

PARKS AND PROTECTED AREAS

Wildlife in Winter: A Field Simulation Activity Guide



This publication is part of a series of field study programs produced by the Environmental Education Program of Parks and Protected Areas in Kananaskis Country and Fish Creek Provincial Park. These publications have been written to address the goals of Alberta Community Development and increase students' environmental awareness, understanding, interaction, and responsibility for the natural world in which they live.

The publications are developed in a close working relationship with teachers, community educators and program writers. Programs focus on the areas of environmental education, science, social studies, and language arts. They are also developed to emphasize elements of environmental literacy, lifestyle, and citizenship.

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Wildlife in Winter: A Field Simulation Activity Guide

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The Big Picture

The Winter Wildlife Game is part of a series of booklets on winter ecology produced by Kananaskis Country Environmental Literacy Program. The programs have been developed for use at the elementary school level, but can be modified for use at higher grade levels. Each booklet contains a series of activities which can be associated with many topic areas. These activities can be integrated into unit teaching plans to help form the basis of a comprehensive unit of study on winter ecology.

The *Winter Wildlife Game* is an action-packed simulation game that allows students to role-play some winter animals, discovering how winter conditions and adaptations can be a matter of life or death!

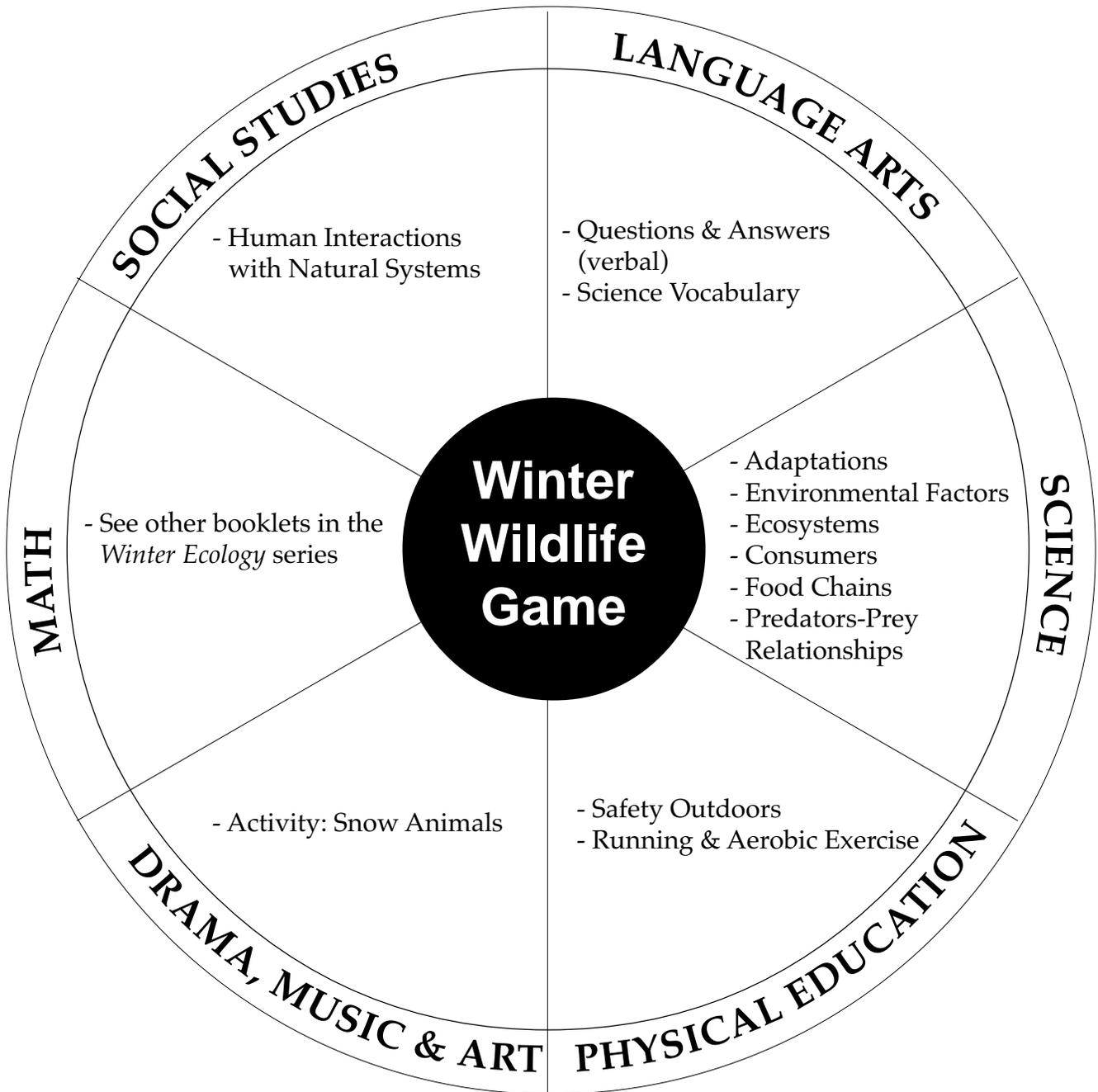
Humans and Winter explores our relationship with winter, how this period of cold and snow affects us, and how we can become better prepared for the *season of the cold*.

All About Snow looks at why we have winter, the characteristics of snow, and some of the fascinating wonders of the frozen world.

Animals in Winter teaches about some of the amazing adaptations that allow animals to survive in winter, and helps students search for signs of these animals on a winter walk.

Although each of these four booklets can be done independently, Kananaskis Country recommends that they be done consecutively. For example, it would be most useful to discuss how to dress for winter (*Humans and Winter*) before doing the outdoor snow study in *All About Snow* and the walk in *Animals in Winter*.

