Exercise 1: Introduction to ArcGIS

Description: This exercise introduces you to **ArcCatalog** and **ArcMap**. You will prepare a folder structure to store the data files and map products. The relationship between ArcGIS and Excel is demonstrated so that you can create maps in ArcGIS.

Note: It is highly recommended that you take notes while you do the lab to track what you have done.

Objectives: :
  ○ Managing data in ArcCatalog
  ○ Getting familiar with the ArcMap interface
  ○ Working with attribute tables: add a field, using the field calculator, joining tables
  ○ Creating new geographic data from a spreadsheet.
  ○ Using symbology and labels.
  ○ Create a layout
  ○ Viewing metadata

Skills: Data management and organization; working with spreadsheets; visualization and cartography

Data: Boundary data for this exercise are from the US Department of State, Office of the Geographer. Visit this site to read more about the metadata:
https://data.hdx.rwlabs.org/dataset/lsib-polygons-africa-and-americas-simplified. Population data are from the UN Department of Economic and Social Affairs, Population Division. Visit this site to read the metadata: http://esa.un.org/unpd/wup/CD-ROM/WUP2014_DOCUMENTATION%5CWUP2014_DESCRIPTION_CD.pdf
Boundary shapefiles:
      -AfricaAmericas_LSIB_Polygons_Simplified_2015Jan23_USG.shp
      -EurasiaOceania_LSIB_Polygons_Simplified_2015Jan23_USG.shp
      -Global_LSIB_Lines_Simplified_2015Jan23_USG.shp
UN Population Data: WUP2014-F22-Cities_Over_300K_Annual.xls

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PART 1: ArcCatalog, the best practice for data management

1. **Start *ArcCatalog from the Start Menu->ArcGIS*.** You will need to map or *connect to the folder* where the data are located.
      ○ In *ArcCatalog*, click on **File/Connect to Folder** or click on the 'Connect to Folder' icon.
      ○ Navigate to the location of the workshop folder, which is displayed at the front of the classroom. Click on the folder, and then click **OK**.

2. To the right of the **Catalog Tree**, in the Data Window, there are a few tabs through which you can explore your data: **Contents**, **Preview** and **Description**.
      ○ The **Contents** tab displays the content of the folder with icons symbolizing the type of data, such as point, line, polygon, or raster.

o   The **Preview** tab shows the geographic representation of the data.
o   The **Description** tab displays descriptive information (metadata) about the data, if it has been properly created.

NOTE: When copying and moving data, **ALWAYS** do this in *ArcCatalog*. <u>Do not copy/delete/rename data using *Windows Explorer*</u>. When using *ArcCatalog,* you automatically capture all the data files associated with each shapefile. If you copy shapefiles from Windows Explorer, you must be sure to copy all files that belong with a shapefile (.shx, .shp, .dbf, .prj, .xml) or your data will be unreadable.
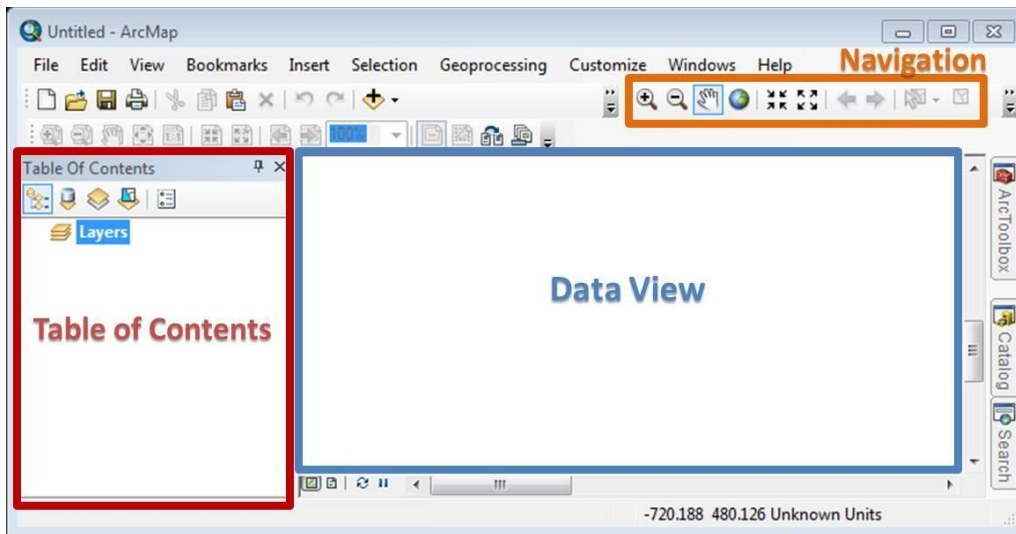
PART 2: Getting familiar with ArcMap

1. **Start ArcMap by clicking on the ArcMap button.** A dialogue appears providing the option to open a new map, a template, or an existing map.

        ▪   A **Blank Map** option is used if you are starting a new map.
        ▪   A **Template** is used if you want to use a layout that has already been created.
        ▪   The **Existing Map** option is used if you want to open a map file that has been previously created in ArcMap.

    o   **Since we are making a new map and not using a template, select Blank Map.**

2. **Table of Contents and Data Frames**. When you first start a blank map, ArcMap automatically creates a working area, or **Data Frame**, called *Layers* in your **Table of Contents**. You can also create new Data Frames and have several Data Frames in a single **ArcMap Map Document**. Each data frame can focus on a different geographical area, or thematic area. Having multiple data frames will allow you to make multiple maps in a single Map Document. However, too many data frames can slow down the software, so use them wisely! We will cover adding new data frames later in the lab.
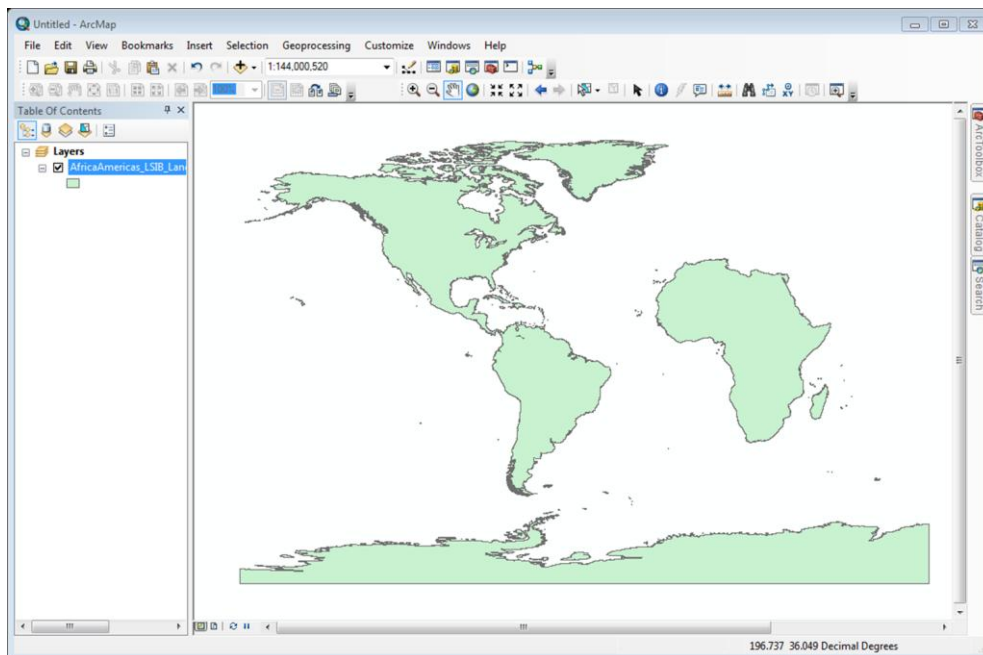
> *Insider Tip: An ArcMap document is called an 'MXD' for short, because the file extension is .mxd*

