: Forests in the Lake States (primarily central and southern).

Wildlife uses: Acorns are important food for many birds and mammals.

Wildfacts: Bur oak acorns are distinctive. The caps on these acorns look like a hairy head.

2 ☼

Switchgrass (*Panicum virgatum*)



Habitat: Prairies and roadsides.

Wildlife uses: Pheasants, blue-winged teal, and other birds nest in this tall, native grass.

Wildfacts: This grass can survive fires that kill other plants.

3 ☼

Red Osier Dogwood (*Cornus stolonifera*)



Habitat: Northern wooded areas, around lakes, streams, and wetlands.

Wildlife uses: The leaves and stems are food for hares, moose, and deer. The berries are eaten by a variety of birds and mammals.

Wildfacts: This plant is easily identified, especially in winter, because of its bright red stems.

4 ☼

Sago Pondweed (*Potamogeton pectinatus*)



Habitat: Ponds, lakes, and marshes across North America, in fresh or slightly salty water.

Wildlife uses: The seeds, stems, and tubers are food for waterfowl, shorebirds, moose, and muskrats.

Wildfacts: This is one of over 60 species of pondweeds in the world. They are one of the most important water plants for waterfowl.

5 ☼

Chokecherry (*Prunus virginiana*)



Habitat: Open woods and near ponds and streams.

Wildlife uses: The leaves and stems are food for browsing animals such as deer. The berries are eaten by quail, ruffed grouse, raccoons, and gray squirrels.

Wildfacts: There are several species of cherry trees in the Great Lakes. Chokecherry is more like a shrub than tree.

6 ☼

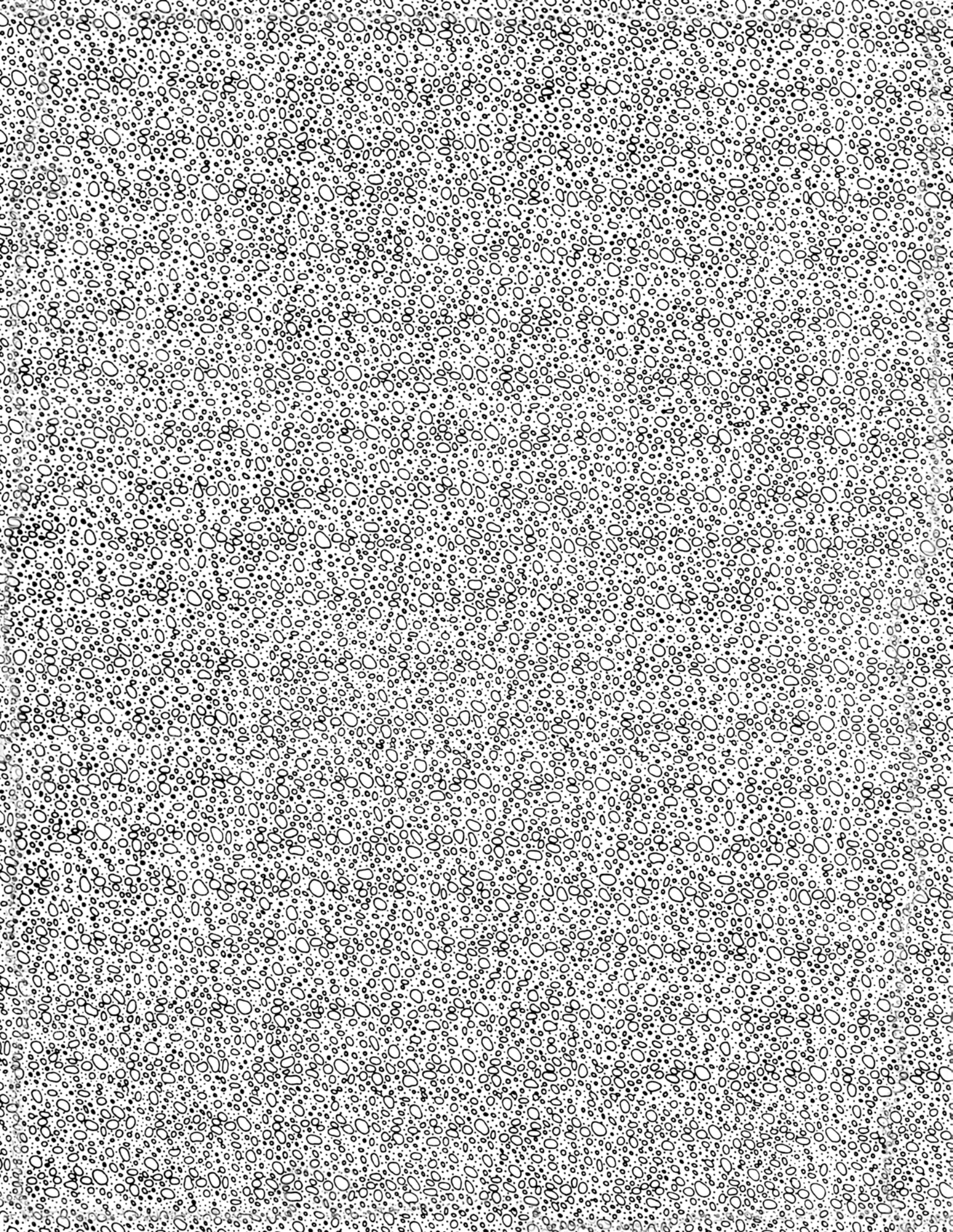
Cattail (*Typha latifolia*)



