To create surfaces from point samples

1. Activate a point or multipoint theme.
2. From the Surface menu, choose Interpolate Grid.
3. If the the view's analysis properties haven't been set to a specific value, then you'll be prompted to set the extent and cell size for the output grid theme. Do so in the Output Grid Specification dialog and press OK. For more information on setting the analysis extent and cell size using this dialog, see Output Grid Specification (Dialog box).
4. In the Interpolate Surface dialog, choose an interpolation method from the Method dropdown list, IDW or Spline.
5. Choose the field containing the values to be used in the interpolation from the Z Value Field dropdown list. The value of Z Value Field for a multipoint feature is used for each point in that feature.
6. Specify the parameters for the chosen interpolation method in parameter type-in boxes. With IDW, you must specify whether it will use Nearest Neighbors or a Fixed Radius in the interpolation. If you choose Nearest Neighbors, enter the number of neighbors (input points). If you choose Fixed Radius, enter the radius to search for points. Specify a power, and choose a barrier theme. If you choose the Spline interpolation method from the Method dropdown list, enter a weight factor, specify the number of points to use per region, and choose Regularized or Tension. Press OK.

Visiting every location in a study area to measure the height, magnitude, or concentration of a phenomenon is usually difficult or expensive. Instead, select strategically dispersed sample input point locations, and use Interpolate Surface to assign an estimated value to all other locations. Input points can be either randomly or regularly spaced points containing height, concentration, or magnitude measurements.

The resulting grid theme is the best estimate of what the quantity is on the actual surface for each location. The surface interpolators make certain assumptions about how to determine the best estimated values. Based on the phenomena the values represent and on how the sample points are distributed, different interpolators will produce better estimates relative to the actual values. No matter which interpolator is selected, the more input points and the greater their distribution, the more reliable the results.

The Inverse Distance Weighted (IDW) interpolator assumes that each input point has a local influence that diminishes with distance. It weights the points closer to the processing cell greater than those farther away. A specified number of points, or optionally all points within a specified radius, can be used to determine the output value for each location. Use it, for example, to interpolate a surface of consumer purchasing. More distant locations have less influence, because people are more likely to shop closer to home. The power parameter in the IDW interpolation controls the significance of the surrounding points upon the interpolated value. A higher power results in less influence from distant points. Each line in a barrier input line theme is used as a break that limits the search for input sample points. A line can represent a cliff, ridge, or some other interruption in a landscape. A choice of No Barriers will use all points specified in the No. of Neighbors or within the identified radius.

The Spline interpolator is a general purpose interpolation method that fits a minimum-curvature surface through the input points. Conceptually, it is like bending a sheet of rubber to pass through the points, while minimizing the total curvature of the surface. It fits a mathematical function to a specified number of nearest input points, while passing through the sample points. This method is best for gently varying surfaces such as elevation, water table heights, or pollution concentrations. It is not appropriate if there are large changes in the surface within a short horizontal distance, because it can overshoot estimated values. The Regularized method yields a smooth surface. The Tension method tunes the stiffness of the surface according to the character of the modeled phenomenon. When you choose Regularized, the weight parameter defines the weight of the third derivatives of the surface in the curvature minimization expression. If you choose Tension, the weight parameter defines the weight of tension. The number of points parameter identifies the number of points per region used for local approximation.

Interpolate Grid works off of the selected set of the active theme. If the active theme does not have a

selected set, then all points in the theme will be used. For more information on selecting features, see Selecting features on a view.

The output grid theme from Interpolate Surface is automatically named "Surface from" followed by the name of the input theme. The grid data set associated with the output theme is written to the project's working directory, with the name "sface" followed by a unique number. Use Properties in the Theme menu to find out which data set is associated with which theme. Use Properties in the Project menu to change the project's working directory. The grid data set associated with the output theme is temporary and will be deleted when the theme is deleted. Use Save Data Set in the Theme menu or save the project to prevent the grid data set from being deleted when the theme is deleted.