wápupxn
LYNX

LESSON PLANS AND TEACHER RESOURCE GUIDE
BC CURRICULUM CONNECTIONS TO
SYILX OKANAGAN PEOPLES' WAYS OF KNOWING, DOING, AND BEING

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AS EDUCATORS WE RESPECTFULLY ACKNOWLEDGE THAT WE TEACH, LEARN, AND PLAY ON THE TRADITIONAL, UNCEDED TERRITORY OF THE SYILX OKANAGAN PEOPLES.

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GRADE 2 | MATHEMATICS
INTERPRETING AND GRAPHING A LYNX DIET

BC CURRICULUM CONNECTIONS

Big Idea: Concrete items can be represented, compared, and interpreted pictorially in graphs.

Curricular Competencies:

Reasoning and analyzing

- Estimate reasonably

Communicating and representing

- Communicate mathematical thinking in many ways
- Represent mathematical ideas in concrete, pictorial, and symbolic forms

Connecting and reflecting

- Connect mathematical concepts to each other and to other areas and personal interests (i.e., the environment)
- Incorporate First Peoples' worldviews and perspectives to make connections to mathematical concepts.

Students will be able to…

- Represent data pictorially and symbolically through tallying and graphing
- Make connections between mathematical concepts, Syilx perspectives, and the environment.
- Develop a better understanding of comparative language in the context of predator and prey relationships.

Content:

- Pictorial representation of concrete graphs, using one-to-one correspondence
- Likelihood of familiar life events using comparative language (i.e., *based on the data, would a lynx be more likely to eat a snowshoe hare, or a red squirrel?*

SYILX CULTURAL CONSIDERATIONS

Like other species, *wápupxn* (lynx) play an important role maintaining balance within our biodiverse environment. Although they are rarely sighted, there are an estimated 454 lynxes in the Okanagan. About 80% of the Okanagan region is classified as high-quality lynx habitat; however, this is highly dependent on the food resources available. From the Syilx perspective, the well-being and existence of lynx are deeply connected to the well-being of the land and all living things. Snowshoe hares make up more than 80% of a lynx's diet; consequently, when hare populations decline, lynx populations quickly follow. When hare densities are low, lynx will prey on other species such as red squirrels, grouse, voles, ungulates (sheep/caribou), and other carnivores (red fox, marten, mink, and even other lynx). It is our responsibility to protect the *tmuxlawx* (land), so that all *tmix*^{w} (all living things) may prosper.

