
Shoe Key

Grade Level: 6-12

Subject Areas: Life Sciences

Duration: 50 minutes or less

Setting: classroom

Skills: gathering, organizing, and analyzing information; applying learned information

Vocabulary: dichotomous, classification

Related State Content Benchmark Objectives

- **Compare and classify familiar organisms on the basis of observable physical characteristics**
- **Compare and classify organisms into major groups on the basis of their structure**

Objectives

Students will be able to:

- construct a dichotomous key using shoes; and,
- apply their understanding of how a dichotomous key works.

Materials

- optional paper and pencils for students
- shoes

Background

A dichotomous key is a tool that scientists use to identify species of living things. At each level of the key are two primary category descriptions, **a** or **b**. Students observe the living things that they are attempting to identify, and match a description to that organism. The answer will either lead students to the name of the species, or to another level within the key. (Students should understand that scientists sometimes have trouble classifying certain organisms. For example, the blue-green algae defies easy placement in either the plant or animal kingdom.) Explain to the students that they will be constructing a key for shoes, and will apply that understanding of how a shoe key works to other dichotomous keys.

The Activity

1. Have each student take off one shoe.
2. Gather the shoes in a pile in front of the group, arranging them so that everyone can see the shoes.
3. Save one shoe for later identification.
4. Tell the students they will have to come up with two main categories of shoes (a way to divide the shoes into two groups of approximately even numbers). Examples are sport and non-sport shoes, leather and non-leather shoes, shoes with ties and shoes without ties. There will always be some shoes that are hard to classify, for example shoes with Velcro fasteners--is this a tied shoe or not? The students will have to adjust their classification system to handle the types of shoes represented.
5. Write your classification system on the board. You may have students copy the key on their own paper, or you can save this until the end of the lesson--it's optional.

Example

- 1a. shoes with ties.....**2**
- 1b. shoes without ties.....**4**

6. Now divide one of the subcategories again, roughly in half. Continue dividing the shoe piles until you reach a description for an individual shoe; this represents the species level. If two students have the exact same shoe, then there will be more than one of that species. (Note that keys do not describe individual differences within a given species.)

Example

- 2a. High-top shoes.....**3**
- 2b. Low-top shoes.....**5**

7. Now , bring out the shoe that you saved earlier for identification. Can students identify the mystery shoe using the key they designed?