Become a Junior Snow Ranger

January 2012

- The Science of Snow
- Meet Cutler, the Avalanche Rescue Dog
- Discover the Thrill of the Chill on Snowshoes
- How Animals Survive Winter Weather
- Fire and Ice

- Create Your Own Avalanche
- Be a Snowflake Sleuth
- Have Fun With Winter Games
- Make Your Own Snowshoes
- Who Left These Tracks?
- Make Frozen Bubbles
- Interview a Snow Ranger

What's Inside

SAFETY FIRST!

When you play outside in cold weather, your body works hard to stay warm. Eat extra food like protein bars, nuts, dried fruit, and trail mix to get extra energy and warmth.

10 Things You Need To Explore in Cold Weather

1. **Smart outerwear**—a hat, sunglasses, gloves, boots, and a bright-colored, insulated, windproof (not cotton) jacket.
2. **Drinking water** in an insulated container (so it doesn't freeze).
3. **Map** and compass.
4. **Pocketknife.**
5. **SPF 15+ sunscreen and lip balm.** (Yes, you can get sunburned on a cold day!)
6. **Duct tape** (to fix anything that tears or breaks).
7. **Whistle.**
8. **Flashlight or headlamp** (with extra batteries and bulb).
9. **First aid kit.**
10. **Space blanket** (special, lightweight blanket with super-warming powers).

Welcome to the World of the Junior Snow Ranger

What's a Snow Ranger?

A Snow Ranger works for the Forest Service—U.S. Department of Agriculture. Snow Rangers work in our national forests.

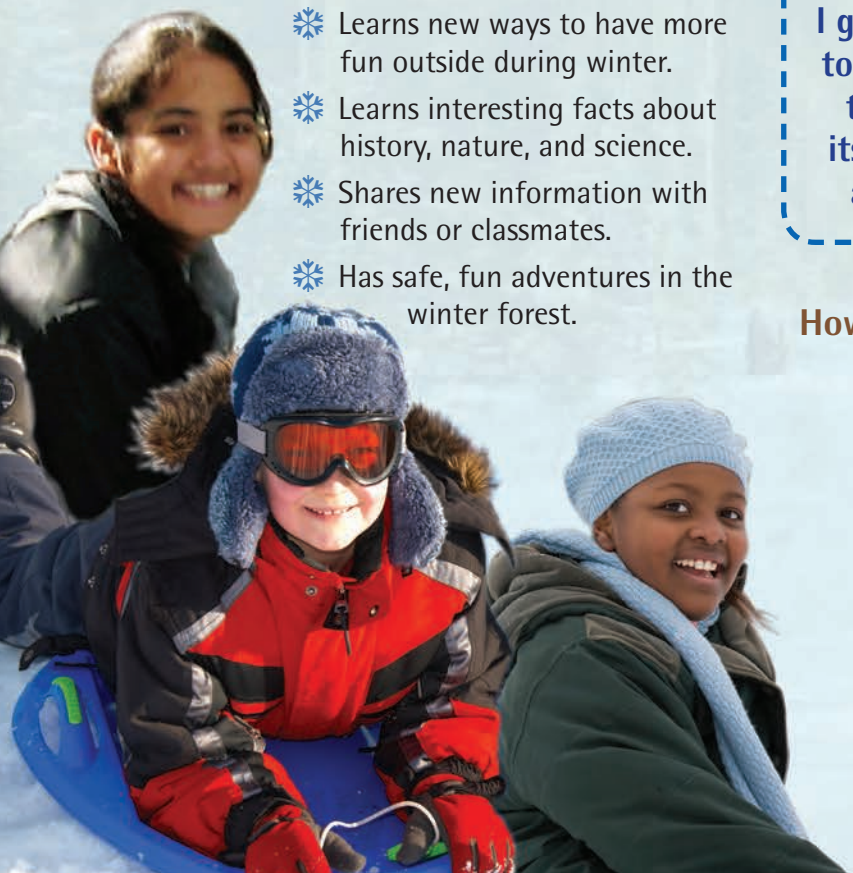
Snow Rangers...

- Keep visitors safe.
- Protect the natural environment.
- Ski down mountains to make sure skiers are safe.
- Warn skiers, hikers, and others about avalanches.
- Search for people who are missing.
- Rescue people when they are found.

What's a Junior Snow Ranger?

A Junior Snow Ranger...

- Reads and uses this Junior Snow Ranger adventure guide.
- Gets helpful tips about winter.
- Learns new ways to have more fun outside during winter.
- Learns interesting facts about history, nature, and science.
- Shares new information with friends or classmates.
- Has safe, fun adventures in the winter forest.



