

Painting With CMY Activity

Overview:

It's your job to order team uniforms but there is one difficulty: the uniform supplier prefers to receive the order in terms of the three primary colors of paints that will be applied to different parts of the uniform. In this activity, you will experiment with the effect of different paint colors on the appearance of a uniform.

Getting Ready:

Navigate to the Painting With CMY simulation in the Physics Interactives section.

www.physicsclassroom.com => Physics Interactives => Light and Color => Painting With CMY

Once at the proper page, Launch the Interactive and begin exploring in **Basic** mode.

Directions:

Use the **Basic** mode to determine the primary paint colors (cyan, magenta, and/or yellow) that must be imparted to the following team uniforms in order to create the desired appearance:

Team #1: Chicago Titans

Uniform Part	Desired Appearance	Required Paint Colors
Helmet	Blue	Circle: C M Y
Shirt	Yellow	Circle: C M Y
Pants	Blue	Circle: C M Y
Shoes	Black	Circle: C M Y

Team #2: Washington Knights

Uniform Part	Desired Appearance	Required Paint Colors
Helmet	Red	Circle: C M Y
Shirt	Magenta	Circle: C M Y
Pants	Blue	Circle: C M Y
Shoes	White	Circle: C M Y

Team #3: St. Louis Fliers

Uniform Part	Desired Appearance	Required Paint Colors
Helmet	Green	Circle: C M Y
Shirt	Cyan	Circle: C M Y
Pants	Green	Circle: C M Y
Shoes	Black	Circle: C M Y

Mixing cyan, magenta, and yellow pigments in equal intensities results in eight possible color appearances. Now switch over to the **Advanced** mode of this simulation and explore how to mix the three primary pigments in unequal intensities to produce the following result:

Desired Appearance	Required Paint Colors
Olive Green Helmet	Put a %: _____%C _____%M _____%Y
Tangerine Shirt	Put a %: _____%C _____%M _____%Y
Deep Purple Pants	Put a %: _____%C _____%M _____%Y
Light Grey Shoes	Put a %: _____%C _____%M _____%Y
Free Choice: _____	Put a %: _____%C _____%M _____%Y
Free Choice: _____	Put a %: _____%C _____%M _____%Y

Summary and Follow-Up Questions:

- Indicate the result of mixing the following primary color of paints in equal amounts:
 $C + M \implies$ _____ $C + Y \implies$ _____
 $M + Y \implies$ _____ $C + M + Y \implies$ _____
- What primary pigments must be imparted to an object to give it the appearance of white?
- What primary pigments must be imparted to an object to give it the appearance of black?
- A primary pigment selectively absorb a specific primary color of light. Whatever light is not absorbed is reflected by that pigment. Use your understanding of color addition and subtraction to indicate the primary colors of light absorbed by each primary pigment.
 - Cyan pigment absorbs the primary light color _____.
 - Magenta pigment absorbs the primary light color _____.
 - Yellow pigment absorbs the primary light color _____.
- Complete the color equations; then indicate what primary pigment(s) is/are in the object.
 - $R + G + B \text{ light} - \text{_____ light} = R + G \text{ light} = \text{_____ appearance};$
there is _____ pigment in the object.
 - $R + G + B \text{ light} - \text{_____ light} = R \text{ light} = \text{_____ appearance};$ there is _____ pigment in the object.
 - $R + G + B \text{ light} - \text{_____ light} = G + B \text{ light} = \text{_____ appearance};$
there is _____ pigment in the object.
 - $R + G + B \text{ light} - \text{_____ light} = \text{_____ light} = \text{Magenta appearance};$
there is _____ pigment in the object.
 - $R + G + B \text{ light} - \text{_____ light} = \text{_____ light} = \text{Black appearance};$ there is _____ pigment in the object.