Daily Routine

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- Have all necessary materials out
- All back packs on the floor
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- All electronic devices away!!!

Bell Work

- Explain how background radiation (gamma waves, microwaves, and radiowaves) help support the Big Bang Theory?

- How do galaxies get their classification?

Earth Science Announcements

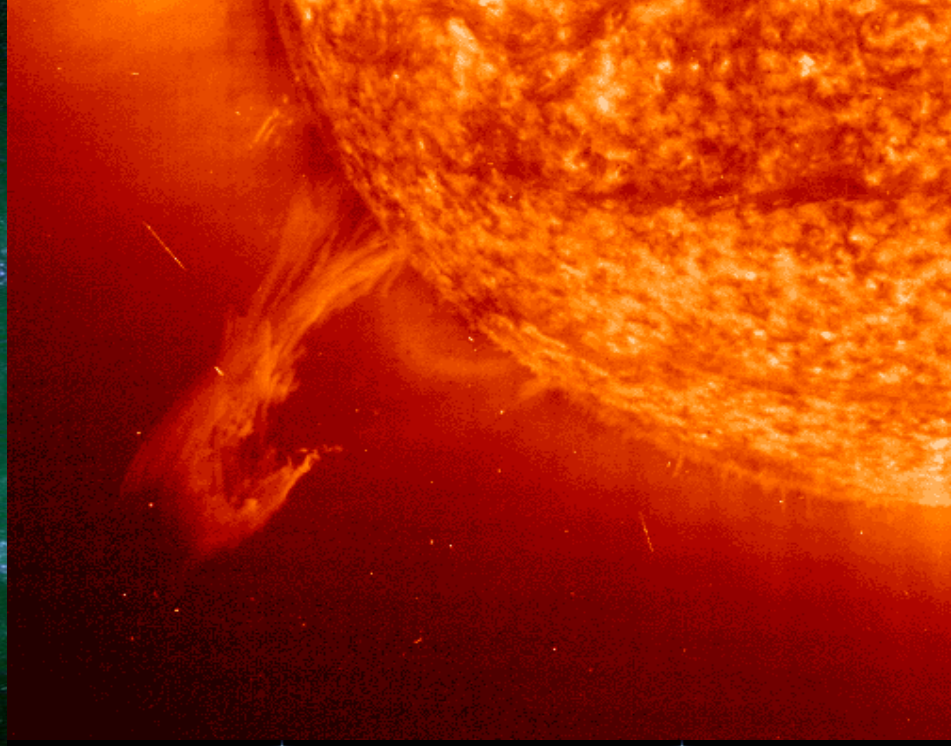
Project Final Draft 11/12/2014

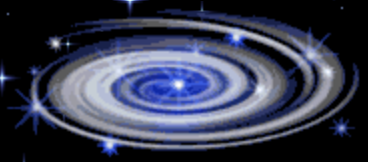
Big Bang and Galaxy Quiz Thursday November 13th

Big Bang, Galaxy, and Stars Test Thursday 20th

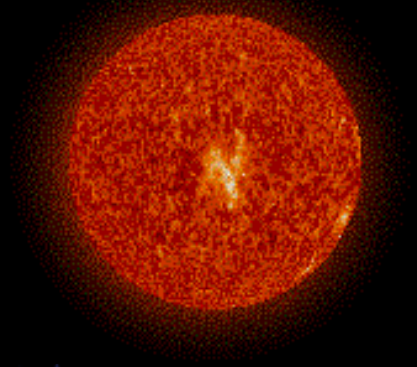
Galaxy Lab

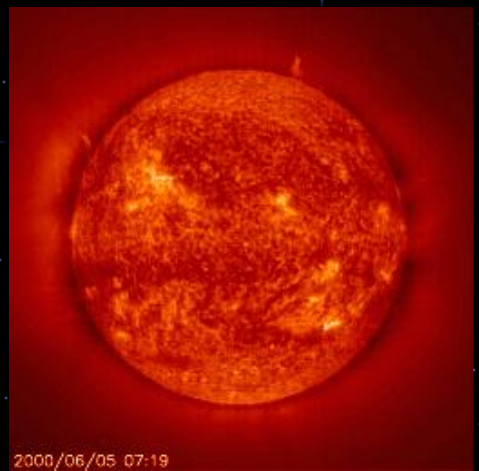
- Groups of 4 to 5 at each of the lab stations
- Stay with your group, you may not move to other groups
- If I notice this, I will choose groups
- Complete sections 1-3, If you finish the first 3 work and complete the final

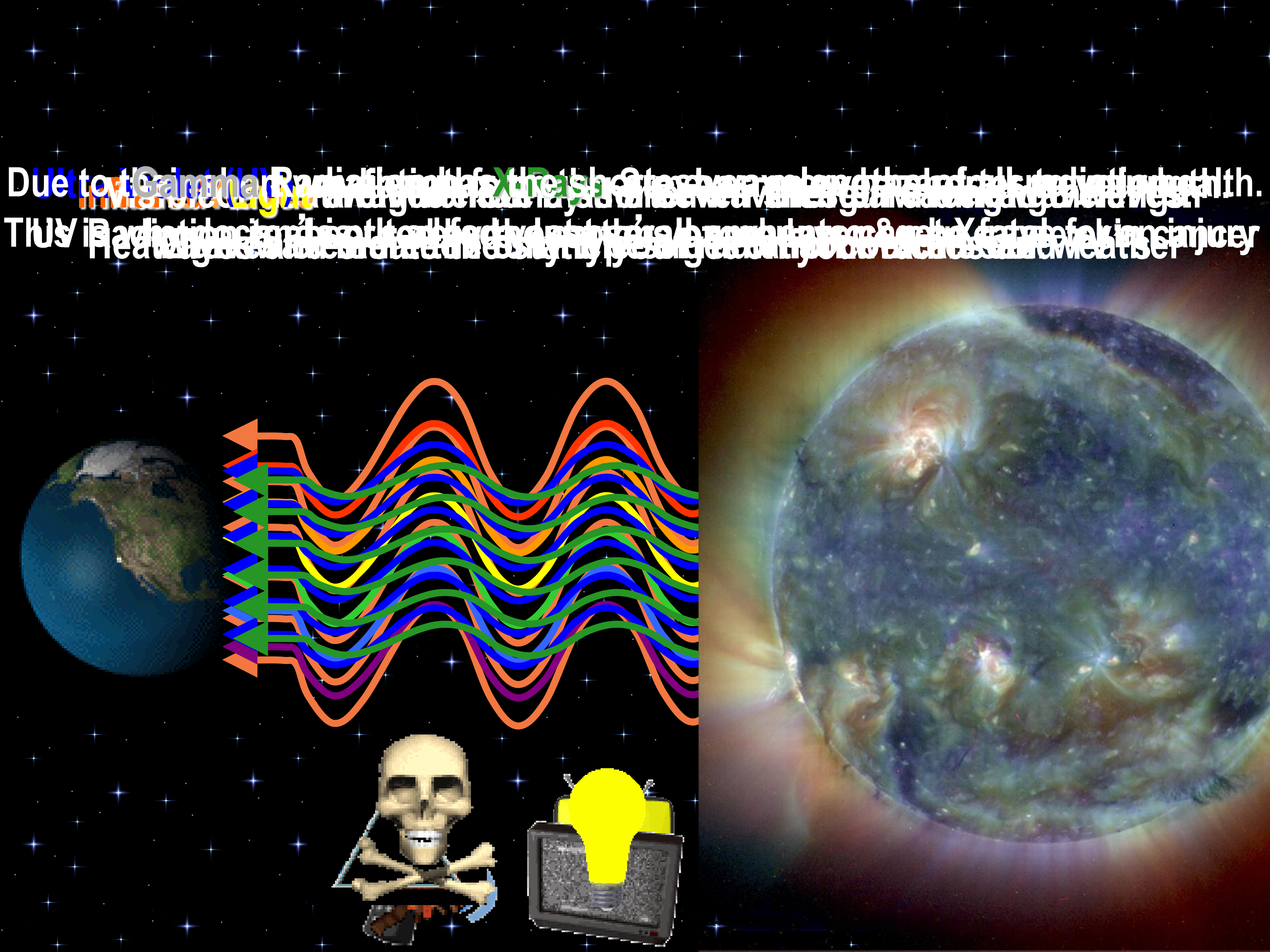




Stars and their Life Cycle







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Bell Work

- Which of the electromagnetic waves are dangerous to us?
- Which waves do we use for evidence to help support the Big Bang Theory?

