Life of Stars – Unit Assessment

Name: _____ Hour_____Date: _____

Date Packet is due:_____ Why late? _____Score: _____
Day of Week Date If your project was late, describe why

Overview: You will be demonstrating your capacity to address the driving questions from this unit through a group presentation.

Main Questions

1. How long do stars last?
2. Why do stars die?
3. How does the life cycle of stars relate to the formation of new elements?

Weekly Schedule

Part 1: Introduction
- Intro to the Stars Unit Project
- Review of Key Concepts

Part 2: Work Time
- Time allotted for completing the project.

Part 3: Peer Review
- Acquiring peer feedback on your first draft

Part 4: Final Preparation
- Determining specifics about your presentation.

Part 5: Presentation
- Presenting your work

NGSS Standard:
HS-ESS1-3: Communicate scientific ideas about the way stars, over their life cycle, produce elements.

Semester Schedule

How the Sun Works

Week 1: What is matter? What is energy?
Week 2: What's inside the sun?
Week 3: How can we measure the sun?
Week 4: Where does the sun's energy come from?
Week 5: Unit Assessment

The Life of Stars

Week 1: How long do stars last?
Week 2: Why do stars die?
Week 3: What happens after stars die?
Week 4: Unit Assessment

How It All Began

Week 1: How can we determine the universe's size?
Week 2: How can expansion determine the universe's age?
Week 3: What can we learn from background radiation?
Week 4: Unit Assessment

Navigating Space

Week 1: How and why do things orbit in space?
Week 2: How can we predict orbits?
Week 3: Unit Assessments

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Part 1: Introduction to the Project

Introduction: In this project, you will work in groups of 2-4 to develop a presentation based on the driving questions below. You should use a presentation program (such as Microsoft PowerPoint or Google Docs) to address each item below. **Begin by reviewing each of the following concepts**. Rank each from 1 (unsure) to 3 (confident) based on your ability.

Week 1 – Life Cycle of Stars

1. True or False: all stars go through a predictable life cycle. Explain.
2. How long do stars last? What determines the length of the life of a star?
3. Where do stars come from?
4. What kinds of information are plotted on the H-R Diagram?
5. How information can be determined by observing a star's position on the H-R Diagram?
6. Briefly summarize the three main regions (or evolutionary stages) of stars on the H-R Diagram.
7. What is the Main Sequence stage? For how long do stars stay in this phase?
8. How does a star's internal balance shift while it is in the Main Sequence stage?
9. What changes occur as a star goes from the Main Sequence stage to the Red Giant phase?
10. How do White Dwarfs form?
11. What is a planetary nebula? How is it different from the nebula from which stars form?
12. How is the life cycle of high-mass stars similar and different from that of low-mass stars?
13. In high-mass stars, nuclear fusion will continue until iron is formed. Why?
14. Briefly summarize the events that occur after a high-mass star enters the phase of gravitational collapse.
15. What is a supernova explosion? Why does it occur? How does this event relate to the heaviest elements?
16. Some high-mass stars form neutron stars; others form black holes. Why? What determines this outcome?
17. How does the H-R Diagram help us to understand how stars age and how long they last?

Week 2 – Nucleosynthesis and Mass Defect

1. How is nuclear fusion different from combustion?
2. What is mass defect? Why does mass defect occur?
3. True or false: the mass of an electron, proton, and neutron is greater when they are separate compared to when they form an atom. Explain.
4. What is nuclear binding energy? How does it relate to both mass defect as well as atomic stability?
5. What primarily determines the stability of an element?
6. What is a nucleon? How does binding energy per nucleon relate to the amount of energy released during nuclear fusion?
7. Briefly explain what information the mass defect curve provides and why this is significant to the life cycle of stars.
8. As high mass stars age, their cores eventually accumulate greater and greater proportions of iron. Why does this limit the lifespan of stars?
9. Nuclear fusion involves combining atoms, while nuclear fusion involves splitting atoms. Why is it that both processes result in a release of energy?
10. How do these atomic properties relate to the life cycles of stars?

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Part 2: Work Time

Introduction & Directions: Use this time to complete your group presentation. Remember that you're not done until your group is completely finished. If you finish your portion of the presentation, help other group members complete their portion, check the presentation for errors, or add additional components to your presentation to improve its professionalism and appeal.

Part 3: Peer Review

Overview: You will be critiquing another group's presentation. For each of the items on the next page, provide a score based on their current work. Use the rubric below to determine if each item should receive +, ✓, or -.

