



Science Unit: *Biodiversity of Local Habitats*

Lesson 3: *Field Trip to Beaty Biodiversity Museum: What is Biodiversity and Why does it Matter?*

School Year: 2011/2012

Developed for: False Creek Elementary, Vancouver School District

Developed by: Jean Marcus (scientist); Peter Watt and David Proctor (teachers)

Grade level: Presented to grade 6-7; appropriate for grades 4 – 8 with age appropriate modifications

Duration of lesson: 3 hours and 15 minutes (flexible depending on how many activities are included)

NOTE: This lesson was developed in collaboration with Leah Blaney at the Beaty Biodiversity Museum. Museum volunteers also supported some aspects of lesson delivery.

Objectives

1. Learn about biodiversity through exploring the Beaty Biodiversity Museum at the University of British Columbia.
2. Explore biodiversity and learn how to use a field guide by examining local intertidal specimens.
3. Practice how to gather data for a biodiversity study with a Beaty Researcher.
4. Explore three different ecosystems and compare their biodiversity.
5. Learn how humans are impacting biodiversity and why biodiversity is vitally important to the health of ecosystems and human society.

Background Information

The overarching goal of this lesson is to introduce students to the concept of biodiversity (ideally in a local museum of centre focused on biodiversity) and explore why biodiversity is important and should be protected. Biologists often define biodiversity as the "totality of genes, species, and ecosystems of a region". However, the most common interpretation of biodiversity is species diversity. Species diversity is a measure of the variety of species that live in an area, and the most basic measurement is the number of species that co-occur in a particular place. Other aspects of biodiversity include genetic diversity and ecosystem diversity.

The current biodiversity of the planet is the result of billions of years of evolution, and in more recent years, human activity. The total number of species on Earth today is estimated to be around 10 million different species, but could be as low as 2 or as high as 100 million. Human activity has a large negative impact on biodiversity through processes such as habitat loss, over-harvesting, pollution and more recently climate change.

There are many reasons why biodiversity is important, such as:

- 1) Ecosystem services. Ecosystems provide our human society with many vital services, such as clean air, clean water, and the decomposition of organic material. Ecologists believe that biodiversity is essential for ecosystems to perform these functions.



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2) Ecosystem resilience. Biodiversity helps ecosystems cope with, and recover from, pressures and environmental stressors such as natural disasters or human-caused impacts such as pollution and habitat degradation.

3) Economic reasons. Biodiversity provides human society with many economic benefits, including food, medicine, and tourism.

4) Intrinsic value of all species. Many people believe that all species have a right to live on this planet, and are intrinsically valuable. Human society thus has a responsibility to ensure we don't negatively impact other species causing them to become threatened, endangered or extinct.

Although it is important to protect, maintain and restore biodiversity in all areas, conservation biologists tend to focus their efforts on areas where biodiversity is highest, such as tropical rainforests and coral reefs. However, local habitats and ecosystems are also vitally important. British Columbia harbors the highest biodiversity of all Canadian provinces, and many BC organizations, scientists and volunteers are working hard to protect BC's marine and terrestrial biological diversity.

Vocabulary

Biodiversity	Definitions vary. Two common ones are: 1) The variety of life in the world or in a particular habitat or ecosystem, 2) The totality of genes, species and ecosystems of a region.
Habitat	The area or natural environment in which an organism or population normally lives.
Ecosystem	A biological community of organisms and their non-living physical environment, interacting as a system.
Species diversity	A measure of the variety of species that live in an area. The most basic measurement is "species richness" or the number of species that co-occur in a particular place.
Field guide	An illustrated book of plants and animals found in nature. Typically includes detailed descriptions of species so that organisms can be identified in the field.

Materials

NOTE: The Scientist should contact the Beaty Biodiversity Museum at least 2-3 months before the desired visit to plan the field trip and deal with any logistics and payment (please check with the Scientist in Residence Program Managing Director to see if a discount for students' admission is still available.). The museum education coordinator also volunteers her time to work with the Scientist to develop a curriculum that meets the needs of the Scientist in Residence Program unit being taught. In 2012, the Museum also provided all the needed materials, apart from field guides. The list below only includes what the scientist and teachers are responsible for.

- Chaperons (# depends on # of stations)
- Students need to pack a lunch
- Field guides (# depends on # of students)
- Any materials needed by the scientist for the introductory and concluding talk
- Students require pens, pencils

In the Classroom

Introductory Discussion

1. The Scientist leads a discussion on what is biodiversity and why it matters. The Scientist should ask the students what they think biodiversity is, and provide examples. The Scientist can explain a few



SCIENTIST IN RESIDENCE PROGRAM

different definitions of the biodiversity concept and illustrate these ideas with photos. After the initial discussion of what biodiversity is, the Scientist should ask students if they think biodiversity matters. Why or why not? The Scientist should come prepared with examples of why it matters and of key human impacts that are decreasing biodiversity and making our ecosystems more vulnerable. Ideally the Scientist can also provide examples of local success stories – how people are working hard to maintain or restore biodiversity in our local habitats.

