



CLASSIFICATION

Teacher Notes



BACKGROUND

- Concepts and vocabulary associated with classification are new
- Students can organize items: pencils go in a pencil box, mathematics is taught in math class
- Students learn some biology in third grade, but there is no comprehensive classification coverage
- Students have not learned about Venn diagrams or sets

INTRODUCTION

Classification is a tool that is used to group the matter and energy that exist in the universe based upon their *properties*. Without this tool, we would be unable to create scientific theories and explanations for what we observe. The point should be stressed that classification is not an end in itself, but is used to organize information to make the study of new organisms, objects, and substances more efficient, which leads to new discoveries.

Classification is used in many aspects of our daily lives. In a grocery store, the milk, cheese, and yogurt are all placed together in the dairy aisle because of their similar characteristics. Spaghetti, macaroni, and lasagna noodles are grouped and arranged together as are napkins, paper towels, tissues, and toilet paper. At home, you probably have one drawer for socks and another for shirts. Your silverware is probably grouped together in one place, but sub-grouped as forks, knives, and spoons. There may even be subgroups within these subgroups, for example, butter knives and steak knives or teaspoons and tablespoons.

Grouping items with similar characteristics is key to the concept of classification. Each scientific discipline has its own classification system, but all are based on this fundamental concept: biologists classify plants, animals, and other living things; geologists have a classification system for rocks and minerals; and chemists place atoms that have similar characteristics together into groups organized into the periodic table. Chemists also classify materials into groups based upon their *state of matter*, which classifies objects into groups of solids, liquids, or gases.

In classifying both living and nonliving things, scientists have tried to provide an order to life so that we can better understand the world in which we live. Shared patterns and physical characteristics among related objects can be organized and denoted in a classification tool called a *dichotomous key*. The key, used to identify objects, is based on the premise an object either possesses an observed physical characteristic or does not possess the characteristic. For example, when attempting to identify a flowering plant with a key, you might see:

1A Petals red.....go to 4
1B Petals orange.....go to 5

Once a characteristic is recognized in the key, a person follows the other properties until it has been isolated and identified on the key. New objects are not found on an existing key; therefore the key must be adapted in order to accommodate the new object.

Classification helps scientists learn more about new objects because they can see if and where the object, substance, or organism fits into the classification system. Depending on where the item fits, scientists can make certain assumptions about it and begin analyzing accordingly. This creates a continuous system of more efficient experimentation, discovery, and potential new discoveries.

DISCUSSION THOUGHTS

What do students classify today (at home? at school?). Why do we classify things?

VOCABULARY

- **Classification:** Grouping items with similar characteristics or properties
- **Property:** A characteristic of an organism or object

- **States of Matter:** The three states of matter are solids (fixed shape and volume), liquids (fixed volume, shape of container) and gases (volume and shape of container)
- **Dichotomous Key:** A system using numbered steps to classify organisms or objects based on them having or not having certain characteristics

ACTIVITIES

- **Worksheets**
 - Students complete a worksheet including vocabulary, a dichotomous key, and states of matter.
 - Materials:
 - 25 Classification worksheets
- **Student Classification**
 - Classify students based upon what they are wearing. Draw a flow chart classification system on the chalkboard as the students are separated.
 - Objective: Students see a dichotomous key and the classification of organisms in action
 - Materials:
 - Students
- **Bean/Button Exercise**
 - Students are asked to sort a bag of beans or buttons into different groups. After they have classified their beans/buttons one way, ask them to classify them again differently.
 - Objective: To practice classifying objects based on different properties
 - Materials:
 - 15 Sets of mixed beans/buttons
- **Grocery Store**
 - Groups of 2 students are asked to sort grocery store items into self-consistent groups and place these groups into logical departments, to make it easier for shoppers to find them. Follow-up discussion should focus on this as an example of classification and how important this is for orderly shopping. Groups must describe their departments and the logic behind their organization (items in each department and location in grocery store).
 - Objective: Students classify household items based on their properties
 - Materials:
 - 15 Laminated construction paper models of grocery stores
 - 15 Sets of grocery store item tabs in Ziploc bags or cups
 - Post-it note pads
- **States of Matter Classification**
 - Students are asked to sort household items based upon their states of matter. Ask students to identify the items on the red construction paper as solids, liquids, or gases. Alternatively, they can separate these items at their desks using the green paper item tabs.
 - Objective: Students understand how scientists classify solids, liquids, and gases
 - Materials
 - 15 Laminated red construction paper sheets
 - 15 Sets of solids, liquids, and gaseous item tabs

CONCLUDING THOUGHT

How do you classify items when you clean your room? Your desk?