

STARS**Warm-up QUIZ**

- Briefly outline the evidence that supports the big bang & the age of the universe.
- What did the energy change into when the universe cooled?

After the Big Bang

- All the hydrogen atoms spread across the universe
- The universe was a cold and dark
- According to the _____, stars form nebulae, dense clouds of gas and dust exist
- How did the universe change from hydrogen to all the other elements?

Force of _____

- Anything that has mass will experience a force of _____
_____ them together.
- _____ began to _____ the hydrogen atoms within the clouds of gas.

Critical Mass + HEAT

- Over time, the collection of the hydrogen atoms became _____.
- With so many hydrogen atoms close together, it got _____!!!!
- The hydrogens did something that had never been done before....
- _____ occurred, which produced huge amounts of _____.

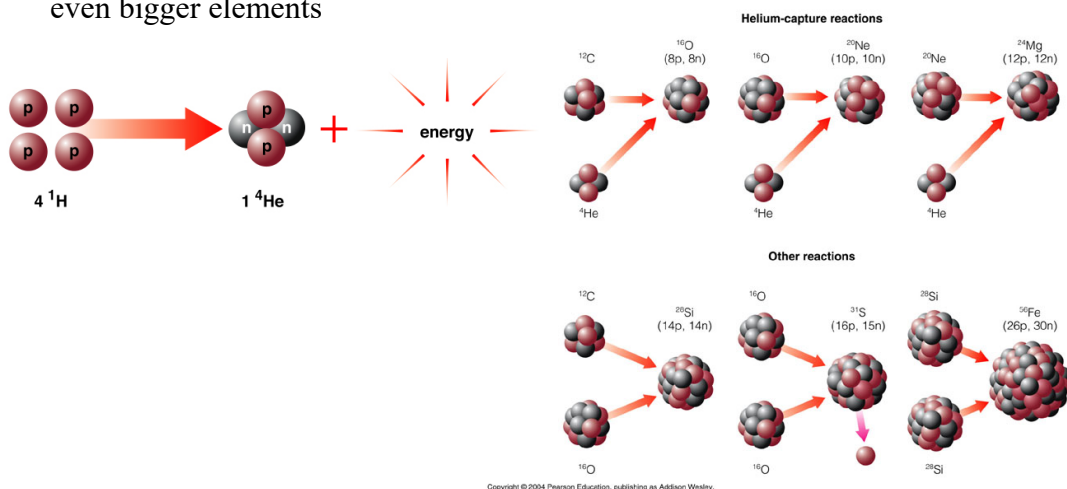
Stars

- A star is a massive sphere of gases with a core that **fuses** _____ together.
- **The fusion in stars** gives off incredible amounts of energy every second.
 - The energy the US uses in a _____ in _____.
- They are the most common _____ in the universe
- It is estimated there are more stars in the universe than there are grains of sand on all the beaches on Earth.
- The closest star to us, _____ is _____ light years away

**Building the Elements**

- For most of a stars life, hydrogen is fused into helium

- Towards the end of a star's life, larger elements are then fused inside stars to form even bigger elements



Life Paths of Stars

- It starts with a _____, but the path of development of each star takes depends on the _____ of the newborn star.
- There are _____ main life paths for star.

Low Mass Stars

- These small stars exist for most of their lives as dim, cool _____.
- Red Dwarfs burn their fuel very slowly and may last for 100 billion years
- When the fuel for fusion is completely used up, the temperature and pressure of the core can no longer support the weight of the outer layers, the star _____
 - the nuclei are squeezed tightly together and this can form a _____
- with its fuel gone, the temperature _____, even though it shines brightly
- eventually it becomes a _____

Intermediate Mass Stars

- These _____ stars are of similar mass to the _____
- The burn through hydrogen faster than low mass star. These stars have a lifespan of about _____ billion years.
- After a long period of stability, the star has used up its "stable" fuel in the fusion process, the gravity forces are unbalanced, and the star becomes _____
 - This causes the core to contract, making the star hotter, and the outer layers expand. As expansion continues the star becomes a _____
 - _____ elements such as carbon, oxygen, nickel and iron form
- Sheds its outer layers and collapses in on itself becoming a white dwarf and eventually a black dwarf

High Mass Stars

- Stars _____ x mass of the Sun, have a violent end
- The life of an average high mass star will last for around _____ billion years.