LESSON

PART ONE: PROVIDING BACKGROUND INFORMATION ABOUT LYNX DIETS

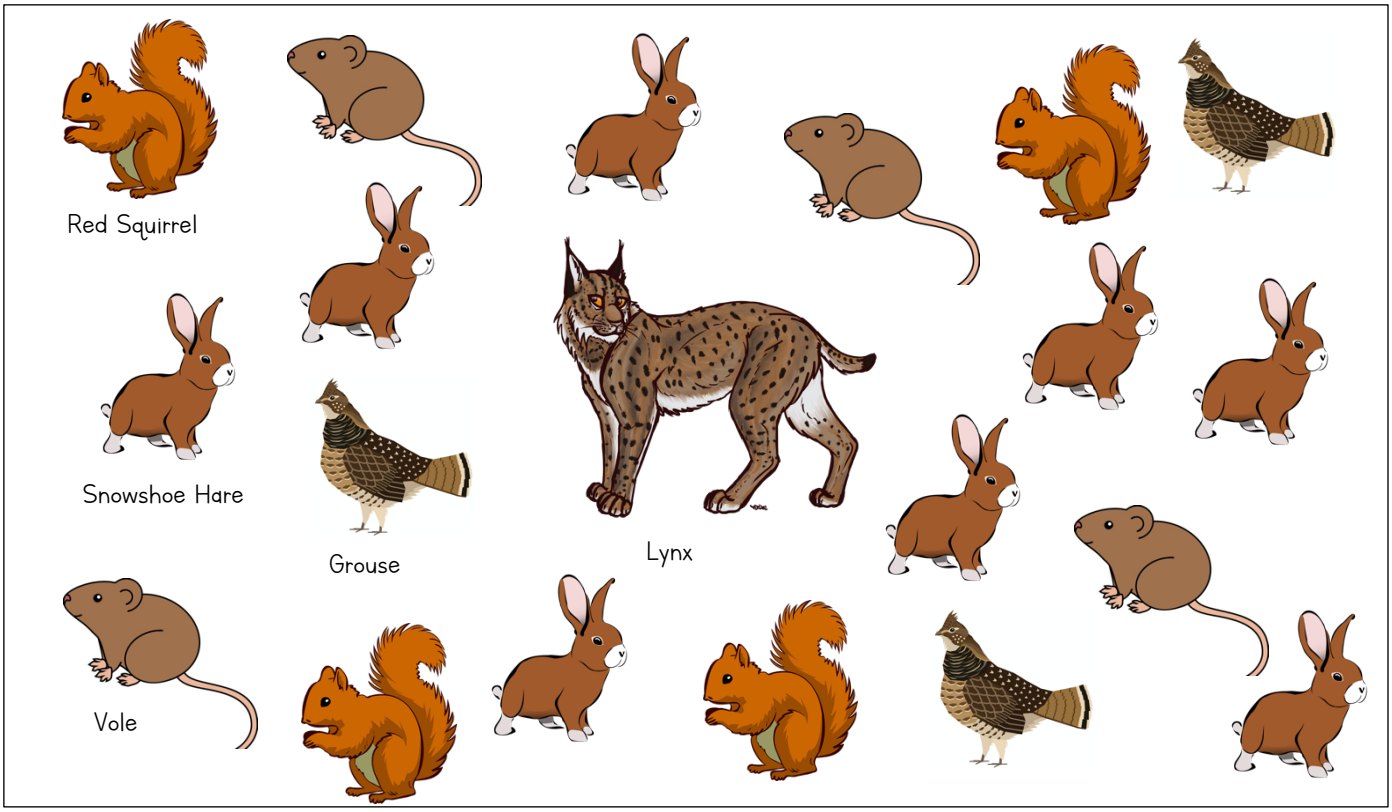
1. Introduce your students to the predator prey relationship between lynx and snowshoe hare. Remember to emphasize the significant influence snowshoe hare populations have on lynx populations.
2. Explain to your students that lynxes are an extremely adaptable species, and will move to other regions where snowshoe hare populations are stable, or will accommodate by eating other species (such as voles, red squirrels, and grouse).

PART TWO: COUNT, REPRESENT, AND COMPARE

1. Have students fill out the chart and bar graph (see attached) by counting and tallying the number of prey animals in the box.
2. While filling out the bar graph, students will create a pictorial representation of a lynx's predator/prey relationships.
3. Students will estimate the reasonably and likelihood of a lynx's diet, while developing a better understanding of comparative language (the least/the most).

Count and Graph

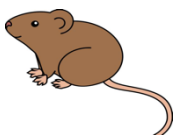
Understanding the Diet of a Lynx in British Columbia



Count, tally, and write *how many* of each animal there is in the box.

	Tally	Total
 Lynx		
 Snowshoe Hare		
 Red Squirrel		
 Grouse		
 Vole		

Color the graph to match *how many* animals you recorded.

Which animal does lynx hunt *the most* ?

Which animal does lynx hunt *the least* ?

Which animal is lynx *more likely* to hunt? (Circle one)

 or 

Which animal is lynx *less likely* to hunt? (Circle one)

 or 

What do you think would happen if the number of snowshoe hare was changed to zero (no snowshoe hare available for the lynx to hunt)?

GRADE 3 | SCIENCE
PREDATOR AND PREY INTERACTIVE ROLE PLAY

BC CURRICULUM CONNECTIONS

Big Idea: Living things are diverse, can be grouped, and interact in their ecosystems

Curricular Competencies:

Planning and conducting

- Make observations about living and non-living things in the local environment
- Collect simple data.

Processing and analyzing data and information

- Experience and interpret the local environment
- Identify First Peoples perspectives and knowledge as sources of information

Evaluating

- Make simple inferences based on their results and prior knowledge
- Identify some simple environmental implications

Communicating

- Express and reflect on personal and shared experiences of place (reflection)

Students will be able to…

- Develop an understanding of how living things interact in the local environment through an interactive role play.
- Record behaviors, characteristics, and factors observed throughout the predator-prey relationship role play activity.
- Consider and infer possible scenarios and outcomes based on the data they collect
- Critically think about the complexity of relationships among living and non-living things in our ecosystem, while considering how humans influence these networks.
- Consider local First Peoples' perspectives on the interconnections between living and non-living things

Content:

- Biodiversity in the local environment (Lynx and Snowshoe hare interactions)
- The knowledge of local First Peoples of ecosystems (the interconnections between living and non-living things)

SYILX CULTURAL CONSIDERATIONS

From the Syilx perspective, the *tmix*^{w} (all living things) and non-living things that co-exist within the natural world are deeply connected. There are webs of interconnected relationships that are shaped by people, plants, animals, the land, the air, and the water. This web of interconnections provides the context in which individuals, families, and communities strive to maintain balance and harmony with the natural world.

