Name: Class: Date:

**Binary Star Interactive**

1) From the text book, briefly explain a binary star system and some of its characteristics.

2) From the text book, explain an eclipsing binary star.

***Exploring the Interactive Model***

Read the Introduction Tab.

Read the How To Tab.

3) The interactive model is showing stars that are:

☐ protostars ☐ main sequences ☐ red giants or red super giants

4) When you change the mass of a star, what other characteristics change?

a)

b)

c)

5) The distance slider allows you to change the distance between the two stars. Explain the distance units used between the two stars.

6) The panel at the upper rights shows a light curve of the system. What are the units:

a) on the vertical axis?

b) on the horizontal axis?

Interactive Tab

Investigate the following scenarios using the binary star interactive module.

7) Manipulate the mass of either Star A or Star B. What happens to the size of a star when you change its mass?

8) As you manipulate the star’s mass, what happens to the luminosity (brightness) of the star?

9) Set the mass of each star to 1 solar mass. Set the distance between them to the minimum value—which is 7 solar radii.

What is the minimum inclination of an orbit that produces eclipses?

10) Set the mass of each star to 5 solar mass. Set the distance between them to the minimum value—which is 7 solar radii.

What is the minimum inclination of an orbit that produces eclipses?

11) Set up a pair of stars with equal masses, an inclination of 90 degrees and a distance of 20 solar radii apart.

Observe how one star can eclipse the other star.

Now, change one of the masses to make it double the mass of the other star. Leave inclination and distance the same.

Observe how one star eclipses the other star.

Explain what is different about the two observations. In observation 1:

In observation 2:

12) Set up a pair of stars with equal masses. Set the inclination at 90 degrees. Set the distance to 20 solar radii. Watch for a full orbital period so that you can see each star pass in front of the other. Look at the Light Curve panel.

a) Are the two dips in the light curve of equal depth or unequal depth?

Now, change one of the masses to make it double the mass of the other star. Leave the other settings. Watch for a full orbital period so that you can see each star pass in front of the other. Look at the Light Curve panel.

b) Are the two dips in the light curve of equal depth or unequal depth?

c) Explain why the dips are different in each of the above scenarios.