13. Tree Identification: Figure out the "Mystery Trees"

Lesson Overview: In this activity, students observe and record information on botanical specimens, then use each other's observations to identify 10 tree species of the northern Rocky Mountains and North Cascade range.

Lesson Goals: To increase students' understanding that trees have characteristics unique to each species and these can be used to identify them.

Subjects: Science, Mathematics, Writing, Reading, Speaking and Listening

Duration: Two half-hour sessions

Group size: Whole class, working in 10 teams

Setting: Classroom

Vocabulary: *field guide, species names*

Objective: Given descriptions of individual tree species, a dichotomous key, and plant samples, students can use sets of photos and botanical specimens to identify 10 species.

Standards:		**6th**	**7th**	**8th**
CCSS	Reading Informational Text	1, 2, 4, 7, 10	1, 2, 4, 10	1, 2, 4, 10
	Writing	2, 4, 7, 10	2, 4, 7, 10	2, 4, 7, 10
	Speaking/Listening	1, 2, 4, 6	1, 2, 4, 6	1, 2, 4, 6
	Language	1, 2, 3, 4, 6	1, 2, 3, 4, 6	1, 2, 3, 4, 6
	Reading Standards Science/Tech	1, 2, 3, 4, 7, 10		
	Writing Standards Science/Tech	1, 2, 4, 7, 10		
NGSS	From Molecules to Organisms: Structure and Processes	LS1.B		
	Ecosystems: Interactions, Energy, Dynamics	LS2.A, LS2.C		
	Heredity: Inheritance and Variation of Traits	LS1.B		
	Biological Evolution: Unity and Diversity	LS4.C		
	Earth's Systems	ESS2.D		
	Earth and Human Activity	ESS3.A, ESS3.C		
EEEGL	Strand 1	A,B,C,E,F,G		
	Strand 2.1	A, C		

Teacher Background: To understand the complexity of fire's role in forests, students must be able to distinguish among tree species. In this activity, they use their observation skills to describe and identify 10 important trees in the northern Rocky Mountains and North Cascade

range. They work in 10 teams, since there are 10 species represented in the "Mystery Trees" materials.

This activity has 2 steps, done in 2 class periods; in between, you'll need to copy some materials for the next class. In **STEP 1 – "KNOWN SPECIES,"** each of the 10 teams describes a "known" species and records their observations on a handout. In **STEP 2 – "UNKNOWN SPECIES,"** which is the **Assessment** for the activity, students use the "Mystery Trees Booklet" (assembled from the completed handouts on all 10 species) to identify all of the tree species – their own plus 9 others. Thus they are using each other's observations to distinguish among the tree species.

If you can visit a forest with the class, have students use their "Mystery Trees Booklets" to identify trees in the field.
Note: A quicker version of Mystery Trees, which uses a dichotomous key, is available in the elementary curriculum: **E10. Tree Identification: Using a Key to Identify "Mystery Trees".**

Materials and preparation:

- Print 10 copies of **Handout M13-1. Tree Species** (1 for each student team).
- Obtain some field guides from a library for students to examine.
- Assemble 10 stations, 1 for each species. Each station should display with the following items from the trunk:
  - Ruler
  - Tree Bark/trunk specimen
  - Cone or flower specimen
  - Foliage specimen
  - Set of four photos of the species (also available in ***Tree_ID_photos.pdf***)
  - Species name label (also available in ***Tree_spp_labels.pdf***)

Procedure:

STEP 1 – FIRST CLASS PERIOD – "KNOWN SPECIES"

1. Explain: Each team will describe a tree species using the specimens at their station and will record their observations on **Handout M13-1. Tree Species**.
2. Explain: In this step, you will work with "known" species, but in the next class session, you will work with "unknowns." You'll use the observations of the other teams to identify all of the "mystery" trees.
3. Explain: Only 10 species are included in this activity, but there are many more native trees in the forests of the northern Rocky Mountains and North Cascades. Thus you can use your descriptions to identify trees in the field, but you'll probably find some that you can't identify. That's what local field guides are for.

4. Pass around some field guides so students can see how they might be used.
5. Assign a team of students to each station. Explain: Complete **Handout M13-1** for your species. You must write neatly so other students will be able to read your observations. When you have completed the handout, let the teacher check your work.
6. As each team completes the handout, visit their station. **REMOVE THE SPECIES NAME LABEL.** Check the handout for completeness and accuracy. Ask the team to revise it, if necessary, so it will be useful for other students in identifying mystery trees.
7. After you approve the team's handout, collect it for copying. Unless you plan to do STEP 2 right away, have students place their specimens back in the grocery bag, leaving the species name label out. (You collected these in the last step.)