Across the Curriculum



The *Wheel of Learning* indicates activities found in this booklet and their associated curricular connections.

Game Preparation

The *Winter Wildlife Game* is a predator-prey game in which adaptations to the cold and snow conditions are emphasized. Participants become predators and prey. The predators (carnivores) try to catch the prey, but must avoid being caught by other predators. The prey (herbivores) search for food cards which they can find at food stations. These food cards can also be lost if they are caught by predators.

Both predators and prey must endure a series of winter conditions which may result in their gaining or losing food cards. The introduction of humans into the game demonstrates the positive or negative effect that humans can have on an ecosystem during critical periods of late winter and early spring.

This game is best conducted during a single one to two hour period, and should be played in the winter in a large, wooded outdoor area. Alternatively, one class period can be allotted for game directions and distribution of player kits. A second class period can be devoted to the actual playing of the game, and a third to the discussion of the game.

Concepts Learned In This Game

Ecosystem: *An ecosystem is an assemblage of living organisms that interact with each other and with their non-living environment.*

Adaptations: *Adaptations are changes in an organism's physical structure or behaviour that allows it to survive in its environment.*

Environmental Factors: *Organisms live in habitats that have environmental factors favourable to their survival. These environmental factors include temperature, light and moisture. Organisms respond to changes in the environmental factors within their habitat. Organisms live where environmental factors suit their needs.*

Roles

The chart below indicates how to assign roles to the students, depending upon the size of the group. Once roles are determined, game materials can be prepared.

NUMBER OF FOOD CARDS REQUIRED BY EACH PLAYER

Players	Status	Number of Students in Class								
		15-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55	56-60
Hare	Herbivore	4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12
Vole	Herbivore	3-5	4-6	5-7	7-8	8-9	8-10	10-11	11-12	12-13
Grouse	Herbivore	2-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12
Deer	Herbivore	3	5	6	6	7	8	9	10	11
Coyote	Carnivore	1-2	2	2	2-3	3	3	3-4	4	4
Lynx	Carnivore	1	1	1	2	2	3	3	3	3-4
Owl	Carnivore	1	1	2	2	2-3	3	3	3-4	4

For example, if you have a class of 30 students, you would have: 6 Hares, 7 Voles, 6 Grouse, 6 Deer, 2 Coyotes, 1 Lynx and 2 Owls.

What You'll Need

Prey: Each *Herbivore's* player kit should include one small plastic or cotton bag containing the following:

- 1 *Animal Description Card* (with animal picture). See appendix.
- 3 Food Cards (5 cm x 5 cm squares of green poster board)
- 4 *Winter Condition Cards* for that animal (see appendix)
- 1 green head band
- 1 piece of string or a curtain ring to hold the cards.

Predator: Each *Carnivore's* player kit should include one small plastic or cotton bag containing the following:

- 1 *Animal Description Card* (with animal picture). See appendix.
- 1 Food Card (5 cm x 5 cm square of green posterboard)
- 4 *Winter Condition Cards* for that animal (see appendix)
- 1 red head band
- 1 piece of string or a plastic curtain ring to hold the cards.

Note regarding food cards: you may wish to laminate these cards to prolong their usefulness. Alternatively, you may wish to have your class save juice bottle lids, which can be used as *food cards*. These lids are not only more durable but provide an excellent model of one of the three R's: namely, Reuse.

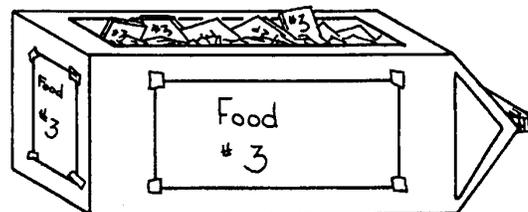
General Game Materials:

- copy of *Winter Wildlife Game Rules* (see appendix)
- copy of *Background Information for Winter Condition Cards* (see appendix)
- copy of *Staying Warm* (see appendix)
- 2 rolls of brightly coloured flagging tape
- 1 watch
- 1 whistle
- 1 hat for the human
- 10 food station buckets (margarine, ice cream, or milk containers)
- 10 sets of Green Food Cards (FC), one set per food station.

The number of food cards in each set should be equal to the number of herbivores playing the game plus 3-4 extra cards. For example, if there are 8 herbivores in the game, then one set of food cards should contain $8 + 3 = 11$ cards and the total number of FC would be 11×10 food station buckets = 110 food cards.

Label each set of food cards with the number of the bucket it belongs in (1 to 10). The FC's are numbered so that the students will only take one card per bucket.

Note: The milk carton can be sealed easily by placing another cardboard panel over the rectangular hole (see illustration below) and securing it with rubber bands.



Food Station



Preparation

Materials

1. Make the *Animal Description Cards* (see appendix). The information about the animal should be on one side of the card and the picture of the animal should be on the other. These may be glued back to back with poster board in between, or simply folded. Laminate all the cards.

2. Make the *Winter Conditions Cards* (see appendix). These can be made either by gluing the sheet to posterboard and then cutting along the dotted line, or by simply laminating the sheet and then cutting along the dotted line.

Note: Make copies of the cards for your whole class, using the table on page three to determine the number of each species needed. Much of the preparation for the game can be done in-class by the students themselves.

3. Punch a hole in the upper right-hand corner of each of the *Winter Condition Cards* and *Animal Description Cards* (see illustration) and tie all of the cards together with string or a shower curtain ring.
4. Arrange for program assistance by enlisting the help of parents, school volunteers, or high school students. A ratio of one volunteer for every ten students is recommended. The volunteers' roles are to help hand out materials, supervise the boundaries of the game and act as *Game Wardens* to referee the game. One volunteer can take on the role of the *human* near the end of the game.

