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1.



1 / 1 point

Activity overview

The video you just watched showed you how to make and visualize JOINs in Tableau. Now, you can use the datasets and instructions in this activity to perform the JOINs yourself. Feel free to refer back to the previous video if you get stuck.

In earlier activities, you worked in Tableau to create a data visualization. In this activity, you will review a scenario, link different data sources in Tableau, and create visualizations using multiple datasets.

By the time you complete this activity, you will be able to make visualizations out of data from multiple sources. This will enable you to visualize comparisons and combinations of data, which will allow you to share more complex projects in your career as a data analyst.



What you will need

Click the link to create a copy of the datasets and download them. If you don't have a Google account, download the datasets directly from the attachments below.

Link to datasets: [CO2](#), [energy](#), [total population](#), and [gdp total](#)

OR

Download datasets:

CO2
XLSX File

Energy data
XLSX File

totalpopulation
XLSX File

gdptotal
XLSX File



The scenario

Imagine you are working as a data analyst at a policy research institute. For your current project, you need to create a visualization that shows the CO2 emissions per capita for each country from 2000-2011. You need to provide a visual presentation that not only allows someone to visually compare CO2 emissions between countries from year to year, but also provides information about each country's population, GDP, and energy use.

You already have a dataset that includes emissions for each country between the years 1960 - 2011. But, the information that you need on energy use, total population, and GDP you had to collect from a government website. Each dataset is in a separate file. Moreover, some of the information is missing for some countries.

Often you will work with datasets that are missing information. Whether or not you need to find this missing information will depend on your project. In this case, you will notice that the missing information is from the 1960s, 1970s, and 1980s.

Luckily, your project is only concerned with the data from 2000-2011. You need an efficient way to utilize some data from one source, and some data from other sources. Taking just the information that you need from each source and creating a new data source takes a lot of time.

Tableau allows you to link data from different sources, as well as import data from different formats. While you won't be working with one in this assignment, Tableau allows you to use a Web Data Connector. This tool allows you to import the data you need directly from another site. Your visualizations will update when the data sources for your visualization are updated.

Load the data

1. Log in to [Tableau Public](#).

- **Note:** Tableau frequently updates its user interface. The latest changes may not be reflected in the screenshots, but the principles in this activity remain the same. Adapting to changes in software updates is an essential skill for data analysts, and we encourage you to practice troubleshooting. You can also reach out to your community of learners on the discussion forum for help.

2. Go to your profile and click **Create a Viz**.

3. From the **Connect to Data** window, go to the **Files** tab and open the **CO2 dataset** you downloaded earlier.

4. From the **Data Source** tab on the bottom of the interface, go to the **Connections** header at the top of the left-side column.

The screenshot shows the Tableau Connections pane. At the top, it says "Connections" with a plus sign icon. Below that, it lists "CO2 Dataset" under "Microsoft Excel". On the left, there's a "Sheets" section with a "Use Data Interpreter" checkbox and a note about it being able to clean Microsoft Excel workbooks. A list of sheets follows: "About", "CO2 (kt) for Split", "CO2 (kt) Pivoted", "CO2 (kt) RAW DATA", "CO2 Data Cleaned", "CO2 Per Capita (Pivoted)", "CO2 Per Capita RAW DATA", "Metadata - Countries", and "New Union".

5. Click the + icon to add another data source. Start with the energy dataset.

6. Repeat step 5 for the other datasets, **gdptotal** and **totalpopulation**.

Now, you should have all four datasets loaded into Tableau. The datasets will be on the left-hand side of your screen under **Connections**.

Note: As you progress through the activity, make sure to save your progress by clicking File > Save or the Save icon. If you are asked to "Create an Extract," do so. It may take some time to create an extract of the data you are using in this activity, but it is essential to saving your progress.

You'll notice that Tableau has already added one of the data sources into the area **Multiple Connections**. In the screenshot below, **Energy** is already loaded.

