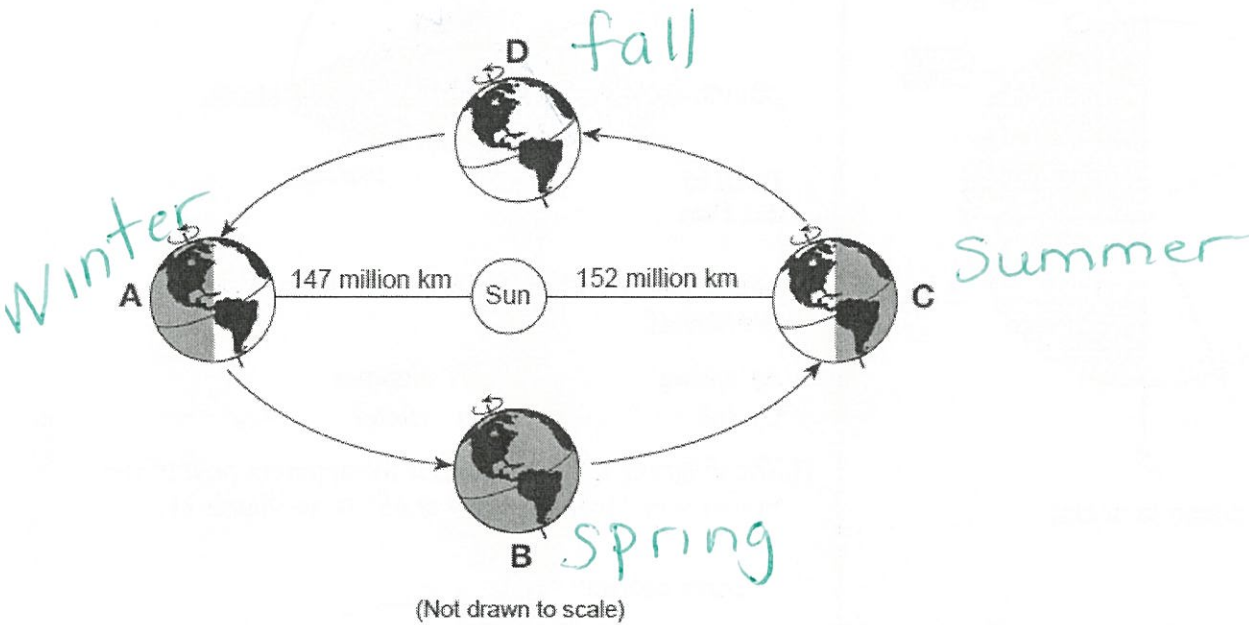


Name: Key

REVIEW

Base your answers to questions 1 through 3 on the diagram below and on your knowledge of Earth science. The diagram represents Earth in its orbit around the Sun. Locations *A* through *D* represent four positions of Earth in its orbit. Earth is closest to the Sun (perihelion) at position *A*, and farthest from the Sun (aphelion) at position *C*.



- At all four positions, the northern end of Earth's axis points toward
A) the Sun B) the Moon C) *Betelgeuse* D) *Polaris*
- Which change in seasons occurs in the Northern Hemisphere at position *D*?
A) Winter is ending and spring is beginning.
B) Spring is ending and summer is beginning.
 C) Summer is ending and fall is beginning.
D) Fall is ending and winter is beginning.
- At which position is the gravitational attraction between the Sun and Earth the greatest?
 A) *A* B) *B* C) *C* D) *D*

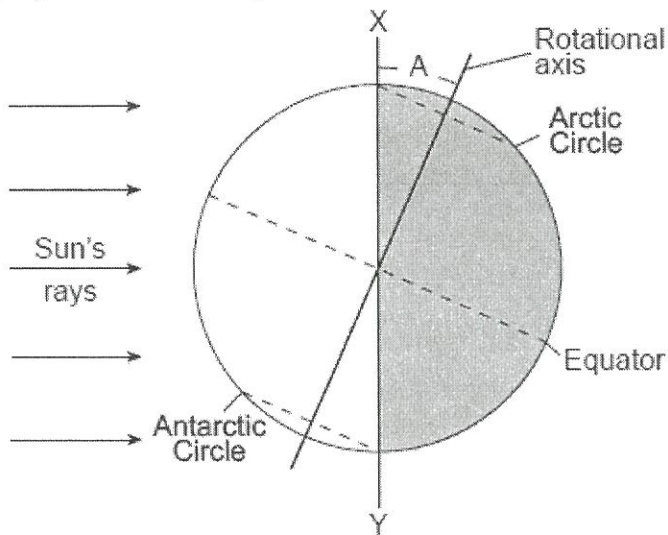
closer

- Earth's rate of revolution is approximately
 A) 1° per day B) 15° per day
C) 23.5° per day D) 360° per day
- If the tilt of Earth's axis were increased from 23.5° to 30° , summers in New York State would become
 A) cooler, and winters would become cooler
B) cooler, and winters would become warmer
 C) warmer, and winters would become cooler
D) warmer, and winters would become warmer

- Which hot spot location on Earth's surface usually receives the greatest intensity of insolation on June 21? $23.5^\circ N$
A) Iceland B) Hawaii
C) Easter Island D) Yellowstone
- The Foucault pendulum and the Coriolis effect both provide evidence of Earth's
A) revolution B) rotation
C) tilted axis D) elliptical orbit

Page 5

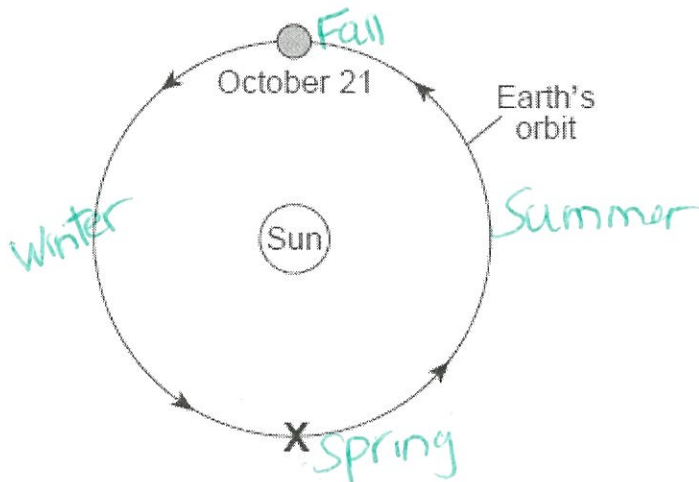
8. The diagram below represents Earth as viewed from space. Letter *A* represents the approximate angle of tilt between Earth's rotational axis and a line (*XY*) perpendicular to the plane of Earth's orbit.



(Not drawn to scale)

What is the value of the angle represented by letter *A*?

- A) 15.0° B) 23.5° C) 24.5° D) 30.0°
9. The diagram below represents the orbital position of Earth on October 21.

