Tutorial

Introduction to Tableau

This tutorial is adapted from Tableau Help – Tutorial: Get Started with Tableau Desktop.

Download and install Tableau

Due to licence restrictions, Tableau Desktop is unavailable on AppsAnywhere, but it is installed on computers in the labs we use for this module. To start it, search for **Tableau**. You will see an entry like **Tableau 2023.2** (depending on the installed version). Click it to start Tableau Desktop.

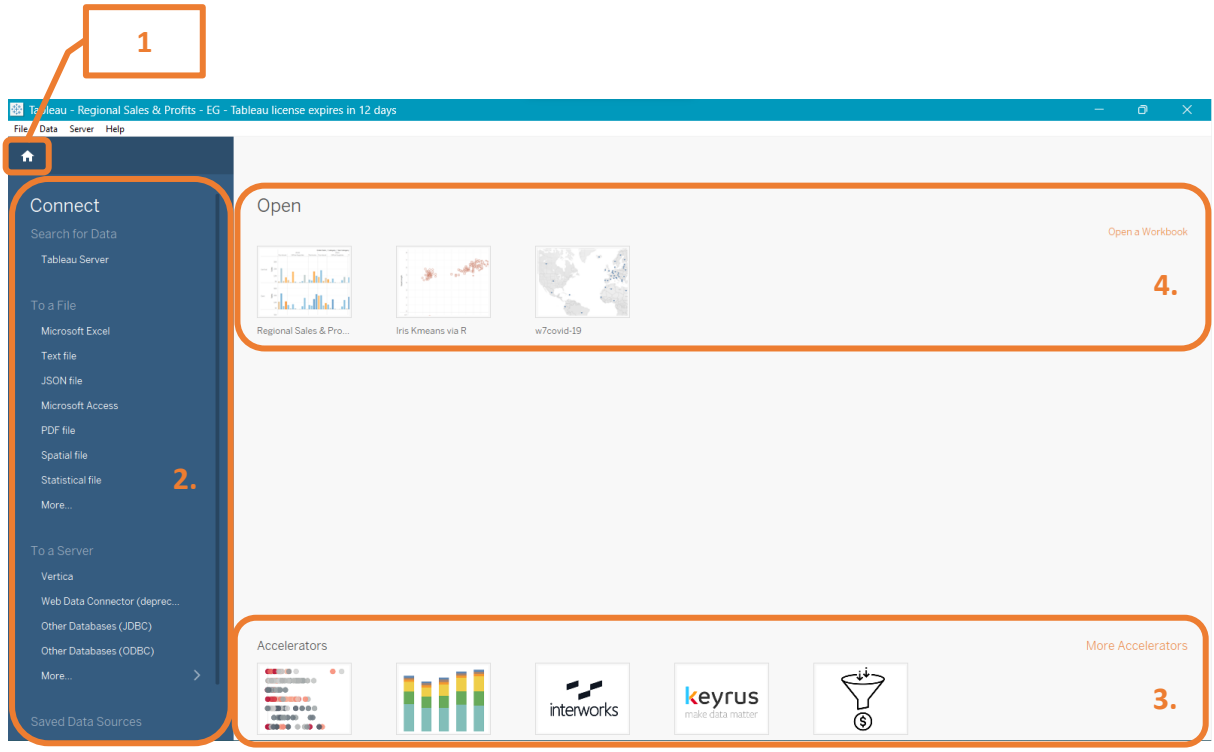
You can also download Tableau and install it on your own computer. When first installing Tableau, you can use it for 14 days. After this period, you need to enter a licence key.

You can get a one year student licence for free from Tableau. Go to https://www.tableau.com/academic/students and click the **Free Academic License** button. Fill in the form with your @westminster.ac.uk email address and Tableau will send you your licence.

Step 1: Connect to your data

Open Tableau Desktop and begin

The first thing you see after you open Tableau Desktop is the Start Page. Here, you select the connector (how you will connect to your data) that you want to use.



