1. Format of Modules
	1. Background (1-2 paragraphs, and images if you want!)
		1. Title (Topic(s) of module)

**Title:** Animals and the places they live

**Topic:** LIFE SCIENCE: NEEDS OF LIVING THINGS

* + 1. Learning Goals & PLOs  [**Objective]**

**Prescribed learning outcomes:**

* Classify living and non-living things
* Describe the basic needs of local plants and animals
* Classify familiar animals according to similarities and differences in appearance, behaviour, and life cycles
* Describe some changes that affect animals (e.g., hibernation)
* Describe how animals are important in the lives of Aboriginal peoples in BC
	+ 1. Why is this module interesting? [**Bridge**]

Animals play important roles in ecosystems. For example, some forest trees rely on animals for eating fruit and dispersing seeds. Without these animals, trees suffer reduced population growth rates, which can lead to changes in the community structure and diversity of forest trees. However, animals also play important roles in human lives when humans rely on animals as a source of protein or for cultural value. It is therefore important that children understand the general premise of sustainable resource extraction: we should only harvest animals (and plants) to a level at which they still function in the roles that they play in their ecosystems. For example, if Aboriginal peoples in BC harvest a seed dispersing animal, they should leave a high enough number of those animals in the forest to ensure that they still disperse seeds efficiently.

* + 1. References
			1. Include a few readings for further interest (such as secondary sources

**Children:**

VanCleave, J. (1996) *Janice VanCleave’s Ecology for Every Kid: Easy Activities that*

*make Learning Science Fun.* Wiley, New York, USA.

**Advanced:**

Brodie, J.F., Helmy, O.E., Brockelman, W.Y., & Maron, J.L. (2009). Bushmeat poaching

reduces the seed dispersal and population growth rate of a mammal-dispersed tree. *Ecological Application*, 19, 854–863.

Levey, D.J., Silva, W.R., & Galetti, M. (2000). *Seed Dispersal and Frugivory: Ecology,*

*Evolution and Conservation*. CABI Publishing, Oxon, UK.

* 1. Materials (List)
		1. List of materials:
			1. Be specific and include quantity per person

We will be constructing an ecosystem with animal communities. A prescribed learning outcome is to describe the needs of local plants and animals, so this ecosystem will likely be a temperate forest in BC. I will make some living and non-living things (e.g., trees, plants, dirt, rocks, insects, fish, and mammals) and tape them to the board during the introduction. I will ask the students to make additional living and non-living things and have them tape them into the ecosystem into appropriate areas.

This activity will use construction paper and white paper. I will use construction paper and have the living and non-living things prepared before the module. The students will use white paper and pencil crayons, markers, etc to make living and non-living things on the day of the module.

**Materials:**

* Construction paper
* White paper
* Glue
* Tape
	1. Procedure (note if any items are optional)
		1. **Pre-Assessment**
			1. Include how you are going to assess the knowledge of your audience. It may be a simple question or an entire activity.

**Introduction:**

I will begin by introducing myself and telling the class about my research. My research is directly applicable to the topic, so I will make sure to address each issue during this introduction. I will ask general questions during this introduction after each point I make to assess the knowledge of the students. After asking questions I will put one construction paper living or non-living thing on the board. The goal of this is to create an ecosystem (similar to what we will do for the activity) with each question.

