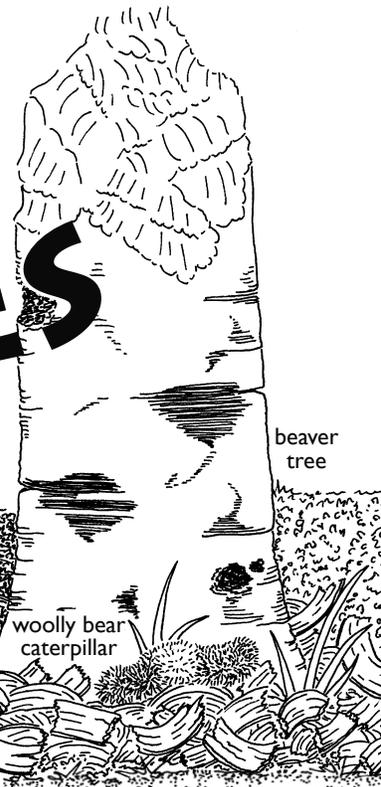




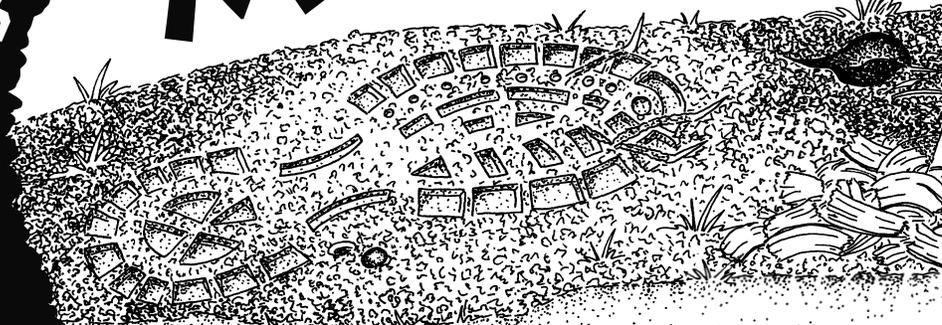
green darner dragonfly

# SOLVING MYSTERIES



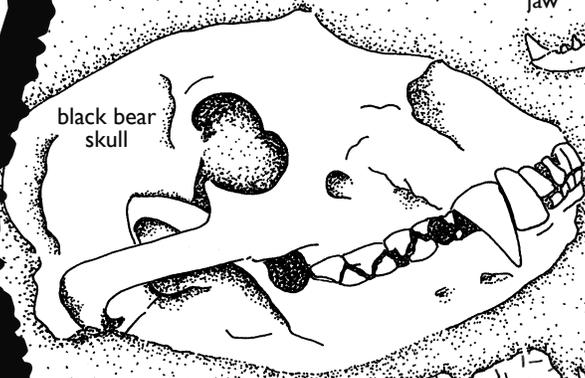
beaver tree

woolly bear caterpillar

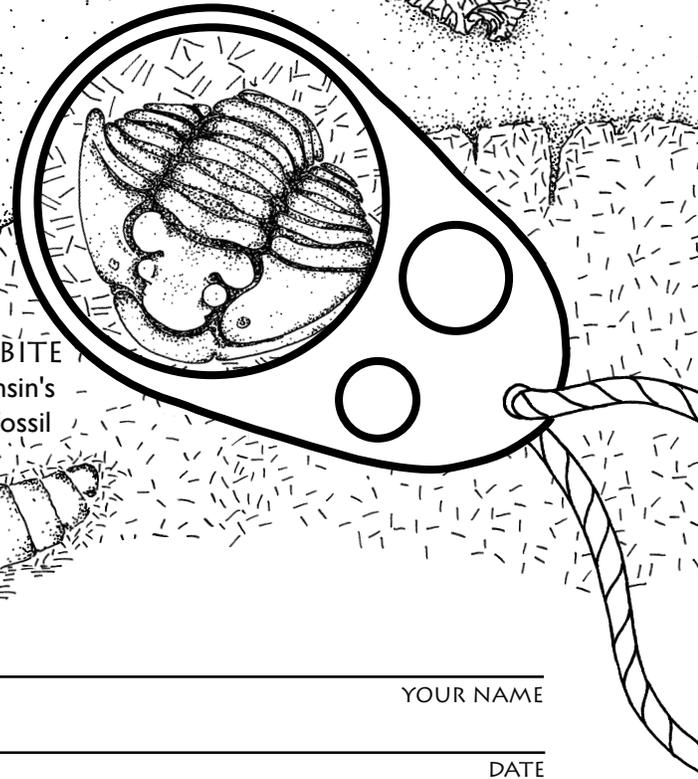


weasel jaw

Archaic point



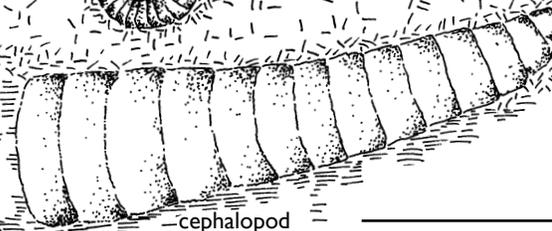
black bear skull



TRILOBITE  
Wisconsin's  
State Fossil



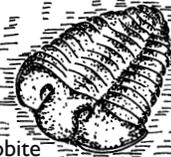
ammonite



cephalopod



brachiopod



trilobite

YOUR NAME \_\_\_\_\_

DATE \_\_\_\_\_

NAME OF PARK \_\_\_\_\_

**Wisconsin Explorers** Kids ages 9 + up  
**Wisconsin Explorers**  
**Wisconsin Explorers**  
**Wisconsin Explorers**  
**Wisconsin Explorers**  
**Wisconsin Explorers**

# HAVE FUN! EXPLORE! COLLECT A PATCH!

Look at all these things you can do. Pick something and do it!

- Look for tracks and traces (pages 3-4).
- Record your mysteries (page 5).
- Tell a tree story (page 8).
- Go on a tree hunt (page 9).
- Guesstimate a tree's age (page 10).
- Tune into nature's weather station (pages 12-13).
- Navigate through the stars (pages 15-16).
- Make your own star chart (page 17).
- Explore this place (pages 18-19).
- Sketch the past (page 20).
- Embark on a quest (page 21).
- Search and rescue (page 23).
- Be a geology detective (page 24).
- Find a sacred stone or magic rock (page 25).



**BORROW AN EXPLORER PACK!**  
Ask park staff for a pack filled with exploring tools and books.

## TO EARN A PATCH:

- Complete 7 to 14 of the explorations listed above.
- Attend a nature program or take a nature hike.
- Do my part to leave no trace when camping (page 22) or share nature mysteries with my family and friends.
- Fill out the evaluation form in this booklet. If lost, print from website (visit [www.wiparks.net](http://www.wiparks.net), search for "Wisconsin Explorers" and select the "Share Nature" tab).

## TO RECEIVE YOUR PATCH (CHOOSE ONE METHOD):

- Give your evaluation form to a park staff person at a participating property and describe one thing that you did.
- Mail the evaluation form, your name and address, and a letter or journal entry telling about your explorations to: Wisconsin Explorers PR/6, Department of Natural Resources, P.O. Box 7921, Madison, WI 53707. The patch will arrive by mail in 2-4 weeks.

**Please note:** The Wisconsin Explorer program provides **one** booklet per child each year. While youth groups and schools are welcome to use individual activities, children participating in groups **cannot** earn patches. For more information, call (608) 266-2181 or email [DNRWisconsinParks@wisconsin.gov](mailto:DNRWisconsinParks@wisconsin.gov)

**The Wisconsin Explorers program is an interpretive program of the Wisconsin State Park System** made possible by the generous support of the Natural Resources Foundation of Wisconsin and the following donors: Bong Naturalist Association, Friends of Buckhorn State Park, Friends of Devil's Lake State Park, Friends of Hartman Creek State Park, Friends of Interstate Park, Friends of Kettle Moraine, Inc., Friends of Kohler-Andrae State Park, Friends of New Glarus Woods State Park, Friends of Rock Island State Park, Friends of Whitefish Dunes State Park, Menasha Corporation Foundation, R.D. & Linda Peters Foundation, and one very generous anonymous donor.



# SOLVE A COLD CASE

You've probably seen pictures of perfect animal tracks in books. But when you're outside, you're more likely to find half a track! Tracking down and identifying animals is never as easy as it seems in books. Imagine you are a detective assigned to a "cold case." Think about the animals that might live in the habitat you are investigating, then sift through all the evidence carefully to solve the mysteries you find.

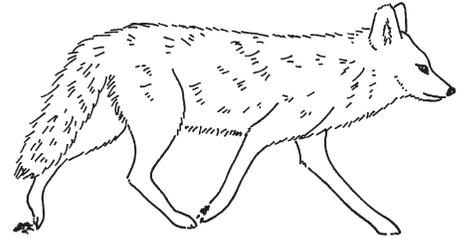
## SEE THE BIG PICTURE

Usually, animal tracks aren't clear enough to count the toes or see the claws. Instead of trying to identify the animal by one print, look at the size and pattern of the tracks it left. Here are some tracking clues:

### walkers

(coyotes, foxes, dogs, deer, cats, people)

Animals with long legs move diagonally opposite limbs at the same time (like we do when we crawl).



### waddlers

(raccoons, opossums, bears, badgers, skunks)

Animals that are short and stocky move both limbs on one side of the body at the same time.



### hoppers

(squirrels, rabbits, mice)

Animals that have large back legs and small front legs usually hop to get around.



Hoppers that live in trees (like squirrels) usually put their front feet down side-by-side.

### bounders

(weasels, minks, otters)

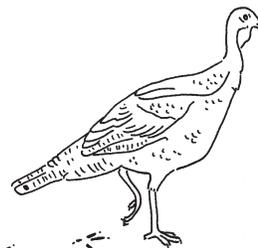
Animals with long, slender bodies and short legs bound.



### walking birds

(turkeys, crows, ducks, geese, gulls, pigeons)

Birds that spend a lot of their time on the ground leave walking patterns. They usually do not have long back toes.



### hopping birds

(songbirds)

Birds that spend most of their time in the trees usually leave hopping patterns. Their long back toes help them perch on tree branches.

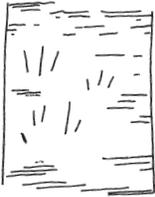


# LOOK FOR TRACES

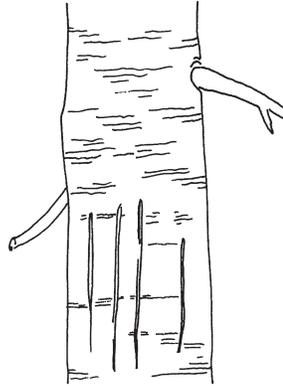
When you can't find tracks, look for other evidence. Hike early in the morning and after dinner when more animals will be active. Inspect tree trunks and holes in the ground. Carefully peek under logs to see what is underneath. One clue might not help you identify an animal, but a combination of clues just might.

