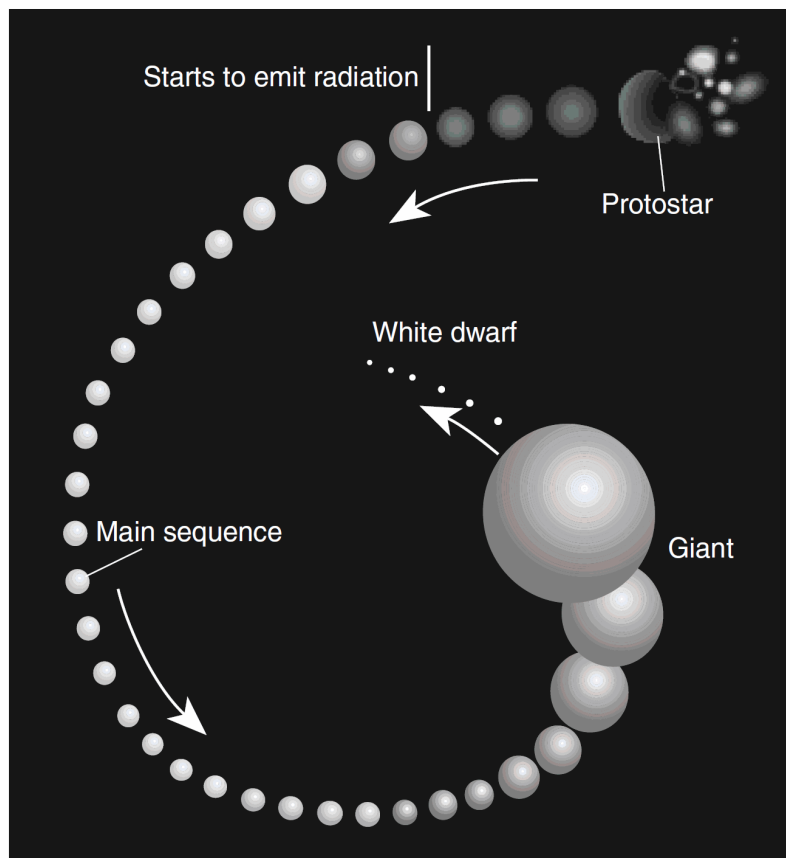


Topic 3 -Earth and Universe

- Which star is hotter, but less luminous, than *Polaris*?
A) *Deneb* B) *Aldebaran*
C) *Sirius* D) *Pollux*
 - If we observe a Doppler blue shift from a star, the star must be
A) relatively cool in temperature
B) moving away from us
C) moving toward us
D) a blue star
 - In which sequence are the items listed from least total mass to greatest total mass?
A) solar system, Milky Way, universe
B) Milky Way, solar system, universe
C) universe, Milky Way, solar system
D) Milky Way, universe, solar system
 - At which phase of its evolutionary life is a white dwarf star?
A) the late phase for small mass star
B) the remains of a larger star's explosion
C) in the main sequence phase
D) early phases, soon after a star's formation
 - Light and other forms of electromagnetic radiation are given off by stars using energy released during
A) nuclear fusion B) conduction
C) convection D) radioactive decay
 - Which sequence of stars is listed in order of increasing luminosity?
A) *Spica, Rigel, Deneb, Betelgeuse*
B) *Polaris, Deneb, 40 Eridani B, Proxima Centauri*
C) *Barnards Star, Alpha Centauri, Rigel, Spica*
D) *Procyon B, Sun, Sirius, Betelgeus*
 - The explosion associated with the theory and the formation of the universe inferred to have occurred how many billion ago?
A) less than 1 B) 2.5
C) 4.6 D) over 10
 - Compared to the sun a white dwarf star is
A) hotter and larger B) hotter and smaller
C) cooler and larger D) cooler and smaller
 - What factor from the choices below determines whether a star will evolve into a white dwarf, a neutron star, or a black hole?
A) mass
B) percentage of helium
C) percentage of carbon
D) apparent brightness
 - 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
 - Most of the radiant energy released by the sun results from the process of
A) nuclear fission
B) nuclear fusion
C) combustion
D) electrical generation
 - What is the name usually given to the group of objects consisting of a sun and any planets, comets, and other objects that orbit it?
A) a solar system B) a universe
C) a galaxy D) an ecosystem
 - Most scientists believe the Milky Way Galaxy is
A) spherical in shape
B) 4.6 billion years old
C) composed of stars revolving around Earth
D) one of billions of galaxies in the universe
 - The smallest stars on a H-R diagram are found
A) at the upper left end of the main sequence
B) at the lower right end of the main sequence
C) at the upper right corner of the H-R diagram
D) at the lower left corner of the H-R diagram
 - The vertical axis of an H-R diagram relates to the
A) the color of the star
B) the actual visual brightness of the star
C) the apparent brightness of the star compared to our sun
D) the speed of the star
-

Topic 3 -Earth and Universe

16. Base your answer to the following question on the diagram below, which shows the change in the size of a star such as our Sun as it evolves from a protostar to a white dwarf star.

