



Hertzsprung-Russel Diagram

Plotting a Star Graph

Classroom Activity

Overview

Age Range:

11-16

Prep. Time:

10 minutes

Lesson Time:

1 hour

Cost per activity:

Low

Includes the use of:

String, large space (4 x 4 m)

Outline

For this activity, students will make a classroom-sized, Hertzsprung-Russell diagram showing the lifecycle of stars.

They will be given a number of different stars of different luminosities and temperatures and they will need to create a graph with appropriate axis to plot the stars on.

There are some hint cards which you may wish to give to students to help them.

Pupils will Learn:

- How to identify relevant and useful data
- How to plot a graph from star data

Lesson Plan:

Overview of the time required to complete lesson.

| Description | Time | Notes |
|-----------------------------|--------|--|
| Introduction to the subject | 15 min | |
| Activity 1 | 30 min | Use: HRdiagramCards.pdf and HRdiagramHints.pdf |

Online Observatory: onlineobservatory.eu

The online observatory collaboration consists of the following partners:

Baldone Observatory, Brorfelde Observatory, Cardiff University, Harestua Solar Observatory, Helsinki Observatory



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| Assessment | 15 min | |
|------------|--------|--|

Introduction to the subject:

This lesson can be a continuation from the 'Life Cycle of Stars' lesson or done alone. If done separately, mention that stars go through several different stages in their lifetime and that their properties such as brightness, radius and temperature will change depending on its stage of life.

A HR diagram plots the stars temperature (or colour) against its luminosity (magnitude), allowing astronomers to see a star's evolutionary phase. All stars fit somewhere onto the diagram, inside its three main regions, that students should be able to spot after completing the activity.

Activity 1:

- Print and cut out the cards (HRdiagramCards.pdf), if you chose to do so, do the same with the hint cards. Clear a large space and gather the students into a large group.

Mention that not all the cards will be needed. Some are red herrings, so students will have to decide which ones are useful and which are not relevant.

1. Layout all of the laminated cards to see what they are, each card will fall into one of the following categories star cards, axis title cards and axis value cards
2. Using the string, make a graph axis for your diagram.
3. From looking at the cards and the parameters, decide on what parameters you want to plot on each axis and the values. Place them on your diagram.
4. Now place each of the star cards in its correct place on the diagram

Assessment:

- Describe how the graph looks? Are stars clumped together in certain areas or spread out? Why might the graph look this way?
- Can you identify any red giants/super giants or white dwarfs?
- Is there a diagonal strip of stars? This is the Main Sequence. What determines a star's position on the main sequence strip?

Background Material/Knowledge:

Students should create a graph that looks similar to the one displayed below.

They should have identified that luminosity in solar luminosities is displayed on the y-axis and temperature in Kelvin is displayed on the x-axis.

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