PHYSICS 1091 Stars & Galaxies Lab

LAB: **Planning an Observing Run**

Name_____
Date Start_____End_____

Professional astronomers must prepare meticulously in advance of an *observing run*, or a trip to an observatory for the purpose of gathering data. They create *finding charts* for finding their targets, and they calculate the positions of the objects during their observing time to make sure that they will be accessible to the telescopes.

In this lab, you will make use of sky atlases, planetarium programs, star locators, and/or a celestial globe in order to find objects and check their observability. Try to choose objects to follow some theme or to answer some science question. Examples of objects that you can choose are tabulated below.

Object Type	**Symbol(s) Used in Atlas.**	**Symbol in Stellarium**
Double Stars		
Variable Stars		
Galaxies		
Planetary Nebulae		
Emission Nebulae		
Open Clusters		
Globular Clusters		
Supernova Remnants		

Your observations will obey the following constraints:
A) over 30° above the horizon some time between 7 pm and 12 am.
B) observable between the 4th and 10th weeks of the semester
C) bright enough to see in a 4-inch or larger telescope. This means an apparent magnitude, m, that is a smaller number than 12 (m<12 mag).

1. Assemble some star atlases, celestial spheres, star "locators", apps, and at least one planetarium program. List which ones you are using: _____
_____
_____
_____
2. Fill out the table above for one of the atlases. Atlas: _____
3. For constraint A (and filling out the next table) you need to know the definitions of *altitude* and *azimuth*. Write definitions here: _____
_____
_____
4. For constraint B, you need to know how to find positions on certain dates and times. Use your planetarium program or celestial globe to estimate the position of Altair (in *Aquila*) at 9 pm (21:00) on June 30? Altitude_____Azimuth:_____

5. Another way to figure out where stars are on a certain date is to use a “Graphical Timetable of the Heavens” (Peterson field guide p. 9), or Sky and Telescopes' “Sky Gazers” almanac. Use one to figure out what time Deneb (in Cygnus) transits on July 30. _____ What is it's altitude?_____
6. You must choose a *Target Date* which is during this quarter. Your *Target Time* on that *Target Date* must be during our class time.

Choose a target date (don't worry about if it is a few weeks off):_____.

7. You must tabulate the relevant information about these objects in Table 2. You can use our atlases, the *Messier* catalogue (get from instructor), the *Caldwell* list, or other online resources. To find objects, look at the list of *Messier Objects* (or *Caldwell Objects*) and choose objects that are sufficiently bright. Or, start paging through an atlas or a field guide and start looking for objects that look interesting. Multiple stars and variable stars should be chosen using a table in a field guide (like the *Peterson Field Guide for Stars and Planets*). If you are uncertain how to determine the magnitude of certain objects, ask your instructor.
Try to choose enough objects to evenly fill the time period of 7pm - 12 am. At least 4 objects. (At most 8.)

Table 2. Your observing list. Col.s 1-3,8 come from the catalogs, other columns come from a planetarium program.

Obj Name _____	**RA2000.0 (hr, m)**	**DEC2000.0 (deg,')**	**Transit Time**	**Target Time**	**Alt. (deg)**	**Az. (deg)**	**mag (V or B)**

8. Enter information below about what to expect in the appearance of each object. Look up or estimate the size of the objects (in arcminutes or arcseconds) so that you know how much of the eyepieces, (or detector's) field of view it will take up. (Typical fields of view are 0.1-2.0° .) Also comment on the colors and shapes of your objects, if applicable.

Table 3. Expected properties of targets

Obj Name	Type of Object	Size (")	Colors (B-V)	Other (shapes, separations, etc)

9. Save this part until you actually go observing!

Table 4. Observed properties of targets (Complete during or after actual observing run)

Obj Name	Size (")	Colors (B-V)	Other (describe what you see in eyepiece or CCD data)

10. Finder Chart

On a separate sheet you will create a 2x2 degree finder chart for at least one of your targets. Choose a faint or point-like target, the type that will be difficult to spot in the eyepiece. Instructor will show you how to make a transparant finder using the B&W printer at the observatory.