Student

1. Before conducting the game, distribute and review the handout *Staying Warm*. Remind students of the need to ensure they do not overheat or become too cold while playing the game.

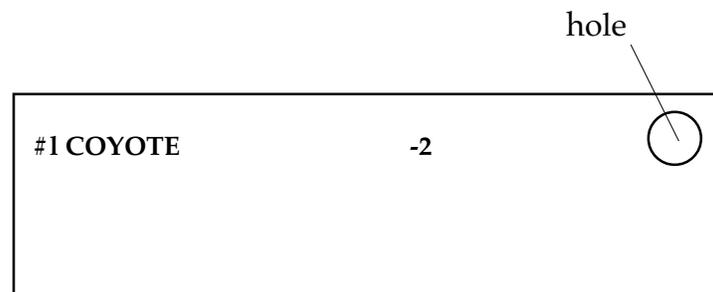
Game Area

1. The game area should be at least 100 m x 100 m and should be wooded so that the players have a place to hide and must search for the flagged feeding stations. If the location has few trees or if the players are older, double the size of the playing area.
2. Mark the boundaries of the game area with flagging tape. Place the food stations securely on the ground or in the snow where they are out of the wind, yet accessible to players.

Depending on how easy the food stations are to see, you may wish to mark each station with a piece of flagging tape placed at the students' eye level. Place the Food Cards (FC's) in each bucket.

3. Conduct the pre-game discussion (next page) indoors.

Note: Choose an area for the activity that is not environmentally sensitive and can withstand the impact of fleet-footed students. Remind students of natural hazards which may be present and the need for caution.



Pre-Game Discussion

This discussion should occur indoors - before the students go to the game area.

1. Ask the students for definitions of the following words: predator, prey; adaptation, food chain, consumer.

Predator: An animal that kills another for food.

Prey: An animal taken by another for food.

Adaptation: Any changes in an organism's physical structure or behaviour that allows it to survive in its environment.

Food Chain: a relationship which occurs when an organism eats a plant or animal

Consumer: Any living thing that cannot make its own food and must eat plants and/or other animals to get the energy it needs to survive. There are three main types of consumers:

Herbivore: A consumer that eats plants.

Carnivore: A consumer that eats other animals.

Omnivore: A consumer that eats both plants and animals.

2. Introduce the game by asking the students:

- **Why is winter a difficult season for people?**

We must wear heavy clothing; some cars won't start; it is difficult to travel, etc.

- **How do animals cope with the challenges of winter?**

By physical and behavioural adaptations: some migrate, others hibernate and some undergo physical changes such as growing thicker coats.

3. Explain to the students that the *Winter Wildlife Game* will show how different animals survive through the winter season. Each student will assume the role of an assigned animal and attempt to survive the winter in that role. The assigned animals will be herbivores or carnivores. Review the definitions of each.
4. Choose the predators. You can control the dynamics of the game by assigning the role of carnivores and omnivores to faster or slower students; alternatively you can select the students at random. Point out that the predators include the coyote, the lynx and the Great Horned owl. Pass out the appropriate player kits.
5. All remaining players are herbivores. These animals are the prey and include the snowshoe hare, vole, Ruffed grouse and mule deer. Assign a role to each student.
6. The game can be divided into four rounds of equal lengths of time. One teacher or parent will play the role of *the human* in the fourth round of the game. When the time comes, hand out the hat to represent this player's role.

Note to Teacher

You may adjust any of the following factors to influence the pace of the game:

- Predator-prey ratios (an increased number of predators will make the game go faster and end sooner)
- Number of food stations (more food stations will slow the elimination of herbivores)
- Size of the playing area (increase the size of the area with older or more active students)
- Expect the pace of the game to slow down periodically. The entrance of *the human* on the scene will again quicken the pace for a climatic ending.

7. Before opening the player kits, read the *Winter Wildlife Game Rules* to the students so that they understand the game and how it is played. The following notes serve to explain some of the rules:

- You may wish to show the students one of the food stations, so students will know what they look like.
- The food cards in each bucket will be number-coded; stress that each food station contains only enough Food Cards to provide 1 for each animal.
- Collected food cards are to be stored on the player's string or ring until the end of each round.
- When a new round begins and the winter condition cards are first read you may choose to have the students assemble around you to discuss the winter condition and its effect on them.
- If the score on a winter condition card is a -1 or a -2, the weather described is difficult for that species. The player with a negative score must remove the number of FC's indicated by the score from those on his string or ring. The FC's are then placed in their plastic or cotton bag.

In subsequent rounds, if the score reads +1 or +2, the animal is able to withstand that winter condition. If FC's are in the player's bag, one or two FC's can then be removed from the bag and put back on their string or ring for play during the remaining rounds. **Note:** You may wish to post these rules in the playing area as well.

8. Distribute and review the player kits, which contain each of the following:

- ***Cloth Head Bands***
To be worn around the player's head (can also be worn as arm bands—but halfway through this game students tend to warm up and take their jackets off). The herbivores' bands are green and the carnivores' are red.
- ***Animal Description Cards***
Students should read their identification card to understand those characteristics which will help them to survive the winter. Quiz each group by reviewing their animal's distinctive traits, habits and adaptations to winter.



- **Winter Condition Cards**

Explain that each animal has different adaptations and because of this, winter weather conditions affect animals in different ways. Each kit contains four numbered cards. Each card has several parts:

- The player's animal name, the card number (either #1, 2, 3 or 4) and a numerical score (-2, -1, 0, 1 or 2) which tells how the winter weather affects that animal.
- A type of winter condition which may be experienced by the animal.

