# Part I. Getting Started

The first thing you will do, at the start of every exercise, is copy any documents and data files from the class folder into your individual folder. This ensures that any changes you make within your map do not change the underlying geographic data layers that we have on our server.

Navigate to the class folder (you can follow along as we do this on the projector):
    Windows Explorer → Computer → Home (Q:\\) → Classes → SummerScience → 2013
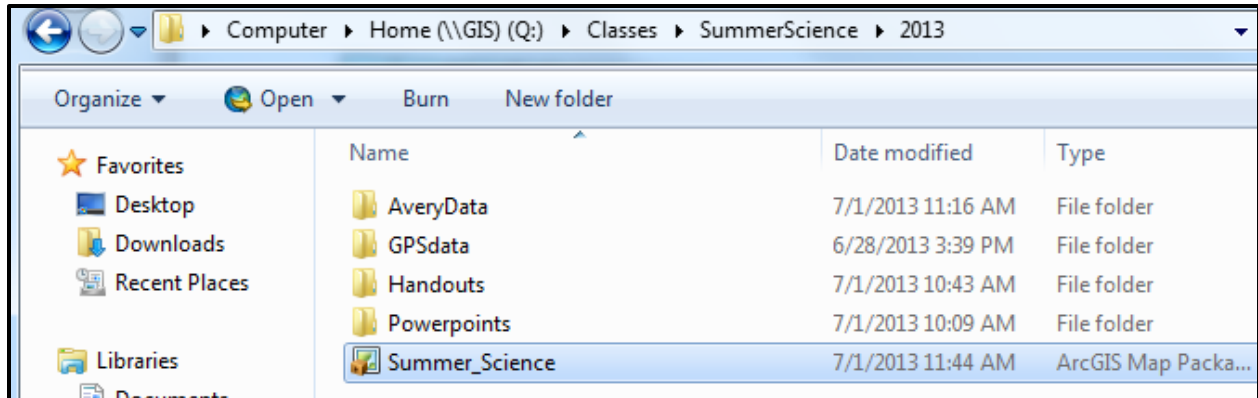
Double click on the **Summer_Science map package**. Opening this file should automatically launch the program ArcMap, which is one of the main GIS softwares used worthwhile. (ArcMap is to "GIS software" as Microsoft Word is "word processing software.")

Now, you should see a map of Massachusetts townships (for those of you not from here, townships in Massachusetts have the municipal role of counties in most states). Stop and observe a few important elements of the display:

- The "map" you're working on is in the main frame, called the "data view."
- On the left-hand side, there is a window called the "Table of Contents." This is where you see the data layers you are working with, as well as any non-active data frames. Here, we have the active "Massachusetts" data frame in bold (which is seen in the data view), and one non-active data frame, which we will use later.
- At the far bottom right corner, you should be able to see geographical coordinates for the data. Because of the coordinate system used here, the units should be in meters, which correspond to an "X, Y" geometric notation.
- At the bottom left of the data frame (the frame where the "map" is seen) there are two tiny but important buttons. One, which is already highlighted, is for the "Data View." The one next to it is the "Layout View" which we will use later on.

Part II. Browsing and Visualizing the Data

Ordering Layers

Right now, we have one layer in the Table of Contents: Massachusetts Townships. Let's add some more data to our map so we can see how layers work.

