Science Unit: ***Local Habitats***

Lesson 15: ***Identifying Forest Trees and Plants***

Summary: This lesson builds on a previous lesson (Lesson 14), preparing students for a fieldtrip to Pacific Spirit Park (Lesson 16). Students practice using a **dichotomous key** to **identify tree species**. They then select become an "expert" in identifying one plant species for the upcoming fieldtrip.

School Year: 2013/2014

Developed for: Sir William Osler Elementary School, Vancouver School District

Developed by: Linda Herbert (scientist); Jessica Rosenblatt and Carol Tam (teachers)

Grade level: Presented to grade 2/3/4; appropriate for grades 1 – 7 with age appropriate modifications

Duration of lesson: 1 hour and 20 minutes

Notes: Pictures of plant specimens can be used or live specimens can be collected if the scientist or teachers have access to them in a private yard or garden. Plants should not be collected from parks, not only does it have the potential to cause ecological harm, in most cities there are also bylaws prohibiting this type of activity.

Although not necessary for using the dichotomous key, bark and wood samples of the trees studied will aid in the plant expert activity.

Objectives

Students will be able to:

1. Practice using a dichotomous key.
2. Learn to identify local tree species.
3. Gain experience selecting descriptive features that can be used to identify a plant.

Background Information

This lesson will build on Lesson 5 by providing students with additional knowledge on the organisms that they may encounter or observe on their fieldtrip to Pacific Spirit Park (Lesson 7). Students will practice using a dichotomous key to identify several common needle leaf tree species. For the second part of the lesson students will select one forest plant to study in more detail with the goal of becoming an "expert" in identifying that plant; a skill that they will use on the upcoming fieldtrip.

Vocabulary

Broad leaf tree: A tree that produces broad leaves.

Needle leaf tree: A tree that possesses narrow, modified leaves known as needles and produces seeds in cones. Also known as a conifer tree.

Needle: Narrow, modified leaves.

Evergreen tree: A tree that retains its leaves year round.

Deciduous tree: In the northern hemisphere, a tree that loses its leaves in the fall and regrows new leaves in the spring.

Dichotomous key: A tool biologists use to help them identify living organisms. Similar to a *Choose Your Own Adventure* book, the key uses a series of questions or statements about an organism that the user must choose between. As dichotomous means dividing into two parts, each question/statement has two possible answers. As the user moves through the series of questions/statements they are guided to the organism's identity.

Materials

- Worksheets including dichotomous key
- Magnifying glasses or pocket microscopes.
- Tree specimens or pictures (see list below)
- plastic sheet to cover table for plant expert station
- Plant specimens or pictures (see list below)
- Bucket with de-chlorinated water to store plant specimens as needed

In the Classroom

Introductory Discussion

1. Briefly review previous lesson activities. Today we are going to use the describing skills we practiced last class to identify some local tree species. Each of us is going to become a tree biologist and become an expert in identifying some of the trees we will see on our fieldtrip next week. Each of you will also get an opportunity to select one other forest plant to study in more detail so that you can become a class expert in identifying it for our fieldtrip.
   - Review the concept of a dichotomous key (if this lesson is not done as part of the original unit read Lesson 3 – What Lives in a Pond? for ideas on how to introduce students to a dichotomous key).
   - Introduce the dichotomous key activity and hand out worksheets. Go through an example as a class.
2. Short description of other items to discuss or review.
   - If any students have plant allergies they can use pictures to study the organisms or work with a partner and only the partner will touch the plants. Remind students to be respectful of others who may have allergies and not wave the plants around or stick them in other's faces, etc.
3. Briefly describe science experiment/activity.
   - Students will use a dichotomous key to identify six local tree species.
4. Briefly describe the processes of science that the students will focus on: Students will focus on making observations and using those observations to make conclusions.
5. Briefly describe safety guidelines.
   - Review appropriate behaviour to be respectful of individuals with allergies.
   - Remind students that they should wash their hands before touching their face and prior to going for recess.
   - Suggest that anyone with sensitive skin avoid touching the cedar tree foliage.

Science Activity

Activity Title: What Tree is it?

Purpose of Activity: To gain practice using a dichotomous key to identify six local tree species.

