Name(s):   _____   _____

                  _____   _____

Date: _____   Course/Section: _____

Grade: _____

Eclipsing Binary Stars

Objectives:

Students will learn how the changing light from an eclipsing binary star system can reveal information about the individual stars and their orbits.

Checklist:

☐   **Complete the pre-lab quiz with your team (if required).**

☐   **Compile a list of resources you expect to use in the lab.**

☐   **Work with your team to complete the lab exercises and activities.**

☐   **Record your results and mark which resources you used.**

☐   **Share and discuss your results with the rest of the class.**

☐   **Determine if your team's answers are reasonable.**

☐   **Submit an observation request for next week (if required).**

Resources:

Pre-Lab Quiz

Record your group's answers to each question, along with your reasoning. These concepts will be relevant later in this lab exercise.

1.
2.
3.
4.

<u>Part 1: Occulting Stars</u>

Experiment with the eclipsing binary star simulator and use it to answer the questions below.

1. How would you determine the relative temperatures of the stars in an eclipsing binary from only its lightcurve?

2. Using only the lightcurve, how would you determine the relative sizes (radii) of the stars in an eclipsing binary?

Part 2: Lightcurve Calculations

Use the provided lightcurve to determine the following characteristics of the components of the binary system.

1. What are the relative sizes of the two stars? Justify your answer.

2. Calculate the mass of the companion star. Show your work.

3. Is the companion star hotter or cooler than the Sun? Provide justification for your answer.

Part 3: Period of an Eclipsing Binary

Give your result for the time of minimum for the binary star you studied, along with an estimate of your uncertainty. Do some research to find a value for the period of this eclipsing binary. When would you next observe if you wanted to catch the next minimum?

Binary Star Name:	
Time/Date of Minimum:	
Uncertainty:	
Period (days):	
Time/Date of next Observable Minimum:	