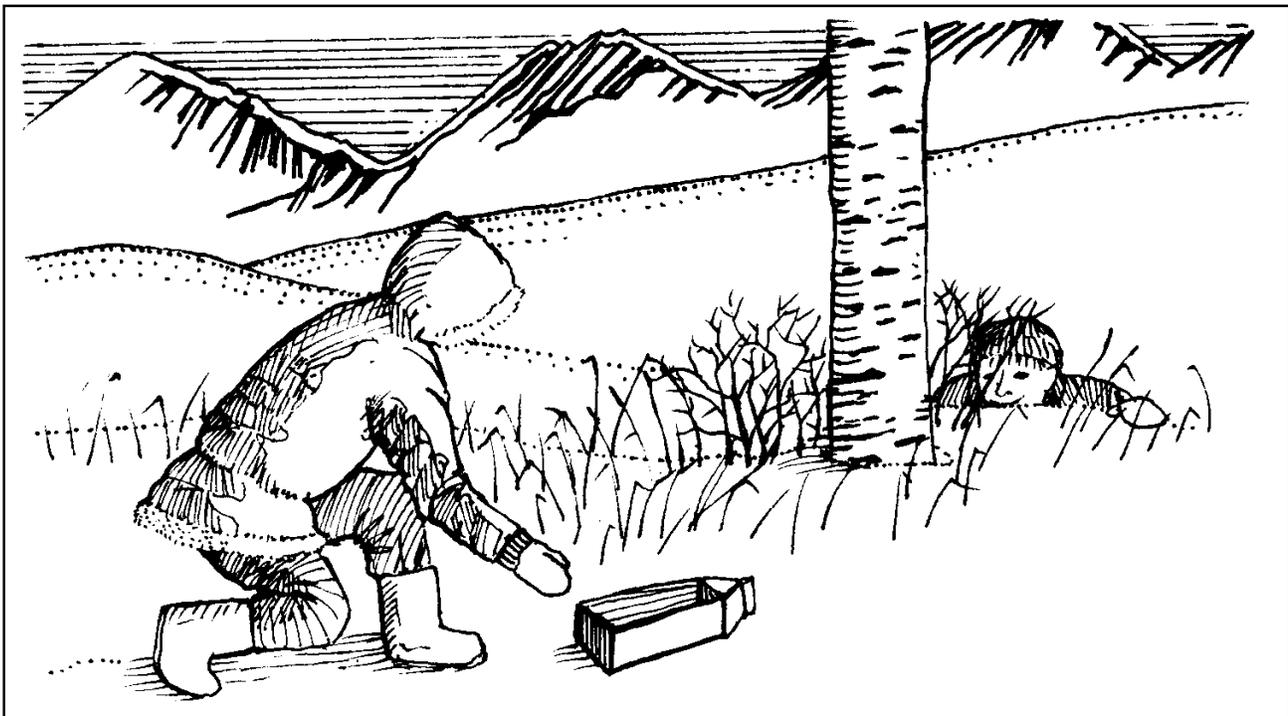
- **Food Cards**

Food cards represent one of the animal's needs - food.

9. Assemble your class at the game area. Show the students where the boundaries of the playing area are; if possible, walk the group around the playing area. As much as possible, use natural boundaries such as roads, trails or creeks.

After walking the boundaries, mention the presence of the ten food stations. If you tell students about the food stations before they walk the boundaries they will watch for the stations, thus removing some of the challenge. After a final review of the game rules and answering any last minute questions...**let the game begin...!**

10. Immediately after the game, before returning to class, have students open their bags and count the number of Food Cards remaining on their string or ring. You may wish to have a parent write down the numbers on a sheet of paper beside the students' names.
11. Collect the player kits and food card buckets and remove the flagging tape. If it is warm enough for a fifteen minute discussion, begin this at the game site, reminding students that they should adjust their layered clothing to stay comfortable. If you think that students will become cold during this time, it is best to hold the discussion indoors.



Game Review

1. Back in the classroom, have the students sit in groups according to what kind of animal they played in the game (e.g., hares sit with hares).
2. Using the *Background Information for Winter Condition Cards* for reference, discuss the effect of the winter conditions on the different animals. As the interest and attention of the group warrants, have different students in each group describe ways in which the winter weather affected them positively or negatively. Group members should also be able to identify ways in which their animal is physically or behaviourally adapted to winter.
3. Have students indicate with raised fingers the number of Food Cards they had left after playing the game. You may decide that only animals with all ten FC's may survive; alternatively, you can estimate the average number of Food Cards retained by each player. Select a number slightly higher than that average as the number of cards required for winter survival so that at least a few animals die. For example, if the average is 5, then tell the students that 5 or more Food Cards are required to survive the winter.

Explain to the students that spring is one of the most difficult times of the year for animals, especially for females who give birth in the spring and are raising a family. Any players with less than the required number of food cards may have survived the winter, but may not survive through the spring.

4. Ask the students any or all of the following questions about the game:
 - **How did it feel to run across icy drifts and through deep snow? Was it awkward for you? Easy? What made the difference?**
 - **Would it have been useful to have snowshoes on for the game?**



- **During the game, did students' footprints join together to form trails? Are trails a good idea?**
The formation of trails is a common characteristic in the world of animals, especially for those who find travel in snow difficult, as people do.
- **What senses did you use during this game?**
Most students will agree that they mainly used sight and hearing.
- **If this game had been played during the night, would you have used any different senses?**
Students should realize that they would rely more on their sense of hearing at night. A keen sense of smell would also be useful at night.
- **How are some animals better suited to the night-time?**
Many animals have acute hearing and night vision, enabling them to find their food at night as well as during the day.
- **How did your chances for survival change when the human entered the game?**
Tell students that humans can represent any group of people who for any reason might assist or disturb wildlife: skiers, hunters, bird watchers, hikers, etc. Because wildlife is at a critical stage toward the end of the winter, any disturbance or assistance can have significant implications for survival.