## scratch marks

Look for marks on trees, logs, and rocks. Measure the distance between claw marks to get an idea of the size of the animal.



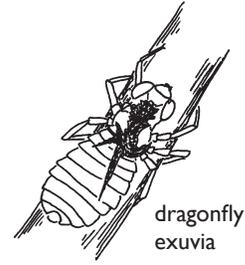
Raccoon scratch marks are about 2 1/2" wide.



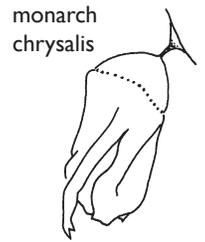
Black bear scratch marks are 3 1/2" to 4 1/2" wide.

## sheds

Animals leave behind skins, antlers, feathers, hairs, and more. Have you ever found an empty monarch butterfly chrysalis? Or empty cicada or dragonfly exuviae (ig-ZOO-vee-ee—the empty skins or exoskeletons left behind when insects molt)? Can you find a mammal hair? Search for hairs on den entrances, fences, tree bark, and low-hanging branches.



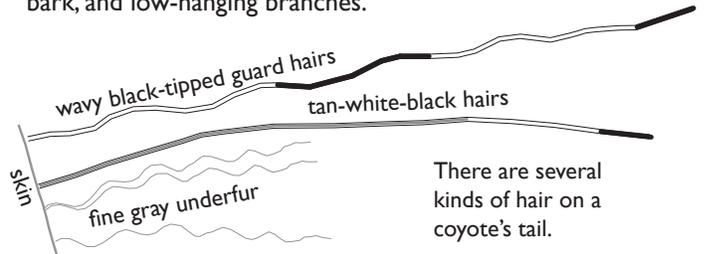
dragonfly exuvia



monarch chrysalis



cicada exuvia



There are several kinds of hair on a coyote's tail.

## tree holes

A tree hole with fresh light-colored wood around the opening is probably being used by a mammal. It must gnaw around the opening to keep the tree from healing.



## eyeshine

Many animals have a mirror-like layer inside the backs of their eyeballs. This reflective layer bounces the light around in their eyes and allows them to see better in the dark. Because different animals have different colors of eyeshine, you can use it as a clue to identify an animal. To see eyeshine, use a headlamp or place the back end of a flashlight on your forehead as you walk at night. When trying to identify an animal by its eyeshine, think about the size of the animal and where it usually lives.

- white – fish, spider
- yellow – raccoon
- red – porcupine, owl
- orange – opossum
- greenish white – deer
- pink/red – rabbit
- green – frog
- green or gold – fox

## FIELD NOTES

If you find a bone, try to guess the size and identity of the animal.

### mammal

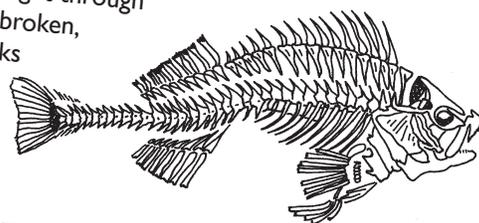
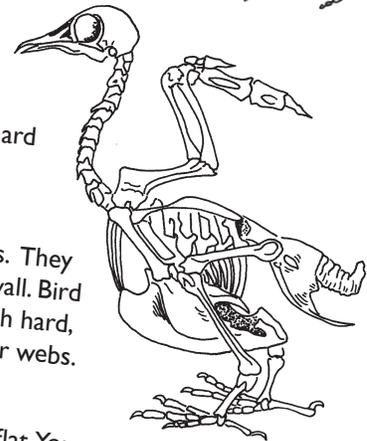
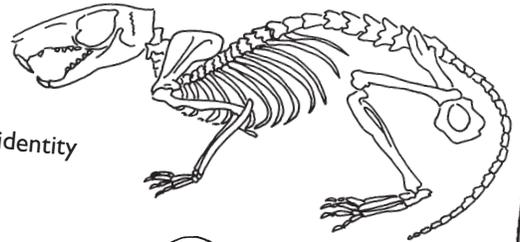
Most mammal bones are rounded. They are hollow with a thick outer wall. Long bones sometimes contain a hard spongy material.

### bird

Bird bones have sharper edges. They are hollow with a thin outer wall. Bird bones are sometimes filled with hard, thin strings that look like spider webs.

### fish

Fish bones are usually thin and flat. You can often see light through them. When broken, the inside looks woody—like a broken twig.



# RECORD YOUR MYSTERIES

Sketch, take photos, and write notes describing animal signs you found that you can't identify. What tools can help you solve your mysteries? What key information are you missing?

- I solved a cold case by ...
- Seeing the big picture.
  - Looking for traces.
  - Recording my mysteries.
  - Thinking outside the box.
  - Cracking a really cold case!

# THINK OUTSIDE THE BOX

To solve these cases, you have to be willing to think about all the possibilities—not just the most obvious ones. If you need help, ask a friend to peek at the answers, then ask your friend yes or no questions until you crack the case.

**1** Jack, Lily, Tom, and Lucy all live in the same house. Jack and Lily go out to a movie. When they return, Lucy is lying dead on the floor in a puddle of water and glass. It is obvious that Tom killed her, but Tom is not prosecuted. Why not?

**2** Joe wants to go home, but he can't go home, because the man in the mask is waiting for him. What is the masked man going to do to him?

**3** A black man dressed all in black, wearing a black mask, stands at a crossroads in a totally black-painted town. All of the streetlights in town are broken. There is no moon. A black-painted car without headlights drives straight toward him, but turns in time and doesn't hit him. How can this be?

**4** A man is alone on an island with no food and no water, yet he does not fear for his life. Why not?

**5** Amanda leaves her house, wearing a mask and carrying an empty sack. An hour later, she returns. The sack is now full. She goes into a room and turns out the lights. What did she do?

## Answers

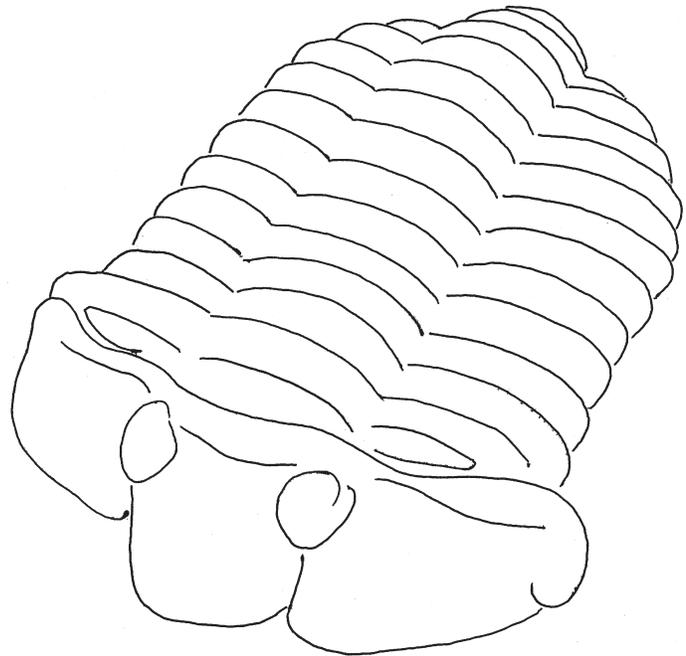
(1) Lucy is a goldfish; Tom is a cat.  
(2) Joe is on third base. The masked man is the catcher waiting at home plate with the ball; (3) It's daytime; (4) It's a traffic island; (5) Amanda was trick-or-treating.

# CRACK A REALLY COLD CASE!

Imagine a crime scene buried in ash, tar, sand, or ice for 400 million years! How could you figure out how animals lived and died when the seas they lived in are gone, and the only clues are fossilized? This is what paleontologists (scientists who study fossils) do every day.

By studying fossilized remains, paleontologists know that trilobites (TRY-low-bites) were covered with hard exoskeletons like insects and other arthropods. They also know that many trilobites could curl up in a ball (like pill bugs) to protect their soft undersides. But there are many unanswered questions. What color were they? Did they have fleshy parts that weren't preserved in fossils?

Add color and texture to this trilobite fossil to show what you think it looked like when it was alive.



Wisconsin's state fossil, a trilobite named *Calymene celebra*, was probably a bottom-dweller that crept along the sea floor in search of food.

# LISTEN TO OLD TREES

Think about your grandparents and other older people. Do they have any scars? Do they walk with a limp? Do they have weathered skin? A story lurks behind every scar, limp, and wrinkle! Think of a nice way to ask your older friends about the stories their bodies tell. Keep in mind that as you get older, you will have more stories to tell about why you look the way you do.