Methods and Instructions:

Set-up prior to experiment: Plant collection – This lesson plan assumes that the scientist/teacher has access to a private yard or garden to collect specimens. If live specimens cannot be collected or purchased, photos of plants can be used. Prior to the lesson the scientist should collect samples of six local tree species that are included in the dichotomous key. Each group should have one set of six specimens. For this lesson the following species were used: western red cedar, shore pine, grand fir, Sitka spruce, western hemlock and Douglas fir.

Brief description of how students will work in groups or pairs: Students will share one set of six tree samples with their group but will complete their worksheets individually.

1. See detailed instructions on worksheet.
2. Go through the dichotomous key as a class and discuss any questions they students may have about each step. Suggested items to review (ask students leading questions to have them suggest the answers):
    a. How to distinguish between flat versus four-sided needles. Look at the profile – four-sided needles are thicker/domed in the middle. Try rolling it between your fingers – flat ones won't roll.
    b. How to distinguish between stalks and stems. Stalks often stay attached to the branch when the needle is removed (spruce is a good example of this). Stalks tend to be branch coloured (brown) while stems are needle coloured (green).
    c. Review what scale leaves look like – look like a set of overlapping pieces, like fish scales. Use cedar as an example.
    d. Review the difference between separate needles (each attaches to the branch individually) and needle bundles (several needles share a single attachment point).
3. Pass out specimens and have students complete the activity individually.
4. Students should have their answers checked by the scientist or teacher prior to moving on to the second activity.

Activity Title: Plant Expert

Purpose of Activity: To gain experience describing and identifying plants independently. Each student will become an expert in one plant that will be seen on the fieldtrip.

Methods and Instructions:
Set-up prior to experiment: Plant collection – This lesson plan assumes that the scientist/teacher has access to a private yard or garden to collect specimens. If live specimens cannot be collected or purchased, photos of plants can be used. Prior to the lesson the scientist should collect a variety of shrubs, herbs and ferns as well as foliage, bark and wood from a wide selection of local trees.

To obtain samples of tree trunks (i.e. wood and bark) one suggestion is to talk to local landscapers and suppliers of firewood. The plants used when the lesson was originally conducted included: salal, dwarf rose, scotch broom, Indian plum, horsetail, salmonberry, trailing blackberry, sword fern, lady fern, bracken fern, maidenhair fern, licorice fern, western red cedar, shore pine, grand fir, Douglas fir, western hemlock, Sitka spruce, red alder, big leaf maple, paper birch, bitter

cherry, and vine maple. For the tree species samples of bark, wood, and cones were also included as appropriate. Ferns and leafy plants should be collected as close to the lesson as possible and kept in a bucket of water.

Plants specimens should be labeled.

Brief description of how students will work in groups or pairs: Students can complete the plant expert activity individually or in pairs.

1. See detailed instructions on worksheet.
2. For this self-directed activity students will pick one plant, or group of similar plants (e.g. ferns), from the selection available and follow the instructions provided on the worksheet to become an “expert” in identifying that plant/plant family.

Closure Discussion

1. How did you like using the dichotomous key? How was using one to identify plants different then when we used one to identify bugs in lesson 3?
2. Use prompting questions to go over the key features of each tree that can be used for identification. Discuss similarities and differences between the species.
3. Ask plant experts to share their expertise with the rest of the class – What plant did they choose? What plants look similar? How can it be identified?
4. Remind students about fieldtrip next week and go over any questions or concerns.

References (examples of the format to use for different types of references are below)

