Colorimeter Student Assessment Questions *(with sample answers)*

Why is it important to shield the device from extra light?
> To avoid false/outside signals; to prevent light bleeding from device to the surrounding environment

What light source is best for red solutions? What about blue? Why is this?
> Green light for red solution/red light for blue solution. As dyes reflect the color that is visualized, it is best to use a complementary color (red/green) such that the dye can absorb the light that passes through the cuvette.

How might temperature affect your results? What are other variables that might affect your results?
> If a water based solution heats up it will expand, lowering the concentration. Dissolved gasses, air bubbles or particulate matter can affect the detected signal. Other variables include: pore mixing, smudging on the cuvette, incorrectly placing cuvette in the colorimeter, tweaks in the position of the LED and/or photosensor, failing to properly rinse/dry cuvettes between samples, low battery power, poor electrical connections, etc.

Would you consider your data reliable? How do you know this?
> Prudent to discuss the r values of the curve, Beer's law is only viable where the response is linear, so doesn't work at higher concentrations. Also signal may vary depending on the setup and electrical components.

Where could you imagine using this in your everyday life?
> Detection of contaminants in waste water (copper/lead), determining concentrations of ingredients in foods/drinks, food spoilage, etc.

Suggest an improvement to the design of the colorimeter, and explain how this will make the device better.
> Perhaps a multicolor LED, or interfacing the device with a computer to record data would be an improvement.

Sketch out a design for a device that would measure sound, taste, touch, or smell. How does it differ from the colorimeter? What features are common?
> Simplest idea: stimulus source (odor generator, flavorant), sample, detector (pressure response, selective chemical detection…)