

Chapter 14

Bennett—The Sun

page	term	definition
495	gravitational contraction	The process of heating a ball of gas by gradual contraction under its own gravity in which gravitational potential energy is turned into heat. Also called Kelvin-Helmholtz contraction or sometimes Helmholtz contraction.
496	gravitational equilibrium	Another term for the hydrostatic equilibrium in stars.
496	hydrostatic equilibrium	In stars, the condition by which at each point the weight of the overlying layers is balanced by the total pressure.
497	luminosity	The rate at which electromagnetic radiation is emitted by a star or other object.
497	plasma	A hot ionized gas.
497	sunspot cycle	The somewhat regular 22-year period with which the number and magnetic polarity of sunspots fluctuates.
498	conduction*	The transfer of heat by directly passing energy from atom to atom.
498	convection*	The transfer of energy by moving currents of fluid or gas containing that energy.
498	convection zone	The region in a star where convection is the dominant means of energy transport.
498	corona	The Sun's outer atmosphere with a temperature of millions of degrees temperature but a low density.
498	photosphere	The layer of the Sun from which most of the visible light escapes into space. This layer is the "disk" of the Sun we see as it is setting.
498	radiation zone	The random migration of photons from a star's center toward its surface.
498	solar wind	An outward flow of particles (mostly electrons and protons) from the Sun.
499	nuclear fission	A process in which very heavy atomic nuclei are induced to split by the addition of neutrons resulting in two smaller nuclei, energy and a few more neutrons to continue the reaction. Often simpler called fission.
499	nuclear fusion	A process in which light atomic nuclei are induced to fuse by the application of high temperatures and pressures resulting in one larger nucleus and energy. Often simpler called fusion.
500	net reaction*	A statement that reveals the final outcome of a process such as fusion reactions within the Sun. The net solar fusion reaction is $4\text{H} = 1\text{He} + \text{energy}$.
500	proton-proton chain	A sequence of thermonuclear reactions by which hydrogen nuclei are built up into helium nuclei.
502	solar brightening	A very long term gradual increase in the solar luminosity due to the contraction of the core as hydrogen is fused and the number of particles in the core decreases.

502	solar thermostat	The idea that changes in nuclear reaction rate in the solar core are self correcting due to the relationship between pressure and temperature in a plasma.
504	radiative diffusion	A region within a star where radiative diffusion is the dominant mode of energy transport.
505	solar model*	Mathematical constructs that predict the properties of the Sun based on the laws of physics and its size and mass.
505	solar vibrations	Oscillation of the solar surface that arise from movement of gas deep within the Sun and whose analysis reveals temperatures, pressures and densities within the Sun.
506	solar neutrino	A neutrino emitted from the core of the Sun.
506	solar neutrino problem	The discrepancy between the predicted and observed numbers of solar neutrinos found by the first neutrino observatories. This problem has been resolved with new facilities able to count several flavors of neutrinos.
507	magnetic field	The region around a magnet where its magnetic properties can be detected.
507	solar activity	A general measure of the number and severity of spots, flares and other active regions on the sun.
507	Zeeman effect	A splitting or broadening of spectral lines due to a magnetic field.
508	magnetic field lines	Lines drawn to represent the direction of the magnetic field in the region of a magnet.
508	solar flares	A sudden, temporary outburst of X rays and charged particles from a region of the solar surface.
508	solar storm	Any sudden, temporary rise in solar activity in a specific region of the solar surface.
510	aurora	Spectacular array of light in the night sky, caused by charged particles from the Sun hitting the Earth's upper atmosphere. The aurora borealis is seen in the north of the Northern hemisphere; the aurora australis in the south of the Southern.
510	coronal mass ejection	An event in which billions of tons of plasma from the Sun's corona is suddenly ejected into space at high speed.
510	geomagnetic storm	A disruption of the magnetic field of the Earth by a large mass of charged particles from the Sun.
510	induced current	An electric current that is caused to flow in a wire because of a changing electric field. This principle is the basis for electric generators that provide our electricity.
510	sunspot	A temporary region in the solar photosphere that is cooler than its surroundings and thus has a lower luminosity and looks dark in comparison.
511	Maunder minimum	A period of time in the 1600s and early 1700s when few or any sunspots were visible and solar activity was at a minimum.