CREEPY CRITTERS

FACILITATOR

What if you discovered a completely new life form? Would you be able to determine what existing organisms it might be related to? What would you look for? How would you organize your research?

Goal

To develop a classification scheme based on the structural features of organisms and then use the scheme to classify newly-discovered organisms.

Activity Time

60 minutes

Time to Get Ready

15 minutes

What You Need

Have the following for each team of 4:

1 set of Organism Cards

1 piece of paper

1 pencil

1 pair of scissors (optional)

1 set of Newly Discovered Organism Cards

Getting Ready

- Make 1 set each of Organism Cards and Newly Discovered Organism Cards for each group of 4 participants. See Figures 1 and 2 on pages 2 through 4. If each group has a different color, it will be easier to keep them organized. You may cut and bundle the cards for each group ahead of time or have the groups do it before the activity.
- Become familiar with common examples of classification systems such as sorting items in a market, the postal system, educational levels, and libraries.
- Be aware that there is more than one way to design a classification system, and different sorting criteria may be used. Be prepared to accept any classification scheme that can be justified by the group.

Useful Information

Scientists have organized living things into large groups called kingdoms based on natural relationships. Early classification systems were based only on structural similarities. Today, we consider similarities in cell make-up, genetics, and more when classifying organisms. Plants make up one kingdom, and animals another. Protists, bacteria, and fungi make up still more kingdoms. Things are placed into a kingdom based on their similarities. The kingdoms are then divided into smaller and smaller groups. The more similar living things within a kingdom, the more closely they are grouped. The smallest group within a kingdom is a species. Members of different species cannot interbreed. This whole organizational system for living things is called "classification."

It works like this. Suppose you wanted to classify a car. See Figure 3.

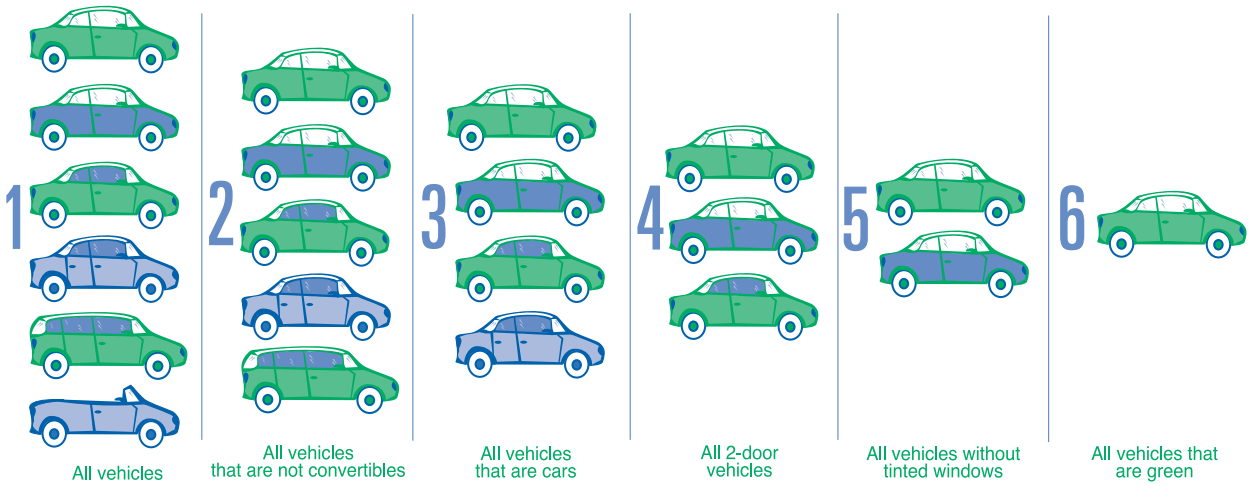


Figure 3. One way to classify cars.

