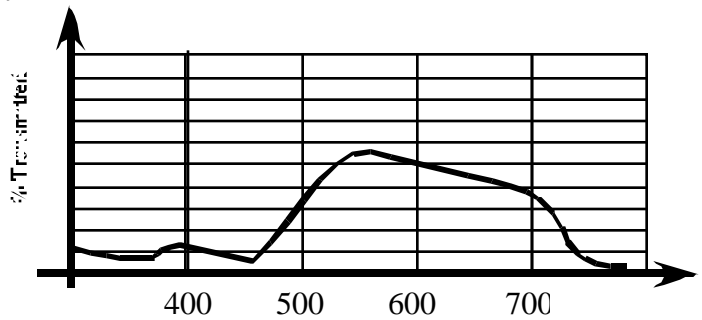


Bonus question: Where were you the night they drove old Dixie down? _____

1. The transmission profile of a filter is shown. What color is the filter? Explain.

The graph shows that this filter transmits light in the 500-600 nm range (green) and in the 600-700 nm range (red), but absorbs light in the 400-500 nm range (blue). Thus the filter is yellow ($G + R = Y$).



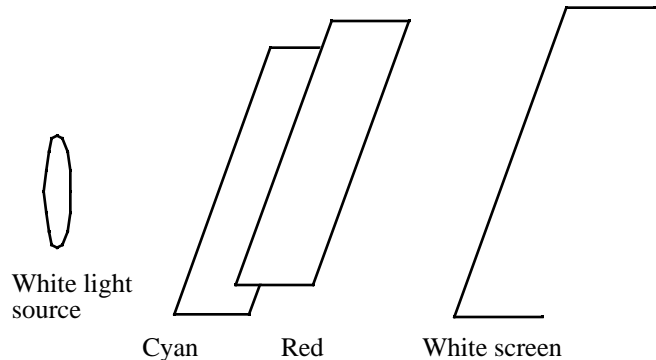
2. What combination of paints can be mixed to give black (assuming the correct proportions)? Assume perfect 'physics' paints. (choose all that apply)
- Blue and red
 - Red and yellow
 - Cyan and magenta
 - Red, blue, and green**
 - none of the above are correct

Blue absorbs red & green, red absorbs blue & green, and green absorbs red & blue. Thus either a or d will absorb all three colors. The combination of ed and yellow would not absorb red, and the combination of cyan and magenta would not absorb blue.

3. A beam of white light is set up so that it must pass through a (perfect) cyan filter followed by a (perfect) red filter.

- a. A white screen is placed in the path of the light after it leaves the red filter. What color will be seen on the screen (assume that the room contains no other light sources)? Explain briefly.

Black / no color. The cyan filter absorbs the red light from the source, and the red filter absorbs the blue green. Thus all of the light from the white source is absorbed.



- b. After the light has been shining for several minutes, is the temperature of the red filter greater than, less than, or equal to the temperature of the green filter? Explain briefly.

Greater than. *The red filter absorbs 2/3 of the white light, including the higher-energy blue and green light. Thus it absorbs approximately twice as much energy per unit time as the cyan filter. A greater energy absorption for the red means a greater temperature.*