Name: _____ Class: _____ Date: _____ ID: A

Stars Short Study Guide

Multiple Choice
Identify the letter of the choice that best completes the statement or answers the question.

____ 1. Most of the light emitted by the Sun comes from the ____.
a. chromosphere
b. corona
c. photosphere
d. prominence

____ 2. When the polarity of the Sun's magnetic field is taken into account, the solar activity cycle lasts ____.
a. 22.4 years
b. 22.2 years
c. 11.2 years
d. 11.4 years

____ 3. What causes the dark bands observed in a solar spectrum?
a. the emission of specific elements
b. different chemical elements which absorb light at specific wavelengths
c. highly compressed, glowing gas
d. warmer gas in front of a source that emits a continuous spectrum

____ 4. The apparent shift in a star's position caused by the motion of the observer is called ____.
a. luminosity
b. apparent magnitude
c. absolute magnitude
d. parallax

____ 5. A star that is gravitationally bound to another star can either be part of a star cluster or a ____ star.
a. constellation
b. white dwarf
c. binary
d. red giant

____ 6. All stars, including the Sun, have the following identical composition:
a. 25 percent hydrogen; 73 percent helium; and 2 percent oxygen
b. 25 percent helium; 73 percent hydrogen; and 2 percent other
c. 25 percent helium; 73 percent hydrogen; and 2 percent oxygen
d. 25 percent hydrogen; 73 percent helium; and 2 percent other

____ 7. The ____ of a star determines its temperature, luminosity, and diameter.
a. mass
b. composition
c. energy output
d. density

____ 8. Only ten percent of a star's mass undergoes fusion because temperatures outside of the core ____.
a. never get hot enough for reactions to occur
b. are too hot for reactions to occur
c. are too dependent on the amount of hydrogen
d. are always changing and are never stable

____ 9. Following the end of each reaction stage, a massive star becomes a ____ several times.
a. white dwarf
b. red giant
c. main sequence star
d. supernova

____ 10. The main sequence lifetime of a low-mass star is ____ the lifetime of the Sun.
a. much longer than
b. much shorter than
c. the same as
d. sometimes identical, sometimes different than

Matching

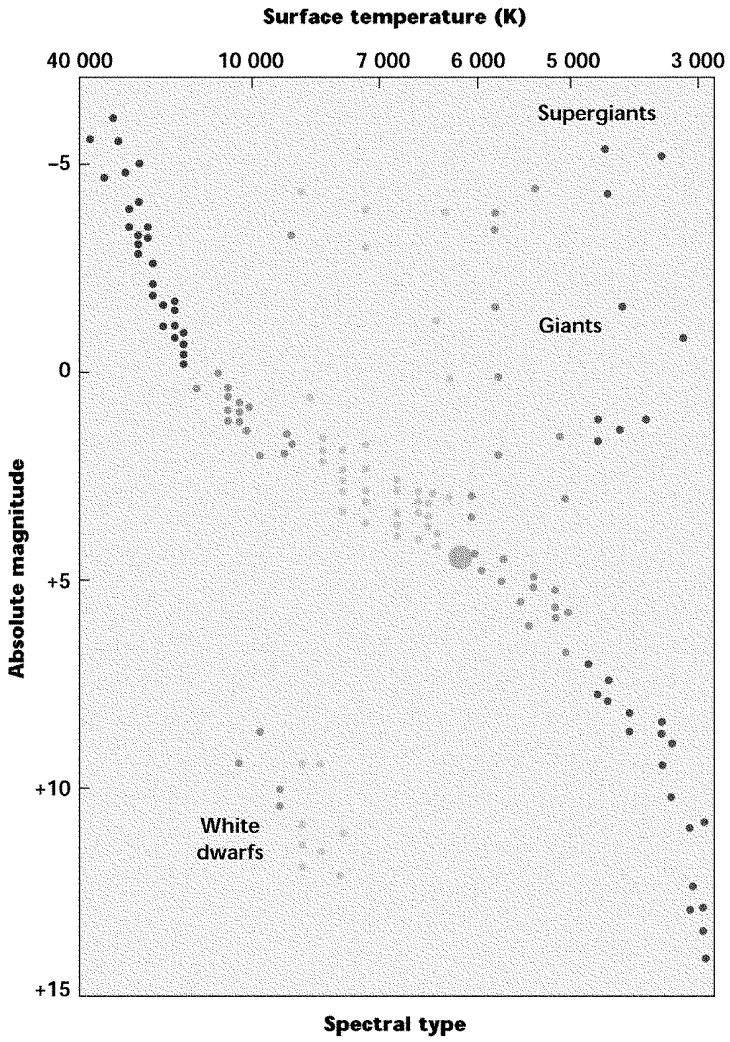
Match each item with the correct definition below.

a. black hole
b. photosphere
c. fusion
d. constellation
e. main sequence
f. nebula
g. solar activity cycle
h. spectrum

