

**Physics 174**  
**Homework 2 - Due 13 October**

20 September, 2006

**The Phases of the Moon**

The objective is to understand the phases of the Moon and its motion through the sky by drawing its position and phase at the same time each evening as it moves from new to full.

You will need an 11x17" and an 8.5x11" piece of paper. You will also need a ruler, a pencil, and a flashlight. The 11x17" paper will be your **sky map**, and the 8.5x11" paper will be your **moon chart**.

Pick a location with a good view of the southern horizon, from east to west. Before starting your observations of the Moon, make a note of where you are standing, and carefully draw in the landmarks along the entire horizon onto your **sky map**. Use your ruler, held at arm's length, to help you measure the relative size of objects along your horizon before drawing them in. You will need to scale your measurements so that they fit on the 11x17" page. A scale of 6:1 should work. If you are tall, you might need to try 8:1. Using the metric side of your ruler might be easier than using inches!

Each night, make a note of the date and time of your observation. Measure the altitude of the Moon with your ruler, make a careful note of what landmarks are immediately below it on the horizon, and draw it onto your **sky map** in its proper position with respect to the horizon you've already drawn. Number your observations.

For each observation, draw the Moon on your **moon chart** (8.5x11" paper) as a circle roughly an inch in diameter. Most likely, you will need two columns of circles. For each observation, shade in the dark side of the Moon so that your drawing matches its approximate visible shape. Each drawing on the **moon chart** should include the number from the sky map and the date and time of observation. In addition, you should label the phase of the Moon. For example, is it waning gibbous, first quarter, full, etc.?

New Moon is on Friday, 22 September. From that night forward, you should come to **exactly the same spot** at **nearly the same time every night** to observe the phase and location of the Moon. You should make your observations close to dusk so that you can catch the nearly New Moon before it sets. It may be hard to observe the first night since it will only be a sliver close to the Sun, but you should see it the next night.

If the weather is partly cloudy, be patient, as you'll probably get a good view of the Moon after a few minutes have passed. You should be able to get about seven to ten

observations over a two-week period. You will be graded on the number of observations you have made, their accuracy, your notes, and the aesthetic qualities of your **sky map** and **moon chart**. In other words, be as neat and as artistic as you can. Feel free to redraw your work before you submit it.

Your submitted homework should include your **sky map**, folded in half, and your **moon chart**, stapled together. Be sure to put your name on both in case they get separated.