Activity

Memorize the Oath of the Junior Snow Ranger

I give my pledge as a Junior Snow Ranger to save and faithfully defend from waste the natural resources of my country—its soil and minerals; its forests, flowers, and trees; its waters; and its wildlife.

How Can I Become a Junior Snow Ranger?

- Complete the activities in this guide.
- Mail back the Junior Snow Ranger Official Form.
- Receive your official Junior Snow Ranger card, badge, and bandana.
- Use your Junior Snow Ranger tools to explore the winter woods!

Teachers' Page

Who Is This Book Designed For?

The Junior Snow Ranger adventure guide is designed for 4th and 5th grade students and emphasizes the standards of learning and educational skills for these grades. You can conduct the activities indoors and outdoors.

Objectives

When using this adventure guide, students will have the opportunity to:

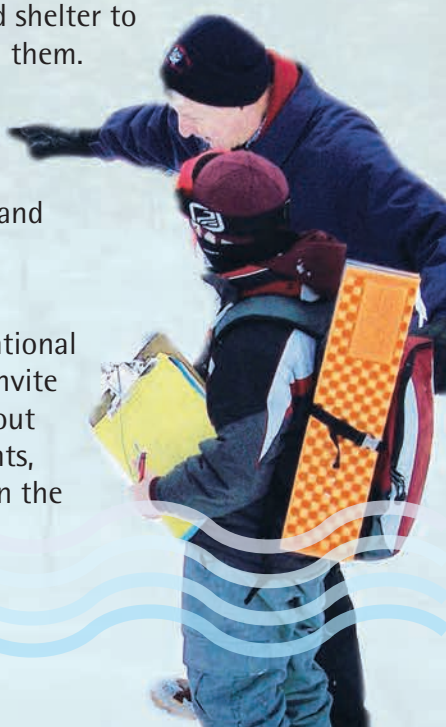
- Understand safety as an important component of winter recreation.
- Transfer knowledge of winter and safety to peers and adult caregivers.
- Recognize that the Snow Ranger is a career that the students can pursue, if they are interested.
- Understand that winter is a great time to enjoy and understand how nature changes and adapts.
- Understand and appreciate forest resources during the winter.

Activities

- Plan a hiking trip to a nearby forest or park on National Winter Trails Day!
- Make this activity book part of your science class in connection with the National Winter Trails Day.
- Visit a national forest, museum, zoo, or State park. Or, have someone from one of these sites come to your classroom to talk about winter safety, recreation opportunities, or winter science.
- Take your class outside to appreciate and learn about trees and how they change during winter. Visit a national forest or State forest.
- Use a map to locate the forest or park that is closest to your school.
- Take your students for a hike with a local naturalist.
- Invite Woodsy Owl to your classroom to talk about conservation practices during winter.
- Ask children to write about their preferred winter activity and why that activity is important to them.
- Ask children to keep a nature journal during winter.
- Invite a Snow Ranger or Forest Ranger to your classroom to talk about enjoying winter in a safe and fun way.

Discussion Themes

- Forests are communities where trees, plants, animals, and insects live. Forests give shade, food, and shelter to the many animals and plants that live in them.
- Forests are important for people, too. They are fun to visit. They are important to our health because they give us food, medicine, clean air, water, and places for us to recreate and have FUN!
- We need to take care of our forests.
- Ask your students: Have you visited a national forest with your family during winter? Invite them to discuss what they liked best about the forest. What did they see (trees, plants, animals, footprints)? What did they do in the forest (hike, practice a winter sport or activity, fish)?



WHAT'S HAPPENING IN YOUR WOODS?

Winter is a great time to find out what's happening in the woods. So, go exploring! Just put on your boots, skis, or snowshoes—and be sure to take your "senses" with you.

As you walk through the woods, stop every now and then.

Look around. What do you **see**?

Close your eyes and listen. What do you **hear**?

Breathe in deeply through your nostrils. What do you **smell**?

Touch the rocks, tree branches, snow, or ice. What do you **feel**?

Stand very still. What do you **feel**?

Make a list of your observations—what you saw, heard, smelled, and felt. What one **new thing** did you learn from your observations?

_____

_____

_____

_____

_____

When You Explore the Forest

* When exploring the winter woods, always go with an adult and never go alone.
* Stay on marked trails and in designated areas.
* Pay attention to signs and instructions.
* Pace yourself. Don't go so fast that you'll get tired. Keep track of time. For example, if you head out the door at 1:00 p.m. and plan to return at 4:00 p.m., you should turn around to head home at 2:30 p.m.—half way through your 3-hour adventure.
* Know some first aid (like how to treat a small cut). Learn about and watch out for hypoglycemia (low blood-sugar levels). If you live in a cold area, learn about and watch out for frostbite, hypothermia, and snow blindness.

