Noble Academy

The "Key" to Leaf Identification

Introduction

Classification is an important and specific way of organizing information so that it can be used to understand the natural world. There are almost 9 million species on earth today; classification of these living things helps us see the similarities and differences in the living things around us.

The field of biology that identifies and classifies organisms into categories is called *taxonomy*. Scientists, or taxonomists, have classified millions of living species based on their physical characteristics and have given a unique name to each unique species. The scientists who classify living things record their classifications so that later, others who encounter a certain species will be able to identify it in the same way. Making sure that two scientists are referring to the same thing when using a certain name is important for clear communication.

A *dichotomous key* is a guide for classifying and identifying something by asking a series of questions to which there are only two possible answers that help guide scientists toward the correct identification or name of the item. Dichotomous means "divided into two parts." Many parts of the natural world that have been classified, categorized and grouped can be identified using a dichotomous key.

Activity Overview

In this activity, you will use a *dichotomous key* to identify 13 unknown leaf samples.

Materials

- 13 unknown leaf samples
- Leaf dichotomous key
- Leaf identification worksheet

Safety Precautions

- Please do not eat or drink in the laboratory.

Procedure

- Using the dichotomous key at each station, identify each unknown leaf.
- Always begin with step 1 of the *dichotomous key*.

(Continued on the next page)

Procedure (continued)

- When looking at the key, there are two options for each step. For example:

  1a. Leaves are scalelike or needlelike ……………..2
  1b. Leaves are not scalelike or needlelike……….3

  Choose the option that best describes the leaf in front of you and continue to the indicated step (in the example above you would either continue to step 2 or 3).

- As you work your way through the key, your choices will eventually lead you to the name of the leaf in front of you.
- Record the identity of the leaf on your "Leaf Identification Worksheet."
- Move to the next station and repeat, always beginning with step 1 of the *dichotomous key*.
- Continue classifying until all of the unknown samples have been identified.

Leaf Anatomy

Understanding the meaning of the anatomical terms used in the dichotomous key is necessary to successfully identify each leaf. If you are not sure of the meaning of a term, use the definitions and leaf figures below to help you. Never guess, as this could lead to the wrong classification term.

Definitions

Leaf **veins** are the vascular tissue of a leaf that carry water and nutrients, and support the blade, much as the metal ribs support the fabric of an open umbrella.

The **main vein** is the main or central vein that runs from the leaf stem to the tip of the leaf or to the tips of the leaf lobes (in this case, the leaf will have more than one main vein). Secondary or lateral leaf veins may branch off of the main vein.

A leaf **lobe** is a distinct protrusion that may be either rounded or pointed.

A **compound** leaf is a leaf that is composed of two or more leaflets on a common leaf stem.

A **scalelike** leaf is a leaf that has leaves that look like scales.

A **needlelike** leaf is a leaf that has long, thin leaves that look like needles.

A **serrated** leaf is a leaf that has a margin that is notched like a saw with teeth pointing toward the tip of the leaf.

The leaf **margin** is the edge of the leaf.

Leaf Anatomy (continued)

Figures

Use the definitions provided to label the different parts of the leaves below.

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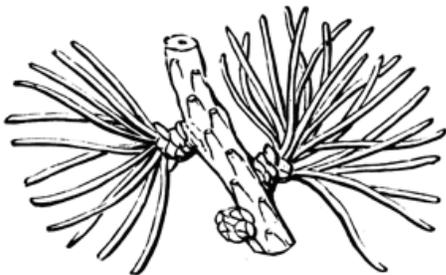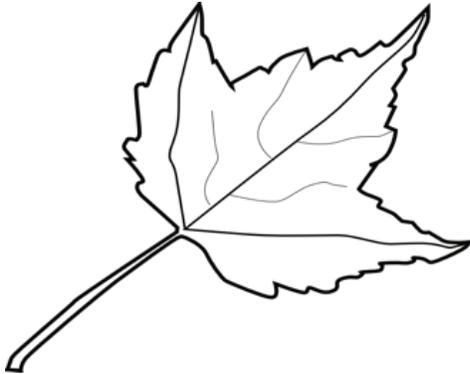
Leaf Identification Worksheet

Name _____

Unknown Leaf #	
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	

The "Key" to Leaf Identification

Name _____

1. _____ is an important way of organizing information so that it can be used to understand the natural world.