2. A museum Interpreter welcomes students to the Beaty Biodiversity Museum. S/he will address questions such as: What research happens inside the museum walls? Why do scientists research biodiversity? Students will gain understanding of a few of the many way that the museum and UBC contribute to biodiversity conservation and understanding. Practical museum logistics will also be discussed.

Station Rotations, Museum Floor

Prior to your visit, ask the museum to organize the students into appropriately sized groups for the number of stations you have planned. Ideally you want a minimum of 30 minutes per station (40 minutes is better). Each group of students needs either a teacher or a parent chaperone. Student groups rotate through the stations.

Station #1

Activity Title: Intertidal Field Guide (Led by the Scientist)

Activity Description: In the lab or the auditorium, pairs of students will examine a local intertidal specimen and complete a species fact sheet that will be added to a class field guide. The Scientist provides a short introduction describing why it is important to learn how to identify species, how to use a field guide, and instructions for the activity. The museum provides the specimens, and the Scientist should work with museum staff prior to the visit to devise a **Student worksheet** (an example sheet is attached). If the museum does not have an adequate number and/or the type of field guide desired by the Scientist, these should be sourced and brought by the Scientist and/or teachers.

Station #2

Activity Title: Be a Beaty Researcher (Led by a museum volunteer)

Activity Description: Students participate in a real UBC research project. For example, in our 2012 visit students worked with a UBC graduate student studying how climate change affects animals (periwinkle snails) living on rocky shorelines. Students record and interpret a small data set, allowing them to see how some biological questions can begin to be answered with a research study.

Station #3

Activity Title: Measuring Biodiversity (Led by a museum volunteer)

Activity Description: Students examine three mock ecosystems (represented by a table of specimens with different numbers, varieties and variability) and present an argument for what is the most diverse ecosystem. Together, the group will discuss how biodiversity is measured.



SCIENTIST IN RESIDENCE PROGRAM

Station #4

Activity Title: Biodiversity Scavenger Hunt (Supervised by school chaperones)

Activity Description: Through a scavenger hunt activity students explore the wide variety of organisms housed by the Beaty Biodiversity Museum, adding content to the word “biodiversity”.

Closure Discussion

The Scientist leads the wrap-up discussion in the museum auditorium. Students reflect on their field trip experience and add to their earlier brainstorming on why biodiversity matters.

- What was the most interesting thing you learned today?
- Has your idea of biodiversity changed?
- What did you learn about local habitats and animals?
- If someone asked you to explain biodiversity, what would you say?
- Why do you think biodiversity matters?

References

1. Sheldon, Ian. 1998. Seashore of British Columbia. Lone Pine Publishing. [good background on the intertidal zone]
2. Sept, Duane J. 1999. The Beachcomber’s Guide to Seahorse Life in the Pacific Northwest. Harbour Publishing.
3. <<http://beatymuseum.ubc.ca/>> Beaty Biodiversity Museum home page.
4. <<http://www.cbc.ca/news/canada/british-columbia/story/2013/02/21/bc-biodiversity-report.html>> B.C. failing Biodiversity, report says. Accessed May 2013.
5. <<http://www.geog.ubc.ca/biodiversity/>> Biodiversity of BC. Accessed May 2013.

Extension of Lesson Plan

1. See the Scientist in Residence Program unit entitled “Biodiversity and Extreme Environments” for additional lesson plans on biodiversity, including a field trip to an intertidal zone to measure biodiversity.
<http://scientistinresidence.ca/science-lesson-plans/biodiversity-and-extreme-environments/>

Common name: _____

Scientific name: _____

Kingdom: _____

Phylum (or major group): _____

Description (including distinguishing traits, from all sides):

Colour(s): _____

How to distinguish from similar species:

Expected habitat:

Expected behaviour in the wild:

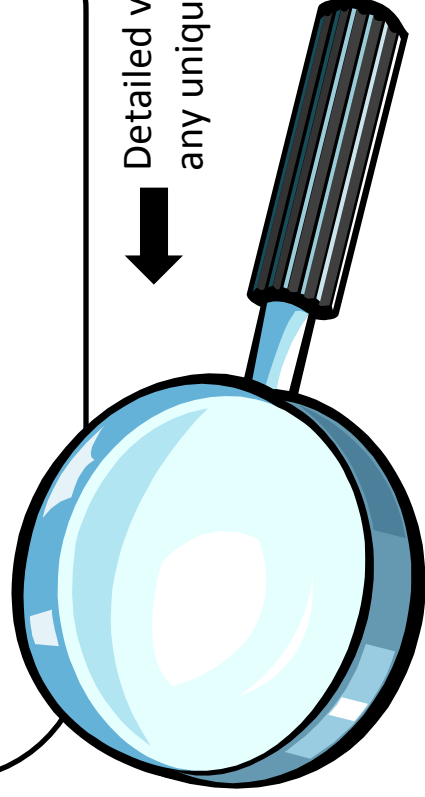
Other observations/notes:

Authors of this page:

Body length of specimen: _____ cm

Mark length on ruler, if possible:

Draw a detailed diagram of your specimen



Detailed view of
any unique part.

