

EVOLUTION DRY LAB

Name _____

Partner _____

All organisms are grouped into kingdoms like Plantae and Animalia. A kingdom is further divided into **phyla** (plural) or **phylum** (singular). A phylum is a **group of organisms with a certain degree of evolutionary relatedness**. Humans belong to the kingdom of animals and the phyla **Chordata**, animals with a spinal cord. Other animal phyla include Mollusca (snails, squid, clams), Annelida (worms, leeches) and Arthropoda (spiders, insects and crustaceans).

Phylogeny is the **evolutionary history of a group of organisms**. A family tree or **phylogenetic tree** shows the evolutionary descent of the organisms from a common ancestor. In this activity different nails, screws and other hardware will represent different species in the same phylum. The hardware represents fossils from different species. All of the “species” descended from a common ancestor. The task is to organize all of the hardware into a “family tree” showing degrees of relatedness based on “genetic traits” like shape and size.

Materials: A package of 21 hardware items.
Count the items before starting.
A labeled diagram of all the items on the last page of this lab.
Some items are sharp so handle them carefully.

Procedure

1. Examine all the pieces.
2. Determine the common ancestor.
3. Organize a **phylogenetic tree**. Show small changes in size or shape in a straight line.
4. Decide when to make a branch in the family tree based on large changes in the shape and/or size of each object. On your cutout diagram, state **why** each branch in the family tree is required. [1]
5. Record the results in the box on the next page. Use the letters from the diagram and **arrows to show descent** of one species from another. For example,
L □ B □ J [1]
6. Highlight species you refer to in questions #5 and 6. [1x2=2]

Note: **There is no one correct answer. Many logically correct possible solutions exist.**

Results: Proposed Phylogenetic Tree – rough sketch-use the letter labels. [2]



Analysis – All answers must refer to a species using the letter names. Answers without letters will receive a mark of zero.

- 1.a) What is the common ancestor? Explain your choice. [2]

- b) What is one trait from the common ancestor that is found in all the descendents? [1]

- c) What is one trait in the common ancestor that has been lost in some of the descendents? [1]

2. Describe an adaptation that occurred between two species. [1]
3. Describe a location where a trait is **not** passed on to the subsequent species. [1]
- 4.a) Which three species are the most closely related? Explain. [2]
- b) How is this close evolutionary relationship shown in the phylogenetic tree? [1]
5. Describe a situation that corresponds to homologous traits. Highlight species you refer to in this question. [2+1]
6. Describe a situation that corresponds to analogous traits. Highlight species you refer to in this question. [2+1]
7. Describe one branching point in the phylogenetic tree. Be sure to explain the major trait change that required a branch to be made. [3]

8. Cut out all the items on the diagram on the next page and paste them on the back page so they match your proposed phylogenetic tree. **Be sure to keep the letters with the pictures.** There must be a reasonable line of descent for all the species.
[4+1=5]