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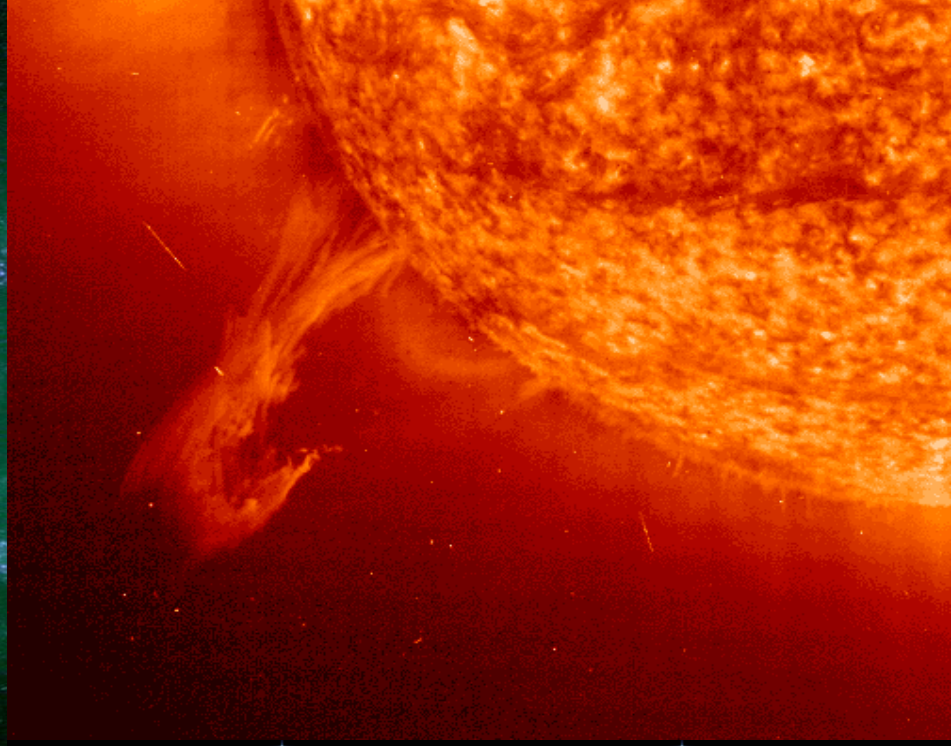

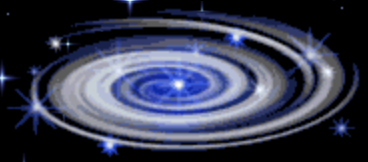

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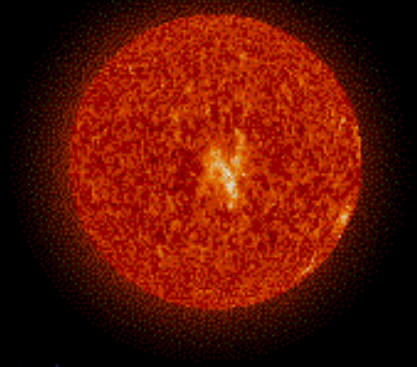
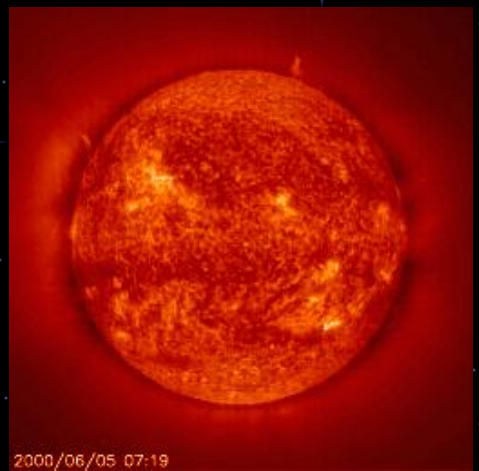
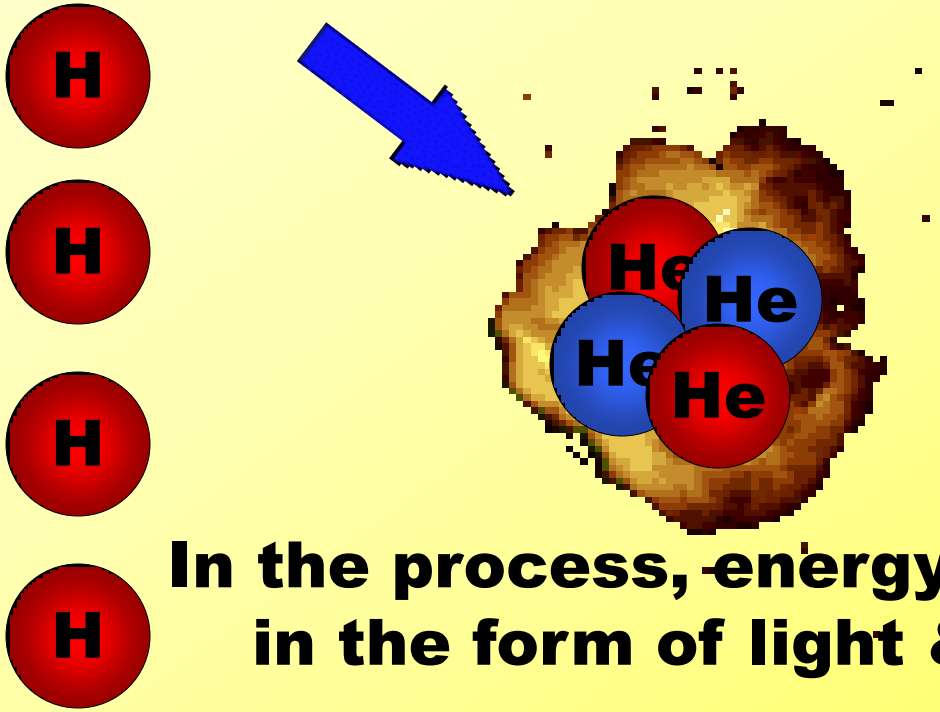




Where does light and these waves come from?

The core, where nuclear fusion takes place let's zoom in and what happens

In the Core, Pressures and Temperatures are high enough for <u>Fusion</u> to take place



In the process, energy is released in the form of light &radiation

<u>Fusion</u> occurs when 4 hydrogen atoms (light element) combines to form 1 Helium atom (heavier element) Hydrogen, a lighter element is converted into a heavier element, *helium*

What are star characteristics?