The start page gives you several options to choose from:

1. **Home icon**. Click  in the upper left corner of any page to toggle between the start page and the authoring workspace.

2. **Connect pane**. Under **Connect**, you can:

- Connect to data that is stored in a file, such as Microsoft Excel, PDF, Spatial files, and more.
- Connect to data that is stored on Tableau Server, Microsoft SQL Server, Google Analytics, or another server.
- Connect to a data source that you've connected to before.

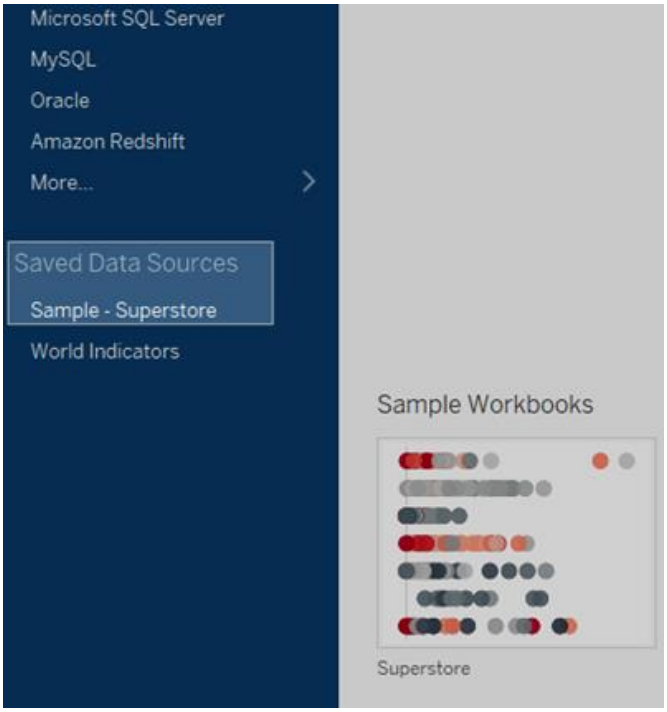
Tableau supports the ability to connect to a wide variety of data stored in a wide variety of places. The **Connect** pane lists the most common places that you might want to connect to, or click the **More** links to see more options.

3. Under **More Accelerators**, view sample dashboards and worksheets that come with Tableau Desktop. See also: https://help.tableau.com/current/pro/desktop/en-us/accelerators.htm#add-your-data-to-the-accelerator-in-tableau-desktop