The screenshot shows the Tableau interface with the title "Tableau Public - Book2". The top menu bar includes File, Data, Window, and Help. The left sidebar shows "Connections" with entries: CO2 (Microsoft Excel), energy (Microsoft Excel), totalpopulation (Microsoft Excel), gdptotal (Microsoft Excel), and "New Union". The main workspace shows a "Multiple Connections" section with a green box highlighting the "energy" entry. Below it, a table preview shows columns: "#", "Country", "Year", and "Abc Energy use (kg of ...)". The data rows are: Afghanistan (2000, NA), Afghanistan (2001, NA), Afghanistan (2002, NA), and Afghanistan (2003, NA).

#	Country	Year	Abc Energy use (kg of ...)
1	Afghanistan	2000	NA
2	Afghanistan	2001	NA
3	Afghanistan	2002	NA
4	Afghanistan	2003	NA

If one of the datasets has already been loaded in, you can remove it by dragging the box to the left-hand side (the grey area) of the screen. Click on the box labeled **Energy** in the center-top of the screen and drag it off to the left to delete it.

Once you remove the data from **Multiple Connections**, it should appear similar to the image below.

Make connections with JOINs

Now, you'll set up the connections between the different datasets by creating JOINs between them. You learned about JOINs in the previous course.

As a refresher: INNER JOINs and OUTER JOINs are types of relationships that can be used to combine data based on common columns of information.

In Tableau, you'll notice that the former JOINs window has now become a multi-purpose Relationships window. By double-clicking your data tables, you can edit the JOINs instead of the relationships.

Follow these instructions to create JOINs in Tableau:

1. Click on **CO2** under **Connections**.
2. Under **Sheets**, you will notice all the different sheets in the **CO2** dataset. Find **CO2 Data Cleaned** and double-click on it to load it.
3. Hover your cursor over the right side of the **CO2 Data Cleaned** box and click on the **arrow**.
4. Select **Open** to open the **CO2 Data Cleaned** dataset. *Make sure you complete this step.* This allows you to change the physical table, which will allow you to create JOINs. Otherwise, you will only be able to edit Relationships. Usually, you could use either option to accomplish the same goal. But for the purposes of this activity, we specifically want to use JOINs.

Your screen should appear similar to the screenshot below.

5. Click on the **energy** dataset under **Connections**.

6. Drag the **energy** sheet across from the **CO2 Data Cleaned** box under **Multiple Connections**. A pop-up window for a Join will appear.

7. The pop-up window may automatically populate with **Year** from **CO2 Data Cleaned** and **Year1** from **Energy**. If not, put **Year** on the left side of the chart and **Year1** on the right side.

8. Click on **Add new join clause** under **Year**. A dropdown menu will appear.

9. Select **Country Name** on the left side and **Country** on the right side.

10. Click the **X** to close the dropdown menu.

□ - CO2 Data Cleaned+ (Multiple Connections)

CO2 Data Cleaned is made of 2 tables. ⓘ



The screenshot shows the Power BI ribbon with the 'Data Model' tab selected. Below the ribbon, there's a grid of four icons representing join types: 'Inner', 'Left', 'Right', and 'Full Outer'. The 'Left' icon is highlighted. The main area displays two tables: 'CO2 Data Cleaned' and 'Energy'. A join operation is being defined between 'Year' in 'CO2 Data Cleaned' and 'Year1' in 'Energy'. The 'Sort fields' section is visible, and the 'Add new join clause' section is open, showing a join clause between 'Country Name' in both tables.

11. Click **Update now** to examine the dataset. You will notice that **Year** and **Year1** have a number sign above them. Change the data type to date for each of these columns.

12. In the column, **Year** click on the # (not the arrow next to it) and select **Date** from the available options.

After completing the first field, you will notice a red exclamation mark between **CO2 Data Cleaned** and **Energy**. This indicates that the columns you have joined are no longer of the same data type. One is formatted as date, and the other numeric.

You will also notice that after changing **Year** (CO2 Data Cleaned) to a Date type, the data preview pane will no longer display properly.