Yellow Stars like are
Sun are average in
brightness & temperature

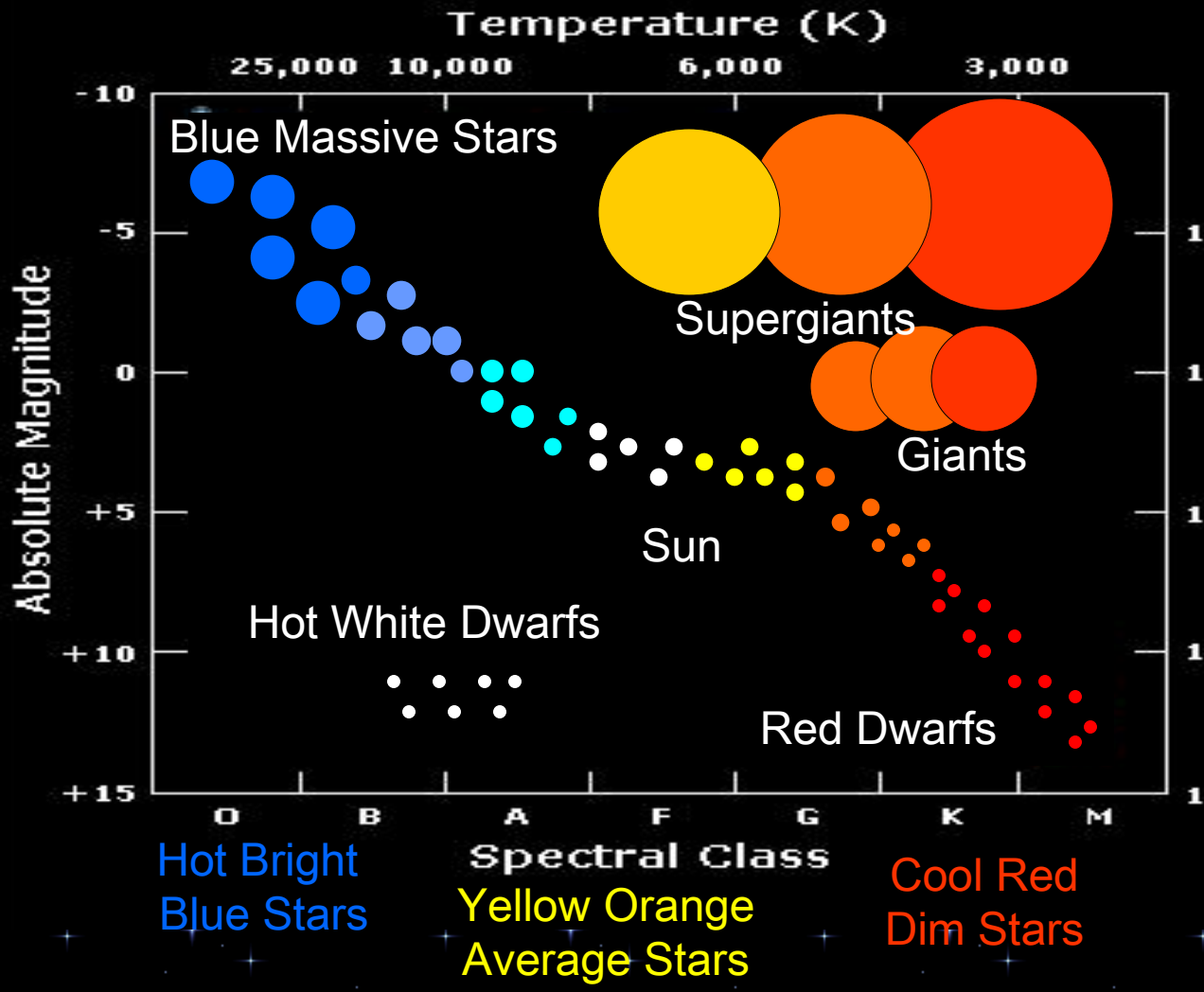
Blue Stars are
large hot and bright

Red Stars are
small cool and dim

How do we use the H-R Diagram?

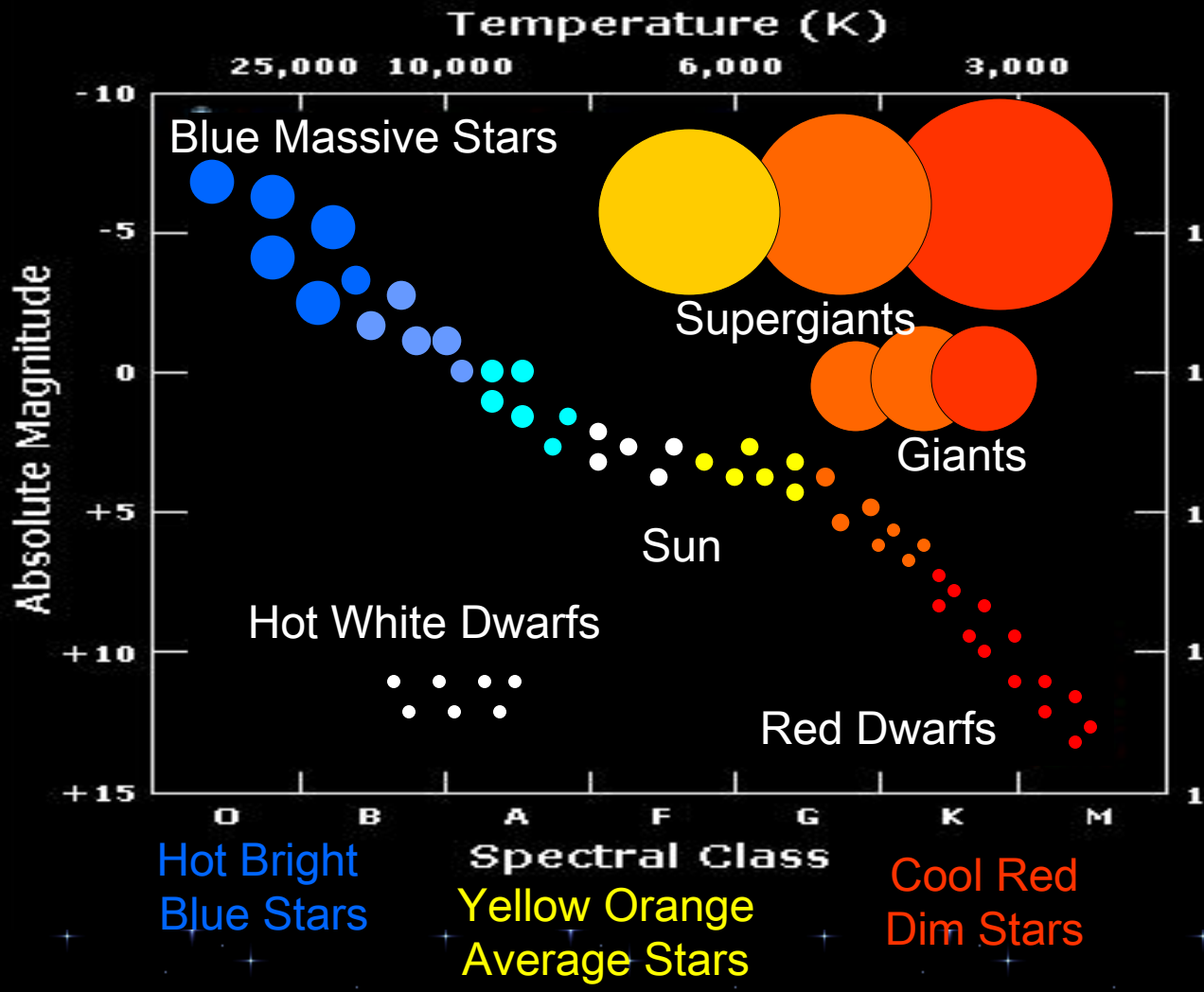
- In the early 1900's, Ejnar Hertzsprung and Henry Russell found a way to classify stars
- They classified stars by their temperature and brightness