Habitat: Wetlands, on the shores of ponds, in road ditches.

Wildlife uses: Muskrat use cattail for building their houses and eat the stems and roots. Red-winged blackbirds and waterfowl build nests in the stems or in the water surrounded by cattails.

Wildfacts: The roots of cattails are eaten by people.



7

Mosquito (*Culex pipiens*)



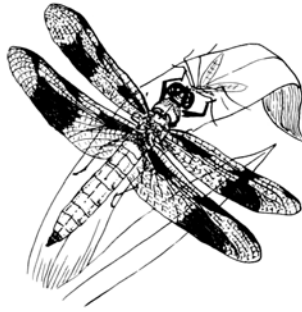
Habitat: They are found in many parts of North America, in areas near pools of water (no streams or rivers).

Food: The young feed on very small pieces of animal and plant matter in the water. Only the adult females bite animals and feed on blood.

Wildfacts: Mosquitoes are an important food for bats, spiders, birds, insects, and mammals.

8

White-Tailed Dragonfly (*Plathemis lydia*)



Habitat: Common in North America around ponds, lakes, and slow moving rivers.

Food: The adults are predators. They eat other small flying insects.

Wildfacts: The young live in the water, feed on other insects, and breathe through gills.

9

Monarch Butterfly (*Danaus plexippus*)



Habitat: Across North America.

Food: As caterpillars they eat leaves of milkweed plants.

Wildfacts: Monarchs migrate thousands of miles south to Mexico in the winter.

10

Meadow Grasshopper (*Orchelimum vulgare*)



Habitat: Common across North America, especially in grassy and open areas.

Food: These are herbivores. They eat the leaves of a variety of plants, including crops such as corn and wheat.

Wildfacts: Grasshoppers are important food for mice, songbirds, burrowing owls, ducks, and pheasants.

11

Decomposing Bacteria



Habitat: Bacteria are found almost all over the earth in soil and water.

Food: They get their food from dead plants and animals.

Wildfacts: Bacteria are what make milk go sour, cider turn to vinegar, and dead leaves and plants turn into soil nutrients.

12

Morel Mushroom (*Morchella semilibera*)



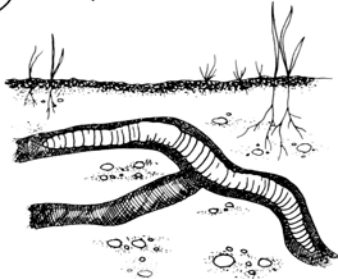
Habitat: Hardwood forests with moist soil.

Wildlife uses: Squirrels, chipmunks, turtles, grouse, and other wildlife eat mushrooms.

Wildfacts: Morels are one of the tastiest wild mushrooms. (Never eat wild mushrooms unless an expert has identified them for you!)

