SWAN LAKE
CHRISTMAS HILL
NATURE SANCTUARY

WETLANDS DISCOVERY PROGRAM (grades 3 to 5)

This one and a half hour program is delivered on site at Swan Lake Christmas Hill Nature Sanctuary.

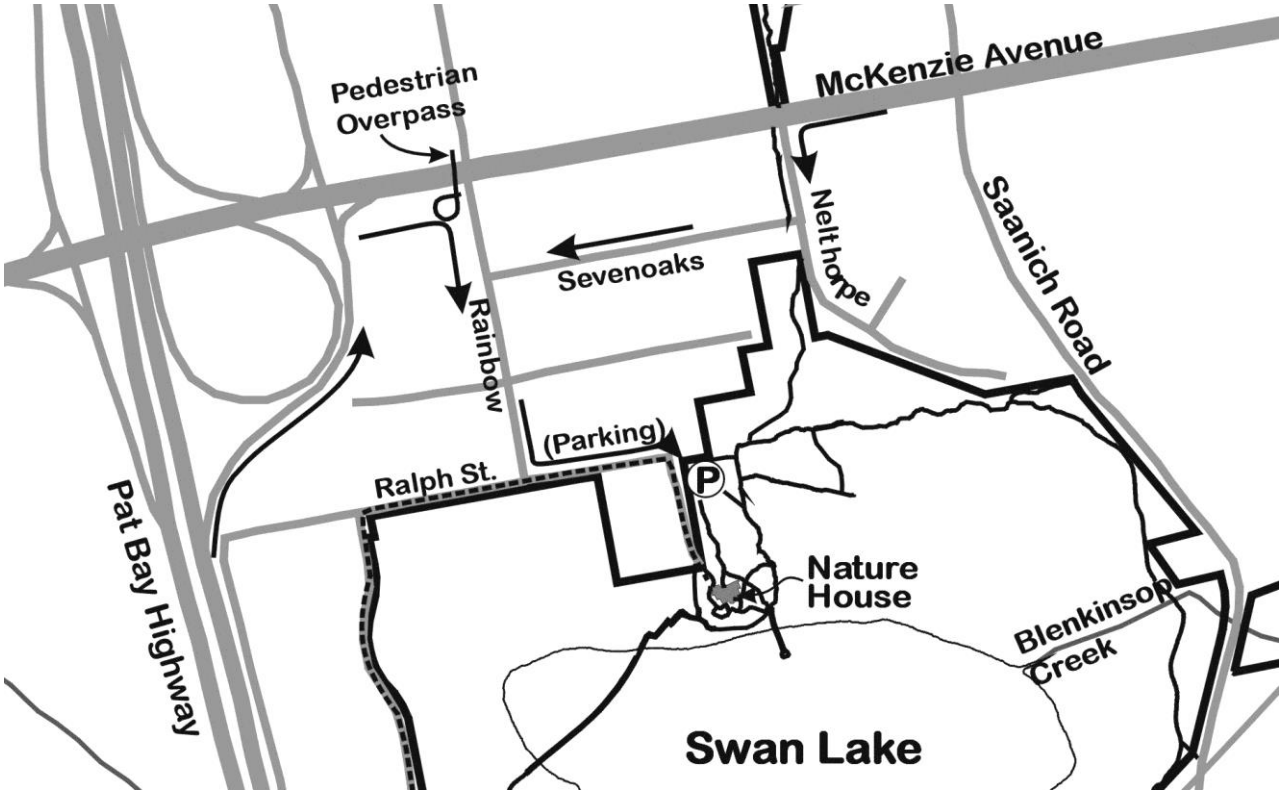
BEFORE YOU ARRIVE

1. Provide each student with an easily read **name tag** for both indoor and outdoors.
2. Please encourage appropriate **clothing** for the weather. Remember that at least half of your program is outside.
3. Divide your class into **two groups** before the program. It is very helpful if you have another adult to go along with one group, so that they can manage any problems that may arise, such as taking a student to the washroom.

The program consists of the following activities

1. Walking on boardwalk through the wetland plants at the lake edge habitat
2. Collecting aquatic organisms from the wharf
3. Observing and drawing of lake plants and animals
4. Discussing adaptations of our Western Painted Turtle and its predators

WE'LL MEET YOU IN FRONT OF THE NATURE HOUSE.