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Overview of ArcMap Interface.

IMPORTANT NOTE: Each data frame has its own properties, one of the most important of which is **projection.** The projection for a data frame will default to the projection of the first layer added to the data frame. All layers thereafter added to that data frame will be **on-the-fly-projected** to the same coordinate system as the data frame. Note that this is for display purposes only, and this does not change the permanent coordinate system of the newly added layer.
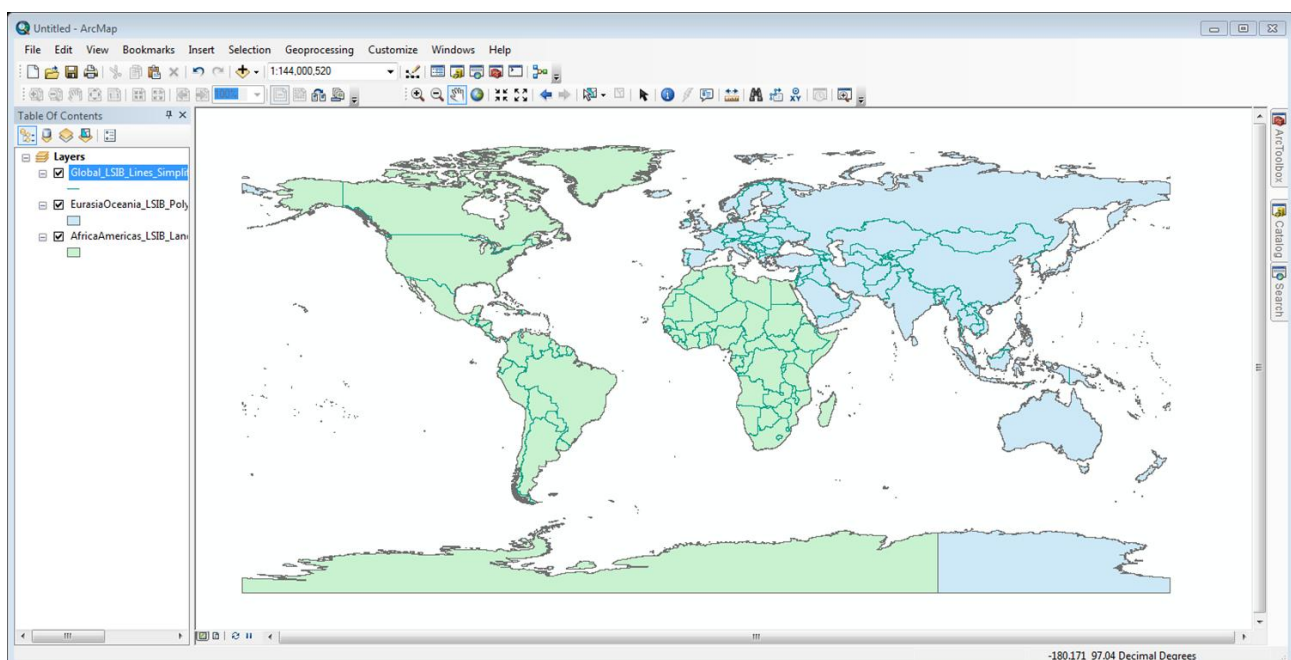
o To set the *Data Frame properties* right click on *Layers* and select **Properties** to open the Data Frame Properties window. Various tabs control the properties for the data frame. Select some of the other tabs to see the different options. We will explore these in depth at another time. For now, close the window when you are through with the tabs.

3. **Navigation and Data View.** Now we are going to explore some geographic data using ArcMap.

▪ Use the **Add Data** button to add the data for this exercise.
▪ Navigate to the **Data folder** and select the **AfricaAmericas_LSIB_Polygons_Simplified_2015Jan23_USG.shp** shapefile.
▪ Click the **Add button** to add the layer.

o **Important concept:** We have just created a **layer** in ArcMap. Each layer references a dataset and specifies how that dataset is portrayed using symbols and text labels. It is important to note that the MXD does not house a shapefile. The layer is POINTING to a shapefile.

o Let's explore this new dataset by navigating the map in the **Data View**. **Data View** is used to display, query, edit, explore and analyze data.

o Use the navigation bar to **zoom in, zoom out, and pan around your map**. Use the magnifying glass to zoom in and out, and use the white glove to pan. To quit using the navigation tools, click the black arrow.

o Add two additional datasets:
  ▪ **EurasiaOceania_LSIB_Polygons_Simplified_2015Jan23_USG.shp**
  ▪ **Global_LSIB_Lines_Simplified_2015Jan23_USG.shp**

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o   Explore their geography in the data view.

o   Let's rename our layers so that we can refer to them more easily. You will find that there are multiple ways to accomplish just about anything in ArcMap. You can rename a layer at least 3 different ways:
  ▪ Double click to access **Properties** and change the name in the **General tab**, or
  ▪ Click once on the layer, wait a moment, and click again, then type in the new name and hit enter, or
  ▪ Click on a layer, hit F2, type a new name, and hit enter.
    NOTE: These techniques are renaming the **layers** in your MXD, not the actual shapefile names.
o   Use one of these techniques to rename the layers as follows:
  ▪ **EurasiaOceania_LSIB_Polygons_Simplified_2015Jan23_USG**
    ● Change to **LSIB Eurasia and Oceania**
  ▪ **AfricaAmericas_LSIB_Polygons_Simplified_2015Jan23_USG**
    ● Change to **LSIB Africa and Americas**
  ▪ **Global_LSIB_Lines_Simplified_2015Jan23_USG**
    ● Change to **LSIB Lines**

