CONTRASTING LANDSCAPES
UBCFarm and Agroforestry Trail

The students will have two 1.5 hour sessions:

When we get the farm we will meet with the UBCFarm coordinator and then have a quick orientation. The kids have formed groups of five.

Outline:

10:00 - meet students and give overview of UBCFarm (Anelyze ~15 minutes)

10:15 - 12:00 - split into two groups (2 classes)
Group A goes to forest (with Shona and volunteers)
Group B stays at the farm (with Anelyze and volunteers)
Recess break for 10-15 minutes sometime during the morning.

12:00 - 12:30 Lunch

12:30 - 2:00 Afternoon Activities
Group B goes to forest (with Shona and volunteers)
Group A stays at the farm (with Anelyze and volunteers)

The Two Sessions:

1. UBC FARM – Leader: Jacob

There will be a number of stations and games for the kids (I am not exactly sure how this part will run, but the UBCFarm folk have a great program). Activities will include checking out the chickens, buzzing with the bees, and diving in the dirt. Booklets have blank pages in them just in case they are to take notes or draw. Jacob will give directions.

2. Agroforestry Trail – Leaders: Francesca, Jamie, Dongho, Kirin, Corey, and Shona

This will be a walk in the woods with numerous stops (stations). Each student will have their journal We have covered a number of topics in other lessons: plant reproduction, insect biology, pollination biology, insectivorous plants, ecosystems, and food webs. We will make stops for them to document in their journals.

FOREST WALK:

At the trailhead, as a large group, we will begin by discussing the similarities and differences we see between agricultural land and forest (probably more in depth in the afternoon). Talk about what the forest is and what an ecosystem is.

We will be exploring the traditional lands of the Musqueam (Coast Salish) and look at some of the plants that they would have used for materials and food. Think about what the forest offers.

We will break into four groups of four-five. Each volunteer will lead one group to each station along the trail. Each group will wait in "**the Clearing**" at least 5 minutes before entering the forest (Jamie). Shona will lead the first group. Each group will have a designated place to stop in the woods to stop and write observations (what they see, smell, hear). Remind them that being noisy will scare away the animals.

In the Clearing at the Trailhead:

A. Introduce yourself
- let kids know what you do and what you are interested in
- you are a real, live scientist!

B. Trail Etiquette
- do not go off the trail
- stay with your leader
- what you take in your bring out – no littering (pick up trash if you find any)
- no mangling organisms including plants

C. Discussion Points
There are a number of discussion points to bring up while you wait to go into the trail (those that you miss can be interjected during the walk).
Rose family (roses, *Geum*, blackberry, salmonberry)
- lots of edible fruit…but not all. *Geum* makes little burrs that when mature will stick to clothing.
Alder trees – symbiosis between plant roots and bacteria
- grade 2/3 class know about the importance of nodules for providing nutrients (nitrogen to the plants)
Conifers – hemlock, Douglas fir, and western red cedar (review for students)
Alder with lichen – example of symbiosis (what is a lichen?)

D. What is an ecosystem?
- a forest is an example
- it is made up of organisms that fulfill different roles:
Plants are the foundation as they take energy from the sun and convert it into food that other organisms can eat.
- combination of abiotic and biotic

Discuss:
- Ask students if they know: herbivores, detritivores, carnivores, omnivores
- Define detritus (bodies or fragments of dead organisms)
- What is another important components of an ecosystem?
    Abiotic – nonliving
        water, minerals, temperature, light

At some point in the forest have the students stop and make observations (what they see, hear, and smell) – they should be as quiet as possible.

STATION 1: Berry Station

Stuff at the Station:
Berries – these plants produced fruits, which would be eaten fresh, or dried, sometimes mixed with oolichan grease and stored
- young shoots of these were eaten like a vegetable for thimbleberry and huckleberry

Thimbleberry (*Rubus parviflorus*)
    - Fruit is like a dryish raspberry
Huckleberry (*Vaccinium parviflorum*)
Salmonberry (*Rubus spectabilis*)

– review flowering plant reproduction
- flowers → fruit

Great diversity of flowering plants – have seen it in the variation in fruit types, but can also see it with the diversity of structure.
Compare the leaves (simple, lobed, compound)

Contrast:
- mosses and ferns which reproduce by spores

STATION 2: Bumble Bee Station

STATION 3: Slime mold Sporangia

Stuff at the Station:

White sporangia

- what we are looking at are the reproductive structures….the parts that produce spores. Before this the organism was like a little blob that crept over the substrate (dead log) and ate bacteria and small pieces of detritis

Symbioses in the woods – pick a spot that has a fungus or lichen or alder

- close associations between organisms (usually 2)
- emphasize the importance of understanding interactions

Types of interactions – relationships organisms have with each other:

mutualism – both benefit

- pollination – plants and animals
- mycorrhizae

parasitism – one benefits the other is harmed

- ichneumonid wasps, aphids, spit bugs, some fungi

commensalism – one benefits, while the other is unaffected

Note: You can also use alder as a good example of mutualism (bacteria in roots fix nitrogen that the tree can use, alder provides sugars to the bacteria)

STATION 4: Douglas-fir

Stuff at the Station:

Douglas-fir (*Pseudotsuga menziesii*) – review general conifer structure and reproduction

- needles (are leaves)
- cones have cool mouse bum shaped bracts.