http://www.youtube.com/watch?v=HEheh1BH34Q&feature=fvw



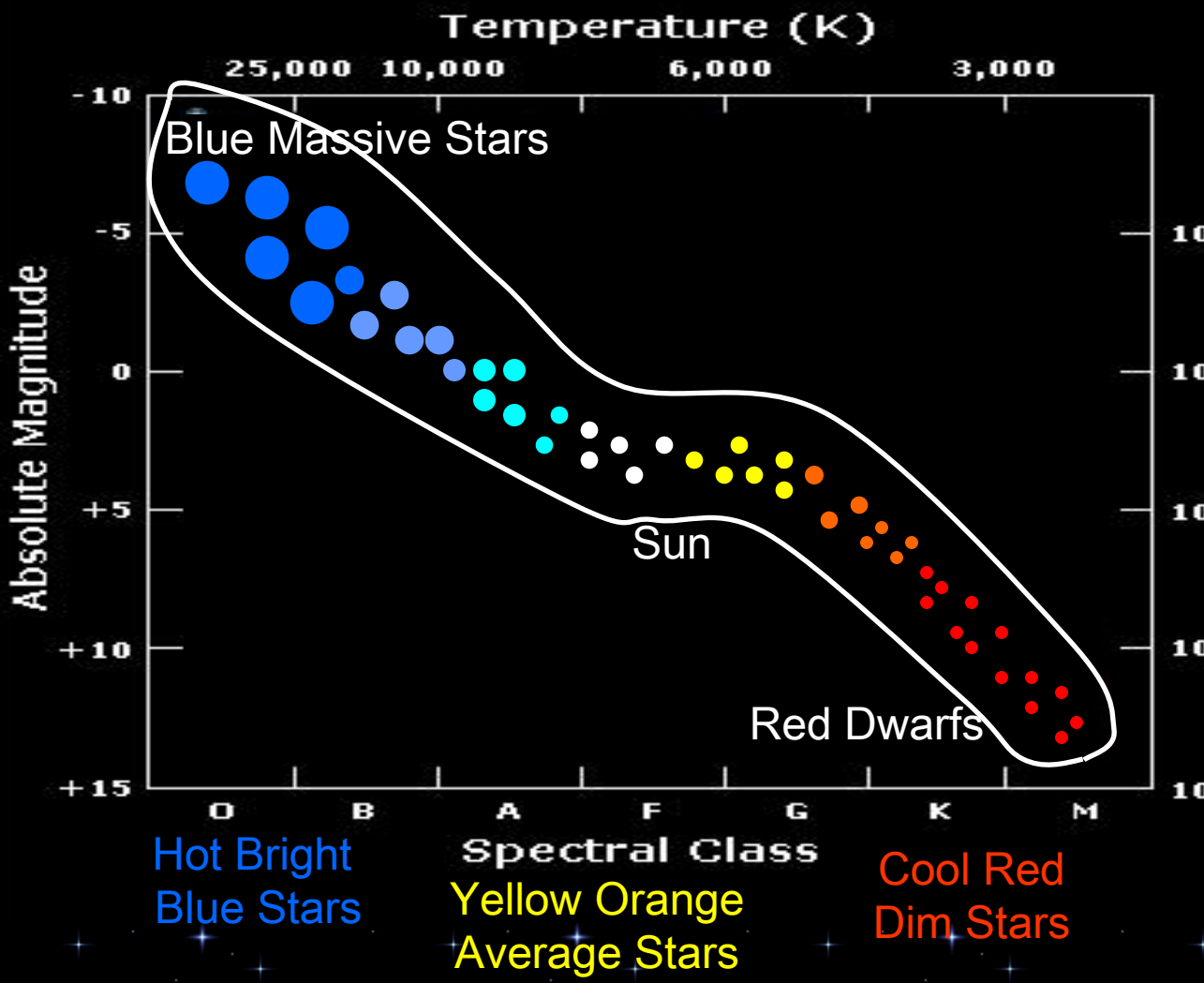
How do we use the H-R Diagram?

- Hertzsprung and Russell came up with a graph that shows the relationship between temperature and brightness
- Notice where the cool small red dwarfs stars are located
- Notice where the massive hot blue dwarfs stars are located



What are Main Sequence Stars?

- Our sun is a yellow Main Sequence Star
- Main Sequence Stars that fit into a diagonal band that run from the upper left to the lower right corner
- Main Sequence Stars contain large, hot blue stars, as well as small cool red stars
- 90 % of all stars are Main Sequence

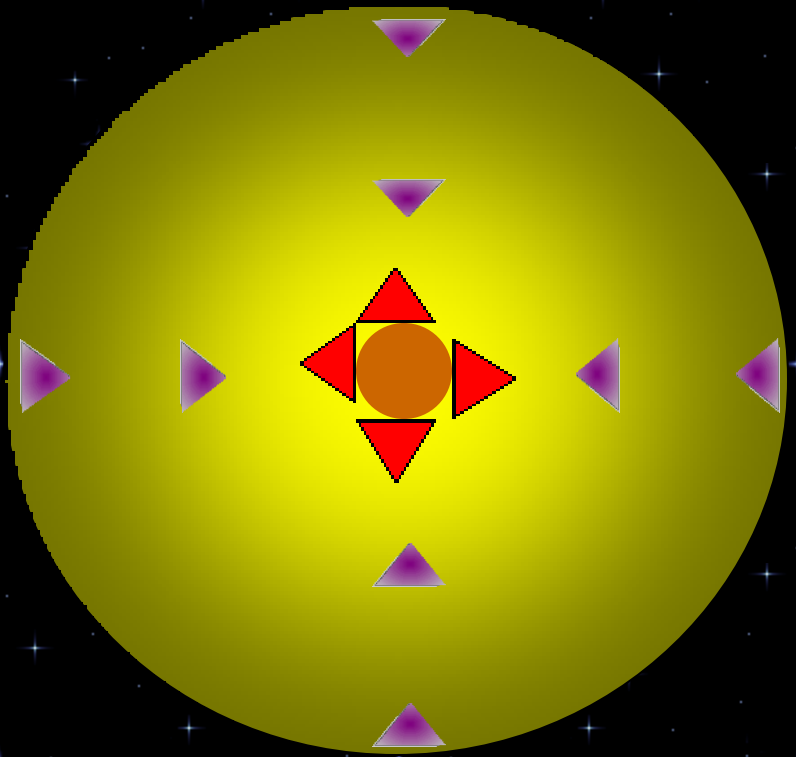


What determines Star Size?

A star will begin it's main sequence when hydrogen fusion begins

Gravity wants to crush the star
So why doesn't it?

Because the outward pressure
Or force of energy from
Fusion balances out the
inward force of gravity
This keeps the star in a
state of balance or equilibrium!



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Bell Work

- How does a star maintain its shape?
- Describe how fusion works.

