**GRADE K-2 ORGANISMS SUMMARY**

**Grade K-2 Learning Standards (From BCEd Curriculum)**

Kindergarten

* basic needs
* include habitat — food, water, shelter, and space of plants and animals
* adaptations
* may include structural features or behaviours that allow organisms to survive
* of local plants

-features may include roots, stems, leaves, flowers, seeds

* and of animals

-features may include shape, size, feet, teeth, body covering, eyes, ears

* local First Peoples uses
* First Peoples practice and knowledge of plant and animal use (e.g., local berries or food, plants and animals, conservation of resources) of plants and animals

Grade 1

* classification
* Is it living or non-living? Is it a plant, animal or something else?
* differences between conventional scientific and indigenous ways of classifying of living and non-living things
* names
* e.g., common, indigenous and scientific of local plants and animals
* structural features of living things in the local environment
* How do stems, roots, leaves, skeleton or no skeleton or exoskeleton, lots of legs, few legs, eyes, etc. help us understand organisms?
* behavioural adaptations of animals in the local environment
* dormancy, hibernation, nesting, migration, catching food, camouflage (stick bugs), mimicry (fly that looks like bee), territorialism (squirrels fighting), etc.

Grade 2

* Life cycles of different organisms:
* metamorphic life cycles: body structure changes (e.g., caterpillar to butterfly, mealworm transformation, tadpoles to frog)
* non-metamorphic life cycles: organism keeps same body structure through life but size changes (e.g., humans)
* similarities and differences between offspring and parent
* a kitten looks like cat and a puppy looks like dog but they do change as they grow; salmon change a great deal as they grow and need fresh and salt water environments to survive
* First Peoples use of their knowledge of life cycles:
* stewardship: sustainably gathering plants and hunting/fishing in response to seasons and animal migration patterns (e.g., clam gardens, seasonal rounds, etc.)
* sustainable fish hatchery programs run by local First Peoples

**WHAT DO K-2’s need to know about living things?**

Discuss the differences between living things and non-living things. Features of living things:

1. Nutrition. Living things take in materials from their surroundings that they use for growth or to provide energy. Animals have to eat, whereas plants use light from the sun to make their own food.

2. Respiration. Living things exchange gases with the environment—all living things need oxygen and release CO2, plants also use CO2 and release oxygen in the process of photosynthesis.

3. Movement. Living things can move, although sometimes they are attached to one place (this may happen in different phases of the life cycle), all living things can move through growth.

4. Excretion. Living things produce wastes.

5. Growth and development. Living things usually start their life cycle as smaller and less complex, and grow and develop through their life cycle.

6. Reproduction. Living things can copy themselves.

7. Response. Living things will respond to their environment.

(Of course, this is sophisticated language for Gr K-2, but the ideas are important).

Living things have basic needs. This can be simplified for primary students into: a place to live (habitat); food/materials to make food; water; air; shelter. Plants and animals have structures that are adapted for their survival in their environment. That means their features or structures will match their habitat (WHERE they live) and their means of survival (HOW they obtain food/energy). For example, a herbivore will have mouth parts that enable it to chew plants (example ant or beetle or deer); a carnivore will have excellent eyesight for hunting and sharp claws and teeth for obtaining prey (example eagle or dragonfly).

This concept of adaptation also extends to behaviours. Use the seasons to discuss what happens to plants and animals as they grow in the spring, reach maturity in summer/fall, and prepare for winter. Why do birds migrate? What do squirrels do in the fall? Where are the slugs laying their eggs?

The connectedness of all living things and the concept of the tree of life (see image) are key understandings for primary students.

Students will also learn about life cycles. Living organisms are reproduced, in most cases by two biological parents creating a fertilized egg or a seed. The organism will grow and develop into an adult. Sometimes this change is METAMORPHIC (the body plan goes through drastic changes, like a tadpole into a frog or a larvae into a ladybug or a fern from a tiny prothallus to a full grown fern). Sometimes the change is non-metamorphic, like a kitten becoming a cat or a seedling becoming a tree.

