

DRAFT - UNIT 5 TEST: SPACE ADV 2023

Total Questions - 35

COMPLEXITY/DEPTH OF KNOWLEDGE

DOK1 - 18

DOK2 - 13

DOK3 - 0

STANDARDS

8.3(D) [P] - 1

8.8(A) [R] - 17

8.8(B) [S] - 6

8.8(C) [S] - 6

8.8(D) - 4

TYPES

Selected Response - 20

Constructed Response - 0

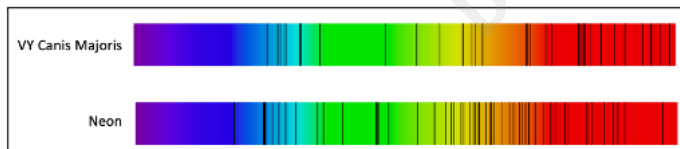
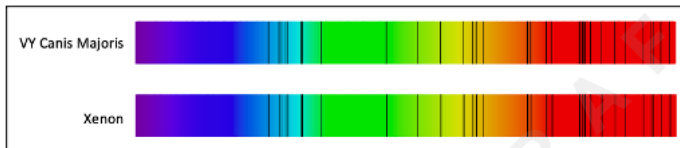
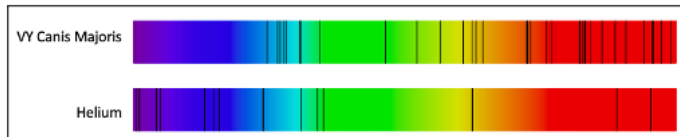
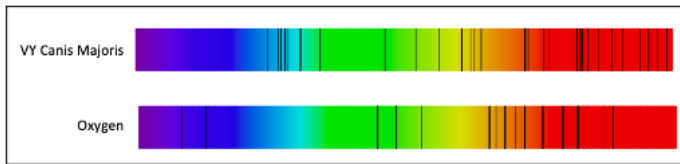
Numerical Response - 0

Interactive Response - 15

Resource - 0

1. Selected Response

VY Canis Majoris is one of the largest stars discovered to date. The spectra from VY Canis Majoris is shown below. Which element is present in this star? (hint: if you need to make this larger to see better, you can)



A. Oxygen

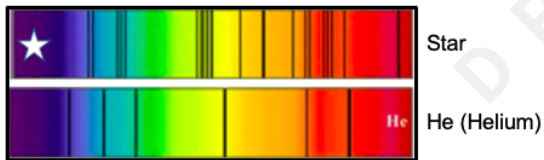
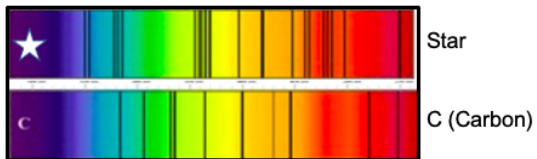
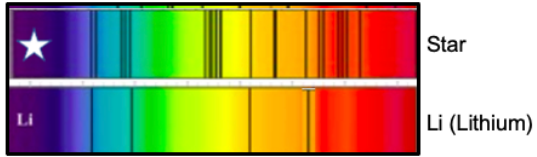
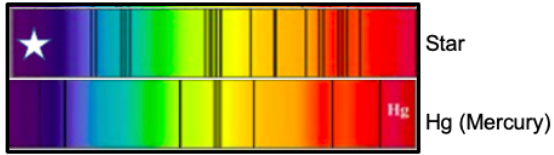
B. Helium

C. Xenon

D. Neon

2. Selected Response

Which element is present in the Star shown?