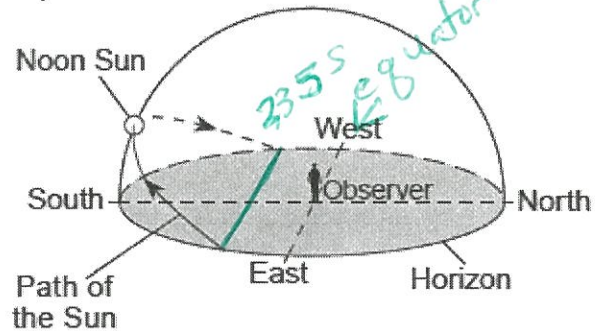


(Not drawn to scale)

Which Northern Hemisphere season is occurring when Earth reaches position *X*?

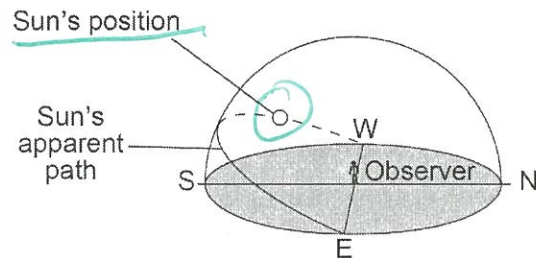
- A) winter B) spring C) summer D) fall

10. The model below shows the apparent path of the Sun as seen by an observer in New York State on the first day of one of the four seasons.



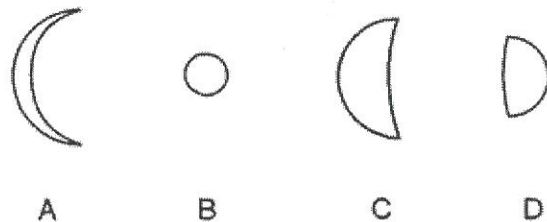
This apparent path of the Sun was observed on the first day of

- A) spring B) summer C) fall D) winter
11. The diagram below represents the apparent path of the Sun as seen by an observer at 65° N on March 21.



The Sun's position shown in the diagram was observed closest to which time of day?

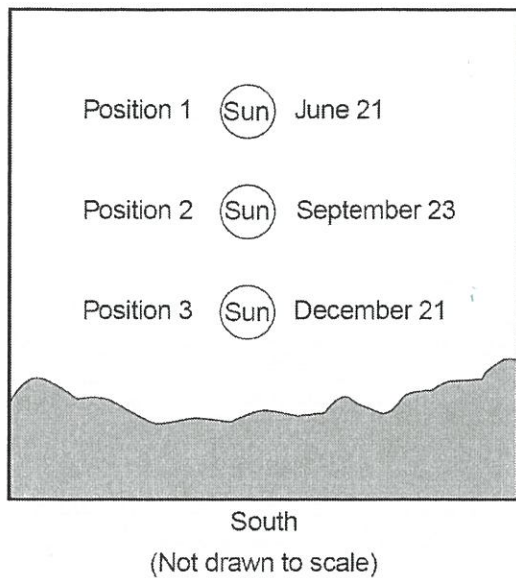
- A) 9 a.m. B) 11 a.m. C) 3 p.m. D) 6 p.m.
12. The diagrams below represent photographs of Venus at four different positions in its orbit, as taken from Earth.



At which position is Venus closest to Earth?

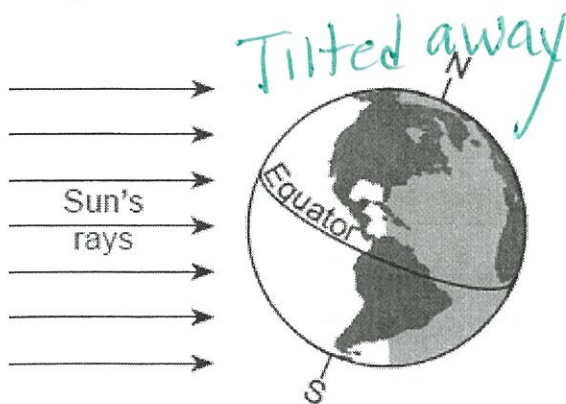
- A) A B) B C) C D) D

13. Positions 1, 2, and 3 in the diagram below represent the noon Sun above the horizon on three different days during the year, as viewed from Binghamton, New York.



At which position was the noon Sun on January 21, as viewed from Binghamton?

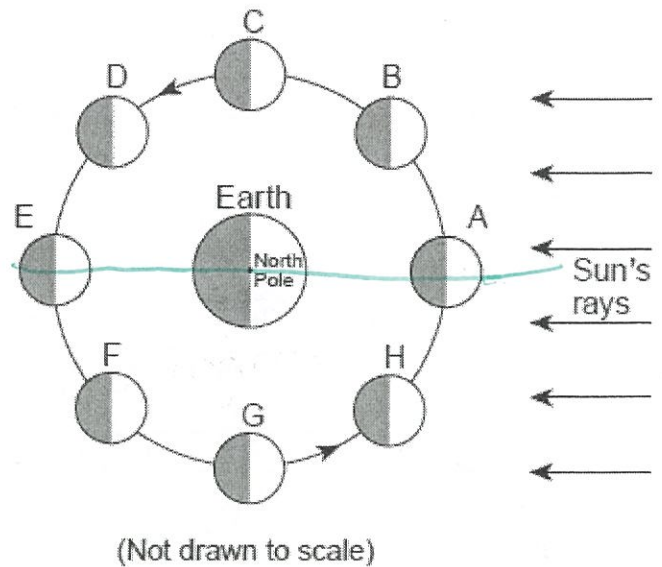
- A) above position 1
 B) below position 3
 C) between position 1 and position 2
 D) between position 2 and position 3
14. The diagram below represents Earth in space on the first day of a season.



Which season is beginning in New York State on the day represented in the diagram?

- A) winter
 B) spring
 C) summer
 D) fall

15. The diagram below represents eight positions of the Moon in its orbit.



Why are high tides on Earth greatest when the Moon is in position A and in position E?

- A) The Moon is closer to the Sun.
 B) The Moon is closer to Earth.
 C) The Moon, the Sun, and Earth are aligned.
 D) The Moon is in the same phase at both locations.
16. The table below shows the times of ocean high tides and low tides on a certain date at a New York State location.

Ocean Tides

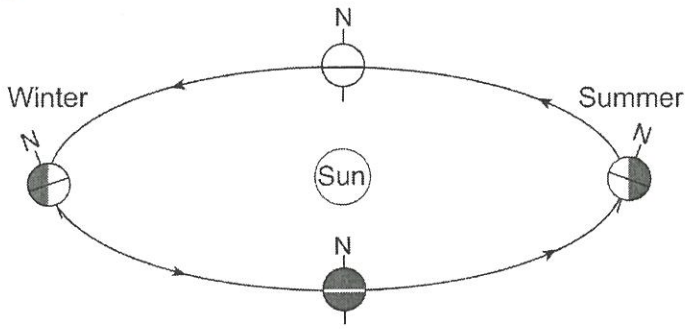
Type of Tide	Time
high	4:45 a.m.
low	10:58 a.m.
high	5:15 p.m.
low	11:22 p.m.

At approximately what time on the following day did the next high tide occur at this location?