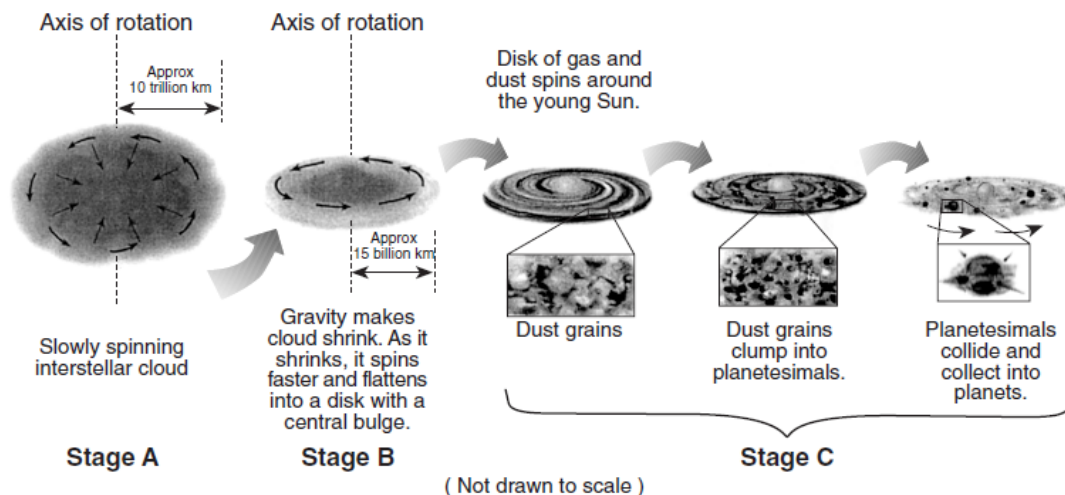


Which process produces the energy radiated by the star when it becomes a main sequence star?

- A) radioactive decay
B) nuclear fusion
C) conduction
D) convection
17. 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*
18. Which evidence best supports the theory that the universe began with a massive explosion?
- A) cosmic background radiation in space
B) parallelism of planetary axes
C) radioactive dating of Earth's bedrock
D) life cycle of stars
19. The apparent brightness of an object such as a star does not depend on
- A) how fast the star is moving
B) the strength of the light emanating from the star
C) the distance from us to the star
D) the amount and kind of obstacles between us and the star
20. An astronomer can estimate the temperature of a star by observing its
- A) size
B) shape
C) color
D) brightness
21. Which star has the greatest size?
- A) Sun
B) *Alpha Centauri*
C) *Betelgeuse*
D) *Procyon*

Topic 3 -Earth and Universe

22. Base your answer to the following question on the diagram below, which shows an inferred sequence in which our solar system formed from a giant interstellar cloud of gas and debris. Stage *A* shows the collapse of the gas cloud, stage *B* shows its flattening, and stage *C* shows the sequence that led to the formation of planets.



From stage *B* to stage *C*, the young Sun was created

- A) when gravity caused the center of the cloud to contract
 B) when gravity caused heavy dust particles to split apart
 C) by outgassing from the spinning interstellar cloud
 D) by outgassing from Earth's interior
23. 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.



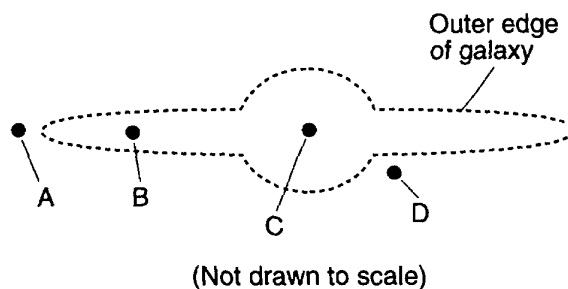
The shift in the spectral lines indicates that the star is moving

