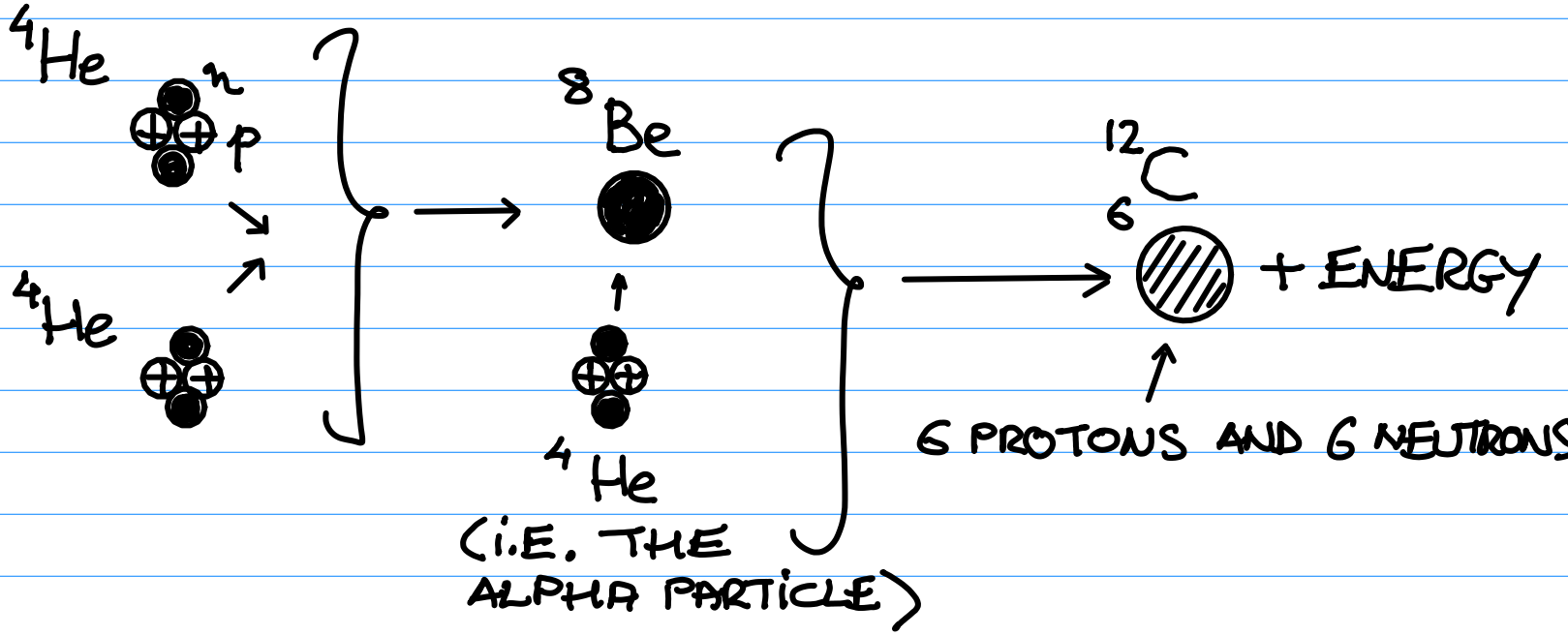
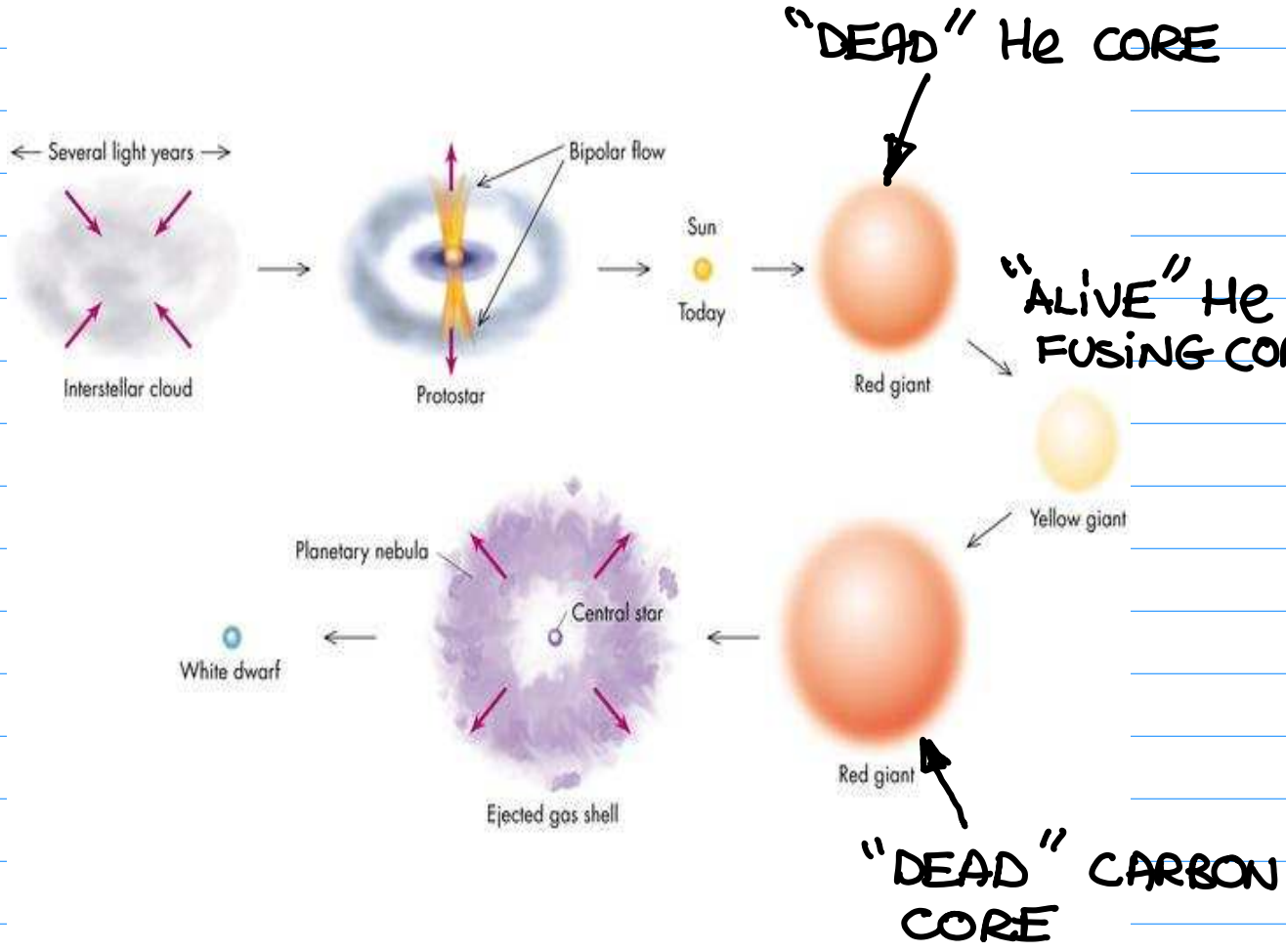
THE TRIPLE ALPHA PROCESS:



