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## Introduction To *Stellarium*

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The purpose of this activity is to introduce you to the *Stellarium* astronomy software package. Stellarium is an open-source (free!) planetarium software that runs on Windows, Mac's and Linux computers. If you become an advanced user you can use it to control certain telescopes. You will learn how to start it, select controls and panels from the menus, use many of *Stellarium*'s different buttons, and find your way around the night sky.



### 1) **Getting Started**

The Stellarium software is installed on the lab laptops. Start the program by double clicking on the Stellarium icon. If you wish to use your own computer, download Stellarium ***before the lab*** from <http://www.stellarium.org/> and follow the installation instructions. A manual for Stellarium is also available from the above website, or directly from [http://www.stellarium.org/wiki/index.php/Category:User%27s\\_Guide](http://www.stellarium.org/wiki/index.php/Category:User%27s_Guide).

Once you have the program up and running, you will find two menu bars that can be accessed in the lower part of your screen and the far left side of your screen by moving the cursor to those locations. The default location for the lab laptops is Clarksville, TN. If you are using your own laptop you will need to set the location. Click on the top icon of the left side menu to set your location. You can just find Clarksville in the list of locations, or type in the coordinates yourself. The home location for Clarksville, TN, is latitude 36° 33' 36.00" North, longitude 87° 21' 00" West, time zone -6.0 hours.

### 2) **Controlling Stellarium**

*Stellarium* is operated using a combination of menus, toolbars and control panels. The menus are accessed at the bottom and the left side of your screen as shown in the image on the next page. Before continuing, you should spend a little time just playing around with the program and get used to the menus, mouse controls, and keyboard commands. If things get too messed-up, just quit and restart.



### 3) Observations

In the lower toolbar, fourth button from the far right, click on the play button to halt time. Using the date and time controls on the left toolbar (looks like a clock), set the date and time to 9 pm on January 20 of this year.

Let's turn on the constellation outlines and labels. In the lower menu, first two buttons on the far left, right-click the "Constellation lines" and Constellation labels".

#### A. Constellations

##### i) Big Dipper

Locate the familiar pattern of the Big Dipper in the constellation of Ursa Major (look to the north). Such a portion of a constellation is known as an asterism. Choose the star at the end of the handle and get more information about that star by right clicking on it. Write down the following information.

Name \_\_\_\_\_

Magnitude \_\_\_\_\_

Distance \_\_\_\_\_

The Bayer system of star names consists of a Greek letter to indicate its brightness ( $\alpha$  is brightest,  $\beta$  is second brightest and so on) followed by the name of the star's constellation.. What is your star's Bayer designation?

What does the word **magnitude** in the context of astronomy mean? (Use your textbook or search the web if you don't know.)

ii) **Northern Sky**

Zoom out to a  $100^\circ$  field of view (FOV at the bottom of the screen).

Following the procedure above, turn off the constellation outlines and labels. Change your viewing angle so that you are looking due north (if you have just been looking at the Big Dipper, you should be facing in the right general direction. Increase the time rate. Click on the fast forward button and watch the **northern** sky for a couple of hours. What do you observe?

iii) What is the name of the star that does not appear to move much? What is its Bayer designation?

iv) **What's in the Southern Sky?**

Change your viewing angle so that you are looking due south. Change your date and time to January 20 of the current year at 11 p.m. Scan the sky between the horizon and the zenith. Can you identify any constellations on your own? If so, what?

Turn the constellation labels and outlines back on. Name three constellations that are in the southern sky.

**B. Nebulae**

Nebulae are clouds of gas and dust found in our Milky Way. There are several of them in the southern skies during January. Reset the date & time to 9:00pm January 20 and change your viewing angle to looking south. In the lower menu click the Deep-sky objects (looks like a swirl pattern). Look up from the horizon and find the Great Nebula in Orion by clicking on the sky between NGC 1980 and 1981. You may need to zoom in a bit to get the Orion Nebula and not one of the two NGC objects (it is just below and left of NGC 1980). Center on the nebula by clicking the "Center on selected object" box in the lower menu (looks like a box with four arrows pointed inward). Now zoom in on it. What constellation is the Orion Nebula in?

What is its magnitude?

What is the distance to it?

Describe what the Orion Nebula looks like.

Now let's find the Crab Nebula. In the left menu click on the "Search window" (looks like a magnifying glass with a star in it). Type in Crab Nebula then hit return. Your view should automatically shift to be centered on the Crab Nebula. Zoom in on it.

What constellation is the Crab Nebula in?

What is its magnitude?

What is the distance to it?

Describe what the Crab Nebula looks like.

### C. **Star Clusters**

Star clusters are groups of stars in close proximity to each other. There are two types of clusters in the Milky Way: open clusters and globular clusters. Let's start with an open cluster. Find M45.

What constellation is M45 in?

What is its magnitude?

What is the distance to it?

What is its name?

Describe what M45 looks like.

Now let's look at a globular cluster. Find M79.  
What constellation is M79 in?

What is its magnitude?

What is the distance to it?

Describe what M79 looks like.

#### **D. The Sun and Sky**

- i) Turn off the constellation lines and labels and the Deep sky objects. Set the time to sometime during the day of the current day. Of course you should just see the sun, and maybe the moon, but no stars. That is why we call it daytime. For fun, turn off the Earth's atmosphere (lower menu box that looks like a cloud with the Sun peeking out). Describe what you see.

What constellation is the Sun in? You'll have to turn the constellation lines and labels back on to see.

Does the constellation the Sun is in agree with today's zodiacal sign? What is today's zodiacal sign?

Are there any planets visible within two constellations of the Sun? If so, which planets?

**E. Eclipse 2017**

Turn the atmosphere back on. Set the date/time to 11:30am August 21, 2017. Center on the Sun and zoom in until you get a clear view of the disc of the Sun. Click "fast forward" a few times to speed time up. If you aren't centered on the Sun it will move so be sure you are centered.

What time does totality (when the Sun is completely covered by the Moon) start? You may need to slow time down and go backwards to get the exact time.

What time does totality end?

What is the name of the star you can see just to the left of the Sun?

What is the name of the planet that is to the right of the Sun? You may need to zoom out a little to see it.