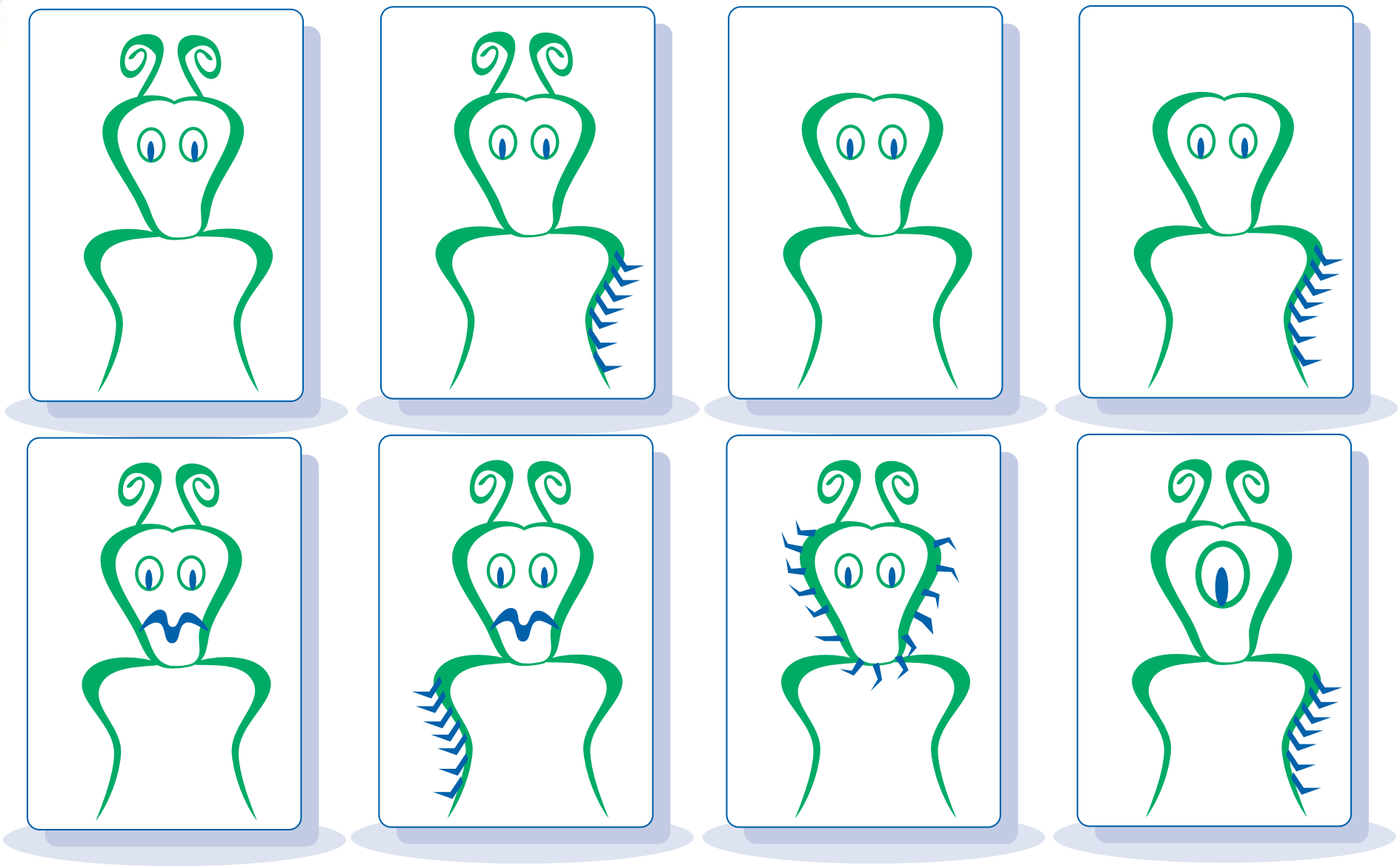
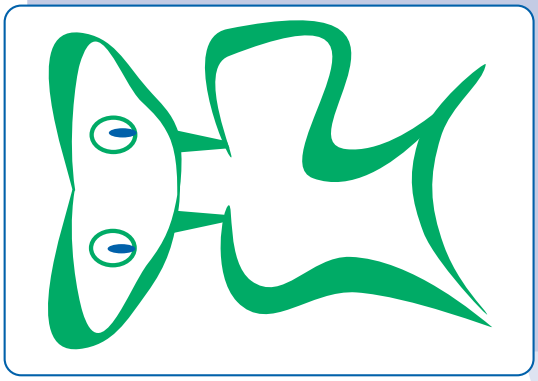
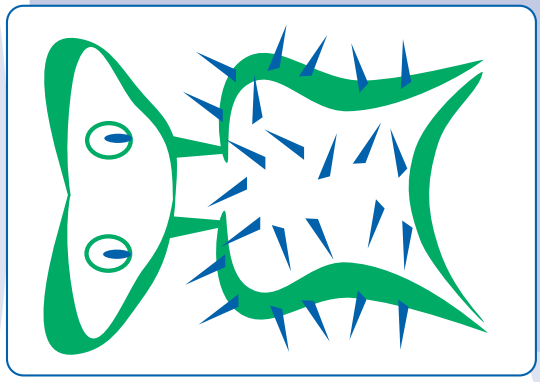
