

# Junior Snow Ranger Activities

## Teacher Guide

1/13

Dear Educator:

The activity book is designed for children in the elementary school particularly the 4<sup>th</sup> and 5<sup>th</sup> grade. It is designed as a fulfillment program: children receive a card, a pin, and a certificate of completion once they have completed the activities. Outdoor and indoor activities are included in a colorful publication that highlights the joy of winter fun. Topics include: personal safety, wildlife, winter ecology, snow science, and recreation and highlights the role of a real snow ranger, the use of rescue dogs, and the continued importance of wildfire prevention during the winter. Please take a few minutes to look through the booklet. Below are more activities to extend the Junior Snow Ranger program experience. Many of these activities can be done either indoors or outdoors though we encourage you to explore the world of winter outdoors when possible. Please let us know if you have any question or suggestions for ways to enhance this new and exciting program. Contact your local US Forest Service office for more information and to share your ideas. Email comments and suggestions to: Clare Long, Conservation Education Specialist at [cclong@fs.fed.us](mailto:cclong@fs.fed.us).

Enjoy exploring!

### Winter Safety (pg ii and pg 3)

#### Equipment

- a backpack,
- the mentioned essential items and extra non-essential (Clothing layers – a wicking layer, a mid-layer of fleece, and an outer layer of wind/waterproof material, safety whistle, drinking water, map, pocket knife, sunscreen, duct tape, flashlight, first aid kit, and space blanket). Other items you could bring include: food, water, flashlight, first aid kit, whistle, rain/wind gear, knife, garbage bag, bandana, yearbook, toy car, bat, bottle of soda, electronic game, big bottle of shampoo, calendar, toothbrush, big pot, ping pong paddle, slippers, guidebook, camera, hacky sack, small plastic bag, 20 feet of rope or parachute cord, box of jello, sit upon/crazy creek chair;
- an extra box to put the “no go” items in
- snowshoes or boots
- poster of the 10 Things You Need to Explore Winter

Familiarize yourself with the “10 Things you need to explore in Cold Weather” on page ii, including the paragraph above the listing, and the information on Pg 3 in “When you explore the forest” and “Dress Like an Onion”. *Include a discussion on clothing*

- Dress like an onion. Dressing in layers allows air to be trapped between layers and will keep you warmer. You also will be able to add and remove layers as needed. You should have an inner layer that will wick away moisture, a middle layer that provides warmth, and an outer layer that protects you from rain/snow and wind.
- Choose materials that will best protect you such as synthetics like fleece or polypropylene, or wool. Avoid cotton because it does not dry quickly and will make you wet and cold.
- Wear appropriate footwear and socks. Socks will help prevent blisters. Boots will give you good support and protect your feet.

The Wabenaki tribes of VT, NH and ME wore buckskin leather dresses, tunics, leggings and loincloths and cloaks. Headgear was of animal fur and peaked leather. Footwear was moccasin or mukluk of leather with rabbit and beaver tail sole. What kind of clothing do you use in the winter? What is it made of? Why do we say “dress like an onion?” (You can control how hot or cold you are by using the layering method).

**Activity:** Should it stay or should it go?

In this activity the kids will decide what items they would want to take along with them on a 3 mile day hike out in the forest in the winter. Place the backpack far enough away from the group so they have to move to it but within sight; Place the “no-go” box or other container in another direction in sight but far enough away so the kids have to run to it. Hand the items out the kids and have them figure out the following:

- What is it?
- What is it used for?
- Would you bring it along with you and why? If not, why?

Once the kids have answered the questions so everyone can hear have them run/ski/snowshoe to an area where you have put your pack or a bag/container and put the item that you would take with you into the pack. Put the item that you wouldn't take with you in the other container. After all the items have been sorted bring the group to the backpack and take the items out and review why this would/wouldn't be a good choice to take along with you. Do the same review with the “No-go” box as well.

