

# COLORS OF US

## SKIN PIGMENTS/PAINT PIGMENTS

Mary Karrow, first-grade teacher  
Kramer Elementary  
Oxford, OH

### Lesson Summary for Grades K–3

Students mix colored paints to duplicate the various skin colors of people, and they develop vocabulary to describe these colors. They also learn about the different substances in the body that contribute to skin color.

Featured fiction book: Katz, K. *The Colors of Us*; Holt: New York, 1999. (ISBN 0-805-05864-8)  
Seven-year-old Lena learns about mixing paint from her Mom, who is an artist. By mixing just the right combinations of red, yellow, black, and white, she learns how to make a variety of browns so that she can paint the skin colors of all the people she knows and loves.

### Part 1: Building Bridges

The following text is intended for the teacher's information. Modify the explanation for students as required.

#### Building Student's Knowledge

Before doing the featured activity, make sure students have explored mixing primary colors to make secondary colors using paints, food color in water, or primary-colored Play-Doh<sup>®</sup> at the Discovery Center.

#### Coloration of the Skin

From URL:

<http://www.ppcc.ccoes.edu/dept/BIO/BIO/bio201/mullen/Chapter7Integumentary.htm>

- Coloration of the skin is due to three pigments: melanin, carotene, and hemoglobin.
- Hemoglobin is the oxygen-binding pigment found in red blood cells.
- The closer blood vessels in the dermis are to the surface of the skin, the more pinkish the skin.
- Carotene is a yellowish-orange pigment that is not produced naturally by the body.
- Carotene tends to accumulate in the epidermal cells and the fatty parts of the dermis.
- When babies are fed increased amounts of carrots and squash, they can take on an orange color because of carotene deposition.
- Melanin is a brown-black pigment produced in the melanocytes of the stratum basale.
- All individuals of similar size have approximately the same number of melanocytes, but the amount of melanin produced and the distribution of melanin determine racial variations in skin color.
- Melanin protects the basal layer against the damaging effect of ultraviolet (UV) rays from the sun.

## Reading the Story

After sharing the title and cover illustration with the class (fold book open to include back cover), invite the students to predict what this story will be about. (Repeat with title-page and dedication-page illustrations.) As the story is read, think aloud occasionally or make a text-to-self connection about the skin-color comparisons.

Have students look at various skin tones through one of the following experiences:

- After students share their responses to the book, take them on a walk like Lena's (for example, through the neighborhood, school hallways, or preselected/arranged first-grade classrooms).
- Gather students in a tight circle on a carpet and have them lie down on their stomachs with their hands in the center of the circle.

Encourage students to observe the different shades of brown skin seen on the walk or on the different hands. Develop a vocabulary of colors to describe the variety of browns. Also, model and reinforce comparisons similar to Lena's and her mother's in the story text.

## Part 2: Science Activity

*Students discover that red, yellow, black, and white can be mixed to make brown. Students will make connections between types of pigments (paint pigments and pigments present in human skin).*

Science Category:

- properties of objects and materials

Key Science Topics:

- varieties of the color brown
- mixing colors
- tints
- shades

Science Standard:

- Nature of Science

### Science Background for Students

Present the following information to the students:

We already learned that primary colors (red, yellow, and blue) can be mixed to create all other colors. We also learned that white added to a color creates a tint, and black added to a color creates a shade.

Just like pigments create colors in paint, they also create colors in the things around us and in us. They create the skin colors in people.

The three pigments that create peoples' skin color are named hemoglobin, carotene, and melanin. Each person's skin has different amounts of these pigments. Some people have more of one pigment than the other two in their skin.

Hemoglobin is a reddish pigment that our bodies make. Can you think of anything in your body under your skin that would be that color? (Let students suggest answers until they decide on blood.)

Yes. Everyone has hemoglobin in his or her blood, so everyone's skin color will have some of that type of red showing in it.

Carotene is an orange-colored pigment. Our bodies don't make this pigment. We get it from things we eat. Can you think of some things we eat that are that kind of color? (Let students suggest carrots, oranges, etc.)

We all eat different types of food. Some of them have carotene in them. Our bodies store carotene. That's why everyone's skin color will have some of that type of orange showing in it.

Melanin is a brown-black pigment. Everyone's bodies make this pigment. We all have melanin in our bodies. Our bodies use melanin to help protect us from the rays of the sun.

(NOTE: There will be a science extension on sunblocks.)

The combinations of these pigments create all the different skin colors possible in humans.

All of the skin colors we see in people are made from the pigments in hemoglobin, carotene, and melanin.

Artists use the pigments in paints to create skin colors in their art. We are going to work with paint today to see how skin colors are mixed.