Insider Tip: You can change the order of the data layers in the Data Frame by <u>clicking and dragging a data layer up or down</u>. ArcGIS draws from the bottom up, meaning that the layers on top in the table of contents are shown above the layers on bottom in the data view.
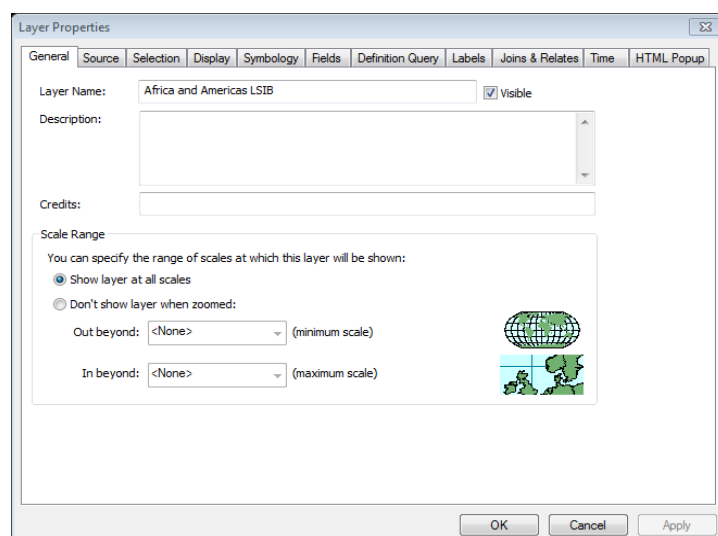
*In general, data layers should be organized with **points at the top, followed by lines and then polygons on the bottom of the list**.*

*ArcMap will **default to this drawing order** when adding data to the map.*

4. **Data Layer properties.** Just as the **Data Frame** has properties, each layer in the **Table of Contents** also has properties. To view the properties of a data layer, right click on the layer name and select *Properties* to open the **Layer Properties** window. You can view and modify the display properties of the layer including symbology and labeling options. Some of the most important things you can do:

Insider Tip: You can also simply double click on either a Data Frame or a Data Layer to get to the Properties dialog.

o   *General tab* allows changing the name of the layer, adding description and credits, and making the layer invisible at a certain scale. This helps declutter your map at different scales.
o   *Source tab* allows viewing the metadata and editing the

Layer Properties	
General	Source	Selection	Display	Symbology	Fields	Definition Query	Labels	Joins & Relates	Time	HTML Popup

Layer Name: Africa and Americas LSIB   ☑ Visible

Description:

Credits:

Scale Range

You can specify the range of scales at which this layer will be shown:
◉ Show layer at all scales
◯ Don't show layer when zoomed:

Out beyond: \<None\>   (minimum scale)

In beyond: \<None\>   (maximum scale)
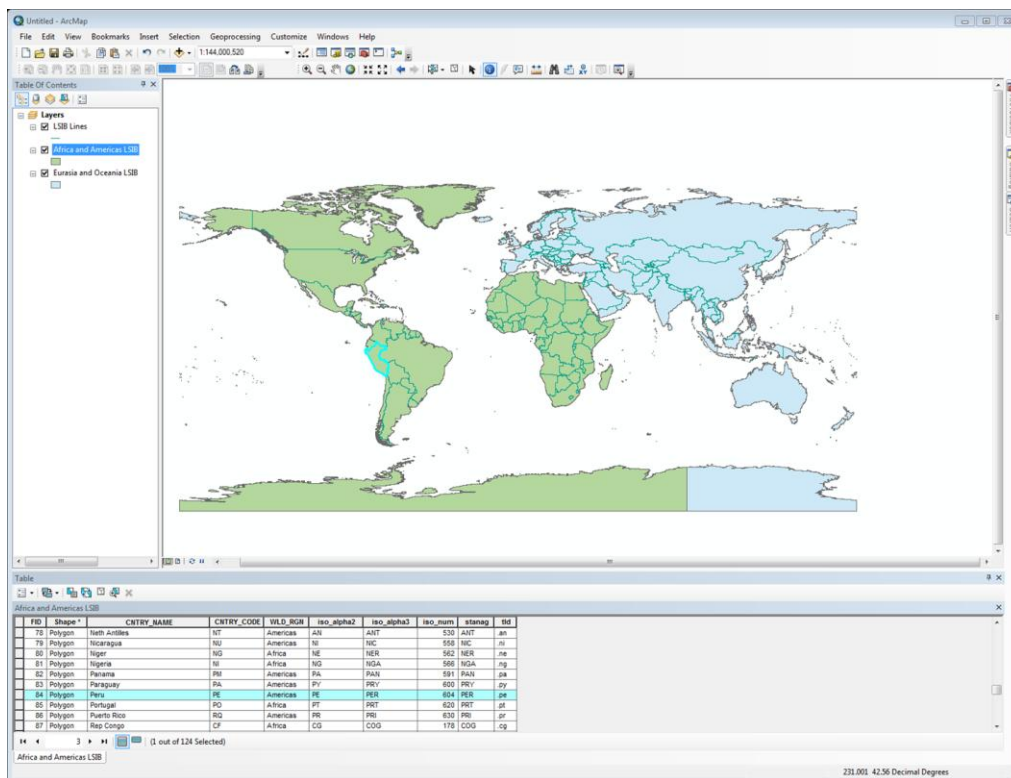
OK Cancel Apply

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data source of the layer.

o *Selection tab* allows customizing selection symbology.

o *Display tab* allows changing transparency of the layer and the default attribute field that shows when you identify on a feature.

o *Symbology tab* allows customizing and importing symbology of the layer via Features, Categories, Quantities, Charts, and Multiple Attributes.

o *Fields tab* allows customizing the display of attribute data, which is useful when you have many attributes but are not interested in seeing all of them all the time.

o *Definition Query tab* allows to write scripts to query the data via Query Builder.

o *Labels tab* allows displaying, changing symbology, and defining placement, scale, and style of the labels.

o *Join & Relates tab* allows joining and relating various datasets.

o *Time* allows animation of data with time attributes

o *HTML Popup tab* allows showing the content of the layer using HTML Popup tool.

Close the **Layer Properties** dialog.