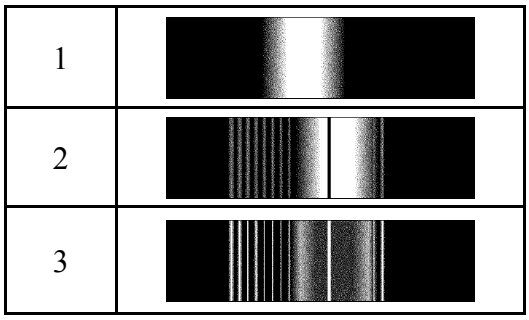
____ 11. Combining of lightweight nuclei into heavier nuclei, such as four hydrogen nuclei combining to form a helium nucleus
____ 12. Cloud of interstellar gas and dust that collapses on itself to form a new star
____ 13. Visible light arranged according to wavelengths
____ 14. Group of bright stars named for an animal, a mythological character, or an everyday object
____ 15. Minimum to maximum sunspots, a reversal of polarity, and minimum to maximum sunspots over a period of 22.4 years
____ 16. Lowest layer of the Sun's surface from which most of the light emitted by the Sun comes
____ 17. Section of the H-R diagram into which about 90 percent of stars fall
____ 18. Small, massive, dense object that has a gravity so immense that nothing—not even light—can escape it

Short Answer

19. On the H-R diagram shown below, fill out the horizontal axis with the correct spectral types and label the Sun and main sequence.



Identify and describe each kind of spectrum and explain how each is produced.



20. Figure 1 is a(n) ____ spectrum

Wavelength Shifts
One of the many ways scientists learn more about stars is the use of spectral lines. They help scientists determine the speed of a star's motion. Motion between the source of light and the observer cause the spectral lines to shift in wavelength. Depending on whether the wavelength is shorter or longer, the observer can determine if the star is moving toward or away from Earth. These shifts are called blueshifts and redshifts. The larger the shift, the higher the speed of motion. The shifts in spectral lines can also be used to detect binary stars as they orbit around their center of mass and move toward and away from Earth.

21. The shifts in spectral lines are an example of the Doppler effect. What motion will this effect not detect?

Under the right conditions, when the CME arrived at Earth's magnetosphere, energy would be released in the form of an intense auroral display. For an intense auroral display, the emission must encounter Earth's magnetic field directly, as opposed to a glancing blow, and the magnetosphere must already have stored energy, ready to be released in the form of an aurora.

During an aurora, the sky glows as charged particles rain down from space along Earth's magnetic field lines. The resulting color depends on the type of molecules that the charged particles hit. Energetic particles striking oxygen molecules at an altitude of about 320 km cause all-red auroras. Oxygen at lower altitudes, about 100 km high, produce brilliant yellow-green colors. These are the brightest and most common auroras. Ionized nitrogen gives off blue light, and neutral nitrogen glows red. The nitrogens create the purplish-red lower borders and ripple edges seen in many auroras. Auroras are at least 60 km above Earth and can extend about 1000 km above the planet. The best places to see an aurora borealis display include Fairbanks, Alaska, parts of eastern Canada, Iceland, and the Scandinavian countries. These sites are close to the average auroral oval around Earth's north magnetic pole. It is best to see an auroral display during the hours of local midnight. The farther south, the less chance of seeing an aurora borealis display, but displays have been seen as far south as Florida and Texas.

22. What is an aurora, and what two conditions must be present for an intense auroral display?

23. What colors can an auroral display be? What causes these different colors?

Stars Short Study Guide
Answer Section

MULTIPLE CHOICE

1. C
2. A
3. B
4. D
5. C
6. B
7. A
8. A
9. B
10. A

MATCHING

11. C
12. F
13. H
14. D
15. G
16. B
17. E
18. A

SHORT ANSWER

19. Horizontal axis should be labeled: O5 B0 B5 A0 F0 F5 G0 G5 K0 K5 M0 M5. Main sequence is the strip of stars running from upper left to lower right and Sun is between G0 and G5 just above +5.
20. continuous. A continuous spectrum is produced by a glowing solid, liquid, or highly compressed glowing gas. The spectrum has no breaks.
21. The Doppler effect will not detect any portion of the motion that is perpendicular to the line of sight.
22. An aurora is a result of a geomagnetic storm in which charged particles rain down from space along Earth's magnetic field. For an intense auroral display to occur, the disturbance must encounter Earth's magnetic field directly, and the magnetosphere must already have stored energy to be released in the form of an aurora.
23. Auroras can be red, yellow-green, blue, or purplish. When energetic particles strike oxygen molecules 320 km up, the color is red. When particles strike oxygen about 100 km up, the color is yellow-green. Ionized nitrogen gives off blue light, and neutral nitrogen glows red. Together, neutral and ionized nitrogen create a purplish-red border.