Name _____ Date _____ Class _____

CHAPTER 15 DIRECTED READING

Classification of Organisms

▶ Section 15-1: Categories of Biological Classification

Scientists Assign Organisms Two-Word Names

Complete each statement by writing the correct term or phrase in the space provided.

1. The science of naming and classifying organisms is called _____ .
2. The Greek philosopher and naturalist Aristotle grouped plants according to their _____ similarities.
3. Linnaeus's two-word system for naming organisms is called _____ _____ .
4. _____ is the basic biological unit in the Linnaean system of biological classification.
5. A(n) _____ is a taxonomic category containing similar species.
6. The scientific name of the willow oak is _____ _____ .
7. The common name of *Quercus rubra* is the _____ _____ .

Complete each statement by underlining the correct term or phrase in the brackets.

8. The first word of a scientific name is the [species / genus].
9. Oak trees are placed in the [species / genus] *Quercus*.
10. People in Great Britain call [*Erithacus rubicula* / *Turdus migratorius*] a robin.
11. The correct abbreviation of the scientific name for modern humans is [*H. sapiens* / *h.s.*].

(continued on next page)

Scientists Use a System to Classify Organisms

Study the following categories of classification. Determine the correct order of the categories from largest to smallest. Write the number of each category in the space provided.

_____ **12.** phylum

_____ **13.** class

_____ **14.** species

_____ **15.** family

_____ **16.** order

_____ **17.** kingdom

_____ **18.** genus

Read each question, and write your answer in the space provided.

19. What are some of the other taxonomic levels in addition to the seven major levels?

20. How do taxonomists decide which organisms to place in each level?

21. What are the six kingdoms for classifying organisms?

▶ Section 15-2: How Biologists Classify Organisms

How Biologists Recognize Species

Mark each statement below T *if it is true or* F *if it is false.*

_____ 1. According to the biological species concept, the members of the same species actually interbreed or have the ability to interbreed.

_____ 2. In practice, modern biologists determine species by studying an organism's features.

_____ 3. Wolves and dogs are members of the same species because they can produce fertile offspring.

_____ 4. The biological species concept does not apply to organisms that reproduce asexually.

_____ 5. There are fewer than 1 million described species.

_____ 6. A drawback of the biological species concept is that many different species can produce fertile hybrids.

Read each question, and write your answer in the space provided.

7. What is reproductive isolation?

8. What are hybrids?

Taxonomy Reveals Evolutionary History

In the space provided, explain how the terms in each pair are related to each other.

9. convergent evolution, analogous characters

10. cladistics, derived traits

Read each question, and write your answer in the space provided.

11. What is phylogeny?

12. Why must biologists be able to distinguish homologous traits from analogous traits?

13. What is a cladogram?

Phylogenies Give Extra Weight to Important Characters

Mark each statement below T *if it is true or* F *if it is false.*

_____ **14.** A great strength of cladograms is that they are an objective way of examining phylogenies.

_____ **15.** Evolutionary systematics places birds in a different class from reptiles.

_____ **16.** Evolutionary systematics allows biologists to use all available evidence and to exercise judgment in deciding how to classify animals.

_____ **17.** Many taxonomists give more importance to characters that made powered flight possible, such as feathers.

_____ **18.** A cladogram is based entirely on whether an organism has or does not have a characteristic.

NAME: DATE: PERIOD:

USING AND MAKING A DICHOTOMOUS KEY

(Adapted from Using and Making a Biological Key)

Classifying is a way of putting things into groups by looking at similarities. When classifying, there is usually a large group to start out with and then it gets broken down into smaller groups. The members of the small groups have many things in common. Classification makes it easy to identify things in biology and all sciences. In fact, the scientific names of organisms come from the classification system. When scientists are trying to classify an unknown organism, they will use something called a dichotomous key. This tool helps them find the name of the organism. This key has a list of specific characteristics or traits that the scientists can use to compare to the unknown organism. It is called a dichotomous key because each step along the way gives the scientists two choices and then directions of what to do next.