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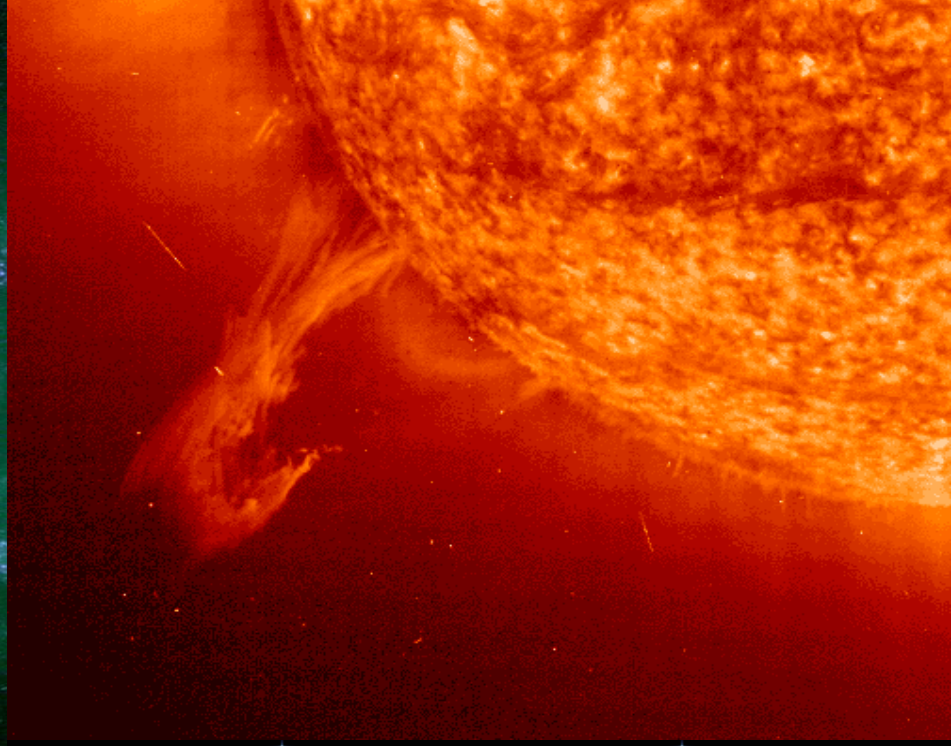
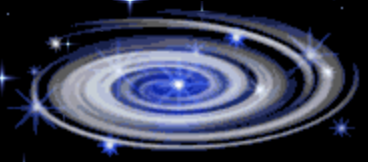
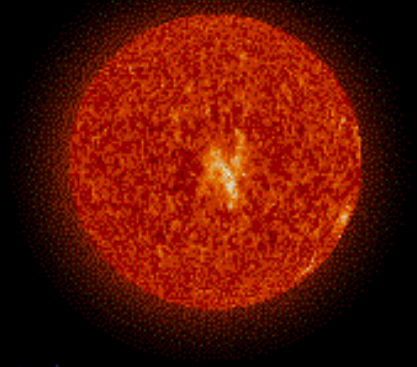
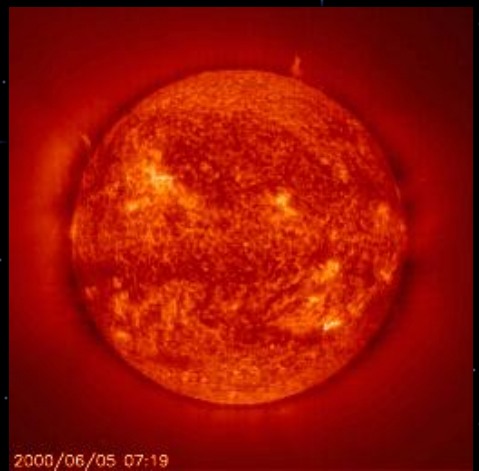




Stars and their Life Cycle





Temperature & Pressure Affect Star Life

Hydrogen

Empty Full

Large massive blue stars have **Short lives** Because they have higher pressures & temperatures in the Core, therefore they run through their Hydrogen fuel source faster

Hydrogen

Empty Full

Star like our sun have average lives

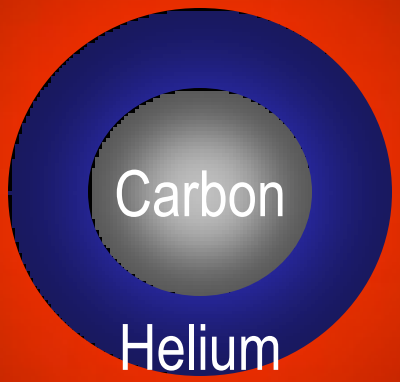
Hydrogen

Empty Full

Small Red dwarf stars have long live because of cooler temperatures in the core

Massive Blue Star Lifecycle

In a massive blue stars core, hydrogen fuses together to form Helium for most of its short Main sequence life

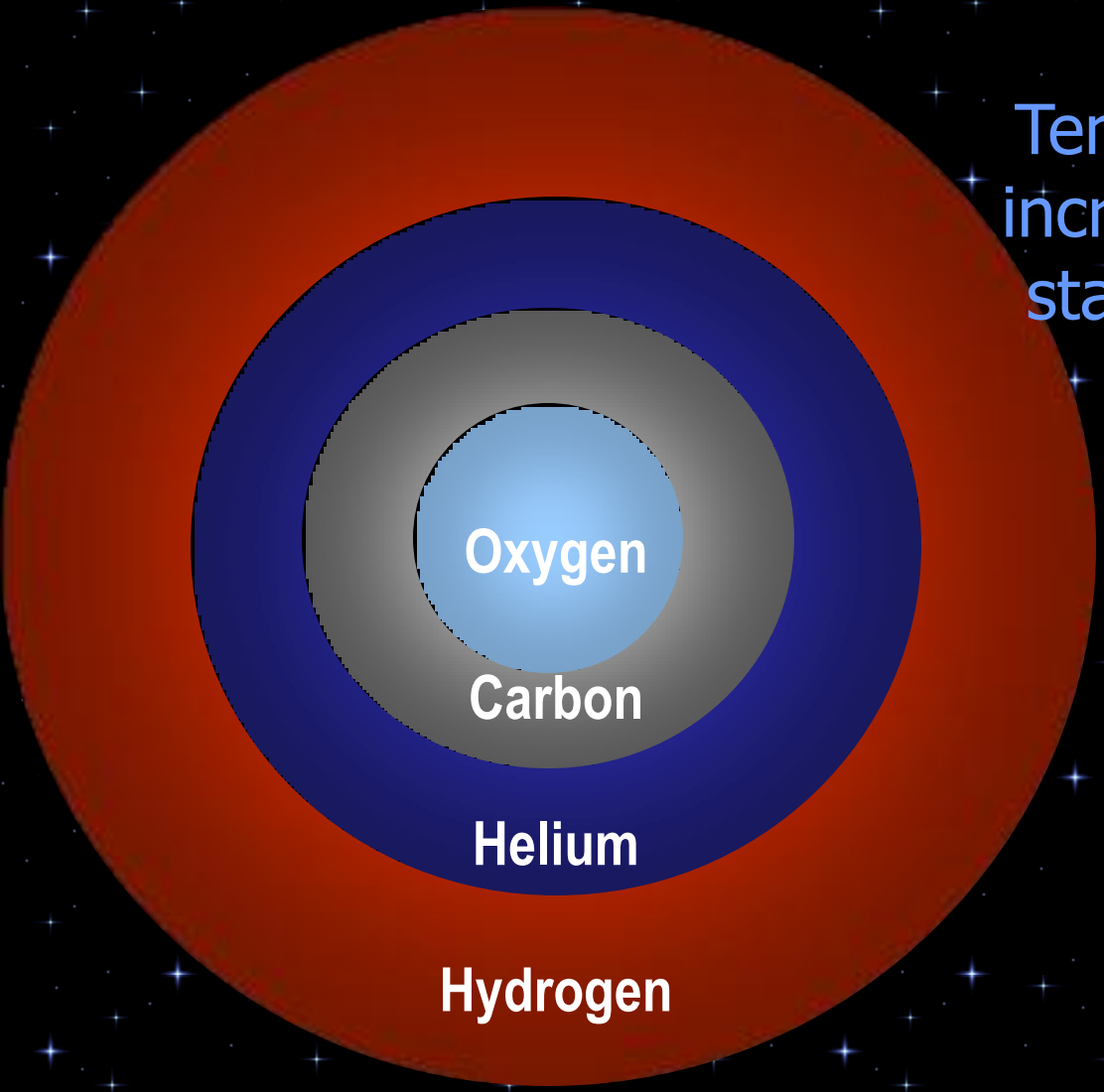


Eventually hydrogen starts to run out and helium starts to accumulate

As a result gravity wants to crush the star, pressures & temperatures increase, & the star begins fusing helium into carbon

Over time the outward pressure or force of energy from fusion becomes stronger than the inward force of gravity & the star begins to swell & cool changing its color in the process