5. **Attribute Data.** How do you know what you are looking at in the **Data View**? There are multiple ways to get more information about the geographic data you are viewing. We will explore the attribute information for your geographic data.
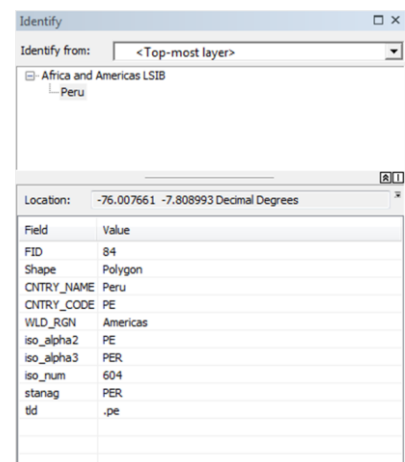
   o An integral part of each shapefile is a *.dbf* file, or database file. This contains the attribute information about your data. It can be very robust or very minimal, depending on the data source and purpose of the data. **Attributes should be thoroughly defined in the dataset's metadata** (more about metadata later)

   o **Attribute tables** contain a row (record) for each **feature** in the layer and a column (field) for each **attribute**.
      ▪ A **Feature** is a single geographic feature, such as a single point, line or polygon.
      ▪ An **Attribute** is a characteristic of that geographic feature. For example, an attribute of a city point may be the population or the year it was founded.

   o **Attribute tables.** Right click on the *Africa and Americas LSIB* layer and select **Open Attribute Table**. There are attribute values for each country, because each country has its own polygon. Scroll across the table and examine the attributes. When a record is highlighted in the attribute table (by clicking on the blank square to the left of each record) the corresponding feature is highlighted on the map.

- o **Identify tool.** If you are exploring data in the data view and want information about a particular feature, use the **Identify tool**, found on the navigation bar shown below.

- o Use the **Identify** tool to explore the attributes of a feature by selecting the tool from the navigation bar and then clicking on a feature in the **Data View**. Note that the same attributes from the attribute table show up in the pop up window.
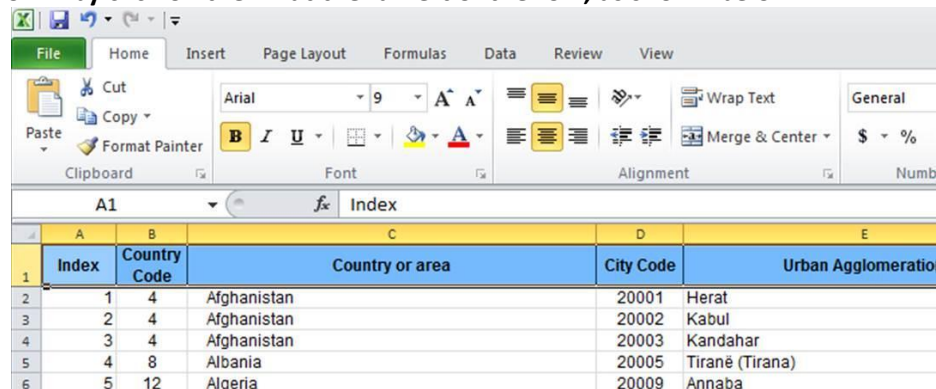
Part 3. Interacting with your Data and Importing Data – Working with Excel

1. ArcMap is a very robust application. You can interact with your data in many, many different ways to analyze, interpret, create, and convey new information. In this section, we will create a new geographic dataset from an existing spreadsheet; extract part of a dataset to create a new subset, and then we will symbolize and label this dataset in preparation for making a map.

2. If you have anything selected (highlighted) on your map, use the **Clear Selection** button to the left of the black arrow on your toolbar to clear your selection. If this option is grayed out, you have nothing selected and need not worry about this step.

3. Excel documents (.XLS), Comma Separated Values (CSV) files, and Text (.TXT) files are often used to store and analyze structured data. In particular, Excel and CSV files are popular. We will use a spreadsheet from the *United Nations Population Division* to create data and display information about cities across the globe and in Peru in a geographic context.

4. In Excel, open the **WUP2014-F22-Cities_Over_300K_Annual.xls** document in the Workshop Exercise 1 folder.

5. Explore the fields included in the dataset and get a sense of the information included:
    o   What format is each field in? For instance, is it text, an integer, a decimal, or a year?
    o   How many fields are there?
    o   How many records are there?
    o   Is there anything other than data, such as notes or headings, in the spreadsheet?

6. ArcMap does not like certain characteristics that are often included in spreadsheets and CSVs, and we have to 'polish' our spreadsheet before importing it or ArcGIS will get angry. This is one reason why it is important to be familiar with your dataset. Here are some of the most common issues to consider:
    o   No spaces allowed in field names.
    o   Field names must start with a letter, but can still include numbers
    o   The word 'Year' cannot be the title of a field.
    o   No special characters, such as parentheses, commas, or hyphens. If it is not a letter or number, we must take it out of the field name.

7. We will now polish this spreadsheet to bring it into ArcMap.
    a. Use the **Save As** tool to save a new copy of the spreadsheet in case we make a mistake with this one. We can always return to the original. Just Append '_ArcGIS' to the end of the filename:
        i.   WUP2014-F22-Cities_Over_300K_Annual_ArcGIS.xls
    b. Note that Rows 1 through 16 on the page **Annual_Data** do not contain data, but do contain useful information. Cut and paste these rows into a new spreadsheet in the workbook, and then delete the 16 rows from the sheet Annual_Data.
    c. You now have useful headers, but **must remove any incompatible characters**. Renaming headers can be a tenuous process, but there are some tricks that can save you time if you know your way around excel.
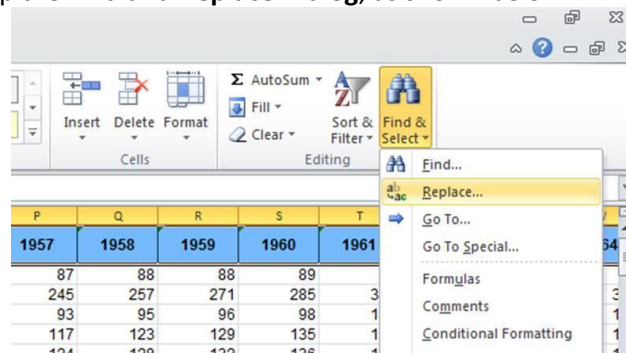   d. Let's get rid of all the spaces in the header rows. We will do this by selecting the header

row, then replacing all the spaces with no characters, thus deleting them. This is much faster than deleting the spaces individually and manually.