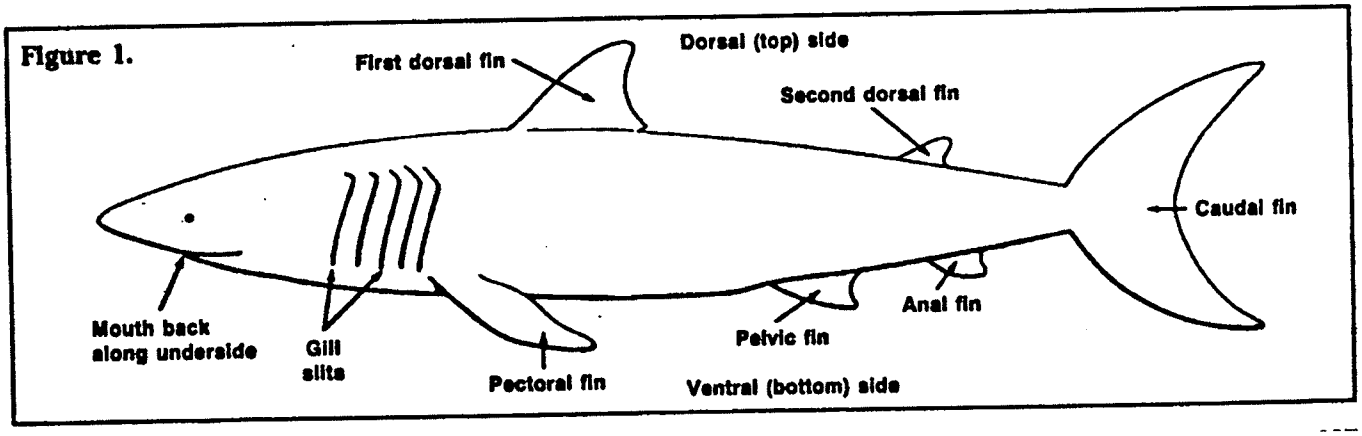
In this activity you will:

1. use a dichotomous key to identify fourteen different sharks.
2. look at how to make a dichotomous key.
3. actually make your own dichotomous key.

PROCEDURE:

1. Use the picture of the shark below to help you identify the different parts.
2. Choose one of the fourteen sharks in Figure 2 and try to identify it using the dichotomous key.
3. Start at statement 1A of the key and read the statement. If the statement is true, follow the instructions at the end. If the statement is false, go on to statement 1B. If the instructions tell you to go to another statement, then read that statement and follow the directions at the end.
4. Continue to follow the statements according the directions written in the key until you find the name of the Family the shark belongs to.
5. Write the Family name on the line provided under the picture of the shark.
6. Do this for each of the fourteen sharks but remember to ALWAYS START AT THE FIRST STATEMENT! If you start in the middle of the key or try to work backwards, you could get a wrong answer.

Figure 1.