**Snow Crystals (Pg 5)**

Background info: Snow forms if the air in a cloud is below freezing. The water vapor then turns to ice instead of rain and the tiny ice crystals stick together until they form snowflakes. When they get heavy enough to fall, they drop out of the clouds. At this point though, we still don't know whether they will end up as rain or remain as snow. This depends on the temperature of the air they travel through on the way down to the ground. If it gets warmer, they turn into rain, but if the air stays close to freezing all the way down, then the snowflakes will make it without melting and so fall as snow. If this occurs in a mountain area, it is possible for snow to be falling on the mountaintop while lower down in the valley the air is warmer and so it is raining instead.

Snowflakes occur in a huge variety of forms. In fact, no two snowflakes are the same – each one is unique, just like each person is unique. All snowflakes have one thing in common though – they all have six sides. If you look at them under a magnifying glass, you will see the different shapes, as well as the fact that they are all hexagons (six-sided).

The actual shape of snowflakes depends on the temperature of the air. When air is colder (below freezing) they may look like needles or columns. This snow, formed in freezing conditions, is powdery and dry – and not very good for making snowballs! However, when the air is warmer (just about freezing) the shapes are more complicated and often look like delicate lace. These snowflakes are usually larger and the snow is 'wet'. It is much easier to squash this snow into heavy, icy snowballs!

Snow and snowflakes are ice crystals mixed with air molecules. The air gaps between crystals, along with the crystals' complex shapes, bounces the light beams around so much that all the wavelengths eventually get reflected out, giving it a white color.

### **Snowflake Sleuths Activity (pg 5)**

#### Equipment

- Snow crystals, black construction paper, hand magnifiers, large snowflake poster from pg 5

Have kids pair up (for younger than 4<sup>th</sup> grade you'll probably need to pair them up).

Hand out the black pieces of paper, a magnifying glass, and to each pair making sure one of them has a booklet.

Go over what a snowflake is and how it is made

One kid has the black paper and magnifying glass, the other has the booklet. Have them search for snow in different areas and see if they can ID what type it is using the chart on page 5.

#### **Game:**

Snowflake Scramble

(Adapted from Idaho Snow School at Bogus Basin)

This game will have students running around and acting out various forms of snow. It is a great way to introduce the concepts of a) snow crystal shapes, b) the concept that old and fresh snow are fundamentally different, c) how a sun crust forms, and d) how avalanches move.

Before starting the game have the students circle up and have them look at Pg 5 of the Junior Ranger booklet at the “Shapes of Crystals”. Some students will be familiar with these shapes and some will not. Take this time to allow students to become familiar with the various names and shapes. After having them look at the shapes, tell them that they are going to become the crystals. Demonstrate the shapes for them first, then call out the names and have them demonstrate to make sure they understand. Also discuss with them what a sun crust is and how it forms as well as how avalanches move. Select 5 to 7 shapes for the kids to use in the first round of the game. Always have “Fresh Snow” as one of the shapes in your version of the game. The various forms are as follows:

Old Snow: Lay flat on the ground

Fresh Snow: Run around falling/ drifting “from the sky” with arms spread out in a T

Stellar Dendrite: Grab a partner, stand feet spread apart one in front of the other partner (back to front); one partner puts arms in a Y, other partner puts arms up in a T

Plate: Grab two partners and hold hands in a circle (making a hexagon with your arms)

Needles: Arms straight up over head

Column: Stand with legs spread out and arms in a circle over your head

Graupel: Curl into a ball and drop onto the ground

Rime: stand on one foot and make a T with their arms

Sun Crust: Each person melts (wiggles) then jumps up and stands at attention

Avalanche: Everyone runs to whichever side has been designated as “downhill”

- 1) Start the game off with Fresh Snow (kids running around)
- 2) Call out a specific shape/form
- 3) Kids who forget the action, are too slow, or are unable to find the proper number of partners is called out
- 4) Students cannot change from one form to another without being “thawed” first into Fresh Snow. You must call out Fresh Snow/ Thaw between each form; if students move when they are not first “thawed” they are out (when first starting this game you’ll usually get lots of kids out if you are sneaky and direct them from one form to another without “thawing” them)
- 5) Play until there are one or two winners

