



Lesson Plan

Course Title: Advanced Audio Video Production

Session Title: Color Theory

Lesson Duration: Approximately Two 90-minute class periods
[Lesson length is subjective and will vary from instructor to instructor]

Performance Objective:

Upon completion of this unit, students will explain the additive color theory and describe how it is applied to video and television production.

Specific Objectives:

1. Define terms associated with the lesson.
2. Identify previous experiences with hue, saturation, and brightness.
3. Discuss the physics of light.
4. Discuss two types of color.
5. Discuss concepts associated with additive or electronic color.
6. State the primary colors and resulting combinations of the additive color (electronic) system.
7. Discuss concepts associated with subtractive or pigment-based color.
8. State the primary colors and resulting combinations of the subtractive color (pigment-based) system.

Preparation

TEKS Correlations:

130.86(c)

- (14) The student understands the post-production process. The student is expected to:
- (A) apply knowledge and appropriate use of hardware components, software programs, and their connections by:
 - (i) demonstrating knowledge and appropriate use of digital systems such as software applications, communication, and networking components.
 - (E) use appropriate computer-based productivity tools to create and modify solutions to problems by:
 - (i) integrating productivity tools to develop and modify solutions to problems.
- (15) The student understands the business aspects of the industry. The student is expected to:
- (A) understand the roles of various industry professionals by:
 - (iii) discussing the duties of editors.

Instructor/Trainer

References:

<http://gbhsweb.glenbrook225.org/gbs/science/phys/Class/BBoard.html>
http://en.wikipedia.org/wiki/Color_theory

Instructional Aids:

- Color Theory slide presentation
- Color Theory Handout (this handout needs to be printed on a color copy machine/printer)
- Color Theory Quiz

<ul style="list-style-type: none"> • Color Theory Quiz Key 		
<p>Materials Needed:</p> <ul style="list-style-type: none"> • Optional: Color filters and/or three light sources • Three studio lights on stands (light kit) • Three gels (one red, one green, one blue) 		
<p>Equipment Needed:</p> <ul style="list-style-type: none"> • Computer with slide presentation software or player installed. • TV or projector capable for displaying the presentation. • Optional: Color printer for color wheel chart hand out. 		
Learner		
<p>Notebook Pens/pencils</p>		
Introduction		
MI	Introduction (LSI Quadrant I):	
	<p>SAY: The presence or absence of color is a building block of all television and film productions. The color you see on TV is made up of varying amounts of three basic colors. Understanding how color is constructed is essential to being able to use color effectively. It is a part of everything you will do in media productions.</p>	
Outline		
MI	Outline (LSI Quadrant II):	Instructor Notes:
	<p>I. Define terms associated with the lesson.</p> <p>A. Color: “The appearance of objects or light sources described in terms of the individual’s perception of them, involving <i>hue</i>, <i>brightness</i>, and <i>saturation</i>.”</p> <p>B. Hue: “The dimension of color referred to a scale of perceptions ranging from red through yellow, green, and blue, and circularly back to red.”</p> <p>C. Brightness: “The dimension of color that represents its similarity to one of a series of achromatic colors ranging from very dim to very bright.”</p> <p>D. Saturation: “Degree of difference from a grey of the same lightness or brightness: vividness of hue.”</p>	<p>Use the slide presentation to discuss terms.</p>
	<p>II. Identify previous experiences with hue, saturation, and brightness.</p> <p>A. In the video menu when you try to adjust the color of your TV set.</p> <p>B. In the color palette menu of your</p>	<p>ASK: Where do you see the use of: Hue, Saturation, and Brightness?</p>

