Name_____

Observing the Planetarium Sky Worksheet

Table 1: Number of stars observed

Time (minutes)	Number of Stars
0 minutes	

After you leave the planetarium plot your data on the provided graph and answer the following questions.

Questions

1. What does your graph tell you about the number of stars you can see at different times? What is physically happening to you to cause this change?

2. Calculate the rate at which stars become visible? (Remember the *rate* is the slope of the graph: the change in "y" divided by the change in "x". Show all calculations.)

3. What are sources of error in this rate?

4. If we observed for another 5 minutes, what would the graph look like? In a different color sketch your prediction for the second 5 minutes on the graph. Explain your prediction.

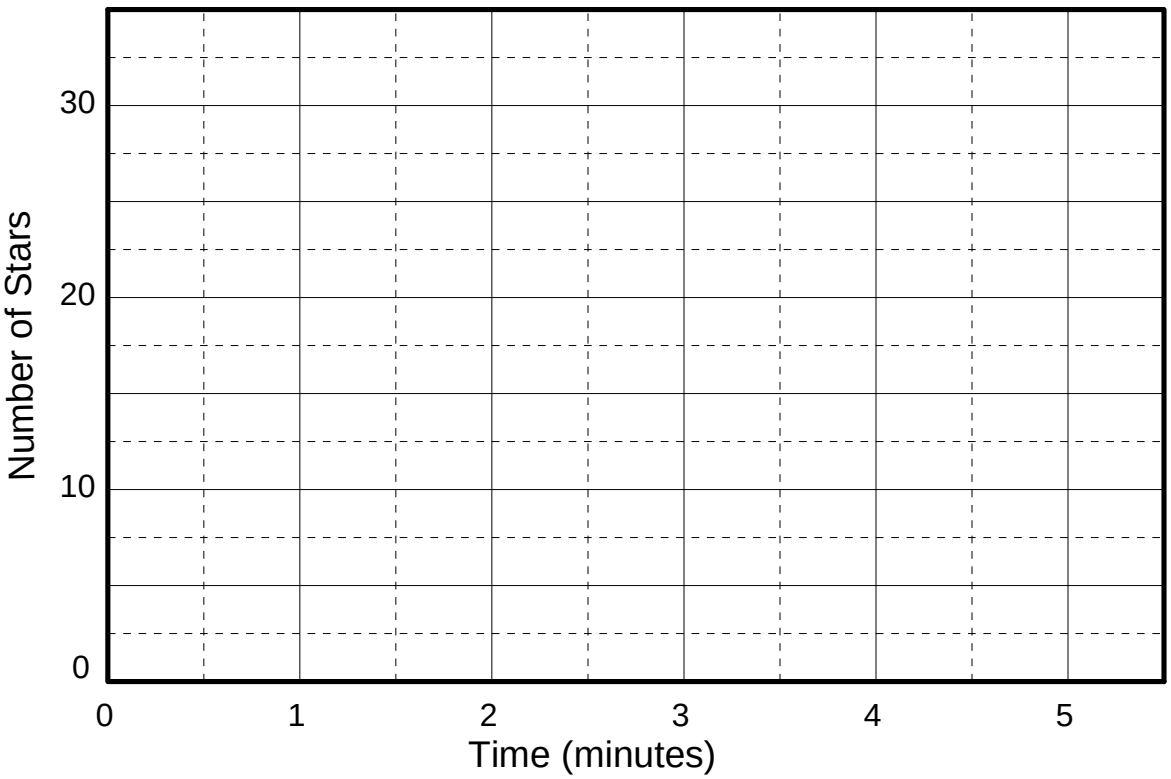
5. The area of your pupil is proportional to its radius squared [area = π*(radius)^2]. Suppose that during the 5 minutes of your observations, the size of your pupil grows from 2 mm to 6 mm in diameter. What is the ratio of the area of your dark-adapted pupil to the bright-adapted pupil? (Show all calculations.)

6. The amount of light that enters your eyes is proportional to the area of your pupil. Did the light-gathering power of your eye increase or decrease over time? By what factor?

7. An average-sized amateur telescope is about 20 cm (200 mm) in diameter; the largest ground-based astronomical telescope is currently about 10 m (10,000 mm) in diameter. Compare the light-gathering power of an amateur telescope to the best light-gathering power of your eye. Compare the professional telescope to the best light-gathering power of your eye. Show all calculations.

8. Why were ancient astronomers so limited in their observations of the sky?

9. Given today's technology, how would we observe fainter objects?


Number of Stars
30
20
10
0
0
1
2
3
4
5
Time (minutes)