Sheldon Centre for Outdoor Education

Grade 6: Biodiversity

Description: Students investigate and compare the characteristics of living things via a visit to the Sheldon apiary followed by a stream study. Within a small habitat students gather and record data to examine the diversity and interrelationships within and among species.

Stage 1—Desired Results

Gr6: Science and Technology

Key Overall Expectations:

1. assess human impacts on biodiversity, and identify ways of preserving biodiversity;

2. investigate the characteristics of living things, and classify diverse organisms according to specific characteristics;

3. demonstrate an understanding of biodiversity, its contributions to the stability of natural systems, and its benefits to humans.

Curriculum Big Ideas:

- Biodiversity includes diversity of individuals, species, and ecosystems.***(Overall expectations 2 and 3)***
- Classification of the components within a diverse system is a beginning point for understanding the interrelationships among the components.***(Overall expectations 2 and 3)***
- Because all living things are connected, maintaining diversity is critical to the health of the planet. ***(Overall expectations 1 and 3)***
- Humans make choices that can have an impact on biodiversity. ***(Overall expectation 1)***

What concepts should students learn as a result of this unit?

Understanding(s): *What are the "big ideas"?* *What misunderstandings are predictable?*	**Essential Questions** What provocative questions will foster inquiry, understanding, and transfer of learning?
Interdependence: • all living things are connected, every organism, system, and place depends on others **Long-term effects:** • actions will have effects beyond immediate reactions • Change in any one system can have long term effects on human and natural systems that limit the systems ability to regenerate. • Human behavior can have long-term effects on natural systems that can be irreversible. • The impact of human behavior, choices, and decisions isn't always immediate. • Short term and temporary effects are much easier to measure than long term effects.	1. In what ways does how we live today impact both our lives and other natural systems? 2. In what ways does how we live today impact our lives and other natural systems in the future? 3. How can we make choices to ensure a healthy future? 4. How might our choices both at home and here (positive/negative) have multiple impacts on Sheldon's natural communities? What can we do? How did the Sheldon bees help us understand the stream as healthy parts of the ecosystem? Eco Links -human reliance on pollinators for food -interconnections (trees and stream) -human impact of lesson on stream (justify what we destroy for learning purposes)

Learning Goals: • *Students will know...* *Students will be able to...*	**Success Criteria:** • *Criteria by which to assess and evaluate their understanding*
• evaluate living and nonliving things that affect animals in their environment. • Identify a positive or neg human impact, its short/long term consequence on animal population at Sheldon • Define biodiversity and be able to describe why biodiversity is important to a healthy ecosystem • Describe biological indicators and their roles in assessment of ecosystem/stream health • *Define Unhealthy* ecosystems as a natural system that supports **very little life,** whereas *healthy* supports lots of **different kinds of life.** •	☐ I can define biodiversity and be able to describe why biodiversity is important to my life and other natural systems ☐ I can determine if a stream is healthy or unhealthy based on the type of macroinvertebrates taht that live there. ☐ I can identify threats to animal populations in this area and in my own neighbourhood and propose actions both individually and as a group, people can do to support biodiversity ☐ ☐ **I took action on enhancing biodiversity????? Pull invasives/feed birds/ build brush piles/ plant trees??**

Stage 2: Assessment Plan:

(how will you know what they know? how will you know they got it?)

- *Through what authentic task(s) will students demonstrate the desired understandings or achievement of the learning goals?*
- *How will students reflect upon and self-assess their learning?*

Type of Assessment	Assessment task
Initial assessment for learning: • *Determine students' readiness to learn new knowledge and skills, as well as obtain information about their interests and learning preferences*	•
On-going assessment for learning: • *Both instructor and students monitor students' progress, provide feedback and modify instruction/approaches in order to achieve set goals*	•
Final assessment of learning: • *Summary is used to make judgements about the quality of student learning on the basis of established criteria*	•

Stage 3- Learning Plan

- What key learning events (lessons) will help students learn and understand the big ideas and curriculum goals?

