

# It's Classified

## Teacher Guide

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Grade Levels: 9 — 12

### Program overview

Students will discuss why and how scientists identify and classify organisms. Students will then divide into small groups and identify specimens from the museum collection based on clues found at each station around the room. Students will need to measure different characteristics, describe qualitative characteristics, and create their own specimen descriptions for the “mystery” specimen at each station. We will conclude the program by having student groups share their answers from one station that they visited and then briefly discuss how classification and taxonomy are components of understanding the natural history of a species.

P.A.S.S.

### BIOLOGY I

Science Process – 1.1, 2.1,  
2.2, 4.7

Biological Diversity – 3.1, 3.2

### Objectives/Student Learning Outcomes

After participating in this program, students will be able to

- Identify important characteristics for distinguishing species of mammals, amphibians, reptiles, birds, trilobite fossils and/or snail shells.
- Discuss the purposes for identifying and classifying organisms.
- Understand and use qualitative and quantitative characteristics to identify organisms.

### Background

Scientists name and classify organisms as a means of organizing them into different groups. Carl Linnaeus (1707 – 1778), a Swedish botanist, developed a system for classifying living things that is the foundation for modern **taxonomy**, the science of describing, naming and categorizing organisms. A significant innovation of Linnaeus is the development of **binomial nomenclature**, a formal system for naming **species**. A species is assigned a two-part, Latin name that is a combination of a **genus** name and a specific second term (sometimes referred to as **specific name** or **species name**) that uniquely identify a species. For example, *Canis latrans* is the binomial name for coyote. No other species can have this same binomial name.

Species are grouped based on similar characteristics and classified in a ranked hierarchy. Originally, species were grouped based on shared physical characteristics (like your students will be practicing in this program) but many groupings have been revised to reflect relationships based on genetic (DNA ) data. **Biological systematics**

is the study of the diversity of life, both past and present, and the relationships among living things through time (e.g., evolutionary relationships).

### **At the Museum**

Throughout the Ancient Life and Natural Wonders galleries, plants and animals are identified using scientific, or Latin, binomial names. While visiting the museum, have each student choose an animal on exhibit and create a list of characteristics to identify his/her plant or animal. Students can compile their descriptions, add digital pictures and create a "guide" to the plants and animals of the museum galleries.

### **Supplementary/Enrichment Activities**

#### **Science**

1. Create a classification system for items in your school, community, or other defined area. Have students name the items in their system, describe them in detail using both qualitative and quantitative characteristics, and arrange them in a consistent classification hierarchy. Test the system by introducing a new item and ask students to place the item according to the system.

### **Additional Resources**

#### **NCBI Taxonomy Browser**

<http://www.ncbi.nlm.nih.gov/Taxonomy/tax.html/>

Do a search at NCBI (National Center for Biotechnology Information) to retrieve the complete lineage of your species. This database does allow searches by common name and is very complete. If you do not find your species, try a variation on the name, ex: *crayfish* instead of *crawfish* or *mangroves* vs. *mangrove*. If you need guidance, use the online help sheet.

### **VOCABULARY**

**Aperture** – An opening; Gastropods: the opening in the shell through which the head and foot protrude.

**Beak** – The mouth of a bird.

**Biological Classification** – The method that biologists use to group and categorize species of organisms.

**Calipers** – An instrument used for measuring internal and external dimensions, composed of 2 curved hinged legs.

**Canine** – The teeth that are pointed and conical in shape and positioned between the incisors and premolars, in the upper and lower jaws.

**Carapace** – The upper shell of a turtle.

**Gastropod** – Snails, slugs, or sea slugs. A mollusk of the class Gastropoda, with a single shell and a broad, muscular 'foot' for locomotion. The term means "stomach foot."

**Incisor** – The front cutting teeth, located forward of the canine teeth in the upper and lower jaws.

**Molar** – The rear grinding teeth located behind the premolars in the upper and lower jaws.

**Plastron** – The lower shell of a turtle.

**Pre-molar** – Teeth positioned just after the canines and just before the molars in the upper and lower jaws.

**NatureServe: an online encyclopedia of life**  
<http://www.natureserve.org/>

"Welcome to NatureServe, a source for authoritative conservation information on more than 50,000 plants, animals, and ecological communities of the United States and Canada. NatureServe provides in-depth information on rare and endangered species, but includes common plants and animals too. NatureServe is a product of the Association for Biodiversity Information in collaboration with the Natural Heritage Network."

**Qualitative** – Relating to physical appearance or features.

**Quantitative** – Relating to the number or amount, measurement.

**Skull** – The skeleton of the vertebrate head or the bony framework of the head that protects the brain.

**Species** – A species is often defined as a group of organisms capable of interbreeding and producing fertile offspring.

**Systematics** – The study of the diversity of life, both past and present, and the relationships among living things through time (e.g., evolutionary relationships).

**Taxon** (Taxa plural) – A name designating an organism or group of organisms, often referred to as a taxonomic unit.

**Taxonomy** – The science of describing, naming and categorizing organisms.

**Taxonomist** – Scientist that studies taxonomy or the characteristics of organisms.

**Trilobite** – A fossil arthropod from the Cambrian and Silurian Periods, with three body segments, lived 300-500 MYA.