DATA AND OBSERVATIONS

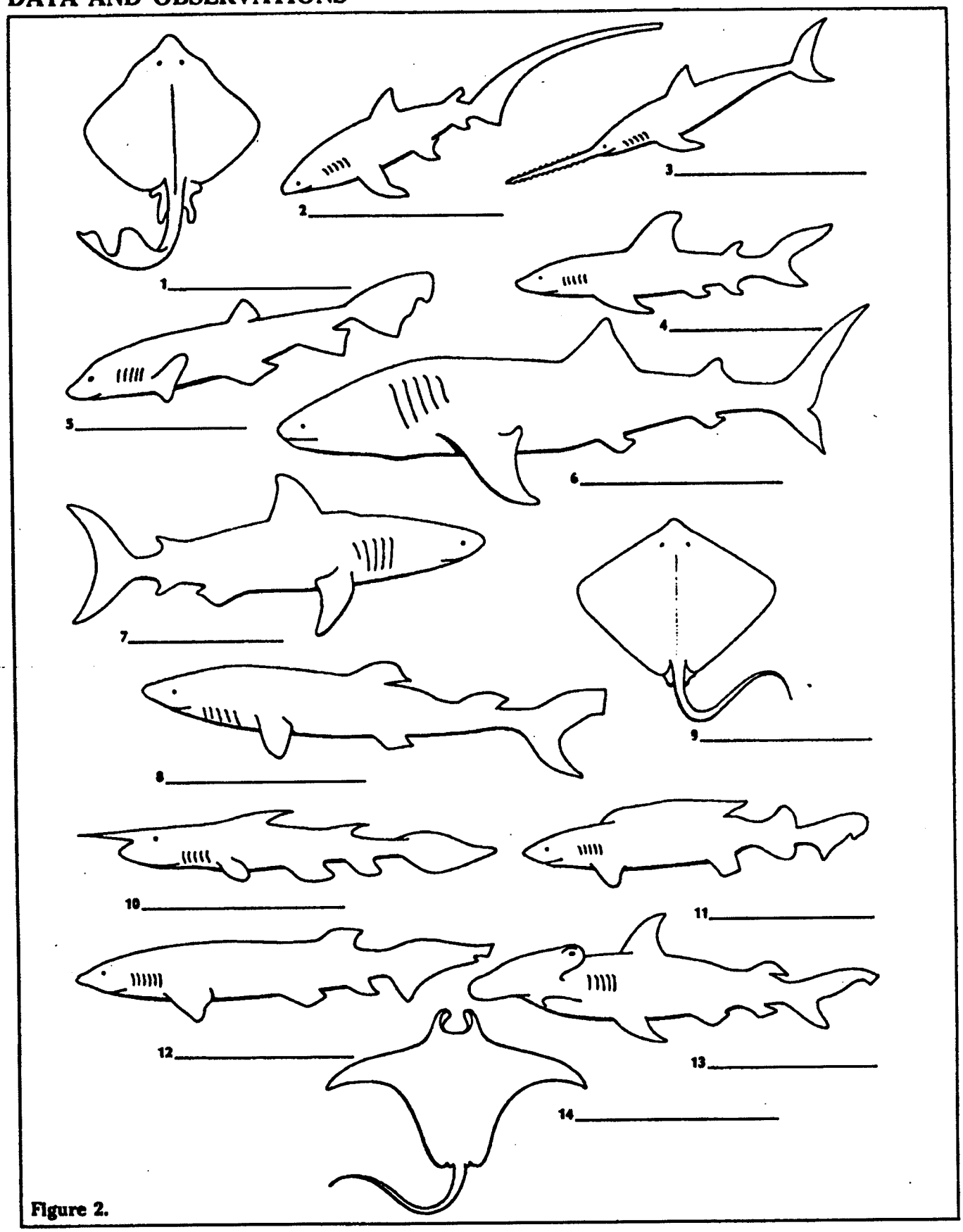


Figure 2.

The Dichotomous Key

1A. The body is the shape of a kite..... Go to statement 12
B. The body is not the shape of a kite..... Go to statement 2

2A. There is no pelvic fin and the nose looks like a saw..... Family Pristiophoridae
B. There is a pelvic fin..... Go to statement 3

3A. There are six gills..... Family Hexanchidae
B. There are five gills..... Go to statement 4

4A. There is only one dorsal fin..... Family Scyliorhinidae
B. There are two dorsal fins..... Go to statement 5

5A. The mouth is at the front of the face like a human giving it a small nose.....Family Rhinocodontidae
B. The mouth is on the underside of the head..... Go to statement 6

6A. The head goes out on the sides and the eyes are on the extensions..... Family Sphyrnidae
B. The head does not go out on the sides..... Go to statement 7

7A. The top half of the caudal fin is the same size and shape as the bottom half.....Family Isuridae
B. The top half of the caudal is different in shape and size from the bottom half..... Go to statement 8

8A. The first dorsal fin is very long, almost half as long as the body..... Family Psuedotriakidae
B. The first dorsal fin is regular length..... Go to statement 9

9A. The caudal fin is very long, almost as long as the body..... Family Alopiidae
B. The caudal fin is regular length..... Go to statement 10

10A. There is a long point (like a needle) on the end of the nose..... Family Scapanorhynchidae
B. The nose does not have a point.....Go to statement 11

11A. There is no anal fin..... Family Squalidae
B. There is an anal fin..... Family Carcharhinidae

12A. There is a small dorsal fin near the end of the tail..... Family Rajidae
B. There is not a small dorsal fin near the end of the tail.....Go to statement 13

13A. The front of the animal has two points that look like horns..... Family Mobulidae
B. The are no points that look like horns..... Family Dasyatidae