13. To fix this, go to the column list in the lower left of the screen.

This screenshot shows the 'Fields' pane in Power BI. It lists the fields of the 'CO2 Data Cleaned' table. The 'Year' field is highlighted with a red exclamation mark, indicating a data type mismatch. The 'Type' column shows various data types like Number, Date, and String. The 'Field Name' column lists the names of the fields, and the 'Physical Type' column shows the corresponding database column types.

14. Select the # icon next to the **Year1** (Energy) column. Then, change the data type to Date.

This screenshot shows the 'Fields' pane again, but this time the 'Year1' field in the 'Energy' table is selected. The '# Date' option is highlighted, indicating it's the current selection for changing the data type. The rest of the table structure is visible, including the 'Country Code', 'Country Name', 'Region', 'Year', 'CO2 (kt)', 'CO2 Per Capita (metric tons)', 'Country', 'Year1', and 'Energy use (kg of oil equiva...)' fields.

You may need to click **Update Now** in the preview pane to display the data properly. Make sure to repeat this step when you change more data types later on in this exercise.

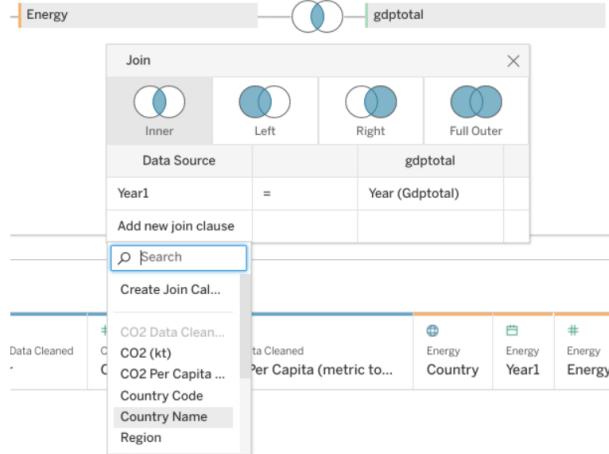
The red exclamation mark will disappear. You might notice that all the years have been put into a month/day/year form with the default month and day as January 1st. This will not create any problems when creating a visualization, as you will filter the data by year.

Connect additional datasets

Before adding any additional joins, the data type for **Year(GdpTotal)** needs to change.

A pop-up window will appear for the join. It might already be populated with **Year1** under **Datasource** and **Year(GdpTotal)** under **gdpTotal**.

1. Click on **gdptotal** under **Connections**.
2. Under **Sheets**, drag the **gdptotal** sheet into the white space underneath the **energy** box.
3. Go to the column list in the lower left of the screen, scroll until you find the column **Year(Gdptotal)**. Click on **#** above it. A drop-down menu will appear.
4. Select **Date** from the drop-down menu.
- If the data preview does not display properly, fix the date type in the lower left pane.
5. Click on the Venn diagram between energy and gdptotal. Click on **Add new join clause** under **year**. A drop-down menu will appear.
6. Under **CO2 Data Cleaned** click on **Country Name**.



7. Click on the empty field under **gdptotal** across from **Country Name**. A dropdown menu will appear.

8. Set the right side of the join statement to **Country1**.

9. Close the Join pop-up by clicking on its **exit button**.

Now you are going to join **totalpopulation**, the last of the four datasets that you downloaded.

10. Click on **totalpopulation** under **Connections**.

11. Under **Sheets**, drag the **totalpopulation** sheet into the white space to the right of the **energy** and **gdptotal** boxes.

A pop-up window will appear for the join. It should already be populated with **Year** under **Datasource** and **Year(totalpopulation)** under **totalpopulation**.

12. Go to the column list in the lower left of the screen, scroll until you find the **Year(totalpopulation)** column. Click on **#** above it. A drop-down menu will appear.

13. Select **Date** from the drop-down menu.

If the data preview does not display properly, fix the date type in the lower left pane.

14. Click on the Venn diagram to the left of totalpopulation. Click on **Add new join clause** under **Year**. A drop-down menu will appear.