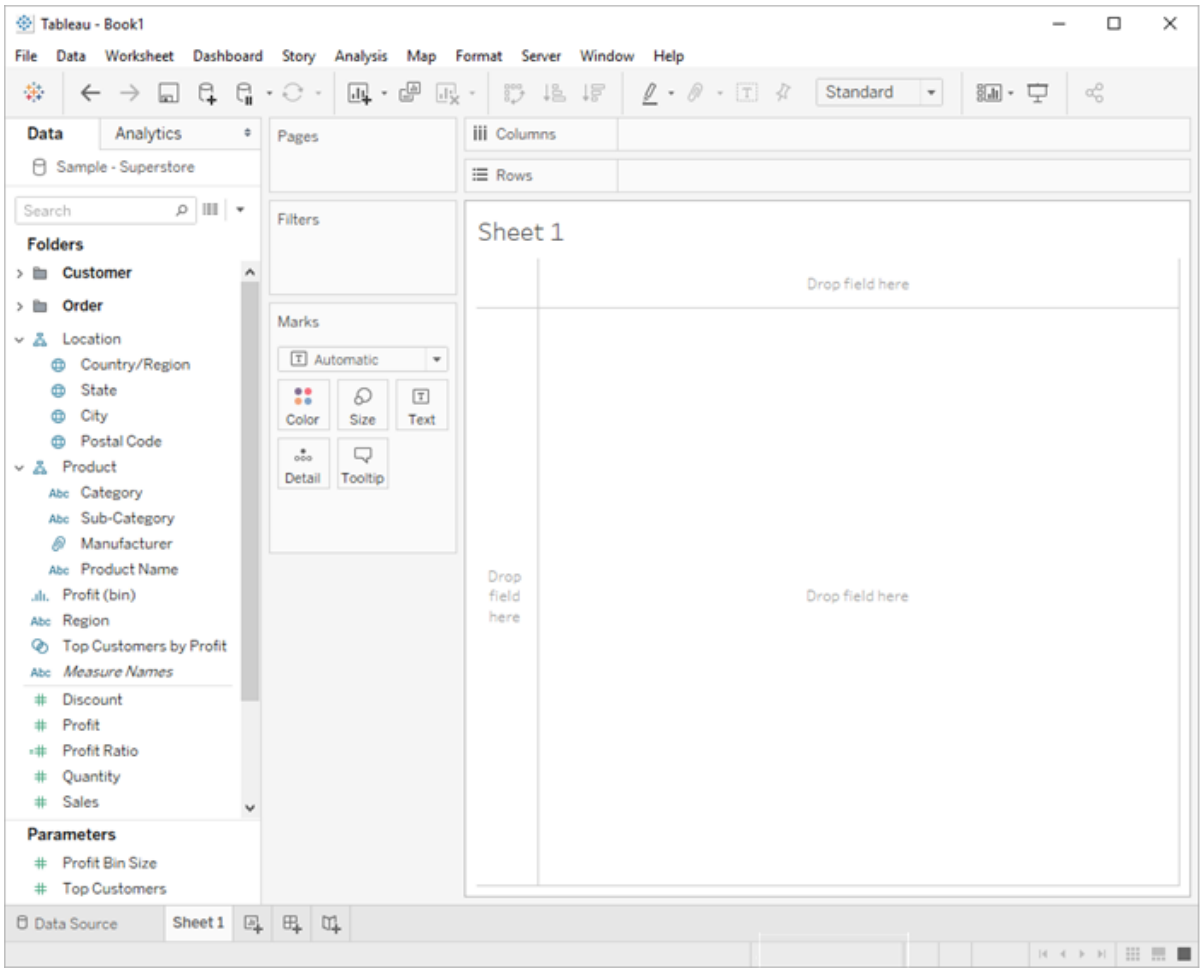
4. Under **Open**, you can open workbooks that you've already created.

Older versions of Tableau may also show a **Discover** pane on the right, where you can find additional resources like video tutorials, forums, or the "Viz of the Day" to get ideas about what you can build.

In the **Connect** pane, under **Saved Data Sources**, click **Sample - Superstore** to connect to the sample data set.



After you select **Sample - Superstore**, your screen will look something like this:



The **Sample - Superstore** data set comes with Tableau. It contains information about products, sales, profits, and so on that you can use to identify key areas for improvement within this fictitious company.

Step 2: Drag and drop to take a first look

Create a view

You set out to identify key areas for improvement, but where to start? With four years' worth of data, you decide to drill into the overall sales data to see what you find. Start by creating a simple chart. [Tip: Tableau Workspace]