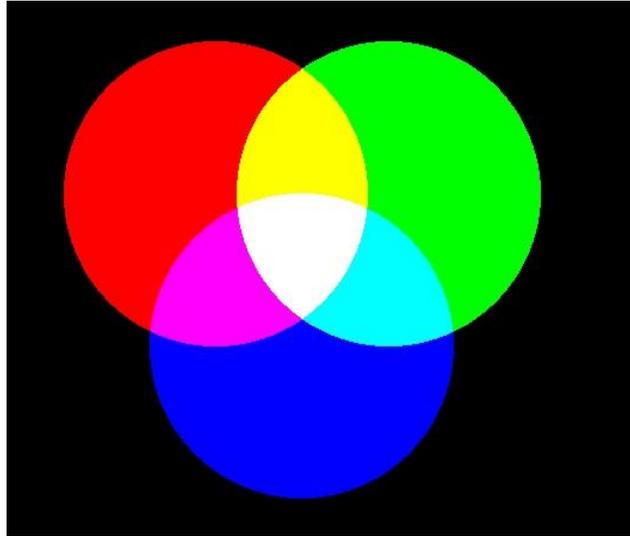
	<p>computer's paint program when you try to adjust or choose a color.</p>	
	<p>III. Discuss the colors of light.</p> <p>A. White light, when run through a prism, splits into visible red, green, blue, and violet colored light beams.</p> <p>B. Discuss two types of color.</p> <ol style="list-style-type: none"> 1. Electronic color – used in video cameras and displayed on television and computer screens through the use of cathode-ray tubes (CRT) 2. Pigment-based color –used in color printers, color filters, and color paints 	
	<p>IV. Discuss concepts associated with electronic color.</p> <p>A. Color monitors use three different types of phosphors that appear red, green, and blue when activated. These phosphors are placed close together and when combined in differing intensities, can produce any color.</p> <p>B. Color video cameras use a prism system to split the light into the red, green, and blue signals, known as RGB.</p>	
	<p>V. State the primary colors and resulting combinations of the additive color (electronic) system.</p> <p>A. Primary additive colors are: red, green, and blue</p> <p>B. In the primary color system, these three colors can produce all other colors.</p> <p>Green + Red = Yellow Red + Blue = Magenta Green + Blue = Cyan Red + Green + Blue = White</p>	
	<p>VI. Discuss concepts associated with pigment-based color.</p> <p>A. Color printers use cyan, magenta, and yellow pigments, referred to as CMYK. These pigments when combined in differing intensities can produce any color.</p> <p>B. Black ink is in color printers because of the impurities often found in the one or more of the three color pigments. These impurities will usually produce a brownish black when combined.</p>	

	<p>VII. State the primary colors and resulting combinations of the subtractive color (pigment-based) system.</p> <p>A. Color printers use cyan, magenta, and yellow pigments, referred to as CMYK.</p> <p>B. When combined, CMYK pigments will produce the following colors: Magenta + Cyan = Blue Yellow + Cyan = Green Magenta + Yellow = Red Yellow + Magenta + Cyan = Black</p>	
Application		
MI	Guided Practice (LSI Quadrant III):	
	<p>The teacher can demonstrate by using three studio lights, light bulbs, or flashlights with one red filter, one green filter, and one blue filter (and/or cyan, magenta, and yellow). When each colored light is combined, the students can see the color theory come to life.</p>	
MI	Independent Practice (LSI Quadrant III):	
	<p>Students take turns manipulating the three colored lights. Use the Color Theory Handout, and have students predict the results when each colored light is combined.</p>	
Summary		
MI	Review (LSI Quadrants I and IV):	
	<p>SAY: Understanding how color is created by using light and pigments can be very useful. Let's review some of the key points of this lesson.</p> <p>Q: What is the difference between RGB and CMYK colors? A: <i>RGB is based on light, CMYK is pigment based.</i></p> <p>Q: Magenta and Cyan pigments equal what color? A: <i>Blue</i></p> <p>Q: Magenta and Yellow pigments equal what color? A: <i>Red</i></p> <p>Q: Yellow and Cyan pigments equal what color? A: <i>Green</i></p> <p>Q: Green and Red light combine to form what color? A: <i>Yellow</i></p> <p>Q: Green and Blue light combine to form what color? A: <i>Cyan</i></p>	