2. Classifying and identifying species is important because it establishes a clear line of _____ _____ between scientists.

3. The field of biology that identifies and classifies organisms into categories is called
   ☐ Biology
   ☐ Endocrinology
   ☐ Virology
   ☐ Taxonomy

4. A _____key is a guide for classifying and identifying something by asking a series of questions to which there are only two possible answers.

5. The word "dichotomous" means:
   ☐ Divided into two parts
   ☐ Divided into three parts
   ☐ Divided into four parts
   ☐ Divided into five parts

The "Key" to Leaf Identification Follow-up

Name _____

1. List two reasons why classification is important to science and scientists.

2. _____ is the field of biology that identifies and classifies organisms into categories.

3. What is a dichotomous key used for?

4. What does the word "dichotomous" mean?

5. What are some of the identifiable features that are used to classify the unknown leaves?
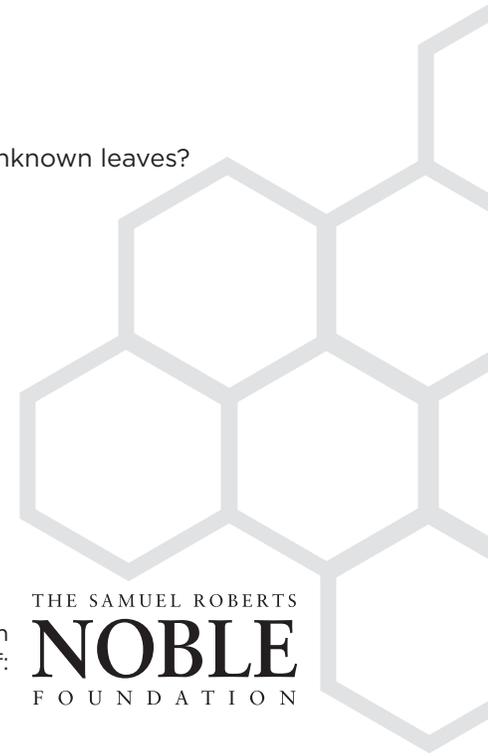
Leaf Dichotomous Key

1a.   Leaves are scalelike or needlelike 2

1b.   Leaves are not scalelike or needlelike 3

2a. Leaves are ½" long or shorter and have a narrow base ....Eastern Hemlock

2b. Leaves are long and narrow, and needles are united at base to form bundles .... Scotch Pine

3a. Leaves are finely serrated 4

3b. Leaves are not finely serrated 6

4a. Leaf has a single main vein with smaller side veins 5

4b. Leaf has main veins radiating from one point, base is not symmetrical............... Little Leaf Linden

5a. Leaf has a wide main vein.. Eastern Cottonwood

5b. Leaf has straight, parallel, seldom branched veins.. Siberian Elm

6a. Leaves are lobed 7

6b. Leaves are not lobed 10

7a. Leaf has one main vein .... Northern Red Oak

7b. Leaf has three to seven main veins radiating from one point at or near the base............................8

8a. Leaf has three distinct main veins.. American Sycamore

8b. Leaf has more than three distinct main veins 9

9a. Notches between lobes are deep and the under-surface is white downy ....Silver Maple

9b. Leaf is usually wider than long and base of leaf is not curved .... Norway Maple

10a. Compound leaflets are present .... Honey Locust

10b. Compound leaflets are not present 11

11a. Leaf is fan-shaped.. Ginkgo

11b. Leaf is not fan-shaped 12

12a. Leaf is heart-shaped with veins branching from the base .... Eastern Redbud

12b. Leaf is not heart-shaped .... Osage Orange

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