Eastern University
Physical Science 111 The Solar System
Fall 2004 - Observing Objectives

The following is a list of objects that I want everyone to observe in the course of their lab work. These are the minimum requirements and I recommend trying to observe more, but make sure that you find, observe, and describe these. Other objects can be found in the following references, available in the Library or in the Observatory:

Resources

1. **Norton's Sky Atlas**
2. **Sky 2000.0 Sky Atlas**
3. **Uranometria** Vols. I and II and companion **Deep Sky Field Guide**
4. **Millenium Sky Atlas** (over 1 million stars plotted - Tycho and Hipparcos data)
5. **The Messier Album** - also on reserve in the Library
6. **The Messier Objects - Deep Sky Companions Series**
7. **Messier Marathon Field Guide**
8. **Burnham's Celestial Handbook**, Vols. I, II, & III - also on reserve in the Library
9. Messier Catalog Card and Caldwell Catalog Card
10. **Atlas of the Moon**
11. ***Real Sky*** - the condensed, computerized Palomar Sky Survey showing the entire sky visible from California in actual photographs at high resolution. Available only in the ***Russell Control Room***.
12. ***TheSky***, the telescope controlling software, is on all of the computers in the Biology/Physics Computer Lab in McInnis 319. This is your main resource for finding celestial objects and printing finding charts for each of them. You will need to borrow a copy of the CD-ROM from the computer room assistant to use all of its features and then return it when you are finished.
13. ***CCDSoft*** is also on the computers in McInnis 319 and will allow you to image enhance your CCD photos. Don't forget your Zip disks when you're working on images, as the files can be quite large.
14. ***MAXIM D/L*** is on all the computers in McInnis 319 as well as the machines in the Control Room. This program is one of the best for image enhancing your pictures, especially aligning multiple exposures of the same field.

Visual Observations

1. **The Moon** - Observe the Moon, preferably within a few days before or after 1st quarter, when surface details show the best contrast. Full Moon is the pits; it shows very little detail, and is so bright it washes out most of the sky. The phase of the Moon can be found in ***TheSky*** program under **Tools | Moon Phase Calendar**. Features to look for are: Copernicus, Clavius, Tycho, Plato, and Apennine Mts. (You don't have to sketch the Moon!) You'll be impressed...
2. **Saturn** - This most beautiful of the planets will only be visible for the latter part of the semester (late November-into December) in Gemini. Sketch the planet and its rings, and look for its largest moon, Titan, which will look like a nearby star. Sketch the position of Titan with respect to the planet. The rings should be easily visible. See if you can spot Cassini's division in the ring system.
3. **Uranus (**in Aquarius**)** and **Neptune** (in Capricorn). Obtain their coordinates (RA and Dec) from ***The Sky*** or from the telescope's Keypad. Observe these early in the semester!

4. **M31** - Andromeda spiral galaxy
5. **M45** - Pleiades open cluster
6. **NGC 869 & 884** - double open cluster in Perseus
7. **M11** - beautiful, delicate open cluster
8. **M13** - large globular cluster
9. **M29** - open cluster
10. **M57** - Ring nebula (planetary nebula)
11. **M27** - Dumbbell nebula (planetary nebula) [***TheSky*** has problems with this one!!]
12. **NGC 891** - edge-on spiral galaxy
13. At least seven objects of your choice (not single stars, but you could look at some beautiful double stars which would count toward the seven objects) –

Astrophotography

1) **The Moon** - at least five different views
2) **One planet shot** – Mars, or
3) Saturn, taken using prime focus or eyepiece projection
4) **Deep sky photography** - 8 objects of your choice - see references for ideas - they must include one of each the following:
   - open cluster, globular cluster, planetary nebula, galaxy, emission nebula
5) **CCD picture in color** - any celestial object of your choice
6) [optional extra credit] - color slide constellation shots
7) [optional extra credit] - Moon mosaic
8) [optional extra credit] - video tour of Moon and/or Sun
9) [optional extra credit] - asteroid motion shot
10) [optional extra credit] – Several images of Uranus, Neptune or Pluto, taken over several weeks to demonstrate their motion relative to the background stars