Hook (excite) • *hook all students and hold their interest* **Introduction** • *helps the students know where the unit is going and what is expected?* • *Help the instructor know where the students are coming from (prior knowledge, interests)?*	**Option 1:** **Nature Connections:** What did you/we eat for _____ (breakfast/lunch) today? Use this meal to trace all the ways that the meal came from nature and depended on nature. *Create mini diagrams- where things connect to nature e.g., fruits- trees, sun, soil, air (CO2)-people harvesting it- needed food energy from nature/ pollination? milk- plant energy/cow/milk cereal/breads- wind pollination/ soils/ sun energy -juice- water/fruit/sugars* In what ways are you connected to nature? What does this exercise teach us about how we are connected to nature and how everything in nature is connected?

	(lesson from Connecting with Nature- David Suzuki Foundation- gr 7/8) **Option 2:** **Honey Bee Murder Mystery** *http://www.beekeeping.isgood.ca/resources/honey-bee-murder-mystery-game-with-lesson-plan* A beekeeper named Billy has lost all his bees and that they will each receive a character card. Students take on the role of this character and present their information to the group. As a group- try and discover what happened to the bees. • Today we are going to discover- how important nature is our life and how change in any one system can have long term effects on human and natural systems that limit the systems ability to regenerate. **Option 3: Would you eat Ugly Vegetables** **The role of pesticides in biodiversity** High market standards unfortunately are forcing farmers to apply more and more pesticides to produce cosmetically acceptable fresh produce. These practices raise costs and impair the health of the farmers themselves, consumers, and ultimately, the environment. Start with pictures of both deformed and regular vegetables or fruit (or even real ones) and ask, students to choose one of the pictures. On the back of the picture of the regular vegetable, list all the environmental hazards that are involved with pesticides, and on the back of the deformed fruit or vegetable- list benefits of organic produce. Link back to our choices affect health and biodiversity not only in fruits and veg., but in natural systems at Sheldon. 
•	
Construct and apply knowledge/skill (explore/explain/elaborate) • *provides students with a common base of experiences* • *students actively explore their environment or manipulate materials.* • *verbalize their conceptual understanding or to demonstrate new skills or behaviors.* • *extends students' conceptual understanding and allows them to practice skills and behaviors*	**Bees-** In what ways do we need bees/ pollinators? What's their role in biodiversity- Without bees- what would we lose? What else depends on bees? What do bees depend on? What present threats exist that may have long term consequences How are we part of the problem? **Action:** Become a bee keeper and learn about the life cycle of bees **Water and Macroinvertebrates-** In what ways do we need water? What other natural communities depend on water? Insects: Role in biodiversity- essential part of food chain- turning leaf litter into food, and becoming food for larger invertebrates and vertebrates Also benefit- health indicator of stream- low tolerance to pollution- need high levels of O2

	Action: Survey macroinvertebrates and tally data to determine if stream is healthy or not
Reflection (evaluate experience) • *participants share inspiration* • *learners assess their understanding and abilities* • *teachers evaluate students' understanding of key concepts and skill development.*	Recap what was seen/heard/discovered • How is everything connected? • Describe the importance of biodiversity to your life? • Describe the effects of changes on natural systems such as pollinators or streams and their potential long term effect • What can we do to protect biodiversity?

Stage 4: Post Visit Consolidation/ Extensions

Indicator Species and Water Quality

The Rideau River in eastern Ontario flows from the Rideau Lakes to the Ottawa River. Along the way, shoreline land use varies, reflecting land uses commonly found along the shores of rivers across Canada.

You have been asked to see how these different land uses might be affecting the health of the river, and you have decided to use data provided by the Canadian Museum of Nature to help you answer this question.

http://nature.ca/education/cls/lp/lpiswqsw_e.cfm

Project Wet: Macroinvertebrate Mayhem

Students learn how different water organisms tolerate changes in water quality. Participating in a game of tag, students discover that the presence of certain species, along with diversity, can be an indicator of water quality

http://www.fws.gov/uploadedFiles/Water%20Canaries.pdf

http://www.kidsinthecreek.com/wp-content/uploads/2012/06/macroinvertebrate_mayhem.pdf

Biodiversity Education and Awareness Network: (BEAN)

Educators have a huge role to play in ensuring that the public understands the role of biodiversity in their lives, and their role in maintaining Ontario's biodiversity. Follow the link to a list of lesson, resources and actions you can take to learn about and get involved in protecting and enhancing local biodiversity. http://biodiversityeducation.ca/formal/