Activity 1A: Color Survey

Students explore their perceptions of color by taking a color survey, in which they categorize colored crayons and compare their responses with classmates' responses.

Understandings

- *Perceptions* are subjective, personal, and conscious reactions to stimuli to the sensory system.

Materials Needed

- **Handout 1: Color Survey**
- 15 crayons selected from a 48-crayon pack (see Advance Preparation)
- Red object, such as an apple or a book with a red cover
- Optional: 48-crayon packs (one pack per group)
- Optional: sets of six paper cups or six sheets of paper (one set per group)
- Optional: Mac- or PC-specific color slide show (see *Media & Resources*)
- Optional: Equipment for displaying color slide show

> **Note:** You may conduct the activity using the Mac- or PC-specific slide presentation provided in *Media & Resources*, using 15 color slides instead of 15 crayons. Be aware that slide color will vary depending on screen monitor and viewing angle. Arrange to have a computer with Internet connection and screen.

1. Introduce *perception* as a function of the nervous system.
Establish that the five senses are part of the human nervous system. Tell students that in this unit they take an in-depth look at one sense, vision, to learn how the nervous system facilitates communication between the environment and parts of the body.

Explain that students will explore how and why they perceive colors. Clarify what it means to *perceive*. Discuss how all five senses are active in human perception.

> **Note:** You may wish to have students use an informal definition of visual perception, such as "a way of seeing or understanding what one sees," rather than the broader biological definition, "the body's response to a stimulus from the environment."

2. Introduce the color sorting activity.
Ask students:

- What is *color*?

Possible answers: *A property of an object, a property of light, something the eye sees, a construction of the brain.*

Hold up a red object and ask:

- What color is this?
- Do you think your perception of *red* is the same as that of your classmates?

Tell students that they will explore these questions by comparing their perceptions of crayon colors with those of their classmates.

Distribute Handout 1: Color Survey and give students time to read it. Explain that you are going to display a series of 15 crayons, each a different color. For each crayon, students will mark on Handout 1 which color they perceive it to be. When they've looked at all 15 crayons, they will compare their perceptions with others in the class.

Explain to students that it is important that they name each color on their own and that they not confer with their classmates. Emphasize that there is no *right* answer.

Teacher's Notes: Small-Group, Hands-On Alternative to Color Survey (Use in Place of Activity Steps 2–5)

Give each group of three or four students a 48-crayon pack with the black, white, and gray crayons removed, a set of six paper cups or six sheets of paper, and a pen or pencil. Have each group write the names of the six color categories from **Handout 1: Color Survey** (red, orange, yellow, green, blue, violet) on the six cups or sheets of paper. Tell groups to sort their crayons into these six categories.

Tell groups that each member should sort an equal number of crayons, but that the group should not try to reach agreement on the color of any single crayon. Emphasize that the activity is based on individual perceptions, not group consensus. Tell students not to read the names of the colors on the crayon labels as they sort. (You may choose to remove or cover the labels in advance.)

When groups have finished sorting their crayons, have them create a bar graph to show the number of crayons their group sorted into each color category. Then compare graphs as a class. Ask:

- Did your group sort the same number of crayons into each category as other groups did?
- Which color categories had the greatest variations in perceptions?
- What conclusions might you draw from this activity?

3. Display crayons.
Show students the 15 crayons one at a time, providing time for students to record the category of each color on the handout.

4. Tally and discuss student responses.
Tally and display the number of responses in each color category for each crayon. For crayons that were classified in two or more color categories, have students create bar graphs to show the number of responses in each category. For example, a crayon that 15 students perceived as blue and 15 perceived as green would have a bar graph that showed two bars of 15 units each, with one bar labeled *blue* and one bar labeled *green*.

> **Note:** Review with students how to make a bar graph, as necessary. Draw a graph on the board. Label the color categories along the x-axis. Label the y-axis "Number of Student Responses" and choose an appropriate interval for numbering. As an example, draw two or three bars on the graph.

5. Discuss responses as a class.

Have students look at the results for each color:

- For how many crayons did your class perceive different colors?
- Which color categories had the greatest variations in perception?
- What conclusions might you draw from this activity?

6. Wrap up the activity.
Ask students:

- Did performing this activity raise any questions for you about color? What are they?

Tell students that they will explore the factors responsible for color perception.

Teacher's Notes: The Diversity of Perception

Students should discover variation in the way they identified the colors. They will probably agree that color perceptions differ among individuals. They may also talk about color itself being a quality of individual perception rather than a property of an object, but they should have a number of questions about why their perceptions vary.

To extend the discussion, ask students how people might vary in the way they perceive the world through other senses. Examples might include:

- **Taste.** Different sensitivities to sweet or to spicy foods (some people are very uncomfortable eating spicy food, while others enjoy it)
- **Hearing.** Different registers of hearing (some people can hear very high or very low sounds; some people have perfect pitch)
- **Smell.** Differences in ability to recognize scents, such as flowers or foods; differences in comfort levels related to strong odors
- **Touch.** Sensitivities to heat or cold; reactivity to different fabrics, such as wool

Handout 1:
Color Survey

Have you ever thought about whether everyone sees colors in the same way?
Here's your chance to find out!

Your teacher will display crayons or slides. Categorize each of the 15 colors under *one* of the six major color headings in the table below. If a crayon or slide doesn't seem to fit well under any of the categories, choose the category that seems best.

	Color Categories					
	Red	**Orange**	**Yellow**	**Green**	**Blue**	**Violet**
Color 1						
Color 2						
Color 3						
Color 4						
Color 5						
Color 6						
Color 7						
Color 8						
Color 9						
Color 10						
Color 11						
Color 12						
Color 13						
Color 14						
Color 15						