e. **Select row 1 by click on the '1' at the far left of the row, as shown below.**
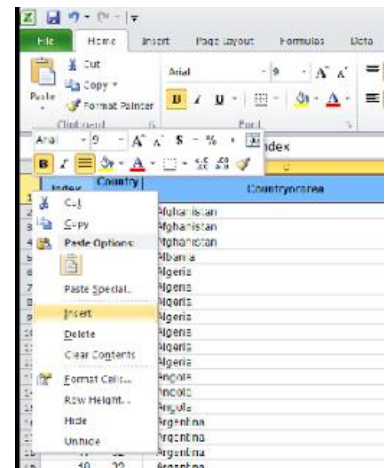

f. At this point you can either choose 'Find & Select' from the ribbon or hit 'Ctrl + H' to bring up the **Find and Replace Dialog**, as shown below.

g. Type a single space in the 'Find what' field, and leave the 'Replace with' field blank. Click 'Replace All' and you will see all the spaces in the headers have disappeared. It is important to **be sure you have just the header row selected when performing this operation or you will remove ALL THE SPACES in the entire SPREADSHEET**. If you do this, simply click undo and try it again.

h. Next we will add the word 'Year' in front of each of the numbered years, since we cannot have a field name that begins with a number. To begin, insert a new row above row 1 by right clicking the '1' and choosing insert.

i. Next type the following formula into the cell above **1950** : =CONCATENATE("Year",I2)

    i. This formula is combining the word in quotations with the contents of the cell directly below it, which is I2. It will maintain this relative reference when we copy it to a new cell. In other words, it will always pull the value from the cell directly below where we put the formula.

ii. Copy and paste this formula into all the cells in the header row from column I through CK by dragging the small white box in the corner of the cell all the way to the right until you get to CK.

j. Copy the cells you just filled in with the formula, select the corresponding cells below them in row 2, right click, and choose 'Paste Special' or click the '123' option under

'Paste.' This will paste the value created by the formula (ie Year1950) instead of the formula itself.

NOTE: You will know if you paste the formula instead of the values if you see that the year no longer makes sense (ie 'Year82.468') The correct version is shown below on the left, and the incorrect paste is shown on the right.
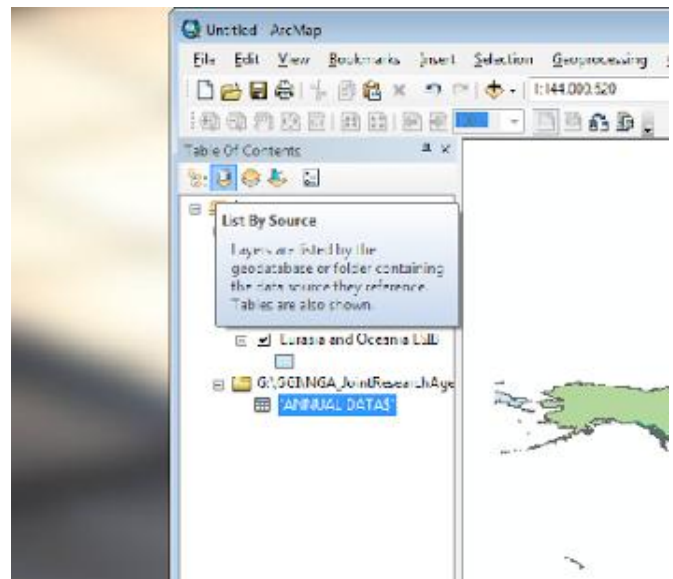
k. Now delete Row 1 and save your Excel Document.
l. Your spreadsheet is ready for ArcMap!

Return to your ArcMap Document.

8. Using the **Add Data** button, navigate to your Excel document. Double click your version with the '_ArcGIS' appended. It will navigate further into your excel document to show the different sheets available. We want the one titled ''**ANNUAL DATA$**'.' Select this sheet and click Add.
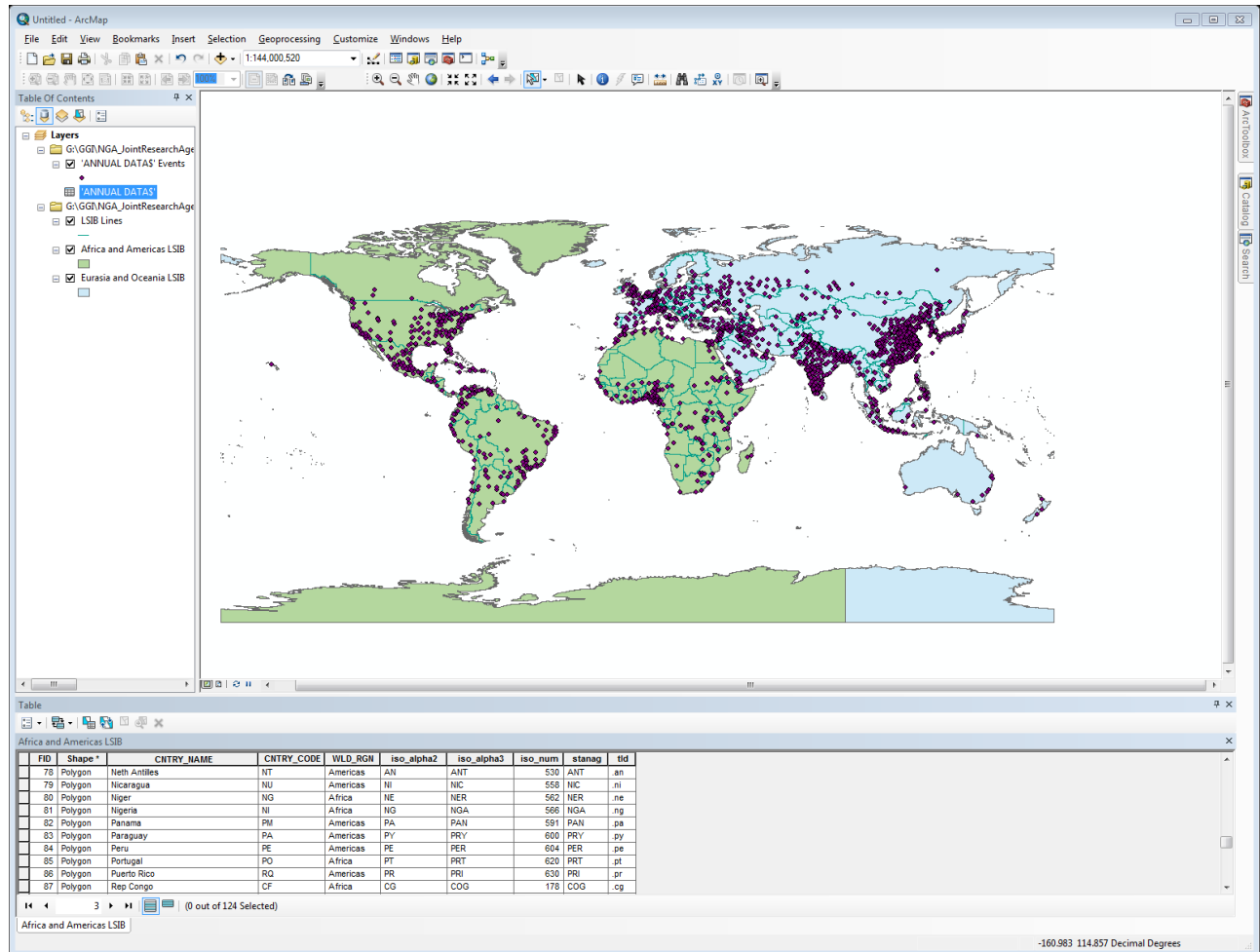
9. You will see that your **Table of Content**s looks a little different. This is a different view in your **Table of Contents**, which lists your data by **Source** rather than by drawing order. To see data in tables that is not in a layer yet, you must use this view. You can hover above the icons at the top of your **Table of** C**ontents** to see how each viewing option is used.

