

# 6-8 What is Taxonomy? Activity

## Overview

### Focus Questions

What is taxonomy?

### Activity Synopsis

Students will practice grouping or classifying everyday objects.

### Time Frame

30-45 minutes

### Objectives

The learner will be able to:

- Define taxonomy
- Group items using shared characteristics

### Student and Teacher Key Terms

- Taxonomy
- Classification

## Standards

### *South Carolina College- and Career-Ready Science Standards 2021*

**7<sup>th</sup> Grade:** 7-LS2-5

### *2014 Academic Standards and Performance Indicators for Science*

**6<sup>th</sup> Grade:** 6.S.1A.1, 6.S.1A.2, **6.L.4**

**7<sup>th</sup> Grade:** 7.S.1A.1, 7.S.1A.2

**8<sup>th</sup> Grade:** 8.S.1A.1, 8.S.1A.2

\* **Bold standards are the main standards addressed in this activity**

### *South Carolina College- and Career-Ready Science Standards 2021*

### Seventh Grade Performance Expectations

7-LS2-5 Evaluate competing design solutions for maintaining biodiversity and ecosystem services.

### *2014 Academic Standards and Performance Indicators for Science*

### Sixth Grade Performance Indicators

6.S.1A.1 Ask questions to (1) generate hypotheses for scientific investigations, (2) refine models, explanations, or designs, or (3) extend the results of investigations or challenge claims.

6.S.1A.2 Develop, use, and refine models to (1) understand or represent phenomena, processes, and relationships, (2) test devices or solutions, or (3) communicate ideas to others.

**6.L.4** The student will demonstrate an understanding of how scientists classify organisms and how the structures, processes, behaviors, and adaptations of animals allow them to survive.

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## **Seventh Grade Performance Indicators**

7.S.1A.1 Ask questions to (1) generate hypotheses for scientific investigations, (2) refine models, explanations, or designs, or (3) extend the results of investigations or challenge claims.

7.S.1A.2 Develop, use, and refine models to (1) understand or represent phenomena, processes, and relationships, (2) test devices or solutions, or (3) communicate ideas to others.

## **Eighth Grade Performance Indicators**

8.S.1A.1 Ask questions to (1) generate hypotheses for scientific investigations, (2) refine models, explanations, or designs, or (3) extend the results of investigations or challenge claims.

8.S.1A.2 Develop, use, and refine models to (1) understand or represent phenomena, processes, and relationships, (2) test devices or solutions, or (3) communicate ideas to others.

## **Cross Curricular Standards**

### ***South Carolina College and Career Standards for Math***

6.EE.9

### ***South Carolina College and Career Standards for ELA***

Communication (C) – 6-1.1, 6-1.2, 7-1.1, 7-1.2, 8-1.1, 8-1.2

### ***Common Core ELA Standards***

Speaking/Listening – 5.1, 5.2, 6.1, 7.1, 8.1

Language – 5.1, 6.1, 7.1, 8.1

## **Background**

### **Key Points**

*Key Points will give you the main information you should know to teach the activity.*

- **Taxonomy** is the **classification** of organisms based on shared characteristics.
- Grouping organisms using taxonomy helps us understand what organisms are closely related. By knowing the relationships between organisms we can better understand our world and the diversity of life on earth.

### **Detailed Information**

*Detailed Information gives more in-depth background to increase your own knowledge, in case you want to expand upon the activity or you are asked detailed questions by students.*

**Taxonomy** is the **classification** or grouping of organisms based on shared characteristics. By grouping organisms, relationships can be studied, patterns in nature can be identified and information can be organized for all to use. With conservation being of increased value, understanding the diversity of an area is very important in making informed decisions and taxonomy is very important in discovering diversity.

In taxonomy, there are 8 main levels or categories, called taxa (singular taxon). The categories in order of most general to most specific are Domain, Kingdom, Phylum (plural phyla), Class, Order, Family, Genus and Species. At this time there are 3 Domains and 6 Kingdoms of organisms on earth. The 3 domains are the Eubacteria, Archaeobacteria and the Eukarya (including the protists, fungi, plants and animals). The Eukarya are lumped together because they are mostly multicellular. The 6 Kingdoms are Animalia (Animals), Plantae (Plants), Fungi, Protista (mostly one-celled organisms), Archaeobacteria and Eubacteria.

Taxonomy is an ever changing science as time moves on due to new technology and new discoveries. For example, for years the Archaeobacteria and Eubacteria were in 1 Kingdom called Prokaryotes. Today it has been split into two different groups of microbes.

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To confuse us even more, but worth mentioning is that when classifying plants and fungi, the term Division is used in place of Phylum. The taxonomy for Plants and Fungi would be Domain, Kingdom, Division, Class, Order, Family, Genus and Species.