Massive Blue Star Lifecycle

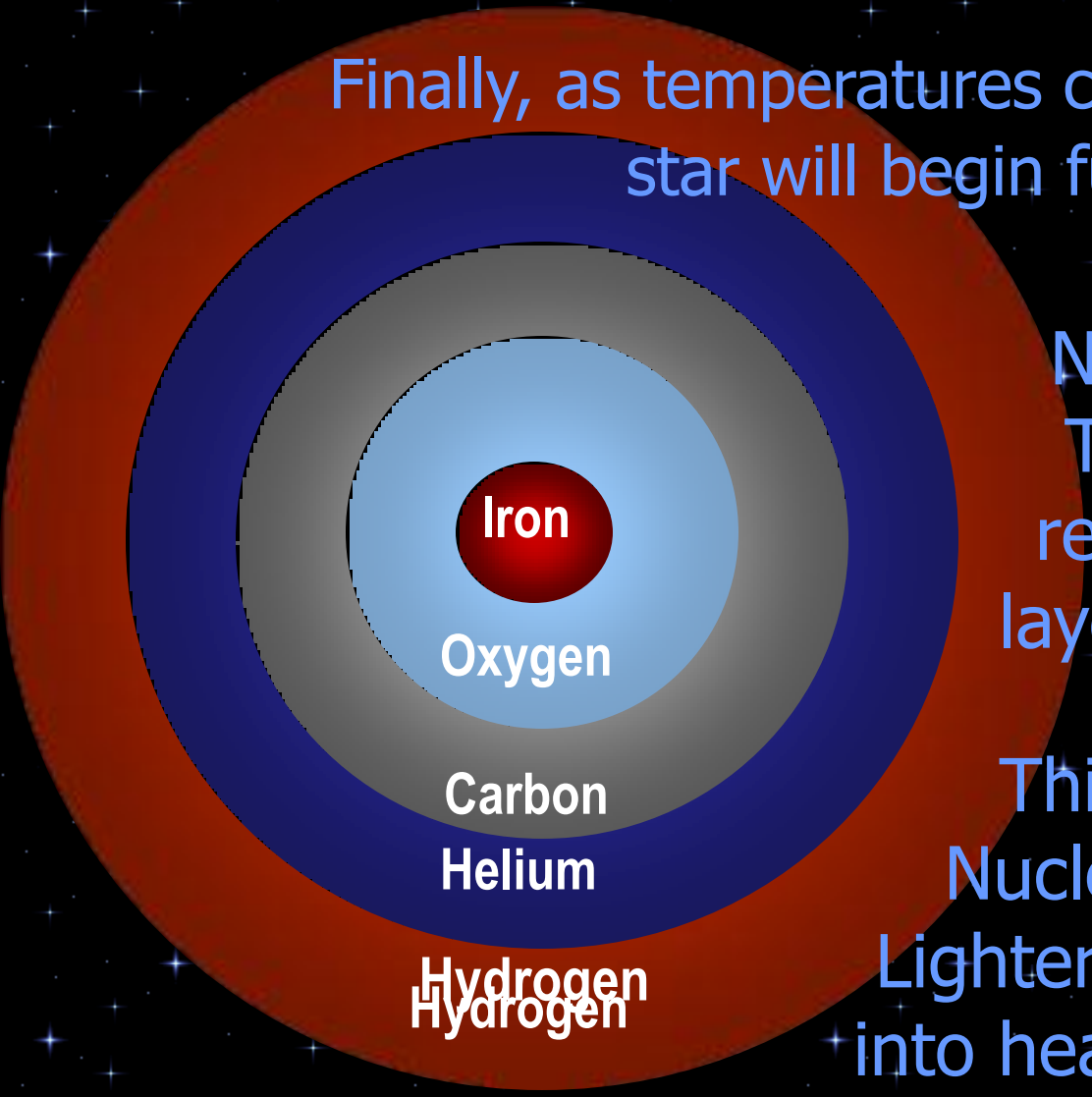


Temperatures continue to increase in the core, & the star begins fusing Carbon into Oxygen

At this point the star is now a supergiant

But fusion doesn't stop Just yet!!!!!

Massive Blue Star Lifecycle

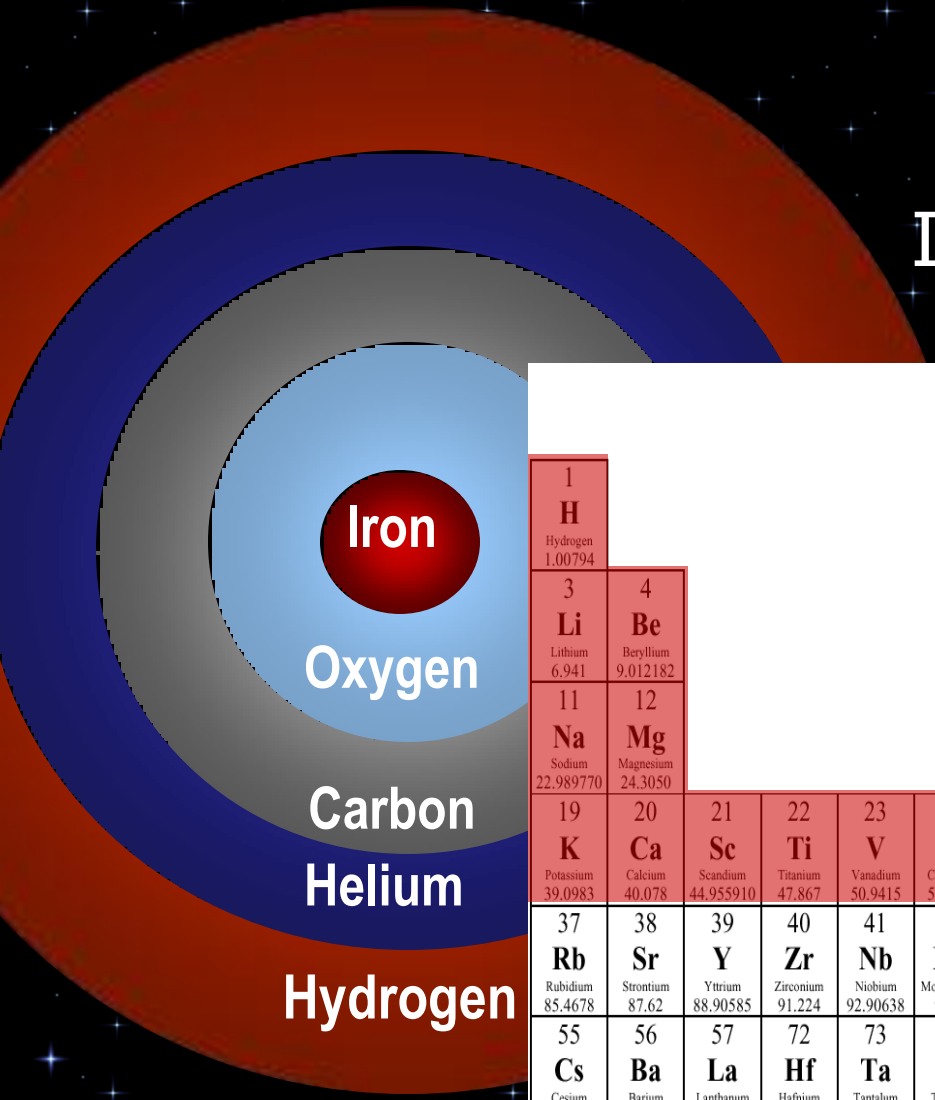


Finally, as temperatures continue to increase the star will begin fusing oxygen into Iron

Near the end of it's life The blue massive star resembles an onion with layers of different elements

This process is called Nucleosynthesis—Where Lighter elements are created into heavier elements through Fusion in a star