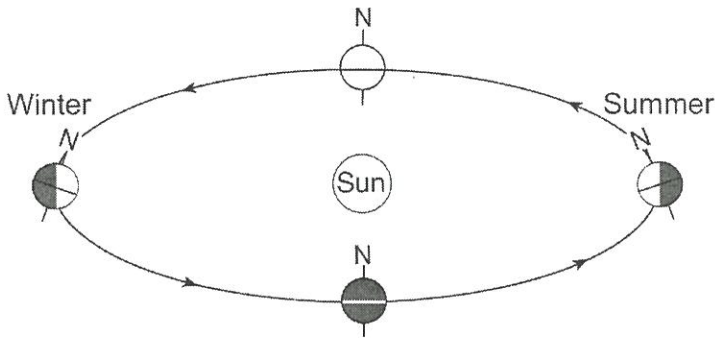
- A) 4:40 a.m.
 B) 5:40 a.m.
 C) 4:40 p.m.
 D) 5:40 p.m.
17. Which planet has the least distance between the two foci of its elliptical orbit?
- A) Venus .007
 B) Earth .017
 C) Mars .093
 D) Jupiter .048
- less eccentric

18. Which diagram best represents the tilt of Earth's axis that causes the Northern Hemisphere seasons shown? (Diagrams are not drawn to scale.)

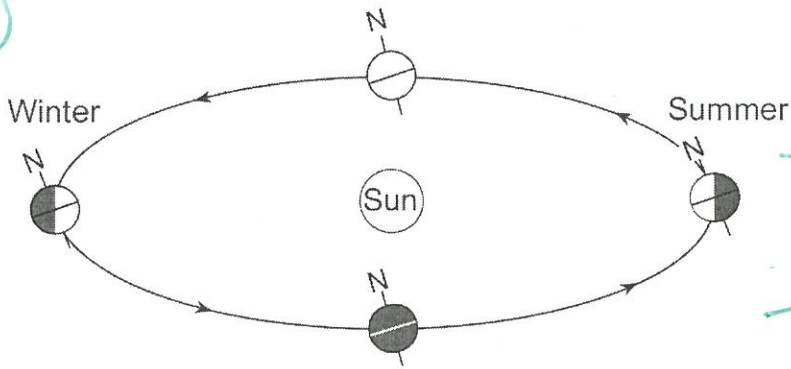
A)



B)

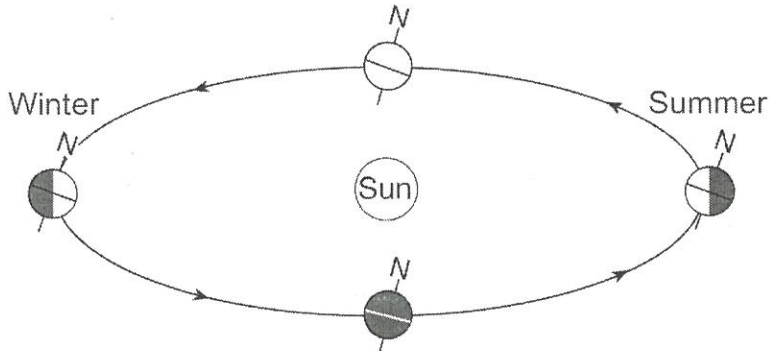


C)

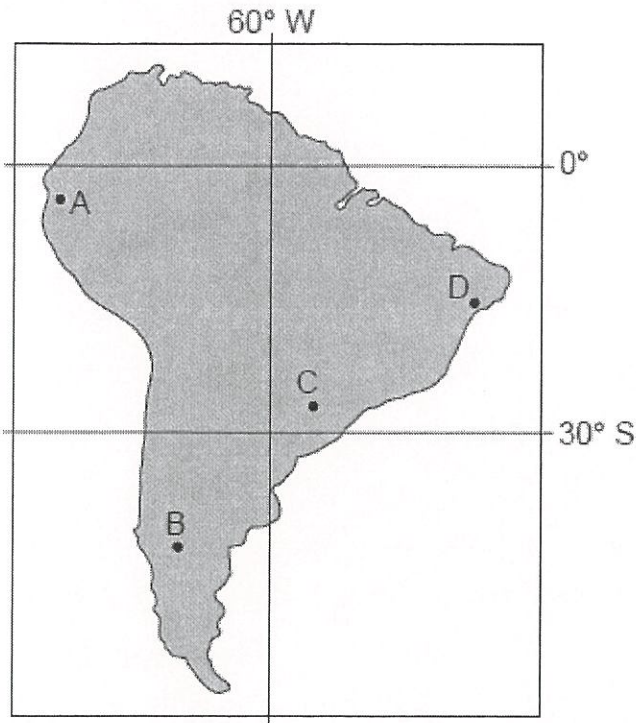


- Summer tilts toward
- Winter tilts away

D)



19. The map below shows four locations, A, B, C, and D, on the continent of South America.



West ← Time moves backward
 East → Time moves forward

Which location is the first to experience sunset on September 23?

- A) A B) B C) C **D) D (Most East)**

20. The curving of the planetary winds to the right in the Northern Hemisphere is evidence of

- A) the Coriolis effect**
 B) high- and low-pressure belts
 C) Earth's revolution
 D) the tilt of Earth's axis

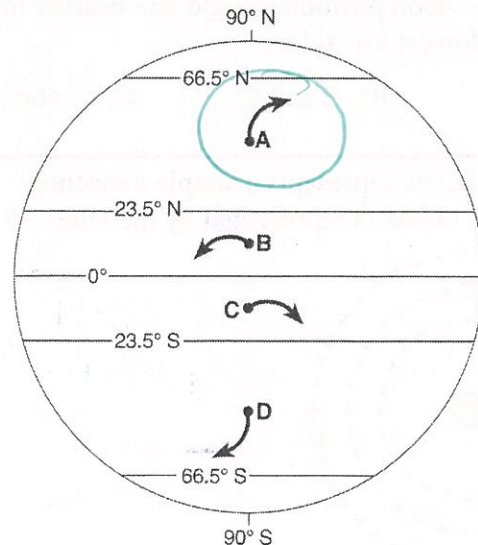
21. If the distance between the Earth and the Sun were increased, which change would occur?

- A) The apparent diameter of the Sun would decrease.
 B) The amount of insolation received by the Earth would increase.
C) The time for one Earth rotation (rotation period) would double.
 D) The time for one Earth revolution (orbital period) would decrease.

22. Which planet has a density that is *less* than the density of liquid water? *Page 1 + page 15*

- A) Mercury 5.4 B) Earth 5.5
 C) Mars .11 **D) Saturn .7**

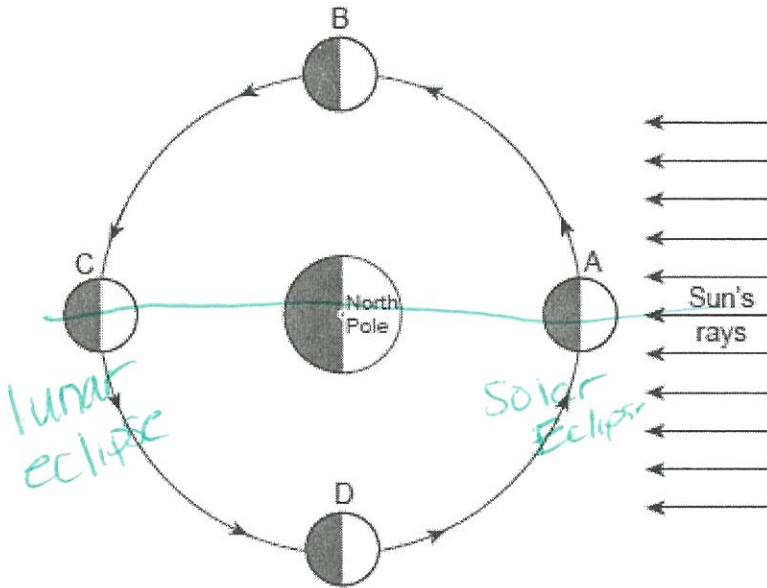
23. The arrows in the diagram below show changes in the direction of surface winds at four lettered locations, A, B, C, and D, on Earth.