Mammals – the stages of life in most; fertilized egg→ infant→ juvenile→ adult Deer are an excellent example of a simple life cycle that is the life cycle of most mammals, including humans. Infant stage baby looks very similar to its parents and is dependent on them for survival. The next stage is that of a youth; becomes more independent; final stage is that of adult.

Birds - egg→ chick→ adult

Amphibian – born alive from their mother or hatched from eggs, spend their childhood under water, breathing with gills and later change to an adult form and breathe at least partly through lungs. Certain species of amphibians, particularly among the salamanders, remain in larval form all their lives.

Insects -egg→ larva→ pupa→ adult

Plants – pollen/egg🡪seeds🡪seedlings🡪adult plant. Some plants (example: beans) are annuals, and complete their entire cycle in one year; some plants (example: Douglas fir) take many years to grow to maturity and reproduce.

**CURRICULAR COMPETENCIES**

Questioning and predicting—can students generate their own questions?

Planning and conducting—can they design and plan an experiment?

Processing and analyzing data and information—can they record data and see patterns?

Evaluating—can they draw conclusions from their data?

Applying and innovating—can they improve their design?

Communicating—can they talk, write and draw about their learning?

**WHY IS IT IMPORTANT?**

Knowing the plants and animals around us connects us to place, gives us an understanding of our own part in the planet, and our responsibility for sustainability and stewardship. Naming organisms (particularly the ability to name them in local First Nations dialect-- hən̓q̓əmin̓əm̓) further connects students to the land.

Understanding life cycles allows students to learn about biology’s two biggest concepts: unity and diversity. The biological processes that drive the structures and behaviours of living things are the same, but variation has produced the amazing diversity of life that we see.

Knowing our local flora and fauna and their life cycles also helps us understand how WE meet our basic needs for food and shelter.

Studying life cycles helps scientist make sure that the environment needed is there for animals at their different stages of development. It helps them control things such as disease transmission which might only occur during a certain stage of the life cycle of an organism, or in the case of farmers, be able to recognize the life stages in their crops to know when to harvest, fertilize or treat their crops.

**KEY VOCABULARY**

**Living—shows the traits of life: made of cells, using energy, produces waste, reproduces, has genetic material, evolves.**

**Non-living—does not show the above traits.**

**Structures—physical features of a plant or animal.**

**Behaviours—how an animal acts.**

**Adaptations—specific features that allow an animal to survive in its habitat.**

**Life cycle—the stages an organism goes through as it grows and develops.**

**Metamorphic—life cycles with different body shapes/types (ex. Frog, caterpillar).**

**Non-metamorphic—life cycles with similar body shapes/types (ex. Cats, humans).**

**Place—located in our local environment.**

**Plants—organisms that can do photosynthesis to produce their own food.**

**Animals—organisms that must eat other organisms in order to get energy.**

**SOME INQUIRY QUESTIONS**

-What things are living and what aren’t?

-What are some living things in my classroom/school yard/neighbourhood?

-How does the variety of plants and animals change over the seasons?

-What does a seed need to grow?

-What does an animal need to survive? (Keep wood bugs or earth worms in class)

-What are some First People’s uses of plants and animals?

-What do plants and animals do differently to survive in each season?

-What are the life cycles of some of the plants and animals (including insects) in our community?

-What kinds of trees and other plants live in our school yard?

-What kinds of birds are attracted to our feeder?

