Science Unit: ***Marine Critters and Communities***

Lesson 10: ***Intertidal Field Trip to Jericho Beach***

School Year:	2011/2012
Developed for:	Tecumseh Elementary School, Vancouver School District
Developed by:	Kathy Heise (scientist); Teresa Harris, Stephanie Pearce, and Chuck McNicholl (teachers)
Grade level:	Presented to grade 7; appropriate for grades 4 – 7 with age appropriate modifications
Duration of lesson:	All day field trip (follow up Extension Lesson on comparing Jericho Beach with Stanley Park to be done during a science class at school)
Notes:	This lesson is similar to Lesson 4, Intertidal Field Trip, in the Biodiversity and Extreme Environments science unit, Scientist in Residence Program. http://scientistinresidence.ca/science-lesson-plans/biodiversity-and-extreme-environments/ It is also linked with Lesson 11 Intertidal Field Trip to Stanley Park, in the Marine Critters and Communities science unit, Scientist in Residence Program. http://scientistinresidence.ca/science-lesson-plans/marine-critters-communities/ Data collected from both field trips will be compared as a Lesson Extension Exercise. This lesson uses circular plots of 1 m^2 area. Waterproof paper for the worksheets can be purchased at Western Technical Supply in North Vancouver. Other sources can be found at <www.riteintherain.com>. When it is raining, pencils must be used to write on waterproof paper. Staples is a source of plastic sleeves that can be used to enclose the Spring Beach Walk field guide pages. These sleeves have a flap at the top that keep the pages inside and do not allow rain to enter. The pages of each copy of the field guide can be secured together using paper clips. The location of the survey is near the rehabilitated salmon stream at Spanish Bank Creek. The 1 m^2 study circle-plots are made of ½ inch poly line and the ends are secured with zap straps- supplies that are readily available at most hardware stores.

Objectives

1. Explore a real intertidal zone.
2. Replicate how ecologists collect ecological data in the field.
3. Practice species identification of intertidal organisms.

Background Information

The field trips should be timed to take advantage of the lowest part of the tidal cycles in the spring. On site, students will work in groups of 3-4 students to apply what they learned in lessons 9 and 10 to collect ecological data that will help them to appreciate the differences between two different intertidal areas in the Vancouver area: Jericho Beach and Stanley Park. Ideally there will be at least one adult per two groups. At Tecumseh Elementary School, this trip coincided with a school-wide trip where students were able to release salmon smolts to the rehabilitated Spanish Bank Creek.

Materials

- Study plots (1 per group of 3-4 students)
- Clipboards (2 per group)
- Buckets to put specimens in, to share with the class
- Field Guide: 'Explore the Rocky Shore at Stanley Park' (1 per group)
- Worksheets- Intertidal Data Collection Sheets (2 pages, 1 per group) printed on waterproof paper
- Garbage bags for beach clean-up if necessary
- Field Guide: Spring Beach Walks- Quick Reference Identification Guide
- Magnifying glasses

In the Field

Before the students begin, once again review intertidal etiquette.

- Leave animals where you found them.
- Carefully return rocks to their original position.
- Avoid walking on animals and plants whenever possible.
- Leave the beach cleaner than you found it.
- **Safety Concern: Step carefully and don't run. Barnacles are sharp!**

Each group of 3-4 should have 1-1m^2 study plot rope, one Stanley Park field guide, one Spring Beach Walk field guide, two clipboards, a magnifying glass, copies of the 2 page intertidal data collection sheets (printed one side only), 1 copy per person of the Observational Skills worksheet.

Allow the students to choose their study plot. Suggest that they move low enough down the intertidal to observe as many different creatures as possible, but high enough that their plot won't be covered by a rising tide. Estimate the distance from shore in meters. Ask one student to sketch the study plot while the other students are making species observations.

Closure Discussion

1. Were you surprised at the number of species you saw today?
2. What intertidal predators did you observe?
3. What was the most interesting thing you saw today?
4. Do you think we left the area better or worse than we found it?

Extension of Lesson Plan

1. In class, take up the results of the study plots as a group, using the Excel spreadsheet 'Recording our Results'. These results will later be compared with the results from those obtained from Lesson 11, Intertidal Field trip to Stanley Park, in the Marine Critters and Communities science unit.

References.

1. Sheldon, Ian. 1998. Seashore life of British Columbia. Lone Pine Publishing.
2. Sept, Duane J. 1999. The Beachcomber's Guide to Seashore Life in the Pacific Northwest. Harbour Publishing.
3. <http://naturevancouver.ca/sites/naturevancouver.ca/VNHS%20files/4/Nature_Vancouver_Intertidal_Pamphlet.pdf> Explore the Rocky Shore at Stanley Park. Nature Vancouver. Accessed May 30 2012.
4. Harbo, R. 2011. Whelks to Whales: Coastal Marine Life of the Pacific Northwest. Harbour Publishing.
5. Harbo, R. 1988. Guide to the Western Seashore: Introductory Marinelife Guide to the Pacific Coast. Harbour Publishing.

Intertidal Data Collection Sheet

Students: _____

Location: _____ Date: _____

Survey Start Time: _____ Tides for the day: ___m @_____ ___m @ _____ ___m @____

Weather: _____

Study Plot Location: (Distance to shore) _____

Study Plot Description: Sketch your study plot, including any big rocks, and major clumps of animals and plants below. Please label them neatly.

ANIMALS

Species name	Number of individuals (estimate if necessary)

PLANTS

Seaweed type	% cover (estimate)

NON-LIVING SUBSTRATE

Substrate type (solid rock, cobble, sand, mud, etc.)	% cover (estimate)

Other observations:

_____

_____

_____

_____

Teacher's Worksheet: Species list for field trips to intertidal sites around Vancouver

The following marine animals and marine plants/seaweeds can be found in intertidal locations around Vancouver. A representative from each of the 7 student groups will need to fill in the number of each species that their group found in their study plots. As a group you can then calculate estimates of species richness and total community abundance.