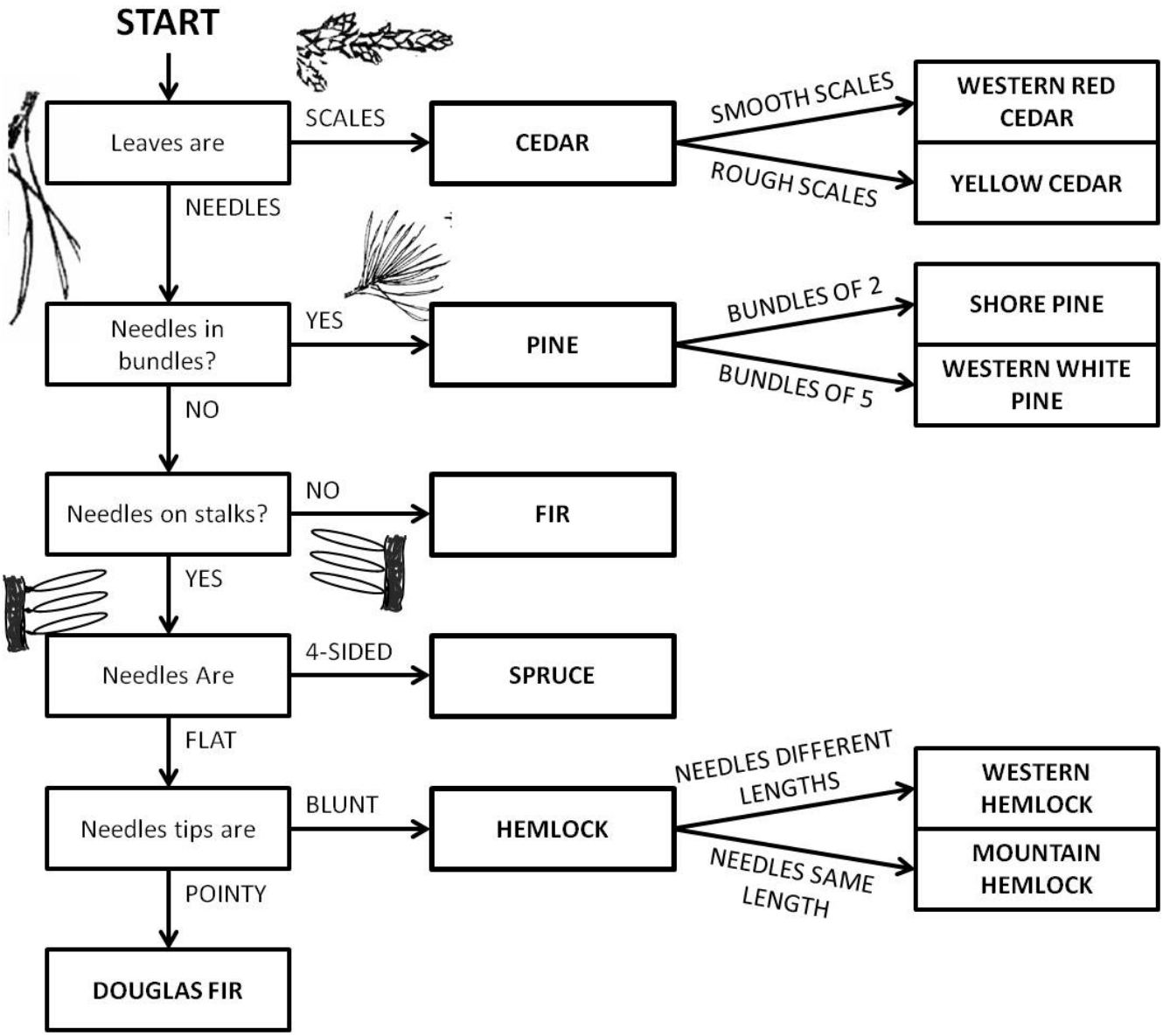
McCloskey, Erin and Gregory Kennedy. British Columbia Nature Guide. Lone Pine Publishing.

Pojar, Jim and Andy MacKinnon. Plants of the Pacific Northwest Coast. Lone Pine Publishing.

WHAT TREE IS IT?

Use the dichotomous key to identify the needle-leaf tree samples.

SAMPLE NUMBER	DESCRIPTION
1	
	NAME:
2	
	NAME:
3	
	NAME:
4	
	NAME:
5	
	NAME:
6	
	NAME:



Scientist: _____

Date: _____

FOREST PLANT EXPERT

Pick one plants or group of plants to become an expert in.

_____

Are there other plants that look similar to your chosen plant? If so which ones?

_____

_____

What features do they have that are similar?

_____

_____

What unique features can you use to identify your plant and tell it apart from similar plants?

_____

_____

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Draw a picture of your plant and label the features you can use to identify it.