## THINK ABOUT LIFE AS A TREE

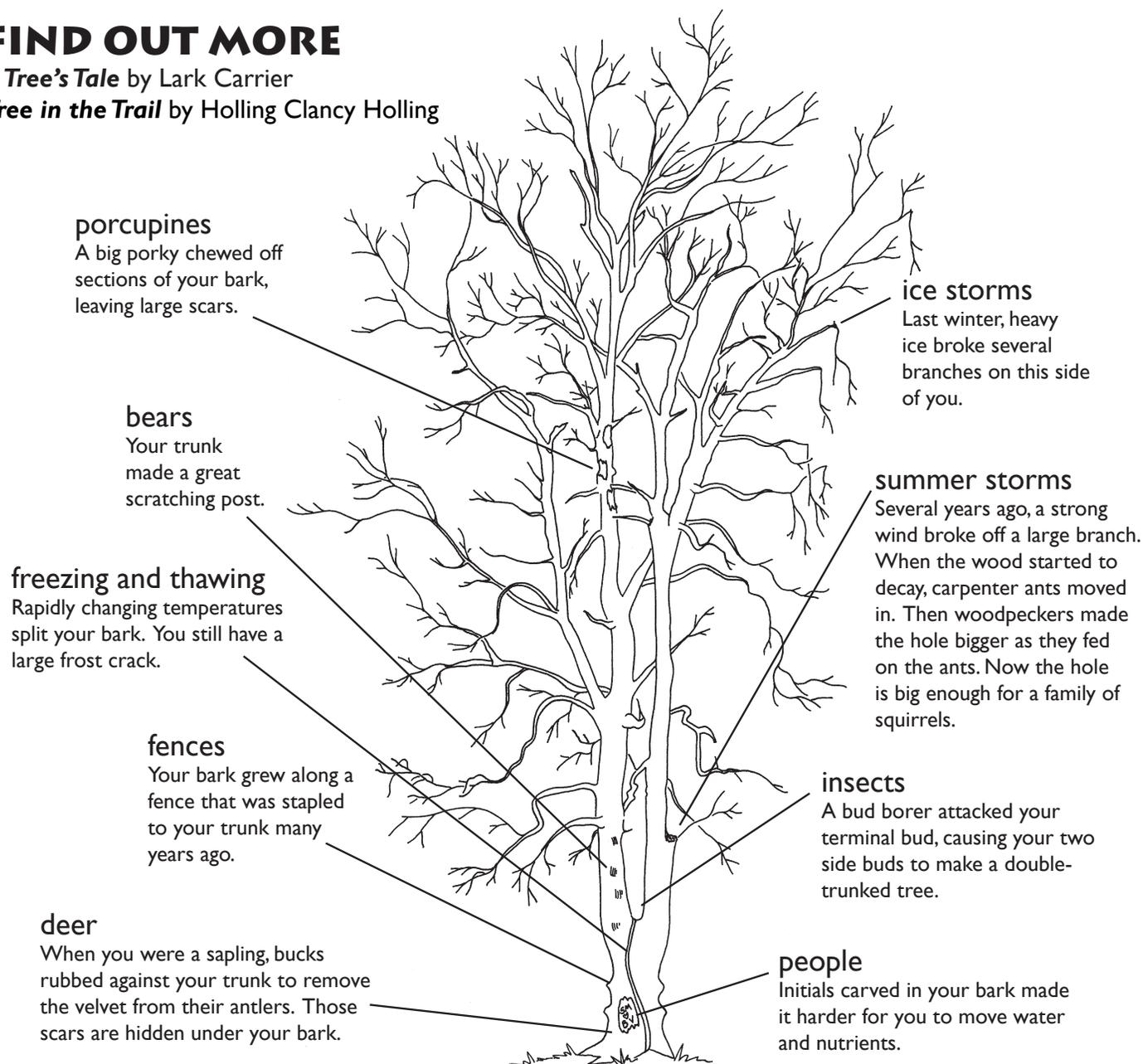
Imagine what it would be like to be firmly rooted in one spot your whole life. You can't go inside to escape the wind or cold. Wild animals scratch, insects drill, and birds peck. Other trees try to steal your sun, water, and nutrients. Rains fall. Lightning strikes. It rains too much and floods your roots. It doesn't rain for months, and your leaves fall off. People carve into your skin.

All of that exposure begins to take a toll on you. A little scar here, a broken branch there, a hole, a crack, and suddenly you are an old tree with lots of stories to tell. Since you can't talk, your stories are a mystery until someone takes the time to look.

## FIND OUT MORE

*A Tree's Tale* by Lark Carrier

*Tree in the Trail* by Holling Clancy Holling



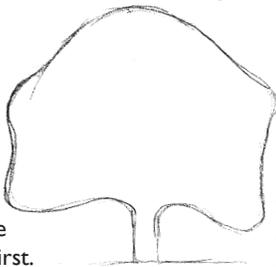
# TELL A TREE STORY

Find an interesting old tree. Draw a sketch of it here. What do you think happened to the tree during its life to make it grow the way it did?

## DRAW BETTER TREES

If your trees look like lollipops, try some of these tree drawing hints.

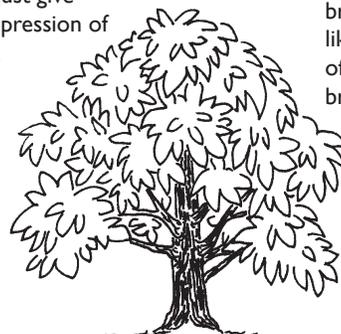
Draw a light outline of the basic shape first.



Start in the middle of the trunk. Draw down to the ground and up to the sky. Then sketch the large branches.



Don't draw each leaf—just give the impression of leaves.

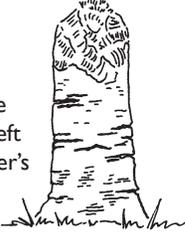
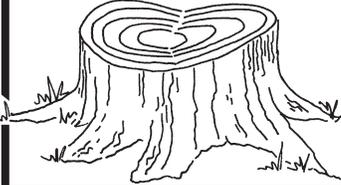
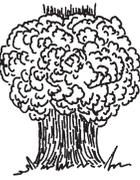
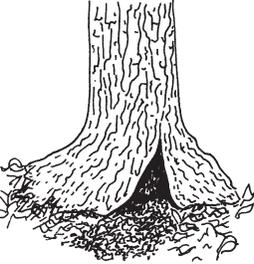
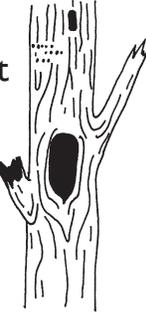
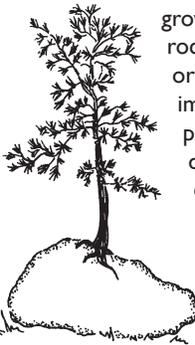
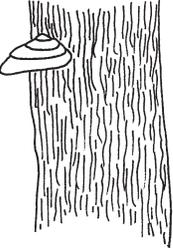
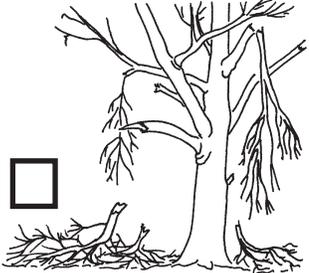
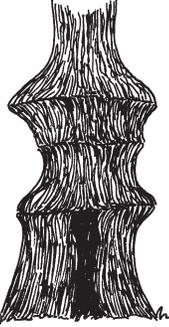


Trees are 3-D. That means some of the branches need to look like they are in front of or behind other branches.

The farther from the trunk a branch is, the thinner it should be.

# GO ON A TREE HUNT

Trees have amazing stories to tell. As you explore forests, campgrounds, and swamps, look for the tree mysteries on this page. Check them off as you find them. Can you find four in a row, four in a column, all four corners, or all of them?

<input type="checkbox"/> <p><b>beaver sign</b> Can you see the marks left by the beaver's large teeth?</p> 	<input type="checkbox"/> <p><b>wolf tree</b> Look for a large tree with wide-spreading branches that once grew in the open by itself.</p> 	<input type="checkbox"/> <p><b>snag</b> Standing dead trees are important homes for wildlife. How do you think your tree died?</p> 	<input type="checkbox"/> <p><b>direction tree</b> Find a tree with moss growing thicker on the north side of the tree.</p> 
<input type="checkbox"/> <p><b>stump</b> Can you tell when or why the tree was cut down? How old was it when it was cut? Count the rings.</p> 	<input type="checkbox"/> <p><b>frost crack</b> Look for a long, thin injury. These scars spread with freezing and thawing.</p> 	<input type="checkbox"/> <p><b>trees in rows</b> Trees don't usually grow in straight rows by themselves. Who could have planted the trees you found?</p> 	<input type="checkbox"/> <p><b>burl</b> Burls are strange lumps and bumps on trees that are probably caused by injuries from lightning, disease, insects, or animals. Burl cells grow wildly in all directions like a cancer.</p> 
<input type="checkbox"/> <p><b>den tree</b> Openings at the bottoms of trees are often homes for wild animals. Anybody home?</p> 	<input type="checkbox"/> <p><b>apartment tree</b> Many animals live in tree holes. Who lives in the tree you found?</p> 	<input type="checkbox"/> <p><b>impossible tree</b> Find a tree growing in rocks, on a cliff, or in another impossible place. How did the seed ever sprout and grow?</p> 	<input type="checkbox"/> <p><b>conk</b> Conks are the fruiting part of a fungus. They indicate the tree is infected with a wood-destroying fungus.</p> 
<input type="checkbox"/> <p><b>storm damage</b> Ice storms and heavy snows can break large tree branches.</p> 	<input type="checkbox"/> <p><b>carvings</b> When people carve on trees, they damage the growing part of the tree. Save a tree; send an electronic message!</p> 	<input type="checkbox"/> <p><b>fence tree</b> When fences are attached to trees, the bark grows along the fence. Look for wire.</p> 	<input type="checkbox"/> <p><b>blowdown</b> An uprooted tree leaves a hole in the ground right next to a mound of upturned roots and soil.</p> 

# GUESSTIMATE YOUR TREE'S AGE

How old is a big tree? Since some trees grow quickly, and some trees grow slowly, you'll have to know what kind of tree you are looking at. Using a tape measure or piece of string, measure the circumference of the tree (distance around the trunk) about 4 1/2 feet above the ground. (If you use string, you can measure the string by remembering that this piece of paper is 11" tall, and a dollar bill is about 6" long.)

Divide the circumference by 3.14 to find the diameter. Multiply the diameter by the tree growth factor in the chart to calculate the age. For example, a sugar maple that has a circumference of 32" would have a diameter of about 10" and be about 60 years old.

white oak

red oak

basswood

cottonwood

aspen

sugar maple

silver maple

black walnut

ash

birch

tamarack

hickory

hemlock or fir

pine

### Tree Growth Factors

Aspen grow fast, while hickories take their time!

aspen, cottonwood .....	2
silver maple, basswood ...	3
black walnut .....	3
birch, red oak .....	4
ash, pine.....	5
sugar maple, white oak ...	6
fir, hemlock .....	7
hickory, tamarack .....	8

## TELL A CIRCLE STORY

Sit down with your family or friends around an old tree. Follow a Native American tradition and use a Talking Stick. The Talking Stick is passed around the circle. Only the person holding the stick is allowed to speak. You can start the story by telling how old the tree is and how the seed got to this spot. Then pass the Talking Stick to another person to continue to tell the tree's story. The story can grow with the tree as each person tells another chapter in the tree's life. Imagine all the things that could have happened to the tree—winter storms, diseases, sunny days, floods, nesting birds, etc.

- I listened to old trees by ...

  - Thinking about life as a tree.
  - Telling a tree's story with words and pictures.
  - Going on a tree hunt.
  - Guessing my tree's age. I think it is \_\_\_\_\_ years old.
  - Telling a circle story.

# PREDICT THE WEATHER

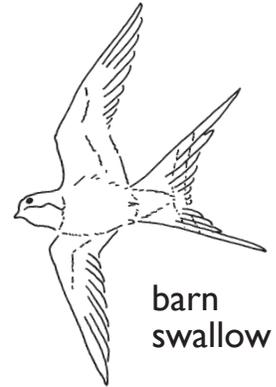
Before weather satellites and radar-based forecasts, survival depended on a person's ability to recognize weather signs, perceive patterns, and remember seasonal changes. People needed to be weatherwise, or they would be otherwise!