* I study mammals in tropical forests. *Does everyone know what a mammal is? What about a tropical forest?* ***Tape monkey to board; tape tropical tree with fruit on board***
* Now, I study these animals because they are very important in the tropical forest. They eat fruit ***remove money and fruit; put fruit to monkey’s mouth*** and move seeds to new places in the forest ***take seed from behind fruit, put seed in dirt pile taped to board.***
* Does anybody know what a seed is? (trees have seeds to grow new trees)
* That’s right, so monkeys help trees grow new seeds
* Now, does anyone know what a seed needs to grow into a tree? ***Tape water drop and sun to board; tape new smaller tree where seed was***
* Right, so a tree and a seed and a monkey are all living things. But are water and sunlight living things? (this is to distinguish between living and non-living things). Is dirt a living thing? ***Tape up words “living things” and “non-living things” in different colours (living = green; non-living = purple). Make point to say that I am taping a green dot by the living things and a purple dot by the non-living things.***
* Okay, so we see that monkeys, or all animals, do important things for other living things where they live. But, sometimes people come into the forest and hunt animals for food or trophies. ***Tape hunter on board; remove monkey.***
* Now, removing that monkey has a negative impact on the tree because it no longer eats the fruit and moves the seed so no new tree grows. ***Remove small tree; remove seed and put it back into fruit; tape fruit back onto original tree***
* So why is this bad? Removing all the animals means that no new plants will grow
* But in some places of the world people remove animals from forests to eat them. So what we want to do is only remove as many animals as we need to eat, and leave enough in the forest so that the animals continue to eat fruits, move seeds, and new trees grow.
	+ 1. **Participatory Learning**
			1. Detailed information on the activities
			2. You could include *italicized* notes with additional guidelines for teacher use only

**Activity:**

As a group we will construct an ecosystem similar to the one I constructed in the Introduction. We will focus on a temperate forest ecosystem in BC.

* Okay, so now let’s talk about a forest where we live. Every forest has trees ***tape a tree spruce tree to board***; this is a spruce tree. Forests also have rivers ***tape river to board; tape dirt to board to distinguish between land and water***
* There are also animals in the forest ***this is a deer, where does the bear live? On land or in the water? Tape bear to land.*** What kinds of animals live in rivers? ***That’s right, fish; tape salmon to board***
* Stop and ask for a volunteer to come to board and tape a green and purple dot beside living and non-living things
* Now divide the class in two and have each student draw either a living thing in the forest or a non-living thing. ***Students will then come to board and tape their drawing in the right place***
* I will ask students if each thing is living or non-living and tape appropriate coloured dot beside each
* Now ask students if they remember what animals do in forest. ***Show how deer may pick up seeds on its coat and move to a new location and tape up a new tree***
* Now illustrate how bears need food to live, and they eat fish from river. ***Move a bear (student’s drawing, or have one prepared) to river and remove fish from river***
* At this point discuss implications of removing animals from forest.
	+ What happens if we remove the deer that moved the seeds? (human hunters) ***Tape hunter from before into ecosystem and remove deer and tree as students answer question***
	+ What about if we remove the fish? (bears no longer have food) ***tape in fisherman; remove fish; remove bear***
* Now ask if everyone understands why it is important for us to make sure we leave enough animals in the forest?
	+ 1. **Post-Test**
			1. Include how you are going to assess the impact/outcome of your model. Again it might be a question or full activity.

After we complete the module, each student will be asked to take a piece of paper and draw their favourite living and non-living thing. I will ask them to draw something that the living thing needs to live (e.g., if they drew a bear, they could draw a fish or berries). I will then ask them to draw where the animal lives.

* + 1. **Summary**
			1. Include the relevancy & applications of the topics. Why should the students care (think conservation, future jobs, agricultural, land-use etc.)

It is important for children to understand the difference between living and non-living things in their local ecosystem, as well as in ecosystems from different regions (e.g., temperate vs. arid vs. tropical). Understanding the ecology and function of different plants and animals, both within the ecosystems they live and for human use, may increase their appreciation for the natural world and underscore the importance of sustainable natural resource extraction.

* 1. Make it your own
		1. Include 1 way to advance the module
			1. For example: “This module could be advanced by including topics of genetics for high school students”
			2. “Students can do basic statistics instead of only examining graphs”

Basic ideas addressed here can be advanced for students in higher grades. For example, once the ecosystem is created, terms such as population and community could be defined and the students could be asked to identify each within the ecosystem. Additionally, arid, tropical, and marine ecosystems could be created on the board. For high school students, the negative impacts on trees from removal of seed dispersing animals could be explained using examples from scientific literature (e.g., graphs to highlight important consequences).

* + 1. Include 1 way to adjust module for younger groups
			1. “Students can draw hypotheses instead of writing them”
			2. “The topic of inheritance can be excluded or simplified”

To adjust this module to meet the needs of JK or SK students, the interactions between living things (e.g., seed dispersal) and the human dimensions can be removed. The basic idea will then be to explain where animals live and some important things those animals do.