CLASSIFICATION #1: DICHOTOMOUS CHOICES WITH SHOES

Goals
Students explore basics of classification using their own shoes. They create a dichotomous key based on their classifications.

Introduction
Students experience difficulty with taxonomic keys because the subject matter (various kingdoms) and concepts (dichotomous choice) are both new. Using shoes and their own yes/no sorting, they can grasp the idea of taxonomy and concept of exclusive categories.

Outcomes
Students will:
1.   identify relevant characteristics of a group of objects
2.   sort objects based on those attributes into exclusive groups
3.   develop a key to show others how the sort works to both include like objects and exclude unlike objects
4.   compare different students' keys for defining sorts
5.   abstract and compile defining attributes into one key and test

Vocabulary
characteristics
attributes
dichotomous
taxonomy
classification
key
tree or branching diagram

Prerequisites
None

Materials
shoes
markers
18 X 24" paper

Time Required
1 class period

Procedure

1.   Ask students either to bring in a shoe for the activity the day before or have them use one of the shoes they are wearing. Some kids will forget to bring a shoe, but some may be embarrassed to remove a shoe in class. They could be asked ahead to bring one with the caution that if they forget they will have to use one of those they are wearing.

2.   Tell students to put one shoe in a classroom pile. If it's a large group, you may wish to use both shoes in the pair and have two separate, but identical, piles and split the class.

3.   Direct students to sort the shoes into several different piles that make sense.

4.   Students identify the characteristics for the sort (They will automatically group according to similarities and differences). They do not have to agree with each other.

5.   Tell students to write the categories and reasons for the inclusion of some and exclusion of others on a sheet of paper using circles and titles.

6.   Ask students to present their sorts to whole class and justify them.

7.   Ask, "What do you notice about the members of the categories? What do you notice about the headings for the categories? Are there any you don't agree with? Why? Help students to compare the different sorts and identify exclusionary attributes from their lists.

8.   Show students a tree or branching diagram of the major attributes they developed (athletic shoes/not athletic shoes) using dichotomous choices. Either the shoe is one that can be worn for sports or exercise or it is not. Is there another/better name you can give the category "not athletic shoes"? Can you give me two separate categories into which we can divide the athletic shoes? Continue until students understand the concept ichotomous.

9.   Once students get the idea that the attributes they use to sort shoes must incorporate all and only those with that attribute and exclude all and only those without that attribute, ask them to complete the tree so that the shoes can fit in only one category, no overlap. Draw your tree diagram with attributes on the flip side of your paper. Students may work in small groups or pairs or alone as you wish.

10.   Ask students to present their work to the class and discuss how well each diagram works according to yes/no in/out. Ask, What was hard about this task? What helped you with the task? Where did you find the most difficulty? Why? What do you notice about the size of the groups in each category? Why do you think that happens?

11.   Tell students that biologists use the same concepts (alike and different according to a set of characteristics that make sense) to classify all organisms and set up a axonomic key. First they identify major characteristics that lump living things into large categories called kingdoms (most agree there are five)--a gross sort of alike and different. Then they look at the things in those big lumps and try to separate the lumps into smaller piles called phyla, then smaller called classes, then smaller still called families, to genus, and down to the smallest complete group called species.

12.   You can distribute handouts of the five kingdoms and some of the larger groups, display a poster(s) of each of the kingdoms and their members for consistent referral, etc.