## **Animal Adaptations to winter (pg 10)**

### Equipment

- Winter Animal Adaptations relay cards with animal pictures, boxes/containers labeled: “migrate”, “adapt”, and “hibernate” for sorting

When winter comes animals work in many ways to prepare for the cold weather just as we do. We turn on the heat, get out our warm coats and in areas that are quite cold we buy extra food in case a storm comes that keep us from going to the store. Some animals grow warmer coats, for the winter. Others waterproof their homes in order to stay dry and warm. Some store up food for the long winter and others migrate to warmer places until the cold weather is gone. Some even curl up and sleep the winter away. (Read through the appendix teacher's guide –How Do Animals Survive Winter? For good general background information.)

### **Activity:** Adaptation Strategy Relay

There are laminated photos of animals with clues on the back as to how they adapt to the winter world. Lay down 2 pieces of flagging tape 40 ft away and parallel to each other. Behind one piece set up 3 “areas” (a piece of flagging tape laid out perpendicular to the first tape laid out would work). One for Migrate, one for Hibernate, one for Active. Behind the other put the pictures in a pile on the ground. Split the group in 2. The first kid in each line picks up a photo, looks at the animal and reads the clue to his team. The team decides the winter strategy this animal uses. Then the first kid skis/runs down to the other area and puts the photo in the “area” that he thinks is the adaptation. The first kid then runs back and tags the second kid who picks up a photo, reads the clue, decides as a team and then skis/runs to the other area. Continue the process until all photos are gone. Then walk down to the area with the adaptations and look at each animal photo in that area. Decide as a group whether the animal is in the correct adaptation strategy.

### **Migration Activity#1**

#### Equipment

Hula Hoops, enough for a “flock” of at least three kids/flock

Migration course

3 “Dangers”

Two parallel lines on the ground 20 yards apart

Birds migrating have to maneuver many dangers. Review what kind of dangers birds might encounter on their way south. (Hunters, bad weather, lack of food, predators). The flock of birds needs to “migrate” from one end of the playing field to the other without being tagged by the “dangers”. Have groups of kids get inside the hula hoop and run, flapping one arm and holding on the hoop with the other. Have several hoops along the course; kids have to get in to the hoop to be safe from danger and to rest. Flocks must stay together and can't leave until everyone is in the hula hoop. The “dangers are placed throughout the migration route and stay in one place. They try to tag the flock as they fly by. If a flock is tagged they have to start at the beginning again. The first flock to reach the other side wins and are the next “dangers”.

## **Migration Activity #2**

### Equipment

Hula Hoops, enough for a “flock” of at least 3 kids/flock

### Migration course

This game has kids in hula hoops following a circular obstacle course, over, under, and around items and eventually returning back to the start. One is holding on to the hula hoop and one arm flapping. The “flock” is timed to see how long it takes them to get back to the start. You can make it a little more competitive by setting a time limit and if the flock doesn’t make it back in they have to hang up their wings.

## **Animal tracks (pg 11)**

### Equipment

- Track identification cards

Animal tracking is a guessing game with lots of answers that you need to ask the question of in order to understand who has been around. Who made the track, what they were doing, and even why? Follow these steps when you first come on a track or track pattern:

- Where is the track (woods, fields, water’s edge, etc/)
- What animals live and are active in this area?
- What was the animal doing? Where was it going?
- Why was the animal doing this?

Now look at your tracking chart and see if you can identify the pattern. Then look at the tracks in the pattern section of the card and track measurements to see who was here before you!

Keep this in mind: Learning to track is an important responsibility. It gives you the ability to come into the center of the lives and homes of animals. Respect the animals by being non-intrusive. Getting too close to animals can cause serious disturbances including: abandoning young, disturbing nesting grounds, damaging foraging areas, and may even cause the animal's death. For example, in winter, many animals are severely stressed to gather enough energy to stay alive. Escaping from a human presence could rob them of enough energy that they can no longer sustain themselves. Always remember that you are only a visitor into their habitat.

