

Star Life Cycle Worksheet Answer Key PDF

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Part 1: Building a Foundation

What is the initial stage in the life cycle of a star?

undefined. A) White Dwarf

undefined. C) Protostar ✓

undefined. D) Neutron Star

undefined. C) Red Giant

The initial stage in the life cycle of a star is a protostar.

Which of the following are involved in the formation of a star? (Select all that apply)

undefined. A) Nebula ✓

undefined. C) Supernova ✓

undefined. D) Protostar ✓

undefined. C) Black Hole

Nebula and protostar are involved in the formation of a star.

Describe the process that occurs in the core of a star during the main sequence stage.

During the main sequence stage, hydrogen is fused into helium in the core of the star.

List the two possible end stages for a high mass star after a supernova.

1. First end stage

Neutron Star

2. Second end stage

Black Hole

The two possible end stages for a high mass star after a supernova are a neutron star or a black hole.

Part 2: Understanding and Interpretation

During which phase does a star expand and cool after exhausting hydrogen in its core?

undefined. A) Main Sequence

undefined. C) Protostar

undefined. D) White Dwarf

undefined. A) Red Giant/Supergiant ✓

A star expands and cools during the Red Giant/Supergiant phase.

What elements are primarily produced during the helium fusion stage in a star's life cycle? (Select all that apply)

undefined. A) Helium

undefined. C) Oxygen ✓

undefined. D) Iron

undefined. A) Carbon ✓

During the helium fusion stage, carbon and oxygen are primarily produced.

Explain why a star becomes a red giant or supergiant after the main sequence stage.

A star becomes a red giant or supergiant after the main sequence stage due to the exhaustion of hydrogen in its core, leading to the fusion of heavier elements.

Part 3: Application and Analysis

If a star is observed to be in the red giant phase, what can be inferred about its core processes?

undefined. A) It is primarily fusing hydrogen into helium.

undefined. C) It has stopped nuclear fusion entirely.

undefined. D) It is forming a black hole.

undefined. A) It is undergoing helium fusion. ✓

If a star is in the red giant phase, it is undergoing helium fusion in its core.

How might the elements dispersed by a supernova contribute to the formation of new celestial bodies? (Select all that apply)

undefined. **A) They form new stars. ✓**

undefined. **C) They contribute to the formation of planets. ✓**

undefined. **D) They become part of existing stars. ✓**

undefined. A) They create planetary nebulae.

The elements dispersed by a supernova can form new stars and contribute to the formation of planets.

Describe how the life cycle of a star like our Sun might differ from that of a much more massive star.

A star like our Sun will end its life as a white dwarf, while a much more massive star may end as a neutron star or black hole.

Part 4: Evaluation and Creation

Which of the following best describes the relationship between a neutron star and a black hole?

undefined. A) Both are formed from low mass stars.

undefined. C) A black hole can become a neutron star if it loses mass.

undefined. D) Both are formed directly from protostars.

undefined. **A) A neutron star can become a black hole if it gains enough mass. ✓**

A neutron star can become a black hole if it gains enough mass.

Analyze the differences between a white dwarf and a neutron star. Which of the following statements are true? (Select all that apply)

undefined. **A) A white dwarf is the remnant of a low to medium mass star. ✓**

undefined. C) Both are formed from the remnants of supernovae.

undefined. **D) A neutron star can evolve into a black hole. ✓**

undefined. **A) A neutron star is denser than a white dwarf. ✓**

A white dwarf is the remnant of a low to medium mass star, while a neutron star is denser and can evolve into a black hole.

Compare and contrast the processes occurring in the core of a star during the main sequence and red giant phases.

During the main sequence phase, hydrogen is fused into helium, while in the red giant phase, helium is fused into heavier elements.

Which scenario is most likely to lead to the formation of a black hole?

undefined. A) A low mass star exhausting its nuclear fuel.

undefined. C) A white dwarf gaining mass from a companion star.

undefined. D) A protostar collapsing under gravity.

undefined. A) A high mass star undergoing a supernova. ✓

A high mass star undergoing a supernova is most likely to lead to the formation of a black hole.

Evaluate the impact of supernovae on the universe. Which of the following are potential consequences? (Select all that apply)

undefined. A) Creation of new elements. ✓

undefined. C) Destruction of nearby planets. ✓

undefined. D) Increase in cosmic radiation.

undefined. A) Formation of new stars. ✓

Supernovae can lead to the creation of new elements, formation of new stars, and destruction of nearby planets.

Imagine you are an astronomer observing a distant galaxy. Propose a method to determine the life cycle stage of a star within that galaxy and justify your approach.

To determine the life cycle stage of a star, one could analyze its spectrum and luminosity to identify its temperature and composition.