



Classroom Teacher Preparation

Earth Science 11: Stars

Please use the following to prepare for the next SfS lesson.

Description:

In this module students learn about the variety of stars in the Universe and how our Sun compares to other stars. Students work in pairs to build a Hertzsprung-Russell (H-R) diagram, a powerful tool based on temperature and brightness of stars used by astronomers to study the stars. Students then analyze data from the H-R diagram and learn what the position of a star on H-R diagram can tell us about the star.

Lesson Objectives – SWBAT (“Students Will Be Able To...”):

6th-8th

- Analyze characteristics of stars based on their position in the H-R diagram
- Describe various types of stars in the universe

Disciplinary Core Idea (DCI)

ESS1 Earth’s Place in the Universe – ESS1.A The universe and its stars

- (6th-8th) The solar system is part of the Milky Way, which is one of many billions of galaxies.

Science & Engineering Practice (SEP)

Analyzing and Interpreting Data

- (6th-8th) Construct, analyze, and/or interpret graphical displays of data and/or large data sets to identify linear and nonlinear relationships.

Crosscutting Concept (CCC)

Patterns

- (6th-8th) Graphs, charts, and images can be used to identify patterns in data.

Preparation:

This lesson is mostly introductory, but if students’ background in this area is limited, it might be beneficial to teach *Earth Science 8: Solar System* before this lesson.

Students should be familiar with plotting points on a graph and powers of 10.

Room Set Up for Activities:

Students will work in pairs at their desks to build a H-R diagram on a magnetic board and to analyze their data.

The classroom’s whiteboard (if magnetic) will be used for the large class version of the H-R diagram. If a magnetic whiteboard/chalkboard is unavailable in the classroom, the class chart will be assembled on the floor. In this case, a clear area of about 30’ x 30” of floor space will be needed.



Safety:

There are no safety concerns with this lesson.

Related Modules:

This lesson may be taught as part of a sequence or group of related modules on **Space**. Other modules in this sequence include:

Earth Science 8: Solar System – This lesson provides an overview of the objects that make up our solar system, with an emphasis on scale. Students will learn about the vastness of space by building their own Solar System model to scale, in order to visualize how it really looks.

Physics 4: Gravity – This exploration-driven lesson uses an interactive physical model of a gravity well to introduce students to the laws governing the gravitational interactions of objects.

Earth Science 6: Lunar Landing Challenge – Students work in groups to solve a difficult problem (astronaut crews have suffered an emergency crash landing on the moon) and make complex decisions in order to salvage the damaged materials and safely reach the moon base.

For other module sequences and groups, look here: www.sciencefromscientists.org/sequences

Standards Covered:

Please click the following link to our website to review the standards covered by this lesson, listed by state: www.sciencefromscientists.org/standards/

Lessons are matched to both national NGSS and local state standards.

After Our Visit:

Extend this lesson by exploring how stars progress through the H-R diagram as they age.

Access this Extension activity by visiting the Classroom Post found on our website at sciencefromscientists.org/cohorts. Use the name of your school/cohort and password to log in.

To help Evaluate, check out our Open Response questions online at sciencefromscientists.org/open-response-questions. They are freely available for all of our lessons for current teachers. Use the password supplied by your instructor to log in.

Additional Resources:

- Stars and Galaxies: The Life Cycles of Stars (4:26): <https://www.youtube.com/watch?v=BCXq9QuCsK0>
- H-R diagram animation (1:39): <https://www.youtube.com/watch?v=jiSN95WX1NA>
- Star size comparison (6:50): <https://www.youtube.com/watch?v=GoW8Tf7hTGAb>