# What Are Stars Made Of?

## Overview

In this activity, students will explore the different emission spectra of elements by observing heated gas elements with diffraction gratings (or spectroscopes). Students will draw their observations on the handout. Then, students will use the emission spectra of given elements to see what elements exist in stars.

## Suggested Grade Levels

Upper elementary (grades 3-5), middle school (grades 6-8). This could also be a supplemental activity on light or astronomy for high school (grades 9-12).

## NGSS Connections

- 5-PS1-3: Make observations and measurements to identify materials based on their properties
- MS-PS4-2: Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials
- HS-PS1-1: Use the periodic table as a model to predict the relative properties of elements based on the patterns of electrons in the outermost energy level of atoms
- HS-ESS1-3: Communicate scientific ideas about the way stars, over their life cycle, produce elements.

## Where does this fit into my curriculum?

*Physical Sciences*

- Structure and Properties of Matter (NGSS DCI PS1.A) - observable properties of materials, substructures of atoms (in particular electrons and electron energy levels)
- Electromagnetic Radiation (NGSS DCI PS4.B) - wave model of light

*Earth and Space Sciences*

- The Universe and Its Stars (NGSS DCI ESS1.A) - spectra of stars used to identify element composition of stars

## Materials Needed

- All materials will be provided by the Berkeley Lab K-12 Team. Access to outlets is required.
- Link to student handout for reference

## Sample Activity Flow (1 hour)

- Introduction of Berkeley Lab, K-12 team, and Berkeley Lab scientists. Scientists share their research and what they do at the Lab. (15 min)
- Element Emission Spectra Stations (30 min)
- Mystery Star Activity (10 min)
- Open Q&A with scientists (5 min)