A. Mercury

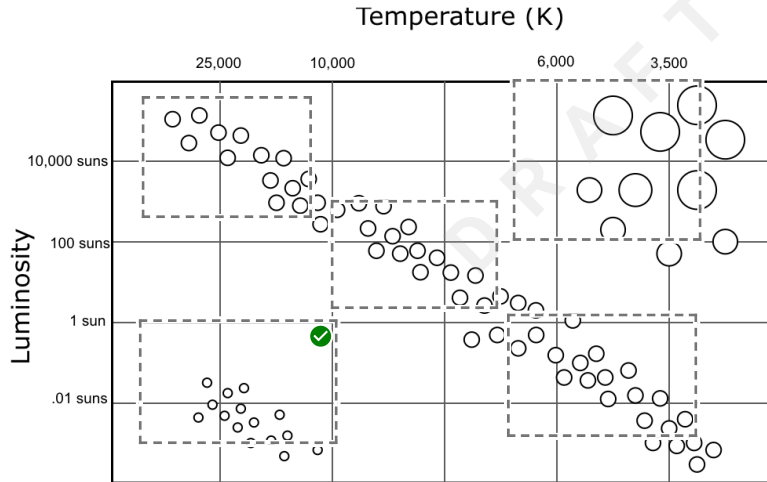
B. Lithium

C. Carbon

D. Helium

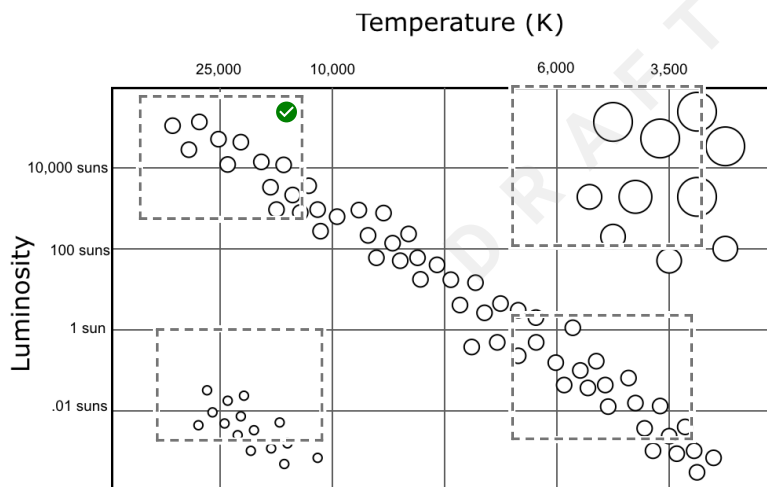
An HR Diagram is displayed below. Which of the following stars on the HR Diagram have a greater surface temperature than the sun, but a lower luminosity?

Select the correct answer.

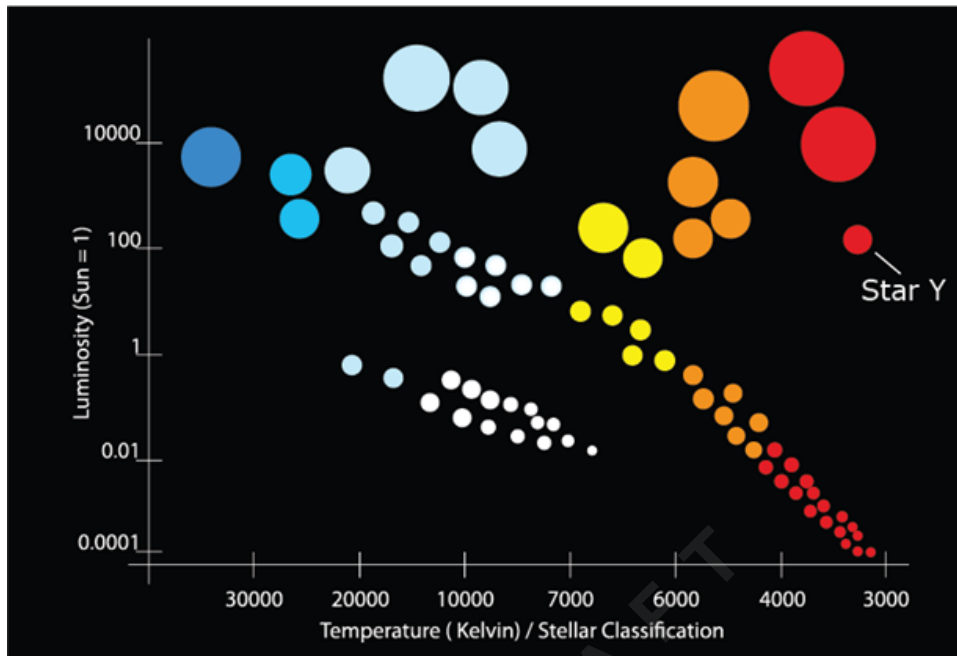


An HR Diagram is displayed below. Which of the following stars on the HR Diagram have a surface temperature and luminosity greater than that of the sun?

Select the correct answer.