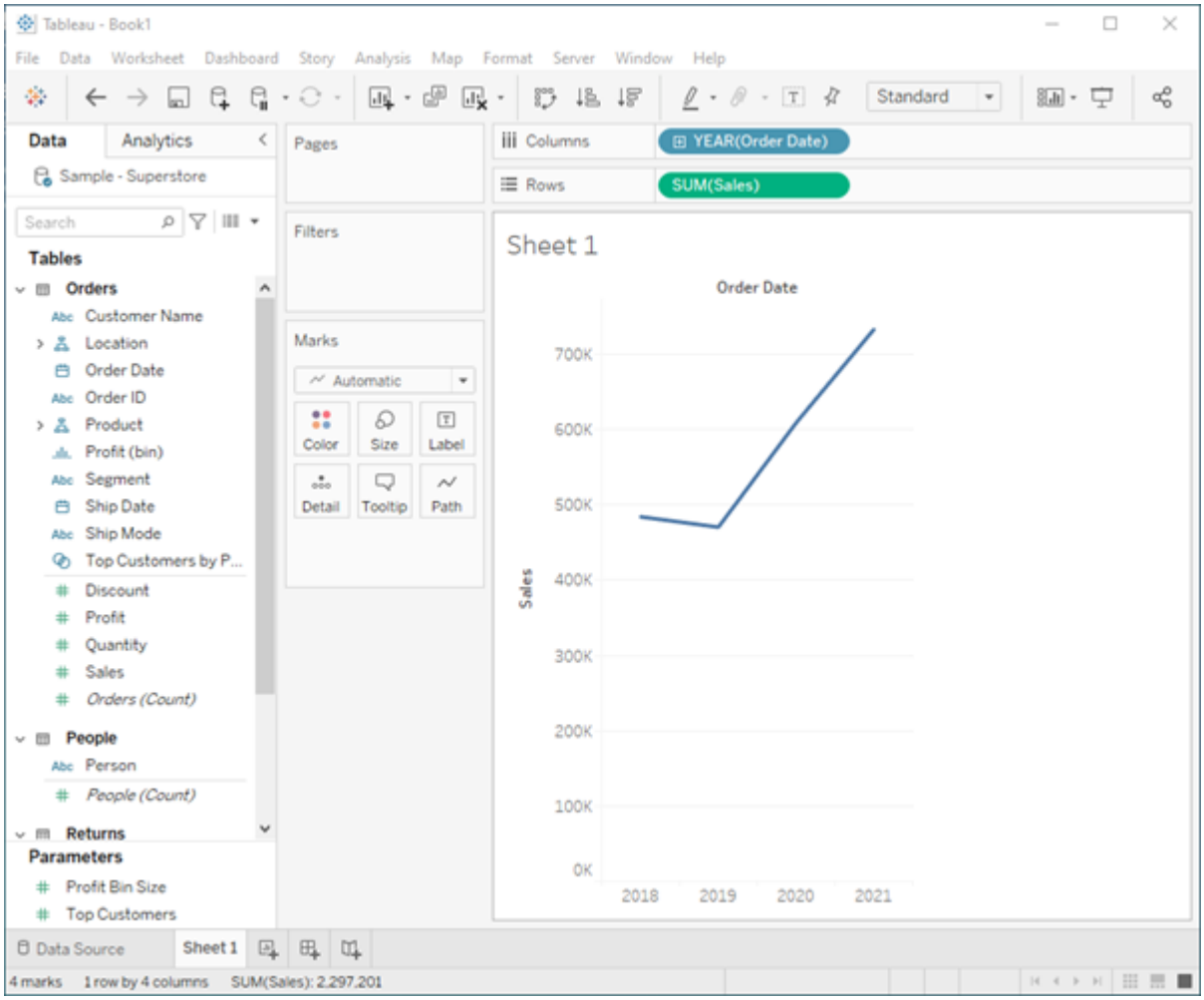
1. From the **Data** pane, drag **Order Date** to the **Columns** shelf.

Note 1: When you drag **Order Date** to the **Columns** shelf, Tableau creates a column for each year in your data set. Under each column is an **Abc** indicator. This indicates that you can drag text or numerical data here. If you were to drag **Sales** to this area, Tableau creates a series of bar charts for each year.

Note 2: In previous versions, Tableau would create something similar to an Excel crosstab (like a spreadsheet) that displays the sales totals for each year. This is obtained in Tableau 2023.2 by dragging **Sales** to the **Label** mark.

2. From the **Data** pane, drag **Sales** to the **Rows** shelf.

Tableau generates the following chart with sales rolled up as a sum (aggregated). You can see total aggregated sales for each year by order date.



When you first create a view that includes time (in this case Order Date), Tableau automatically generates a line chart.

