2014

Taurus

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TAURUS

INTRODUCTION

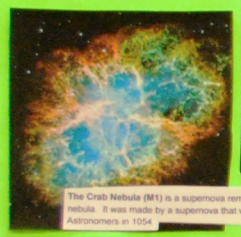
The **reason** behind this project was to learn about a specific constellation. But it is much more than that. This project furthers our learning about stars in the galaxy. The knowledge of stars and how they work was possible due to all three parts of the project which include calculating a year's time by looking at stars and their movement, plotting a graph with the azimuth and altitude, and ultimately finding the fate of our constellations stars.

A **constellation** is a specific area with borders that is located in the celestial sphere that has stars that stretch deep into space. There are 88 constellations that cover the whole sky. Thirteen of these constellations make up the zodiac.

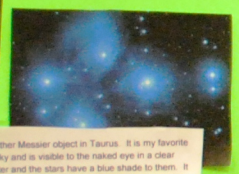
I chose **Taurus** due to the fact that my birthday fell within it and it was the only constellation that I had any relation to.

MESSIER OBJECTS IN TAURUS

Messier Objects are just objects in the sky that resemble comets from far away but with closer observation are not. Charles Messier got tired of dealing with them so he created a list of all of them.



The Crab Nebula (M1) is a supernova remnant and pulsar with wind nebula. It was made by a supernova that was recorded by Chinese Astronomers in 1054



The Pleiades (M45) is the other Messier object in Taurus. It is my favorite thing to look at in the night sky and is visible to the naked eye in a clear night sky. It is an open cluster and the stars have a blue shade to them. It is one of the closest star clusters in the sky.

CALCULATING THE LENGTH OF THE YEAR

The first part of the Project was to calculate the time of the year by using a specific star and its rise time. I chose the star **Aldebaran**. In Stellarium I found the rise time for each date listed below and wrote down my findings. I then calculated the difference between each rise time from week to week. Ultimately I changed the difference to Decimal Minutes and then calculated the Change in time per day. Finally I did the calculation for the time of the year which was done with 1,440 minutes divided by my change in time per day which was 3.93.

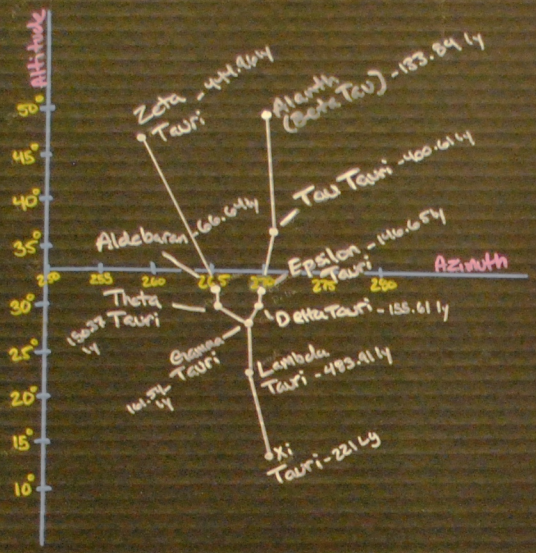
Date	Rise Time for Aldebaran		
	Hour	Minute	Second
May 23	6	24	34
May 30	5	57	02
June 6	5	29	31
June 13	5	01	59
June 20	4	34	28

Dates	Change in Rise Time Minutes	Seconds	Change in Time Decimal Minutes	Change in Time Per Day in minutes/day
5/23–5/30	27	32	27.53	3.93
5/30–6/6	27	31	27.52	3.93
6/6–6/13	27	32	27.53	3.93
6/13–6/20	32	31	27.52	3.93

At the end I determined that the Length of the year was 366.41 days. 1,440/393=366.41

Of course there was some error to this calculation which I found out was 0.70%.

The reason for the error is most likely due to only having rise times from five days. As with everything, sample size can make or break the calculation.



MYTHOLOGY

According to Greek Mythology, Zeus was madly in love with Europa, the daughter of Agenor, King of Phoenicia. So instead of just talking to her or confessing his love he decided to turn himself into a white bull. As the bull Zeus got closer to Europa and ended up tricking her to climb on his back. He then swam out to sea and ultimately came ashore in Crete. Once he knew that he had gotten away with kidnapping Europa he transformed back into his true form. To commemorate his feat he put the picture of Taurus in the sky.

SPATIAL RELATIONSHIP OF STARS

In the night sky it is easy to be confused about how close the stars are to each other. From our point of view stars seem close together, especially those in the form of a constellation. It is like playing a game of connect the dots to form a constellations border. The reason they appear like this is because of their apparent magnitude which is how bright we view a star. For example, Gamma Tauri and Lambda Tauri look like they are the same distance from Earth to us but they are over 300 light years apart and they are close to each other from our point of view. But if you were to look at them from a side angle they would be extremely far apart.