BEFORE THE NEXT CLASS: Make a booklet containing all 10 handouts. Use the "Mystery Trees Booklet" page shown at the end of this activity as a cover. Make a copy of the booklet for each team.

Assessment:

STEP 2 – SECOND CLASS PERIOD – "UNKNOWN SPECIES"

8. Set up the stations again – THIS TIME WITHOUT THE SPECIES NAME LABELS.
9. Give a copy of the "Mystery Trees Booklet" to each team.
10. Explain: DON'T SHARE INFORMATION WITH THE OTHER TEAMS DURING THIS STEP.
11. Explain: Each station contains a "mystery tree." You should recognize the one that your team described, but the others are "unknowns." Circulate from station to station and use the observations in your Mystery Trees Booklet to identify each tree. Then write the tree's one-letter code in the upper right corner of the page and circle it.

Evaluation: Here are the correct code letters for the tree species:

Black cottonwood	B
Douglas-fir	V
Engelmann spruce	H
Lodgepole pine	E
Ponderosa pine	O
Quaking aspen	L
Subalpine fir	C
Western larch	T
Western redcedar	D
Whitebark pine	J

Fully successful	Moderately successful	Unsuccessful
-Student team correctly identified 8-10 species	-Student team correctly identified 5-7 species	-Student team correctly identified <5 species

Handout M13-1. Tree Species: _____

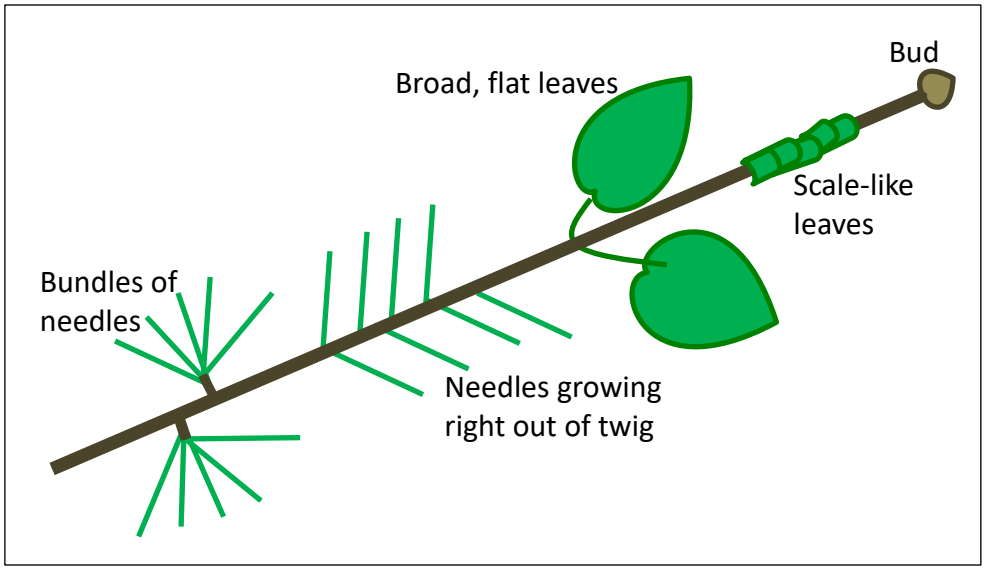
Team Members: _____

1. Are the leaves *broad and flat* (more than 1 centimeter wide)… or *narrow and needle-shaped…* or *a long series of tiny, overlapping scales*? _____

2. How big are the leaves? _____ centimeter(s) long by _____ centimeter(s) wide

3. If the leaves are NOT scales, do they grow in bundles or right out of the twig? _____

4. Find the biggest bud. This is at the tip of the twigs. How big is it? _____ centimeter(s) long by _____ centimeter(s) wide



5. Do the buds have pointy tips or rounded tips? _____

6. Does the tree put its seeds in flowers or cones? _____

7. Describe the flowers, seeds, or cones — size, color, shape, other features:

8. How thick is the bark? _____ centimeter(s)
   Describe the bark:

9. Do the branches reach all the way from the treetop to the ground? _____

10. Describe two other characteristics that would help someone identify this tree:

Mystery Trees Booklet for the Northern Rockies and North Cascades

Team Names:

_____

1. Use the descriptions in this booklet to identify the tree species at each station.
2. Write the correct code letter for that species in the upper right corner of the page.
3. Circle the code letter so it's easy to see.