

Creating a map from X,Y coordinate data using ArcView GIS

Creating a map from data that you have collected is easy if your database includes X,Y coordinates for each observation. A GIS such as ArcView GIS can convert X,Y coordinates in a database into features on a map. These features can be combined with other GIS data or they can be linked to images (photographs, sketches, or other maps) using ArcView's "hotlink" feature. This document explains the process of creating a data table, converting X,Y data to a map theme (an "event theme"), and creating hotlinks.

A. CREATE THE DATA TABLE

1. Create the data table using a database, spreadsheet or word processing package.

If you are using a database or spreadsheet package, organize the information in records (rows) and fields (columns). There should be one record for each feature and one field for each characteristic or measurement describing the features.

If you are using a word processor, enter the information for each record (feature) on a single line, using commas to separate the fields (characteristics). Use the Enter (or Return) key to create a new line for each new record.

Make sure the table contains columns for the coordinate data, one for the X coordinate and one for the Y coordinate. The coordinates are most commonly measured as latitude and longitude (in degrees) but can be measured in any units relative to known positions (e.g., in meters from the town square). The fields for latitude and longitude should be named "Latitude" and "Longitude" or "Lat" and "Long". Using these names will simplify step #6 below because ArcView will identify these fields automatically as the fields containing the coordinate data.

2. Enter the data

If locations are measured in latitude and longitude, record the values in a decimal degree format rather than degrees, minutes, seconds. In this format, fractions of a degree are expressed as a decimal rather than as minutes and seconds. For example, 44.75 degrees is equal to 44 degrees 45 minutes. Use positive numbers for latitudes north of the equator and longitudes east of the prime meridian. Use negative numbers for latitudes south of the equator and longitudes west of the prime meridian.

Save the completed file as either a dBASE file (.DBF) or a comma delimited ASCII text file (.TXT). Note carefully what the file is called and where it is stored.

Example spreadsheet/database file:

SITE	LAT	LONG	DATA#1	LINK	COMMENT
G021	48.88521	-96.75023	7.4	Tony's house	Many pets!
G022	48.87795	-96.84123	66.4	Pat's house	Cool windmill
M023	48.67921	-96.81495	23.6	Mickey's house	Pond nearby

Example word processor file:

```
SITE,LAT,LONG,DATA#1,LINK,COMMENT  
G021,48.88521,-96.75023,7.4,Tony's house,Many pets!  
G022,48.87795,-96.84123,66.4,Pat's house,Cool windmill  
M023,48.67921,-96.81495,23.6,Mickey's house,Pond nearby
```

B. BRING THE TABLE INTO ARCVIEW GIS

3. Launch ArcView and construct a project as usual.

This table will be added to an ArcView GIS project and will be displayed within a View. The View may contain other features (map layers), but does not need to. The View may have a map projection set, but

does not need to have one. If the View does contain other vector data (points, lines, polygons), these data and the incoming data table must be stored in the same type of coordinates (e.g., all layers in decimal degrees or all layers in UTM coordinates).

Create a View and add any relevant themes to it.

4. Add the Table.

Navigate to the Project window (The Project window always can be found by clicking on the Window menu and selecting item number 1 in the list of documents.)

In the Project window, click once on the TABLES icon at left, and then click the ADD button at top. At the bottom of the ADD TABLE window, specify the format of your table (.DBF or .TXT) by selecting it from the list labeled LIST FILES OF TYPE. Navigate to the stored table and double-click on the desired table to select it and add it to the project.

5. Inspect the imported table to ensure the format and data are correct.

If the table is correct, close it. (It does not need to be visible to be mapped, just present in the ArcView project.) If the table is not correct, delete it entirely from the project, repair it, and add it to the project again.

6. Create an Event Theme from the table.

Open the View in which the table will be mapped. From the VIEW menu, choose ADD EVENT THEME. In the Add Event Theme window, choose your table and review the fields listed as the X field and Y field. Make sure the proper fields from your table are selected (e.g., Longitude for the X field and Latitude for the Y field). If none are selected, choose the appropriate fields from the lists. Click OK.

A new theme (an "event theme") has been created from the table and has been added to the View (the top theme in the Table of Contents). The new theme can be treated like any feature theme - you can edit the legend, modify the theme properties, query the theme, etc.

C. NEXT STEPS

1. Creating Hotlinks to display images

Images can be linked to the features in the new event theme using ArcView's Hotlink function. To do this, the original data table must contain a field that serves as a link between each feature (record) and an image or ArcView document (e.g., a field named LINK). The cells in this field will contain the name of the image or document to which each feature is linked.

Prepare the documents that will be linked to the map by creating a new View for each image. Name each View to match the contents of the "LINK" field in the data table. For example, a View containing an image of Tony's house is named "Tony's house" to match the contents of the field "LINK" in the example database. Close the views containing the images.

Open the View containing the map. Make sure the event theme you created is the active theme. Click the THEME PROPERTIES button and in the window, click the HOT LINK icon at left. To the right, find the list box labeled "Field" and select the field LINK from it. From the list box labeled "Predefined Action" and select LINK TO DOCUMENT from it. Click OK to dismiss the Theme Properties window. The HOTLINK tool (lightning bolt) now should be active.

2. Joining additional data to the event theme

Additional data can be joined to the new event theme. To do this, the original data table must contain a key or ID field so each record in the table can be uniquely identified (no duplicate names). This unique identifier should be created when the table first is constructed. It is easier to add this information right at the start (even if you do not use it at first) than to discover later that you need information that you do not have.