Location: _____

Date _____ Tides- (high or low in metres @ time of day) _____m @ ___: ___ _____m @ ___:___ _____m @ ___:___

MARINE ANIMALS

Student Groups

Group	Scientific Name	Common Name	1	2	3	4	5	6	7	Total	Rank	Found outside the plot
Annelid	*Nexis vexillosa*	Banner Sea-nymph										
Arthropod	*Idotea wosnesenskii*	Rockweed Isopod										
Arthropod	*Hemigrapsus oregonensis*	Green Shore Crab										
Arthropod	*Semibalanus cariosus*	Thatched Acorn Barnacle										
Arthropod	*Amphithoe valida*	Square-tooth Sea Flea										
Arthropod	*Cancer productus*	Red Rock Crab										
Arthropod	*Balanus glandula*	Common Acorn Barnacle										
Arthropod	*Pandalus danae*	Coonstripe Shrimp										
Arthropod	*Oregonia gracialis*	Decorator Crab										
Arthropod	*Cancer magister*	Dungeness Crab										
Arthropod	*Pugettia producta*	Northern Kelp Crab										
Arthropod	*Paguridae spp.*	Hermit Crab										

Group	Scientific Name	Common Name	1	2	3	4	5	6	7	Total	Rank	Found outside the plot
Bird	*Ardea herodias*	Great Blue Heron										
Bird	*Corvus caurinus*	Northwestern Crow										
Bird	*Larus glaucescens*	Glaucous Winged Gull										
Bryzoan	*Membranipora serrilanmella*	Kelp-encrusting Bryzoan										
Echinoderm	*Evasterias troschelii*	Mottled Star										
Echinoderm	*Dermasteris imbricata*	Leather Star										
Echinoderm	*Cucumaria miniata*	Orange or Red Sea Cucumber										
Echinoderm	*Pisaster ochraceus*	Purple Star										
Echinoderm	*Strongylocentrotus droebachiensis*	Green Sea Urchin										
Echinoderm	*Strongylocentrotus purpuratus*	Purple Sea Urchin										
Echinoderm	*Pycnopodia helianthoides*	Sunflower Star										
Echinoderm	*Ophiopholis spp.*	Brittle Star										
Echinoderm	*Psolus chitonoides*	Armoured Sea Cucumber										
Fish	*Anoplurchus purpurescens*	High Cockscomb										
Mollusc	*Mytilus trossulus*	Pacific Blue Mussel										
Mollusc	*Onchidoris bimallata*	Barnacle-eating Nudibranch										
Mollusc	*Protothaca staminea*	Pacific Littleneck Clam										
Mollusc	*Clinocardium nuttallii*	Nuttal's cockle										
Mollusc	*Saxidomus gigantea*	Washington Butter Clam										

Group	Scientific Name	Common Name	1	2	3	4	5	6	7	Total	Rank	Found outside the plot
Mollusc	*Mopalia mucosa*	Mossy Chiton										
Mollusc	*Tresas capax*	Fat Gaper										
Mollusc	*Tectura persona*	Mask Limpet										
Mollusc	*Lottia digitalis*	Ribbed Limpet										
Mollusc	*Littorina scutulata*	Checkered Periwinkle										
Mollusc	*Euspira lewisii*	Lewis Moon Snail										
Mollusc	*Fusitriton oregonensis*	Oregon Triton										
Mollusc	*Cerastomata foliatum*	Leafy Hornmouth										
Mollusc	*Nucella lamellosa*	Frilled Dogwinkle										
Mollusc	*Callistoma ligatum*	Blue Topsail										
Mollusc	*Aeolida papillosa*	Shaggy Mouse Nudibranch										
Mollusc	*Hermissenda crassicornis*	Opalescent Nudibranch										
Mollusc	*Anisdoris nobilis*	Sea Lemon										
Mollusc	*Archidoris odhneri*	Giant White Dorid										
Nemertean (ribbon worms)	*Paranemertes peregrina*	Mud Nemertean										
Polychaete	*Eudistylia vancouveri*	Vancouver feather-duster										
MARINE ANIMALS		**Species Richness**										
		Total Community Abundance										

SEAWEEDS and MARINE PLANTS

Student groups record % cover within the study plot

Group	Scientific Name	Common Name	1	2	3	4	5	6	7	Total % cover ÷7	Rank	Found outside the plot (yes or no)
Seaweed	*Sargassum muticum*	Wireweed										
Seaweed	*Chondracanthus exasperatus*	Turkish Towel										
Seaweed	*Saccharina latissima*	Sugar Wrack Kelp										
Seaweed	*Mazzoella splendens*	Iridescent Seaweed										
Seaweed	*Alaria marginata*	Broad-winged Kelp										
Seaweed	*Nereocystis luetkeana*	Bull Kelp										
Seaweed	*Costaria costata*	Seersucker kelp										
Seaweed	*Fucus gardneri*	Rockweed										
Seaweed	*Mastocarpus papillatus*	Turkish Washcloth										
Seaweed	*Cladophora sp.*	Sea Moss										
Seaweed	*Pterosiphonia bipinnata*	Filamentous Red Seaweed										
Seaweed	*Ulva lactuca*	Sea Lettuce										
Seaweed	*Lithothamnium spp.*	Coraline Algae										
Marine Plant	*Zostera marina*	Eelgrass										
SEAWEEDS AND MARINE PLANTS		**Species Richness**										