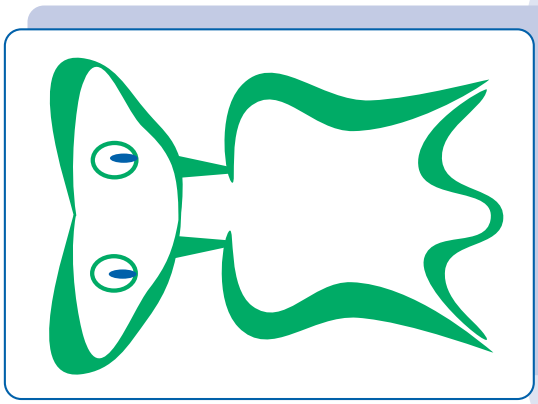
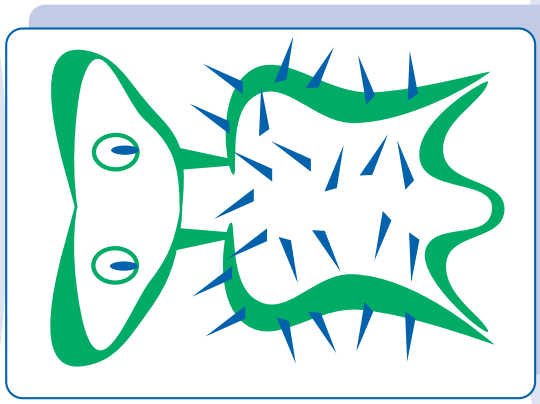
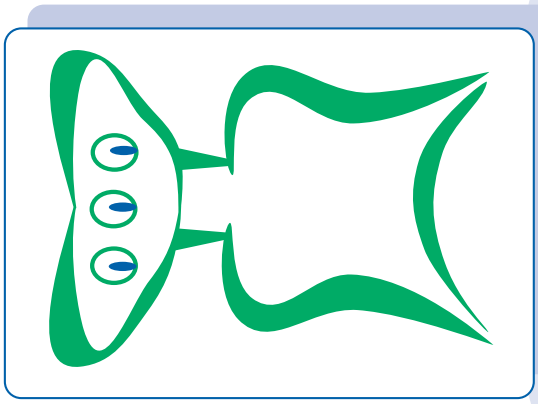
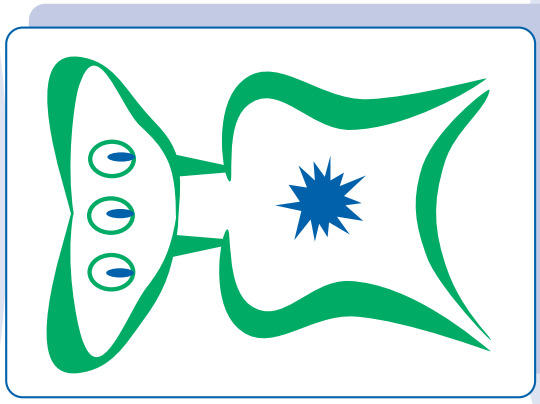