## CHECK OUT WEATHER SAYINGS

Ask your parents, grandparents, or older friends if they have heard any of these weather sayings. If you hear others, add them to the list. Check off the ones you think might accurately predict the weather.

- Ring around the moon, rain is coming soon.
- Wind from the south brings rain in its mouth.
- Ants that move their eggs and climb, rain is coming anytime.
- Swallows fly high: clear blue sky. Swallows fly low: rain we shall know.

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_



barn swallow

If you think these sayings sound old-fashioned, you're right! They were written by people who had spent their lives observing nature. By recording the weatherlore in rhymes, they were hoping to make the information easier to remember and pass on to future generations. If you were in charge of passing the information on to the next generation, how would you rewrite the sayings to make them more appealing to today's kids?

## FIELD NOTES

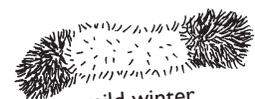
### Weatherlore vs. folklore

Weatherlore is based on generations of observations. People use weatherlore to predict the weather for today or tomorrow, and it is usually accurate. For example, the saying "Red sky at night, hikers delight. Red sky in morning, hikers take warning" does a fairly good job of predicting the weather for the next 24 hours.

Folklore is based on superstitions and fears. Since people use folklore to predict the weather over a long period, it isn't very reliable. It might be fun to find a woolly bear caterpillar and look at the width of the brown band, but caterpillars can't predict the weather!



average winter



mild winter



cold winter

I predicted the weather by ...

- Checking out weather sayings.
- Tuning in to nature's weather station and making a forecast. My forecast was (circle one) right-on-target! OR way off!

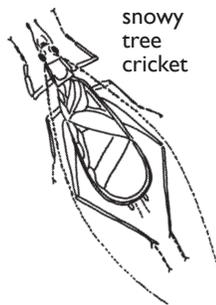
# TUNE IN TO NATURE'S WEATHER STATION

When you are home, it is easy to get a weather report. When you are camping, you might not be able to turn on the TV, check the Internet, or listen to the radio. Can you forecast the weather by observing these summertime clues in nature?

## CALCULATE THE TEMPERATURE

Since insects are cold-blooded, they make interesting thermometers. The higher the temperature climbs, the faster they move and chirp! Listen for the call of a male cricket. To estimate the temperature in degrees Fahrenheit, count the number of chirps in 14 seconds, then add 40. Here are other clues:

- 40°..... All insects are quiet.
- 45°..... Grasshoppers can't fly.
- 55°..... Ants stay home; katydids are quiet.
- 65°..... Katydid sing "Katy."
- 70°..... Katydid sing "Katy Did."
- 78°..... Katydid sing "Katy Did It."
- 84°..... Cicadas start to buzz.
- 105° ..... All insects are quiet.

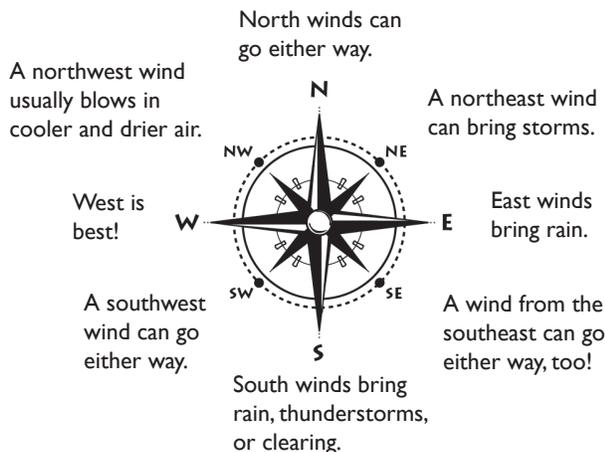


## FOLLOW THE WIND

You can notice changes in the wind speed by watching smoke, trees, and waves.

### When the wind speed is ... then...

- 0-1 mph ..... Smoke rises straight up.
- 1-3 mph ..... Smoke drifts.
- 4-7 mph ..... Leaves rustle.
- 8-12 mph ..... Leaves and twigs constantly move.
- 13-18 mph ..... Small branches move
- 19-24 mph ..... Waves form on inland waters; small trees sway.
- 25-31 mph ..... Large branches move.
- 32-38 mph ..... Large trees sway; wise people find shelter.
- 39-46 mph ..... Twigs break from trees.
- 47-54 mph ..... People find it very difficult to walk.
- 55-63 mph ..... Tree limbs and branches break.
- 64 mph+ ..... Damage is widespread!



## MY FORECAST

The current temperature is about \_\_\_\_\_

The current wind speed is about \_\_\_\_\_

The wind is blowing from the \_\_\_\_\_

I think the air pressure is (circle one)

high or low

Based on what I've noticed, I think the air pressure is (circle one)

falling or rising

I think the humidity is (circle one)

high or low

The clouds are ...

Based on what I have observed, I think the weather for the next day will be ...

How accurate was your forecast?

## FEEL THE PRESSURE

When the air pressure is high or rising, we usually have good weather. These things indicate high pressure:

- Campfire smoke rises straight up in the air.
- Strong black coffee forms bubbles in the center of the mug when stirred.
- It is easier to fly a kite!

When the pressure is low or falling, the weather is usually not the best for camping. These things indicate low pressure:

- Campfire smoke lingers closer to the ground.
- Birds stay on the ground or fly lower than usual.
- Strong black coffee forms bubbles that cling to the sides of the cup.
- Old people complain about stiff joints.
- Insects swarm and bite more.



high pressure



low pressure

## ENDURE THE HUMIDITY

The air becomes more humid as wet weather approaches. Here are some signs of high humidity:

- Frogs and toads are more active.
- Your hair might be curlier.
- Sound seems to travel farther.
- The contrails left by airplanes last a long time.
- Stones sweat.
- Smells become more intense. Sometimes it even “smells like rain.”

On the other hand, dew on the grass in the morning usually indicates a nice day.

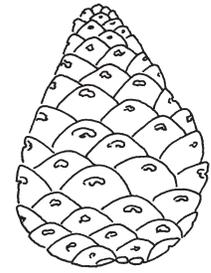
## WATCH THE CLOUDS

Expect sunny, clear weather when:

- Fog burns off before noon.
- Clouds break up and get thinner.
- Clouds climb higher.
- Blue sky increases.

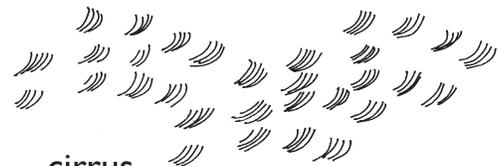
Expect changes in the weather, or rain, if:

- Clouds get thicker and cover more of the sky.
- Clouds get lower. Low clouds can bring rain.
- Clouds start moving in all directions.
- Cumulus clouds grow into thunderheads.
- There is a halo around the sun or the moon.



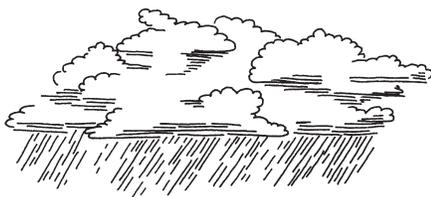
### pine cone humidity test

In dry weather, the scales on a fresh pine cone open up to release seeds. When it is damp, the scales close tight.



### cirrus

High, wispy clouds are made of ice crystals. If cirrus clouds thicken, watch for rain within 24 hours.



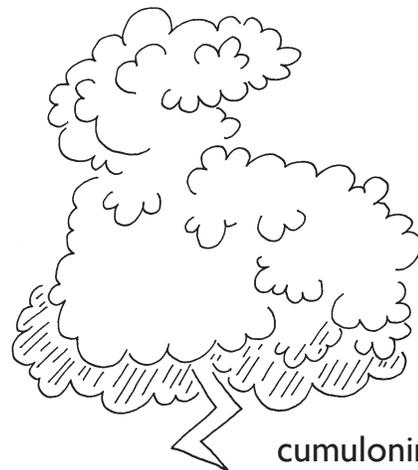
### nimbostratus

Dark gray blanket clouds bring all-day drizzle.



### cumulus

Puffy cauliflower-shaped clouds bring nice weather; but if they keep growing, they can become storm clouds.



### cumulonimbus

Towering clouds bring thunderstorms.

# LOOK INTO THE NIGHT SKY

Ancient people may not have understood how the stars moved, but they did unlock the mysteries of navigating and keeping time by the stars.

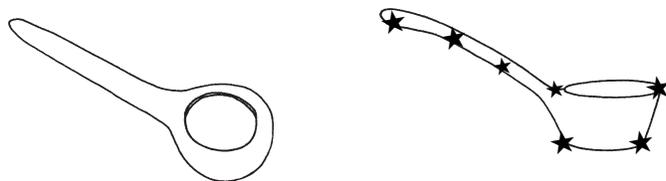


## FOLLOW THE DRINKING GOURD

The stars of the Big Dipper are part of the constellation known as the Big Bear. But not all people look to the sky and see a dipper! People have always seen things that are important to their culture.

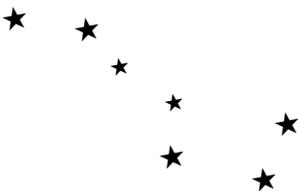


African people enslaved in the South used carved gourds for drinking. To them, the Big Dipper was the Drinking Gourd. It was a symbol of freedom for people who dreamed of escaping slavery. The song "Follow the Drinking Gourd" reminded them to use the stars to travel north to freedom.



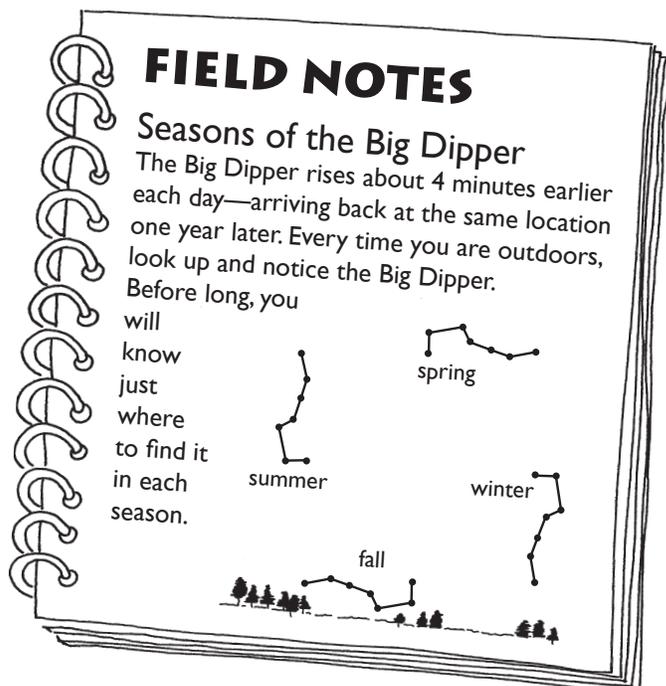
Chinese saw a carriage with Wen Ch'ang, the god of literature.