### **Track patterns:**

**Diagonal walkers/Perfect Steppers** - (cats, dogs and hooved animals) Move opposite limbs together, right foreleg with left back leg.

**Bounders** - (most weasels except skunks, badgers and wolverines) Hop in steady series of jumps, forelegs first and back legs pulling right behind them

**Gallopers/Leapers/Hoppers** - (most rodents and rabbits) These animals hunch down and bring hind legs in front of back legs.

**Pacers/Waddlers** - (wide bodied animals such as raccoons, bears, beavers, porcupines, and skunks). They shuffle along, but move from pacing to bounding as they go faster.

**Families:** (adapted from Tom Brown's Field Guide to Wilderness Survival 1983 NY: Berkley Press)

**Cat family:** Rounded tracks with four toes on both front and back feet. Claws are retracted and don't show. They direct register, placing back paws in the front print.

**Dog family:** Four toes on front and rear prints, claws showing. They indirect register, with back feet falling behind front feet. Wild dogs tend to have scent piles to which they return, and more than one den.

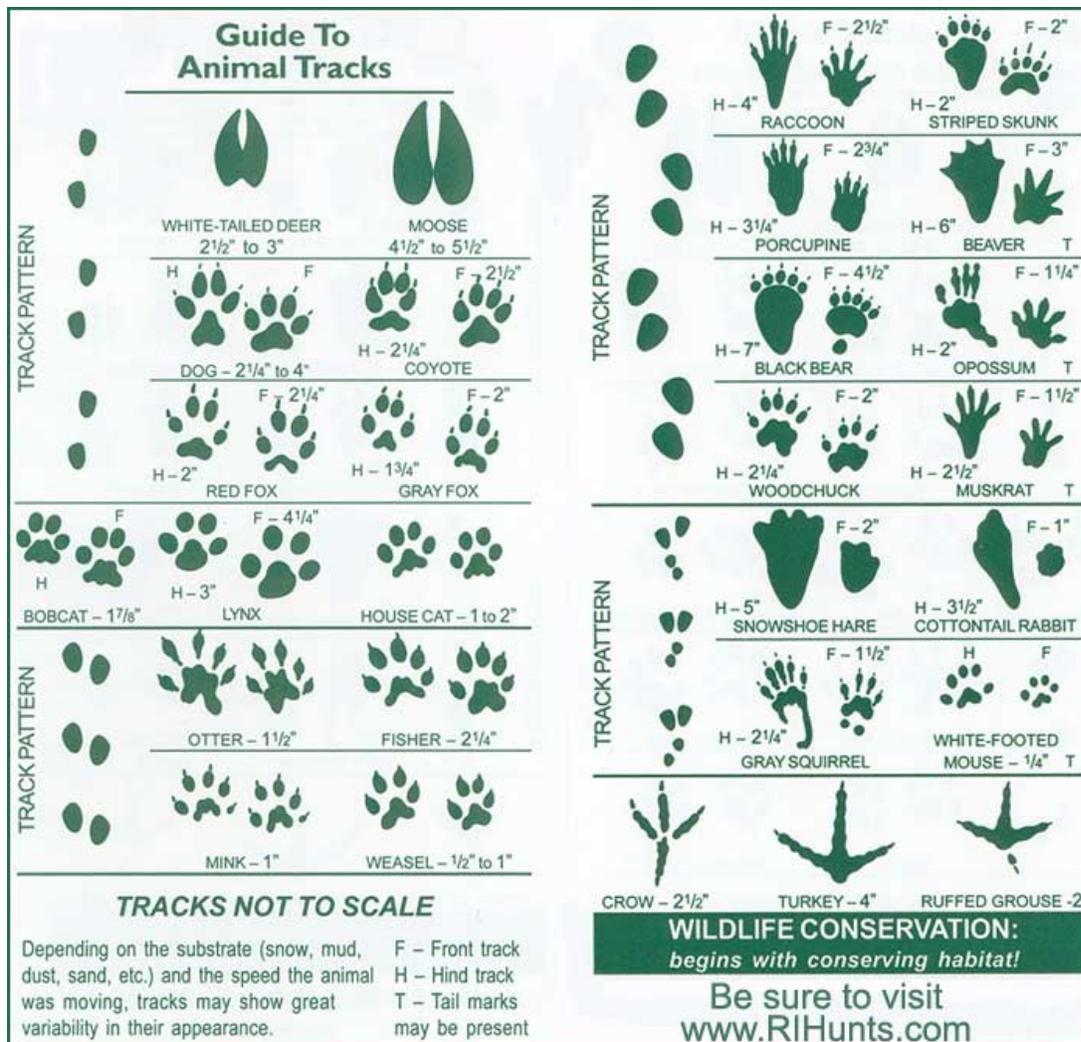
**Weasel family:** Five toes in front and five in back, with claws usually showing. Skunk-like smell.