- Click the "Add Data" button (see below) and select "Add Basemap."
- Choose the "Imagery with Labels" basemap, then click "Add."
- If a "Geographic Coordinate Systems Warning" appears, do not worry about it and just hit "OK."
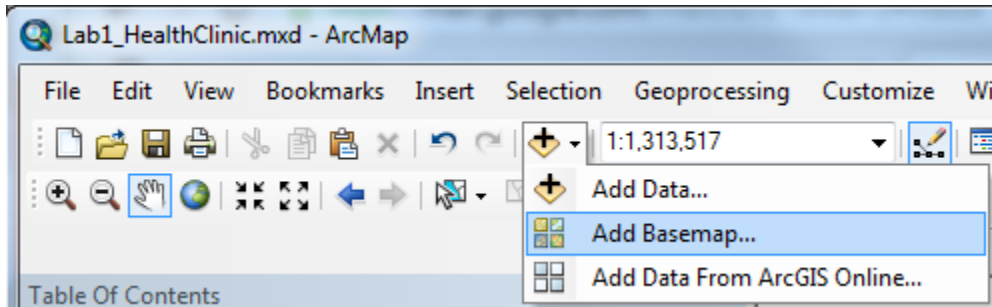
After adding this layer, you should be able to see it in the table of contents (T.O.C.), and you should see a basemap for all the area *around* Massachusetts, but not in Massachusetts itself. That is because the "Massachusetts Towns" layer is *on top of* the basemap in the T.O.C. To view the basemap for Massachusetts, there are several things you can do; **go ahead and try them all:**

1) Uncheck the box next to "Massachusetts Townships" in the T.O.C. Now Massachusetts Towns layer should disappear and the base map should be the only visible layer. *Note that only layers which are checked "On" in the T.O.C. are drawn on the map.*
2) Drag and drop the basemap layer so that it is above the Massachusetts Townships layer in the T.O.C. The towns are theoretically still visible, but now they are "covered" by the basemap. *Note that layers appear on the map in the order they appear in the T.O.C.*
3) You can use a cartographic approach to make both layers visible at the same time. Move the Massachusetts Townships layer back on top on the basemap. Double-click on the "symbol" (a colored square) for Massachusetts Townships in the T.O.C. A dialog box, "Symbol Selector," will pop up. Change the "Fill Color" to "No Color," the "Outline Width" to "2.00" and the "Outline Color" to a dark blue. Hit OK. Now you should be able to see the basemap *through* an outline map of the townships.

All three of these techniques will be useful later when working with MacLeish and Avery Brook GIS data—there will be times when we need to turn layers on and off in the TOC, change the order of layers in the TOC, or make a certain layer have no fill color.

Labeling features and zooming in and out

Now we are going to zoom into Northampton township, where Smith College and the city of Northampton are located. Maybe you don't know where Northampton is located within Massachusetts. It's not labeled on the basemap. To find it, we're going to label all the counties in the state. In the T.O.C., right-click on Massachusetts Townships. In the pop-up menu, select "Label Features." By default, the names of the counties appear. If you have trouble seeing the labels against the basemap, you can temporarily turn that layer off by making it invisible (see above).

Use the zoom tools to find Northampton. The "Zoom In" tool looks like a magnifying glass with a plus sign. "Zoom Out" is the one next to it. These kinds of are probably familiar to you.

You can zoom in by clicking on the map, or by dragging the tool around your area of interest to create a zoom rectangle. Go ahead and experiment with the other navigation tools. The "hand" tool next to the zoom tools allows you to pan around the map without changing the scale.

- Use the zoom in, zoom out, and pan tools to find your hometown on the map. Can you find the street you live in?
- Use the zoom in, zoom out, and pan tools to find a place you've always wanted to visit, anywhere in the world.

To return to the scale of the whole state of Massachusetts, right-click on Massachusetts Towns in the T.O.C. and select "Zoom to Layer." This is a useful trick to re-center the map on your area of interest.

Part III. Creating a good-looking map display

Your challenge: make a nice-looking map of Smith College campus.

- Click the plus-sign next to the words **Smith College** to expand this group of layers and see what map data we have for the campus: the campus outline, the campus paths (sidewalks and roads around campus), all of the trees on campus, all of the nike racks, the buildings, the green spaces, and the parking lots.
- Right-click on the words **Smith College**, and choose "Activate" from the menu that appears (see image at right). Now you can see the extent of Smith in the map.
- Right now, all of these layers are turned on, and they all have ugly default symbols. Think of what would be useful to show on a map of Smith for a certain audience (perhaps parents, or visitors to Northampton— depending on your audience, your map might look different from other people's!).
- Use the skills from above—turning off layers you don't want to see, re-ordering layers so that important things aren't covered up, and double-clicking to change the fill color and outline, to make your map look great!