

Starry Night and Sky Visualization

Objectives—

- Install the *Starry Night* sky visualization software.
- Use *Starry Night* to find different astronomical objects.
- Use *Starry Night* to explore precession and how our view of the sky changes depending on longitude and latitude.

Introduction— *Starry Night* is designed to show you a view of the sky from any location on the Earth at any time in the last few thousand years. With it, you can identify the different objects in the sky, from planets to stars to galaxies to constellations. It even allows you to print star charts.

Installation—

1. Insert the *Starry Night Orion Edition* CD into your computer.
2. The CD icon should appear on the desktop. Double click on it. This should bring up a window with an icon for installing *Starry Night Orion Edition* on your computer. Click on this icon.
3. Install *Starry Night* using the default settings throughout the installation process.
4. Once the software is installed, go to the Start menu, and find the *Starry Night* directory. You should find an updater that will update your version of the software to the newest version. Run this updater and use the defaults provided during installation.
5. When the updater is complete, run *Starry Night*. You will be prompted for an authentication key, but you can easily register for free and get one of your own.

Procedure—

1. Start up *Starry Night*.
2. Use the menu to set your home location to be New York City.
3. Move the sky view around to different locations in the sky with your mouse.
4. In the left pane (the Skyguide pane), click on the *Starry Night Basics* link. There should now be several buttons at the bottom of this pane. Toggle them individually to see how they change your view of the sky.
5. Find the *Time Flow Rate* panel at the top of the program window. Change the time rate to be 3000x the normal speed. Watch the stars fly by. What direction do stars appear to move across the sky? Change the time rate back to 1x before you get dizzy.
6. Now find Polaris. The easiest way to do this is to click on the *Find* tab on the right side of the Skyguide pane. Type in Polaris and hit return. *Starry Night* will turn on a label and pan to Polaris, which will always be up if your location is New York. Why?
7. Turn off the Sun by selecting *Hide Sunlight* under the *View* menu at the top of the screen. Now change the time rate to 3000x. Notice that the rest of the stars seem to be circling Polaris. At what location would Polaris be directly overhead? To illustrate this, select *Set Home Location...* from the *Starry Night* menu. Type in the location you want to go to and select *Save as Home Location*. Find Polaris again, and turn up the speed.
8. To see if Polaris is directly overhead you can turn on a grid of altitude and azimuth. Click on the Skyguide tab and then the *Toggle Positioning Grid* which is the fifth button from the left in the bottom left corner of the screen. Where is Polaris?
9. Polaris has not always been the North Star. Due to the precession (wobble) of the Earth's axis, the Celestial North Pole has moved in the past several thousand years. To see this, change the date to 1000 AD, and the 1000 BC. Where is Polaris? Does the rest of the sky still seem to rotate around it?
10. You can use the ability to change the date by thousands of years to see when the Sun's position matches the Zodiac signs. Find the Sun and turn on the constellations by clicking the *Identify all Constellations* button which is second from the left on the bottom of the screen. Change the date to your birthday and note the constellation the Sun is in. Change the year to when you think the zodiac was defined. Where is the Sun now?

11. Now that you feel more comfortable getting around, let's find an object to look at. In the upper right corner of the screen, click *Now* to go back to the current time. A super-cool object is the Perseus Double Cluster. Find this using the find screen. Click the arrow to the right of the name in the find panel and select *Center*. Go back to the Skyguide screen and click on the leftmost button on the bottom of the screen (*Toggle Labels*). You should see the Perseus Double Cluster in the center of the screen. Click and hold the left mouse button on it. A menu will pop up. Select *Magnify*. You will be rewarded with a cool fly-in for a closer view of the double cluster.
12. Zoom back out using the box in the upper right corner of the screen or the mouse wheel. If you wanted to find this on the sky, *Starry Night* can help you by printing a custom star chart. Under the *File* menu, select *Print Star Chart*. Don't print, but you can see the chart by selecting *Preview*.
13. Reset the view by clicking *Home* in the center of the upper part of the screen. You may want to reset your home location to New York. Go to the "Find" screen and clear any text in the find box. You should see a list of planets. If you click on the box next to a planet's name, it will display a line corresponding to a planet's path in the sky. Turn all the planets on except Earth. Where are the orbits in the sky? What is this line called?
14. Now change your home location to a place in the Southern Hemisphere. Notice the changes in the sky. Look at the South Celestial Pole by moving to the South Pole and look at the zenith. Change the flow rate and watch the sky rotate around that point.
15. If you have time, find another couple pretty objects and magnify them. Good ones are the Andromeda Galaxy and the Orion Nebula. When you hold the left button down, you'll also see a *Pronounce* option. Give that a try...