Measuring the Sky

Turn in one copy of this lab with each group member's printed name and signature. By signing, you certify that you have actively participated in the exercise and have put forth effort in equal share to your fellow group members.

Printed Name	**Signature**
_____	_____
_____	_____
_____	_____
_____	_____

Measuring the Sky: Part 1 Data

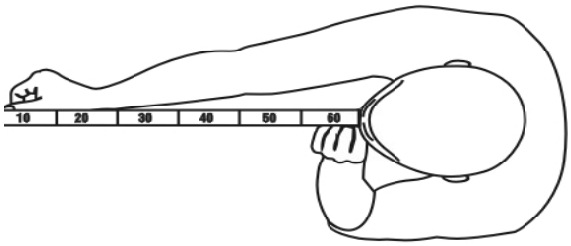

Table 1: Arm Length Measurements

Names (Across and down)					Avg (cm)	PCF (deg/cm)

Put group member names across the first row AND down the first column. On the row with your name, have each of your group members measure your eye to thumb distance. You can't measure your own, so that cell is blacked out. The last column, PCF, is Personal Conversion Factor.

Table 2: Angular Size Measurements

Distance	Name	Ruler Reading Measured (cm)	Angular size Calculated (Degrees)
10m			
		Average Ang. Size	
15m			
		Average Ang. Size	
20m			
		Average Ang. Size	

Part 1 Questions:

1. What happens to the angular size of the meter stick as it is moved further away?

2. What would the angular size of the 2-meter stick be if it were 100 km away? How many centimeters is that on your ruler? Could you accurately measure that angle? Why or why not?

3. Imagine that two photons leave a star that is 4 light years away. If the photons hit opposite sides of our planet, what is the angular separation of the photons? (R_{Earth} = 12,700 km, 1 Lyr = 9.4×10^{12} km)

4. What does question 3 suggest about the *lines of sight* from the surface of the Earth to the stars?

5. Now you are ready to take measurements for your term project. What challenges do you foresee?

Part 2: Data

Table 3: Mock Landmark observations

Name	Ruler	Angle	Landmark Azimuth

Table 4: Mock Sunset Observations

Name	Date	Time	Ruler	Angle	Sun Azimuth

Part 2: Questions

1. What is the azimuth of the following directions:

   NE: _____

   SW: _____

   ESE (east-south-east): _____

   NNW (north-north-west): _____

2. In the sample picture, the landmark and sunset are to the right of West. If West is 270^{o}, will the azimuth of the landmark be greater than or less than 270^{o}? Will the Sun's azimuth be greater than or less than the landmark's? How do you know?

3. In this lab, you are given the location of West. When you do your observations, you will need to find West yourself. What are some ways you might do this?

4. Looking at Table 4, compare your group's measurements in the **ruler** column. Are they similar? Different? Why?

5. Now compare your measurements in the **azimuth** column. Are they similar? Different? Why?

6. Sometimes you will find that the Sun will start out in a nice clear spot along the horizon, but as the semester goes along, it will move so that the sunset falls behind a building or other obstruction. What are some ways to still get observations, if that happens?