3873 Swan Lake Rd. Victoria, B.C. Canada V8X 3W1 T 250 479-0211 F 250 479-0132 E info@swanlake.bc.ca
www.swanlake.bc.ca

Swan Lake nature programs strive to support Teachers in the classroom:

Big Ideas:
- All living things and their environment are interdependent (gr.4)

Curricular Competencies:
- Demonstrate curiosity about the natural world (gr.3, gr.4)
- Make observations about living and non-living things in the local environment (gr.3)
- Questioning and predicting: How can you observe the concept of interconnectedness within ecosystems in your local area? (gr.5)

Content:
- Biodiversity in the local environment (gr.3)
- The ways organisms in ecosystems sense and respond to their environment (gr.4)
- Features of biomes (gr.4)

Our Goals
Students will be able to:
- Recognize a marsh wetland habitat
- Observe the plant profile at the edge of the lake
- Observe biodiversity
- Record observations showing this biodiversity
- Recognize that marsh plants and animals have adaptations to their habitat

PROGRAM OVERVIEW

Habitat Walk
Students will wander along the boardwalk at the edge of the lake observing plants, animals and signs of animals that live in the marsh. The Plant Profile of the lake edge marsh will be introduced.

Plant Profile of the Lake Edge Marsh Habitat
Plants are the **primary producers** of food, and also supply **shelter** to this rich and varied community. To understand lake ecology, 2 points are very important:

a) Large aquatic plants **modify their habitat** by their presence and provide a variety of microhabitats for aquatic animals.

b) Large aquatic plants are **restricted to certain areas** by competition with other plants and by their own physical limits.

In a profile of the lake from the shore to the deeper water, there are definite groups of plants, forming **zones:**

1. **Shoreline:** The first group of plants at the shore includes **willows and Red Osier Dogwood**. These shrubs are moisture tolerant (they don't mind getting their "feet wet"). **Bittersweet Nightshade** often twines among the branches of willows and is easily recognized by its small purple flowers, and in fall, by its bright red poisonous berries. Unlike us, ducks are able to eat these without getting sick. **Reed grass** also grows here.
2. **Emergent:** The next plants are **Cattails**. It is the main emergent plant, with roots in the dirt under water. The tuberous roots are edible and native people had many uses for this plant. Muskrats eat them and build their lodges with them. **Rushes** and **Marsh grasses** are also in this section.

3. **Floating-leaved, rooted: Yellow Water Lilies** come next. With roots anchored in the bottom, only their flat leaves float on the water surface. They provide a **resting** place for insects, snails, Red-winged Blackbirds and even Mallard ducklings.

4. **Submergent:** The main totally submerged, rooted plants are **coontail** (hornwort) and ***Elodea sp***. Coontail, looking like a raccoon's tail, has whorls of finely divided leaves. Elodea has 3 small leaves at each interval. These plants provide habitat for many small lake creatures. Stickleback fish use a thicket of plants in which to lay eggs and raise young. Snail eggs are often found attached to these plants.

5. **Free-floating: Duckweed, *Azolla sp*. and filamentous algae** are the representative non-rooted floating plants at Swan Lake. Two kinds of duckweed make extensive green mats over the water surface. Filamentous algae growing around coontail, often forms a thick green floating sludge.

Aquatic Creatures of the Lake Edge Marsh Habitat
Students will use **dip nets** to collect small aquatic creatures, mostly invertebrates, and transfer them into a collecting tub. These will be carried up to the nature house. Adaptations of each animal for breathing will be discussed.
These animals possess many **adaptations** to allow them to get the food, air and shelter that they need. It is interesting to observe the many ways they cope with problems of aquatic life, such as moving and breathing underwater, catching food, and seasonal temperature changes. This habitat supports a community where competition is stiff between predators and prey.

Damselfly nymphs have a very streamlined shape; **side swimmer shrimp** are flattened laterally; and **backswimmers** and **water boatmen** have oar-like legs. The 3 trailing gills of **damselfly nymphs** help in their locomotion, while the expulsion of water from the anal cavity of **dragonfly nymphs** propels them forward.

Many small, slower moving creatures, like the **snails, worms** and **water mites**, absorb air through their skin. While the larger or faster moving animals may also breathe through their skin, they need extra oxygen. Various anatomical features have evolved to allow these aquatic animals to obtain sufficient oxygen. **Damselfly nymphs** have 3 external gills trailing behind them and **dragonfly nymphs** have internal gills in their anal cavity. **Backswimmers** and **water boatmen** carry bubbles of air with them when they dive. Short hairs trap an air bubble giving then a silvery appearance on their sides. **Mosquito larvae and pupae**, and **Water Sticks** breathe through "snorkels".

Adaptations help hunters catch food. **Damselfly nymphs** hide in the vegetation and grab small animals by extending their lower jaws. Voracious **Giant water bugs** suck blood from their prey. **Horse leeches** use suckers to hold on. Most hunters are fast moving.