**Raccoons, opossums and bears:** Five toes in front and five in back, with claws usually showing. Raccoon travels around water, opossums live in logs or stumps, and a bear travels widely and hibernates in dens. Basically the shape of the track pads pulled into longer patterns than the weasel, cat or dogs.

**Rodent family:** Four toes in front and five in rear, with some 5 and 5. These are gnawing vegetarians.

**Hoofed mammals:** Heart shaped

The chart below has been broken into groups by track patterns meaning how the animal steps one foot after the other. These pictures are not actual size so use the measurements provided for each track. Each foot is labeled with an "F" meaning that track is a front foot track of the animal shown. Or it is labeled with an "H" showing the hind foot track of the animal shown.



## Track Activity #2

Animal Track Races – Make a Start/Finish line – have to walk like a perfect stepper, waddler, hopper, bounder, one way for each type of animal track pattern. Can do this either as a race or do it for time.

## Frozen Bubbles (pg 13)

### Equipment

- Frozen Bubble mixtures and bubble wands

Have the kids dip the wands into the solution and slowly blow a bubble, then catch it on the wand. Hold it out and watch as the bubble slowly freezes. Once it is frozen take the wand and flick it away from you and watch as the bubble shatters and floats down to the ground. Optional activity include blowing the bubble and keeping it in the air by blowing underneath it. (note: the temperature has to be at or below freezing for this to work).

### **Interview a Ranger (pg 16)**

#### Equipment

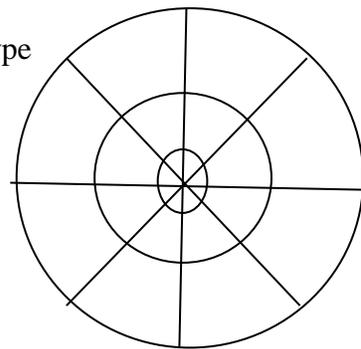
- pencils, 2 or more rangers (try for 4, particularly for larger groups of 30 or more kids)

This is a round-robin introduction of different types of jobs in the forest service. Introduce the Rangers to the group and separate them into different areas but close enough for kids to see where the next ranger is when they have to move. Divide the kids up into groups corresponding to the number of rangers you have (3 rangers, 3 groups of kids). Have the kids read the interview questions and write down the first ranger's answer in their book. (Kids can choose to write down another ranger's info rather than the first ranger they see if they choose). After 10-15 minutes have the groups rotate and ask the same question of the next ranger. Rotate the kids until all rangers have been interviewed by all kids.

### **Lynx and Snowshoe Hare Tag**

The Lynx and Snowshoe Hare are two animals with "snowshoe" type feet that help them move along the top of the snowpack in winter. The Lynx has very furry feet and the Hare has very large back feet.

The Hare is prey for the Lynx. Traveling through the snow in winter takes a lot of energy. Animals in winter will travel the same paths creating "runs" through the snow in order to save energy. In this game the predator, the Lynx, is trying to eat as many prey, the Snowshoe Hare, as possible.