- **How did you as a predator or prey survive? What problems did you have? Did colour of clothing affect your survival?**
- **Which of the following qualities are most important for your animal: intelligence, speed, or camouflage?**
- **What would happen if the number of predators in the game had been doubled?**
It is possible that a trend may have become apparent even in a half-hour game. For example, if the predator/prey ratio had been 1:2 instead of the recommended 1:3, the prey would probably not have survived, leading to an unbalanced predator/prey relationship and a short game.
- **Could this game have gone on forever?**
No. Even if there were large numbers of prey and the predators were all slow runners, the prey would eventually run out of food.
- **How would you change this game if you wanted it to go on indefinitely?**

For this game to continue indefinitely, several things would have to happen:

- *Some of the Food Cards would need to be recycled so that the food stations would be refilled*
- *Animals would have to die*
- *Animals would have to reproduce to replace those that die; for example, a pair of animals that were able to meet all of their food needs could turn in their extra food cards in exchange for another member of their species.*

Most natural systems have been sustained for millennia; they tend to oscillate around a natural equilibrium that allows the “game” to go on for very long time periods.

- **What effects would a large, healthy herbivore population have on vegetation over several years?**
A large population could overgraze an area. If that happened, the animals would, where possible, move onto other areas, giving the vegetation a chance to recover.

- **What kinds of measures could a park adopt in order to protect and help deer and elk populations? Should a park adopt these measures?**

Parks may protect animals from hunting, trapping and fishing (if those activities are prohibited in the park) and from being fed or harassed by people. As well, parks often protect animal habitat, migration routes, and travel corridors.

- **What would happen to each of the animals in the game if a shopping centre were built very close to the game area?**

Some animals are more sensitive to the presence of humans than others. Smaller animals (such as voles) which use small areas would be relatively unaffected. Coyotes adapt well to humans and would be able to adjust to the change. Owls, lynx and deer, however, would likely move away and would no longer use this area.

It is useful to examine the students’ perceptions of the animals they played. Ask the students the following questions:

- **Do you feel that humans have a negative impact on wildlife?**

Many people have a minimum impact on the wilderness areas they visit. People who make a lot of noise, leave fires unattended, leave garbage behind, or who damage trees will have a negative impact on wildlife habitat. Other people however, work to protect wilderness areas and animal habitats.

- **Do you feel that carnivores are the bad animals and that herbivores are innocent good animals?**

Animals are neither good nor bad. They are all trying to survive in their environment. It is difficult for humans to avoid assigning human values to animals, but understanding the relationships and dynamic balances that exist in natural communities will help ensure healthy and sustainable ecosystems.

Post-Game Activities

The following activities are meant to complement the *Winter Wildlife Game*. Students can choose an activity that is of interest to them and share it with their class. The first activity is highly recommended, as it provides a valuable follow-up activity:

- ***Background Information for Winter Condition Cards***

These two pages describe in detail how the four winter conditions encountered during the game affect the various animals. Before covering this information, challenge each student to prepare an explanation of their scores: i.e., why does a ruffed grouse lose two food cards during a spell of very cold weather.

- ***Snow Animals (Create-A-Critter)***

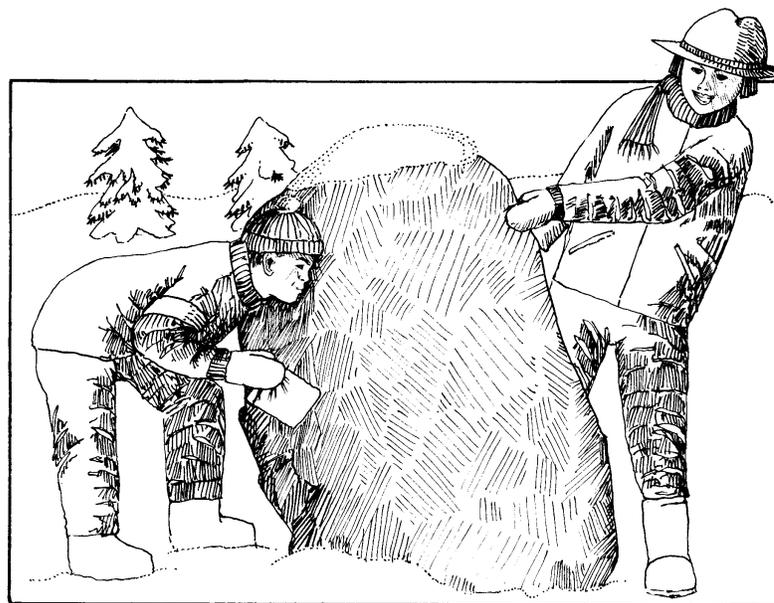
Students work in small groups to create an imaginary animal that they think would be able to best survive winter's harsh conditions.

Use pens, pencils, paper drawings, styrene, construction paper, coloured clay and other art materials as available. Explain to students that the creatures that live in a winter world have interesting adaptations, or ways of fitting in, to help them survive. In groups of five, they

are to design an imaginary snow animal that is adapted to live in a winter environment. Students must think about what the animal will eat, how it will move and where it will live. If you wish, have students write a report about their animal.

After giving the groups time to prepare, have each group present their animal and give an explanation of how it functions and why they chose to build it as they did.

- Draw a winter scene illustrating a situation between a predator and a prey.
- Write or produce an illustrated story about a day in the life of one of the animals in the *Winter Wildlife Game*.
- How well do you know the main players? Investigate the life history, habits and problems faced by one of the seven players (hare, vole, grouse, deer, coyote, lynx, or owl).



