

Student Name: _____

Class: _____

Due Date: _____

Introduction to the HR Diagram and Life Cycle of Stars

What is the HR Diagram?

The HR diagram, also known as the Hertzsprung-Russell diagram, is a tool used to understand the life cycle of stars. It plots the luminosity (or brightness) of a star against its surface temperature.

Stages of a Star's Life Cycle

- **Protostar Formation:** The birth of a star, where a cloud of gas and dust collapses under gravity.
- **Main Sequence:** The stage where a star fuses hydrogen into helium in its core.
- **Red Giant:** The stage where a star has exhausted its hydrogen fuel and expands to become a red giant.
- **White Dwarf:** The stage where a star has shed its outer layers and is left with a hot, compact core.

Short Answer Questions

1. What is the HR diagram, and what does it show?

2. Describe the main sequence stage of a star's life cycle.


3. What happens to a star during the red giant phase?

4. What is a white dwarf, and how is it formed?

Section 2: HR Diagram Labeling

Label the following stages on the provided HR diagram:

- Protostar formation
- Main sequence
- Red giant
- White dwarf



Section 3: Case Study

Choose a star from the list below and research its life cycle stage:

- Sun
- Betelgeuse
- Sirius
- Procyon

Write a short paragraph describing the star's life cycle stage and how it relates to the HR diagram.

Reflect on what you have learned and how it relates to real-world applications.

Ask yourself:

- What did I learn about the HR diagram and the life cycle of stars?
- What challenges did I face, and how did I overcome them?
- What would I like to learn more about in the future?

A large, empty rectangular box with a thin black border, intended for a student to write their reflection on the learning experience.

Choose any combination:

1. Research a specific type of star, such as a neutron star or black hole, and create a short presentation (5-7 minutes) about its life cycle stage.

2. Imagine you are a star going through its life cycle. Write a short story (1-2 pages) about your journey from protostar formation to white dwarf.

Success Criteria

To successfully complete this assignment, you will:

- Accurately label the HR diagram with the different stages of a star's life cycle.
- Answer the short answer questions in complete sentences.
- Complete the case study and provide a clear description of the star's life cycle stage.
- Demonstrate an understanding of the HR diagram and its relation to the life cycle of stars.

Time Management Guidelines

This assignment should take approximately 30-45 minutes to complete.

Break down the tasks into manageable chunks, and take regular breaks to stay focused and avoid fatigue.

To support your child's learning, you can:

- Encourage them to ask questions and think critically about the life cycle of stars.
- Help them research and gather information for the case study.
- Provide guidance on time management and organization.
- Encourage them to reflect on what they have learned and how it relates to real-world applications.

Conclusion

By completing this worksheet, you will gain a deeper understanding of the HR diagram and the life cycle of stars, and develop critical thinking and independent learning skills.