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

24. The red shift of visible light waves that is observed by astronomers on Earth is used to determine the

- A) sizes of nearby galaxies
 B) relative motions of distant galaxies
 C) densities of the planets
 D) rotation periods of the planets

25. The diagram below represents a side view of the Milky Way Galaxy.

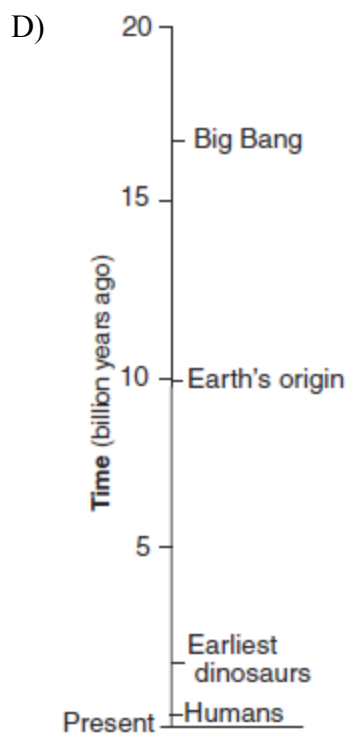
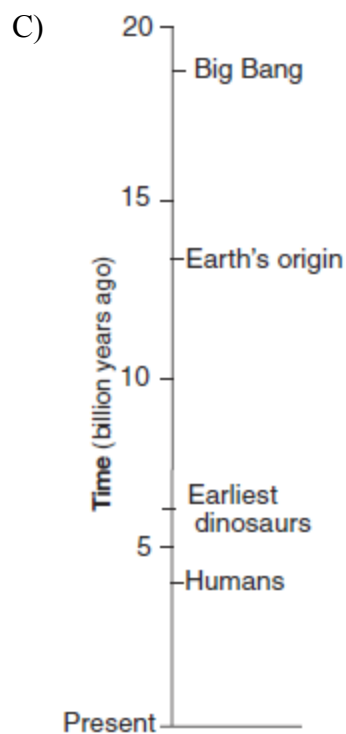
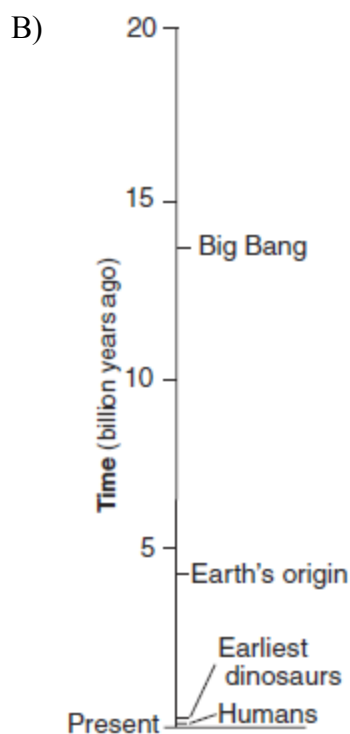
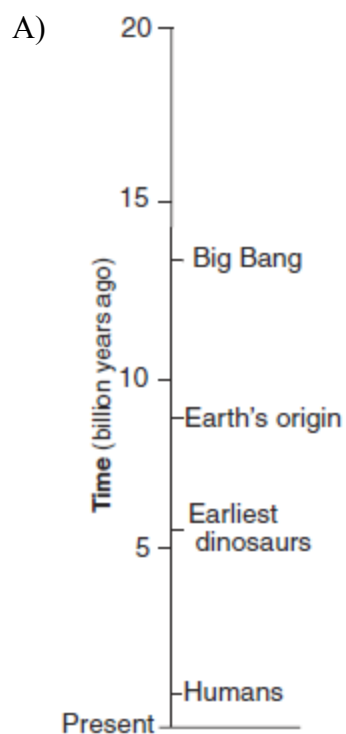


At approximately which position is Earth's solar system located?

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

Topic 3 -Earth and Universe

26. Which time line most accurately indicates when this sequence of events in earth's history occurred?



27. By using a spectroscope an astronomer can

- A) measure the size of a star
- B) measure the altitude of a star
- C) identify elements in the atmosphere of a star
- D) measure the diameter of a star

28. The theory that the universe is expanding is supported by the

- A) blue shift of light from distant galaxies
- B) red shift of light from distant galaxies
- C) nuclear fusion occurring in the Sun
- D) radioactive decay occurring in the Sun

Topic 3 -Earth and Universe

29. Base your answer to the following question on the table below, which shows eight inferred stages describing the formation of the universe from its beginning to the present time.