The hunted greatly outnumber the hunters. Prey organisms include millions of **plankton**. Plankton consists of free-floating, microscopic plants and animals. A rapid increase in the number of plankton is called a **plankton bloom**. This can be caused by a change in environmental conditions, such as water temperature, hours of sunshine, or the amount of sediment or dissolved minerals in the water. **Phytoplankton** (plant plankton) are found near the surface where the water is generally warmer and there is sufficient light for photosynthesis. The most common types in Swan Lake are *Volvox* or "Tennis-ball algae"; *Aphanizomenon* which looks grass clippings, and *Oedogonium* which forms large floating masses on the lake in summer. **Zooplankton** (animals) are creatures that move themselves.

Our most common include *Daphnia* (water fleas), various copepods, rotifers and ostracods (seed shrimp).

Other creatures in Swan Lake Edge Habitat include: **orb and pouch snails, roundworms, flatworms, fly larvae, hydra, and fish and fish fry** of Pumpkinseed Sunfish, Stickleback and Sculpin.

Adaptations: Marsh Turtle and its Predators
Inside the nature house the students will receive an introduction to our native **Western Painted Turtle.** We have two other types of turtles in the lake that are not native. **Red-eared and Yellow-eared Sliders** were sold in pet stores, and have been released into local waterways. People should not release non-native organisms into the wild. Being shy, turtles are not usually seen outside by visitors, although on warm days, they can sometimes be found basking at the edge of the lake and on the anchored logs at the west end of the lake. Students are asked to look at some of their **adaptations** and relate these to survival in their habitat.
An adaptation is something a living thing has or does to help it live in its habitat.
(Adaptations can be structural or behavioural.)

Mounts of the **predators** of the turtle: **raccoon, mink, and Great Blue Heron**, will be shown and students encouraged to discuss what adaptations each has to find, catch and eat turtles.

Free Time
Students will hopefully have a few minutes of free time to explore the **Nature House** exhibits. The displays in the Nature House emphasize the animal residents in the Sanctuary and most are hands-on. There are information cards in pockets beside the displays to help. Besides our Western Painted Turtle, our live animals include **Three-spined Stickleback Fish,** non-native **Pumpkinseed Sunfish, Northwestern Garter Snakes** and **Honeybees**. Down the hallway there are a **Western toad**, **Northern alligator lizards, Western garter snake, Treefrogs, Salamanders** and **Rough-skinned newts.**

HABITATS

Before your visit to Swan Lake, it would be helpful to introduce the concept of **habitat** to your students.

The **Habitat** of an animal is the "neighbourhood" where it lives and obtains everything it needs to survive: **food, water, shelter, air and space**. If one of these components is missing, the animal will cease to live there.

Habitat destruction is one of the main reasons for the decline of animal populations and endangerment of species.

In Canada, the loss of **Wetland Habitats** to farming, urban development, draining and clear cutting, and introduced invasive species has resulted in a decrease of many animal species including amphibians, waterfowl and fish.

WETLANDS
Wetlands are essentially wet lands. Water is present at or near the ground surface all or part of the time. This means that only wetland vegetation can survive in a wetland.

All wetlands have three basic characteristics:

- water
- water-saturated soils
- water-tolerant plants

Canada's Wetlands are classified into **five main groups**: bogs, fens, marshes, swamps and shallow water. These are further divided into seventy different wetlands. For more information see ***The Wetlandkeepers Handbook***. (BC Wildlife Federation or www.bcwf.bc.ca/programs/wetlands/wetlandkeepers.html)

In the Students' Journal, page 3 of ***Wetland Ecosystems I*** (Gr 4 to 6) of the ***Ducks Unlimited Canada*** kit, lists four of these wetland ecosystems: **marshes**, **swamps**, **fens** and **bogs**. These ecosystems are further described in the Students' Journal, pages 6 to 8 of the ***Wetland Ecosystems II*** (Gr 7 to 8). The former resource states "Of all the wetland types, the **marsh** is the most productive. Marshes are shallow wetlands less than two meters deep. In different areas of the marsh, different plant communities thrive. In deep water areas, **submergent** and **floating-leaved** plants grow. In the shallower portions of the marsh, **emergent** plants can be found. Marshy areas like this may also develop in the shallow parts of lakes and streams."

Wetland habitats provide animals with the necessities of life: abundant **food** source, adequate **water** supply, **space** to live and to grow, and **shelter** for resting and nurturing young. Without wetlands, we would not have many of our own sources of food and income. The study of interactions of organisms in a wetland habitat leads to an understanding of our own impact on this environment and the role we can take in preserving and restoring wetlands.

