

UCLA DIGITAL HUMANITIES

HOW TO
Create GIS Maps
Using ArcGIS 10

CREATING AND WORKING WITH PROJECTS IN ARCGIS 10

A fundamental difference between an application like Google Earth and a piece of GIS software such as ArcMap is that the user must define the parameters for the data to be entered and for the shape of the world itself. Along these lines, a few terms are useful for understanding how to work in ArcMap.

PROJECTION

Any map has to deal with the problem of projecting a 3D world onto a 2D image (i.e. the map). To deal with this, we use projections, which apply some mathematical transformation to geographic data in order to fit it on a flat map.

SHAPEFILE

Just as in Google Earth, objects in ArcMap can take the form of points, lines or polygons. ArcMap uses the shapefile format (.shp) to contain this kind of data. Each shapefile can only contain one type of data, and separate data sets using the same kind of shape should be kept in separate shape files. For instance, if you want a set of points showing hospitals, and another set of points showing fire stations, you should create two separate shapefiles for the different facilities.

LAYERS

ArcMap is capable of displaying other kinds of data, such as images. Each piece of information is contained in a layer. Additionally, selections from existing layers can be made into new layers. Layers can be removed or added to the display without affecting the data contained in them, allowing multiple maps to be made from a few layers.

SHARE WORK

- Send an e-mail containing map URL
- Save map as a KML file
- Collaborate with others

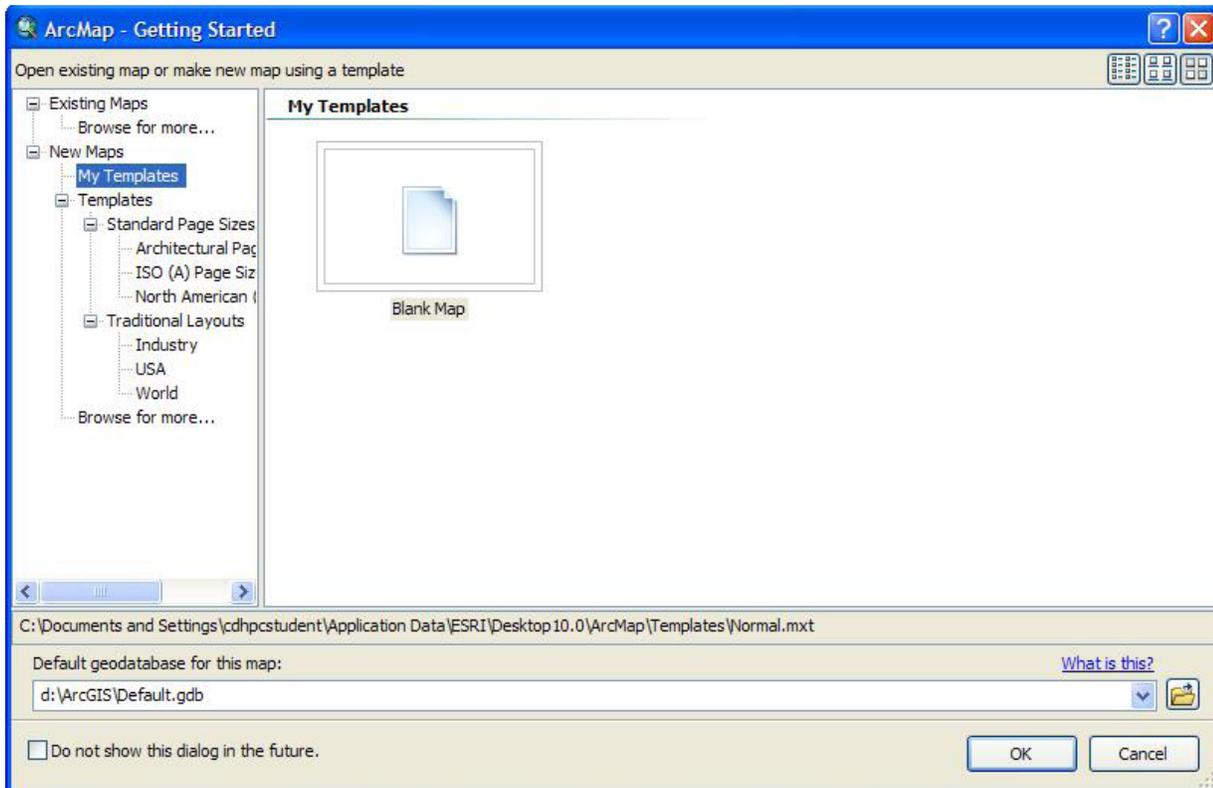
ORGANIZATION

ArcMap is a more powerful GIS tool than Google Earth, but the tradeoff is that it can be a little user-unfriendly. Keeping your data organized is important, because it's very easy to generate a large number of files and rapidly lose track of them. For this reason, you should outline your project before you start creating anything; figure out what sorts of data you will need, how many shapefiles and layers you will want and what you will label them before you start making anything.