A group of students studying the HR Diagram below were asked to write statements concerning Star Y.



Which of the students accurately described Star Y based on its location on the HR Diagram?

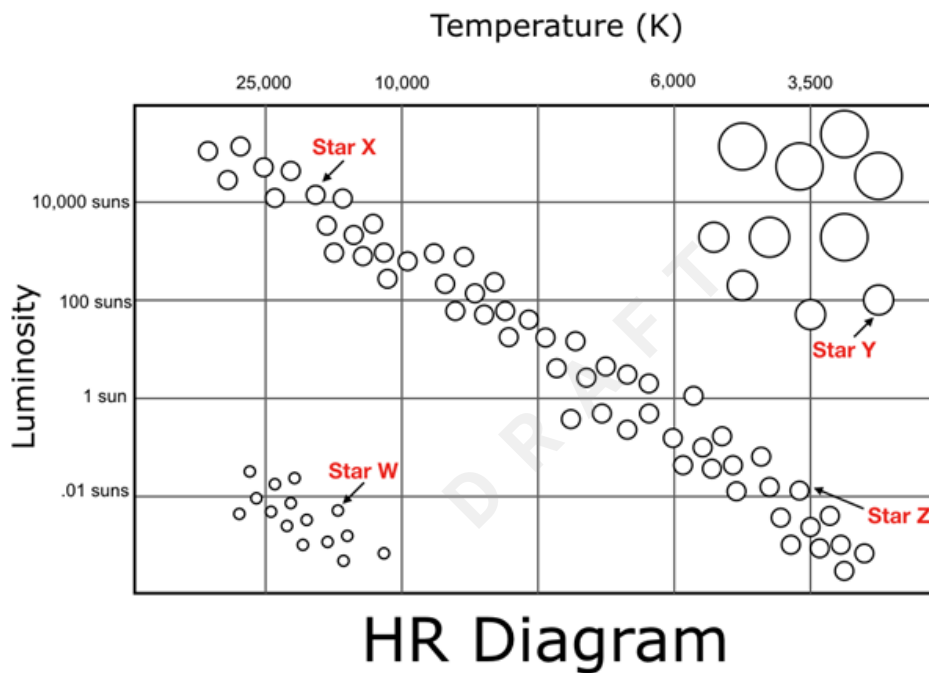
Select **TWO** correct answers.

- Student A:
A. Star Y has a luminosity lower than that of the sun.
- Student B:
B. Star Y has a surface temperature greater than 4,000 K.
- Student C:
C. Star Y has a luminosity greater than that of the sun.
- Student D:
D. Star Y has a luminosity equal to that of the sun.
- Student E:
E. Star Y has a surface temperature lower than 4,000 K.

An HR Diagram displays a star's temperature and luminosity.

Using the HR Diagram below, complete the following statements by moving the answers to the correct boxes.

Some answers may be used more than once. Not all answers will be used.


 giant

 supergiant

When compared to the sun, Star W has a lower luminosity and a greater surface temperature.

Star W is classified as a white dwarf while the sun is classified as a main sequence star.

Complete the statement below.

Our Sun is a medium mass star that is approximately one-third of the way through its life cycle. As our sun nears the end of its life cycle and burns away most of its hydrogen fuel, it will become a Red Giant and eventually a dwarf .

8. **Interactive Response** INLINE CHOICE

8.8(A) [R] | SC3

Complete the sentence below.

An example of an average, main sequence star would be the Sun ▼ .

9. **Interactive Response** INLINE CHOICE

8.8(A) [R] | SC3

Complete the statement below.

A large cloud of gas and dust from which a star begins is known as a nebula ▼ .

10. **Interactive Response** INLINE CHOICE

8.8(A) [R] | SC3

Complete the statement below.

As a star uses up its hydrogen supply, it changes from a main sequence star to a red giant ▼ .

11. **Selected Response**

8.8(A) [R] | SC3

Which of the following is an accurate statement about irregular galaxies?

