SECTION 30.2 *Measuring the Stars*

In your textbook, read about groups of stars and stellar positions and distances.
Circle the letter of the choice that best completes the statement or answers the question.

1. Constellations are
   a. the brightest stars.
   b. stars over Greece.
   c. groups of stars named after animals, mythological characters, or everyday objects.
   d. found only in the northern hemisphere.

2. Ursa Major, or the big dipper, is an example of a
   a. circumpolar constellation.
   b. constellation that can be seen only in winter.
   c. constellation that can be seen only in summer.
   d. constellation that can be seen only in the fall.

3. Scientists measure distances to stars and observe how stars interact with one another to
   a. determine if stars are right next to each other.
   b. determine if stars are touching.
   c. determine the names of constellations.
   d. determine which stars are gravitationally bound to each other.

4. Astronomers can identify binary stars by
   a. comparing the colors of the stars.
   b. measuring the parallax of the stars.
   c. measuring the position of the visible star in the pair and noting shifts as it orbits the center of mass between it and the unseen companion star.
   d. examining the stars' absorption spectra.

5. When estimating the distance of stars from Earth, astronomers use the fact that nearby stars shift in position as observed from Earth, which is called
   a. parsec. **b.** parallax. **c.** precision. **d.** shafting.

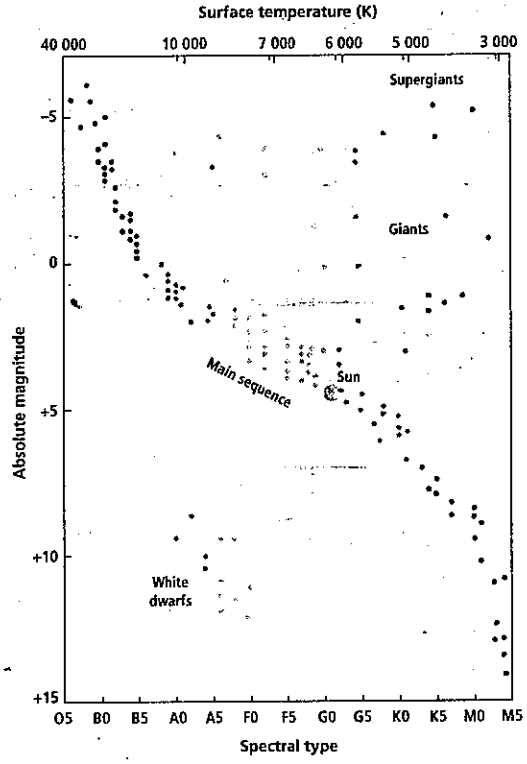
In your textbook, read about the basic properties of stars.

For each term in Column A, write the letter of the matching item in Column B.

Column A	Column B
_____ 6. Ancient Greek classification system based on how bright a star appears to be	**a.** luminosity
_____ 7. Brightness of an object if it was placed at a distance of 10 pc	**b.** absolute magnitude
_____ 8. Energy output from the surface of a star per second	**c.** watt
_____ 9. Unit of measurement used to express the energy emitted per second	**d.** apparent magnitude

SECTION 30.2 *Measuring the Stars, continued*

In your textbook, read about the spectra of stars.
Use the diagram below to answer the questions.



10. The spectral types—O, B, A, F, G, K, M—were originally based on the pattern of spectral lines. What else did astronomers discover that the classes corresponded to? What is the difference from O to M?

11. What type of star is the Sun? What is its surface temperature? What is its absolute magnitude?

12. What is the typical composition of a star?

13. What makes a star's spectrum appear to be different from another star's?

SECTION 30.3 *Stellar Evolution*

In your textbook, read about the basic structure of stars.
Use each of the terms below just once to complete the passage.

carbon	**helium**	**hydrostatic equilibrium**	**iron**
luminosity	**magnesium**	**mass**	**neon**
nuclear fusion	**oxygen**	**silicon**	**temperature**

For a star to be stable, it must have **(1)** _____, which is the balance between gravity squeezing inward and pressure from **(2)** _____ and radiation pushing outward. This balance is governed by the **(3)** _____ of the star. The **(4)** _____ inside a star determines the star's energy output, or **(5)** _____.

Stars on the main sequence produce energy by fusing hydrogen into **(6)** _____. Once a star's core has been converted into helium, it may react if the temperature is high enough. If the temperature is high enough, **(7)** _____ can react with helium to form **(8)** _____, then **(9)** _____, then **(10)** _____, and then **(11)** _____. Other types of reactions can produce even heavier elements, the heaviest being **(12)** _____.

In your text, read about stellar evolution and life cycles.
For each statement below, write *true* or *false*.

_____ **13.** As a star ages, its internal composition changes as a result of rising temperature.

_____ **14.** As nuclear fuel runs out, a star's internal structure and its mechanism for producing pressure change to counteract gravity.

_____ **15.** The formation of a star begins with a cloud of interstellar gas and dust called nebula.

_____ **16.** A nebula collapses on itself as a result of its high temperature.

_____ **17.** As a nebula contracts, its rotation forces it into a disk shape with a hot condensed object at the center, which will become a new star.

_____ **18.** A new star often illuminates the gas and dust surrounding it.

SECTION 30.3 *Stellar Evolution, continued*

In your textbook, read about the Sun's life cycle.
Answer the following questions.

19. How many years does it take a star with the mass of the Sun to convert all the hydrogen in its core? To what is the hydrogen converted?

20. What happens to a star when it becomes a red giant?

21. A star of the Sun's mass never becomes hot enough for carbon to react, and the star's energy production is at an end. What happens to the outer layers? What is this star called?

In your textbook, read about life cycles of massive stars.
Circle the letter of the choice that best completes the statement.

22. A star that begins with a mass 8 to 20 times that of the Sun's mass will
- **a.** undergo the same evolution as the Sun.
- **b.** become a white dwarf.
- **c.** end up with a core too massive to be supported by pressure and come to a violent end.
- **d.** remain at the same stage and not evolve.

23. The resistance of a star's core to being squeezed halts the collapse of the core and the core becomes a
a. supernova. **b.** neutron star. **c.** red dwarf. **d.** protostar.

24. During a supernova,
- **a.** infalling gas remains trapped in the core.
- **b.** the core continues to fuse helium.
- **c.** the resistance of electrons being squeezed counteracts gravity and supports the core.
- **d.** the entire outer portion of the star is blown off in a massive explosion.

25. A star that starts with more than about 20 times the Sun's mass will
- **a.** become a neutron star.
- **b.** continue to fuse iron in its core.
- **c.** end up with a smaller mass.
- **d.** collapse forever and become a black hole.