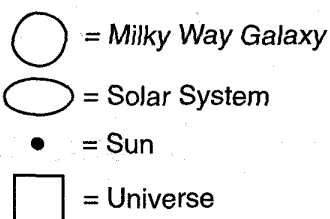
Data Table

Stage	Description of the Universe	Average Temperature of the Universe (°C)	Time From the Beginning of Universe
1	the size of an atom	?	0 second
2	the size of a grapefruit	?	10^{-43} second
3	"hot soup" of electrons	10^{27}	10^{-32} second
4	Cooling allows protons and neutrons to form.	10^{13}	10^{-6} second
5	still too hot to allow the forming of atoms	10^8	3 minutes
6	Electrons combine with protons and neutrons, forming hydrogen and helium atoms. Light emission begins.	10,000	300,000 years
7	Hydrogen and helium form giant clouds (nebulae) that will become galaxies. First stars form.	-200	1 billion years
8	Galaxy clusters form and first stars die. Heavy elements are thrown into space, forming new stars and planets.	-270	13.7 billion years

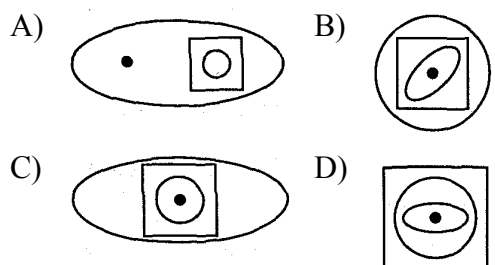
What is the most appropriate title for this table?

- A) The Big Bang Theory B) The Theory of Plate Tectonics
C) The Law of Superposition D) The Laws of Planetary Motion

30. The symbols below represent the Milky Way galaxy, the solar system, the Sun, and the universe.



Which arrangement of symbols is most accurate?



31. Two stars of the same color are plotted on an H-R diagram. Star *A* is more luminous than star *B*. Which one of the following statements could explain this?

- A) Star *A* is hotter than star *B*.
 B) Star *A* is more distant than star *B*.
 C) Star *A* appears brighter in the sky than star *B*.
 D) Star *A* is larger than star *B*.

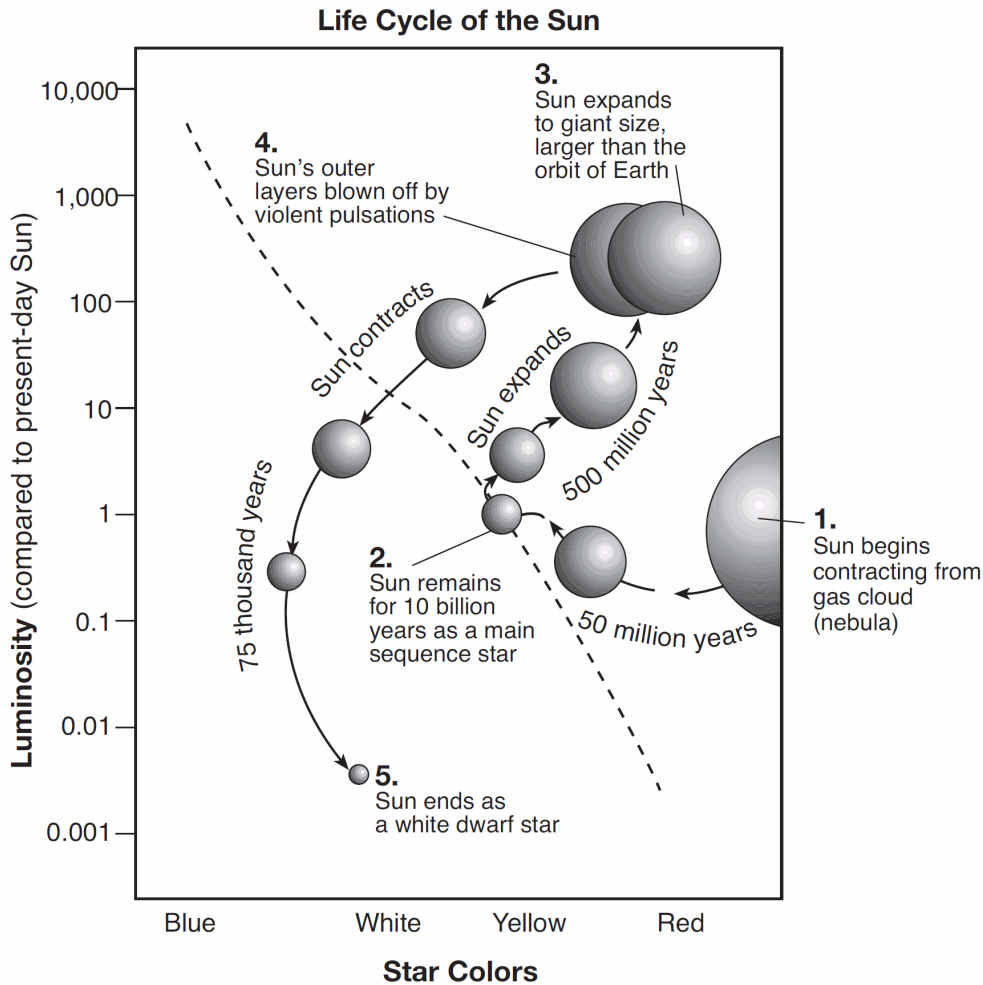
32. The star *Algol* is estimated to have approximately the same luminosity as the star *Aldebaran* approximately the same temperature as the *Rigel*. *Algol* is best classified as a