FOLLOW-UP ACTIVITIES

1. **Microscope Work:** Investigate water life, soil, plants etc.
Compare the organisms from a different pond to that of Swan Lake. Discuss why there would be differences. Is there a difference in the wetland habitat? Compare in a chart.

2. **Food Chains**: How are the plants and animals of the lake interrelated? Make a mural of pond life to show the network of "who eats whom". Make food chains in pictures.

3. Play the **Webbing Game**. See Joseph Cornell's book, Sharing Nature With Children.

4. **Pond Life**: Use clay or plasticine to make scale models of pond creatures, and make a **diorama** showing **biodiversity**.

5. **Project Wild**, **Project Wet**, **Wildlife Trees**, **Backyard Biodiversity, WOW The Wonders of Wetlands** (available from **Wild BC**, Ministry of Environment): use activities concerning habitat: The Beautiful Basics; Everybody Needs a Home; Habitat Lapsit; Habitracks; Habitat Rummy; Designing a Habitat; Oh Deer; Puddle Wonders; Adaptation Artistry, or specifically wetlands like Marsh Market.

6. Observe the different habitats near your school. Give them names and find out what kinds of plants and animals live there. Investigate what the animals use for food and shelter and how they are adapted.

7. Read Diane Swanson's Detective series:

The Sixth Street Wetland Detectives, 1996
The Kingfisher Camp River Detectives, 1998
And Forest and Grassland etc. detectives printed by Pacific Edge Publishing Company, Gabriola.

8. Research, discuss, draw, or create real or pretend animals that live in different habitats. This could be a group activity using their imagination. Students could even create "costumes" displaying adaptations of their animals and do a demonstration to the class.

9. Ducks Unlimited Canada ***Wetland Ecosystems I*** activities in their educational kit.

TEACHERS' REFERENCES

NOTE: This is a list of some recommended books. You will probably find many other good ones. **Astersisks** denote books that have suggestions for nature activities.

*Ducks Unlimited Canada. Wetland Ecosystems I and II. www.ducks.ca 1-800-665-DUCK

Donaldson, Chlesea. 2006. Canada's Wetland Animals. Scholastic.

Hare, T. et C. Leplae-Couwez. 1991. Les habitats en voie de disparition. Aladdin Books Ltd., London.

*Hickman, Pamela. 1993. Habitats. Kids Can Press Ltd., Toronto.
*Hickman, Pamela. 1993. Wetlands. Kids Can Press Ltd., Toronto.

Howard, Fran. 2006. Wetlands. Buddy Books

*Hunken, Jorie. 1994. Ecology for All Ages. The Clobe Pequot Press.

Kalman, Bobbie. 2006. A Wetland Habitat. Crabtree Publications.
Kalman, Bobbie. 2006. Wetland Food Chains. Crabtree Publications.
Kalman, Bobbie. 2003. What are Wetlands? Crabtree Publications.

Kozloff,E. 1976. Plants and Animals of the Pacific Northwest. University of Washington Press.

*Lingelback, J. 2000. Hands-On Nature. Vermont Inst.of Nat.Science.

Lyons, C.P.and Merrilees, Bill. 1995. Trees, Shrubs and Flowers to Know in B.C. and Washington. Lone Pine Publishing, Vancouver.

Pojar, J.and A.MacKinnon. 1994. Plants of Coastal B.C. B.C. Ministry of Forests.

Reid, G.K. 1967. A Golden Guide to Pond Life. Golden Press,N.Y.

Scholastic Books. 2004. Living Near the Wetland. Children's Press.

Thompson,G.,J.Coldrey, G.Bernard. 1984. The Pond. Wm.Collins and Sons Co., Ltd., London.

Watson, G. 2006. Wetlands. Weigl Publishing.

*Wild BC. Project Wet, Project Wild, Backyard Biodiversity. Western Reg. Environ. Educ. Council.
WOW! The Wonders of Wetlands
Distributed through workshops by B.C. Min. of Environment, Wild BC.

Payment
In invoice will accompany the confirmation letter you received. **Payment** is due at the time of the program, and cheques should be made out to **Swan Lake Nature Sanctuary** and given to the programmer. **VISA or MC** can be phoned in.
Receipts will be sent by e-mail or fax upon request.

Change of Dates and/or Times:
If you wish to change the date or time of your program please contact us at **250.479.0211** or at **programs@swanlake.bc.ca.** We will do our best to accommodate your request, depending on available times and dates.

If you have any questions or comments about your program please don't hesitate to contact us; we always welcome your feedback.

We greatly appreciate students' feedback. If you send us artwork or writing describing their experience at Swan Lake we will display as many as we can around the Nature House.