

# **Laboratory 12**

## **Evidences of Evolution**

### **Student Tip Sheet**

#### **Introduction/Fossils**

The fossil record is a topic of special interest to many professional scientists and amateurs alike. Ask your instructor if your class members may bring any fossils that they have on a shelf or in a drawer at home to class. Try to estimate their position in the fossil record. Perhaps your instructor can arrange for a resource person to help with identification. This is a great time to share special interests with each other. In the absence of such specimens or resources, pictures or articles are the next best thing. The Internet is loaded with images. Use the resources in your community to do some personal research. Think about some common misconceptions that are sometimes reinforced by movies or the popular media such as human interaction with dinosaurs. Check the time lines and see how many years separate evidence of these creatures with man on earth.

#### **Comparative Anatomy**

A tool for you to learn how to observe and compare various characteristics is a dichotomous key. The following classification exercise uses different types of screws to teach this identification technique.

### **“Why Classify?”**

Adapted from: MAN AND THE GULF OF MEXICO

supported by  
Mississippi/Alabama Sea Grant Consortium  
and  
University of Southern Mississippi  
University of South Alabama  
Gulf Coast Research Laboratory

Many of the early biologists studied the structure of organisms. As a result of these studies, many of our methods of classification (taxonomy) of plants and animals are based on the structures of organisms.

In any plant or animal, there may be hundreds, even thousands, of characteristics that appear to separate it from all other organisms. Experience has shown, however, that most of these are not extremely important in determining the species of the organism. Usually only a few characteristics are valuable in determining the species. But if you were given an organism to classify you would probably be both amazed and confused by the large number of characteristics that are present. Which characteristics do you use in classifying this organism? The answer is simple, you must center your attention on just a few critical characteristics and disregard the others. Wouldn't it be nice if the plants and animals on earth only showed these critical characteristics? Unfortunately, plants and animals do not exist in this manner.

Man-made items sometimes are much simpler to classify than those found in nature. This is true of some of the items in everyday use. Consider all the different types of spoons that help fill the drawers in any kitchen, or consider the different kinds of nails, pipe fittings, pins, or bullets.

To make this job of learning to use a taxonomic key easier, we have chosen to work with screws. Screws are used for many purposes and come in many shapes and sizes. Each has a specific name, much like a plant or animal. The parts of a screw are extremely simple. There is an expanded portion called the head and a long, slender portion called the shaft. Screws can be separated from nails, for example, by the fact that the shaft is threaded, that is, it has a groove spiraling around it from its point toward the head.

### **Materials:**

|   |   |
|---|---|
| 5 each of the following:                  | flat-headed wood screw  |
| round-headed machine screw                | rounds-headed wood screw  |
| hew-headed machine screw                  | flat-headed metal screw   |
| flat-headed machine screw                 | round-headed metal screw  |
| thumb-grip machine screw                  | pan-headed metal screw (Phillips head<br>and /or straight slot) |
| hew-headed metal screw (slotless and not) |   |
| pan-headed metal screw                    | eye screw   |

### **Vocabulary:**

**Genus** - a category of biological classification ranking between the family and the species.

**Species** - a group of animals or plants which possess one or more characteristics in common that distinguish them from other similar groups. These organisms usually interbreed and reproduce their characteristics in their offspring.

**Taxonomic Key**- a table in which the distinguishing characteristics of a group of plants or animals are arranged so as to make it easier to determine their names.

**Taxonomy** - classification of organisms, based as far as possible on natural relationships.

### **Screw Classification**

Using your lab samples and key, identify one screw at a time. Read each couplet as a unit. If your answer to the first statement is “yes”, go to the couplet indicated; if a name appears, you have identified your screw. If your answer to the first statement of the pair is “no”, go then to the second statement of the pair. Your answer to this must be “yes.” If you cannot give a positive answer to the second statement either, you are off the track. Return to the beginning of the key and start over, being very careful to read each statement accurately and to examine your screw meticulously.

After you identified a screw, set it aside with its proper identification indicated.

Take another screw and begin with the first couplet again. You must always begin with the first couplet.

## Key to North American Screws

1. a. Sides of shaft (threaded part) parallel (no point) ..... 2  
b. Sides of shaft tapering to a point (as in 1) ..... 6
2. a. Head with 1 or 2 slots ..... 3  
b. Head without a slot ..... 5
3. a. Head rounded on upper surface ..... Round-headed machine screw  
b. Head not rounded on upper surface ..... 4
4. a. Head flat, six-sided .....Hex-headed machine screw  
b. Head flat, tapering to shaft.....Flat-headed machine screw
5. a. Head six-sided flat on top ..... Hex-headed machine screw  
b. Head flattened parallel to plane of long axis of shaft ....Thumb-grip machine screw
6. a. Head with no slots .....7  
b. Head with 1 or 2 slots .....8
7. a. Head curved into ring .....Eye screw  
b. Head with six sides and flattened collar .....Hex-headed metal screw
8. a. Head with single slot or collar .....9  
b. Head with two slots at right angles to each other .....11
9. a. Shaft with thread all the way up to the head, pan head .....Pan-headed metal screw  
b. Shaft with unthreaded area below head .....10
10. a. Head flat .....Flat-headed wood screw  
b. Head rounded .....Round-headed wood screw
11. a. Head flat .....Flat-headed metal screw  
b. Head not flat .....12
12. a. Head round .....Round-headed metal screw  
b. Head pan ..... Pan-headed metal screw

### Binomial Nomenclature

The following exercise gives you some practice in properly writing a specific epithet. Many mistakes are made in the written media. Cut out any errors that you find as you read about particular organisms in the newspaper or magazines and bring them in to class.

### Binomial Nomenclature

All living organisms can be classified into kingdom, phylum, class, order, family, and some sub or super group of these categories. Beyond this, each known organism is given a Latin or Latinized double name that constitutes its scientific name and distinguishes it from all others. Thus, the scientific name of the black bear is *Ursus americanus*, the first name being the Genus name and the second the specific name.

When writing a scientific name, the Generic name always begins with a capital letter and the species begins with a small letter. Furthermore, the scientific name is always written in *italics* or underlined. If the Genus name is all that is necessary, then the species may be abbreviated as *sp.* For example oak trees may be referred to as *Quercus sp.*

Make corrections to the following scientific names:

Canis Familiaris (dog)

---

*felix domesticans* (house cat)

---

Paramecium

---

**Ontogeny Recapitulates Phylogeny**

The whole last section of this chapter defines and describes this expression from classical biology. After you complete this lab you will understand this descriptive expression of how an individual's embryological development mimics the evolutionary tree of lesser beings.