Massive Blue Star Lifecycle

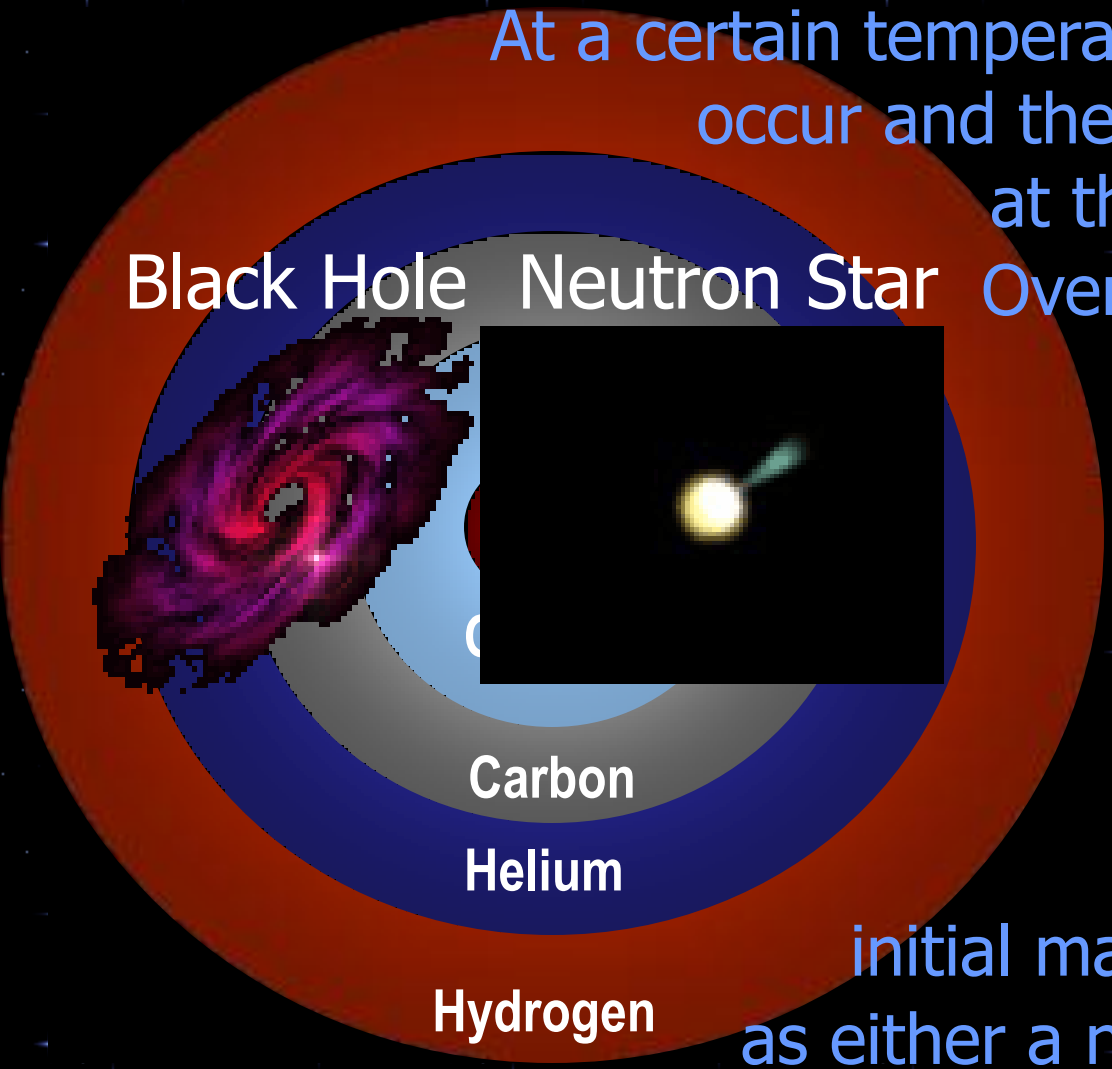


In massive blue stars
Elements up to the size of
Iron-element 26 are created
Through fusion

The Periodic Table of the Elements

1 H Hydrogen 1.00794																	2 He Helium 4.003
3 Li Lithium 6.941	4 Be Beryllium 9.012182											5 B Boron 10.811	6 C Carbon 12.0107	7 N Nitrogen 14.00674	8 O Oxygen 15.9994	9 F Fluorine 18.9984032	10 Ne Neon 20.1797
11 Na Sodium 22.989770	12 Mg Magnesium 24.3050											13 Al Aluminum 26.981538	14 Si Silicon 28.0855	15 P Phosphorus 30.973761	16 S Sulfur 32.066	17 Cl Chlorine 35.4527	18 Ar Argon 39.948
19 K Potassium 39.0983	20 Ca Calcium 40.078	21 Sc Scandium 44.955910	22 Ti Titanium 47.867	23 V Vanadium 50.9415	24 Cr Chromium 51.9961	25 Mn Manganese 54.938049	26 Fe Iron 55.845	27 Co Cobalt 58.933200	28 Ni Nickel 58.6934	29 Cu Copper 63.546	30 Zn Zinc 65.39	31 Ga Gallium 69.723	32 Ge Germanium 72.61	33 As Arsenic 74.92160	34 Se Selenium 78.96	35 Br Bromine 79.904	36 Kr Krypton 83.80
37 Rb Rubidium 85.4678	38 Sr Strontium 87.62	39 Y Yttrium 88.90585	40 Zr Zirconium 91.224	41 Nb Niobium 92.90638	42 Mo Molybdenum 95.94	43 Tc Technetium (98)	44 Ru Ruthenium 101.07	45 Rh Rhodium 102.90550	46 Pd Palladium 106.42	47 Ag Silver 107.8682	48 Cd Cadmium 112.411	49 In Indium 114.818	50 Sn Tin 118.710	51 Sb Antimony 121.760	52 Te Tellurium 127.60	53 I Iodine 126.90447	54 Xe Xenon 131.29
55 Cs Cesium 132.90545	56 Ba Barium 137.327	57 La Lanthanum 138.9055	72 Hf Hafnium 178.49	73 Ta Tantalum 180.9479	74 W Tungsten 183.84	75 Re Rhenium 186.207	76 Os Osmium 190.23	77 Ir Iridium 192.217	78 Pt Platinum 195.078	79 Au Gold 196.96655	80 Hg Mercury 200.59	81 Tl Thallium 204.3833	82 Pb Lead 207.2	83 Bi Bismuth 208.98038	84 Po Polonium (209)	85 At Astatine (210)	86 Rn Radon (222)

Massive Blue Star Lifecycle



At a certain temperature, Fusion can no longer occur and the outward energy stops, at this point gravity takes Over and crushes the star

The star explodes into a super nova!!!

Depending upon the stars initial mass or size, It will end up as either a neutron star or Black hole

Massive Blue Star Lifecycle

When the star explodes, it blasts all The elements into space, seeding the universe with Elements to make new stars, planets, people and buildings

Supernovas are so hot & bright, They produc all other elements heavier than iron

O

C

H

Hy

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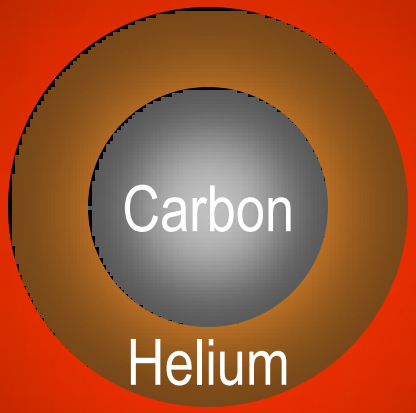
Yellow Star (Sun) Star Lifecycle



