

Classification

31

You are constantly using systems of classification in everyday life. For example, you are classified by year in school, age, and color of hair. A phone book or a coin collection are other examples of information or items that are classified for ease in handling.

Taxonomy is that area of life science dealing with classification of living organisms. The value of a classification system to science is threefold. First, it shows relationships among organisms by grouping together living things that have similar characteristics. Second, the last two divisions of the classification system give the scientific name for each organism. Third, the two word name of an organism in the classification system is the same worldwide.

Group names have been established to simplify the complex process of classifying living things. For example, the largest group is referred to as a kingdom. Each kingdom is divided into several smaller groups called phyla (singular, phylum). After successive divisions into smaller and smaller groups, the genus and species are reached. Each living thing is named by its genus and species.

In this investigation, you will

- (a) prepare a classification of some common objects.
- (b) place these objects into kingdoms, phyla, and classes.
- (c) give names to each kingdom, phylum, and class.

Materials

thumbtack
glass slide
seed
rubber band

test tube
paper clip
pin
pencil

match
penny
wool strand
plastic tie

chalk
file card

Procedure

Part A. Forming Kingdoms

• Place the objects given to you into two groups. You decide what trait to use as a basis for separating the two groups. Call them Group 1 and Group 2. Equal numbers of objects do not have to be in each group.

1. List the objects that you placed into Group 1.

2. List the objects that you placed into Group 2.

3. What trait was used as a basis for placing objects

(a) into Group 1? _____

(b) into Group 2? _____

4. (a) Using the characteristic or trait in question 3a, design an appropriate but brief name for Group 1. The name should describe the trait you used. (For example, large size group or

metal group.) _____

- (b) Using the characteristic or trait in question 3b, design an appropriate but brief name for Group 2. The name should describe the trait

you used. _____

• If these had been living objects, they would have been placed into groups called kingdoms.

Many biologists group living things into six Kingdoms – Eubacteria, Archaeobacteria, Protista, Fungi, Plantae and Animalia.

Part B. Forming Phyla

- Return to the objects that belong only in Group 1. Regroup these objects into two new groups. Equal numbers of objects do not have to be in each group. Refer to these as Group 1A and Group 1B.

5. List the objects placed into Group 1A. _____

6. List the objects placed into Group 1B. _____

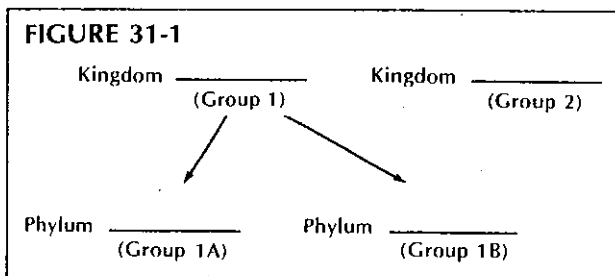
7. (a) What trait was used as the basis for grouping these objects into Group 1A? _____

(b) Based on the trait used, design an appropriate but brief name for Group 1A. _____

8. (a) What trait was used as the basis for grouping these objects into Group 1B? _____

(b) Based on the trait used, design an appropriate but brief name for Group 1B. _____

- If these objects were living, they would have been placed into groups called phyla. Therefore, your answers to questions 7b and 8b are phylum names. There can be many phyla in each kingdom.



9. Complete Figure 31-1 of your classification scheme so far. Place in the spaces provided the brief name you used in questions 4a, 4b, 7b, and 8b.

10. Are all objects in both phyla also grouped into the same kingdom? _____

- Take the objects of Group 2 and regroup them into three phyla. You decide what to use as a basis for separating the three groups. Equal numbers of objects do not have to be in each group. Refer to these groups as Groups 2A, 2B, and 2C. These groups also would be phyla.

- Decide on brief names which could be used to describe the groupings you made.

11. Complete Figure 31-2 of your classification with the names you have chosen.

Part C. Forming Classes

- Objects in each phylum can be separated further into groups called classes. Each phylum may have several classes.

- Take only the objects in Phylum 2A and separate them into two classes. Refer to them as Groups 2AI and 2AII.

