The Color Test

Follow light from source to eye

P.8.6.6 "Obtain and evaluate scientific information to explain the relationship between seeing color and the transmission, absorption, or reflection of light waves by various materials."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline one example each of transmission, absorption, and reflection in the passage, then circle the material involved in each example.

Colors on the Stage

1. At a school theater, a student aims a white spotlight at a white poster, a red costume, and a black curtain. White light contains many visible colors. The poster reflects much of that light across the visible range, so it looks white. The costume's red dye absorbs much of the light of other colors and reflects more red light toward the audience. The curtain absorbs most visible light and reflects little, so it looks black. What your eyes detect depends on which light waves reach them, not just the name of the material.

2. The student then puts a transparent red lighting sheet in front of the spotlight. With white light behind it, the sheet transmits much of the red light but absorbs much of the other visible light. The poster now looks red because red light passes through the sheet and reflects off the poster into the audience's eyes. When a blue spotlight shines through the same sheet instead, the poster looks very dark. There is little red light to transmit, and most of the blue light is absorbed.

3. Finally, the student places a mirror beside the poster. The mirror reflects light in a directed way, making an image of the stage rather than a patch of one color. In the mirror, the red costume still looks red because red light reflected by the costume travels to the mirror, then to an observer. A visitor claims the lighting sheet creates red light. The student's observations offer a way to test that claim: the sheet gives a red patch with white light but not with blue light.

2 ANSWER WITH EVIDENCE

Use the passage

1. Under the white spotlight, why do the poster and curtain look different?

2. Why does the poster look very dark when the blue spotlight shines through the red sheet?

3. How can the mirror show a red costume even though the mirror does not select red light the way the costume does?

4. A visitor says the red sheet creates red light. Does the evidence support this claim? Explain.

3 YOUR TURN

Your own words

A yellow paper sign reflects red and green light but absorbs most blue light; a transparent green sheet transmits green light and absorbs most other colors. Explain what an observer sees when white light passes through the sheet onto the sign, then predict what changes if the light source is only red; use transmission, absorption, and reflection.

ANSWER KEY

The Color Test

GRADE 8 · P.8.6.6

PART 1 · READ AND MARK

Underline one example each of transmission, absorption, and reflection in the passage, then circle the material involved in each example. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	Under the white spotlight, why do the poster and curtain look different?	**The poster reflects much of the visible light and looks white. The curtain absorbs most visible light and reflects little, so it looks black.**
2	Why does the poster look very dark when the blue spotlight shines through the red sheet?	**The blue spotlight provides little red light for the sheet to transmit, and the sheet absorbs most of the blue light.**
3	How can the mirror show a red costume even though the mirror does not select red light the way the costume does?	**The costume reflects red light. The mirror reflects that light toward the observer, forming an image of the costume.**
4	A visitor says the red sheet creates red light. Does the evidence support this claim? Explain.	**No. The sheet makes a red patch with white light but not with blue light. It transmits red light already present rather than creating it.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

With white light behind the sheet, green light is transmitted and then reflected by the yellow sign, so the sign looks green. If the source changes to red light, the sheet absorbs most of it. Little light reaches the sign to be reflected, so the sign looks very dark.

Accept answers that trace light from the source through the material to the observer. For the open task, accept a dim red appearance if the student explains that a real green sheet may transmit a small amount of red light.