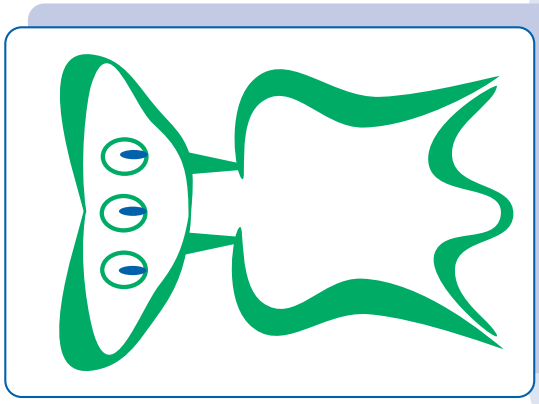
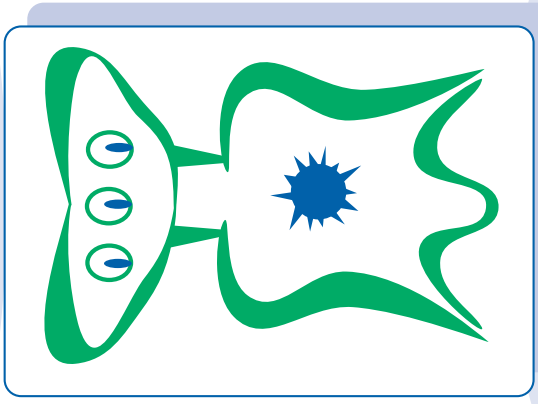
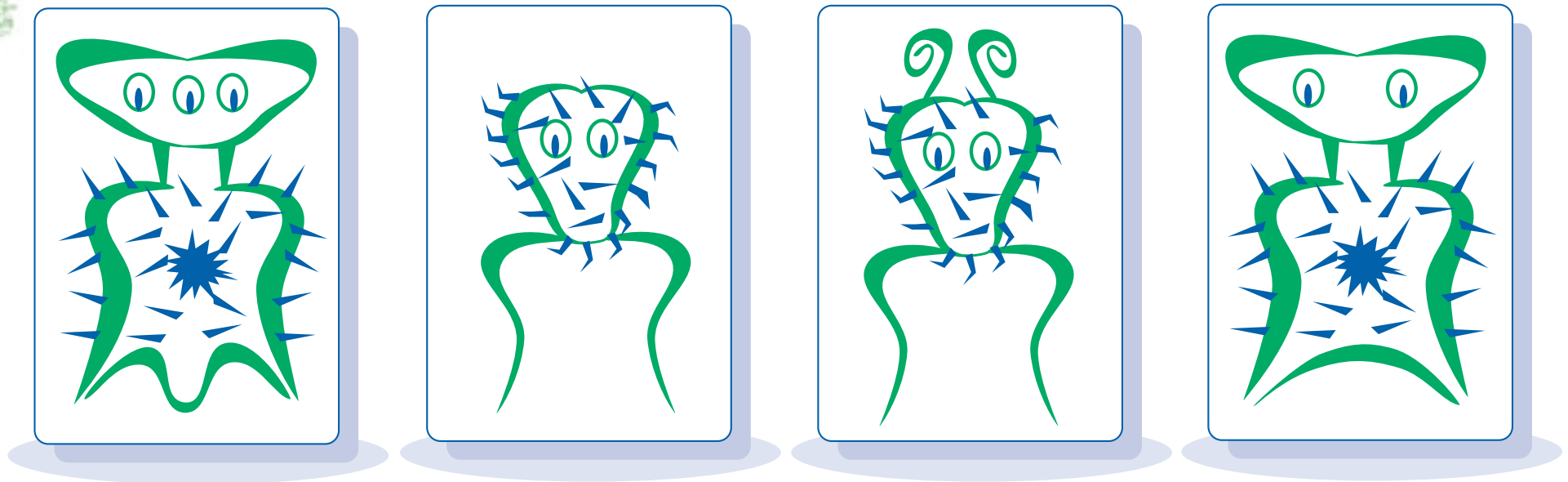