Dress Like an Onion in Three Easy Steps

On a cold winter day, animals have feathers or fur to keep warm. We do not. So, we wear extra clothing to stay warm and dry when we play outside. When you put on extra clothing, you need to "dress like an onion" and wear many layers. Layering your clothing gives you control over how hot or cold you feel. Wear only the layers you need to feel comfortable. If you start to feel cold, put on another layer. If you get too hot, simply remove a layer before you start to sweat.

Step 1. Base Layer

The base layer touches your skin. Wear a tight-fitting layer like long underwear made of wicking cloth—hi-tech fabric that lets moisture (sweat!) evaporate from your body to keep you warm and dry. Don't wear cotton—it can get wet and make you cold.

Step 2. Middle Layer

The middle layer insulates—it keeps body heat inside your clothing and prevents it from escaping. This layer also pulls sweat away from the base layer to help keep you dry. Wear a turtleneck sweater and pants (no jeans!) that are loose but that still touch the base layer.

Step 3. Outer Layer

The outer layer blocks wind and lets moisture escape. This layer may be made of material like fleece. Wear a coat with a hood (to keep your neck warm), waterproof snow pants, and boots with a waterproof foot and warm lining.

THE SCIENCE OF SNOW

When clouds get really cold, frozen water droplets form small ice crystals.

What are they called?

These ice crystals are **snowflakes**.

Then what happens?

After snowflakes land on the ground and start to pile up, they form a snowpack.

What is a snowpack?

A snowpack is made up of millions and millions of snowflakes. The size and shape of the snowflakes can make the layers of a snowpack strong or weak.

What makes a layer strong?

The strong layers are dense and made up of small, round snow grains. They are packed closely together and are stuck to each other very tightly.

What makes a layer weak?

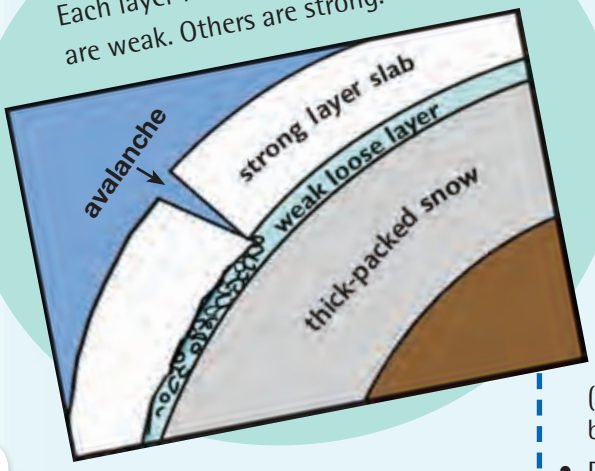
The weak layers are much more loosely packed.

Every time it snows, or when the snow drifts, another layer is added to the snowpack. With each additional layer, the snowpack becomes a little bit thicker.

Activity

What are the layers like?

Each layer is different. Some layers are weak. Others are strong.



What may happen when weak and strong layers are in the same snowpack?

An Avalanche!

The layers constantly change because of the changing temperature in the air and within the snowpack. When the weak layers prevent the strong layers from sticking together, the strong layers slide over the weak layers.

When this movement of the snowpack happens on a steep mountain, it can cause an avalanche. From inside a snowpit, Snow Rangers study snowpacks so they can warn people about possible avalanches.

Create Your Own Avalanche

Phase 1

- Put two books on the floor, one on top of the other, to represent the ground and a slab of snow.
- Slowly lift one end of the bottom book off the floor.
- See how long it takes the slab of snow to start sliding.

Phase 2

- Sprinkle some salt between the two books to represent a layer of loose snow below the hard slab of snow on top. Slowly lift one end of the bottom book off the floor.
- Does the avalanche happen sooner this time?

Phase 3

- Add a third book above the top book to represent people hiking or skiing on top of the snow.
- Sprinkle salt between the bottom book (ground) and middle book (snow) but not between the middle book and top book (people).
- Does the avalanche happen even faster now?

Discussion: In which phase of your experiment did the avalanche happen soonest? Why? What does this experiment tell us about how some types of snowpacks are more likely to cause an avalanche than others? Based on this experiment, do you think avalanches are a bigger danger on steeper mountains? Why?

AMAZING FACTS

Snowflakes are born in clouds and every one grows differently. As a snowflake falls from the cloud to the ground, it passes through many different layers of air.

Each layer of air, whether it is

HOT COLD Wet Dry

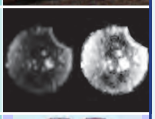
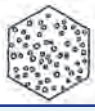
changes the way a snowflake develops.