A. They have more available gas and dust than other types of galaxies.

B. They have barred arms extending from the center.

C. They are shaped like basketballs.

D. They are not held together by gravity as strongly as other galaxies.

12. Selected Response

8.8(A) [R] | SC3

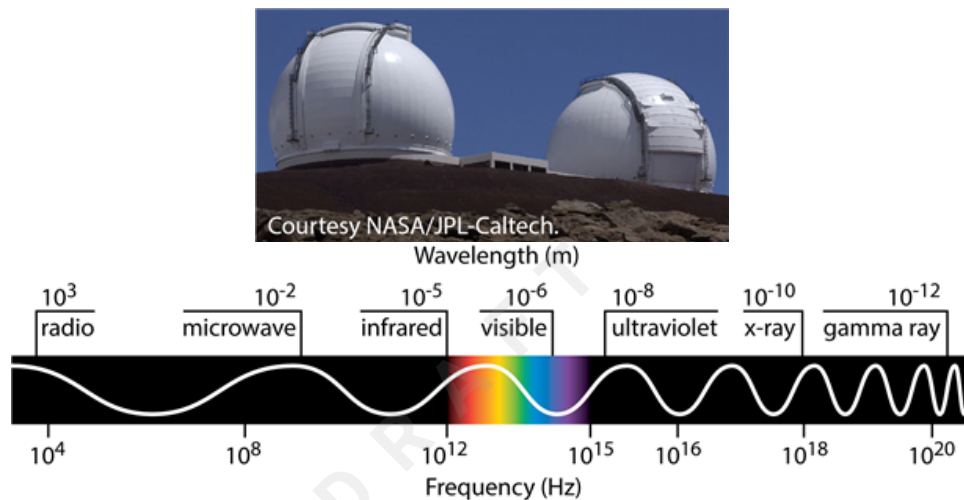
In what kind of galaxy can Earth be found?

- A. elliptical
- B. irregular
- C. magellanic
- D. spiral

13. Selected Response

8.8(C) [S] | SC3

The twin Keck Observatory telescopes (pictured) are able to detect electromagnetic waves with a wavelength of 10^{-8} meters. Use the following electromagnetic spectrum to correctly determine the type of wave the telescopes detect?



- A. Visible light
- B. Microwave
- C. Ultraviolet
- D. X-Ray

14. Selected Response

8.8(C) [S] | SC3

Why do telescopes on Earth analyze radio waves, ultraviolet waves, and visible light waves?

- A. These are the only waves that penetrate Earth's atmosphere.
- B. Stars produce energy only at these wavelengths.
- C. These waves represent the full electromagnetic spectrum.
- D. Objects that produce other electromagnetic waves are too far away to study.

15. Selected Response

8.8(C) [S] | SC3

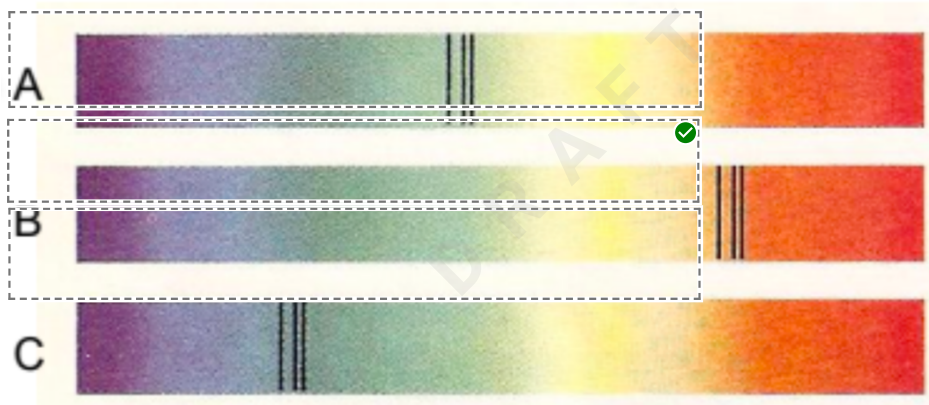
What evidence indicates that galaxies are moving away from Earth?

- A. The majority of stars in distant galaxies are classified as red giants, but the majority of stars in nearby galaxies are average, yellow stars.
- B. The light generated by the galaxies is shifted toward the blue end of the spectrum.
- C. The number of quasars in galaxies closer to Earth is higher than the number of quasars in galaxies farther from Earth.
- D. The light generated by the galaxies is shifted toward the red end of the spectrum.

16. Interactive Response HOT SPOT

8.8(A) [R] | SC3

Which galaxy is moving away from us?



17. **Selected Response**

8.8(D)

Which of the following would BEST support the theory that the universe undergoes cycles of expansion and contraction that last billions of years?