LESSON

PART ONE: WHAT ARE PREDATOR AND PREY RELATIONSHIPS?

Predator-prey relationship: an interaction between two organisms of unlike species, in which one acts as the predator that captures and feeds on the other organism that serves as the prey.

In the natural world, predation is a form of population control; therefore, when a number of predators is in decline, the number of prey should rise and vice versa.

Predator: organisms that survive by preying on other organisms for food.

Many predators stalk, capture, hunt, and eventually kill their prey. Examples include: a lion preying on a gazelle, a grizzly bear fishing for salmon, and whales consuming millions of microscopic planktons.

Prey: the organisms being hunted and eaten by predators.

Examples: the gazelle being hunted by the lion, the salmon caught by the grizzly bear, and the plankton being consumed by the whale.

PART TWO: FACTORS INFLUENCING PREDATOR AND PREY RELATIONSHIPS

Human development: Human communities, presence, and development alter the quality and availability of species' food resources and habitats.
Climate change: global warming and climate change alter the quality and availabity of species' food resources and habitats.

Natural selection: the process through which organisms better adapted to their environment tend to survive and produce more offspring.
Adaptation: Physical or behavioral traits or changes that make an organism better suited to its environment.
Camouflage: a method of predator avoidance, defense mechanism, or tactic that organisms use to disguise their appearance, usually to blend in with their surroundings in the environment.

PART THREE: THE INTERCONNECTEDNESS OF LYNX AND SNOWSHOE HARE

Although lynx are highly adaptable and wide ranging carnivores, their lifecycles are highly dependent and connected to the snowshoe hare. In fact, about 80% or more of a Lynx's diet consists of snowshoe hare. However, when hare densities are low, lynx will prey on other species such as red squirrels, grouse, voles, ungulates (sheep/caribou) and other carnivores (red fox, marten, mink, and even other lynx). Lynxes prefer to survive off of their own fresh kills, but will eat carrion if there is limited food resources available. Approximately two years following a decline in snowshoe hare population, lynx populations will enter a period of distress. Consequently, without adequate nutrition provided by the snowshoe hare, lynx will experience poor physical conditions, increased home range distances, decreased productivity, smaller reproduction rates, decline in offspring survival, cannibalism, and starvation. The interconnected relationship that exists between lynx and snowshoe hare is demonstrative of the complex roles and networks that exist within our ecosystems, while simultaneously serving as a reminder of our responsibility to its biodiversity.

PART FOUR: INTERACTIVE ROLE PLAY ACTIVITY

1. Setting the stage for the role play activity: After providing context on predator-prey relationships and the interconnectedness between lynx and snowshoe hare, ask the students to consider the following:
    - What type of relationship do you think lynx and snowshoe hare have?
    - What other living things does lynx have relationships with? What other living things does hare have relationships with? Do these relationships intercept?
2. Introduce the roleplay activity by explaining to the students that we are going to take on the perspectives/roles of lynx and snowshoe hare. The activity will develop our understanding of their behavior, characteristics, and survival within the context of their habitat, as well as develop a deeper understanding of predator-prey relationships.
3. Discuss some ways or strategies that a snowshoe hare may use to avoid being eaten (i.e., camouflage, being fast, hiding in underbrush, eat their food in a safe location, etc.)
4. Establish game rules and safety expectations.