12. (a) Design an appropriate but brief name for Group 2AI. _____

(b) Design an appropriate but brief name for Group 2AII. _____

13. (a) Fill in the following information for any object in Class 2AI. Use the names you have chosen.

Kingdom _____

Phylum _____

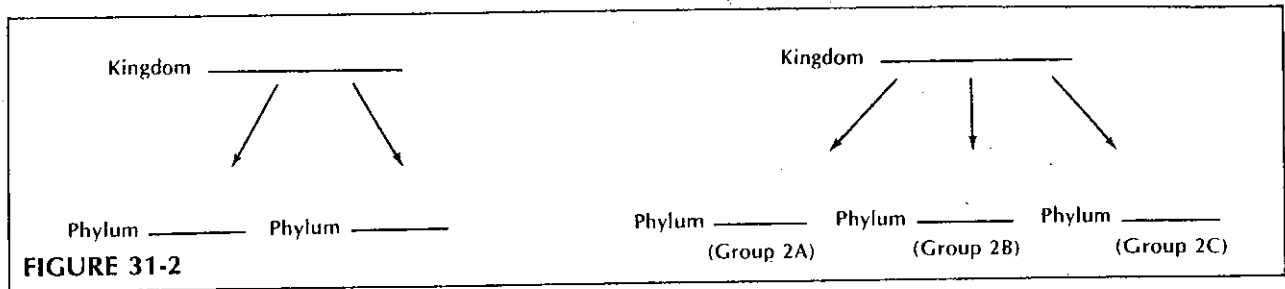
Class _____

(b) Fill in the following information for any object in Class 2AII. Use the names you have chosen.

Kingdom _____

Phylum _____

Class _____



14. (a) Must all objects in the same class also belong to the same phylum? _____
- (b) Must all objects in the same phylum also belong to the same kingdom? _____

• If you were to continue classifying the objects, new group names would appear. For example, classes are broken down into orders, orders into families, families into genera, and genera into species. Thus, the classification of living things is: kingdom, phylum, class, order, family, genus, and species.

Analysis

1. List three reasons scientists classify living organisms. (HINT: Read the introduction.)

2. List the first three group names used in classifications from largest to smallest groups. _____

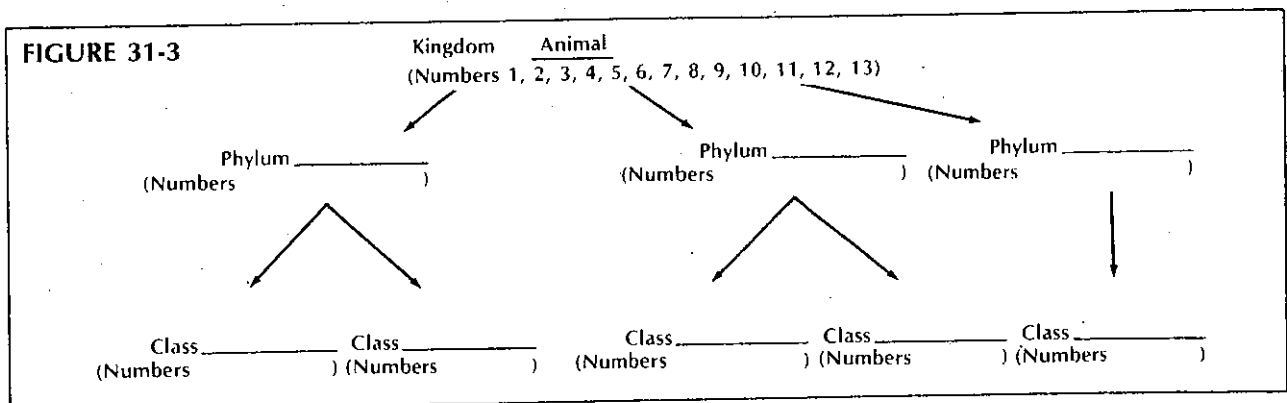
3. (a) In Part A, what trait did you use to form Group 1 (Kingdom 1)? _____

- (b) In Part A, what trait did you use to form Group 2 (Kingdom 2)? _____

- (c) If given a test tube cork and a nail, into which of your kingdoms would each of these two objects be placed? _____

4. All of the organisms on page 124 belong to the animal kingdom. Design a classification grouping the animals into the outline provided.