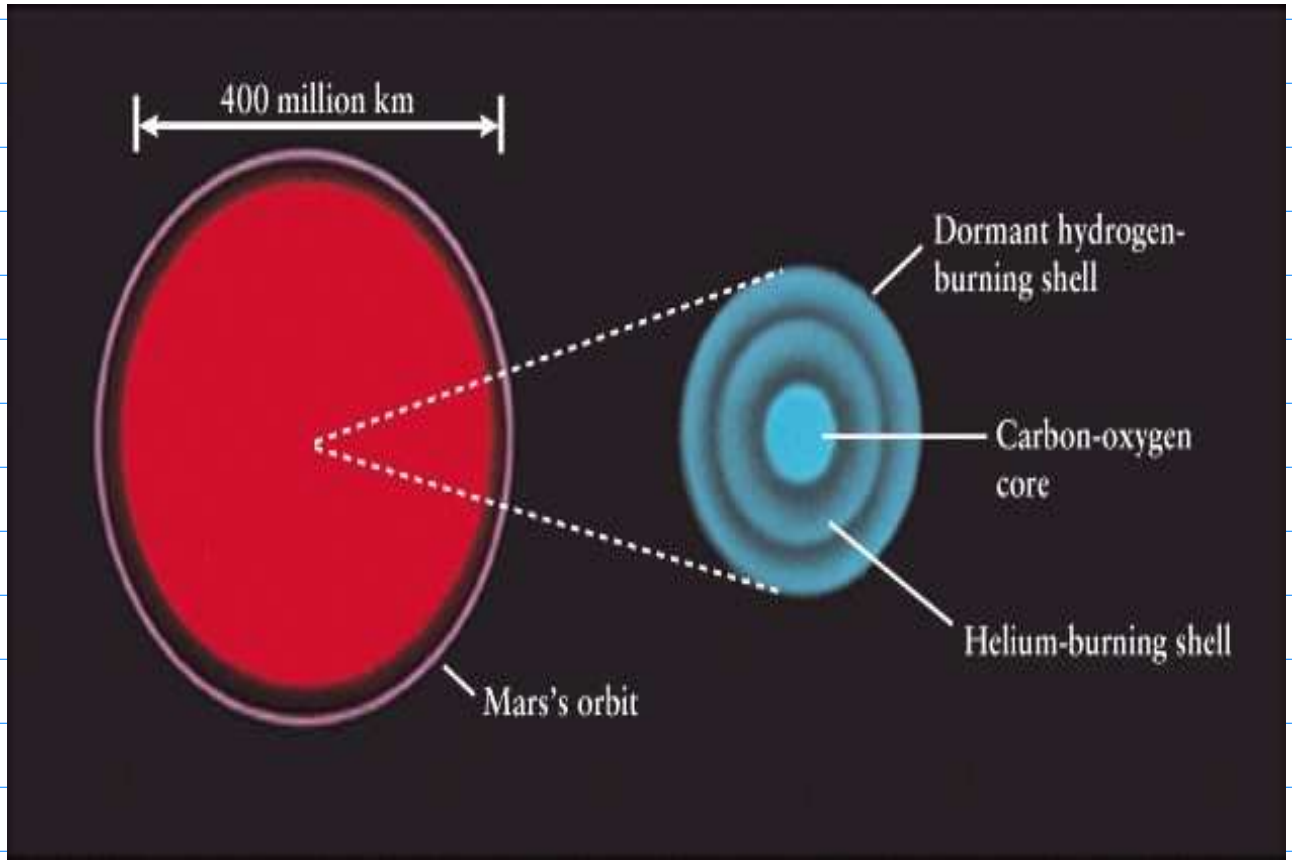
THE ONSET OF He-FUSION INTO ^{12}C IS CALLED THE HELIUM-FLASH. THE STAR ENTERS THE YELLOW GIANT STAGE. THIS STAGE LASTS FOR ABOUT 100 MILLION YEARS ONLY. THE ENERGY RELEASED PER SINGLE He-FUSION REACTION IS SMALLER THAN THE ENERGY RELEASED PER SINGLE H-FUSION REACTION. THUS, THE OVERALL FUSION RATE OF He MUST BE HIGHER THAN THE H-FUSION RATE DURING THE MAIN SEQUANCE STAGE IN ORDER TO SUPPORT THE STAR. AS A RESULT THE He IS FUSED MUCH MORE QUICKLY - IN ABOUT 100 MILLION YEARS.