- A) main sequence star B) red giant star
 C) white dwarf star D) red dwarf star

Topic 3 -Earth and Universe

33. Base your answer to the following question 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.

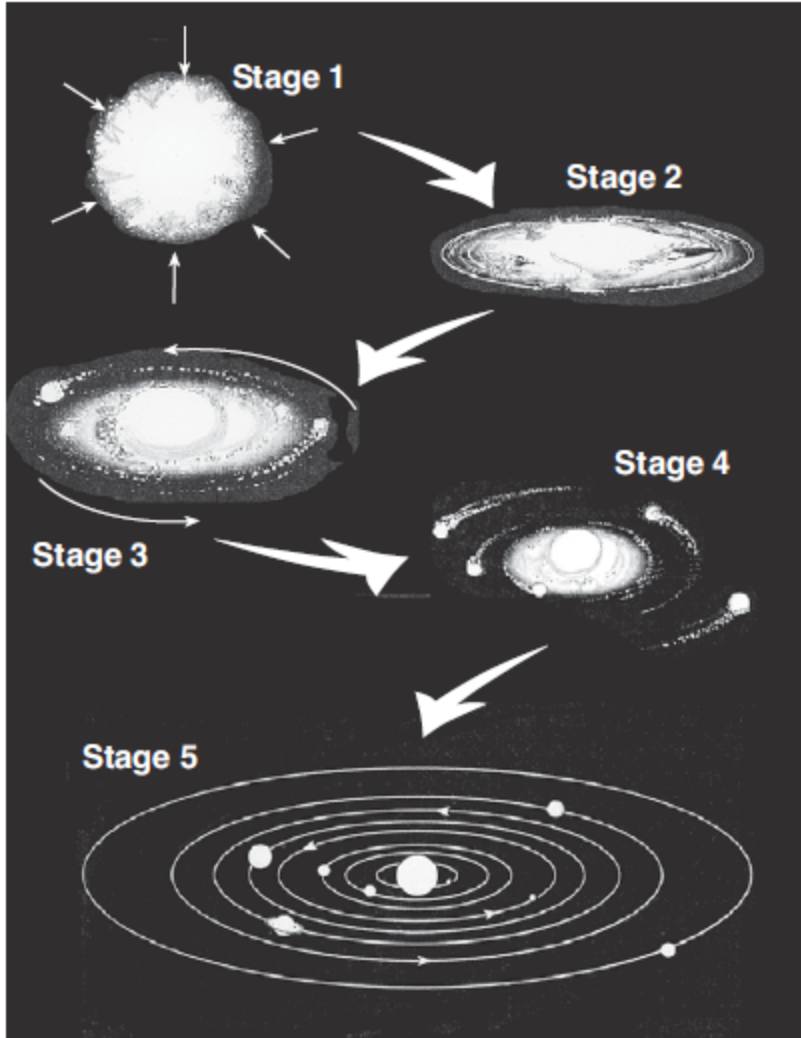


The Sun is inferred to be the most luminous when it is classified as a

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

Topic 3 -Earth and Universe

34. Base your answer to the following question on the diagram below. The diagram represents the inferred stages in the formation of our solar system. Stage 1 shows a contracting gas cloud. The remaining stages show the gas cloud flattening into a spinning disk as planets formed around our Sun.



(Not drawn to scale)

Which force was mostly responsible for the contraction of the gas cloud?

- A) friction B) gravity C) magnetism D) inertia
-