Each snowflake follows a unique path to Earth. No two snowflakes are exactly alike.

It can take a snowflake 2 hours to fall from the cloud to the ground because it drifts through the air at only a few miles per hour.

For more information about avalanches, visit http://www.fsavalanche.org.

Shapes of Crystals

Shape	Name	How They Are Formed	Effect on Snowpack	Actual Image
	**Columns** (hollow or solid)	At 14–21 degrees Fahrenheit (°F)	unstable	
	**Needles** (simple, cluster or crossed)	At 25–21 °F	unstable	
	**Stellar Plates**	At 14–10 °F	stable	
	**Stellar Dendrites**	At 14–10 °F	stable	
	**Irregular**	At 3–10 °F	stable	
	**Graupel**	When snow crystals fall through very moist air	unstable	
	**Hail**	When precipitation becomes coated with a layer of ice	unstable	
	**Ice pellets**	When rain falls through very cold air	unstable	
	**Rime**	When extremely cold water droplets freeze almost instantly on a cold surface	unstable	

BE A SNOWFLAKE SLEUTH!

Gather together your detective tools—black construction paper and a magnifying lens.

Catch snowflakes, ice pellets, or hail on the paper. Use your magnifying lens to look at their shapes. Compare them with the shapes of crystals in the chart. How many different shapes can you find?

Keep a record of different shapes for different times of the day. What differences do you see?

Ask your friends to do the same activity. Share your findings. How do your friends' findings differ from yours?

What clues can you get from these observations? How could the snowflakes you recorded affect a snowpack?

MEET CUTLER,

THE AVALANCHE RESCUE DOG

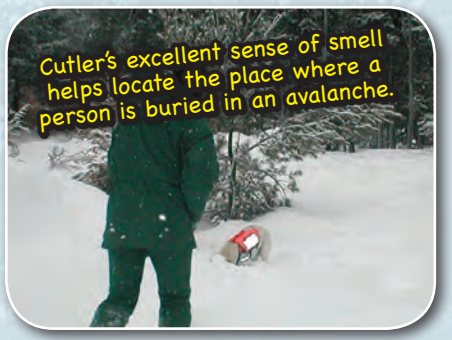

In front of the ranger station, Snow Ranger Chris Joosen helps Cutler gear up for a rescue mission.


Cutler and Chris head out together in search of a missing person.

Hi! My name is Cutler. I'm a Yellow Labrador Retriever, but I'm more than somebody's pet. I'm the Forest Service Avalanche Rescue Dog. I work with Lead Snow Ranger Chris Joosen, who adopted me in 2001 when I was just 9 weeks old. I was actually a gift to the Forest Service from Darcy Kane, a dog breeder in New Hampshire. Darcy said the gift had a string attached. (Back then, I loved to play with strings!) The string (or stipulation) was that the Forest Service would train me to be an avalanche rescue dog.

I absolutely love my name: Cutler. It's the same name as a river on Mount Washington, which is where I work—at the Mount Washington Avalanche Center. Mount Washington is the tallest mountain in the Northeastern United States.

My job is to find people who are buried in the snow. When hikers or skiers get trapped in the snow, human searchers have trouble finding them because they cannot see them. That's when they call on me. I can sniff out the buried hikers with my excellent sense of smell. You can see me digging through the snow in the photos on this page.


Cutler's excellent sense of smell helps locate the place where a person is buried in an avalanche.

Cutler and Chris work together to rescue the person who is buried in the avalanche.


Cutler and Chris get closer to the rescue.


Even though he is covered in snow, Cutler is happy for a good day's work.

Read more about Cutler's home at Mount Washington:

Mount Washington: http://www.mountwashington.com.

Mount Washington Observatory: http://www.mountwashington.org.

White Mountain National Forest: http://www.fs.fed.us/r9/forests/white_mountain/about/wmnf_flyer.pdf.

Word Watch

avalanche: A large mass of snow, ice, earth, rock, or other material moving swiftly down a mountainside.

HAVE FUN WITH WINTER GAMES!

Cutler, the Forest Service Avalanche Rescue Dog, has used his extraordinary sense of smell to locate a hiker who is buried in an avalanche. Help the Snow Rangers reach Cutler so they can rescue the hiker.

Word Search

Look for words that are in this adventure guide.
Words can appear forward, backward, or diagonally.

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

avalanche
rabbit
bear
raccoon
evergreen
ranger
forest
skis
frozen
snowflake
gloves
snowshoe
hat
winter
icicle

DISCOVER THE THRILL OF THE CHILL

People Have Been Having Fun in Winter for Years!