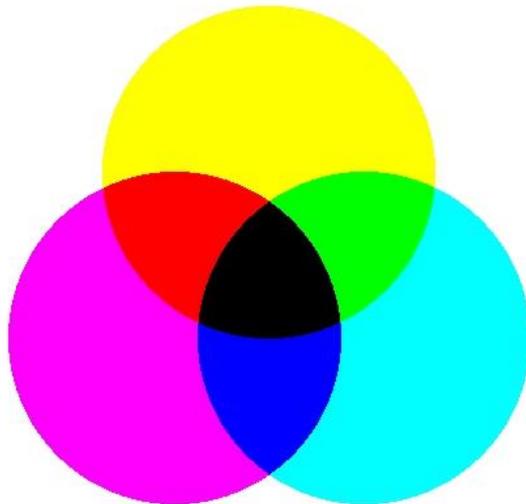
	<p>Q: Blue and Red light combine to form what color? A: <i>Magenta</i></p> <p>Q: What color lights do you need to combine to form white? A: <i>Red, Green, and Blue</i></p>
Evaluation	
MI	Informal Assessment (LSI Quadrant III):
	Teacher: Observes students self-monitoring and checking for understanding during Independent Practice.
MI	Formal Assessment (LSI Quadrant III, IV):
	Color Theory Quiz – Teacher may decide to give a clean copy of the Color Theory Handout as reference.
Extension	
MI	Extension/Enrichment (LSI Quadrant IV):
	<p>Apply learning to future lessons.</p> <p>Read about the historical development of color theory: http://en.wikipedia.org/wiki/Color_theory</p>

COLOR THEORY HANDOUT

Additive Colors: Red, Green, and Blue



Subtractive Colors: Cyan, Magenta, and Yellow



COLOR THEORY QUIZ

Name: _____

Date: _____

Matching: Match each definition in the second column with the appropriate term in the first column. Record your answer in the space provided.

- | | |
|----------------------|---|
| _____ 1. Color: | A. "The dimension of color that represents its similarity to one of a series of achromatic colors ranging from very dim to very bright." |
| _____ 2. Hue: | B. "Degree of difference from a grey of the same lightness or brightness: vividness of hue." |
| _____ 3. Brightness: | C. "The appearance of objects or light sources described in terms of the individual's perception of them, involving <i>hue</i> , <i>brightness</i> , and <i>saturation</i> ." |
| _____ 4. Saturation: | D. "The dimension of color referred to a scale of perceptions ranging from red through yellow, green, and blue, and circularly back to red." |

Multiple Choice: Select the best answer for each question or stem below. Circle your selection.

5. Additive Color is not used in...
- a. Televisions
 - b. Computer monitors
 - c. Paints
 - d. Computer paint programs
6. Pigment based color is not used in...
- a. Computer monitors
 - b. Color laser printers
 - c. Color inkjet printers
 - d. Paints
7. Color monitors use three different types of phosphors that appear _____, _____, and _____ when activated. These phosphors are placed close together and when combined in differing intensities, can produce any color.
- a. Cyan, Magenta, Yellow
 - b. Red, Green, and Blue
 - c. Red, Green, and Cyan
 - d. Cyan, Purple, Yellow

8. Pigment-based color use _____, _____, and _____. These pigments when combined in differing intensities can produce any color.
- a. Cyan, Magenta, Yellow
 - b. Red, Green, and Blue
 - c. Red, Green, and Cyan
 - d. Cyan, Purple, Yellow

Fill-in-the-Blank: What color is produced when two or more Primary or Secondary colors are combined? Record your answer in the space provided.

9. Red + Blue = _____
10. Green + Red = _____
11. Green + Blue = _____
12. Red + Green + Blue = _____
13. Magenta + Cyan = _____
14. Yellow + Cyan = _____
15. Magenta + Yellow = _____
16. Yellow + Magenta + Cyan = _____

8. Pigment-based color uses _____, _____, and _____. These pigments when combined in differing intensities can produce any color.
- Cyan, Magenta, Yellow
 - Red, Green, and Blue
 - Red, Green, and Cyan
 - Cyan, Purple, Yellow

Fill-in-the-Blank: What color is produced when two or more Primary or Secondary colors are combined? Record your answer in the space provided.

- Red + Blue = Magenta
- Green + Red = Yellow
- Green + Blue = Cyan
- Red + Green + Blue = White
- Magenta + Cyan = Blue
- Yellow + Cyan = Green
- Magenta + Yellow = Red
- Yellow + Magenta + Cyan = Black

TEACHER NOTE: For 100 point assignment take off 6.25 points for each missed question.

Q's Missed/Grade

0	100
1	94
2	88
3	81
4	75
5	69
6	63
7	56
8	50
9	44
10	38
11	31
12	25
13	19
14	13
15	6
16	0