- A. finding another planet in the solar system that is similar to Earth
- B. discovering life-forms on another planet
- C. observing blue/red shifted light from stars
- D. calculating the age of the universe

18. **Interactive Response** INLINE CHOICE

8.8(A) [R] | SC3

Complete the statement below.

A region in space that is so dense that nothing, even light energy, can escape its gravitational field is known as a black hole .

19. **Selected Response**

8.8(A) [R] | SC3

Energy in the Sun is produced by –

- A. the conversion of hydrogen into helium through nuclear fission reactions
- B. the conversion of helium into hydrogen through nuclear fission reactions
- C. the conversion of hydrogen into helium through nuclear fusion reactions
- D. the conversion of helium into hydrogen through nuclear fusion reactions

20. **Selected Response**

8.8(A) [R] | SC3

In what way is the life cycle of stars a cycle?

- A. The number of stars in the universe is constant.
- B. All types of stars follow a predictable pattern of change.
- C. Super novas redistribute dust and gas which eventually form nebulae.
- D. Black holes cause the compression of matter which, in time, forms new stars.

21. **Selected Response**

8.8(C) [S] | SC3

The Very Large Array is a series of 27 radio telescopes that work together to capture radio waves. The entire array can be arranged to have a diameter of over 22 miles. Why are radio telescopes so large?

- A. Only objects very far from Earth emit radio waves.
- B. Radio waves have very large wavelengths.
- C. Only very large stellar objects emit radio waves.
- D. Radio telescopes are monitored by computer and controlled remotely.

22. **Selected Response**

8.8(C) [S] | SC3

The Hubble Space Telescope has captured many significant images of objects in space. It uses a series of specifically-designed mirrors, including one that is 2.4m in diameter. The mirrors of Hubble Space Telescope primarily capture light in which portion of the electromagnetic spectrum?

- A. X-rays
- B. gamma Rays
- C. microwaves
- D. visible light waves

23. **Interactive Response** INLINE CHOICE

8.8(D)

Complete the statement below.

Scientists believe that the universe is expanding because of a phenomena known as red shift ▼ .

24. Selected Response

8.8(D)

The table describes two theories about how the universe began and how it changes over time.

Theory	Description
1	Billions of years ago, the universe began in an explosion. Since then, it has grown larger. It will continue to grow forever.
2	The universe began billions of years ago in an explosion. It has grown since then. Eventually, it will begin to shrink. When the universe becomes very small, it explodes and begins to grow larger again.

The main difference between these theories is –

- A. the age of the universe
- B. how the universe began
- C. the purpose of the universe
- D. how the universe changes

25. Selected Response

8.8(D)

Which of the following BEST supports the Big Bang theory of the origin of the universe?

- A. the different shapes of galaxies
- B. the redshift of light from stars
- C. the regular motions of planets
- D. the constant speed of light

26. Selected Response

8.8(B) [S] | SC3

A student was asked to list facts about the sun and came up with the 5 statements below. Which of the following statements accurately describe characteristics of the sun?

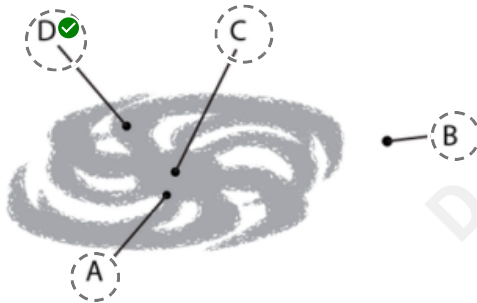
Select **TWO** correct answers.

- A. The sun is a main sequence star with a luminosity of 1 located on the edge of a spiral-shaped galaxy.
- B. The sun has a higher luminosity than all other stars in our galaxy and provides energy to Earth because it is the hottest star.
- C. The sun is the hottest star in our galaxy and has a luminosity of 10^2 .
- D. The sun is a medium-sized star and provides energy to Earth because it is the closest star to us.
- E. The sun is a supergiant and provides energy to Earth because it is the closest star to us.