We learned about winter fun from Nordic and Asian cultures dating back 5,000 years ago. At that time, people traveled long distances across frozen landscapes. To stay warm and travel quickly, they invented ice skates, skis, sleds, and snowshoes.

Why and How Did People Invent Snowshoes?

People most likely invented snowshoes after they watched how easily the snowshoe hare and lynx travel across the snow. These animals have very large feet compared with their body size. Bigger feet allow an animal to spread its weight over a larger surface area (which means less weight per square inch). This physical feature helps keep the animal on top of the snow.

AMAZING FACTS

American pioneers used snowshoes to explore the western part of the United States.

During winter in the 1800s, when snow in the Great Plains piled very high, trappers, hunters, and explorers often had only one way to travel—with snowshoes.

American Indians Wore Snowshoes To Travel Through Snowy Forests.

They made their snowshoes from long pieces of wood and strips of leather. With snowshoes, the American Indians could trek over soft snowdrifts and through landscapes that would have been impossible to walk through with moccasins.

- The **Athabascan** Indians in the Northwest and the **Algonquin** Indians in the Northeast made snowshoes that worked very well and were also very beautiful.
- Before the Spaniards introduced horses to America, the **Plains Indians** wore snowshoes when they hunted buffalo.

Today, We Use Snowshoes for Fun Winter Activities, Sports, and Physical Fitness.

We take Snow Ranger-guided snowshoe walks to discover how plants, animals, and people adapt to winter. We also have snowshoe races—some races are over a long distance, some are for speed over a short distance, and some even involve jumping over hurdles! Snow Rangers, snow researchers, and people who need to travel in snowy areas that they can't reach with motorized vehicles use snowshoes.

Many schools in the United States—even schools located in areas that seldom have snow (see You Don't Need Snow for Snowshoes on page 9)—offer snowshoeing as part of their physical education programs to help fight obesity.

ON SNOWSHOES!

Activity

MAKE YOUR OWN SNOWSHOES!

Before you begin to design and make your snowshoes, think about these two important factors:

1. The platform of the snowshoe must be much larger than your foot.
2. The platform must be firmly attached to your foot so it will not fall off.

Choose the material for the platform. It could be any of the following recycled materials:

Shoe boxes (the bigger, the better) or Cardboard or Gallon-size plastic milk jugs

Choose the material for attaching the platform to your foot. Choose one of the following:

- Long shoelaces (or several shoelaces tied together).
- Large, thick rubber bands.

Strap the platform to your boot just before you are ready to go outside. Be careful when you walk. Lift your foot up high, just as if you were wearing flippers. You don't want to trip over your big, snowshoed feet! Now you know what it is like for Snow Rangers to walk around in the snow.

You Don't Need Snow for Snowshoes

You can make snowshoeing a fun activity wherever you live. Some kids like to snowshoe on soft surfaces, such as thick grass or pine needles. Kids at the beach enjoy snowshoeing through soft sand or over dunes. The main difference between these surfaces and the snow surface is their roughness. To protect the bottoms of their snowshoes from too much wear, these kids often put duct tape on the bottom of their snowshoes.

DID YOU KNOW?

Just about everyone can play in the snow. Adaptive sports programs give people with disabilities the opportunity to enjoy the outdoors.

- People with physical disabilities use sit skis, monoskis, and outrigger skis.
- People with limited vision or blindness participate in assisted blind skiing programs. They don't let their disabilities get in the way of getting outside and enjoying winter sports.
- The National Sports Center for the Disabled is one of many institutions around the world that helps people with disabilities participate in outdoor sports.
- The National Sports Center for the Disabled recommends snowshoeing as an excellent workout for the able and disabled alike.

How Animals Survive Winter Weather

Winter is a challenging time for wild animals.
They have three main strategies for surviving cold winter weather:

Stay (adapt)

Animals have special ways to adapt to the winter. They store lots of food, gain extra fat to provide energy and warmth when the air is cold, or grow thicker fur or fluffy feathers that act like a winter coat.

MICE AND VOLES spend winter deep under the snow where the temperature is warmer than the air temperature—they use the snow like a thick coat. They have to be careful, though, because coyotes can use their excellent hearing to find animals running beneath the snow.

Snooze (hibernate)

Some animals avoid the cold temperatures and lack of food during winter by sleeping through it (by hibernating)—with slower breathing, slower heart rate, and a lower body temperature (37 °F for a ground squirrel—just above freezing!).

A **WOODCHUCK'S** winter burrow is typically below the frost level. Before hibernating during freezing temperatures, a woodchuck grows extremely fat. During the deep sleep of hibernation, a woodchuck's body temperature may drop to 38 °F.

