

## Student Lab Investigation

**Prediction:** You have seen that white light has a definite spectrum. Would you predict that different colors of light have different spectra from each other? Will they be different from white light? If you think there is a difference, how will the spectra be different?

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### Materials:

- Spectroscope or spectroscope kit
- CDs
- Various light sources including a single light bulb
- Optional - microscope
- Optional - crayons or colored pencils
- Dark room
- Red, green and blue filters from Lesson 1

**Procedure:**

Your teacher will provide you with a spectroscope or the material and instructions to build one.

1. Being careful not to get fingerprints on the film, examine the diffraction gratings on the viewing end of the spectroscope (or from the spectroscope kit if you are making one) with the microscope. Describe what you see. Examine the non-label side of the CD with the microscope and describe what you see.
  
2. Look at the light source through the spectroscope (or through the diffraction grating if you are making a spectroscope). You will have to look to the side toward a dark wall. Describe what you see. (The room needs to be fairly dark with a single light bulb as a light source.)
  
3. Hold the CD so that the light reflects off the non-label side. Rotate the CD slightly. Describe what you see. (The room needs to be fairly dark with a single light bulb as a light source.)
  
4. If you are making your own spectroscope, do so now. The room lights may have to be turned back on.



### 7. Spectra Data Sheet

Draw the lines you see in your spectroscope. Try to match the position of each line in each color range. You may wish to try to match the color with colored pencils or crayons. If your spectroscope provides the wavelength of each colored line, write the number above the line on the **Spectra Data Sheet**.

Red	Orange	Yellow	Green	Blue	Violet
Element 1: _____ Color of glowing gas to naked eye _____					

Red	Orange	Yellow	Green	Blue	Violet
Element 1: _____ Color of glowing gas to naked eye _____					

Red	Orange	Yellow	Green	Blue	Violet
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**Making Conclusions - Spectra**

What can you conclude about the visible spectrum of different sources of light? Remember, a conclusion is not a restatement of data; a conclusion is a new idea or concept that you learned from analyzing the data available. A conclusion is a short statement supported by your data that can be further tested by acquiring new data.

Defend your conclusion with data obtained in the investigation.

Analysis of Stars (grades 7-9)

The following two pages contain information about the spectra of specific elements and the spectra of 5 stars. Worksheet 1 contains the spectra for 7 elements commonly found in stars. These spectra do not show colors, however light at the 4000Å end of the spectrum is violet and light at the 6800Å end of the spectrum is red. Worksheet 2 shows the spectra from 5 different stars. Obviously, stars are made of a variety of elements. Use these worksheets to answer the following questions.

What elements are in each star?

	Hydrogen	Iron	Neon	Sodium	Lithium	Magnesium	Helium
Star 1							
Star 2							
Star 3							
Star 4							
Star 5							

1. What stars, if any, contain all seven elements? Compare with another student.

2. What elements, if any, are in every star?

3. Hypothesize an explanation for #2.

### Analysis of Stars (grades 10-12)

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Star 1							
Star 2							
Star 3							
Star 4							
Star 5							