## DRAW WHAT YOU SEE



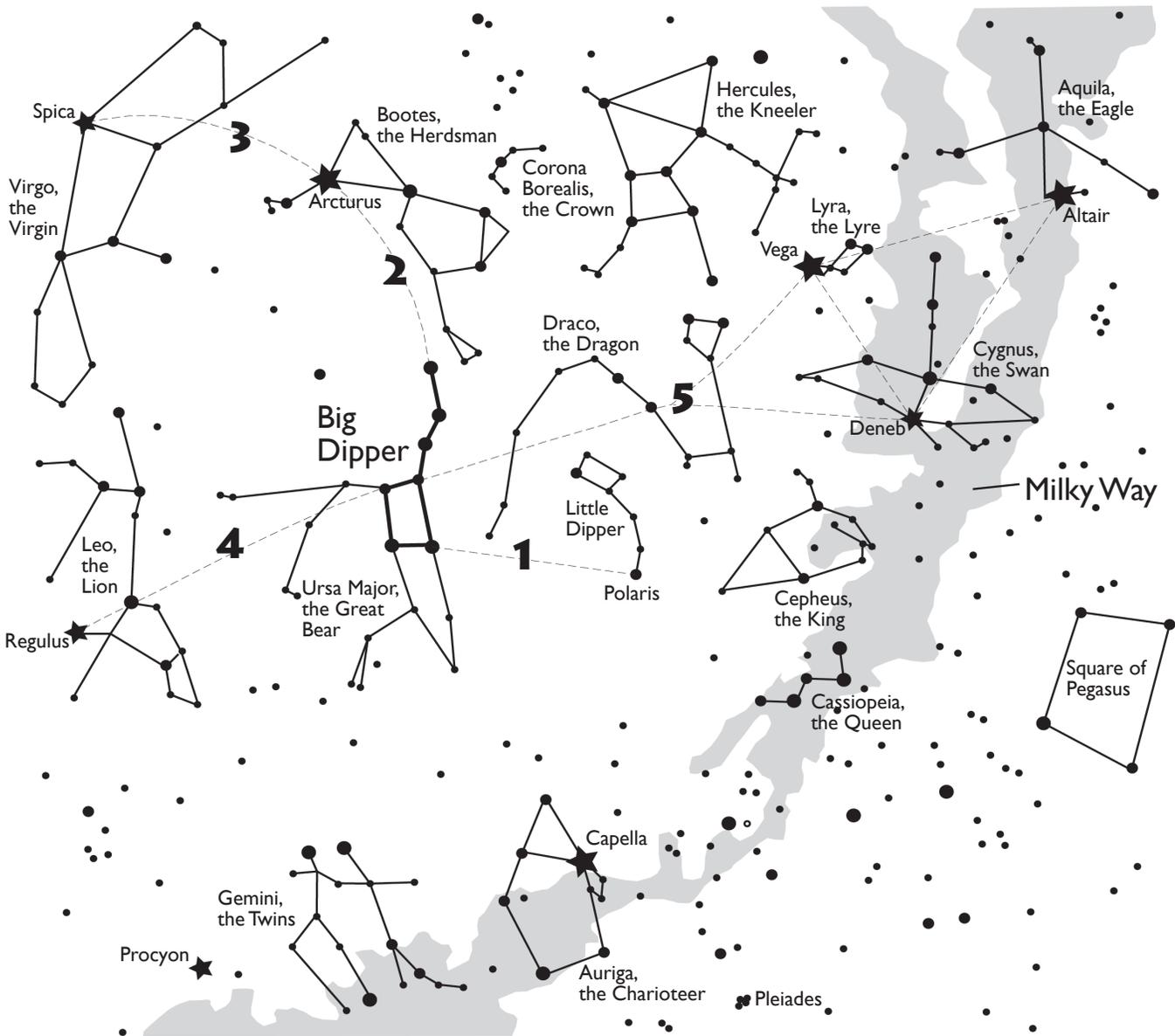
## FIND OUT MORE

*Dot to Dot in the Sky: Stories in the Stars*  
by Joan Marie Galat



# NAVIGATE THROUGH THE STARS

Here are some hints for finding star groups in the summer sky. Look to the north for the Big Dipper. Turn the page until the position of these stars matches what you see in the sky.



## FIND THE NORTH STAR

Find the stars in the Big Dipper opposite the handle. Draw an imaginary line through them and out the open end of the bowl (1). Extend the line about five times the distance between the two stars, and you will arrive at a star about the same brightness as the Dipper stars. It is Polaris, the North Star.

## ARC TO ARCTURUS AND SPEED TO SPICA

Extend the curve of the Big Dipper's handle one full "dipper length" in a gentle "arc to Arcturus" (2), one of the brightest stars in the sky. Now "speed to Spica" (3).

## GO ON SAFARI

The two stars in the Big Dipper's bowl that are closest to the handle point in both directions to bright, important stars. Out the bottom of the bowl, you can travel to Regulus (4). Regulus is the dot of the question mark that forms Leo the Lion.

## LOOK FOR THE SUMMER TRIANGLE

Out the top of the bowl, mentally split your line into a "Y" to find Vega and Deneb (5). Vega, Deneb, and Altair form the summer triangle of bright stars. Can you see that Cygnus the Swan and Aquila the Eagle are flying along the path of the Milky Way?

# FIND A WANDERING "STAR"

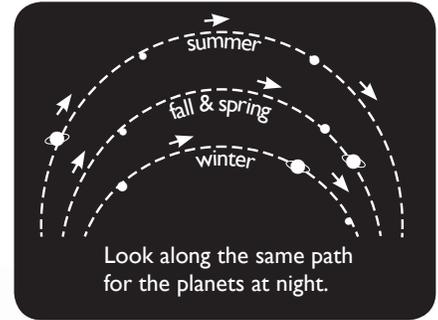
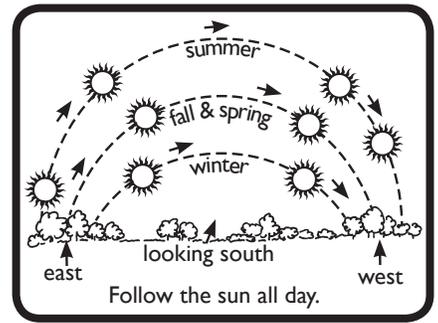
Not all the small, bright objects in the night sky are stars. Look closely and you might ...

## PEEK AT A PLANET

The planets follow about the same path as the sun. During the day, watch the sun and pay attention to where it travels across the sky. After dark, look along that same path for the planets.

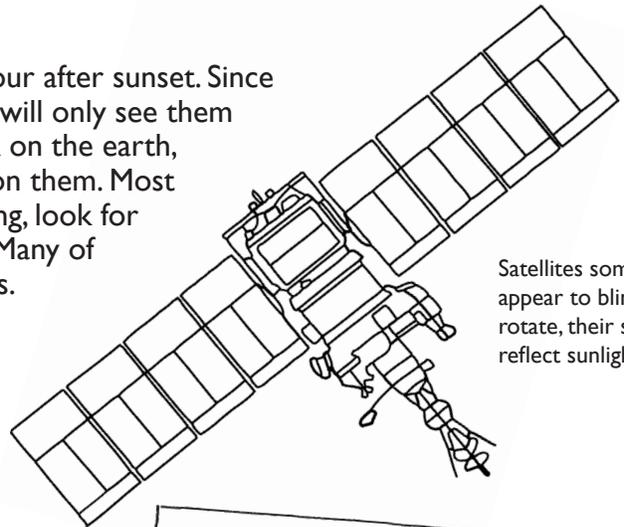
Did you sing "Twinkle, twinkle, little star" when you were little? That song will remind you that stars twinkle, but planets reflect a more steady light. If you have binoculars, take a peek at what you think might be a planet. Even with binoculars, a star is still just a point of light, while a planet looks round.

The planet Venus is one of the brightest objects in the sky. Since Venus is closer to the sun than we are, it isn't visible during the middle of the night. You can use a star chart or the Internet to find Venus, or you can just keep checking. You'll have the best luck if you look east early in the morning before the sun rises or west in the evening after the sun has set.



## SPOT A SATELLITE

The best time to watch for satellites is about one hour after sunset. Since satellites don't have flashing lights like airplanes, you will only see them when they are in the sunlight. After sunset, it is dark on the earth, but satellites are so high that the sun is still shining on them. Most satellites move from west to east. Later in the evening, look for polar-orbiting satellites, traveling from pole to pole. Many of these satellites are mapping satellites or spy satellites.



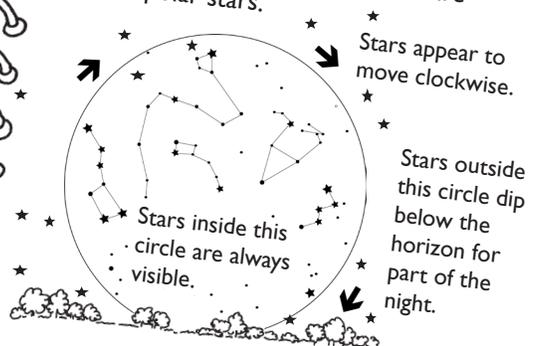
Satellites sometimes appear to blink. As they rotate, their solar panels reflect sunlight.

I looked into the night sky by ...

- Drawing what I imagined in the stars of the Big Dipper.
- Navigating through the stars. I found \_\_\_ of the 17 constellations and star groups on page 15.
- Finding wandering "stars." I found ...
- Making my own star chart.

## FIELD NOTES

Because the earth is spinning around, stars (just like the sun) appear to rise in the east and set in the west. Some stars are always visible. Well, they would be visible if the sun didn't outshine them during the day! These stars are circumpolar stars.



# MAKE YOUR OWN STAR CHART

Find a spot where you can see the night sky. Make yourself comfortable and sketch it. Include stars, planets, and satellites. Connect the stars any way that you want. You can add labels, shade in the Milky Way, or splotch on some clouds.

When you are done, use a pin, paper clip, or something pointy to poke a hole in each star. Shine a flashlight on the paper to see the stars on the inside of your tent.