Figure 1. Organism Cards.
The 20 cards are found on pages 2, 3, and the top row of page 4.



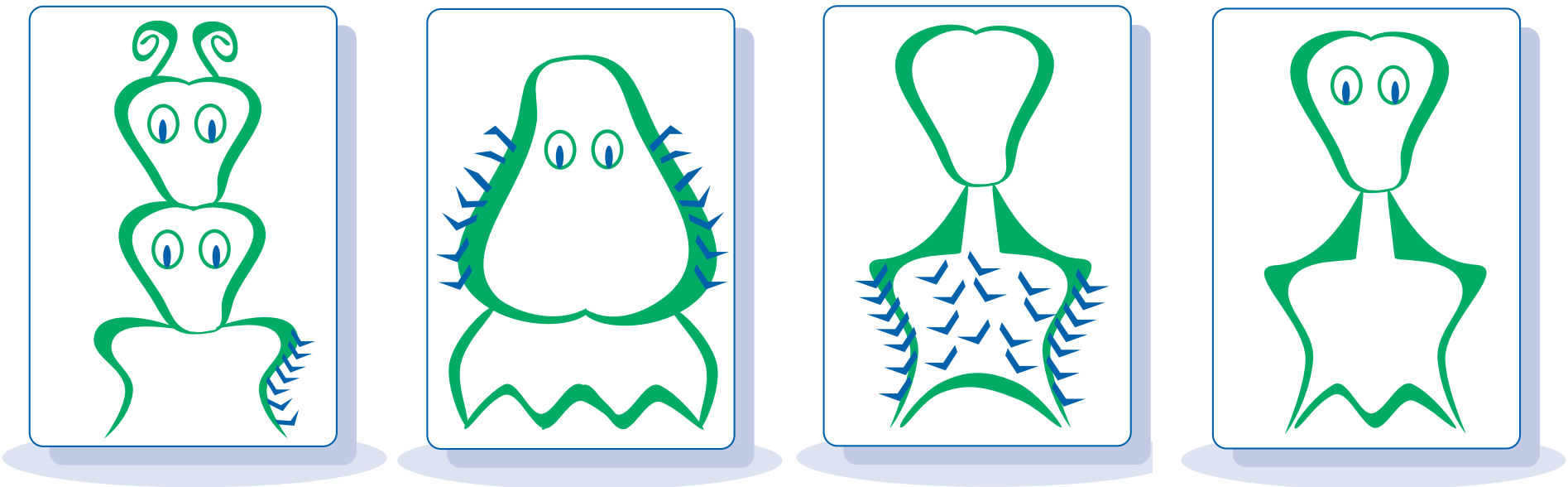


Figure 2. Newly Discovered Organism Cards.
Only cut the 4 cards in the lower row.

The first group, or kingdom, would be all cars. That would exclude trucks, school buses, and RVs. The kingdom of cars would be further divided into all sedans. Now we've excluded all convertibles and station wagons. The third group would be all 2-door sedans. That eliminates all the 4-door models. The fourth group would be all 2-door sedans with tinted windows. The fifth group would be all 2-door sedans with tinted windows and stick shifts. The sixth group would be all green, 2-door sedans with tinted windows and stick shifts. And the last group would be all green, 2-door sedans with tinted windows, stick shifts, and CD players. Each group contains fewer cars than the one before because additional requirements were added. Classification of living organisms works the same way. Each group within a kingdom has fewer members than the group before. See Figure 3 for a simple car classification scheme.

Many times, different scientists classify organisms differently. For example, another scientist might classify the car in the example above like this. The first group would be all cars. The second group would be all cars made in the United States. The third group would be all cars made by General Motors. The fourth group would be all Pontiacs. The fifth group would be all sports cars. The sixth group would be all convertible sports cars. And the last group would be all convertible Trans Ams. Again, each group contained fewer cars than the one before as the system went from general to more specific.

Suggestions to Modify the Activity for Those Who Are Exceptional

Specific modifications for this activity are found here. For common considerations when modifying activities for exceptional participants, see page V of the **Introduction**.

Blind or Visually Impaired

- Enlarge the Organism Cards with a copy machine or produce them in braille.
- Use height as an alternative method for introducing classification. The same rules can apply, but this adaptation will allow for the participant to interact independently by using his/her sense of touch.
- Have the participants classify desk items or publications. Encourage them to repeat the exercise if necessary.
- Discuss each organism in detail as a group. Have the group provide many references to color, texture, and size. Repeat descriptions often. Individuals who are blind have a good understanding of color and size and will want the detailed observations to participate fully.

Deaf or Hard-of-Hearing

- Provide a pyramid chart that shows the breakdown of classification. Visuals are extremely beneficial for this activity.

Mobility Impaired

- Tape the Organism Cards on a blackboard or wall if they are not visible when grouped on the table.

Physically Impaired

- See the ***General Modifications*** for *Physically Impaired* listed in the **Introduction**, page V.

Cognitively Impaired

- See the ***General Modifications*** for *Cognitively Impaired* listed in the **Introduction**, page V.

For More Information

Angier, N. (1998). When evolution creates the same design again and again. *The New York Times, CXLVIII*(51,372).
Crisci, J.V., McInerney, J.D. & McWethy, P.J. (1993). *Order and Diversity in the Living World: Teaching Taxonomy & Systematics in Schools.* The Commission for Biological Education of the International Union of Biological Sciences in cooperation with UNESCO.
Green, K. (1993). Developing a cannamacule key. *Favorite Labs from Outstanding Teachers, Volume II.* Reston, VA: NABT Publications, 14-16.
Kessler, J.H. (Ed.). (1996). Classification. *WonderScience, II*(1).
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Reimink, R.L. (1995). Teach biodiversity at the bell. *The American Biology Teacher, 57*(2), 106-107.
Ross, C. (1993). Classification concentration. *Favorite Labs from Outstanding Teachers, Volume II.* Reston, VA: NABT Publications, 17-23.
Vogt, K.D. (1995). Demonstrating biological classification using a simulation of natural taxa. *The American Biology Teacher, 57*(5), 282-283.