Setting Up the Space

- Set up the game area or the "habitat" in your school yard or gymnasium, or in an area that is free of obstructions with cones (approximately 30ft by 40ft).
- The habitat needs to be divided into two equal sections or habitat zones (i.e., the prey habitat and the predator habitat.)
- On the predator habitat side, place 4 to 5 hula-hoops as "safety zones" for the prey, which mimic the protection of camouflage.
- Throughout the predator habitat, place 30-40 "food resources" (dodgeballs, pinnies, or other small cones) to represent food that the prey will want to collect as they navigate outside of their own habitat.
- Randomly assign 75% of your students as prey, and 25% as predators (i.e., 15 students as prey and 5 students as predators). Distinguish their roles with different colored jerseys or name tags.
- Before starting the game, acknowledge the territory you are on (i.e. Syilx Okanagan territory) and discuss the significance of having the opportunity to gather, learn, and play together in this place.

Playing the Game

Round 1 (5 minutes)

- Have predators and prey start off in their own habitats (on their side).
- Start the round.
- Some prey will be caught by predators as soon as they cross over into their habitat, others will collect food resources (note: prey may only bring ONE food resource back to their habitat at a time), and some students may seek refuge in the "safety zone" hula-hoops.
- Both predator and prey need to collect at least 2 food resources (i.e., prey need to collect the physical food resources and bring them back to their habitat; predators need to tag 2 prey and stand with them outside the habitat zones until the round is complete).
- Before moving onto the next round, ask students what made some predator/prey successful? (i.e., using camouflage (safety zones), being fast (natural selection), being sneaky (strategy).

Round 2 (5 minutes)

- This round will be played exactly the same as the first, but only students who survived the first round will be able to play. Predator and prey that did not survive the first round will be asked to stand on the sidelines, and will now observe and record behaviors on their observation sheets (see attached).
- All food resources are returned to the predator habitat.

- At the end of the round, the observers on the sidelines will share their recordings out loud for all students to record on their own sheets.
- Ask the students:
    - What made some predator/prey successful?
    - How were the predators impacted now that there is less prey? (i.e., have to work harder and compete for food)
    - How were the remaining prey impacted now that there is less prey in the habitat? (i.e., easier to find food since there is more available)

Round 3 (5 minutes) - Final Round

- Before starting the round, reduce the food resources available to the prey (perhaps a forest fire destroyed a significant amount of the vegetation in the habitat, or the area has been overgrazed or developed).
- For the final round, allow all students to return to the game.
- Feel free to select new predators or keep roles the same.
- After the round, ask the students:
    - How did the limited food resources impact prey's survival?
    - How can human's negatively impact habitats? What are the consequences of these actions?

PART FIVE: OBSERVATION SHEET AND REFLECTION

1. Once students are out of the game (starting in the first round), they will begin observing behaviors, characteristics, and factors of predator/prey relationships within the context of the roleplay activity.
2. Since they were just a part of the process, students now have an opportunity to take the "outsider" perspective and to think critically about the complexity of these relationships.
3. Since not all students will get out in the first rounds, the students that started observing and recording in round 1 can help others fill in their sheets as they join the sidelines (this demonstrates a collective experience of place, community, and shared learning).
4. When concluding the final round, review students' responses and observations as a class. This will provide an opportunity for students to fill in the blank sections on the sheet, as well as allow students to share and gain new insights as a community of learners.

Name: _____

Observation Sheet

Round 1

How many prey did not survive?	How many predators did not survive?	What are some strategies or characteristics that helped prey survive?	What are some strategies or characteristics that helped predators catch food?	What are some factors that made it a challenge to collect food and catch prey?

Round 2

How many prey did not survive?	How many predators did not survive?	What are some strategies or characteristics that helped prey survive?	What are some strategies or characteristics that helped predators catch food?	What are some factors that made it a challenge to collect food and catch prey?

Round 3

How many prey did not survive?	How many predators did not survive?	What are some strategies or characteristics that helped prey survive?	What are some strategies or characteristics that helped predators catch food?	What are some factors that made it a challenge to collect food and catch prey?

Reflection

The Syilx Okanagan people have deep connection and relationship to place, plants, and animals. They have this strong relationship, because they respect all living and non-living things. Hundreds of years ago, Indigenous peoples lived on the land with tmix^{w} (all living things) and developed a clear understanding of animals' ways of living, being, and thinking.

During the role play activity, you "lived" the perspective of lynx and/or snowshoe hare. What is something you learned?

_____

_____

_____

_____

_____

As humans, our actions can negatively and positively impact animals' habitats. What is something you can do as an individual or with your community to positively impact lynx and/or snowshoe hare habitats?

Write or draw what you learned about the interconnected relationship between lynx and snowshoe hare