References & Resources

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An Invitation to Our Readers: As with all our new educational publications, this is now to embark upon the true test of its worth and be used. Unlike written forms of the past this is a *living document*. It can and will most likely be changed as educators comment on the contents and approach. In this spirit of positive change I would like to invite you to give me a call or drop a line if you have any activities or skills you would like to share with other educators on winter ecology. Your submissions will be sincerely considered and appropriately included in the next revision of these materials.

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Appendix

Animal Description Cards

Glue this information to one side of the card

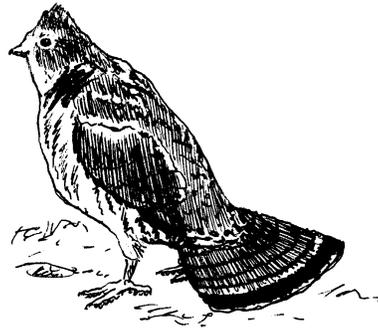
Glue this picture to the other side of the card



RUFFED GROUSE

In winter you...

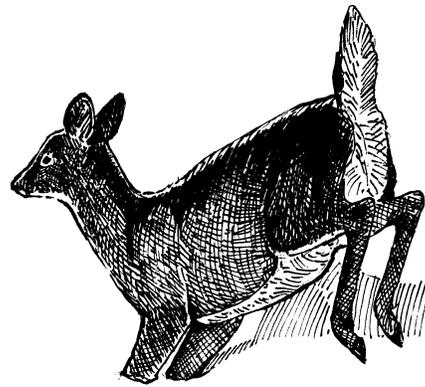
- Eat buds and seeds
- Have thick, downy feathers to keep you warm
- Use your *scaly* toes (like snowshoes) to travel over deep snowdrifts
- Cover yourself with snow to stay warm and hide from your enemies



MULE DEER

In winter you...

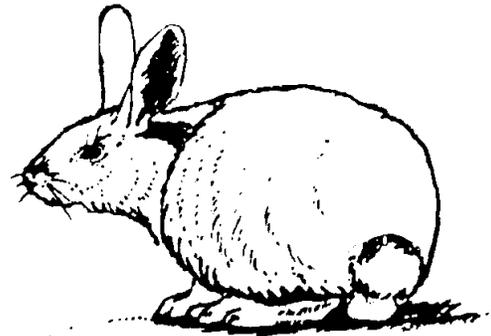
- Eat bark, twigs and grasses
- Keep warm by growing an extra thick coat of hollow hairs
- Have trouble moving through deep snow because your legs are long and thin
- Reduce energy loss by following old trails and banding together with other deer in *yards*



SNOWSHOE HARE

In winter you...

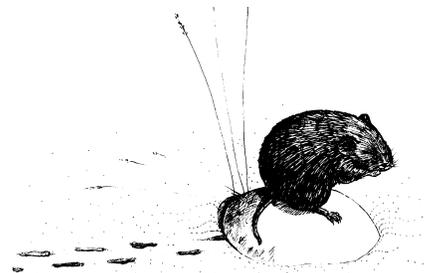
- Stand on top of deep snow to eat twigs and buds
- Burrow into the snow to keep warm during the cold weather
- Have a thick, white coat which blends in with the snow and hides you from your enemies
- Use your large, furry hind feet to move easily on top of the snow



VOLE

In winter you...

- Keep warm by traveling through tunnels you have built under the snow
- Protect your food by hiding it in these tunnels
- Must be careful if any layer seals the air holes to your tunnel, or if the snow melts
- Must beware of hungry coyotes



Animal Description Cards

Glue this information to one side of the card

Glue this picture to the other side of the card



LYNX

In winter you...

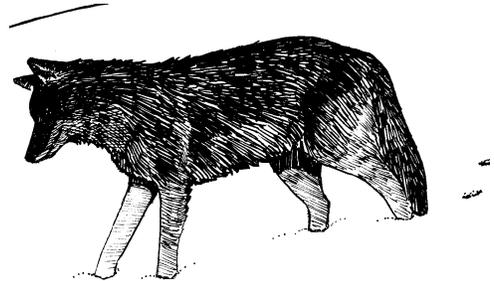
- Have a thick, warm coat which keeps you warm
- Use your snowshoe-like feet to walk on top of the snow
- Ambush your prey or stalk it slowly and silently
- Hunt for your favourite food, the snowshoe hare



COYOTE

In winter you...

- Eat almost anything, from rotten meat to berries
- Eat your favourite food; voles and mice, which are often hidden by the snow
- Are a clever hunter and wait to trap these animals by their air holes
- Keep warm with your thick fur coat
- Have trouble moving through deep snow but can easily walk on top of crusty snow



GREAT HORNED OWL

In winter you...

- Use your sharp eyesight and hearing to hunt your favourite food, the snowshoe hare
- Sit in tree branches until you hear or see something. Then using your fringed feathers, you silently fly in for the attack
- Use your strong claws and sharp bill for meat-eating



Winter Condition Cards

Cut the cards so that each animal has #1, #2, #3 and #4 mounted on separate cards.



