

Investigation 3.B: Creating a Dichotomous Key

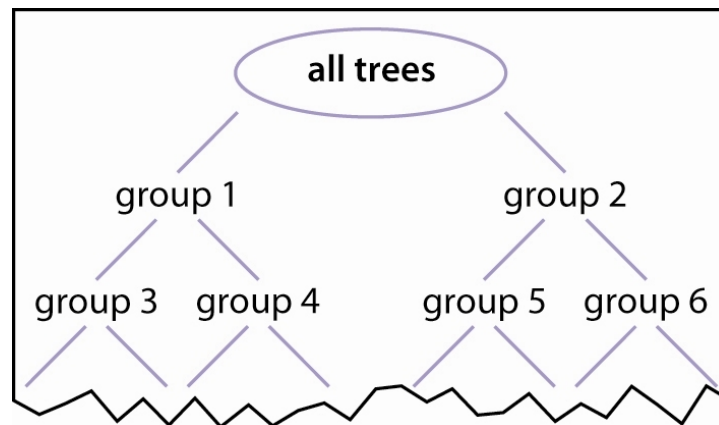
Purpose: To compile and analyze data in a way that helps identify organisms.

Materials

- paper
- pencil
- sample dichotomous keys
- leaves and catkins or needles and cones of Alberta tree species (optional)

Procedure

1. Use this blank dichotomous key diagram as a model for your own dichotomous key. Note that your final key may not look exactly the same.



2. Study the 10 trees shown on the next page of this handout. (As an alternative, you could collect 10 or more plants from one or both of the ecosystems you chose for your field study.)
3. Select one characteristic. Sort the trees into two groups, based on whether they have this characteristic.
4. List each tree's number under either Group 1 or Group 2 on your key diagram.
5. Record the characteristic that identifies each group.
6. Select another characteristic for each subgroup, and repeat steps 4 and 5 for the next level down on your diagram.
7. Continue to subdivide the groups until you have 12 groups with one tree in each.
8. Using the characteristics in your diagram, construct a dichotomous key that someone could use to identify any tree in the given group. To do this, create a series of numbered steps, with the first step showing the first characteristic you used. At each step, offer two choices for classifying the tree based on a *single* characteristic. For example, you may have used the characteristics "have needles" as your first dividing characteristic. The first numbered step in your key would be
 - 1a. have needles
 - 1b. do not have needles

Use the sample keys provided by your teacher to help you.

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whitebark pine (*Pinus Albicaulis*)



jack pine (*Pinus banksiana*)



lodgepole pine (*Pinus contorta*)



tamarack (*Larix laricina*)



white spruce (*Picea glauca*)



black spruce (*Picea mariana*)



subalpine fir (*Abies lasiocarpa*)



balsam fir (*Abies balsamea*)



white birch
(*Betula papyrifera*)

trembling
aspen
(*Populus
tremuloides*)



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9. Exchange keys with a partner. Use your partner's key to classify a tree, and record all the characteristics of the species you chose.

Analysis

1. Is your partner's dichotomous key identical to yours? Explain why or why not.
2.
 - a) Was your partner able to use your key successfully?
 - b) How could you improve your key?
3. Which characteristics of trees were not useful for creating your key? Explain why not.

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Conclusion

- Why does a key offer only two choices at each step?

Extension

- Non-native, invasive plants in Alberta, such as spotted knapweed (*Centaurea biebersteinii*), jeopardize ecosystems by out-competing native plant species. Examples of several other invasive plant species that pose problems in Alberta are purple loosestrife (*Lythrum salicaria*), creeping bellflower (*Campanula rapunculoides*), common tansy (*Tanacetum vulgare*), reed canary grass (*Phalaris arundinacea*), and common soapwort (*Saponaria officinalis*). Research the names of other invasive plant species in the province. Choose at least five of the species you researched, and design a key to identify them.