

Biology

STANDARD V: Objective 3:

Title: Using a Dichotomous Key

Description: In this activity students will use a dichotomous key to identify native Utah conifers. They will then create their own dichotomous key for a bag of candy.

Background Knowledge: None

Equipment and Supplies: Student sheet, collected samples of 11 Utah conifers (select from the following: Limber, Ponderosa, Lodgepole, or Pinyon Pines; Douglas, Sub-Alpine, or White Firs; Englemann or Blue Spruces; Common, Utah, or Rocky Mountain Junipers.) tree field guides, 9 plastic bags filled with “jelly belly” jelly beans

Safety Issues: None

Duration: 1 ½ class periods (70 min.)

Procedures for Teachers:

1. Collect samples of 11 native Utah conifers. (you may want to collect multiple samples of each conifer if you have a large class, this will help spread students around the classroom)
2. Before students arrive in class lay samples around the classroom
3. Label them 1-10
4. Save one sample to be used as an example
5. When students arrive in class have them number a paper 1-10
6. Pass out a field guide to each table
7. Show students the sample you have withheld
8. Ask students to try and identify the sample using the tree field guides on their tables, tell them they may work with their groups
9. Give them about 5 minutes, students will most likely not be successful
10. Ask for student responses to identify the correct name of the specimen
11. Ask students to rate the difficulty of the task
12. Now pass out a dichotomous key to each student
13. Give them 5 minutes to try and now identify the sample
14. Ask students for the name of the specimen
15. Have students rate the difficulty of the task this time. Discuss with students the advantages of having a key such as the one they used.
16. Tell students they are now to identify the 10 samples using their key
17. Check student answers
18. Now pass out a bag of goodies to each table
19. Have the students create a dichotomous key for the items in the bag.
20. Have groups trade keys and test
21. Discuss with students other possible applications of using dichotomous keys

KEY TO NATIVE CONIFERS

1. a. Leaves are needle-like: cones are woody or papery and brown in color.2
b. Leaves are scaly or awl-like (long pointed scales, like short spikes) cones are berry-like and blue in color.....3

2. a. Needles arise in bundles or packets of 2,3, or 5 (pines): cones scales are woody.....3
b. Needles do NOT arise in bundles or packets but are singular: cone scales are thin and papery.....5

3. a. Needles arise in bundles of 5: usually 2 to 3 inches in length: cones are 5 to 6 inches long.....**Limber Pine**
b. Needles arise in bundles of 3 (sometimes 2) usually 3 or more inches in length: cones are about 4 inches.....**Ponderosa Pine**
c. Needles arise in bundles of 2: cones are 1 to 2 inches in length.....4

4. a. Needles are about 2 inches long and twisted in appearance: cones are 1.5 inches long: trunk grows straight and tall.....**Lodgepole Pine**
b. Needles usually less than 2 inches long: cones are 1 to 2 inches long with large edible seeds: trunk is short and bushy in appearance.....**Pinyon Pine**

5. a. Needles are flat and blunt: not sharp to touch.....6
b. Needles are NOT flat, but are square in cross section: sharp to touch.....8

6. a. Needles arise from twigs on all sides and point outward from twig: cones with leafy bract extending from the cone scales.....**Douglas Fir**
b. Needles arise from twig on all sides but bend upward: cones without leafy bracts extending from cone scales.....7

7. a. Needles usually less than 1 inch in length: cones are 4 inches long.....**Subalpine Fir**
b. Needles usually greater than 1 inch in length:; cones are 2 inches long.....**White Fir**

8. a. Young twigs and branches are pendulant(hanging downward): cones are usually less than 2 to 3 inches long with rounded cone scales: mature trucks are reddish, scaly and unfurrowed.....**Englemann Spruce**
b. Young twigs and branches are not pendulant but are stiff, growing outward in flat layers: cones are 3 to 5 inches long with wedge-shaped cone scales: mature trunks are dark gray and somewhat furrowed.....**Blue Spruce**

9. a. Leaves are awl-like: longer than ¼ inch arising in whorls of three: leaves have a silver-white band running down the midrib.....**Common Juniper**
b. Leaves are scaley-like than ¼ inch.....10

10.
 - a. Scaly leaves are coarse (rough to touch): berry-like cones are small, rarely to $\frac{1}{4}$ inch in diameter: trunk usually forked.....**Utah Juniper**
 - b. Scaly leaves are fine (smooth to touch): berry-like cones are small, rarely to $\frac{1}{4}$ inch in diameter: trunk usually with a central stem.....**Rocky Mountain Juniper**