- (a) Using the numbers only of each animal, list those animals belonging to each phylum and class in the space marked Numbers.
- (b) Choose a suitable name for each phylum that helps to show the trait you used for your grouping. Write the name on the blank provided.



(c) Choose a suitable name for each class that helps to show the trait you used for your grouping. Write that name on the blank provided.

5. According to the classification scheme in question 4,

(a) must each phylum contain equal numbers of organisms? _____

(b) must each phylum be separated into the same number of classes? _____

6. A student grouped the animals on page 124 into the following two phyla:

Phylum I—numbers 1, 4, 5, 10, 12

Phylum II—numbers 2, 3, 6, 7, 8, 9, 11, 13

What may have been the basis for grouping the animals in this way? _____

7. A different student grouped the animals in Figure 31-4 into the following two phyla:

Phylum I—numbers 1, 3, 4, 5, 6, 7, 8, 9, 10, 12

Phylum II—numbers 2, 11, 13

What may have been the basis for grouping the animals in this way? _____

8. (a) Must all animals belonging to the same class also belong to the same phylum? _____

(b) Explain. _____

9. (a) Must all animals belonging to the same phylum also belong to the same class? _____

(b) Explain. _____

10. (a) In the animal kingdom, one phylum is the chordates. Humans, birds, snakes, and frogs belong to this phylum. What may be the trait being described in this phylum name? _____

(b) The class Amphibia contains frogs and salamanders. What may be the trait being described in this class name? _____

11. Do the traits being used to separate organisms into classes appear to be more general or more specific than those used in separating organisms into kingdoms? _____

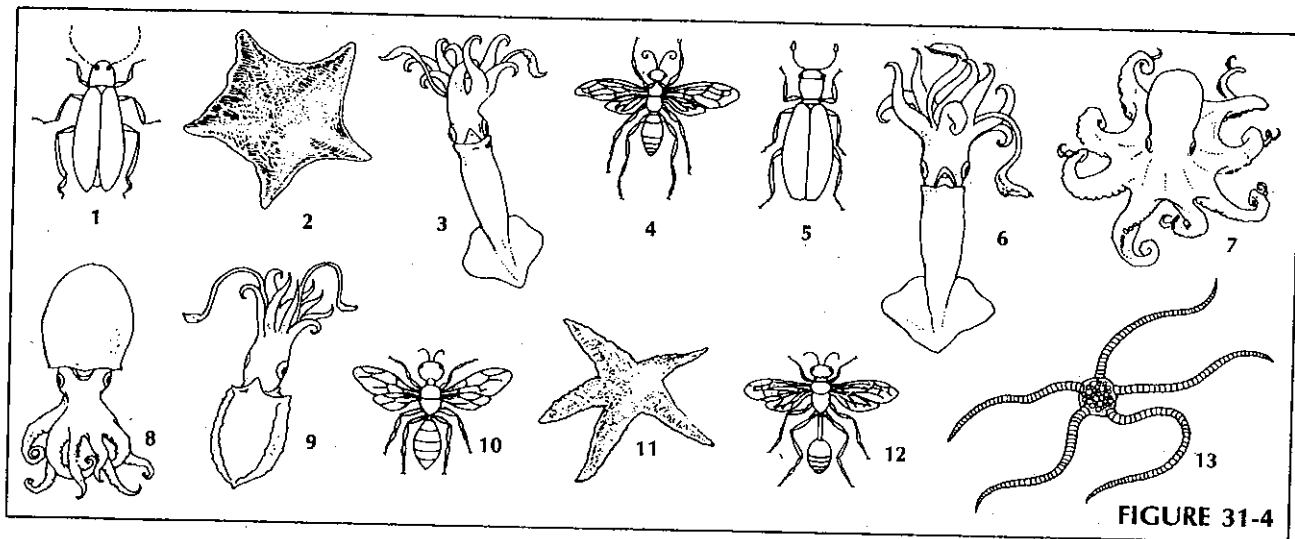


FIGURE 31-4