# EXPLORE THIS PLACE

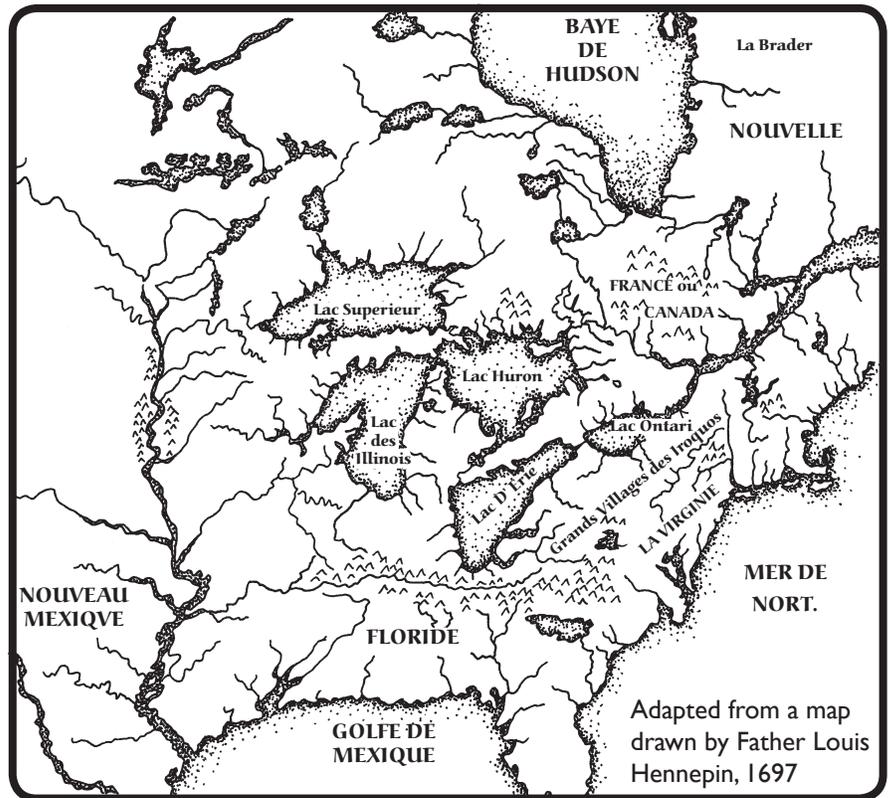
When Sieur de La Salle explored the Great Lakes, it was populated with people, but no one had made a map. Can you imagine trying to make a map of such a big area without a satellite or airplane? Where would you start?

Look for these places on this old map: Lake Michigan, Lake Superior, Door County, and the Mississippi River. Compare this map to a modern map. Water must have been important to this mapmaker!

## FIND A MAP OF THE PARK

Pick up a trail map or look around for maps on bulletin boards.

Check out what the mapmakers thought were important things to label. Since park visitors usually want to know about trails, campgrounds, bathrooms, and lookout towers, you will probably find those kinds of things highlighted. How would the map look different if a beaver had made it? What kind of map would a gartersnake make?



## MAP THIS PLACE

What do you like about this park? Do you fish? If so, you might want to map the best fishing spots. If you are an artist, you might add some inspirational overlooks. History buffs will probably mark places where people traveled and lived. Map whatever is important to you!

You can start by tracing part of the park map onto the next page and then sketching in the features you want to emphasize. Use numbers to mark your places of interest and include a legend to explain what each number represents. Or, if you feel adventurous, pick your favorite part of the park and draw your own map from scratch. Decide the orientation, scale, level of detail, and legend. Remember, accurate distance and direction make a map useful.

## FIND OUT MORE

Learn how to use maps to remember your vacations in the book *Three Days on a River in a Red Canoe* by Vera B. Williams.

Use the Internet to see satellite images of the park you visited.

I explored this place by ...

- Looking at an old map. I'm (circle one) amazed it was this close OR surprised it is so wrong.
- Finding a map of the park.
- Making my own map of the park. If it was up to me, every map would have ...



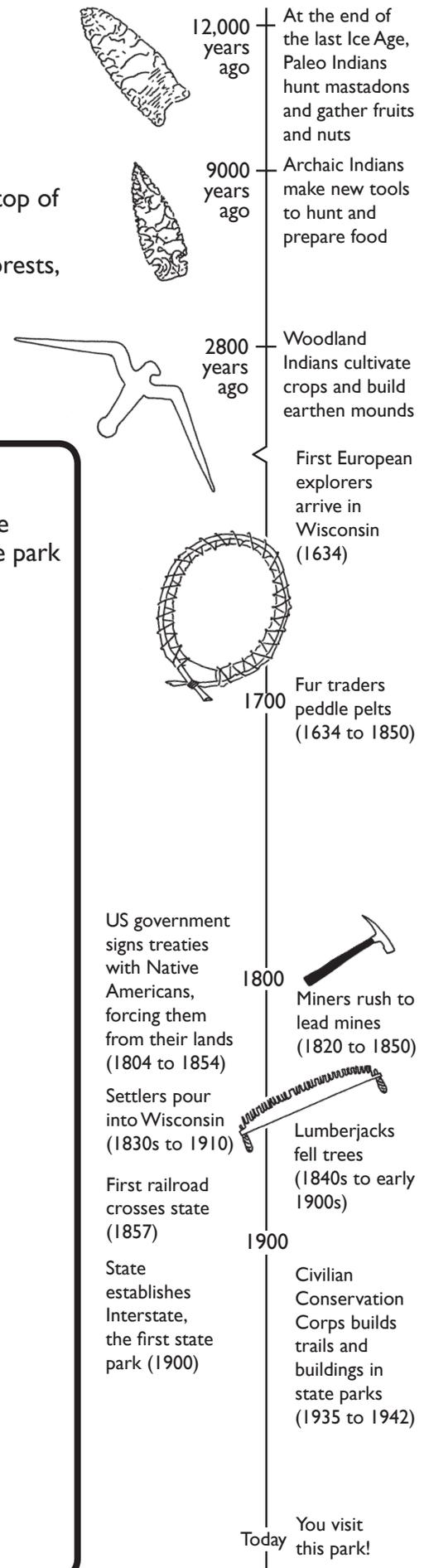
# UNCOVER LOST CIVILIZATIONS

Find a spot with a view. You might need to climb a tower, hike to the top of a hill, or sit on a bluff. What do you see?

This place didn't always look like this! All of Wisconsin's state parks, forests, trails, and recreation areas were something else before they became state properties. You can find clues left behind by mound builders, miners, loggers, farmers, and others. Look at park newspapers, maps, brochures, or signs to find out how people used this park in the past. Then go out and see if you can find any clues.

## SKETCH THE PAST

Use what you know about Wisconsin's history, information from the park, and your own imagination to sketch how you think part of the park looked many years ago.



# EMBARK ON A QUEST

Find a special place at the park where you see a remnant from a “lost civilization.” Your remnant might be an old foundation, an Indian mound, a pine plantation, or an abandoned railroad. Once you have a destination, you can write a quest (a series of clues that will help someone else find your special place).

Pick a starting point, such as your campsite, a trailhead, or the park office. You will need to give “movement clues” so that people reading your quest will know which trails to take, when to turn, and how far to go. You should also give “history clues” that will tell the story of your special place. But that’s not all—your clues have to be in verse. See the sample, then embark!

Here is one verse from a sample quest. Each verse should lead others closer to your special place.

Walk to the crest of the hill  
To a white pine six foot round.  
Then down 35 steps  
Where a small clearing is found.  
Look to the left,  
Look to the right,  
Walk straight ahead  
Toward the lake in your sight.

## LEAVE WHAT YOU FIND

When you are searching for clues from the past, you may find some things you would like to keep. Remember that laws protect resources on state properties. Leave the treasures for other kids to enjoy!

## FIND OUT MORE

*And Still the Turtle Watched* by Shelia Macgill Callahan  
*Under the Moon* by Dyan Sheldon

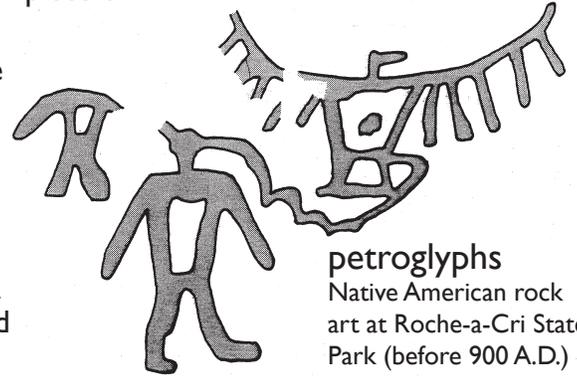
- I uncovered lost civilizations by ...
  - Sketching the past.
  - Writing a quest and inviting someone to follow it.

# LEAVE NO TRACE?

As we hike, camp, picnic, fish, and explore in the outdoors, it is almost impossible not to leave something behind. Someone steps off the trail and leaves a footprint. Another person has a snack and drops a peanut shell. Anyone could reach into a pocket and drop a small piece of paper. It's easy to leave small traces behind.

Leaving traces wasn't a big problem 1100 years ago when there were only a few thousand people living in all of Wisconsin. There was a lot of room for people to build cooking fires, gather wood, construct shelters, harvest roots and berries, and leave their artwork on rocks.

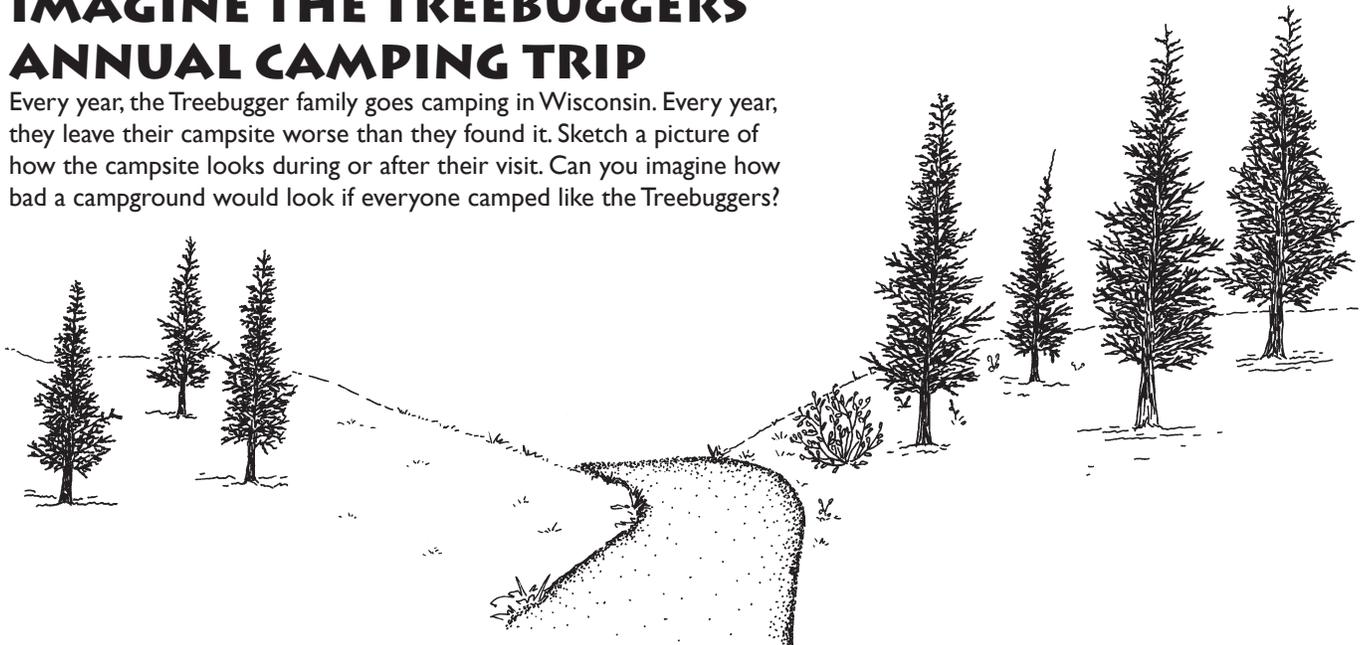
But now there are close to six million people living in Wisconsin. There aren't many wild areas left. When we enter a wild area, we need to step lightly, camp responsibly, protect wild places, and leave our artwork on recycled paper!



petroglyphs  
Native American rock art at Roche-a-Cri State Park (before 900 A.D.)