<p>#1 RUFFED GROUSE -2 ○ Very Cold Temperatures</p>	<p>#3 RUFFED GROUSE +1 ○ Chinook (complete melting of snow)</p>
<p>#2 RUFFED GROUSE -2 ○ Thaw followed by freeze (thick ice cover)</p>	<p>#4 RUFFED GROUSE +2 ○ Deep Snowfall</p>
<p>#1 MULE DEER -2 ○ Very Cold Temperatures</p>	<p>#3 MULE DEER +2 ○ Chinook (complete melting of snow)</p>
<p>#2 MULE DEER -2 ○ Thaw followed by freeze (thick ice cover)</p>	<p>#4 MULE DEER -2 ○ Deep Snowfall</p>
<p>#1 SNOWSHOE HARE -2 ○ Very Cold Temperatures</p>	<p>#3 SNOWSHOE HARE -2 ○ Chinook (complete melting of snow)</p>
<p>#2 SNOWSHOE HARE -1 ○ Thaw followed by freeze (thick ice cover)</p>	<p>#4 SNOWSHOE HARE +2 ○ Deep Snowfall</p>





#1 LYNX Very Cold Temperatures -2 ○	#3 LYNX Chinook (complete melting of snow) +1 ○
#2 LYNX Thaw followed by freeze (thick ice cover) 0 ○	#4 LYNX Deep Snowfall +1 ○
#1 COYOTE Very Cold Temperatures -2 ○	#3 COYOTE Chinook (complete melting of snow) +2 ○
#2 COYOTE Thaw followed by freeze (thick ice cover) +1 ○	#4 COYOTE Deep Snowfall -2 ○
#1 GREAT HORNED OWL Very Cold Temperatures -2 ○	#3 GREAT HORNED OWL Chinook (complete melting of snow) +2 ○
#2 GREAT HORNED OWL Thaw followed by freeze (thick ice cover) +1 ○	#4 GREAT HORNED OWL Deep Snowfall 0 ○
#1 VOLE Very Cold Temperatures 0 ○	#3 VOLE Chinook (complete melting of snow) -2 ○
#2 VOLE Thaw followed by freeze (thick ice cover) -1 ○	#4 VOLE Deep Snowfall +2 ○



Background Information for Winter Condition Cards

CARD #1 VERY COLD TEMPERATURES

RUFFED GROUSE Score: -2
You need more food to keep your body temperature up.

MULE DEER Score: -2
Although the snow has not formed a crust in these cold temperatures, you still need to find a lot of food to maintain your body temperature.

SNOWSHOE HARE Score: -2
Your snowshoe-like hind feet allow you to move easily on top of the snow; however, you have to find more food than usual because of the intense cold.

VOLE Score: 0
The snow cover acts like an insulating blanket and protects you from the intense cold on the surface.

LYNX Score: -2
During cold spells you cannot rest as much during the day, because your energy stores are used up faster. This is a hard time for you.

COYOTE Score: -2
During cold spells you cannot rest as much during the day, because your energy stores are used up faster. This is a hard time for you.

GREAT-HORNED OWL Score: -2
During cold spells you cannot rest as much during the day, because your energy stores are used up faster. This is a hard time for you.

CARD #2 THAW FOLLOWED BY FREEZE (THICK ICE COVER).

RUFFED GROUSE Score: -2
Ice cover is too thick to plough into the snow at night. Other grouse have broken their necks trying. Now you must roost in a tree huddled together for warmth. You will lose precious energy in trying to keep warm and you are also vulnerable to predators.

MULE DEER Score: -2
This is a rough time for you: the icy covering is not quite thick enough to hold your weight. Your legs and feet are becoming badly scratched from the jagged ice. It is very difficult to move around, further limiting your diet to what you can browse. Grasses are mostly buried under the ice/snow cover. By now you are exhausted and are easy prey for predators.

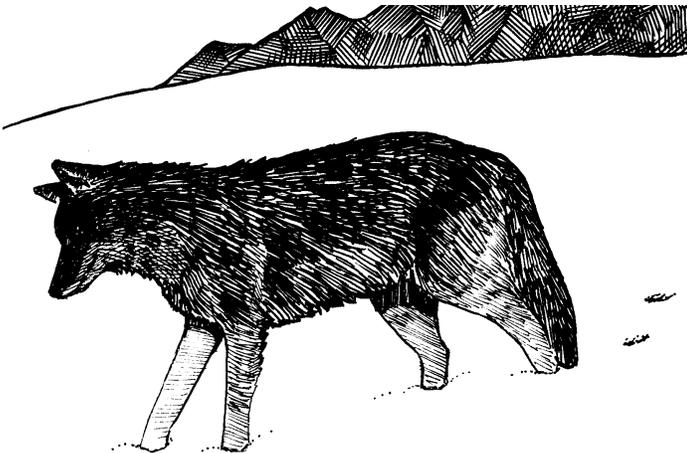
SNOWSHOE HARE Score: -1
Lower snow levels give you less access to fresh food and force you to more open areas, exposing you to danger. More predators, besides lynx can now travel on top of the snow and chase you.

VOLE Score: -1
Thick ice cover means that less oxygen gets into the snow tunnels. To avoid carbon dioxide buildup, you must dig to the surface and make air holes. Often predators will discover these holes and lie in wait for you.

LYNX Score: 0
The slippery ice makes travel awkward; otherwise, you are not greatly affected.

COYOTE Score: +1
Although mice and voles are still under the snow, you know that they must now make air vents to allow oxygen into their tunnels. Being very clever, you lie in wait for them to appear at the surface, then nab them! Your light weight allows you to travel above the snow now, which means that you can prey on many different kinds of animals, including deer in their weakened state.

GREAT-HORNED OWL Score: +1
You can easily find the breathing holes made by mice and voles who must come to the surface for fresh air and patiently wait from a nearby branch. Hare and grouse find this kind of snow condition awkward, making them easier prey.



CARD #3 CHINOOK (COMPLETE MELTING OF SNOW).

RUFFED GROUSE Score: +1
You're not greatly affected, providing there isn't a sudden drop in temperature. Your earthy colours offer some protection from hungry predators. Foraging for food is fairly easy since it isn't covered by snow.

MULE DEER Score: +2
With all the snow gone, you are free to move to new feeding areas.

SNOWSHOE HARE Score: -2
No snow means more exposure. Now your white coat is a disadvantage as it can be easily seen by predators against the brown underbrush. The best areas have been eaten over and you must search for food in open places.

VOLE Score: -2
Snow gives you protection from both enemies and the cold; now you have neither.