15. Under **CO2 Data Cleaned** click **Country Name**.

16. Click on the empty field under **totalpopulation** across from **Country Name**. A dropdown menu will appear.

17. Click **Country (totalpopulation)**.

18. Close the Join pop-up by clicking on its **exit button**.

19. Click the **Update** button to view your data columns.

Congratulations! You have successfully joined four different sources of data.

You should take some time to study your dataset. The only years you should notice in your dataset are between 2000-2011. While your dataset **CO2** went from 1960-2011, and your other datasets went from 2000-2015, the intersection (the years they have in common) only includes 2000-2011. This is just the time span that you need.

If the dataset had gone beyond those dates, you would have filtered out the unneeded years in your visualization.

Reviewing the dataset, you may have noticed that some of your measurement values need to be changed. The data type for the column **Energy use** is listed as string data. You can tell this because of the **Abc** icon above the name. The column **currentGDP** is also formatted as type string.

20. Find the **Abc** icon above the **Energy use** column. Change it to **Number (decimal)**.

21. Find the **Abc** icon above the **currentGDP** column. Change it to **Number (whole)**.

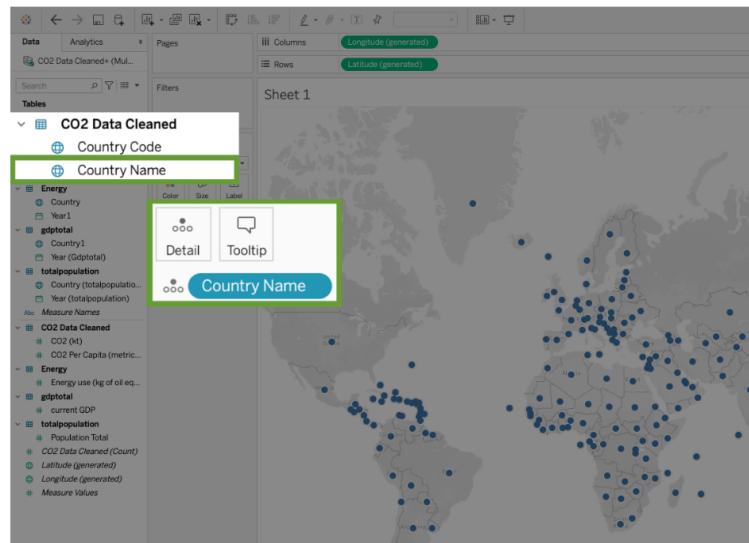
If the data preview does not display properly, fix the date type in the lower left pane.

Create a visualization

At the bottom of your screen, you will notice a tab labeled **Sheet 1**.

1. Click on the tab **Sheet1**.

2. Drag **Country Name** under **CO2 Data Cleaned** into the **Detail** square.



3. Drag **CO2 Per Capita** to **Color**.

4. Click on **Color**, then **Edit Colors**.

5. Click on the **Palette** dropdown and change it from **Automatic** to **Red-Green diverging**.

6. Check the boxes for **Stepped Color** and **Reversed**. (Because green is generally viewed as positive for CO2 emissions, you want the colors to move towards red as emissions go up.)

7. Click the **Show Advanced** dropdown.

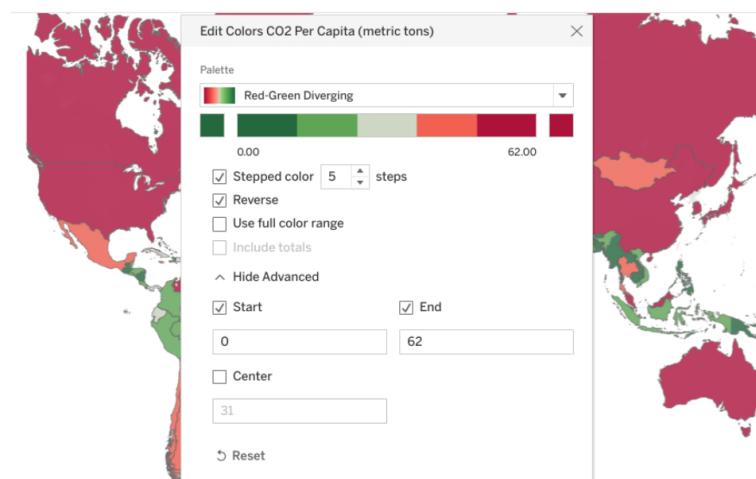
8. Check the **Start** and **End** boxes.

