

Step-by-Step

Creating a Scale Model of a Constellation

In this Step-by-Step Card, you will create a 3D scale model of a constellation inside a box using Starry Night Backyard, Geometry Inventor, and AppleWorks. You will need a box that is approximately the size and shape of a shoebox, although other boxes will work. You will need a skewer for each star in your constellation. See the Constellations project for complete list of materials.

Selecting and printing a constellation

- 1** Open the Starry Night Backyard application.
- 2** Select a constellation for your model. For simplicity, choose one that can be represented by approximately six to ten stars. Only those stars that determine the end points and vertices are necessary. You can omit the other stars if you want.
- 3** Print the line drawing of the constellation from Starry Night Backyard.
- 4** Quit Starry Night Backyard.
- 5** Measure the lengths of the line segments (in centimeters to one decimal place) and measure the angles that make up the constellation shape on the printed copy.
- 6** Place the printout in the inside end of the box and use the width or height of the box to figure out what percentage or ratio the figure should be scaled to to fill most of the end surface.

Enlarging the model

- 1** Open a new spreadsheet document, such as an AppleWorks spreadsheet.
- 2** Enter the segment lengths in a spreadsheet and scale them by creating a column in the spreadsheet that calculates the increased size for all of the numbers.
- 3** Because the Starry Night Backyard printout of the constellation has a lot of other information on it, use a clean sheet of paper to create a rough sketch of the constellation, labeling the angle measures and the length of each side.
- 4** Open the Geometry Inventor application.
- 5** Use the information in your sketch to create an enlarged version of the constellation in Geometry Inventor. (See the Step-by-Step Card, “Constructing a Constellation Image With Geometry Inventor.”)

- 6** Print the scaled figure.
- 7** Label each star in the figure with its distance from Earth.
- 8** Tape the constellation onto the inside end of the box.
- 9** Let the length of the box be equal to the distance to the most distant star. Use a spreadsheet and percent or proportion to calculate the distance in the box of the other stars.
- 10** Locate the placement of each star and put a skewer through the bottom of the box, pushing it up to approximately the correct height and taping it in place. Use a marker to blacken the skewers. Put white dots on the top of skewers to represent the stars.
- 11** Quit Geometry Inventor and the spreadsheet application.