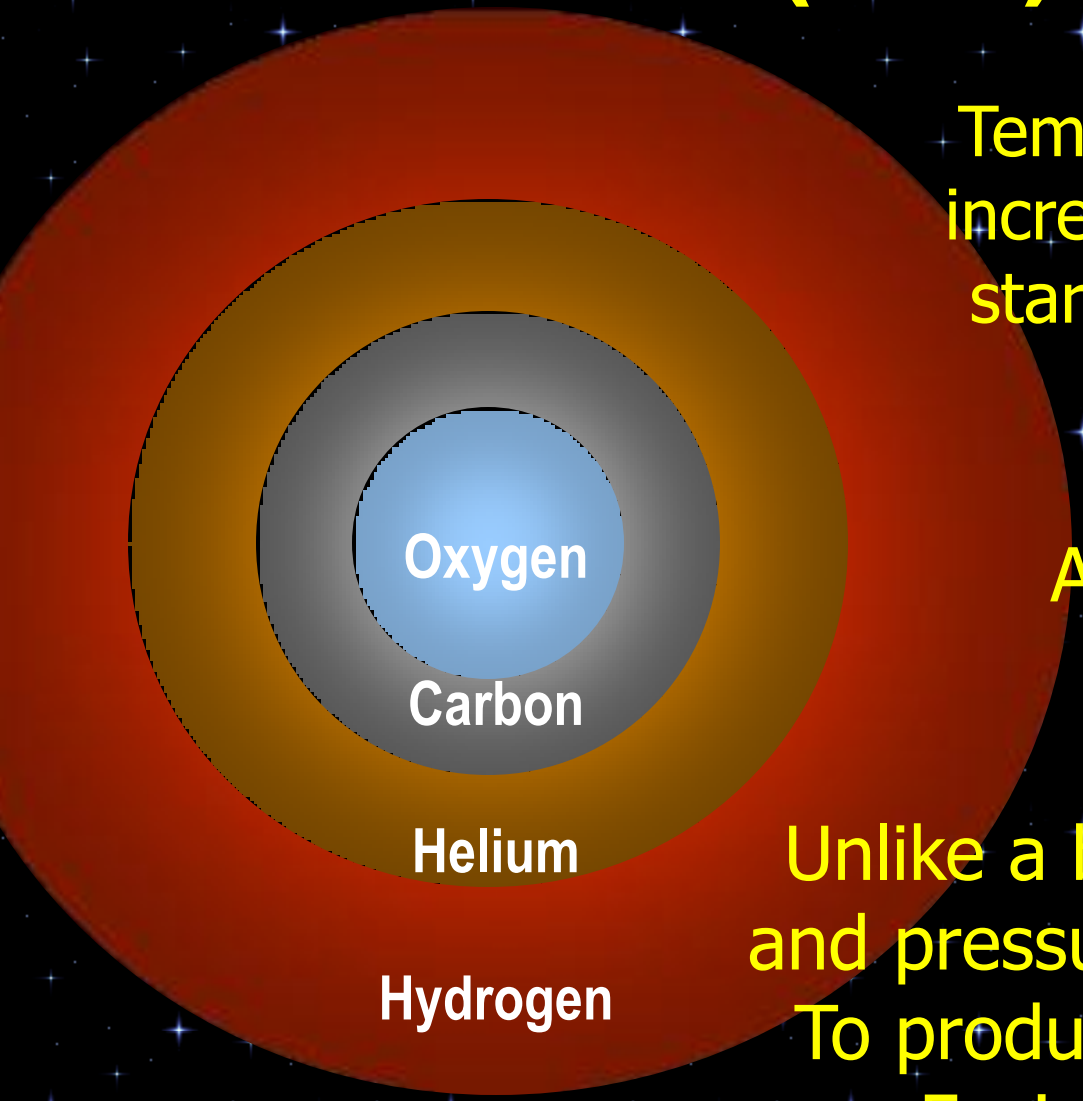
Our sun's core will fuse hydrogen into Helium for most of its 10 billion year old Main sequence life

Throughout this time Helium Will accumulate in its core

As a result of gravity crushing the star, pressures & temperatures increase & the star begins fusing helium into carbon

Over time the outward pressure or force of energy from fusion becomes stronger than the inward force of gravity & the star begins to swell & cool changing its color in the process

Yellow Star (Sun) Star Lifecycle



Temperatures continue to increase in the core, & the star begins fusing Carbon into Oxygen

At this point the star is now a Red Giant

Unlike a blue star, temperatures and pressure are not high enough To produce Iron through fusion Fusion stops at OXYGEN

Yellow Star (Sun) Star Lifecycle

Instabilities in the balance Between Gravity & outward force or Pressure of fusion result in abrupt explosions that blow away the outer layers of the star

The result is a planetary nebula with a hot white dwarf star in the middle

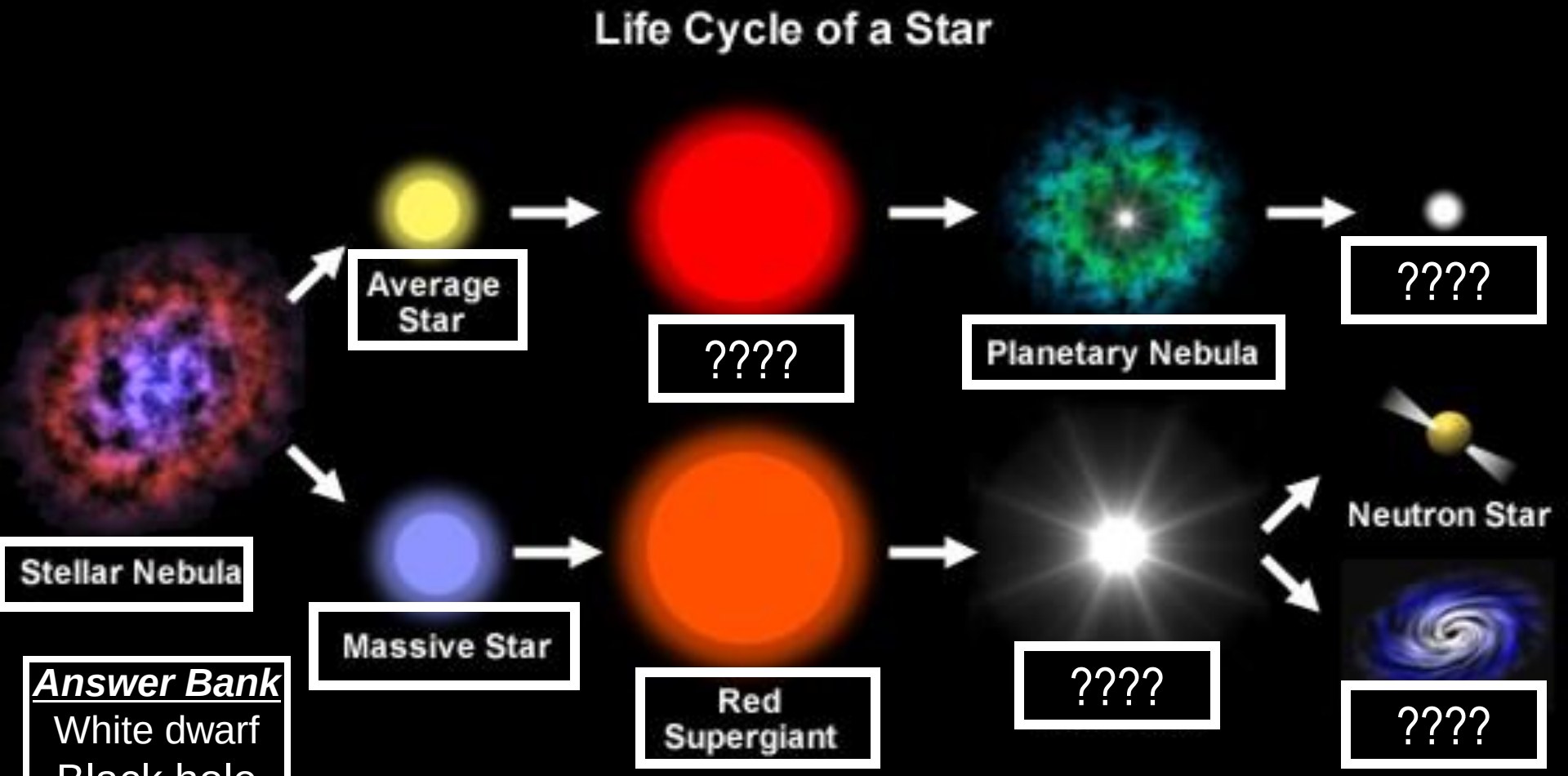
Yellow Star (Sun) Star Lifecycle

Eventually the
Gases are expelled
Leaving behind
A white dwarf star

A white dwarf star is what remains of an average star like our sun after Running out of fuel

It's about the size of earth

Summarize:



Answer Bank

White dwarf
Black hole
red giant
Supernova
10

- Our sun has _____ billion year life span