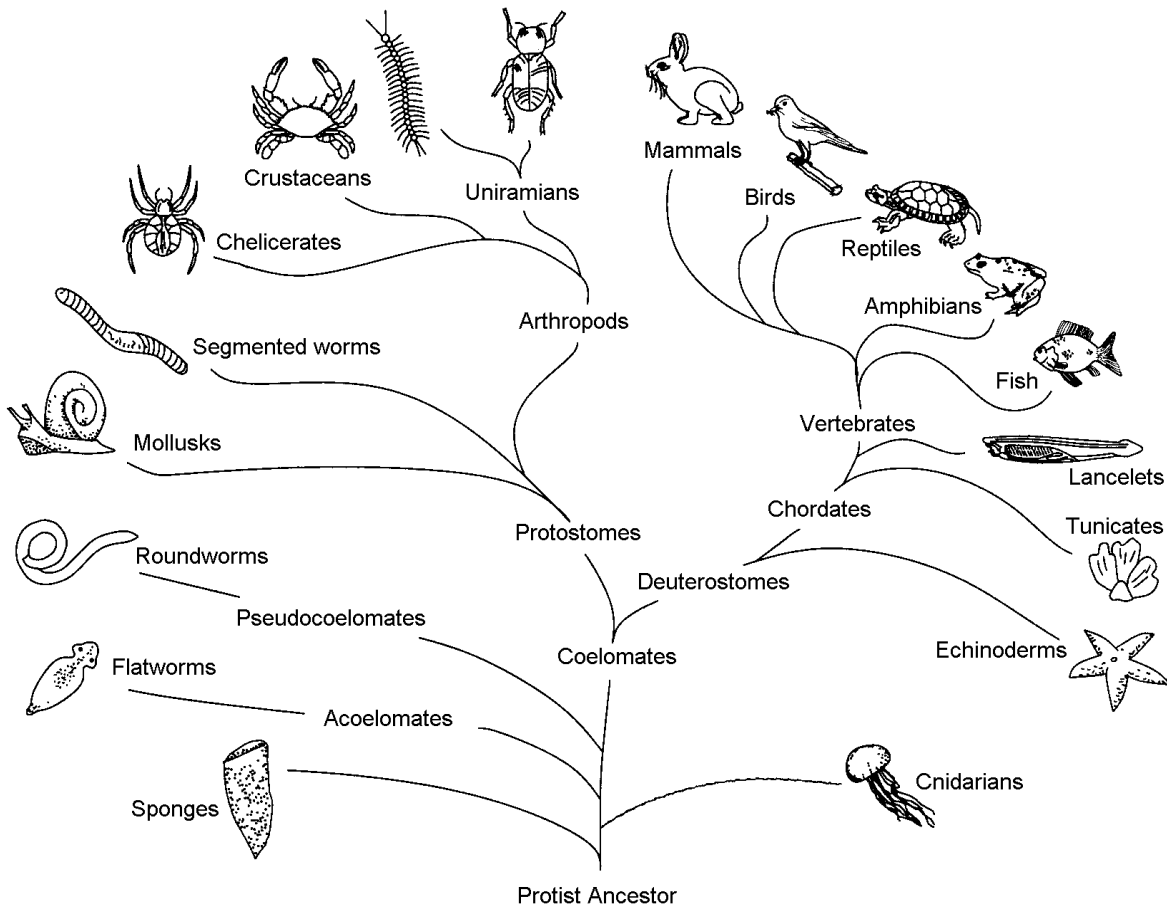


**Background Information**

Scientists use organized diagrams to arrange information about different organisms. A phylogenetic tree is an example of such a diagram. In this activity you will examine a phylogenetic tree in order to determine the evolutionary relationships that exist among several groups of organisms.

**Procedure**

Now examine the phylogenetic tree below, and answer the questions that follow.



1. Explain how a phylogenetic tree is arranged.

2. What is the basis for the division of animals into protostomes and deuterostomes? How does this differ from the basis for the division of animals into acoelomates, pseudocoelomates, and coelomates?
  
3. The cnidarians, roundworms, and annelids are on separate branches of the phylogenetic tree, yet they all have similar skeletons. Describe the type of skeleton that these animals have.
  
4. Which branches of the tree include animals with endoskeletons?
  
5. Where on the tree do you find animals that break down their food primarily through intracellular digestion - on the bottom or on the top of the tree?
  
6. Which two branches of the tree include organisms that have only a single opening through which food enters and through which solid wastes are expelled?
  
7. Which branches of the tree include organisms with closed circulatory systems?
  
8. Describe some trends in the evolution of the nervous system using examples from the tree.
  
9. Some of the more complex animals can reproduce asexually by developing offspring from unfertilized eggs (parthenogenesis). Many of the simple invertebrates have different methods of asexual reproduction. Describe two such methods.

Tables often make it easier to study large amounts of information and also to establish trends among existing groups of organisms. During their evolution, vertebrates have branched off into an enormous diversity of habitats and life styles and have developed many adaptations. In this activity, you will organize information that you have learned about vertebrates and summarize some of the trends shown in your tables.

**Procedure**

Complete the table with the appropriate information.

	<b>Fish</b>	<b>Amphibians</b>	<b>Reptiles</b>	<b>Birds</b>	<b>Mammals</b>
<b>Habitat</b>	water				
<b>Circulatory pathway</b>	single loop				
<b>Number of heart chambers</b>	2				
<b>Structures for gas exchange</b>	gills				
<b>Excretory Structures</b>	gills and kidneys				
<b>Nitrogenous waste produced</b>	ammonia				

1. What relationship exists between the number of circulatory pathways and the number of chambers the hearts has?
  
2. What is the relationship between the habitat of the organism and the structures used for gas exchange?
  
3. How does the type of nitrogenous waste excreted relate to the conservation of water in each group?

In addition to differences among individual systems and structures, methods of reproduction and development also vary among vertebrates. Complete the table in order to observe these trends in variations.

	<b>Fish</b>	<b>Amphibians</b>	<b>Reptiles</b>	<b>Birds</b>	<b>Mammals</b>
<b>Habitat</b>	water				
<b>Type of fertilization</b>	external				
<b>Type of development</b>	oviparity				
<b>Number of eggs produced</b>	many				

4. What relationship exists between an organism's habitat and its method of fertilization?
  
5. How does the number of eggs produced relate to the type of fertilization?
  
6. The type of fertilization and the number of eggs produced often indicate the amount of parental care of the offspring. Use the table to predict the amount of parental care given by each vertebrate group.