Go away (migrate)

One-half of the birds in North America are "neotropical" birds, which means they fly south in the fall to warmer places in Central and South America and the Caribbean. There, they have plenty of food for the winter. They fly back north for the spring.

When these **SONGBIRD** species migrate south for the winter, they fly during the night. When **MONARCH BUTTERFLIES** migrate, they travel during the day. Now that's a good traffic control system!

Monarch Flyway Map

Monarchs are the only known butterflies to make a two-way migration. The map shows how they follow specific routes, or "flyways," each fall, just like birds. Butterflies from east of the Rocky Mountains fly to the Sierra Madre Mountains in Mexico, where forests of fir trees keep them warm and moist. Butterflies from west of the Rocky Mountains fly to the Pacific Coast in California, which has a climate like the climate in Mexico.

Amazing Facts

Central Texas is one of the best places to see the migration of the Monarchs. It is where the separate eastern flyways converge into one.
Some of the Monarchs on the east coast could take a shorter route over the Gulf of Mexico, but Monarchs avoid flying over water.

Word Watch

survive: To stay alive.

Activity

WHO LEFT THESE TRACKS?

Match the animal tracks with the wild critter that makes them.

Fill in the circle next to the prints with the letter of the animal they belong to.

Which track would least likely be found in the snow?

Which footprints can you find in the forest near your home?

1. The mammal behind these footprints can spray its musk accurately up to 10 feet.

2. For this creature, the world record in the long jump is 3 meters (more than 9 feet!).

3. The owner of these footprints is the largest wild member of the dog family.

4. Do these prints look like feet? This animal's name means "one who scratches with his hands."

5. This fast-running animal has hoofs with an even number of toes.

6. This creature's petite feet don't seem to match with its big, bushy tail.

7. This feline has huge paws and a black tip on the tail.

8. This familiar forest animal loads up with berries to build up fat levels for the cold winter months.

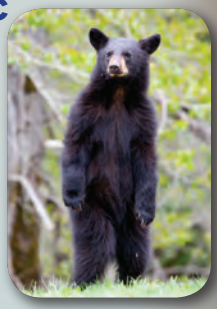
A

Striped Skunk

B

Gray Wolf

C



Black Bear

D

Deer

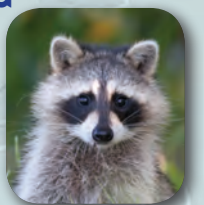
E

Rabbit

F

Red Fox

G



Raccoon

H

Lynx

Answers: 1.A; 2.E; 3.B; 4.G; 5.D; 6.E; 7.H; 8.C

YOU, THE SNOW, AND THE GREAT OUTDOORS

There is no such thing as bad weather, if you have the correct winter clothing (see page 3). So put on your winter woollies, grab your family and friends, and get yourself outside!

Make Cool Things Out of Snow

BUILD A SNOW FORT. Cover it with fallen branches to keep it warm inside.

BUILD A SNOWMAN OR SNOWLADY. Dress him or her like a famous character.

MAKE A SNOW SCULPTURE. Maybe a snow turtle or snow penguin. Use your imagination!

DRAW shapes or **WRITE** words in the snow with your feet.

MAKE A SNOW ANGEL. Get your whole family involved and make a snow angel family.

Go Cross-Country Skiing

Cross-country skiing is liking **HIKING** through the winter woods...on skis!

Dress in **LAYERS** like an onion, and bring along a hat, sunglasses, sunscreen, and water.

Rent **SKIS**, **BOOTS**, and **POLES** at the ski area you choose.

Call ahead for a **LESSON**; an instructor can teach you to cross-country ski in just a couple of hours.

In winter, as at all times, it is a good idea to follow the "Leave No Trace" rule: whatever you take into the wilderness comes out with you. Keep in mind what Woodsy asks us to do: **Give a hoot, don't pollute!**

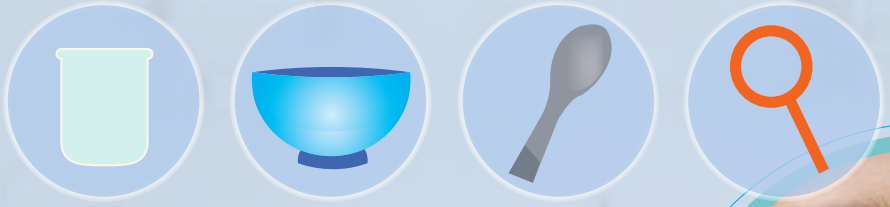
Have a Scavenger Hunt

- Make a list of what to find or maybe just head out and see what you can find.
- Enter a list of the things you find into a journal.
- Make some art or decorations from the things you find.
- Draw or paint a winter scene and paste your findings on the drawing.