27. Interactive Response HOT SPOT

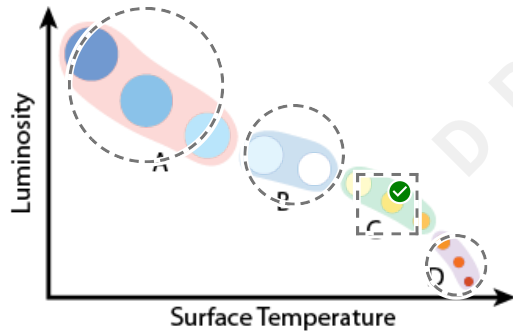
8.8(B) [S] | SC3

Which of these correctly depicts the position of our solar system in the Milky Way?

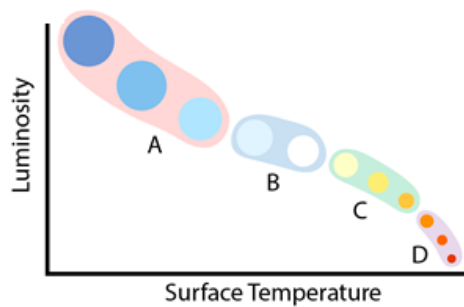


The Sun is the closest star to the Earth, but it is just one type of star in the Universe. There are many types of stars with various sizes and temperatures. The diagram represents stars that are in their main sequence.

Where on the diagram would the sun most likely be found?



Sara is looking at the color of two stars: Rigel and the Sun. Rigel has a blue color while the Sun has a yellow color.



What can the diagram tell Sara about how the stars compare with each other? **Select 2 Answers**

- A. Rigel has a higher surface temperature than the Sun.
- B. The Sun has a higher luminosity than Rigel.
- C. Rigel is much larger than the Sun.
- D. Rigel has a higher luminosity than the Sun.

30. **Selected Response**

8.8(B) [S] | SC3

Medium mass stars like our own sun tend to be seen in the yellow portion of the spectrum. Older stars that have burned much of their hydrogen fuel may appear red in general color. Blue stars are often very young stars, relatively speaking, and burn

- A. very hot
- B. very cool
- C. at temperatures similar to our sun
- D. Blue stars are supernovae.

31. **Selected Response**

8.8(B) [S] | SC3

Scientists approximate that there are 20 billion stars like our sun in the Milky Way. Why does the sun appear to be brighter than any other star in the Milky Way?

- A. The sun is older than all of the other stars in the Milky Way.
- B. The sun is closer to the Earth than any other star in the Milky Way.
- C. The sun is hotter than any other star in the Milky Way.
- D. The sun has more energy than any other star in the Milky Way.

32. Selected Response

8.3(D) [P]

8.8(C) [S]

Christian Andreas Doppler's study of waves led him to conclude that as a wave source moves away from an observer, the frequency of the wave seems to decrease. If the source moves toward an observer, wave frequency increases. This conclusion has been MOST useful to scientists who are —

- A. calculating the volume of the Earth's oceans
- B. studying the causes of erosion
- C. estimating the speeds of distant galaxies
- D. learning about the methods of gene transfer

33. Interactive Response INLINE CHOICE

8.8(A) [R] | SC3




Complete the sentence below.

The mass of a star determines the path of its life cycle .

34. Interactive Response DRAG-AND-DROP

8.8(A) [R] | SC3

Determine which fact is associated with the information below. Drag the correct answer next to the correct information below.

Picture	Name	Description
	<input type="text" value="Spiral Galaxy"/>	<input type="text" value="Has arms that curve out with a large bulge in the center"/>
	<input type="text" value="Elliptical Galaxy"/>	<input type="text" value="Football shape; very little gas & dust with no new stars forming"/>
	<input type="text" value="Irregular Galaxy"/>	<input type="text" value="no defined shape; lots of gas & dust where many new stars form"/>

Sort descriptions correctly for the life cycle of our Sun.

Stage	Characteristics
1	<input type="text" value="Nebula"/> ; high density condenses and contracts under its own gravity
2	<input type="text" value="Protostar"/> ; condensing gas and dust begins to heat up and glow; no nuclear fusion yet
3	<input type="text" value="Main Sequence"/> ; nuclear reactions occur
4	<input type="text" value="Red Giant"/> ; hydrogen runs out and nuclear fusion of helium begins, outer layer of star expands
5	<input type="text" value="Planetary Nebula"/> ; outer layers drift away from the core of the star
6	<input type="text" value="White Dwarf"/> ; with the gas gone, the core cools and dims. When it stops shining, it dies and becomes dark.