The arrow at which location correctly shows a deflection of the wind that could be due to the Coriolis effect?

- A) A** B) B C) C D) D

Base your answers to questions 24 and 25 on the diagram below and on your knowledge of Earth science. The diagram represents the Moon at different positions, labeled A, B, C, and D, in its orbit around Earth.



(Not drawn to scale)

24. During which Moon phase could an observer on Earth see a lunar eclipse occur?

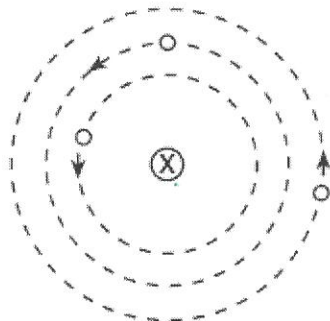


25. At which two Moon positions would an observer on Earth most likely experience the highest high tides and the lowest low tides?

- A) A and B B) B and C C) C and A D) D and B

Sun, moon, Earth aligned

26. The diagram below represents a simple geocentric model. Which object is represented by the letter X?



(Not drawn to scale)

Earth Centered

- A) Earth B) Sun
C) Moon D) Polaris

27. The asteroid Ceres lies at an average distance of 414 million kilometers from the Sun. The period of revolution of Ceres around the Sun is approximately

- A) 438 days B) 687 days
C) 4.6 years D) 12.6 years

PE
between Mars + Jup

28. Which event occurred approximately 4.6 billion years ago?

- A) evolution of the earliest fish
B) evolution of stromatolites
C) formation of the oldest known Earth rocks
D) formation of Earth and our solar system

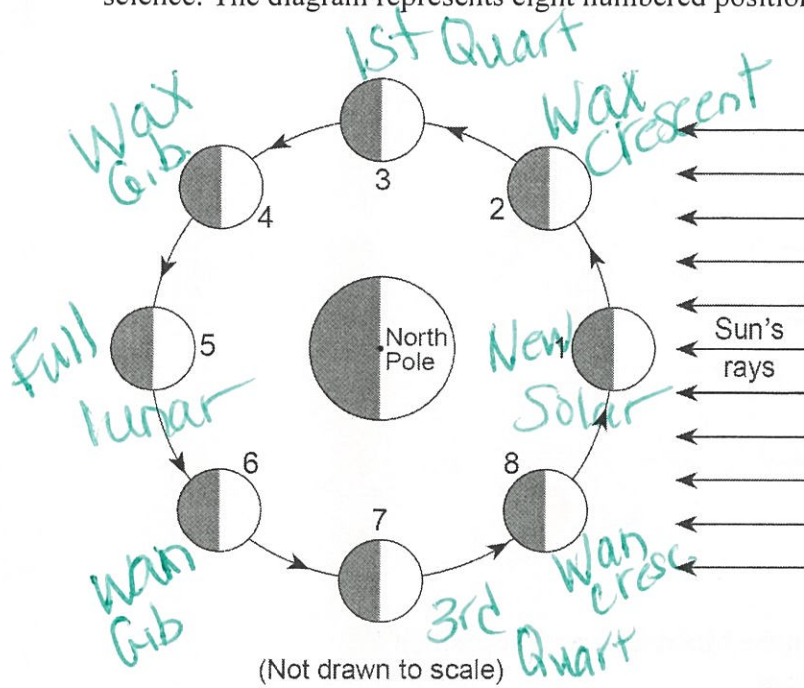
P 8 + 9





29. Which star is hotter, but less luminous, than Polaris?

- A) Deneb B) Aldebaran
C) Sirius D) Pollux

P 15

Base your answers to questions 30 through 32 on the diagram below and on your knowledge of Earth science. The diagram represents eight numbered positions of the Moon in its orbit around Earth.

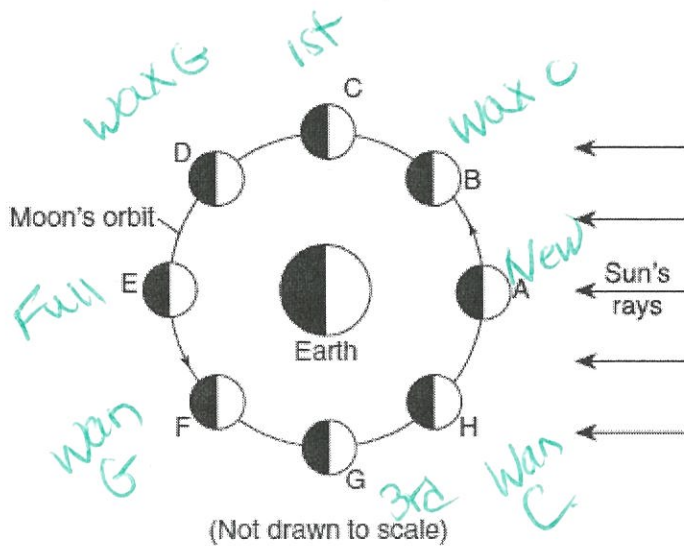


30. A solar eclipse might be observed from Earth when the Moon is at which position?
 A) 1 B) 5 C) 3 D) 7
31. Which two motions cause the Moon to show a complete cycle of phases each month when viewed from New York State?
 A) the Moon's rotation and Earth's rotation
 B) the Moon's revolution and Earth's rotation
 C) the Moon's rotation and the Sun's rotation
 D) the Moon's revolution and the Sun's rotation
32. Which phase of the Moon will be observed in New York State when the Moon is at position 8?
 A)  B)  C)  D) 

33. Most of a Earth's atmosphere comes from
 A) the gas surrounding Earth at the time of its formation
 B) gas released from the interior of our planet
 C) gas captured as Earth passed through a gas cloud
 D) escaped gas from the sun
34. According to astronomers, the age of the universe is estimated to be
 A) 1.3 billion years B) 4.6 billion years
 C) 7.9 billion years D) 13.8 billion years

35. Which evidence best supports scientists' inferences about the origin and age of the universe?
 A) the existence of planets
 B) cosmic background radiation
 C) formation of star constellations
 D) similar composition of Earth and the Moon
36. Fourteen billion years represents the approximate age of
 A) Earth B) Earth's Moon
 C) our solar system D) the universe

Base your answers to questions 37 and 38 on the diagram below and on your knowledge of Earth science. The diagram represents the Moon in eight positions, *A* through *H*, in its orbit around Earth.