First Peoples Uses:

- Wood used to make spear handles, harpoon barbs, fire tongs, salmon weirs, caskets and halibut and cod hooks
- Pitch was used to seal joints of harpoon heads, gaffs and fishhooks
- Used for caulking in canoes and water vessels
- Pitch used to make a medicinal salve for wounds and skin irritations

Activity – (Douglas-fir)

Which terms apply to the tree?
Bark – yes and very thick and craggy
Scale leaves – no (not like the red cedar)
Broad leaves – no…they are long and narrow
Deciduous – no, doesn't lose leaves, keeps leaves all year round
Evergreen – yes, keeps leaves all year round.
Conifer – yes, cone-ifer
Flowering – no….it makes cones
Needles – yes, long pointy leaves
Fruit – no, remember fruit comes from an ovary which is part of a flower…..conifers do not have flowers and therefore no ovary.
Spores – for our purposes…..no
Tree – yes, it is tall.

Mushrooms

- discuss the importance of bacteria and fungi
– decomposition is a very important process – nature's recycling system
- the mushrooms we see are actually the spore-producing structures
- the most important part of the fungus is growing in the soil (or wood or other substrate)
- fungi are made up of long threads that grow <u>through</u> their food, secreting enzymes and then absorbing the breakdown products – therefore they also release nutrients for other organisms to benefit from .
- other fungi are associated with plant roots – mycorrhizae - mutualism

STATION 5: Nurse Log

Stuff at the Station:

A log with a number of organisms growing on it.
Why is it called a nurse log?
- provides nutrients that help other organisms grow

- discuss role of fungi and bacteria in breaking down wood (tough stuff)
- other organisms are important too:
    moss retains moisture that helps decomp
    pill bugs chew up decaying wood (life log and find a few to show kids)
    roots of trees also break the wood into smaller pieces.

STATION 6: Trees – conifers vs flowering plants

Stuff at the Station:

Diversity:

- Ask students how many different types of plants they see?
(ferns, moss, conifers, flowering plants)

Bigleaf maple is a flowering plant; write down your observations.

Uses by First Peoples:

- Called it paddle tree in many languages
- Wood made paddles
- Spindle whorls
- Dishes
- Big leaves → temporary containers

Licorice Fern (*Polypodium glycyrrhiza*)

- can take hold by virtue of the moss mat on the tree (anchorage and maintains moisture) – we will have a piece ready for you to demonstrate the rhizome.
- an epiphyte, what type of symbiosis? commensalism
- called licorice root because of its licorice taste. It is very very sweet (chemical glycyrrhicin is much sweeter than sugar)
- First People of B.C. used it as a flavour (chewed on rhizomes, used to sweeten bitter medicines) also was an important medicine itself for colds and sore throat

Compare bigleaf maple with Western Hemlock (*Tsuga heterophylla*)

- hemlock is a conifer (no flowers)
- hemlock is similar to the Douglas-fir (needles)
- examine cones (compare with Douglas-fir)

Uses by First Nations Peoples:

- Hemlock bark; make red dye to colour mountain goat wool and basket materials, and as a facial cosmetic and hair remover

- branches to collect herring spawn

STATION 7: Spittle (or spit) Bugs and Fern

Good place to talk about ecosystems if you haven't done so already.

Spit Bugs:
- not true bugs
- the spit or spittle bug produces a foamy froth which it then sits inside protected from predators and also lays eggs here.
- It usually forms the "spit" at a node between the stalk and a branch of a plant.
- There the bug resides and inserts its proboscis in order to suck the plants juices (sap)
- Water from the plant sap is excreted as watery feces, to which they add a thickening secretion and blow air bubbles into. The air bubbles produce a froth that builds up to form a large mass, which eventually begins to condense very slowly.
- The insects are generally not numerous enough to cause any real problems
- Using magnifying lenses students can look in the spittle for the bug, which may be either in adult form (with wings) or without wings (larva)

Ferns:
- Sword fern (evergreen) and bracken fern (deciduous)
- Introduce fern structure – the frond (particularly of the bracken fern) is GIGANTIC!!!!!! The stem is underground.

Bracken Fern – uses by First Peoples:
- Rhizome harvested in summer and fall,→ dried and cooked in pit ovens/ roasted until outer skin and tough, then eaten with fish eggs or oil
- central fibres removed used like thread,

STATION 8: Western Red Cedar

Stuff at the Station:
Big Red Cedar *(Thuja plicata)*
- ask what type of plant this is (conifer)
- general structure: roots, stems, leaves (scales)

- reproductive structures (there will be some seed cones to show them) – ask where pollen comes from (small cones)
- bark – protects the inside of the tree – how is it different from Douglas-fir?

Importance to First Peoples (Review):
- bark had many uses including clothing
- wood – important for canoes, poles, house planks, cooking pot, etc

STATION 9: MEETING IN THE BIG LEAF MAPLES

Meet as big group

Who Lives in the Woods?
- Each of us will take a small group on a "treasure" hunt around the clearing
- They will write down different organisms (or evidence of organisms such as scat, holes, etc) that they find (insects, slugs, etc)

Meet as big group to share observations with the rest of the class.

HEADING BACK DOWN THE TRAIL

STATION 9: STUMP

As large group Shona will present:
History of area
- big old stump with springboard notches

AT CLEARING AT END OF TRAIL

What have we learned today about the forest?

Who Am I?
Break up into groups of two (making up partners from different groups will prevent arguing)
Shona will give directions to entire group
- The partners stand back to back. One partner is given a card with the name of an organism. The student reads it, but does not tell his/her partner. The other student asks questions that can be answered by yes or no to find out if the organism is a herbivore, carnivore, omnivore, or detritivore/decomposer. Once they have done this then they ask questions

to see if they can figure out what the organism is. The student with the card can only answer yes or no, but can give clues by imitating the animal.
- When they are done the other student will get a card and repeat.

Walk by Arboretum (living tree collection)