10. Next, we are going to use the **Latitude** and **Longitude** fields in our spreadsheet to tell ArcMap how to locate the data in our sheet.

a. Right click on the **Annual Data** table and choose **Display XY Data**
b. ArcMap makes some assumptions about your data based on the column names, but it's not always correct. If needed, change the X field to Longitude and the Y field to Latitude. Leave the Z field empty for this data set, as we do not have any elevation data associated with our cities.
c. ArcGIS defaults to GCS_WGS_1984 for its datum, which is accurate in this case. You can change this using the **Edit** button if needed.

d. Click **Ok** and disregard the error message about the Object ID field. We will remedy this soon.
e. Now you should have a map full of points displaying your cities!

f. Save your ArcMap document.
g. Your 'Annual Data$ Events Layer' is a temporary layer that ArcMap is showing by reading from your excel. Let's make a permanent Shapefile from this layer, as temporary layers have limitations and can be unpredictable.
h. Right click the 'ANNUAL DATA$' Events layer and navigate to **Data-> Export Data**.
i. Ensure you are exporting '**All Features**' and save your new shapefile to your Lesson 1 folder with the file name **UN_Cities.shp**
j. Choose '**Yes**' when asked if you want to add this to your map.
k. Now you have a reference to your shapefile in your map as a new layer - You've just created a new geographic dataset and mapped it ArcMap!

Part 4: Querying, Symbolizing, and Labeling your Data

1. Using the Toolbar at the top of your **Table of Contents**, switch back to the **List by Drawing Order** view.
2. Double click on the UN_Cities Layer to bring up the properties dialog and navigate to the **Symbology Tab.**
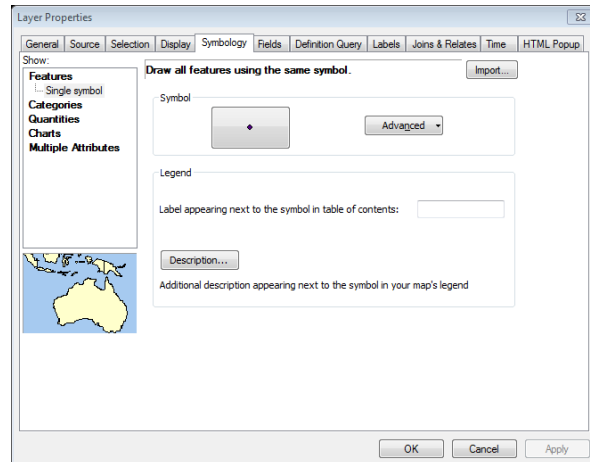3. ArcMap has many symbology options for your data. Explore the options on the left:

   o **Features-> Single symbol** allows you to have all features in a layer depicted with the same symbol.

   o **Categories** option you can use an **attribute field** to differentiate between categories of points. For instance, a field listing the type of city as Country Capital, State Capital, or County Capital could show each type differently.

   o **Quantities** allows you to use a numeric attribute field to determine the symbology. Size and color will change for each feature in accordance with the value of the attribute for that feature.