How to Start the Activity

- Classification systems are based on structural similarities. Encourage the participants to discriminate among physical features of the samples provided.
- Have the participants line up in order by their birthdays. They may communicate only through hand and body motions. Talking and writing are not permitted while they organize the line. After they line up, confirm the birth dates of each participant to determine the degree of accuracy. Discuss the strategy used to sort everyone, and if alternate methods might have been used.

Let's Make a Hypothesis

Discuss the following questions to help guide the participants to make hypotheses.

- What are examples of items that are classified?
- Why are things classified?
- Is there more than one way to classify a set of items?

What the Data Mean

The results will vary with each classification scheme used.

CREEPY CRITTERS

PARTICIPANT

Questions to Think About

If someone from China sends you a letter, how does the postal system know where you are? How are supermarkets organized? If you go to a new supermarket, how would you know where to find a specific brand of cheese?

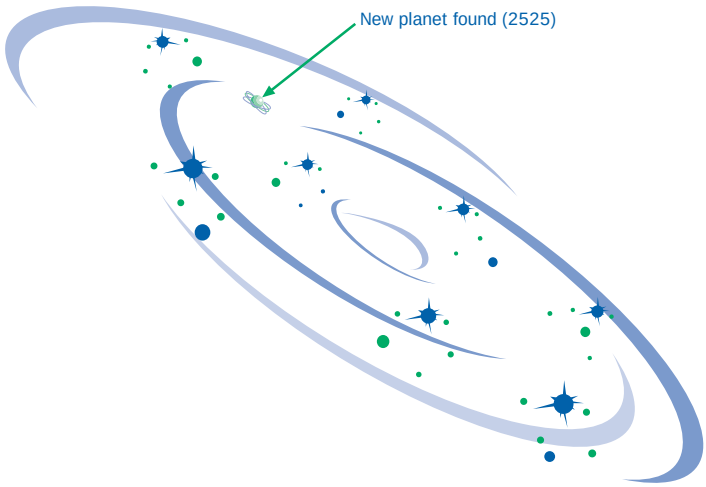
Imagine that in the year 2525, a solar system in a new galaxy is discovered. Many similarities between our solar system and this new one are found, including a planet that resembles Earth. A space probe lands on this planet and sends a variety of different living organisms back to Earth through a molecular transport beam. The macroscopic and microscopic structures of each creature are described. The scientists studying these organisms realize they need to develop a classification scheme to help them compare the life forms to organisms on Earth. Your role is to study the illustrations of the creatures and develop a possible classification scheme based on the information provided for each organism. You must be able to justify and defend the method that you use.

Safety Notes

- Exercise care when using scissors. Point them away from the body when cutting.
- Do not point scissors at other individuals.

What to Do

1. Study the Organism Cards carefully. Note feature similarities and differences of the creatures. Construct a table to help organize your observations. Columns to describe things like hair, antennae, and necks will be helpful.
2. Study the cards again and place them in groups based on the similarities and differences observed. Once the group is satisfied with the results, construct another table listing the characteristics common to each group.
3. Get a set of Newly Discovered Organism Cards from your facilitator. Select one of these organisms and suppose that it was just discovered. Where does it fit in your system of organization? Will you have to create a new group or can you find another way to fit it into an existing group?
4. Present your classification scheme to the large group. Make sure you can justify your methods. How does your classification scheme compare to those created by other groups?



What Did You Find Out By Doing the Activity?

Before doing "Creepy Critters," did you know:

- that not all animals have the same characteristics?
- what the standard classification scheme for organisms is?
- how animals are separated into different groups?
- if how an animal looks has an effect on how it is classified?
- why scientists classify organisms?
- that the basic food groups are another form of classification?

From this activity, did you discover:

- how organisms are classified?
- what factors are most important in classification?
- what benefits come from classifying organisms?
- the major factor that differentiates one species from another?
- how you would further classify yourself as an individual, and what traits would be important in that classification?
- where you would begin if you had to classify an unknown plant?