

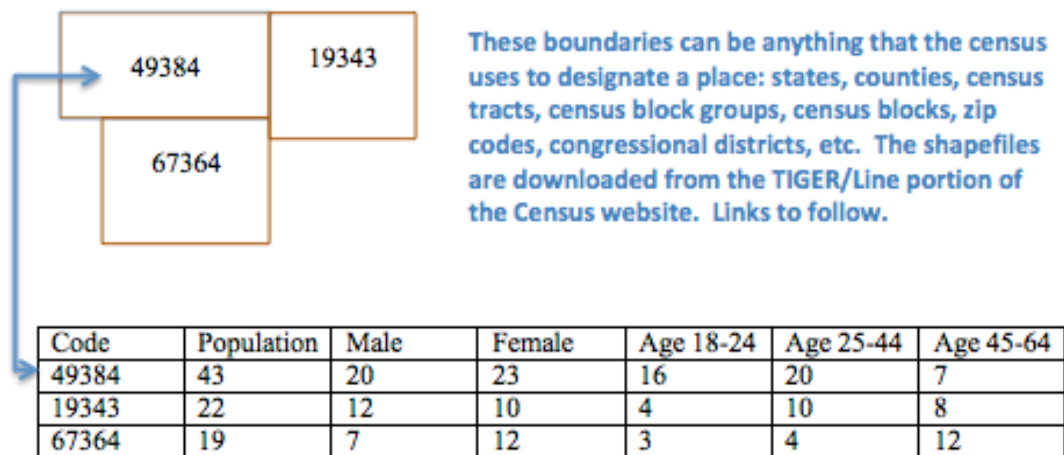
# Mapping Census Data

In order to map census data, two things are needed:

- [TIGER/Line shapefiles](#) (the shapefiles for census-defined areas such as states, counties, zip codes, tracts, block groups, blocks, etc.)
  - Click on the link for detailed information on the [different geographies](#) used in census data.
- [American FactFinder data](#) (the actual data from the census such as numbers of people by age, race, home ownership, etc. in table form)

Why are two different items needed?

- The setup is like this:
  - Shapefile with unique identifying code for the particular geography of what you're looking at (e.g., zip codes or block groups), essentially boundary files
  - Tabular data with the same unique identifying code for the particular geography you're looking at so that the data record matches the (for example) zip code in the shapefile.
  - Below, the boxes represent a (simplified) TIGER/Line shapefile, the table represents (simplified) data from the American FactFinder.



The spatial data can be populated by any numeric data you choose from the American Fact Finder. Just make sure you choose data for the same spatial area (e.g. county-block groups) from the TIGER/Line downloads as you do from the American Fact Finder.

- This means that one set of shapefiles can be made, and then multiple tabular datasets can be manipulated as necessary and separately downloaded. All we have to do as users is join the shapefile with the table, and that unique identifying code is what we use to do it. This tutorial shows you how to do that.

**Very important: before you download your files:**

**Know what you're mapping.** Don't make guesses when you get to the website. Downloading with no goal can lead to confusion and frustration. Why? Because:

- **Items have to match so that their unique codes match.** If you want to map Multnomah County census block groups and show race, you have to download the TIGER/Line file for Multnomah County *that is*

*specifically the one for census block groups.* Then, when you download the data, you'll have to configure the settings properly so that your table downloads *data specifically for block groups and race in Multnomah County*. Everything has to match so that the unique codes can do their work.

- **The years have to match for the shapefile/s and data you download.** Shapefiles from 2000 and 2010 are different. Naturally, datasets from 2000 and 2010 are different. As of publishing of this section of this help wiki (July 8, 2010), there are far more datasets available for 2000 than 2010.

## How to Map Census Data – Step-by-Step Instructions

1. Downloading TIGER/Line files
2. Downloading & Configuring Census Data
3. Joining census data to TIGER/Line shape files
4. Displaying Census Data

In order to map census data, two things are needed:

- [TIGER/Line shapefiles](#) (the shapefiles for census-defined areas such as states, counties, zip codes, tracts, block groups, blocks, etc.)
  - There are many [different geographies](#) used in census data. Click the link for details.
- [American FactFinder data](#) (the actual data from the census such as numbers of people by age, race, home ownership, etc. in table form)

### 1. Downloading TIGER/Line files

Go to the [2010 Census TIGER/Line shapefiles](#) page and click through to the geography you want to map.