   o **Charts** allows you to depict multiple attribute values in a single symbol, such as a bar or pie chart for each feature.
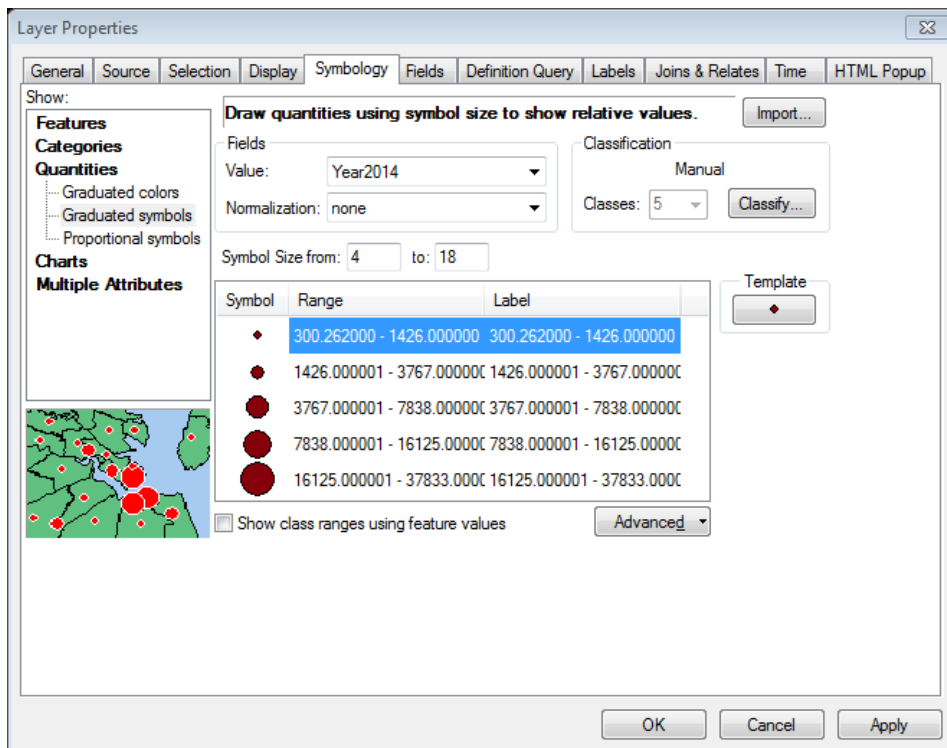
   o **Multiple Attributes** allows you to create combinations of attributes that, together, are their own category. For instance, if you have an attribute for City Type and an attribute for *Under 5,000* or *Over 5,000* people you could depict both attributes in a single symbol by having a unique value for *Country Capital, Under 5,000* and a unique attribute for *Country Capital, Over 5,000.* This option can be cumbersome if you have too many permutations of attribute values, though, so it is best for small lists of types.
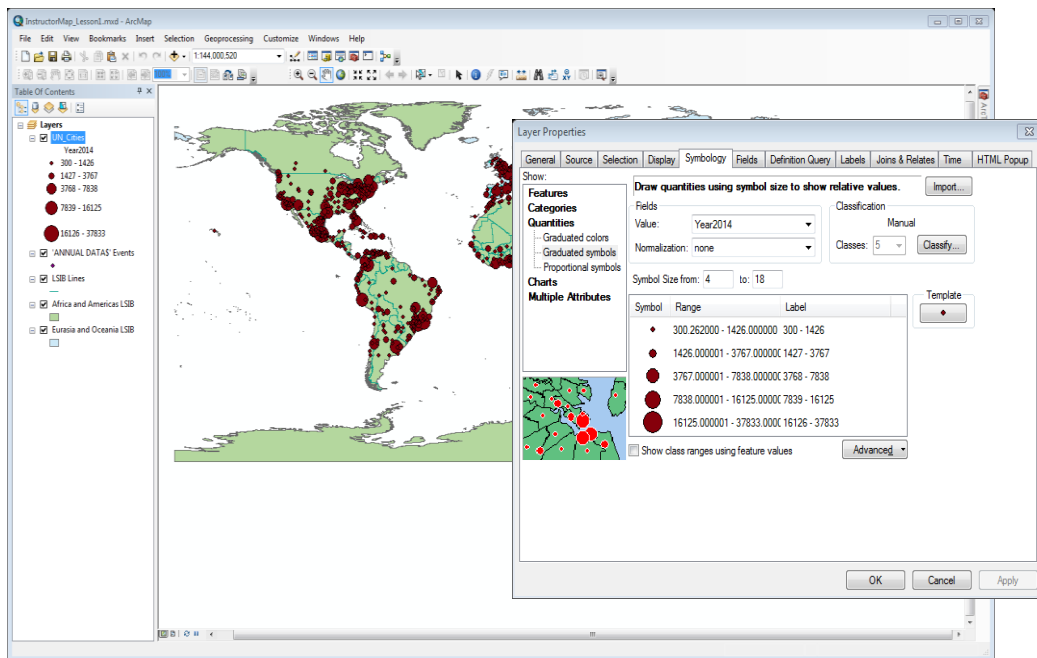
4. We are going to use the **Quantities** option to symbolize the population size for cities in our layer. Click on **Quantities -> Graduated Symbols.**

   We will choose the attribute field of which we want to base our symbology. Click the drop down for **Value:** and select **Year2014.** ArcMap automatically suggests how you might group your data into ranges using the **Natural Breaks (Jenks) method**. You can read more about the methods for classifying your data in the **ArcMap Help**. You can also change the color and symbol used by clicking on the **Template** button to the right. For now, let's simply edit the values so that there are no decimal points.

5. Click on the first value listed in the **Range** column – not the label column. Edit the value so that it is an integer. Repeat this for all of the ranges listed until your data looks like the image below. Be sure to round up for the last value so that you don't lose any features.

6. Adjust the labels so that there are no redundant zeroes showing. This will transfer to our legend later and look much cleaner. Click on the header for the Label column and select **Format Labels.** In the **Rounding Box** change the number of decimal places to **'0'** and select okay. Note that we had to change both the **Range** and the **Labels** so that the **Labels** accurately reflect the **Range** values.
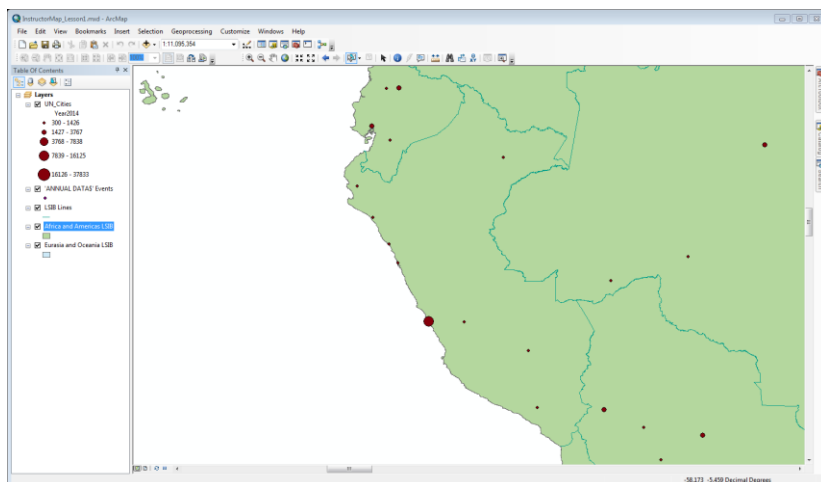7. Hit **Apply**, and move the Properties dialog to preview your map.

8. At the global scale, this data is somewhat overwhelming and difficult to depict. We are interested in cities in Peru, so click **OK** and zoom in to explore Peru.

> **Reminder**: Use the magnifying glass to zoom in, and then switch back to the black arrow.
> **Insider Tip**: Use the selector tool on your navigation bar to **click** and **select** Peru.

o **Right click** and choose **Zoom to Selected Features.** Make a Bookmark for Peru by going to the **Bookmarks Menu** and selecting **Create Bookmark.** Name the bookmark **Peru**. This will allow you to quickly navigate to this map extent again in the future. If you have Peru selected, be sure to clear your selection using either the **clear selected features** tool on either your toolbar or **Selection Menu**.

Your **Data View** should look like this now:

9. Since we are only interested in Peruvian cities, let's extract this from our current dataset and create a new subset of Peruvian cities. There are many ways to accomplish this, but this time we are going to use the **Select by Attribute** tool to select all cities that have Peru listed as the country.