There are also subcategories within the main 8 taxa. An example would be subphylum or superorder. If the prefix is sub it is just below that level. If the prefix is super it is right above that taxa. These subcategories allow for small variations within a taxa. To remember the 8 levels of taxonomy, many use a mnemonic. A couple examples would be: Does King Phillip Come Over For Great Spaghetti or Do Kings Play Chess On Fancy Glass Stools. Come up with your own in order to remember it better!

Scientists name organisms based on the genus and species names. This is called binomial nomenclature. The correct way to write a scientific name is Genus species (underline). When the scientific name is typed it is typed *Genus species* (italicized). Please note that the Genus name has the first letter capitalized and the species name is all lower case. Examples would be *Alligator mississippiensis* (American alligator) or *Haliaeetus leucocephalus* (Bald eagle). Scientific names are often used because sometimes the same animal has many common names. There is only ever one scientific name. An example of this is the scientific name *Sciaenops ocellatus*, which is a fish called a red drum, redfish and spottail bass for just a few of its common names.

By using taxonomy, every living thing will have its own species name and therefore can be distinguished from any other living thing. The definition of a species is a widely argued topic. For our purposes, we will use the biological species definition which is that a species is an organism that cannot breed with another organism to produce a fertile offspring. For example; a grizzly bear and a giraffe cannot reproduce to create a baby.

## Procedures

### Materials

- Multiple different objects of one or more of the following (anything will work as long as you have many different ones):
  - Buttons
  - Beans
  - Stuffed animals
  - Small plastic animals
  - Clothes/Towels
  - Flowers
  - Cereals
  - Office supplies
  - Beads

### Procedure

1. Begin class by reviewing what taxonomy is and how it can be used to group everyday items as well as living organisms.
2. Split class into groups of 3-4 students.
3. Give each group a pile of whatever object you decided to use from the materials list (would be great if each group was given different objects to identify, but that depends on what you have available).
4. Ask each group to figure out at least 3 ways in which they could classify their objects.
5. After about 5-10 minutes, have each group explain how they grouped their objects. Was it by size, color, length, texture, ingredients,...etc.

### Follow-up questions

- How many different species of animals are on earth that we know of?
- What is the taxonomic breakdown of our species *Homo sapien*?

### At-home Learning and Virtual Modifications

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At-home Learning: Have students look around their house for a group of objects that they have a good number of (buttons, beans, stuffed animals, small plastic animals, toys, clothes/towels, flowers, cereals, beads, stickers, etc.). Have students come up with 3 different ways that they could group/classify their objects. Students could fill out the following worksheet to go along with this activity.

[Let's Get Classifying! Worksheet](#)

Virtual: Show your students a collection of objects using the webcam (buttons, beans, beads, stickers, etc.). Have them work as a class to come up with different ways that they could group those items. Explain that what they were just doing is a type of taxonomy! Discuss what taxonomy is and why it is important. As an extension you could have your students go find a collection of something in their house and then repeat the activity with their own items. Be sure to set a time limit, so they aren't rushing around too quickly or disappearing for too long.

## Assessment

Put this [image](#) on your Smartboard/Screen. Ask students to use a piece of paper to list 2 different ways they could group the objects and explain why for each.

*Scoring rubric out of 100 points*

For each plausible way to group the objects

**25 points (total 50 points)**

For each plausible explanation for why they picked the grouping

**25 points (total 50 points)**

## Cross-Curricular Extensions

### **STEM Extension**

Have students use a computer/tablet to make tables and graphs to depict the 3 different ways they grouped their objects. To do this they must not only know how they would group their objects, they must group them, name the groups and count the items in each group (6.EE.9)

## Resources

### **Teacher Reference Books**

Raven, Peter H. and George B. Johnson. *Biology: Sixth Edition*. McGraw-Hill Companies. New York. 2002

Darwin, Charles. *The Origin of Species by Means of Natural Selection*.

<http://www.talkorigins.org/faqs/origin.html>

### **Teacher Reference Websites**

*Natural History Museum*

<http://www.nhm.ac.uk/nature-online/science-of-natural-history/taxonomy-systematics/what-is-taxonomy/>

Great website for basic taxonomy information and history.

*How Stuff Works*

<http://science.howstuffworks.com/life/biology-fields/taxonomy-info2.htm>

Website for basic taxonomy information as well as a list of each Kingdom and the Phyla that are within each.

*International Union for Conservation of Nature*

<http://www.iucnredlist.org/>

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List of species that are of conservation concern.

*National Center for Biotechnology Information*

<http://www.ncbi.nlm.nih.gov/taxonomy>

Database for the taxonomy of most organisms