13

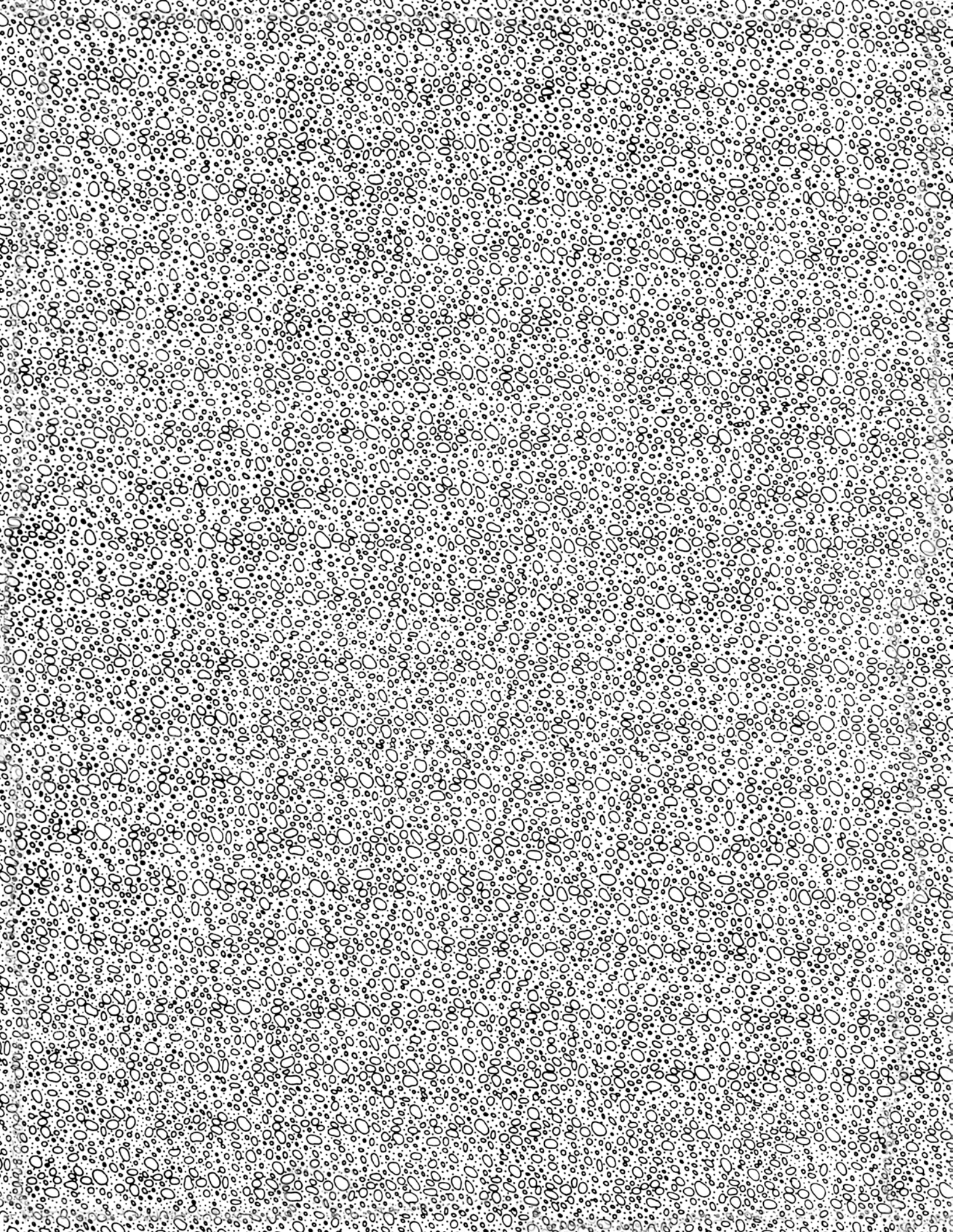
Common Earthworm (*Lumbricus terrestris*)



Habitat: Moist soils.

Food: Dead plant materials, leaves, stems, and roots.

Wildfacts: Earthworms are an important part of the soil-making process. Dead materials are eaten by earthworms and changed into food for bacteria and plants.



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