A note on file names: ArcMap doesn't deal well with file names that have spaces in them. Rather than naming something Peru Archaeological Sites.shp you will want to use a format like Peru_Archaeological_Sites.shp or PeruArchaeologicalSites.shp.

CREATING A NEW PROJECT

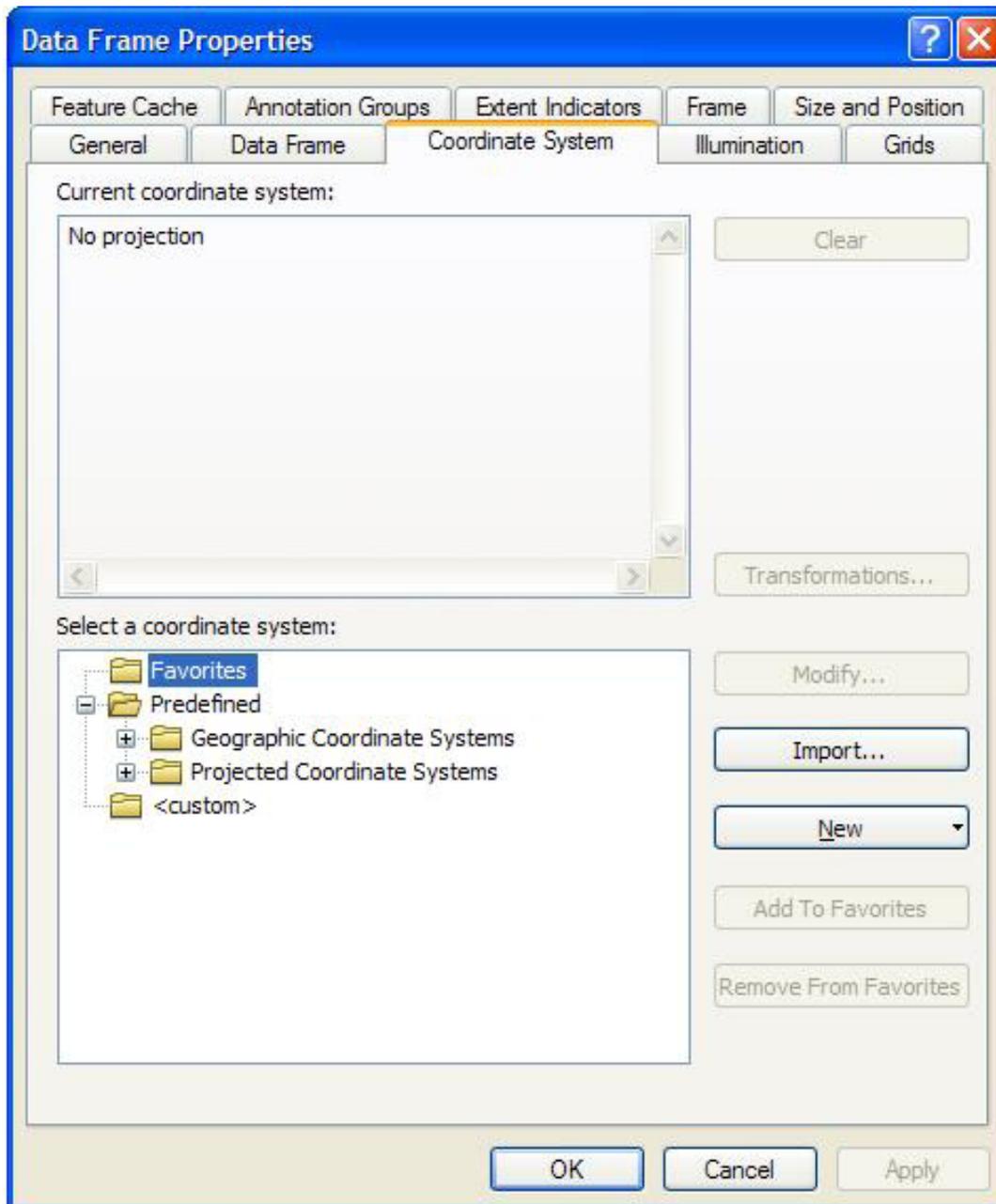
When ArcMap starts up, select “A New Empty Map”. If you are returning to a project in progress, you can select “An existing map” and then select your project from the list below.