37. Which Moon phase is observed in New York State when the Moon is located at position *F*?

- A)
- B)
- C)
- D)

38. How many days are required for the Moon to complete a cycle of phases from the new Moon position represented in the diagram to the new Moon the following month?

- A) 2.2 d B) 27.3 d C) 29.5 d D) 365.26 d

39. Earth, the Sun, and billions of stars are contained within

- A) a single constellation
 B) the Milky Way galaxy
 C) the solar system
 D) a giant cloud of gas

40. Energy is produced within a star's core by the process of

- A) insolation B) conduction
 C) nuclear fusion D) radioactive decay

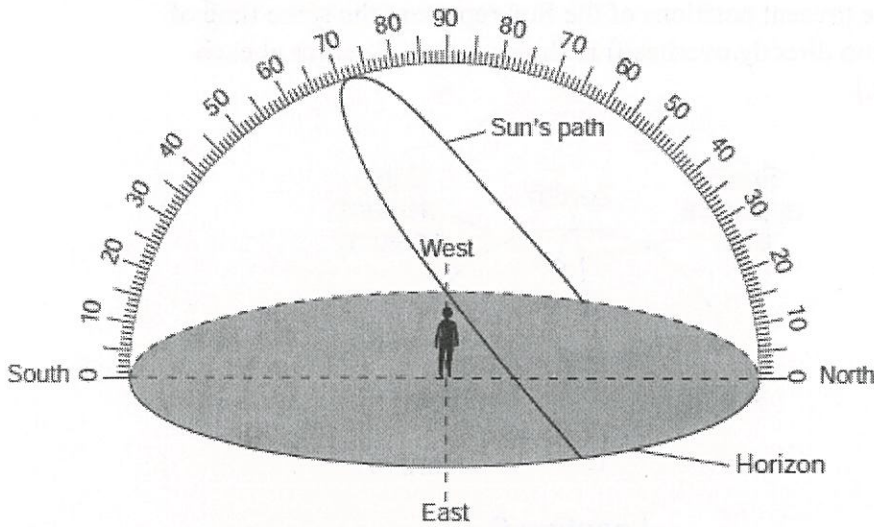
41. A blue shift of the light from a star indicates that the star

- A) will soon become a main sequence star
 B) will soon become a giant star
 C) is moving closer to Earth
 D) is moving away from Earth
- Redshift = away*

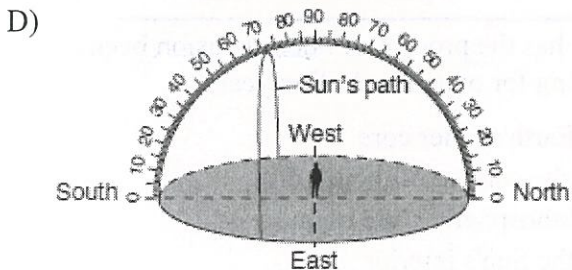
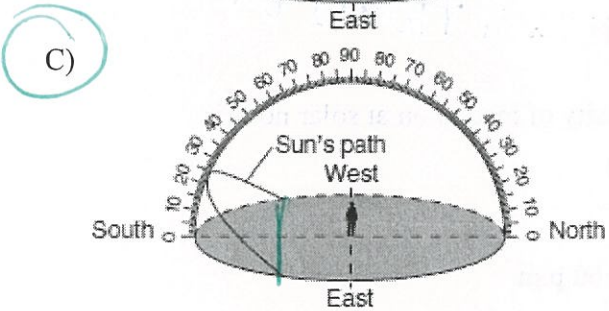
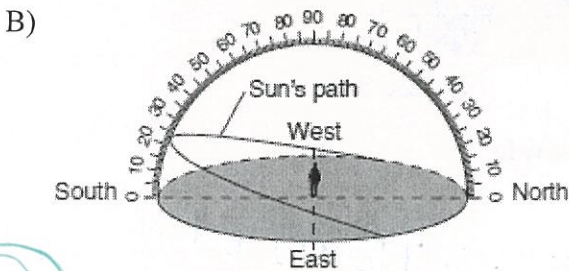
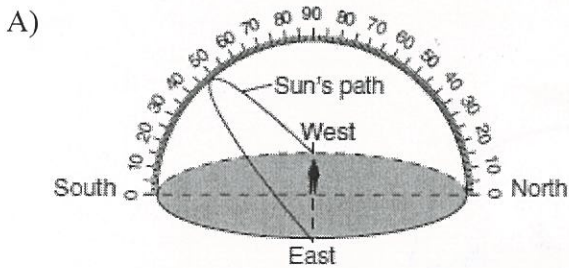
42. Which object in space emits light because it releases energy produced by nuclear fusion?

- A) Earth's Moon B) Halley's comet
 C) Venus D) Polaris

43. The diagram below represents the apparent path of the Sun as seen by an observer on June 21 at a location in New York State.

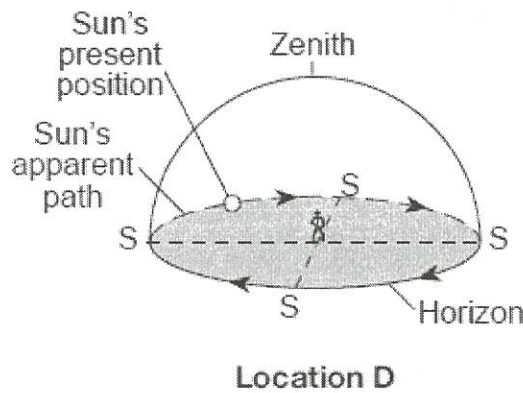
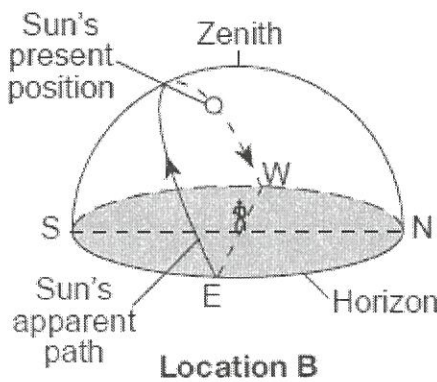
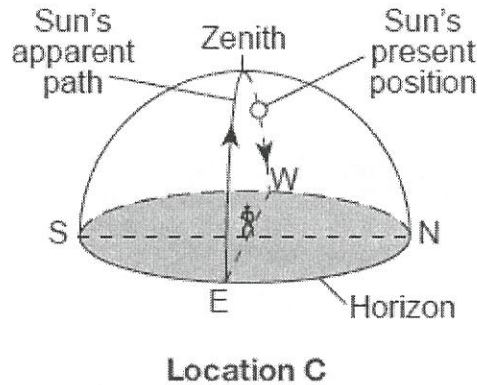
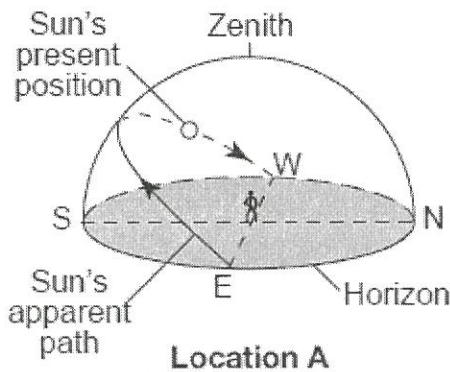


Which diagram best represents the apparent path of the Sun at this same location on December 21?