An item needs a "+ "for all the criteria above to receive an overall "plus" score. For example, if you notice a particular item has a spelling error, is missing a key consideration, or could be delivered in a more appealing manner, that item should receive a ✓ or -. A + is reserved for items that could not be reasonably improved.

Item	*Plus (100%)*	*Check (70-90%)*	*Redo (0%)*
Accuracy – *Are all components factually correct?*	This presentation is 100% factually accurate without any errors or omissions.	Overall, the presentation was mostly factually accurate.	Students are still making progress towards a final draft.
Thoroughness – *Did you address all aspects?*	This addresses all of the information needed for each objective.	Almost all of the required information was included for each objective.	Students are still making progress towards a final draft.
Professionalism – *Does this look like it was professionally produced?*	This presentation reflects the work of a group of adult professionals.	This is acceptable work for high school students.	Students are still making progress towards a final draft.
Effort – *How much work went into this presentation?*	Effort exceeds what would be expected of a high school student.	Effort is acceptable for a high school student.	Students are still making progress towards a final draft.

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	+	✓	-
Week 1 – Life Cycle of Stars			
True or False: all stars go through a predictable life cycle. Explain.			
How long do stars last? What determines the length of the life of a star?			
Where do stars come from?			
What kinds of information are plotted on the H-R Diagram?			
How information can be determined by observing a star's position on the H-R Diagram?			
Briefly summarize the three main regions (or evolutionary stages) of stars on the H-R Diagram.			
What is the Main Sequence stage? For how long do stars stay in this phase?			
How does a star's internal balance shift while it is in the Main Sequence stage?			
What changes occur as a star goes from the Main Sequence stage to the Red Giant phase?			
How do White Dwarfs form?			
What is a planetary nebula? How is it different from the nebula from which stars form?			
How is the life cycle of high-mass stars similar and different from that of low-mass stars?			
In high-mass stars, nuclear fusion will continue until iron is formed. Why?			
Briefly summarize the events that occur after a high-mass star enters the phase of gravitational collapse.			
What is a supernova explosion? Why does it occur? How does this event relate to the heaviest elements?			
Some high-mass stars form neutron stars; others form black holes. Why? What determines this outcome?			
How does the H-R Diagram help us to understand how stars age and how long they last?			
Week 2 – Nucleosynthesis and Mass Defect			
How is nuclear fusion different from combustion?			
What is mass defect? Why does mass defect occur?			
True or false: the mass of an electron, proton, and neutron is greater when they are separate compared to when they form an atom. Explain.			
What is nuclear binding energy? How does it relate to both mass defect as well as atomic stability?			
What primarily determines the stability of an element?			
What is a nucleon? How does binding energy per nucleon relate to the amount of energy released during nuclear fusion?			
Briefly explain what information the mass defect curve provides and why this is significant to the life cycle of stars.			
As high mass stars age, their cores eventually accumulate greater and greater proportions of iron. Why does this limit the lifespan of stars?			

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Part 4: Final Preparation

Overview: Use this time to make corrections based on your peer review. You should also prepare your speaking notes and determine who is primarily responsible for each section. Note that your instructor may assign a group to present only on a specific topic; if so, your group should be prepared to discuss each item as a group (if only one person from your group delivers the entire presentation, you would not score as well based on the rubric below compared to a group where everyone presents).

Part 5: Presentation

Grading: Your grade will be determined using the following considerations:

Item	*Plus (100%)*	*Check (70-90%)*	*Redo (0%)*
Accuracy – *Are all components factually correct?*	This presentation is 100% factually accurate without any errors or omissions.	Overall, the presentation was mostly factually accurate.	Students are still making progress towards a final draft.
Thoroughness – *Did you address all aspects?*	This addresses all of the information needed for each objective.	Almost all of the required information was included for each objective.	Students are still making progress towards a final draft.
Professionalism *– Does this look like it was professionally produced?*	This presentation reflects the work of a group of adult professionals.	This is acceptable work for high school students.	Students are still making progress towards a final draft.
Group Involvement – *Was everyone involved?*	Every member was involved with the development of the presentation as well as its delivery.	Most of the time, all group members were fully involved in the development and delivery of this presentation.	A portion of the group was fully involved in this project.
Effort – *How much work went into this presentation?*	Effort exceeds what would be expected of a high school student.	Effort is acceptable for a high school student.	Students are still making progress towards a final draft.

Remember – your grade is partially- or completely-dependent on your oral presentation, so if you run out of time before you research all your topics, it will probably be ok.

Please provide your names below and give to your instructor when you present so that they can use it to record your grade.

Names: _____

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