Wien's Law

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Subjects(s): Physics

Topic or Unit of Study: Stars

Grade/Level: 9th grade

Time Allotment: 1 class period – 50 minutes

Objective: Teach the students about Wien's Law.

Summary: The students will be introduced to Wien's Law in this lesson. In order to understand this, they must also learn about blackbody radiation and how to relate blackbody radiation to the spectrum of a star.

STANDARDS & ASSESSMENT

Standards:

12.F.4a Explain theories, past and present, for changes observed in the universe

12.F.4b Describe and compare the chemical and physical characteristics of galaxies and objects within galaxies

Assessment/Rubrics: Wien's Law worksheet

IMPLEMENTATION

Learning Context: This is the 5th lesson of the unit and happens on the 6th day of the unit. Students will have learned the day before about the Harvard classification scheme. Specifically, they will know that this classification depends on temperature and the ranges of temperatures for each spectral type. After learning about Wien's Law, the next lesson goes into absorption lines, which is another – more accurate – method for classifying stars.

Procedure:

- Read aloud all of the OBAFGKM mnemonics, maybe even write them on the board
    - Vote on best mnemonic and declare a winner
    - Post the mnemonic somewhere in the classroom with the winning mnemonics from the other classes
- With the help of the board, explain blackbody radiation and what a blackbody curve is. Make sure students understand this is the general shape of a star's spectrum
    - A blackbody curve will be on the Wein's Law worksheet, so no handout is needed here
- Write Wien's Law on the board and explain what the variables are
    - Again, this will be on the worksheet, so no handout is needed yet
- Draw a blackbody curve on the board and calculate the temperature using Wien's Law
- Draw a blackbody curve on the board and have a student calculate the temperature
- Pass out Wien's Law worksheet and have students work in groups (lab groups work well) to complete the worksheet. Let the students struggle with where to put the peak wavelength on the real spectra
- Draw a real spectrum on the board and have a student classify it using temperature
    - The picture does not need to be exact

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:

- Chalkboard
- Chalk
- Wien's Law worksheet