## IMAGINE THE TREEBUGGERS' ANNUAL CAMPING TRIP

Every year, the Treebugger family goes camping in Wisconsin. Every year, they leave their campsite worse than they found it. Sketch a picture of how the campsite looks during or after their visit. Can you imagine how bad a campground would look if everyone camped like the Treebuggers?



# SEARCH AND RESCUE

When people are lost, how do searchers begin the search? First, they hope that the lost people left behind good clues and stopped moving when they realized they were lost! Sometimes, trained dogs help search using their super-powered noses. Sometimes, a human tracker simply follows the tracks. Do you think you could track someone down?



## PRACTICE HUMAN TRACKING SKILLS

Spend some time watching for the signs people leave behind. Track yourself by walking over a beach, along a trail, or through a grassland or forest. Then double back and see if you can find places where you stepped and signs you left behind. You'll quickly discover that impatience, such as running after a "lost" person, will cause you to lose the trail. Practice finding these human signs—then put your skills to the test!

### footprints

When people walk from sand or mud to another surface, their shoes carry some of the sand or mud with them. Look for prints on logs, rocks, and other hard surfaces.

### indents

Usually the heel makes a deeper indent, but when a person is going uphill, the toe sinks in further. Try looking at the imprints from different angles.

### hair

Human hair can get caught on branches and tree trunks.

### pebbles

Watch for pebbles that have been dislodged from their places, leaving holes in the ground.

### dew

Walk over dew-covered grass. How does it look different?

### crushed vegetation

When you step, leaves and twigs under your foot are crushed, bruised, or broken. Look for dark bruises on tender leaves. Look on rocks and fallen logs for places where mosses and lichens have been disturbed.

### broken stems

Watch for freshly broken stems, twigs, or branches. Freshly snapped wood is always lighter in color than weathered wood.

### grass

When you walk through grass, the blades flip or twist, causing the shiny side of the grass to catch the sunlight. This "shine" will disappear in about two hours.

### leaves

Look back after walking through the woods. Do you see any leaves that have been turned over? The undersides of leaves are usually lighter in color.

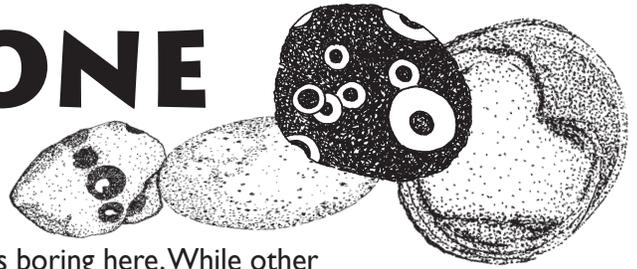
## PUT YOUR SKILLS TO THE TEST

You will need at least two grown-ups. One grown-up is going to be the "lost" hiker, and you and a grown-up are going to be the trackers. You can add extra people to either group. Draw sketches of the bottoms of the lost hikers' shoes so you know what you are looking for. Send the hikers off to leave a trail. Wait at least 10 minutes, then try to follow them. Draw sketches of the clues they leave behind. How did you do?

I learned about the traces humans leave behind by ...

- Imagining the worst campers ever!
- Practicing human tracking skills.
- Putting my skills to the test to find a "lost" hiker.

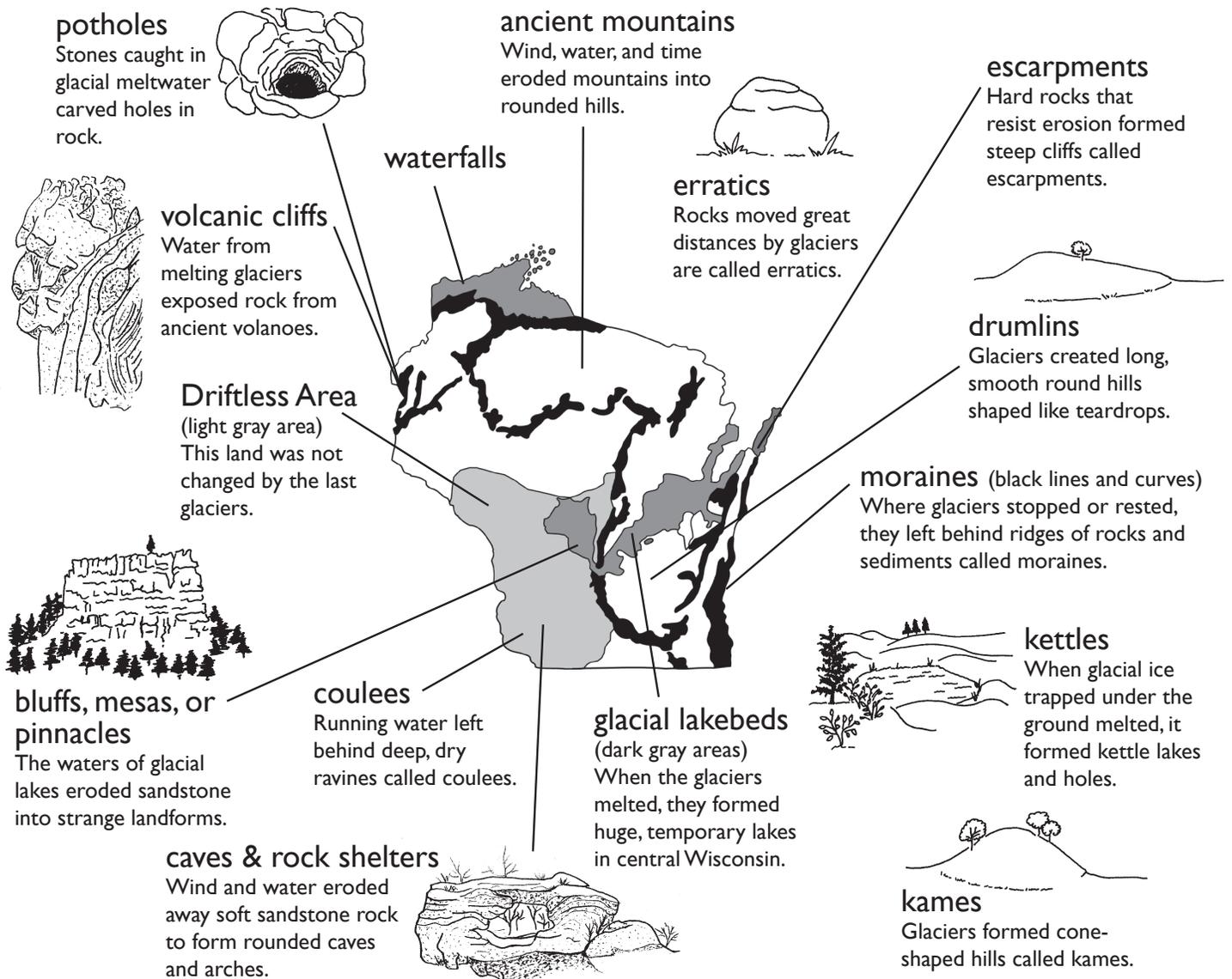
# LEAVE NO STONE UNTURNED



If you've lived in Wisconsin most of your life, you might think it's boring here. While other states have mountains, volcanoes, oceans, and earthquakes, we just have hills, lakes, and trees. It's hard to imagine that Wisconsin was once covered by a huge sea—until you find a fossil. Or that the Penokean Mountains once towered over the northern part of the state—until you hike their eroded remnants in the Northern Highland State Forest. Or that thick glaciers pushed across the land—until you stand in Devil's Lake State Park and look one direction to see what the glaciers did and the other direction to see what they didn't. It's hard to believe that earthquakes once rocked the state—until you run your fingers through shattered rocks in Amnicon Falls State Park. You might think Wisconsin's rocks are ordinary—until you climb Rib Mountain and touch some of the oldest rocks on earth. Take a look around—maybe Wisconsin isn't as boring as you once thought!

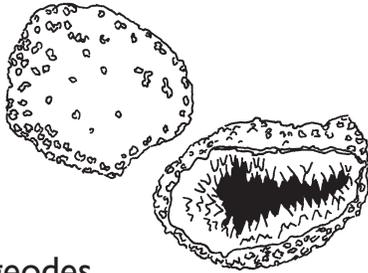
## BE A GEOLOGY DETECTIVE

Get a park map, visit the nature center, and talk to park staff to find out if there are amazing geological features at the place where you are staying. Then hit the trail to find them for yourself. Depending on where you are, you might see:



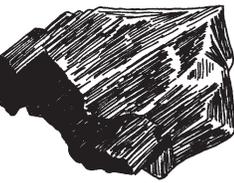
# FIND A SACRED STONE OR MAGIC ROCK

People have always been interested in stones, gems, minerals, and fossils. Wisconsin's prehistoric Indians collected small agates, fossils, and other stones for their magical powers. Today, we wear precious gems, hike to mountain tops, and collect interesting rocks, too. Wisconsin is covered with rocks—some magical, some mystical, and some quite ordinary.



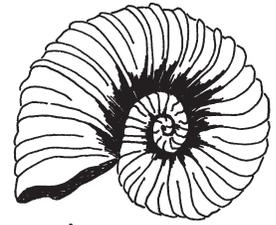
## geodes

Some rocks look boring until you open them. Inside they are filled with crystals. You can hunt for geodes wherever you see sedimentary rock, but finding them isn't that easy!



