Section 4.8 Guided notes for CS Field Guide, Chapter 5, Images and Colors KEY

Link to CS Field Guide, Chapter 5.5

1. What three primary colors do printers mix together to make all colors?
   Cyan, magenta, yellow

2. What is subtractive mixing? Start with white and subtract other colors from it.

3. What three primary colors do computer screens mix together to form all colors?
   Red, green, blue

4. What is additive mixing? STart with black screen and add color to it.

5. Using the RGB color mixer, complete the following chart

Color	Red value	Green Value	Blue Value
Black	0	0	0
White	255	255	255
Gray	163	163	194
Yellow	255	255	102
Orange	255	153	51
Purple	153	51	255
Blue	0	0	255

Answers will vary depending on the shade of the color. Colors can be tested on the CS field guide or w3 schools

6. What is a pixel?
   The word pixel is short for "picture element". On computer screens and printers an image is almost always displayed using a grid of pixels, each one set to the required colour. A pixel is typically a fraction of a millimeter across, and images can be made up of millions of pixels (one megapixel is a million pixels), so you can't usually see the individual pixels. Photographs commonly have several megapixels in them.

7. The CS field guide explains that each color (red, green and blue) have a range of values 0 - 255. The combination of these values gives us different shades of color….16,777,216 color choices to be exact. What is special about the number 255? (Think back to your activities with the binary flippy do and our discussions of bit & byte).

The largest value that can be represented by a byte is 255. So, it potentially takes a whole byte to represent a single value for red, green or blue. Therefore, a pixel would need three bytes.

8. Explain what is meant by 24-bit color.
Each color requires three bytes. A byte is 8 bits. 3 X 8 = 24.

9. Can we drop the leading zeros on the binary representations for RGB?
No, there is no concept of “spaces” to separate the binary value for red, binary value for green and the binary value for blue. Without the leading zero’s, the overall number would be shorter and the computer wouldn’t know where the red value ends, blue value begins, etc.

10. An image can hold millions of pixels. Using 24 bits to save the color for one pixel can require a lot of memory to save an entire image. Read the section on Representing Colors with Fewer Bits. Then click on the Image Bit Comparer. Explore those images and the quality of resolution. Upload an image of your own and play around with the Image Bit Comparer.

In your own words, describe the tradeoffs associated with storage and image quality.