# Spectra Analysis

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**Author:** Drew Sobczak

**Subjects(s):** Physics

**Topic or Unit of Study:** Stars

**Grade/Level:** 9th grade

**Time Allotment:** 1 class period - 50 minutes

**Objective:** Analyze the spectra looked at with the spectroscope.

**Summary:** The class will discuss and analyze the data taken with the spectroscopes as well as the questions from the Spectroscope Analysis sheet.

## STANDARDS & ASSESSMENT

**Standards:**

**13.A.4b** Assess the validity of scientific data by analyzing the results, sample set, sample size, similar previous experimentation, possible misrepresentation of data presented and potential sources of error

**13.A.4c** Describe how scientific knowledge, explanations and technological designs may change with new information over time

**13.A.4d** Explain how peer review helps to assure the accurate use of data and improves the scientific process

**Assessment/Rubrics:** Spectroscope Definitions worksheet.

## IMPLEMENTATION

**Learning Context:** This is the 2nd lesson in the unit and happens on the 3rd day of the unit. Students will have noticed, with help of their spectroscopes, that not all white light has the same spectrum. Students will also have made several observations about various light sources. In this lesson they will be introduced to emission and absorption lines and

learn that light is just a very small portion of the entire electromagnetic spectrum. This will lead them to digital spectrographs. We could only see visible light with the spectrographs we used, but digital spectrographs can show a much wider range of information. Thus, this will show how scientific knowledge, explanations and technological designs may change with new information over time. Learning about absorption lines will lead into the next lesson about the nature and properties of stars.

**Procedure:**

- Collect Spectroscope Analysis sheet (used to judge student understanding – grade based on completion, not correct answers)
- Pass out Spectroscope Definitions sheet. Discuss Spectroscope Analysis sheet answers
  - What is a spectrum?
  - Why was there a strong green line in the fluorescent light spectrum but not in the incandescent light spectrum? Emission
  - When looking at the spectra of the red and blue light, why do come colors disappear from the spectra? Absorption
  - Fill out Venn diagram together on board. Most important points are: emission lines add light, absorption lines remove light, and both can be used to identify an element.
  - What is the electromagnetic spectrum?
- Visible light is only a very small portion of the electromagnetic spectrum. If we want to know more information about an object's spectrum, what would we need to do? Relate our spectrographs to digital spectrographs. Explain how digital spectrographs can take data over a greater range of wavelengths.

**Differentiated Instruction:** Students with hearing or visual impairments will be placed in the front of the classroom, enabling them to hear and see the teacher's instruction better. AD/ADHD students will be placed by the teacher's desk or an easily accessible area so the teacher can make sure these students are staying on task. LD students will receive differentiated instruction on a case by case basis. The differentiated instruction

will depend on what learning disability the student has and how that specific student will cope with the presented lesson.

## MATERIALS AND RESOURCES

**Instructional Materials:**

- Overhead Projector
- Spectroscope Definitions sheet printed on a transparency
- Electromagnetic spectrum picture printed on a transparency