

**INVESTIGATE DARK LINE SPECTRUM ANALYSIS**

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**Analyzing Spectra****Lab Preview**

1. If all vertical lines match, what does that indicate? \_\_\_\_\_
2. What are the five known substances in this activity? \_\_\_\_\_

Look closely at the spectrum below. Those black lines are caused by elements in the star's atmosphere. As light emitted from a star passes through the star's atmosphere, some of it is absorbed by elements in the atmosphere. The wavelengths of the light that are absorbed appear as dark lines in the spectrum. Each element absorbs certain wavelengths, producing a certain pattern of dark lines. The pattern of lines can therefore be used to identify which elements are present in a star.

In this activity, you will observe spectra and determine the compositions of the sun and unknown objects by comparing the dark lines in their spectra with those in the spectra of known substances. The spectra have been greatly simplified for this activity so line patterns can be easily identified. Actual spectral lines are much more complex.

**SCIENTIFIC QUESTION:**

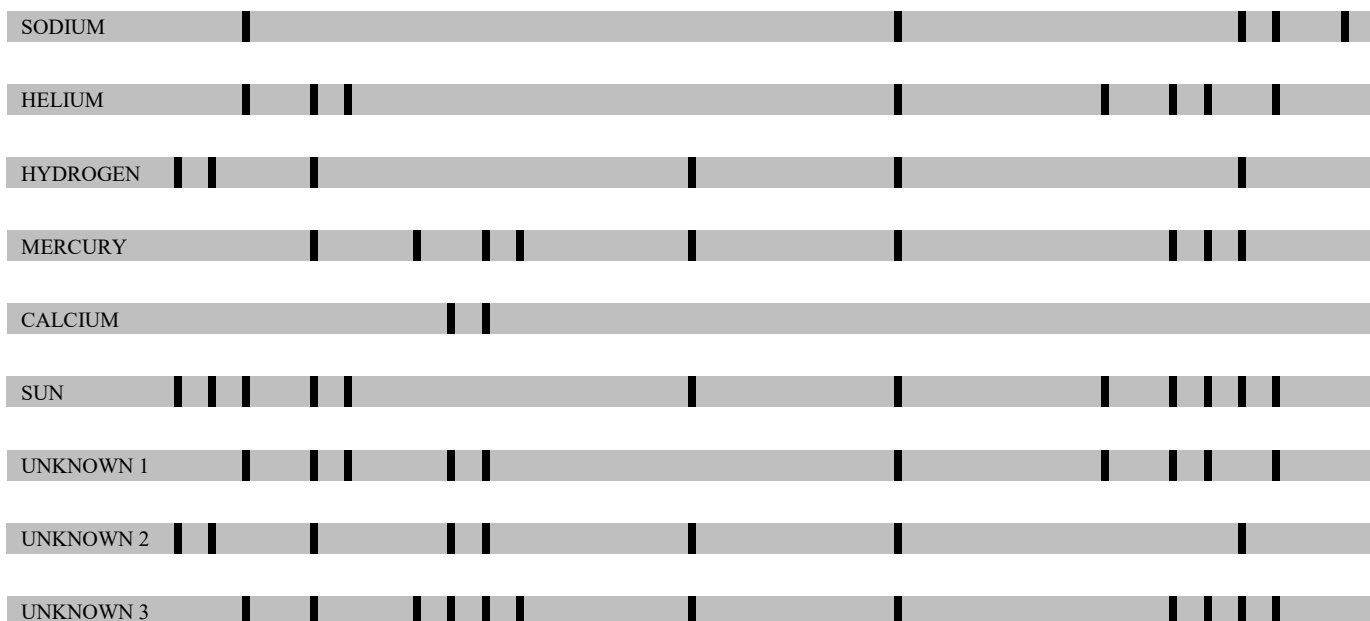
How do scientists know what a star is made of if they cannot travel that far and take a sample of it?

**MATERIALS**

- ruler or straightedge
- pencil
- paper

**PROCEDURE**

1. Look at the spectra on this page. Using a straightedge, try to match the vertical lines in the spectrum of the sun with lines in the spectra of the five known substances: hydrogen, helium, calcium, sodium, and mercury. A matching line indicates the presence of that element in the sun.
2. Record your findings & repeat for unknowns



## Investigate (continued)

### DATA AND OBSERVATIONS

Record a match with an X, and no match with a 0.

Known Substances	Sun	Object 1	Object 2	Object 3
Hydrogen				
Helium				
Calcium				
Sodium				
Mercury				

### ANALYZE

1. What elements are contained in the sun? \_\_\_\_\_
2. What element(s) is/are contained in all the unknown objects? \_\_\_\_\_

### CONCLUDE AND APPLY

3. How is a substance's spectrum like a fingerprint? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

4. How could scientists find out if stars within a newly discovered galaxy are composed of the same elements as stars within the Milky Way Galaxy? Explain the process (2pts)

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