Star Name	Azimuth	Altitude	Distance
Aldebaran	265 degrees 44' 34"	31 degrees 08' 28"	66.64 LY
Alcyone(Beta Tau)	270 degrees 25'35"	47 degrees 30' 60"	133.89 LY
Delta Tauri	268 degrees 51' 43"	29 degrees 18' 17"	155.61 LY
Epsilon Tauri	269 degrees 27' 48"	31 degrees 21' 53"	146.65 LY
Gamma Tauri	267 degrees 18' 38"	27 degrees 33' 23"	161.54 LY
Lambda Tauri	268 degrees 04' 14"	21 degrees 59' 09"	483.91 LY
Tau Tauri	270 degrees 59' 32"	36 degrees 07' 44"	460.68 LY
Theta2 Tauri	286 degrees 23' 03"	29 degrees 23' 38"	150.37 LY
Xi Tauri	271 degrees 14' 10"	13 degrees 52' 45"	222.18 LY
Zeta Tauri	259 degrees 18' 23"	45 degrees 36' 46"	444.38 LY

SOURCES

Sources:

http://en.wikipedia.org/wiki/Pleiades#mediaviewer/File:Pleiades_large.jpg

http://www.tcoe.org/scicon/instructionalguide/constellations.pdf

http://en.wikipedia.org/wiki/Crab_Nebula#mediaviewer/File:Crab_Nebula.jpg

http://2.bp.blogspot.com/-9Dhm19IAV5E/UfKU31maGI/AAAAAAAAAcY/MErtbuYIL2I/s1600/taurus-3947-1920x1080.jpg

http://www.freemars.org/jeff/2exp100/HSTdeepN.jpg

http://en.wikipedia.org/wiki/Taurus_(constellation)#mediaviewer/File:TaurusCC.jpg

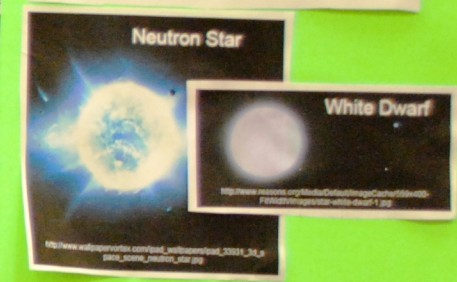
ARTWORK

THE FATE OF THE STARS

Zeta Tauri is the largest star of the bunch with a mass of 14.5 solar masses. It spent 47,600,000 years on the main sequence and after all that time it stopped fusing hydrogen. It then enters the Giant stage where it will stay for 4,760,000. Then it will become a Supergiant for the remainder of its life, which will be 476,000 years. It will ultimately create a Supernova due to it being more than 8 solar masses and will end up as a Neutron Star. It is going to be the first to die out of all the stars.

Epsilon Tauri is one of the smallest stars in the border of this constellation. It has a mass of 2.3 solar masses. It spent 1,890,000,000 years on the main sequence and is now in the Giant stage where it will be for 189,000,000. After the Giant stage that includes the Red Giant branch, the Horizontal branch and the asymptotic branch it will end up as a Planetary Nebula which will ultimately become a White Dwarf which will be 1.4 solar masses.

Xi Tauri has a solar mass of 3.4 and is going to be the last star to die in Taurus. It has not completed any stages in its lifetime and is a very young star. It will spend 865,000,000 years on the main sequence. After this it will be Giant for 86,500,000 years. It will suffer the same fate as Epsilon Tauri and become a Planetary Nebula and serve its final course as a White Dwarf.



DATA

Star Name	HIP #	Spectral Type	Mass	Main Sequence Lifetime	Remaining Lifetime	Death Order	Fate of Stellar Core
Aldebaran	21421 K 5 III		2.5	1,260,000,000	126,000,000		4 White Dwarf
Alnath	25428 B 7 III		10.1	98,000,000	10,780,000		2 Neutron Star
Delta1	20455 G 8 III		2.2	2,070,000,000	207,000,000		8 White Dwarf
Epsilon Tauri	20889 K 0 III		2.3	1,890,000,000	189,000,000		5 White Dwarf
Gamma Tauri	20205 G 8 III		2.2	2,070,000,000	207,000,000		9 White Dwarf
Lambda Tau	18724 B 3 V		7.6	175,000,000	180,300,000		6 White Dwarf
Tau Tauri	21881S B 3 V		7.6	175,000,000	180,300,000		7 White Dwarf
Theta 2 Tau	25894 A 7 III		5.4	343,000,000	34,300,000		3 White Dwarf
Xi Tauri	160838 B 9 V		3.4	865,000,000	951,500,000		10 White Dwarf
Zeta Tauri	26451 B 4 III		14.5	47,600,000	4,760,000		1 Neutron Star

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