### **Materials**

For the demonstration

Per class

- large palette with red, yellow, black, and white tempera paints
- paintbrush
- easel and paper
- container of water for rinsing brush

For the student activity

Per student

- small palettes with red, yellow, black, and white tempera paints
- paintbrush
- containers of water to clean brushes
- painting mat (11 x 16 inch white paper) with lines to record procedure and space to show results. For example:

I mixed \_\_\_\_\_ and \_\_\_\_\_ and \_\_\_\_\_ to make \_\_\_\_\_.

Result \_\_\_\_\_

### **Procedure**

1. Seat students so that they have a clear view of the easel. Demonstrate mixing different combinations/proportions of red, yellow, black, and white to make a variety of browns.

2. Model Recording/Writing:

I mixed \_\_\_\_\_ and \_\_\_\_\_ and \_\_\_\_\_ to make \_\_\_\_\_.

Result \_\_\_\_\_

3. Record each color (e.g., umber, ochre, sienna) mixing result and the color's name in the hand space.
4. Have students return to individual work areas (necessary materials should be set out before the demonstration) to explore color mixing and record their color experiments. After the paint dries, gather to share results. Record group results.

### Evaluation

Observe students as they experiment; assess their understanding with questions about the process and their results. When appropriate, ask them to make a prediction regarding the mixture in progress based on what they saw during the demonstration and from their own experience.

## Part 3: Lesson Extensions

### Literature/Art Extension

1. Reread *The Colors of Us*.
2. Shared Writing:

a) Chart of all the beautiful skin color words and comparisons for characters:

Character	Color	Comparison
Lena		cinnamon
Mom		French toast
Sonia	yellow brown	creamy peanut butter
Isabella	chocolate brown	cup cakes
Lucy	peachy and tan	
Jo Jin		honey
Kyle	reddish brown	leaves in fall
Carlos	light cocoa brown	
Rosita		butterscotch
Mr. Pellegrino	golden brown	pizza crust
Candy	bronze and amber	jewel
Mr. Kashmir		ginger and chili powder
Aunt Kathy	tawny tan	coconuts and coffee toffee

3. Draw and Write book:

- a) The teacher models the “I am” writing for students at the start of the activity.
- b) Have the students draw a self-portrait on draw-and-write paper (upper half blank; lower half lined). (Color with multicultural crayons.)
- c) Student writes: “I am \_\_\_\_\_ like \_\_\_\_\_.” under his or her portrait.

### Grammar/Spelling

Have the students edit the writing extension by checking to see if they used an uppercase letter to begin their sentence and remembered an ending punctuation mark. They also could check spelling of the color word by comparing it to the class word bank.

Vocabulary Link: Encourage use of skin tone vocabulary by providing a word bank of color words on paper cut-outs of paint jars.

Teacher compiles draw-and-write portrait pages into a class book: *Our Class: A Book of Self-Portraits* to be placed in the classroom library.

### **Mathematics/Art**

Students mix different combinations/proportions of red, yellow, black, and white to make color equations. For example:

$$\underline{1 \text{ red}} + \underline{2 \text{ yellow}} + \underline{1 \text{ black}} = \underline{4 \text{ honey brown}}$$

### **Health**

Discuss sunblocks, what they are, and why they are important.

## **Part 4: For Further Study**

### **Additional Books**

#### **Fiction**

Hamananka, S. *All the Colors of the Earth*; Morrow: New York, 1994. (ISBN 0-688-11131-9)  
This story (told in verse) celebrates the multiethnic heritage and color children bring to the world.

Rotner, S. and Kreisler, K. *Faces*; Houghton Mifflin: New York, 1996. (ISBN 0-02-777887-8)  
A photographic concept book showing a world of faces and all that we have in common.

#### **Poetry**

Adoff, A. *Black Is Brown Is Tan*; Harper: New York, 1992. (LCCN 72-009855) A story poem tells about a loving family and the rhythm of their daily lives.

O'Neill, M. *Hailstones and Halibut Bones: Adventures in Color*; Doubleday: New York, 1989. (ISBN 0-385-24484-3) Imaginative poems reveal the spectrum of colors.

#### **Nonfiction**

Ardley, Neil. *The Science Book of Color*; Harcourt Brace Jovanovich: San Diego, 1991. (ISBN 0-15-200576-5) The book explains principles of color and includes simple color experiments.

### **References**

Ammer, C. *Seeing Red or Tickled Pink: Color Terms in Everyday Language*; Dutton: New York, 1992.

Heifetz, J. *When Blue Meant Yellow: How Colors Got Their Names*; Holt: New York, 1994.