## lodestone

Lodestones are magnets! Scientists aren't exactly sure how rocks get magnetized, but it could happen when a certain type of magnetite is struck by lightning. Find something made of metal (like a nail) and hike to the top of a bluff or large hill. Test some of the black rocks on the surface to see if they are lodestones!



## ammonites

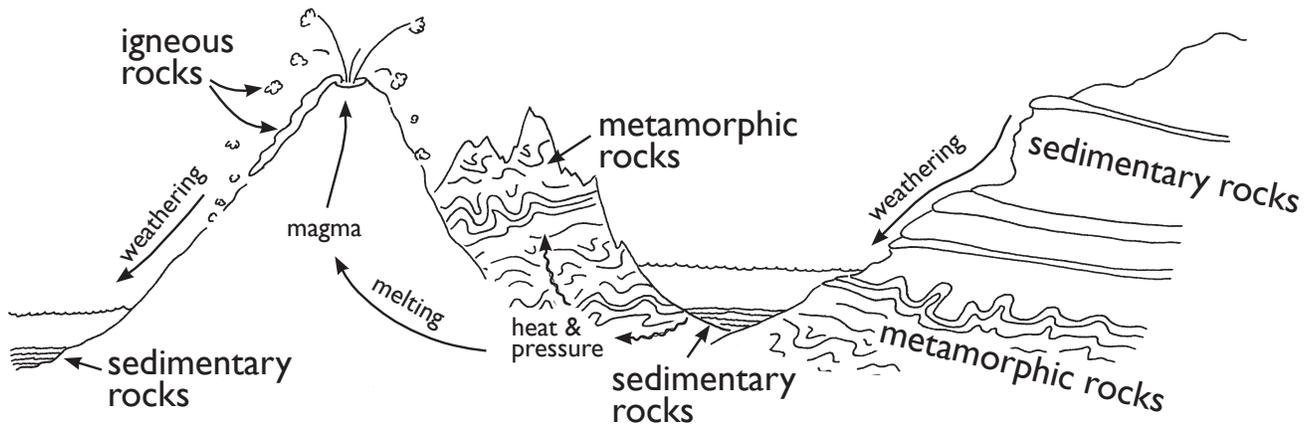
Wisconsin's prehistoric Indians collected the fossilized remains of this curled cephalopod and kept them.

## TELL YOUR ROCK'S STORY

Find a rock. Use pictures and/or words to tell how your rock came to be here on this spot. You can tell a believable story, or you can make up an unbelievable rock adventure.

# GO EAT A ROCK

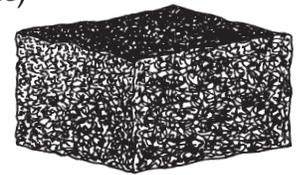
The rock cycle has been going on for billions of years. There is no beginning or end—new rocks form as old rocks erode away. Geologists sort rocks by the ways they are formed. If the classification of rocks is a mystery to you, try eating some!



## MELT & MIX MAGMA FUDGE

Igneous rocks harden from hot liquid magma. Ask a grown-up to help you make Magma Fudge. Melt chips in a microwave for about 1 1/2 minutes. Stir in frosting and microwave another minute or so. Add other ingredients, if you want. Pour into a buttered dish and chill. Watch the ingredients change as you melt, cook, and cool your edible rocks.

- 1 cup baking chips (milk chocolate, peanut butter, butterscotch, or white chocolate)
- a few marshmallows
- 1 can prepared frosting (chocolate or cream cheese)
- 1/2 cup of nuts, coconut, or dried cranberries cut into tiny pieces, optional



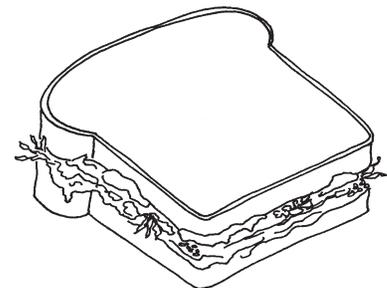
## PRESS SOME MORPHO MUNCHIES

Metamorphic rocks form when rocks are changed by heat and pressure. Use gumdrops, soft taffy, or baking chips to make Morpho Munchies. Place a few candies between the palms of your hands and press them together. Your heat and pressure will change the way the candies look. In rocks, the mineral grains are flattened and rearranged under heat and pressure. You can eat your Morpho Munchies warm or scrape them from your hand and let them cool. You did wash your hands first, right?



## SMASH A SEDIMENTARY SANDWICH

Sedimentary rocks form when layers of sand, clay, plants, and animals are piled on top of each other. Thousands of years of pressure cement them into rock. Make a Sedimentary Sandwich by layering any combination of bread (dust), peanut butter (wet clay), marshmallows or coconut (animal bones), jam (decayed plants), crushed graham crackers (sand), and/or raisins (rocks). Press your sandwich before you eat it!



## FIND OUT MORE

Read *The Pebble in My Pocket* by Meredith Hooper.

Visit <[wgnhs.uwex.edu](http://wgnhs.uwex.edu)> to find detailed geological maps of Wisconsin.

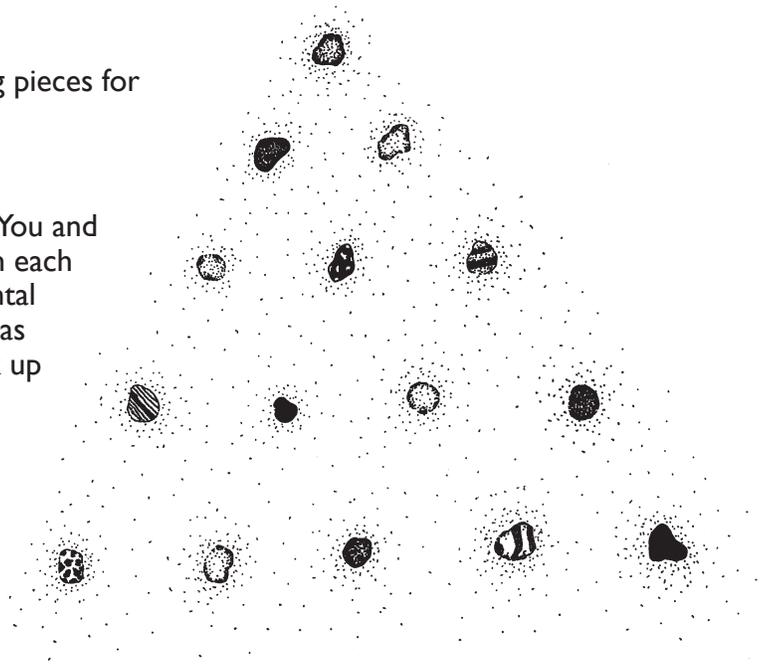
Visit <[www.wiparks.net](http://www.wiparks.net)> to learn more about the geology of Wisconsin's state parks.

# PLAY WITH ROCKS

Pebbles, sticks, bones, and shells make great playing pieces for games. Try these games, then make up your own!

## PYRAMID

Arrange 15 pebbles like the diagram on the right. You and one other player take turns picking up pebbles. On each turn, you can take pebbles out of only one horizontal row. You can take as many pebbles from that row as you want. Each player tries to make the other pick up the last pebble.



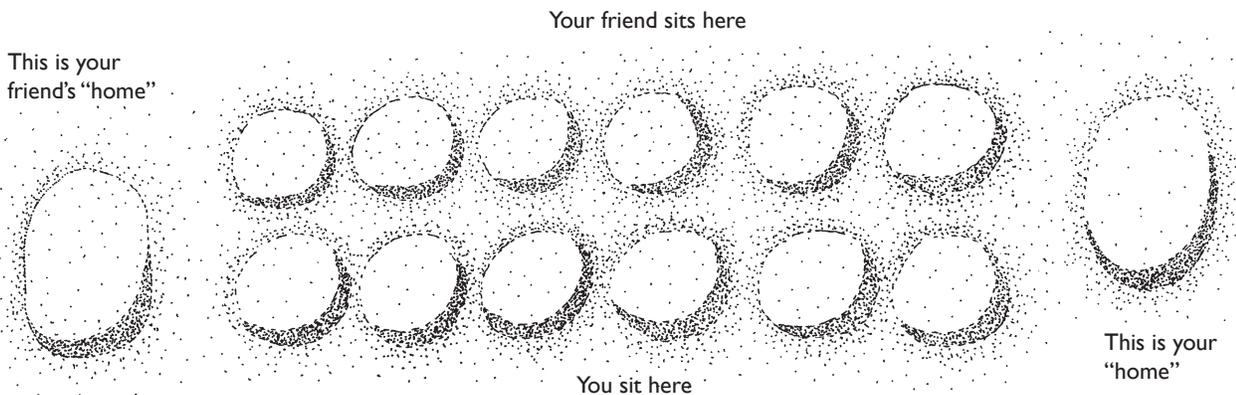
## MANKALA

Mankala is an old game from Africa and Asia. It has been played for centuries!

Mankala is usually played on a board with 14 pits and 48 small stones. In this version, you will simply scoop pits in the sand or mark them in dirt.

Use the diagram to get your playing field ready. Put four stones in each of the 12 small pits. Find an opponent and sit on opposite sides. The side you're sitting on is your side, with your six playing pits and your "home."

You got the game ready, so you go first! Pick up all of the stones from any pit on your side. Place one stone in the next pit to the right, one in the next pit to the right, and so on until you don't have any stones in your hand. Note: You put a stone in your own home, but you skip your friend's home. Once a stone is in your home, it's safely yours for the rest of the game.



If your last stone lands in an empty pit on your side, you get to pick up all the stones in the opposite pit (on your friend's side) and put them in your home.

If your last stone lands in your home pit, you get to take another turn.

When all the stones are gone from the 12 playing pits, the game is over. The player with the most stones in the home pit wins!

I left no stone unturned by ...

- Being a geology detective.
- Finding a sacred stone or magic rock and telling a story.
- Eating a rock!
- Playing games with rocks. My favorite rock game is ...



# GO!

# GET OUT!

# GET OUTDOORS! WISCONSIN!

## GET MOVING! GET ENERGIZED! GET A LITTLE DIRTY! JUST ... GET OUT THERE AND EXPLORE!

The grown-ups in your life need you to help them stay active as they get older. Spending time exploring nature with you will help everyone's health and fitness. Look for ways to get out! How many of these activities can you do together this year?



# Get Outdoors!

- Become a Wisconsin Explorer.
- Go to a nature program.
- Hike or bike a state trail.
- Recreate at a state recreation area.
- Go camping.
- Take a bird walk.
- Snowshoe or ski through a forest.
- Find a geocache.
- Ride a horse.
- Canoe or kayak down a river.
- Go fishing.



Nature Programs and Events – Find out about activities in state parks by visiting [www.wiparks.net](http://www.wiparks.net) and searching for the Get Outdoors! Calendar.

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