

Name: _____ Class: _____ Date: _____

What Color and Temperature Tell Us About Elements

(demonstration)

Learner Outcomes:

- Investigate and illustrate the contributions of technological advances - including optical telescopes, spectral analysis and space travel - to a scientific understanding of space.

Key Terms:

Spectral analysis

Element

Star

Background Information: Stars vary greatly in their characteristics, light intensity and color. Very hot stars generally appear bluish and cooler stars look reddish. A stars color also varies with its chemical composition because different elements give off different colors when they are heated, according to how much energy their electrons have. When we analyze the spectra, or the component light patterns given off by stars, we can identify which elements they are composed of.

Research Question: How is color and temperature associated with different elements?

Materials:

Bunsen burner

Wooden splints

$\text{CuCl}_2(\text{aq})$

Tongs

$\text{LiCl}(\text{aq})$

$\text{BaCl}_2(\text{aq})$

8 test tubes

$\text{KCl}(\text{aq})$

$\text{SrCl}_2(\text{aq})$

Test tube rack

$\text{NaCl}(\text{aq})$

$\text{CaCl}_2(\text{aq})$

Procedure:

1. Light the Bunsen burner
2. Dispense approximately 1 cm depth of each solution in to labeled test tubes.
3. Dip a wooden splint into the first test tube to moisten the tip.

This investigation / activity has been adapted from:

Mah K, Martha J, McClelland L, et al. *Science in Action 9*. Toronto, ON: Addison Wesley.

4. Burn the tip in the blue portion of the Bunsen burner flame and record your observations.

Observations:

Analysis:

1. What was responsible for the different colors you saw? Carefully consider the chemical formulas of each of the substances tested)
2. What can the color of the flame reveal?
3. How would this information be useful for astronomers studying the spectrum of a star?

This investigation / activity has been adapted from:

Mah K, Martha J, McClelland L, et al. *Science in Action 9*. Toronto, ON: Addison Wesley.