Activity

MAKE FROZEN BUBBLES

1. Plan this activity for a day when the temperature is very cold–below freezing (32 °F or 0 °C)–and the wind is not blowing.
2. Gather together the following ingredients (or compounds) for the bubble solution:
   • Laundry detergent powder • Sugar • Hot water
3. Gather together the following scientific instruments for mixing and delivering the solution:
   • Measuring cup • Bowl • Spoon or whisk • Bubble wand



4. Make a strong bubble solution (the stronger the solution, the longer the bubbles will last). Measure the following compounds, put them in the bowl, and stir with the spoon or whisk:
   • 1/2 cup soap powder
   • 1/2 cup sugar
   • 3 cups hot water
5. Take the bubble solution and the bubble wand outside.
6. Blow a bubble and catch it on the wand.
7. Let the bubble rest on the wand in the cold air.
8. Observe how the bubble will soon freeze into a fragile crystal ball. Watch the ice crystals grow before your eyes!

While you are exploring the winter landscape, remember that you are part of the ecosystem. This ecosystem includes other people, plants, and animals that all need to share the ecosystem to survive. Woodsy Owl says, **"Lend a hand, care for the land!"**

Remember: In the winter, it's important not to bother wildlife. Some plants and animals have a hard time dealing with the cold, so they are injured more easily in the winter.

FIRE AND ICE

A Campfire in the Snow

A campfire in the snow is fire and ice. It looks beautiful and feels warm and wonderful on a cold day. But you and the adults who build the fire with you need to know these five things about a winter campfire.

1. Build your fire out in the open, away from trees. Heat from the fire will scorch tree trunks that are too close and melt snow on tree branches over your head. The melted snow will drip on you and put out the fire!
2. Use only dead and downed trees and branches for firewood. Do not cut live branches from trees. Even in winter, they contain a lot of moisture and will not burn.
3. To have a good base for your fire, either dig down to the soil (be sure it's not a peat soil) or put very large pieces of wood at the base. A good base is important—as the fire burns, the snow below it will melt.
4. To protect your collected dry firewood from moisture, cover it with a tarp.
5. Pile a lot of snow on the fire to put it out. Wait for the "hissing" to stop, stir the ashes with more snow, and be sure it is "dead out" before leaving.

A wildfire in winter is fire and ice. The fire in this photo started in the fall, and even the moisture from winter snows could not put it out. That's why it is so important to make sure campfires are "drowned" and "dead out" before leaving a campsite. Some good came from this fire, though. It created habitat for waterfowl and other animals that live in this area.

Photo credit: Agassiz National Wildlife Refuge.

Activity

MEASURE THE SNOWPACK IN YOUR BACKYARD

Phase 1

- Put a measuring cup outside and wait for the snow to fill the cup to the rim.
- Bring the cup inside and let the snow melt.
- Observe how many ounces or milliliters of water remain after the snow has melted.
- Record that amount.

Phase 2

- Go back outdoors and fill the measuring cup to the rim (as in phase 1) by packing snow in it as tightly as possible.
- Bring the cup inside and let the snow melt again.
- Observe how many ounces or milliliters of water remain after the snow has melted.
- Record that amount.

Discussion: In which phase of your experiment did the cup contain the most water? Why? How much difference was there? If you depend on snowpack for your drinking water, which type of snow would you want?

More fun: Conduct this experiment several times during the winter and record the water measurements. Does the amount stay the same over the winter?

Wildfires and Winter Clues

Out West, the size of the snowpack (the amount of snow on the mountains) and how long the snowpack remains give Snow Rangers clues about how bad wildfire season will be. If all the snow melts too early in the spring, wildfire season will be "hot." To predict what the upcoming wildfire season will be like, Snow Rangers measure the snowpack and determine how much water is in the snow.

In the Heat of the Summer, What Does a Snow Ranger Do?

For Snow Ranger Jeffrey Lane (top left), fire and ice tell his story. Jeffrey works hard all winter on the White Mountain National Forest in New Hampshire. He mainly works at Tuckerman Ravine. But in the summer season, he is a wildland fire fighter. Lane works on crews that fight wildfires in New Hampshire and out West. So, fire and ice co-exist in this Snow Ranger's life.

INTERVIEW
A SNOW RANGER OR FOREST RANGER

Activity

Find out more about winter in the forest and what it's like to work in the forest. Contact a local Forest Service, U.S. Department of Agriculture, Ranger Station and arrange an interview with the Snow Ranger or Forest Ranger. Here are some questions to ask during the interview (you may need more paper):

Date of the interview: _____

Begin: Hello, Ranger (Name) _____

My name is _____

Where did you live when you were my age? _____

How old were you when you decided to become a Snow (or Forest) Ranger? _____

What is your favorite part of the job? _____

_____

_____

_____

What tasks do you do in the winter that you don't do in the summer? _____

_____

_____

_____

What is your scariest memory as a Snow (or Forest) Ranger?

