

How Do Scientists use Cladograms and Phylogenetic Trees to Study Past Relationships?

Essential Question: How do organisms continue to adapt to their environment?

Focus Question:

- How do scientists use cladograms and phylogenetic trees to study past relationships
- What characteristics help scientists classify organisms?
- What is a cladogram?
- What is a phonetics?

Preview:

- In the past, biologists would group organisms based **solely** on their **physical appearance**.
 - Today, with the advances in genetics and biochemistry, biologists can look more closely at individuals to discover their pattern of evolution, and group them accordingly
 - this strategy is called **EVOLUTIONARY CLASSIFICATION**

Vocabulary to remember

1. **Cladistics**: is a branch of biology that determines the evolutionary relationships between living things based on derived (resulting) similarity
 - a. **Cladogram**: is a diagram that depicts evolutionary relationships among groups.
 - It is based on **PHYLOGENY**, which is the study of evolutionary relationships.
 - Sometimes a cladogram is called a phylogenetic tree (though technically, there are minor differences between the two)
2. A **phylogeny** (or phylogenesis) is the origin and evolution of a set of organisms.
 - a. **Phonetics** groups organisms based on overall similarity, and from more traditional approaches based on "key characters".
 - A major task of systematics is to determine the ancestral relationships among known species (both living and extinct)
 - The most commonly used methods to infer phylogenies include cladistics and phonetics.

Think:

- Name 2 organisms that you believe are closely related. Why do you think they are?

Traditional Systematics

- Scientists have traditionally used similarities in appearance and structure to group organisms. However, this approach has been problematic.
- Some groups look similar but turn out to be distantly related.
- Other groups look different but turn out to be closely related.

Phylogenetic