23.5°S

Base your answers to questions 44 through 46 on the diagram below and on your knowledge of Earth science. The diagram represents the apparent path of the Sun as observed at four locations, *A* through *D*, on Earth's surface on the same date. The present positions of the Sun represent the same time of day at each location. The zenith (the position directly overhead) is shown for an observer at each location. [Diagrams are not drawn to scale.]



44. Based on the Sun's apparent path, where is location *D*?

- A) equator
- B) Tropic of Cancer
- C) Tropic of Capricorn
- D) North Pole

24 Hours of Daylight

45. During the course of the day, which location had the greatest intensity of insolation at solar noon?

- A) *A*
- B) *B*
- C) *C*
- D) *D*

46. What is the approximate time of day represented at each location?

- A) 6:00 a.m.
- B) 9:00 a.m.
- C) 3:00 p.m.
- D) 6:00 p.m.

47. The red shift of light from most galaxies is evidence that

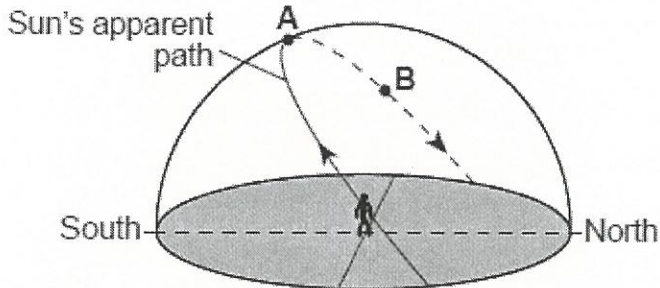
- A) most galaxies are moving away from Earth
- B) a majority of stars in most galaxies are red giants
- C) the light slows down as it nears Earth
- D) red light travels faster than other colors of light

48. Where has the process of nuclear fusion been occurring for over four billion years?

- A) in Earth's inner core
- B) on the surface of the Moon
- C) at lithospheric plate boundaries
- D) in the Sun's interior

Star

49. Base your answer to the following question on the diagram below and on your knowledge of Earth science. The diagram represents the apparent path of the Sun across the sky at a New York State location on June 21. Point *A* represents the position of the noon Sun. Points *A* and *B* on the path are 45 degrees apart.



Which diagram represents the correct position of Polaris as viewed from this New York State location on a clear night?

- A) Polaris
- B) Polaris
- C) Polaris
- D) Polaris

Base your answers to questions 50 and 51 on the passage below and on your knowledge of Earth science.

Comets and Asteroids

Since comets and asteroids orbit the Sun, both are part of our solar system. Asteroids are rocky objects that vary greatly in size. Most asteroids follow orbits between 3000 and 600 million kilometers from the Sun, but several have been pulled from this region by the gravitational attraction of nearby planets. Many of these dislodged asteroids have struck both Earth and the Moon, causing the large impact craters that are visible on the surface of both bodies.

Comets have often been described as "dirty snowballs" and occupy highly eccentric orbits, traveling from near the Sun to far beyond the orbits of the outer planets. As they move through space, comets leave a debris trail of mostly dust-sized particles. When Earth passes through this debris, a meteor shower occurs, often filling the night sky with "shooting star" trails as they burn up in the atmosphere 50 to 80 kilometers above Earth's surface.

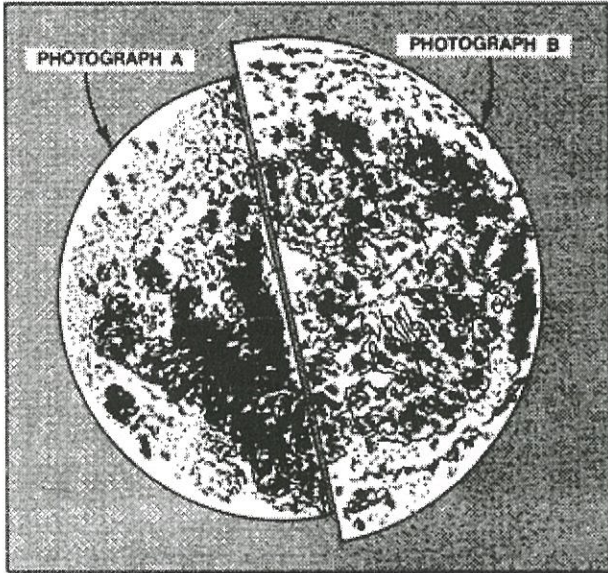
50. Between which two planets are most asteroids located?
- A) Earth and Mars
 B) Mars and Jupiter
 C) Jupiter and Saturn
 D) Saturn and Uranus

51. In which temperature zone of Earth's atmosphere will most meteors burn up?

- A) troposphere B) stratosphere C) mesosphere D) thermosphere

P14

52. The diagram below represents two photographs of the Moon, *A* and *B*, taken at full moon phase several months apart. The photographs were taken using the same magnification. Each photograph was cut in half and the halves placed next to each other.



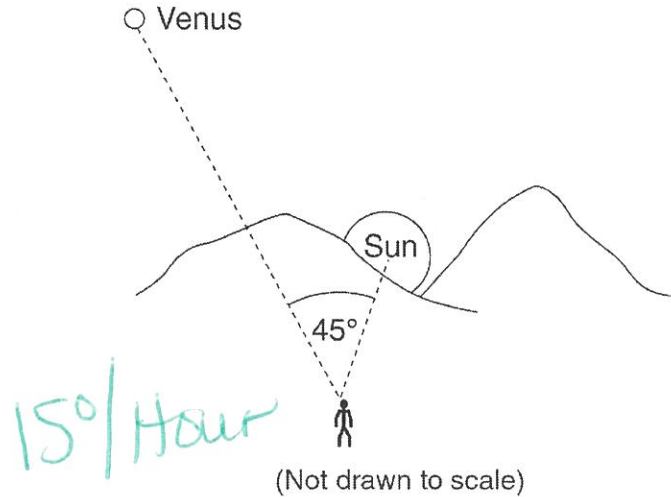
What most likely caused the difference in the apparent size of the Moon in photographs *A* and *B*?

- A) The phases of the Moon changed.
B) The Moon expanded.
C) The distance from the Earth to the Moon changed.
D) The Moon rotated.

53. Light from distant galaxies most likely shows a

- A) red shift, indicating that the universe is expanding
B) red shift, indicating that the universe is contracting
C) blue shift, indicating that the universe is expanding
D) blue shift, indicating that the universe is contracting

54. An observer on Earth measures the angle of sight between Venus and the setting Sun.





Which statement best describes and explains the apparent motion of Venus over the next few hours?