ANALOGY: TO ACHIEVE THE ENERGY OUTPUT OF A SINGLE 100-WATT LIGH BULB WITH ONLY 10-WATT LIGHT BULBS AT ONE'S DISPOSAL, ONE WOULD NEED 10 10-WATT LIGHT BULBS.

THE AMOUNT OF ENERGY RELEASED AFTER THE He-FLASH IS SO LARGE THAT IT HEATS UP THE CORE AND IT EXPANDS. AS A RESULT OF EXPANSION THE EDGE OF THE CORE COOLS DOWN. THIS CAUSES THE TEMPERATURE OF THE H-FUSING SHELL TO DROP, AND THE FUSION IN IT STOPS. THE REMOVAL OF THIS IMPORTANT SOURCE OF ENERGY CAUSES THE PRESSURE TO DROP. AS A RESULT THE STAR STARTS TO SHRINK. THE SURFACE GETS CLOSER TO THE ENERGY PRODUCING CORE AND IT HEATS UP. AS THE TEMPERATURE OF THE SURFACE INCREASES ITS COLOUR CHANGES FROM ORANGE/RED TO YELLOW.



EVENTUALLY, ALL OF ^{4}He IN THE CORE IS FUSED INTO ^{12}C AND A STAR LIKE OUR SUN DOES NOT HAVE ENOUGH MASS TO SQUEEZE THE CARBON CORE AND HEAT IT UP TO THE TEMPERATURES NEEDED TO FUSE CARBON INTO HEAVIER NUCLEI. THE STAR ENTERS THE FINAL RED GIANT STAGE.



THE THERMAL PRESSURE CREATED BY THE ENERGY RELEASED IN THE He-FUSING SHELL PUSHES OUT THE TOP LAYERS AND THEY COOL DOWN AS THEIR DISTANCE FROM THE ENERGY PRODUCING REGION INCREASES. THE COLOUR OF THE STAR CHANGES FROM YELLOW TO RED.