

Name: _____
Date: _____
Period: _____

Evolutionary Tree of Pasta

Learning purpose:

Background: Biologists try to understand the relationships that exist among different species. A simple diagram can be used to represent these relationships. Scientists term this type of diagram a branching tree diagram (phylogenetic tree). In addition, scientists assume that organisms that share many traits in common are likely to share a common ancestor as well (shared derived characteristics). The basis of biological classification is physical structure, although other criteria are also used. Other criteria include embryonic, genetic and biochemical similarities. In today's lab you will assume that all the pastas have evolved from one primitive ancestor.

Materials: pasta specimen (assorted) Branching tree worksheet

Procedure:

1. Obtain the specimen of assorted pasta. Observe and sketch each of your pasta pieces. Record in Table 1.
2. Sort and group your pasta members into related groups (**classification**). Consider the sizes and shapes of the different specimen.
3. Now place your pasta on the branching tree (phylogenetic) under Figure 1. The most **primitive** pasta should be placed in the circle labeled A. Record the letter associated with each pasta specimen on the phylogenetic tree on to Data Table 1.
4. On Data Table 1 explain the basis for your choice of pasta location on the tree.

Analysis:

1. What is the evolutionary relationship between B and D? Between E and M?

2. What evidence besides physical features do scientists use to determine the evolutionary relationships between organisms?

3. What might have caused the pasta to change over time or branch into a new species or even become extinct?

4. What evidence do scientists have for the theory of evolution?

5. **Extension:** In the eighteenth century, Carlos Linneaus devised a system for naming organisms that is still used to the present day. This system is known as **binomial nomenclature**, because each organism is given two names in Latin. The two names are the **Genus** (always capitalized) and the **species** (always lower case). Examples are *Homo sapien* (humans), *Canis familiaris* (dogs), *Canis lupis* (wolves). Choose any 4 organisms (pastas) and give them a **scientific name**. (Bonus for all 7)

Letter/Type of pasta	Scientific Name – <i>Genus species</i>

How did you decide on some of the names (example: homo in Latin is man. Sapien in Latin is wise. Erectus in Latin is straight up. Habilis in Latin is skillful. So all human ancestors were given Latin names based on their new characteristic in evolution.)

Data Table 1: Record observations about pasta specimen.

Sketch of Pasta	Physical Characteristics (size)	Letter on Family Tree	What was the basis for your choice of pasta on the phylogenetic tree? *

* This is your scientific basis for evolution.

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Evolution of an Organism



Learning Standards: Biological evolution accounts for the diversity of species developed through gradual processes over time. 3a. Both genetic variation and environmental factors are causes of evolution and diversity of organisms. 3d. Construct a simple branching diagram to classify living groups of organisms by shared derived characteristics and expand the diagram to include fossils.

Goal:

The goal of this group project is threefold: 1) to research each of the time periods in earth's history. 2) to use this information to determine the evolution of an imaginary organism and design a cladogram. 3) to analyze the results of your cladogram.

Research Directions:

1. There are 11 time periods to research
 - A. Cambrian
 - B. Triassic
 - C. Jurassic
 - D. Cretaceous
 - E. Paleocene
 - F. Eocene
 - G. Oligocene
 - H. Miocene
 - I. Pliocene
 - J. Pleistocene
 - K. Recent

2. Assign at least two time periods to each member of your group.

3. Each member of the group shall take notes on a piece of binder paper or a word/Google document. Using **at least 2** valid websites, you must find the following information:

- A. When was this time period? (mya)
- B. What did the earth look like during this period? (land/water formations, rock strata?)
- C. What type of organisms do we know existed from the fossil record during this period? Name at least 2 organisms. (horses appear, abundance of huge, tropical plants)
- D. What were some major classifications of organisms and their physical characteristics during this period. (rise of mammals)

4. Take your notes from the binder paper or word doc and neatly print (in ink) or glue them on a 3x5 card.

Directions for Evolution Cladogram

1. What must be included in the final presentation:
 - A. Creative title
 - B. Name your organism (must have a scientific name. *Bonus points for giving scientific names to other braches of organisms on your cladogram)
 - C. All note cards must be attached in time period order.
 - D. Draw your cladogram lines in pencil first using a ruler.
 - E. Once you are sure that your cladogram is accurate, glue your organisms to the chart and redraw your cladogram lines in a dark color.