

Using a Fancy Spectrograph Answer Key

1. Does the spectrum of any of the lights change if you move farther away or closer to it? Explain. *The spectrum of the lights should not change with distance unless the light source moves out of the slit. The spectrum remains the same because it does not depend upon distance, but on the composition of the light.*
2. What do you notice about the spectrum of individual colored Christmas lights? How do the different colored light's spectra compare to one another? *The Christmas lights all have a continuous spectrum, and all colors are identical to one another.*
3. Which spectra look exactly the same? *The white Christmas lights are the same as the colored Christmas lights, the frosted and unfrosted incandescent bulb, and the candle.*
4. Which spectra look similar, but are not necessarily exactly the same? Explain your answer. *The florescent bulb, the night light, and the glow stick all look similar, but they don't look the same because they all have different compositions.*
5. How do the spectra of the colored Christmas lights compare to the spectra of the white Christmas lights? Keeping in mind that spectra help us understand what light is made of explain why this is. *The white and colored Christmas lights look exactly the same. The light for both must also be the same, so the color in the colored lights does not effect (change) the composition of the light.*

6. You are looking at a light through your spectrograph and you don't know what it is, but it looks the same as the nightlight spectrum:
 - a. What is the composition of the light? *Neon.*
 - b. How do you know? *The nightlight's light is made from neon. If the spectrum of the nightlight is the same as the light you are looking at, it also must be neon because the pattern of the spectrum is always the same for neon light. Except a variety of responses that explain that the pattern will be the same for the two lights.*

7. How does the spectrum from the frosted bulb compare to that of the unfrosted bulb? *The two bulbs have the same spectrum.*

8. From number 7, what can you conclude about the material that makes the bulb "frosted?" *The part of the bulb that is frosted does not effect (change) the composition of the light.*

9. How is the florescent bulb different from all of the other light sources? Explain. *If the students had access to a low quality bulb, the bulb will have very sharp, bright lines (unlike any of the other sources) separated by dark spaces. These bright lines come from mercury. If you have a higher quality bulb, the spectrum should show bright lines with a fainter continuous spectrum background. It depends on the quality of the bulb.*