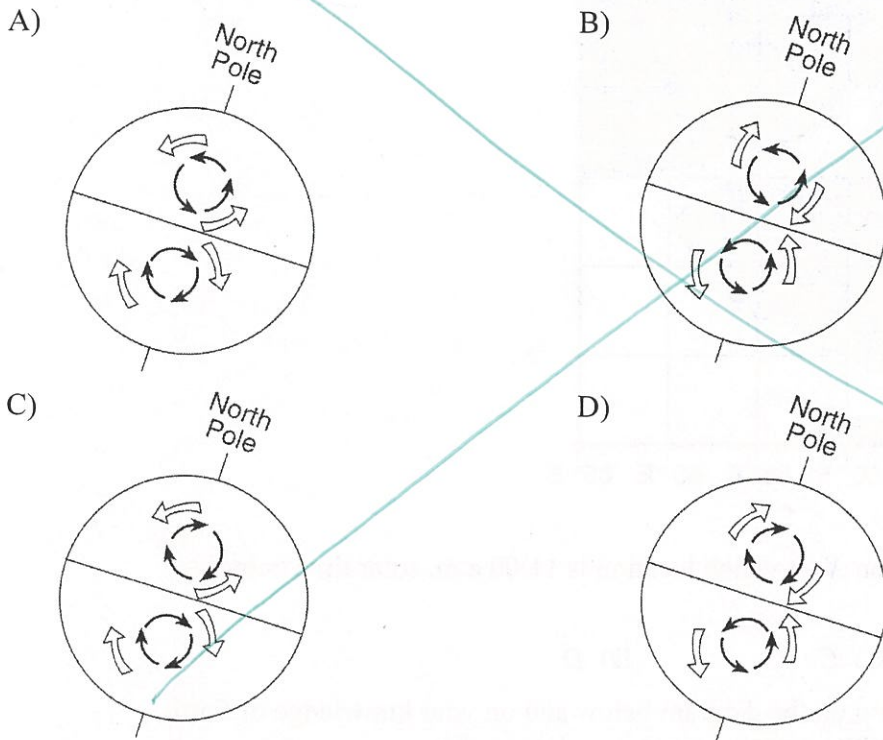
- A) Venus will set 1 hour after the Sun because Earth rotates at 45° per hour.
B) Venus will set 2 hours after the Sun because Venus orbits Earth faster than the Sun orbits Earth.
C) Venus will set 3 hours after the Sun because Earth rotates at 15° per hour.
D) Venus will set 4 hours after the Sun because Venus orbits Earth slower than the Sun orbits Earth.

55. To an observer on Earth, the Sun appears brighter than the star *Rigel* because the Sun is

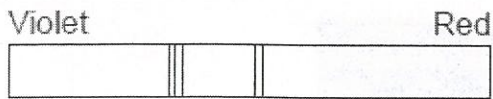
- A) hotter than *Rigel*
B) more luminous than *Rigel*
C) closer than *Rigel*
D) larger than *Rigel*

56. Which diagram correctly represents the curving of Earth's ocean currents and prevailing winds due to the Coriolis effect?

Key	
	= Ocean currents
	= Prevailing winds



57. The diagram below represents the bright-line spectrum for an element.



The spectrum of the same element observed in the light from a distant star is shown below.

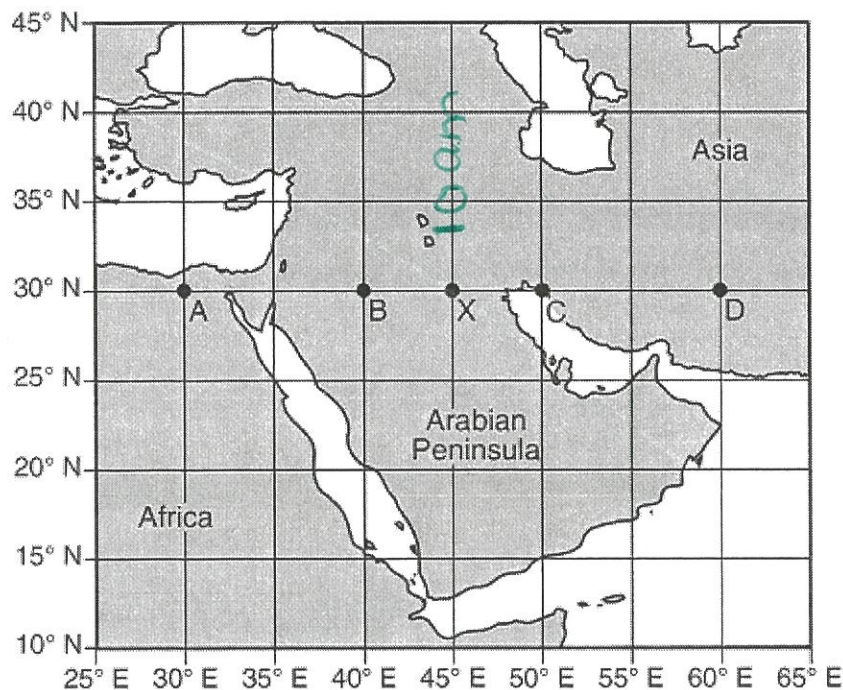


Red shift

The shift in the spectral lines indicates that the star is moving

- A) toward Earth
- B) away from Earth
- C) in an elliptical orbit around the Sun
- D) in a circular orbit around the Sun

58. The map below shows a portion of the Middle East. Points *A*, *B*, *C*, *D*, and *X* are locations on Earth's surface.



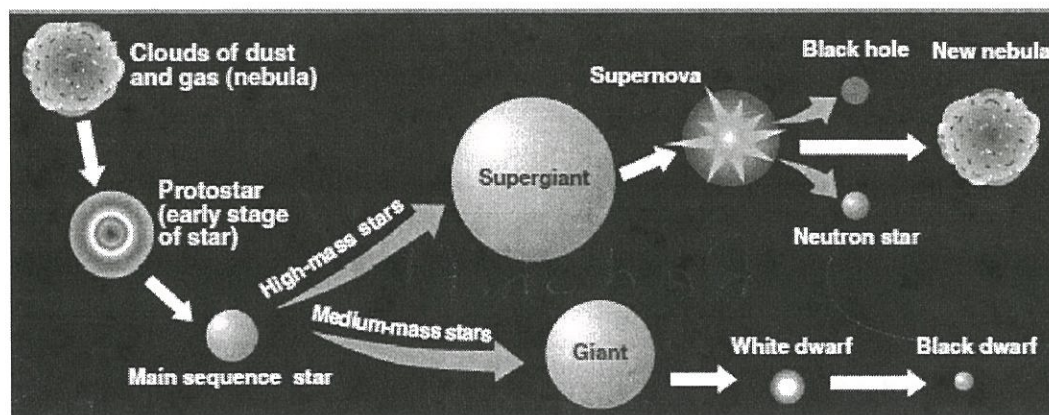
→ later
← earlier

When it is 10:00 a.m. solar time at location *X*, at which location is 11:00 a.m. solar time being observed?

- A) *A* B) *B* C) *C* D) *D*

59. Base your answer to the following question on the diagram below and on your knowledge of Earth science. The diagram represents two possible sequences in the evolution of stars.