LYNX Score: +1
You're well built to travel quietly on snow or bare ground. The white coat of the snowshoe hare makes it easy to see against the brown underbrush. Your diet becomes more varied due to the exposed populations of mice and voles which previously hid underneath the snow.

COYOTE Score: +2
With the snow gone you can move about freely, a variety of food is available, especially exposed populations of mice and voles. As well, you will eat just about anything that you come across, including vegetation and rotting meat.

GREAT-HORNED OWL Score: +2
Your prey can now be more easily seen and heard, especially large numbers of mice and voles which can no longer hide underneath the snow.



CARD #4 DEEP SNOWFALL

RUFFED GROUSE Score: +2
You can travel on top of the snow cover because of your scalelike feet which act as snowshoes. At night you dive into a snowbank for insulation from the cold and protection from your enemies.

MULE DEER Score: -2
Deep snow greatly restricts your travel, forcing you to yard or gather together in well-trampled areas so that not too much energy is lost. Your food supply is limited to what you can find within these yards and you are vulnerable to hungry predators such as coyotes.

SNOWSHOE HARE Score: +2
Your snowshoe-like hind feet allow you to move easily on top of the snow. Your white fur coat blends in with the snow and makes you more difficult to see. You can burrow into the snow at night or during cold snaps for protection. The high snow lets you reach twigs and buds that you weren't able to reach before.

VOLE Score: +2
The snow cover gives you great protection. You spend most of your time travelling about in the under-snow tunnels you and others of your kind have built. Food is stored here and the snow acts as a good insulator.

LYNX Score: +1
Your furred, snowshoe-like paws allow you to move easily on top of the fresh snow cover. Your main source of food is the snowshoe hare which also travels above the snow and will give you quite a run for your money! You solve this problem by making surprise ambush attacks.

COYOTE Score: -2
The soft, deep snow makes it very difficult for you with your thin legs to get around. You are forced to follow game trails and just hope you are lucky in finding an abandoned kill or an injured animal. Your favourite food, mice and voles, are well protected under the snow cover. Old carcasses are also buried under snow.

GREAT-HORNED OWL Score: 0
The thick snow cover offers good protection to your prey. Mice and voles mostly travel under the snow at this time. Snowshoe hare, your favourite food, is difficult to see against the snow with its white coat. You rely on your keen sight for hunting. Most of your hunting is during the night when many of the forest animals have taken shelter, but your hearing makes you an exceptional hunter.

WINTER WILDLIFE GAME RULES

The Winter Wildlife Game will be played in four rounds, each of which is signalled by a single whistle blast. **One whistle blast** means students stop and read the first Winter Condition Card (#1). The main Game Warden will shout "Winter Condition #1!", and all the students, when they hear this, have to shout "Winter Condition #1!". **Another single whistle blast** means to resume the game. During these pauses, players will make additions or subtractions of Food Cards from the kits as dictated by their Winter Condition Card.

The game will end with a series of repeated whistle blasts, indicating that everyone must return to the starting point.

PREY (HERBIVORES)

- Enter the playing area first
- Start the game with three green Food Cards
- To survive the winter, must gather one Food Card from each of the ten food stations
- Avoid the predators, as herbivores may be tagged at any time
- Food stations are *not* safe areas. Predators may tag herbivores as Food Cards are being removed from the food stations.

PREDATORS (CARNIVORES)

- Enter the playing area 2-3 minutes after the herbivores
- Start the game with one Food Card
- Chase and tag the herbivores, who must then give one Food Card to the predator
- Cannot catch the same animal twice consecutively; another herbivore must be caught in between.

GAME WARDENS

- The warden's role should be assumed by an adult. The Game wardens patrol the boundaries of the game, ensuring that students stay in the game area. If a player runs out of Food Cards during the game, the animal *dies* and joins the Game Warden as a junior referee. Duties will include *policing* the action by watching to see that only one Food Card is removed from each food station, to make sure predators do not attack the same herbivore two times consecutively, and to help with the calculations involved in adding and subtracting Food Cards. The Game Warden also offers protection against all predators during the game. Players may ask the Game Warden questions during a rest break of up to 30 seconds and remain safe during that time: the Game Warden can also reward animals with food cards if a good question is asked.

HUMAN

- The human is introduced during the fourth round. The arrival of the human will be announced when the teacher calls out, "Here comes the human!" The human enters the play approximately 5 minutes before the end of the game, wearing a hat. The human is able to claim or give Food Cards simply by pointing at any animal and calling their name; the human does not have to tag.

Staying Warm

- Dress in layers. Several layers of loose clothing are better than one thick one, especially if you are exercising outdoors. By wearing layers of clothes, you can regulate your body temperature so that you don't perspire too much. The best combination of layers has three components:
 - A breathable layer next to the skin which allows body moisture to escape: e.g., wool or polypropylene.
 - An insulating layer which holds air near the body: e.g., down, wool, or pile.
 - A protective outer layer which shelters the body from water and wind and protects the inner layers of clothing from abrasion and wetness.
- Boots are much better than running shoes. Wool socks are better than cotton.
- Two pairs of socks are better than one. Avoid cotton socks—wool or polypropylene socks make a good, warm second layer. Boots should not be too tight or they may cut off circulation and cause cold feet.
- Mitts are warmer than gloves. Two pairs are warmer than one pair.
- We lose a disproportionate amount of heat from our head—prevent heat loss by wearing a wool hat.
- Prevent frostbite by heeding warning signs such as white patches on the face and ears. Do not rub or apply snow to frost-nipped areas. Warm white areas gently.
- Keep moving! A steady hiking pace will keep most people warm in winter. If you remain in one spot, try jumping jacks or running on the spot. Allow for a quick warm-up; *helicopter* your arms to warm up cold hands and fingers.