You might have noticed that the legend on the right-hand side of the screen shows **Sum(CO2 per capita)**. You need to change the **start** and **end** values in order to notice color contrasts showing red shades.

The lowest CO2 Per Capita emission for any year is 0.0396 and the largest is 61.9898.

9. Enter 0 into the **Start** field, and 62 into the **End** field. Click **OK**. Click the **X** button.

Note: These values are the highest and lowest emissions between 2000-2011. Your screen should now look like this:



10. Drag **Year** from under **CO2 Data Cleaned** into the **Filters** area.

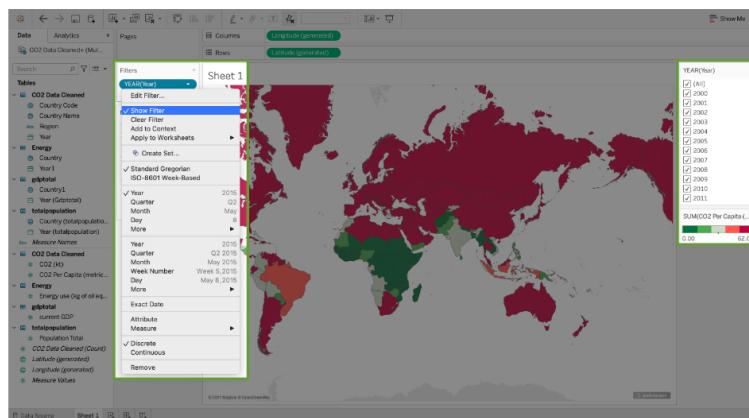
11. Click on **Years, Next, All, OK**.





12. In the **Filters** box, right-click on **YEAR(Year)**

13. Select **Show Filter**. The filter will appear on the right side of the screen.



14. Click on the arrow to the right of **YEAR(Year)** on the far-right side of the screen.

15. Select **Single Value (dropdown)**. Now the areas are colored only for the values of each year. Use the checkboxes in the list to choose which years you want to include in the visualization. You can select only the years between 2000-2011 to view the emissions relevant to the scenario.

Congratulations! You've linked your data and made a comprehensive data visualization in Tableau.

Reflection

In this activity, you used Tableau to link data together and visualize it. In the text box below, write 2-3 sentences (40-60 words) in response to each of the following questions:

- What did linking data from multiple sources allow you to do with your visualization in Tableau?
- What other kinds of datasets could you link to the four you used in this activity? What kinds of comparisons or insights could you make?
- If you couldn't link data in this way, how would you make complex comparative datasets and visualizations like this?

What did linking data from multiple sources allow you to do with your visualization in Tableau?
 Allowed me to make better predictions with my data. Because I could analyze a grade range of years.
 What other kinds of datasets could you link to the four you used in this activity? What kinds of comparisons or insights could you make?
 The number of colonized countries. I could see if colonialism had an impact on CO2 emissions.
 If you couldn't link data in this way, how would you make complex comparative datasets and visualizations like this?
 By using Tableau and its tool box.



Correct

Congratulations on completing this hands-on activity! A good response would include that linking data allows you to combine different features of multiple datasets without having to create a new dataset as you visualize comparisons and combinations of data.

With Tableau and other visualization software, you can simplify the process of combining and visualizing data. Otherwise, you would need to select the information you need and create a new data source, which takes a lot of time. This simplified process will allow you to share more insights with your peers and stakeholders throughout your career as a data analyst.