**SUGGESTED PROVOCATIONS/ACTIVITIES/EXPERIMENTS**

As with all the biology, getting outside is one of the best ways to engage with the natural world. Check out the Burnaby Environmental Educators’ Blog for lots of ideas: <http://blogs.sd41.bc.ca/placebasedlearning/>

Science World has a number of ideas for connecting students to plants and animals. You can search their educator resources by topic and grade. Some examples:

<https://www.scienceworld.ca/resources/activities/living-or-non-living>

<https://www.scienceworld.ca/resources/activities/seed-dissection>

<https://www.scienceworld.ca/resources/activities/seed-food-match>

<https://www.scienceworld.ca/resources/activities/salmon-life-cycle-hexaflexagon>

<https://www.scienceworld.ca/resources/activities/feathers-fur-or-fin>

Grow seedlings and keep a journal. This will help students develop their observation skills. Beans of any sort can easily be grown placed between some moistened paper towel and the outside of a plastic cup. Daily observations help reinforce concepts about living vs. non-living, and growth and development. Students can take the seeds home, or you can perform experiments with them (such as: what type of soil works best, or do they grow towards the light?).

Walk outside and pick up a pail of soil. In some pans or trays, using magnifiers, have students explore the number of living things they find. (I suggest waiting until mid-March).

Invite an elder to walk with you and help identify plants and animals that are important to Indigenous peoples.

Track sea turtles and learn about conservation:

<https://conserveturtles.org/stc-programs-educational-initiatives/>

Beaty Museum of Biodiversity

This is an amazing field trip opportunity, and for getting resources. In addition, they have “Beaty Boxes” that allow you to bring some of their exhibits into your classroom: <http://beatymuseum.ubc.ca/>

Science world has many activities and experiments about plants:

<https://www.scienceworld.ca/resources-topic/plants?page=1>

Design a home for animals:

<http://www.sciencecompanion.com/wp-content/uploads/AnimalHomesDesignProjectDigitalSamplerWEB.pdf>

**CROSS-CURRICULAR CONNECTIONS**

Literature: there a numerous books about life cycles that can be used for reading. In addition, there are many wonderful poetry books to connect to the natural world. This book, Perfect Pairs, has suggestions for linking science concepts to fiction and non-fiction books: <https://www.melissa-stewart.com/books/teachers/bk_perfectpairs.html>

Design and ADST: Can you make a seed fly? Activity from Science World: <https://www.scienceworld.ca/resources/activities/can-you-make-bead-fly>

Social Studies and Science: My Seasonal Round: <https://www.openschool.bc.ca/elementary/my_seasonal_round/pdf/SeasonalRound_unit.pdf>

(directed at Gr 4, but may be adapted).

Math: some of the inquiries above lead themselves nicely to collecting and organizing data.

**INDIGENOUS PERSPECTIVES**

The seasonal discussion is an excellent way to bring Indigenous perspectives into your teaching, by exploring the seasonal cycles of our local plants and animals, and how local First Nations used their knowledge of these cycles to sustainably gather food.

As we weave Indigenous perspectives into our teaching, no area of science is more ripe for this than the study of the living world. From the FNESC First Peoples’ Science Guide (see reference at end):

*“What is Indigenous knowledge, and how can it be brought into science classes? … the importance of Interconnectedness, Sense of Place, Language, Place Names, Story and Traditional Ecological Knowledge. Interconnectedness: First Peoples are diverse, and the unique knowledge each group holds is part of their individual worldviews. However, they share a common belief that we are all connected to nature and to each other. This notion that we are all connected with everything in the world is expressed by many First Peoples in the phrase “All my relations.” Inherent in this view of the world is the understanding that everything in the universe has a place there and deserves respect. From this vantage point, people view their relations with others as well as the natural world differently than someone who only sees it through a microscope or telescope.”*

See also the list of common plants and animals to know in Burnaby. We are working to develop a resource that will show images of these common organisms, along with their names in Coast Salish languages.

**RESOURCES**

Nature Guide:

<http://bcnatureguide.ca/how-to-use-this-nature-guide/>

Comox Valley SD website has many resources and ideas: <https://portal.sd71.bc.ca/group/wyhzgr4/Pages/default.aspx>

FNESC First Peoples Science (activities are Gr 5-9, but many good resources here):

<http://www.fnesc.ca/wp/wp-content/uploads/2015/08/PUBLICATION-61496-Science-First-Peoples-2016-Full-F-WEB.pdf>