CHAPTER 1 Stars

True or False

Name_____ **Class**_____ **Date**_____

Write true if the statement is true or false if the statement is false.

_____ 1. Constellations appear from Earth to move with the seasons.

_____ 2. Our sun is the biggest and brightest star in the galaxy.

_____ 3. Stars are made mostly of hydrogen and helium.

_____ 4. The coolest stars are red in color.

_____ 5. Once a star forms, it never changes.

_____ 6. Gravity causes a nebula to become denser at the center.

_____ 7. A larger star remains on the main sequence longer than a smaller star.

_____ 8. The next stage our sun will go through is white dwarf.

_____ 9. Betelgeuse is an example of a red supergiant.

_____ 10. A black hole is an empty place in space.

Critical Reading

Name_____ **Class**_____ **Date**_____

Read this passage based on the text and answer the questions that follow.

Introduction to Stars

When you look at the sky on a clear night, you may be able to see thousands of stars. A star is a giant ball of glowing gas that is extremely hot. Most of the stars you see in the night sky are medium-sized stars like our sun. But some stars are much smaller, and others are much larger. Except for the sun, all stars are so far away that they look like single points of light. Even through a telescope, stars appear this way.

The star we are most familiar with is our sun. Only a tiny bit of the sun's light reaches Earth, but it supplies most of Earth's energy. The sun is just an ordinary star, but it looks much bigger and brighter than any of the other stars we can see. Of course, this is just because the sun is much closer to Earth than any other star.

Stars generate incredible amounts of energy. The energy is produced by nuclear fusion reactions. The majority of stars are made mostly of hydrogen and helium. They contain so much hydrogen and helium that the weight of these gases is enormous. The pressure at the center of a star is great enough to heat the gases to extremely high temperatures. This causes nuclear fusion reactions, in which two atoms fuse, or join together, to create an atom of a different element. In stars like our sun, hydrogen atoms fuse to create helium atoms. Nuclear fusion reactions need a lot of energy to get started. Once they begin, they release far more energy.

You may have noticed that stars shine in different colors. A star's color is determined by the temperature of its surface. The coolest stars are red. Warmer stars are orange, yellow, or white. The hottest stars are blue. The most common way of classifying stars is by color. Each color of star is associated with a range of temperatures. For

example, red stars are classified as M stars, which range from 2000 to 3500 K. Yellow stars are classified as G stars, which range from 5500 to 6000 K. Blue stars are classified as O stars, which have temperatures of 30,000 K or higher. The surface temperature of a star is usually related to its size. Bigger stars generally produce more energy, so their surface is hotter. But some small stars are very hot, whereas some big stars are relatively cool.

Questions

1. What are stars?
2. How do stars generate energy?
3. Relate the color of a star to its temperature.
4. How does the size of a star relate to its surface temperature?

Multiple Choice

Name_____ **Class**_____ **Date**_____

Circle the letter of the correct choice.

1. A group of stars that seem from Earth to form the outline of a familiar shape is called a
   a. binary star system.
   b. constellation.
   c. solar system.
   d. galaxy.
2. Constellations appear to move across the sky each night because
   a. all stars have orbits.
   b. Earth rotates on its axis.
   c. Earth revolves around the sun.
   d. constellations are affected by Earth's gravity.
3. Which color of star has the highest temperature?
   a. red
   b. blue
   c. yellow
   d. orange
4. Which class of star is our sun?
   a. B
   b. F
   c. G
   d. K
5. A star forms from a nebula when the temperature is high enough for
   a. a supernova to occur.
   b. nuclear fusion to start.
   c. a black hole to collapse.
   d. heavy elements to form.
6. Astronomers measure the distance to very distant stars by comparing the stars to our sun. Which factor do they compare?
   a. brightness
   b. location

c. parallax
d. color

7. A star spends most of its "life" as a

a. main sequence star.
b. red supergiant.
c. white dwarf.
d. supernova.

Matching

Name_____ **Class**_____ **Date**_____

Match each definition with the correct term.

Definitions

_____ 1. giant ball of glowing gas that is very hot

_____ 2. stage of a star's life in which hydrogen atoms fuse to form helium

_____ 3. stage of a star's life in which helium atoms fuse to form heavier elements

_____ 4. explosion of a red supergiant star

_____ 5. core of a star that has too much gravity to let light escape

_____ 6. cloud of gas and dust from which a star forms

_____ 7. two stars that orbit each other

Terms

a. binary star system

b. black hole

c. main sequence

d. nebula

e. red giant

f. supernova

g. star

Fill in the Blank

Name_____ **Class**_____ **Date**_____

Fill in the blank with the appropriate term.

1. A star that is made almost entirely of neutrons is called a(n) _____ star.
2. The color of a star is determined by the star's _____.
3. The energy of stars comes from reactions called _____ reactions.
4. The next stage that a main sequence star will go through is _____.
5. After a supernova, the core that remains becomes either a neutron star of a(n) _____.

6. A shift in the position of a star over time is called _____.
7. Whether a red giant becomes a white dwarf or a red supergiant depends on its _____.

Critical Writing

Name_____ **Class**_____ **Date**_____

Thoroughly answer the question below. Use appropriate academic vocabulary and clear and complete sentences.

Compare the life histories of a medium star like our sun and a massive star like Betelgeuse.