   - o Open your UN_Cities attribute table by right clicking on your UN_Cities layer and selecting **Open Attribute Table**. You can see all the attributes transferred from the Excel document we started with. Familiarize yourself with fields.
   - o In the **Selection Menu** choose the **Select by Attributes** tool. This is also accessible through the attribute table in the upper left corner.
   - o Be sure that the '**Layer**:' field is set to **UN_Cities**, as this is the layer we want to query. We are creating a new selection, so ensure the Method says 'Create a new selection.'
     - ▪ This option can be used to create a query which selects within, adds to, or removes from an existing selection.
   - o Build your query statement. We want to return values that match the thought *Country is Peru*, so:
   - o **Double click** the field **'Countryora'** to add the **country** attribute to your query. Single click the **=** button to add it to your query statement: = is the '**is**' in your query statement. Click the **Get Unique Values** button to retrieve and list all the options in the 'Countryora' field. Type *Peru* in the **Go To:** field to quickly find *Peru.* **Double click Peru** to add it to your query statement.
   - o Verify your query to be sure we made no syntax mistakes by clicking the Verify button. If there are errors, clear the statement and try again. If not, click **OK** in the verify dialog and **Apply** in the **Select By Attributes** tool.
   - o Note that ArcMap selects your cities in the Data View and that they are also selected in the attribute table.

10. We are going to export these cities to a new layer in ArcMap to more easily work with them. This will not create a new shapefile, just a layer reading only cities that match our selection from the UN_Cities shapefile.
    - o Right click the UN_Cities layer, go to **Selection**, and choose **Create layer from selected features**.
    - o Turn off the original UN_Cities layer and the 'ANNUAL DATA$' Events layer clicking the check box next to each, and see that only the cities in Peru, which we selected, are showing on the map.

11. **Change the symbology for your new layer to a quantities type that you like and adjust the range and labels to integers with no decimals showing.**

12. Now let's label the cities in our map. In the properties dialog, go to the labeling tab. You can choose to pull labels for each feature from any attribute field. We are going to show the names of the cities, but you could also show the population or a combination of attributes using an expression.
In the **Label Field** drop down, ensure that **UrbanAgglo** is selected. You can use the options in the Text Symbol section to adjust the font, size, and color for your text, as well as more advanced options using the Symbol button. For now, select a size 14 Arial Black font and click **OK.**
  o Enable labeling for your cities layer by right clicking the layer and choosing **label features.**

Congratulations! You've created a map of cities in Peru based on their population size. Let's make a finished map product using the layout view next.
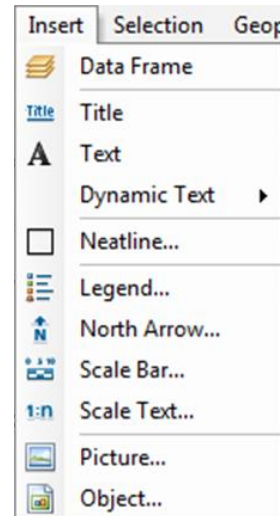
Part 5: Creating a Layout

  1. Select **View/Layout View**. You may need to resize/reorient the Layout to accommodate the orientation of the geography of the surface you are mapping. There is a separate toolbar for navigating your layout view than for navigating the geography of your data.

MAP ELEMENTS:
Be sure to add all the map elements: **North arrow, legend, title, source, scale, date, author** by using the **Insert** option on the Menu bar. Think about sizing of elements, spacing, white space on the page, etc. These elements should be on *ALL* future maps.

o A **title** should include three things: Theme, year of the theme, and geography. Be sure you are in *Layout View*.

> ● From the **Insert** menu, select **Text**.
> ● Type a meaningful Title with the date & geographic area then click O**K**.
> ● Move the title box above the map data.
> ● To change the font, right click the title box.
> ● Select **Properties**.
> ● Select **Change Symbol**. You can change the font type, size and style.

Title fonts should be bold and 16-point or higher. Try a font of 36 point, choose one font type for all the text on your map. Sans serif fonts (i.e., Arial or Helvetica) are easier to read than serif fonts.

  -Click **OK** to close the windows.
  -One quick way to get the right title size is to use the **Fit Width to Margins** option: Right click the title, select **Distribute**, and then **Fit Width to Margins. You still may have to adjust the size of the title.**

o   A **legend and symbology** tell the story of your map**.**

    Insert legend --From the **Insert** menu, select **Legend**.
    -Click **Next,** then **Next** again to accept the defaults.
    -On the *Legend Frame wizard*, select a **0.5** border for the first option. For the *Background color*, select **White**. The default for a legend is **Hollow**, which makes the Legend transparent.
    -Click through the rest of the wizard and **Finish**.
    -Move the legend to a spot close to the data frame – this is usually a good place for a legend.

NOTE: When creating maps with multiple layers, the legend should be organized logically with the key data layers above base data layers.

o   **Insert Scale Bar**

    Scale bars should accompany every map since scale is a critical element for distance/context.
    -From the **Insert** menu, select **Scale Bar**.
    -Select the first scale bar template by clicking on it once, then select **Properties**.
    -Change **Division units** to **Kilometers**.
    -Click **OK** to close the windows.

o   **Insert North Arrow**

    With north arrows, the simpler the better. Avoid overly ornate arrows, yet find your style.
    -From the **Insert** menu, select **North Arrow**. Often the North Arrow will be positioned adjacent to the Scale Bar.

o   **Insert source**

    Be sure to include the sources for data and maps. Citing data sources helps the reader verify the primary source of data. There are many ways to cite sources. Be sure to be consistent in how you cite sources:
    -Create a text box for the source information. On the **Insert** menu, select **Text**.
    -Drag the text box to the lower right corner to be able to see it.
    -Right click the text box and select **Properties**.

    You may have two parts to your source: the **Map Source** and the **Data Source**:
    Map Source: Your organization (or your name), date
    Data Source: where the data was obtained from -Add the production date of the map.

> Map Source: Jane Smith, 2011
> Data Source:
> Deparment of Surveys and Mapping, 2000,
> Retrieved from Botswana National Atlas CD
> 17 January 2011

    -Click **OK**.

- Map frame boundary (optional). Also known as the Neat Line
  A simple frame is best – use the default (simple) and a width of 0.5.

  -While in *Layout View*, click the map frame to activate it. Blue dots will appear around the frame.
  -Right-click the map and select **Properties**.
  -Select **Frame tab**
  -Under **Border**, scroll to the top and select a style.
  -Click **OK**.

NOTE: The design and organization of the map should be well-balanced. Avoid clustering the elements on one side of the map, avoid overly large fonts for the title and legend, and white space should be fairly equal on all sides of the map.

Challenge Activity: Use the UN Population data to make a map of population in another part of thew world. Create a layout.