#### Equipment

- Snowshoes, ski boots or winter boots; snowy, open, flat, area to run around on; noodle or other soft tag stick
- See grid pattern to the right

-On the ground either stomp out the grid pattern in the snow (having kids play follow the leader as you stomp out the pattern) or draw the circles using colored water on the snow;

-Then pick a "Lynx" to tag the "Hares" (use a soft long item such as a noodle to extend smaller kids' reach)

This is a game of tag in a series of circular patterns. There is a large outer circle, inner circle and a larger area in the center of the circle. The circles are bisected by lines leading from the outside of the circle to the larger area in the center. These bisected sections are similar in size and width – like pieces of a pie. One person is the Lynx and everyone else is Hares. The Lynx chases the Hares in the patterned area and tags them with the noodle. Once a Hare is tagged it becomes the new Lynx. You have to stay on the pattern (animals in the winter follow the same paths in order to preserve energy). The center is a “free” area where tired Hares can rest for 60 seconds. The Lynx can’t guard the “free” area. Some Lynx tire quickly so having an adult Lynx take over helps the Hares rest. Or, introduce a second Lynx to speed up the game. Game ends when everyone is exhausted! 😊

Activity: **Oh Deer** (a population game)

Oh Deer! Game Directions

1. Mark two parallel lines on the ground 10 to 20 yards apart. Ask students to count off in fours. The ones become the “deer” and line up behind one line *with their backs* to the other students. The other students become habitat components necessary to survive (food, water, and shelter) and line up behind the other line *with their backs* to the “deer”.
2. Explain that the deer need to find food, water, and shelter in order to survive in their environment. If they do not then they will die.
3. In this activity when the “deer” is looking for food, it should clamp its hands over its stomach. When a “deer” is looking for water, it should put its hand over its mouth. When a “deer” is looking for shelter, it holds its hands together over its head.
4. A “deer” can choose to look for any one of its needs during each round of the activity. **Emphasize that the “deer” cannot change what it is looking for during a round. It can only change what is looking for at the beginning of each round.**
5. The other students are the food, water, and shelter. Students get to choose what they want to be at the beginning of the round. They show their choice in the same way as the “deer” have. Emphasize to these students that they cannot change what component they are during a round. They can only change at the beginning of each round.
6. The teacher should begin the first round by asking all students to make their signs—hand over stomach, mouth, or head. **Emphasize that students should choose one of these symbols before turning around to face the other group.**
7. When the students are ready tell them to “GO!”. At this time each “deer” and each “habitat component” turns to face the opposite group continuing to hold their sign clearly.
8. When the “deer” see the “habitat component” that matches what they need, they are to run to it. Each “deer” must hold the sign of what it is looking for until getting to the matching “habitat component.”
9. Once the “deer” find their correct component they should take it back to their line, and the “habitat component” becomes a “deer”. Any “deer” who fails to find its “habitat component” dies becomes a “habitat component” on the other side and becomes available as food, water, or shelter to the “deer” who are still alive.
10. “Habitat components” not taken by a “deer” continue to be “habitat components”.
11. The activity should consist of 12-15 rounds. The teacher records the number of “deer” at the beginning of the activity and at the end of each round so that students can graph the results in the classroom.

Oh Deer Game Directions adapted from Project Wild Teacher's Guide  
(See lesson activity materials list)

Less Active Activities

## **BIRD SEED SCULPTURES**

### Equipment

Various types of bird seed

Small cups

Pattern or image created ahead of time or free-lanced on the spot

Bird seed sculptures – put various types of bird seed into cups; have children find a space big enough for their bird seed mural. Have them design ahead of time or freelance an image. Lay the bird seed on the top of the snow (or ground if no snow) and create a beautiful picture that help feeds the local bird population. Visit your beautiful creation and see which seeds the birds preferred and how much was eaten!



Create a **SNOWY SELF PORTRAIT** that doubles as a tasty treat for animals who might stop by to admire and sample your work.