_____

_____

_____

What is your most exciting memory? _____

_____

_____

_____

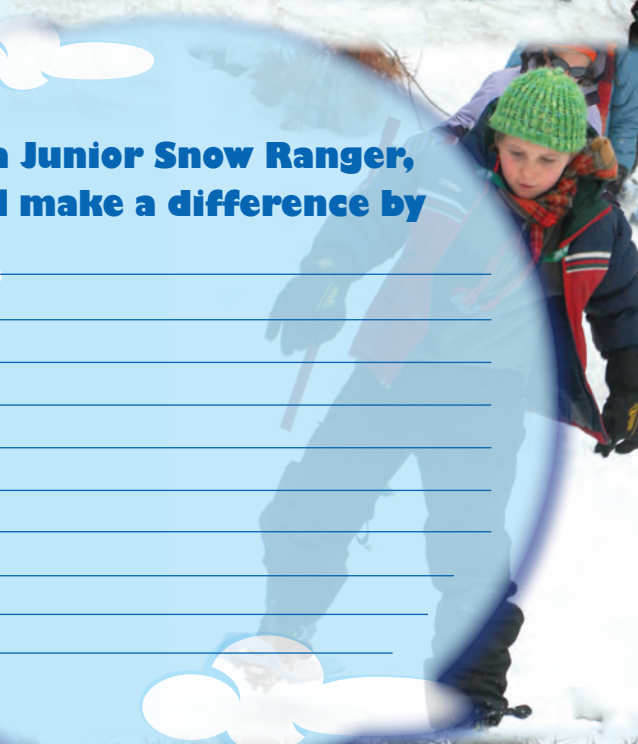
What advice would you give someone who wants to become a Snow Ranger? _____

_____

_____

_____

End: Thank you, Ranger (Name) _____, for the interview.



As a Junior Snow Ranger, I will make a difference by

_____

_____

_____

_____

_____

_____

_____

_____

_____

ENJOY YOUR NATIONAL FORESTS!

CONGRATULATIONS!

Now that you've completed the activities in this book, you are just one step away from becoming an official Junior Snow Ranger. Please fill out the Junior Snow Ranger Official Form on the detachable card and mail it to us at:

Junior Snow Ranger
USDA Forest Service
National Symbols Cache
402 SE 11th Street
Grand Rapids, MN 55744–3955

After the Forest Service receives your form, the agency will mail you a Junior Snow Ranger card, badge, and bandana. We hope you enjoyed the activities in this guide and that you'll share the fun and excitement you had with friends, family, and people in your community.

Share the Junior Snow Ranger Experience With a Friend!

Forests and green spaces are important for everyone to share. Now that you've learned so much about the forest, bring a friend along and introduce him or her to the excitement of being a Junior Snow Ranger.

It's Easy to Do.

Just tear off the Share With a Friend Card.

Give it to a friend.

Ask your friend to fill it out, put a first-class stamp on it, and mail it to the USDA Forest Service.

We will send your friend the same Junior Snow Ranger adventure guide your are holding in your hands. Then your friend can do the activities and become a Junior Snow Ranger, too!

FOREST SERVICE
US
JUNIOR SNOW RANGER

http://www.fs.usda.gov/conservationeducation

January 2012
PA-2102

USDA

FOREST SERVICE
US
DEPARTMENT OF AGRICULTURE

Junior Snow Ranger Official Form

Your Name: _____

Address: _____

City: _____ State: _____ ZIP Code: _____

E-mail: _____

Age: _____

School Name: _____

Parent/Family Member/Friend (Adult), please sign here.

I certify that _____ completed the activities in this guide.

Signed _____ (name of the adult)

Share with a Friend Card

Yes, I also want to be a Junior Snow Ranger.

My friend _____ gave me this card and told me all the exciting ways I can learn about the forest and the environment. Please mail me a Junior Snow Ranger adventure guide so I can complete the activities and become an official Junior Snow Ranger.

Your Name: _____

Address: _____

City: _____ State: _____ ZIP Code: _____

E-mail: _____

Age: _____

School Name: _____

Name _____

Address _____

City _____ **State** _____ **ZIP Code** _____

Postage Requested. Post Office will not deliver without proper postage.

JUNIOR SNOW RANGER
USDA FOREST SERVICE
NATIONAL SYMBOLS CACHE
402 SE 11TH STREET
GRAND RAPIDS, MN 55744-3955

Name _____

Address _____

City _____ **State** _____ **ZIP Code** _____

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