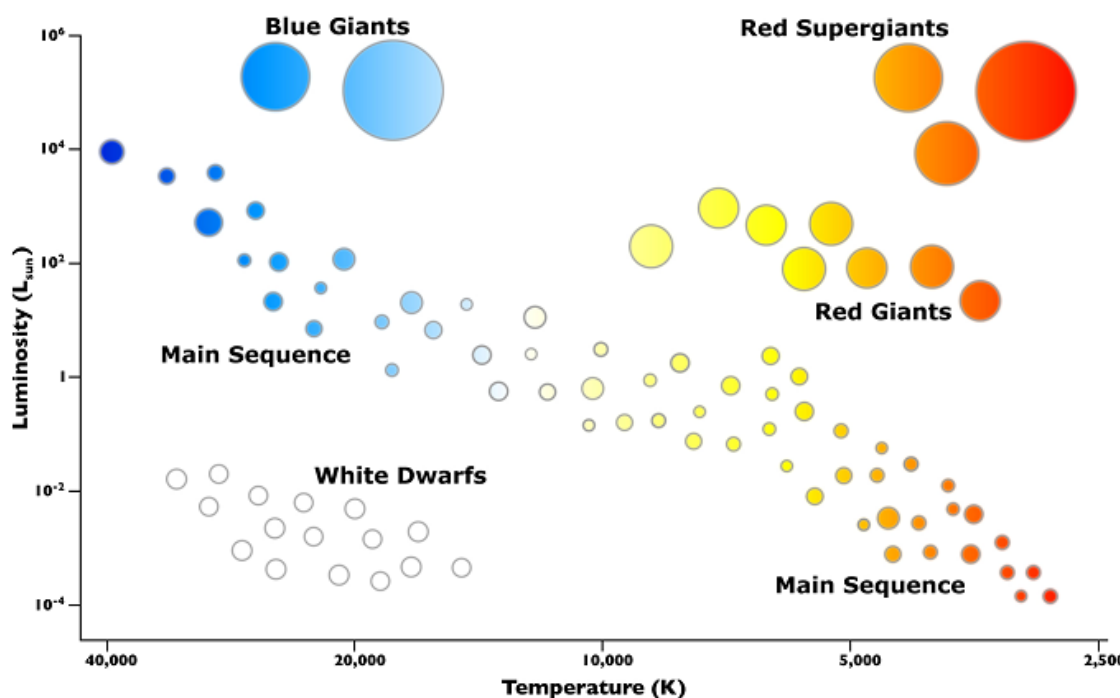
Supernova

- A supernova is the largest stellar explosion in the _____
 - The explosion shoots material at up to _____

- They shine so brightly, they can be seen from Earth even during the _____. They can out shine entire _____.
 - They are caused by the core of an old massive star undergoing sudden _____.
 - This occurs when the star begins to fuse _____ nuclei together.
- Life from Supernova**
- Supernova are extremely important for life in the universe for TWO REASONS
 - They create the _____ elements and _____ these elements across the cosmos
 - The explosion shock waves stir up _____ and can trigger the _____.

Hertzsprung-Russel Diagram

- Russel (US) and Hertzprung (Holland) both concluded that stars _____ stay the _____ forever
- Stars have a clear evolutionary or development _____
- Both their research brought together in diagram
- Data shows relationship between star's _____ (energy released) and its _____
- When plotted most stars fall into what is called the _____



Your Assignment

- Read p. 336-349
- Do:
 - Work book 4.3 p. 206-213
 - Optional: Questions 1-9 p.349