SETTING PROJECTION

The projection to be used can vary from project to project. If you are using data gathered with a GPS, the standard projection is something called WGS 1984. If you are using scanned maps as a basis for creating your project, the projection should be listed on the map. If you have downloaded files from an online source, the projection is usually listed in a readme file. If there is no projection clearly listed, you may have to do some background research in order to determine what it is.

To set the projection of your new map, go to View > Data Frame Properties. As a default, the frame should be set to “Coordinate System”.

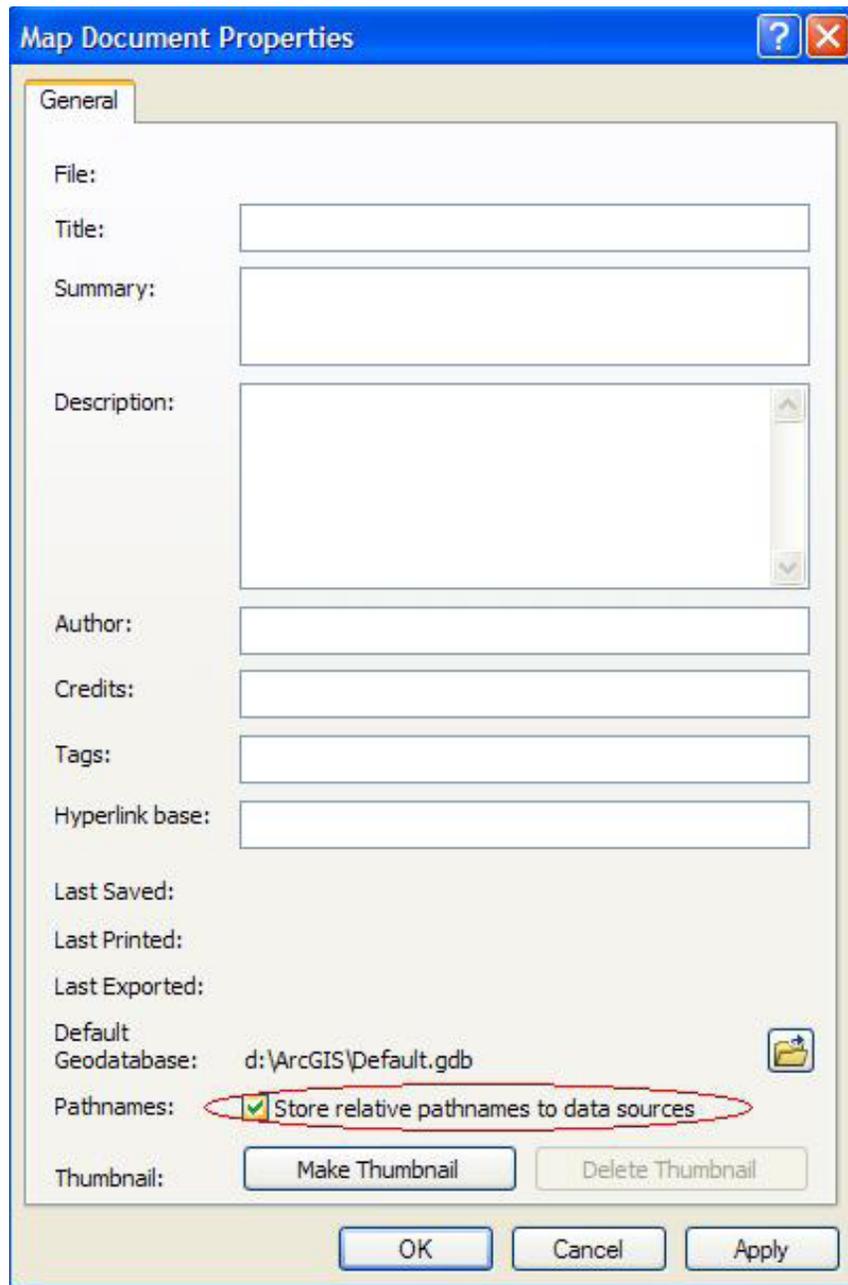


Under “Predefined”, find and select your projection. There are a lot of them, so it might take a little hunting the first time around. Hit “Apply”, then “OK”.

