

DICHOTOMOUS KEYS

INTRODUCTION

A key is a tool that allows its user to identify a novel item. The dichotomous key is the most widely used type in biological sciences. In these keys, the user is presented with a sequence of choices, each involving two statements. These keys therefore work through an “either/or” process, with each set of statements (a **couplet**) linked to another. How you progress through the key is dependent upon which option within each couplet is selected. Ultimately, the choices presented in the key lead the user to the proper identification of the organism being investigated.

USING A SIMPLE DICHOTOMOUS KEY

When using dichotomous keys, keep the following suggestions in mind:

- Always read both choices before making your selection, even if the first option seems to be valid.
- Be sure you understand the meaning of any specialized terminology employed.
- If the choice is not clear, note this couplet as a return point. Attempt to key the specimen using one couplet choice and then the other. You may end up with two possible solutions. Read descriptions of both choices to help select the appropriate identification.
- Do not accept any identification from a key as definitive. Check a description of the proposed species to see if it agrees with what you have. Errors can be made by selecting the wrong option within a couplet.

Procedure

Below is a simple dichotomous key to the evergreens commonly encountered on campus. You will use this key to identify the labeled plant samples.

Key to Common Evergreens

- 1a. Leaves linear, needle-like or scale like.....2
- 1b. Leaves broad, not needle-like nor scale-like....5

- 2a. Leaves needle-like.....3
- 2b. Leaves scale-like.....Red Cedar

- 3a. Leaves in groups of 2 or 3.....4
- 3b. Leaves in groups of 5.....Eastern White Pine

- 4a. Leaves in groups of 2.....Virginia Pine
- 4b. Leaves in groups of 3.....Loblolly Pine

- 5a. Leaf margin smooth.....Magnolia
- 5b. Leaf margin spiny.....American Holly

Twig	Identification
A	
B	
C	
D	
E	
F	

DEVELOPING A DICHOTOMOUS KEY

A well constructed dichotomous key has a logical flow. It uses the most basic differences between groups of organisms as the conditions for the options at each couplet. Use the following suggestions when constructing a key:

- Use constant characteristics rather than variable ones. For instance, if a plant has red leaves only in the fall do not use this as a defining characteristic in a key that may be used in the spring.
- Use actual measurements rather than relative comparative terms like “large” or “small.”
- Use characteristics that are observable by the user. For instance, if a key is to be used in the field, do not include microscopic anatomy.
- Make the choice a positive one, i.e. something is
- Start each choice within a couplet with the same words, if possible.
- Start different couplets with different words when possible.
- Precede the descriptive terms with the name of the part to which they apply, e.g. use “leaves are scale-like” rather than “scale-like leaves.”

Procedure

Apply your observational skills to the assortment of objects at your lab station. Develop a dichotomous key for this collection that is based upon the differences you observe.

1a. _____

1b. _____

2a. _____

2b. _____

3a. _____

3b. _____

4a. _____

4b. _____

5a. _____

5b. _____

6a. _____

6b. _____

7a. _____

7b. _____

8a. _____

8b. _____

9a. _____

9b. _____

10a. _____

10b. _____

If you need more space, use a sheet of notebook paper.

Review the various keys developed by your classmates. Describe the similarities and differences.

Similarities: _____

Differences: _____

USING A LARGE DICHOTOMOUS KEY

The Extension Service of Clemson University has developed a key to the common trees of South Carolina. This key has been placed on a web page and is used by extension agents to help identify tree species sent in by residents of the state. Once the species is identified, complex questions concerning propagation, disease control, or insect infestations can be more easily addressed by extension personnel.

You will use this key to identify unknown tree species. While using the key, click on any highlighted term to see its definition.

Procedure

1. Boot up the computer, and load the tree key.

**The URL for this key is:
<http://depts.clemson.edu/extfor/publications/bul117/>**

2. Use the key to identify five of the specimens available in lab.

Specimen #	Common name	Genus species

3. As a homework assignment, obtain five leaf and twig samples from trees on campus, and identify them using this key. (Alternatively, you may collect specimens from off campus if you prefer.) These identifications and the collected plant materials will be turned in for points one week after the completion of this lab.

No pre-lab worksheet or pre-lab quiz with this lab