



Star in a Box Worksheet - Intermediate

☆ Launch *Star in a Box* and open the lid. The main plot is a Hertzsprung-Russell diagram. On the right, the information panel allows comparisons between the radius, surface temperature and luminosity of the star relative to the Sun. The starting parameters are for a star like the Sun.

A. Download the CSV file for a 1 solar mass star and open it in a spreadsheet. Plot graphs of mass, luminosity, radius and surface temperature against time.

1. Describe how the luminosity changes with time.
2. Describe how the radius changes with time.
3. How does the mass of the star change with time?
4. What do you think happens to the rest of the mass?

B. Some of the changes in luminosity and temperature are very sudden. What do you think might be happening within the star at these changes?

C. Download the CSV file for a 30 solar mass star, open it in a spreadsheet, and plot the same graphs as in section A.

1. How do these graphs compare with the 1 solar mass star?
2. How are the compositions of the two stars changing over their life times?

D. *Betelgeuse* is 20 times the mass of the Sun and very near the end of its life.

1. It is 450 light years away, but how bright would it look compared with the Sun if it were at the distance of the Sun?
2. How large would it be compared with the orbit of the planets?