Stages of Star Evolution

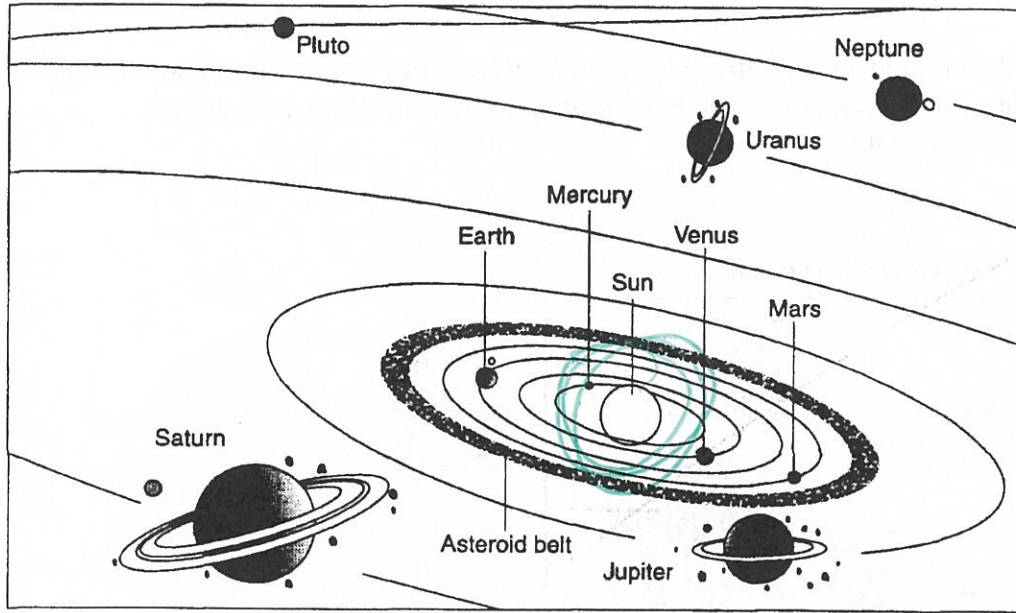


(Not drawn to scale)

What causes clouds of dust and gas to form a protostar?

- A) magnetism B) gravitational attraction
C) expansion of matter D) cosmic background radiation

60. Base your answer to the following question on the diagram of the solar system below.



(Not drawn to scale)

Which kind of model of the solar system is represented by the diagram?

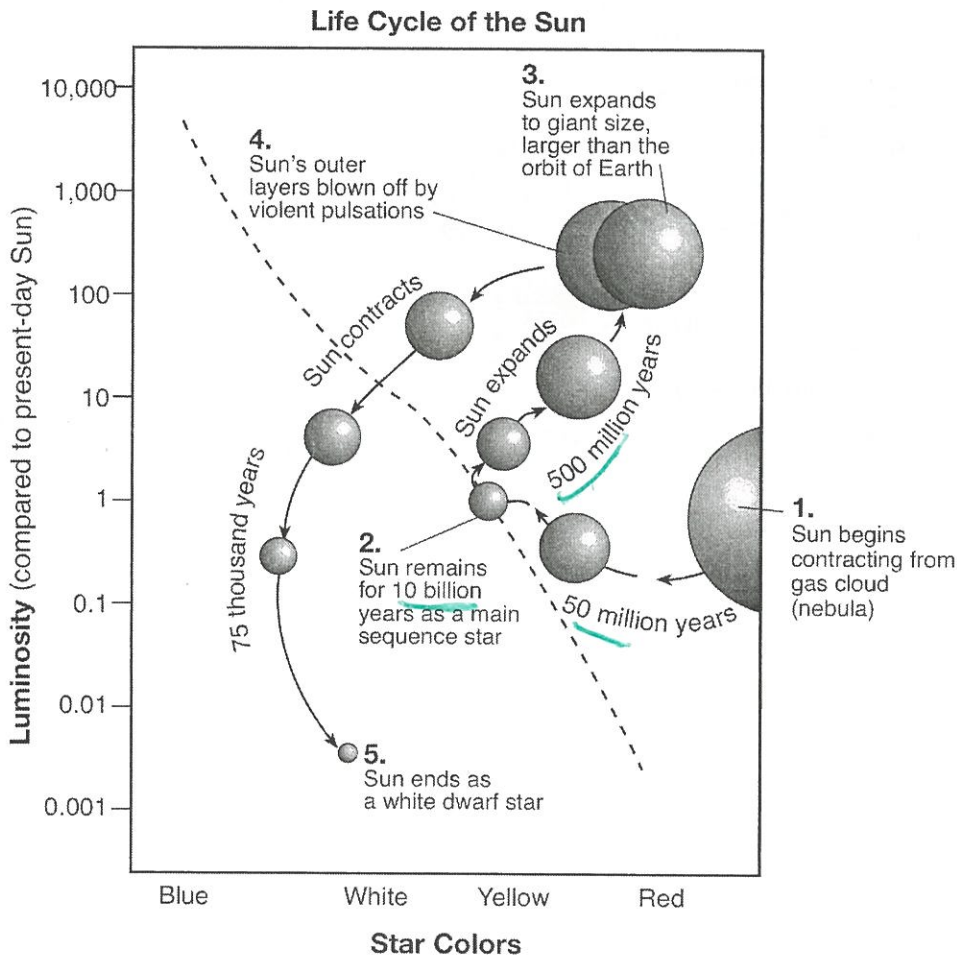
- A) heliocentric model
- C) sidereal model

- B) geocentric model
- D) lunar model

Sun centered

Base your answers to questions 63 and 64 on the diagram below and on your knowledge of Earth science.

The diagram represents the inferred changes to the luminosity and color of the Sun throughout its life cycle. The diagonal dashed line represents the main sequence stars. The numbers 1 through 5 represent stages in the life cycle of the Sun.



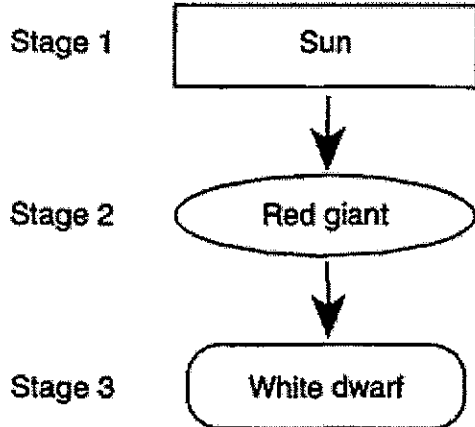
63. The Sun is inferred to be the most luminous when it is classified as a

- A) white dwarf star
- B) gas cloud (nebula)
- C) main sequence star
- D) giant star

64. The Sun is inferred to spend the greatest amount of time in its life cycle

- A) contracting from a gas cloud (nebula) 50 million
- B) as a main sequence star 10 million
- C) moving away from the main sequence and becoming a giant star 500 million
- D) changing from a giant star to a white dwarf star 75 thous.

65. Stars are believed to undergo evolutionary changes over millions of years. The flowchart below shows stages of predicted changes in the Sun.



According to this flowchart, the Sun will become

- A) hotter and brighter in stage 2, then cooler and dimmer in stage 3
- B) cooler and dimmer in stage 2, then hotter and brighter in stage 3
- C) hotter and dimmer in stage 2, then cooler and brighter in stage 3
- D) cooler and brighter in stage 2, then hotter and dimmer in stage 3