Materials:

Birdseed (such as sunflower seeds and cracked corn)

Fruits and vegetables (like apples, kale and carrots)

Food coloring

Pump bottles

Time needed: Under 1 Hour

**1.** Start by prepping your art materials; fill the pump bottles with different hues of food-color-

tinted water and cut up various fruits and vegetables. Then take the materials outside.

**2.** Next, start your masterpiece by lying back in the snow to make a body print. Gently rock your body to pack the print, then carefully get up (you may need a friend's help).

**3.** Create a portrait by filling in the shape with the seeds and vegetable pieces and adding details with the colored water.

**Tips:**

Younger kids may find it easier to work with fewer materials and to use cups or small pitchers (instead of their hands) to pour lines of seed. Remember to have the artists sign their initials somewhere, too! Source: [familyfun.go.com](http://familyfun.go.com)

**Create Your Own Avalanche (pg 4)**

Equipment

4 books, rock salt

Create your own avalanches by placing books on top of each other and lifting at different angles. Measure the angle the top book starts to slide. Place some salt between the books and try the experiments again. Place another book on the pile and see what happens. Try using other materials between the books (sand, dowels, popsicle sticks, etc.) and see how much of an angle you need before you have an avalanche.

**Winter Discovery Grid (Finding Your Forest In Winter)**

Equipment

-1 grid page per student

-pencil

Clip board or surface to write on

Hand out a winter grid to each student. Some of the squares are filled in and some are left blank for you and the students to fill in before you head outdoors. Spend time looking, listening, smelling, and touching as you try to find as many of the winter items on the grid as you can. Check off the box as you find the items. Extension: Create a winter journal and number either lines or pages. Number the boxes in the grid and have the kids write a sentence about what they discovered relating to the numbered box on the corresponding line/page in their journal. Have them share their discovery sentences when they return to the classroom.

## Appendix

**Answers to Animal Migration game**

Moose – I have lost my antlers and am eating tree bark for food. (Active) use a letter in lower corner

Canada Goose – I fly up to 600 miles a DAY to as I travel to warmer place to find food  
(Migrate)

Little Brown Bat – I go into a cave in September or October and come out in April or May  
(Hibernate)

Muskrat – I spend more time in my den near the water when it is cold so I can find food  
(Active)

Grey Whale – I travel to the warm waters of the tropics and in the spring go to the cold waters of Alaska (migrate)

Pine Marten – I hunt all winter and burrow in the snow to stay warm (active)

Porcupine – I eat the inner bark of trees even in the winter so I have to travel from tree to tree  
(active)

Raccoon – I fatten up on acorns all fall and sleep in a den with other raccoons (hibernate)

Red Squirrel – I store food all fall in birds' nests, hollow logs and other cavities to eat during the winter (active)

Short tailed shrew – I tunnel through snow and forage on the surface at night (active)

Snowshoe hare- I can move VERY quickly on the snow and blend in so my enemies can't easily see me (active)

Stripped skunk- I line my den with leaves and needles for a soft bed for a long winter's nap  
(torpor)

Black Bear – Because I can retain my heat with the fat I've stored, I can sleep for up to 100 days  
(torpor)

Beaver – I swim under the ice and eat the store of twigs I have stored there. (active)

Opossum – I fatten up in the fall but in the winter sometimes my ear tips and tail freeze! (active)

Monarch Butterfly – I am cold blooded and fly to Mexico to stay warm (migrate)

Bobcats – my short legs and small feet do not make it easy for me to hunt in the winter snow but I keep trying (active)

Red Fox – Even when I am full I will continue to hunt and store my food in the snow for eating later (active)

Eastern Coyote – I was first sighted in New Hampshire in Holderness in 1944. I like to hunt in all seasons I decided to stay! (active)

Mink – I live near water and I grow fur between my toes in the winter to help move through the snow (active)

Fisher – I create dens in the snow and connect them with tunnels, to hunt more easily (active)

Least weasel – Starting in fall I grow a white coat to help me blend in with the snow so I can hunt more easily (active)