SNC1D

The Lives of Stars

(pp. 462-473)

When you look at the stars on a clear night, the stars differ in ________________. A ______________ is a light collector, concentrating the light it collects in the ________________. A ______________ can be placed over the _________________ and a long time exposure photograph can be taken. Astronomers have inferred a great deal from ________________ about important properties of stars: _______________, ________________, _________________, ________________, _____________, and ________________.

Although the human eye can only detect ___________ light, other types of electromagnetic radiation also exist, each with a different range of ________________. The entire arrangement of electromagnetic radiation is called the _________________ ________________.

____________ and _______________ can affect how bright a light-emitting object appears. This is also the case with stars. The closest stars to Earth are _________ ________________ the brightest because it depends both on how ____________ the stars are to Earth and how ______________ the stars are. __________________ is a property of the stars themselves. Luminosity is a measure of the total amount of _______________ a star radiates per ______________.

Although the stars look like small points of _____________ light, they range widely in ______________. Some are _______________ white, ____________ green, yellow, or ____________-red. Astronomers use the colour of a star to infer its ______________ __________________. A ________________ star, such as the Sun, is relatively ____________, with a surface temp. of about _______________. A ___________ star is relatively cool, about ________________. A _____________ star is extremely ___________, typically between ______________ and ______________. Analysis of starlight also indicates a star's ____________________. To analyze the light, astronomers use a _________________ which separates light into a __________________ (bands of different _________________). A star's spectrum also shows dark ______________ across the _________________. These bands reveal that some _____________________ of light have _____________________, absorbed by _____________ in the star's atmosphere. Each ____________________ (eg. _______________, helium, ______________, calcium, etc.) leaves its unique pattern of ______________ ______________ on a spectrum. Astronomers use this information (and the basic temp.) to ________________ stars.

Astronomers found they could calculate the ____________ or ______________ of a star once they knew its ________________ and ___________________. Stars come in many sizes. More than half the stars we see from Earth are _______________ stars, ___________ single stars _________________ one another. Star mass is expressed in terms of ________________ ______________. The Sun is a _____ ____________ ____________ star; other stars range from __________ solar mass to over ___________ solar masses.

The Hertzprung-Russel diagram (Fig. 14.7) is a plot/graph of the ________________ (on the y-axis) against the _________________ or temperature (on the x-axis) of stars. The Sun is shown near the _______________. A star located in the upper-right corner is _____________ and ___________ whereas a star in the lower-left corner is ____________ and _____________. About ______% of stars is not in the main sequence. These stars (such as _______ giants and supergiants) are very large but rather ___________ in temperature. Other stars are very small but extremely ___________ in temperature; these stars are called white _____________.

_________________ law of gravitation states that an ______________ gravitational force exists between all ______________ and this force gets ________________ the closer the objects become. Gravity is the force that helps ____________ and _____________ stars and ultimately causes them to __________ (see Fig. 14.9). Astronomers speculate that vast clouds of gas and ______________ called _________________ are the birth places of stars. In these clouds, _____________ pulls the "____________-_______________" material together. The accumulating gas causes the ________________ in the centre to ____________. When it reaches about _______________________, the nuclear reaction, _______________ (transformation of _________________ into _______________) begins and the star “turns on” or shines. Once the _______________ process begins, it starts to consume the ____________ fuel. ________________ begins to accumulate in the ___________ of the star. The interior of the star continues to heat up, increasing the _______________ and ______________. These forces are balanced by the _________________ pull toward the centre. The result is a ________________ star. All ___________ sequence stars, including our ________, are in this condition. The time the star remains in this phase, before advancing to a later phase, depends on its ____________.

Low mass stars (________ ____________) consumer their hydrogen ___________ over a period that may last as long as __________ ___________ years. During that time, they lose significant __________, essentially __________________. In the end, all that remains of them is a very faint ______________ ________________.

Intermediate mass stars (ie. the ________) consume their _______________ a little ___________, over a period of about ______ ______________ years. When the hydrogen is used up, _____________ production stops and gravity causes the star to _____________. As the core contracts, the _______________ increases and the outer layers begin to _____________. Eventually, the _____________ starts fusing into ______________. Because the star has expanded so much, the outer layers are much ____________ than when the star was a main sequence star. It therefore appears _________, earning the name _________ ____________. Our Sun will evolve to this phase in about ________ ____________ years.

________________ winds peel away gases, eventually revealing the hot inner region of a star. The result is a _______________ _________________, a fuzzy _____________ object. Over time, it disperses into space, its remnant _____________ slowly and losing _______________. it then becomes a ___________ ______________. These continue to cool over billions of years and are eventually nothing more than a dark cylinder called a ___________ ____________.

High mass stars consumer their ______________ very rapidly. So much _________ is released that the star swells into a ________________. In the core, _______________ is transformed into ____________. Once an _________ core is achieved, no further _____________ process can counter the force of ______________ and the core collapses. A massive ____________ wave bursts from the star’s surface causing a huge explosion or ________________.

After the supernova phase, a star has one of two fates depending on its __________. If the remaining core is about 1.4 to 3 __________ masses, the gravity crushes the remnant into a small superdense object called a ______________ star. If the core is greater than 3 _________ masses, they form ___________ holes, objects so compact and __________ that not even ____________ can escape. _____________ holes are the most extreme conclusion of ______________ work in stellar evolution.