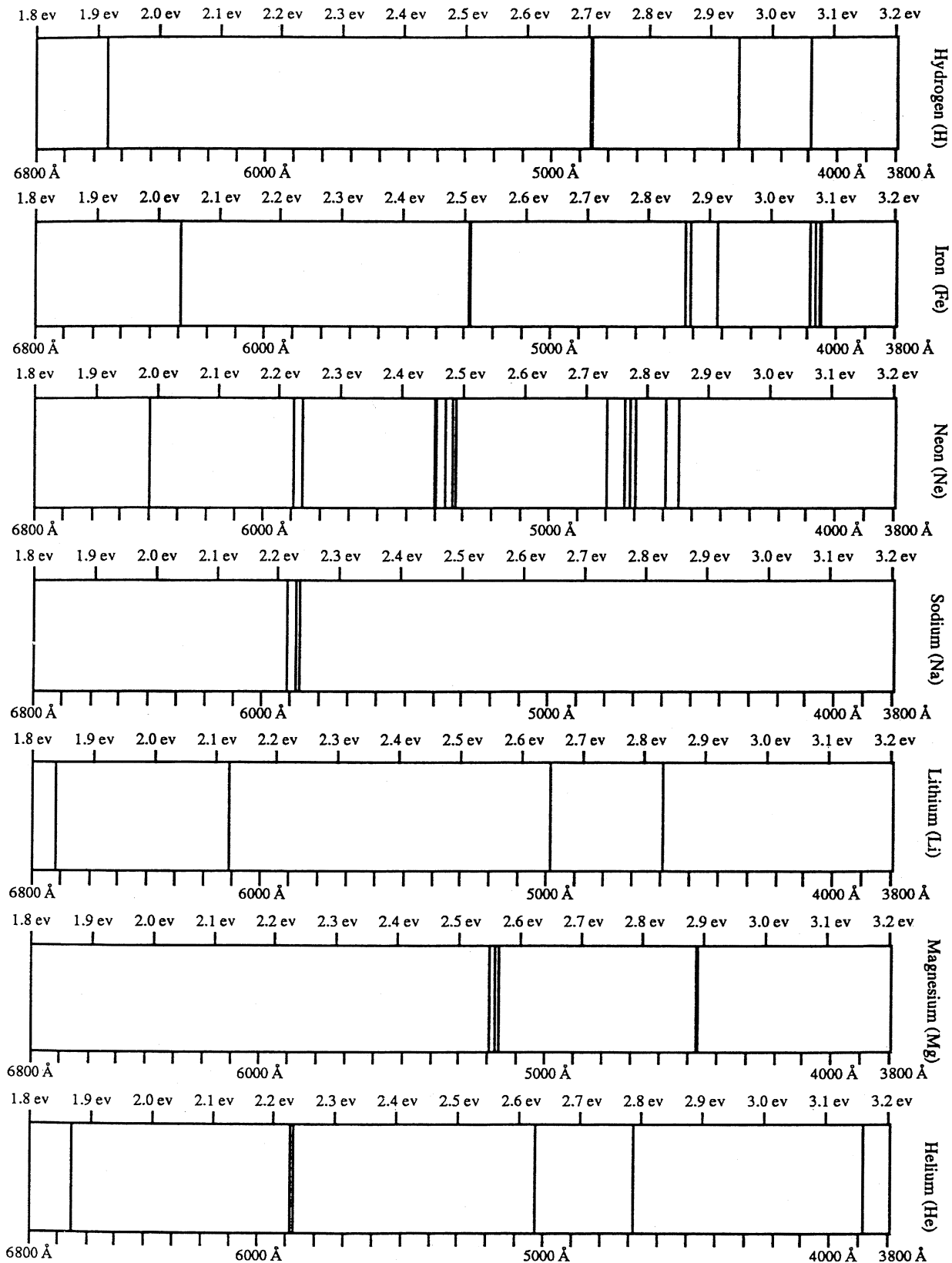
What conclusion(s) can you make from these data?

