

Stellar Evolution Activity

1. This is the temperature of an interstellar cloud prior to gravitational collapse
 - a. 10 K
 - b. 100K
 - c. 1000 K
 - d. 1000000 K

2. When a star's core runs out of hydrogen, the core shrinks and does what
 - a. heats up
 - b. cools down
 - c. becomes a black hole
 - d. becomes a neutron star

3. A white dwarf will eventually cool down forming this hypothetical object
 - a. Black dwarf
 - b. Brown dwarf
 - c. Red dwarf
 - d. Black hole

4. This is a failed star not massive enough for nuclear fusion to begin
 - a. Black dwarf
 - b. Brown dwarf
 - c. Red dwarf
 - d. Black hole

5. This is the outward force produced by the fusion of hydrogen into helium in a star's core
 - a. gas pressure
 - b. gravity
 - c. electromagnetism
 - d. nuclear force

6. This is the most significant force that determines the evolution of stars
 - a. gas pressure
 - b. gravity
 - c. electromagnetism
 - d. nuclear force

7. High mass stars are considered high mass when they reach _____ solar masses
 - a. 2
 - b. 10
 - c. 20
 - d. 30

8. At the end of a high mass star's life, its 2 billion degree core is made of _____ and its outer layer is made of hydrogen and helium
 - a. uranium
 - b. carbon
 - c. iron
 - d. lead

9. At the end of a high mass star's life, a _____ remains after a supernova.
 - a. black hole
 - b. neutron star
 - c. both a neutron star and a black hole could occur after a supernova
 - d. neither a black hole nor a neutron star will occur after a supernova

10. This occurs in a main sequence star when the radiation pressure outward equals the force of gravity inward
 - a. superposition
 - b. electromagnetism
 - c. hydrostatic equilibrium

11. Stars fall into this category when nuclear fusion begins in their core and when they reach hydrostatic equilibrium
 - a. red giant
 - b. main sequence
 - c. white dwarf
 - d. black hole

12. This is the most important property that determines the evolution of stars
- mass
 - temperature
 - magnitude
13. This is the process where two lighter weight nuclei combine at extremely high temperatures converting some of their mass to energy
- nuclear fusion
 - nuclear fission
 - superposition
14. Hydrogen fusion occurs at _____
- 1,000,000 K
 - 10,000,000,000 K
 - 10,000,000 K
 - 100,000,000,000 K
15. A _____ is left behind at the center of a planetary nebula
- white dwarf
 - red dwarf
 - brown dwarf
 - white giant
16. Massive stars burn fuel more quickly giving them shorter lifespan
- True
 - False

Definitions of terms

Black dwarf	The remnant of a white dwarf after it has cooled down. It has very low luminosity
Black hole	A singularity in space time; the end result of the evolution of a very massive star
Brown dwarf	Gas and dust that did not reach a high enough temperature to initiate fusion. These objects continue to compact and cool down
Interstellar medium	Gases (mainly hydrogen and helium) and dust grains (silicates, carbon and iron) filling the space between stars. The density of the interstellar medium is very low. There is about one atom of gas for every cubic centimeter of space. The density of dust is a trillion times smaller. The temperature of the gas is about 100 K
Main-sequence star	A normal star that is undergoing nuclear fusion of hydrogen into helium. Our Sun is a typical main sequence star
Nebula	Clouds of 'dust', i.e. compounds of carbon, oxygen, silicon and metals, as well as molecular hydrogen, in the space in between stars
Neutron star	The end result of the explosion of a red supergiant; a very small star (a few tens of kilometers in diameter) and very dense. This is a star consisting almost entirely of neutrons. The neutrons form a superfluid around a core of immense pressure and density
Planetary nebula	The ejected envelope of a red giant star
Red giant	A main-sequence star evolves into a red giant – a very large, reddish star. There are nuclear reactions involving the fusion of helium into heavier elements
Supernova (Type II)	The explosion of a red supergiant star: The amount of energy emitted in a supernova explosion can be staggering – comparable to the total energy radiated by our Sun in its entire lifetime!
White dwarf	The end result of the explosion of a red giant. A small, dense star (about the size of the Earth), in which no nuclear reactions take place. It is very hot but its small size gives it a very low luminosity