Safety in Numbers

Grades: 1-12
Subjects: science, physical education
Skills: analysis, communication, cooperation, team work, discussion
Duration: 60 minutes
Vocabulary: predator, prey, survival strategies, limiting factors, herbivore, carnivore

Objectives:

Students will be able to: 1) understand predator-prey relationships.
2) explain how wolves cooperate while hunting White-tailed Deer.
3) explain why deer yards are important to White-tailed Deer survival.

Methods:

Students role-play wolves and deer in a high energy game.

Background:

In Algonquin Provincial Park, Eastern Wolves prey on three different animals, beaver, Moose and deer. Because of their relatively small size, 25-35 kilograms, Algonquin Park wolves are not capable of killing healthy, adult Moose. As a result they specialize in preying on the smaller White-tailed Deer.

White-tailed Deer are common summer inhabitants of Algonquin Park. During this time they are scattered over small individual summer ranges. By late fall White-tailed Deer in Algonquin start to migrate long distances to traditional yarding areas outside of the Park's boundaries. These winter yarding areas, with large stands of conifers, offer good cover and low snow depths. One of these traditional deer yards is located in the Round Lake area, 13 kilometres outside the southeast
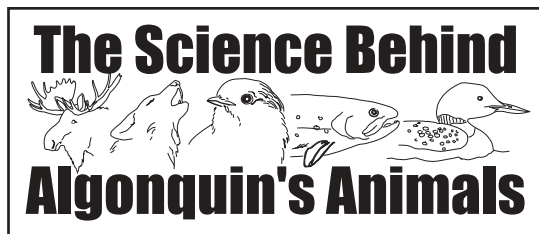
boundary of the Park. This deer yard is approximately 80 km², and supports between 1500-2000 deer during the winter.

Because deer are relatively small animals (males stand no more than one metre at the shoulder), and do not have long legs as do Moose, snow depths more than 30 centimetres make travel difficult. Because Algonquin Park can receive up to a metre of snow each winter, it is not surprising that deer migrate out of the Park to winter yarding areas where the snow depth is less substantial. While reduced snow depth may be one advantage to congregating in these large sheltered areas, the real value may lie in the added protection it affords against wolves. The protection to deer in winter yarding areas results from two factors. Firstly, you have many deer in one wolf territory, instead of many deer spread over many territories. This lessens the exposure to wolves from a large area to a small area. Secondly, there is safety in numbers. By yarding up, deer find other deer to hide behind, and thus have a better chance of not being singled out and attacked by wolves.

Each winter some deer do stay in the Park, but these few individuals do not survive long. Algonquin's wolves are very efficient at killing the few deer that do remain in the Park for the winter.

During the winter many of Algonquin's wolves also leave the boundaries of the Park. This is directly related to the migration of White-tailed Deer. Wolves will stay on their territory until the availability of deer declines. So, by late December, wolves undertake extraterritorial movements and enter deer yards outside of Algonquin. Thus, the movement of wolves in Algonquin Park is associated with the seasonal availability of their main prey, White-tailed Deer.

Throughout most of the year wolves are territorial, and the population density is approximately 2 wolves/100 km². Wolves that spend the winter outside of the Park have no defined territories, either directly in, or surrounding the deer yard, and population densities are often as high as 58 wolves/100 km².

Materials:

| ✓	Items Required	Quantity
	flagging tape	one roll
	record cards	one per student
	pencils	one per student
	cloth ties	two per student
	10 sets of different food tokens (coloured popsicle sticks work well)	ten of each colour
	containers to hold the food tokens	ten

Procedures:

1) Before starting, select an outside area with varying terrain if possible. Set up 10 food stations throughout the area, marking each with surveyors tape and placing one set of tokens, and a hole punch, at each station.
2) Define the playing area to students. Stress the boundaries. You may wish to penalize students that roam (intentionally or not) outside of the boundaries.
3) Explain that students will be role-playing wolves and deer in winter. Choose at least ¾ of the class to be White-tailed Deer. You can do this by numbering the students 1-4 and having numbers 1-3 be deer. Make three of them solitary deer, representing animals that are sick, old, or have remained in Algonquin Park for the winter. Distribute two ties per deer to be tucked into back pockets or waistbands. The remaining students will be wolves. Distribute a food record card and pencil to each wolf.
4) To survive, deer must collect eight different coloured food tokens and avoid being killed by wolves. Three of the deer will be solitary animals who can only escape by running. The rest will be in a herd, and can escape by either running, or by stopping and holding hands (minimum of four deer).
5) Wolves kill a deer by taking both its ties. A lone wolf may only take one tie from a particular deer, and then it must be helped by another wolf in capturing the second tie in order to kill that deer. (Both ties do not have to be taken at the same time).
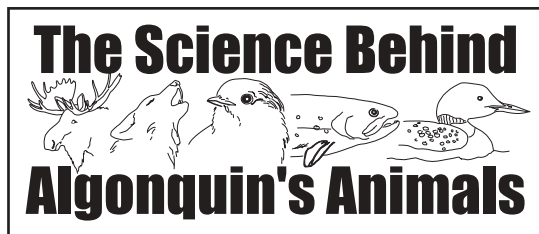
6) Once a deer's second tie is taken it dies and must sit on the ground. The wolf then howls to attract others to the kill. The dead deer signs the food records of the first three wolves at the kill scene, including those that committed the kill. To survive, a wolf must eat once in each half of the game. It may rest after eating.

7) Play the game for two 15 minute halves. A deer that dies in the first half becomes a wolf for the second half. Any wolves that have not eaten in the first half become deer in the second half.

8) In the classroom, discuss, and evaluate survival and hunting strategies. Discuss ways in which the game accurately showed the predator-prey relationship between wolves and deer during the winter in Algonquin Park, as well as ways it did not reflect this complex relationship or the wilderness conditions.

Variations:

1) Vary the rules of the game by adjusting conditions, such as time limit, the number of wolves, the number of wolves that can eat a deer i.e. have their food record card signed when a kill is made, or the number of food stations deer must visit to survive winter. These adjustments will help keep the action high, and will give both deer and wolves reasonable chances of survival.

2) Simulate changes in the deers' habitat such as drought, flooding, or freezing, by putting fewer food tokens at some stations than there are deer.

3) Have three wolves necessary to kill a deer.

Extension:

Research and report on the relationship between deer and wolves.

Evaluation:

Ask students to:
1) Name some strategies wolves use to get their prey.
2) List ways deer defend themselves from wolves
3) Name three things that could affect the success of a wolf attack on a deer, e.g. lots of stragglers, sick deer, many solitary animals.

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