IMPORTANT! - Another note on organization:

By default, ArcMap follows full path names for all its layers. What this means is that if you add a layer from C:/desktop/GISproject/maps/my_map.shp, the program will only look in that exact location when you start it up again. If you have saved the project to a flash drive under E:/myflashdrive/GIS-project/maps/my_map.shp, ArcMap doesn't know where to find your data and it shows a blank map with red exclamation points on all your layers.

To avoid this, you can force ArcMap to follow relative data paths instead. Go to File > Map Document Properties. Check the box that says “store relative path names to data sources” and hit “OK”.

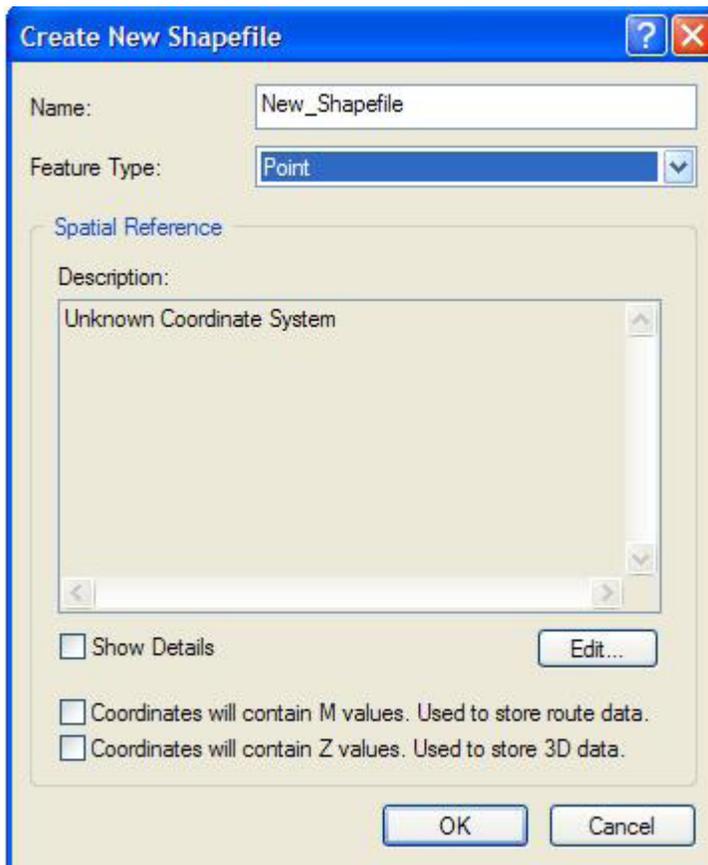


With these steps completed, your project is ready to go!

CREATING NEW SHAPEFILES

If we want to add new data in the form of points, lines or polygons to our GIS, we will need shapefiles to place them in. To create a new shapefile, open ArcCatalog by clicking on the yellow file cabinet icon in the upper right area of the toolbar.

Once Arc Catalog is open, go to File > New > Shapefile.



Name your new shapefile, and in the next dropdown box select whether you want to make a point, line or polygon file. You can ignore the multipoint and multipatch options. Next set the projection of your shapefile by clicking Edit > Select and navigating to the correct coordinate system (make sure to use the same one as the rest of your project). Hit "Apply" and "OK" to set the projection, then "OK" again to create your new shapefile. (You can also ignore the M and Z-value options unless you plan on working in 3D).

ADDING DATA TO THE GIS

Now we are ready to add layers to our GIS. If you have existing shapefiles to work with, you can go straight to this step.

To add a new shapefile to your project, either click File > Add Data or the Add Data button:



Simply find the shapefile you want to add and select it. At this point, if you are working with newly created shapefiles, there will not be any data displayed.

ASSIGNMENT

Using the shapefiles provided by your instructor, create a map with at least four layers of data. Then create three new shapefiles for future use: one each for point, line and polygon features.

NOTES

- Think about what kind of spatial relationships you might want to investigate when choosing your layers.
- Use ArcCatalog to figure out what projection your project should be set in before you start.
- Experiment with the options for display in each layer. Modify the colors and symbols used for each layer to come up with a map that communicates effectively.
- Explore the attribute tables of the layers you add to get an idea of what sorts of data are available for searching.
- Remember, ArcGIS is a huge toolkit with lots of options. Don't be afraid to explore and try out different things; just make sure to save your work first in case something breaks!
- Stay organized!