# Worksheet 1

Name \_\_\_\_\_

Date \_\_\_\_\_

## THE SPECTRA OF SEVEN ELEMENTS





# Worksheet 2

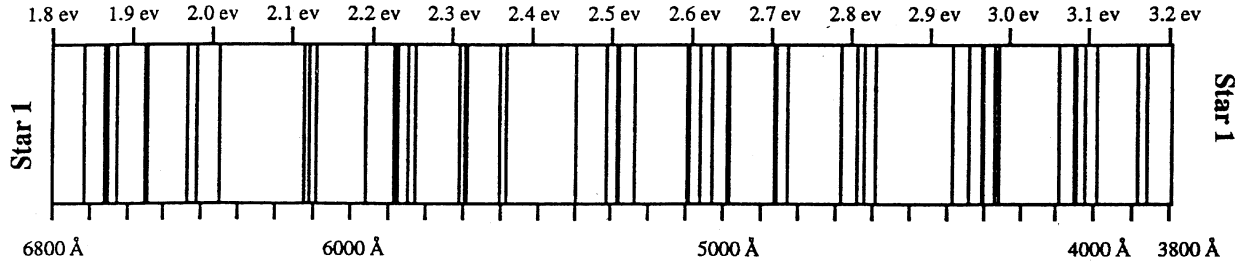
Name \_\_\_\_\_

Date \_\_\_\_\_

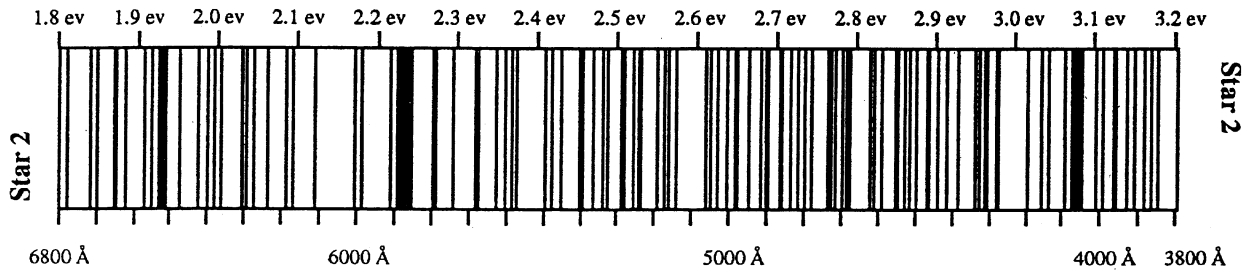
## THE ABSORPTION SPECTRA OF FIVE STARS

Determine which of the elements on Worksheet 1 are present in these stars

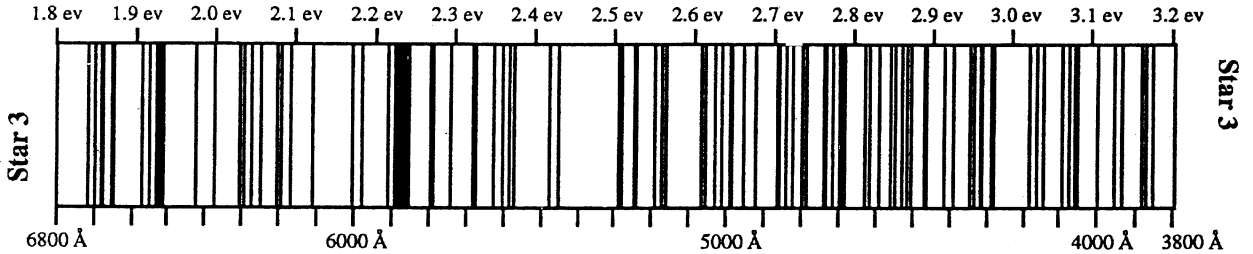
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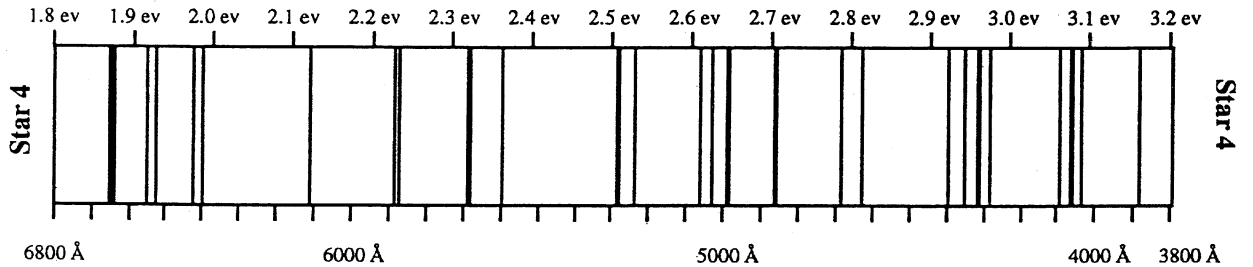
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