1. In the "Select a layer type" pull-down menu, **pick the geography you want to use on your map** (example = block groups)
2. From the "Block Groups 2010" pull-down menu, **pick your state** (example = Oregon)
3. From the next pull-down menu, **pick your county** (example = Multnomah)
4. The files then download automatically
5. Navigate to your downloads folder and **unzip your data** by right-clicking and choosing "extract all." A folder appears, named exactly like the zipped folder you downloaded.
6. You may need to work with the projection of the shapefiles. Shapefiles come in NAD83 GCS with no PCS. This means that unless you're adding them to an ArcMap that already has a PCS that you're using, you'll need to project them. More help with projections is available at the SGE website.

### 2. Downloading & Configuring Census Data

Census datasets are retrieved in table form from the American FactFinder site.

[Follow the procedure](#) for formatting your data on pages 11-17 of this tutorial from the census website.

#### A few pointers that should help:

- Instead of the 2010 Redistricting Data SF (PL (94-171) that's used in the tutorial, you'll choose whichever dataset you'd like to download. Or, ignore datasets, and just choose based on geography (recommended).
- **Follow the instructions very carefully when formatting the table data in Excel.**
- Do save the data file as an .xlsx file rather than a .csv file. Save the data file as a .dbf file if you'll need to edit it within Access.

Additional help is available by clicking on the "[Using Factfinder](#)" button in the menu bar.

### 3. Joining census data to TIGER/Line shape files

Once you've downloaded your shapefiles and also downloaded and formatted your tabular data files, you can perform a "join" on them and get them to work together to display the data. Here's how.

1. **Add your projected shapefile to a new map** (or existing map).
2. Open the attribute table by right clicking on the data layer and **note which column has the GEO ID numbers that are the same as what you created in your Excel table**. Close the attribute table.
3. **Right click on the data layer** and go to "joins and relates" and click on "join..."
4. Configure the "join data" window
  - Under "What do you want to do with this layer?" make sure the dropdown says **"join attributes from a table"**
  - Under "Choose the field in this layer that the join will be based on:" **choose the field that contains the GEO ID in the SHAPEFILE**
  - Under "Choose the table to join to this layer, **choose the Excel file you formatted**.
  - Under "Choose the field in the table to base the join on:" **choose the new field you created when formatting your census data table**.
  - Under "join options", choose "Keep all records."
  - **Click ok**
  - **Open the layer's attribute table to make sure the join worked** (you should see the fields from the data table in the attribute table, and they should be populated).
  - **Display your data** using the symbology tools in properties for the layer. Remember that if you want to display things like population density, you'll have to use the tools in the attribute table to calculate areas before adding symbology.
  - **Save your new data layers as shapefiles** by exporting.

### 4. Displaying Census Data

There are several ways you can choose to display your data. You can choose color ramps and adjust your numbers in the symbology tab of the properties of your data layer.

Using census data, one of the most effective statistics to display is density of a certain population or attribute. In order to do that, a couple of steps are necessary as the area of the polygons in the layer must first be calculated, then the population must be normalized by the area of the polygon.

1. Open the attribute table for the layer you'll be manipulating.
2. At the bottom of the table, click on **"Options > Add Field..."**
3. **Name the field** something descriptive, for example, "Area\_SQ\_MI" and for **"type," use "double."** Click ok.
4. At the top of the newly created field, right click on the field name, and select "Calculate Geometry." Click Yes if a warning box comes up.
5. For "Property," make sure "area" is selected, then choose your desired area measurement for "units."
6. A new field appears with your requested area calculations. Close the attribute table.

Now display the population density within the symbology dialog box.

1. **Right-click on the data layer** for which you created the new area field and select **"Properties..."**.
2. Select **"Quantities"** to the left of the screen. Below that, select "Graduated Colors" (unless you would like to use different symbology, but graduated colors works well for density).
3. In the **"Value"** dropdown inside the "Fields" box, **select the population** for which you would like to display the density. In the **"Normalization"** dropdown, **select the newly created area field**.
4. **Choose an appropriate color ramp** (a two-color graduated ramp is more appropriate than a multiple color ramp in this case), and click ok.
5. The densities of your selected population should now appear in the polygons on your map.