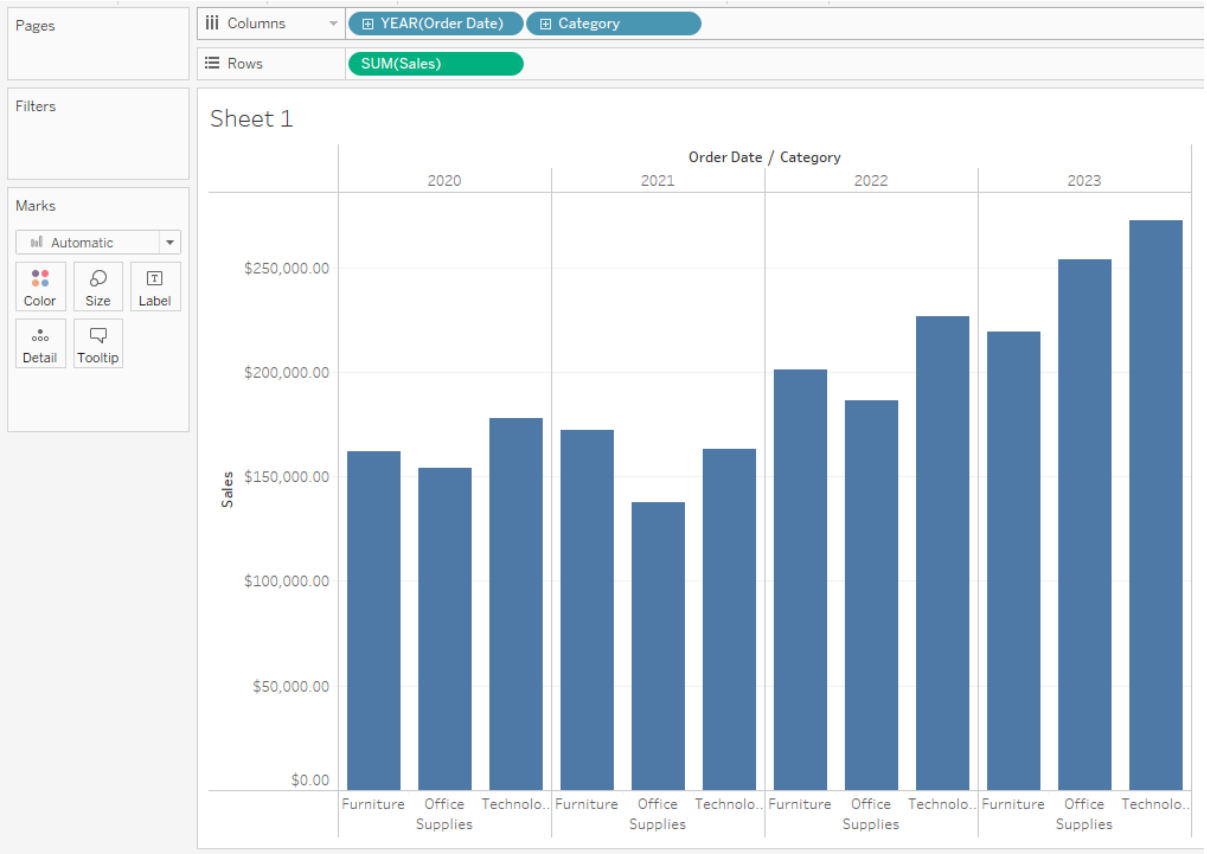
This line chart shows that sales look pretty good and seem to be increasing over time. This is good information, but it doesn't really tell you much about which products have the strongest sales and if there are some products that might be performing better than others. Since you just got started, you decide to explore further and see what else you can find out.

Refine your view

To gain more insight into which products drive overall sales, try adding more data. Start by adding the product categories to look at sales totals in a different way.

1. From the **Data** pane, drag **Category** (under the **Product** hierarchy) to the **Columns** shelf and place it to the right of **YEAR(Order Date)**.

Your view updates to a bar chart. By adding a second discrete dimension to the view you can categorize your data into discrete chunks instead of looking at your data continuously over time. This creates a bar chart and shows you overall sales for each product category by year.



Your view is doing a great job showing sales by category—furniture, office supplies, and technology. An interesting insight is revealed!

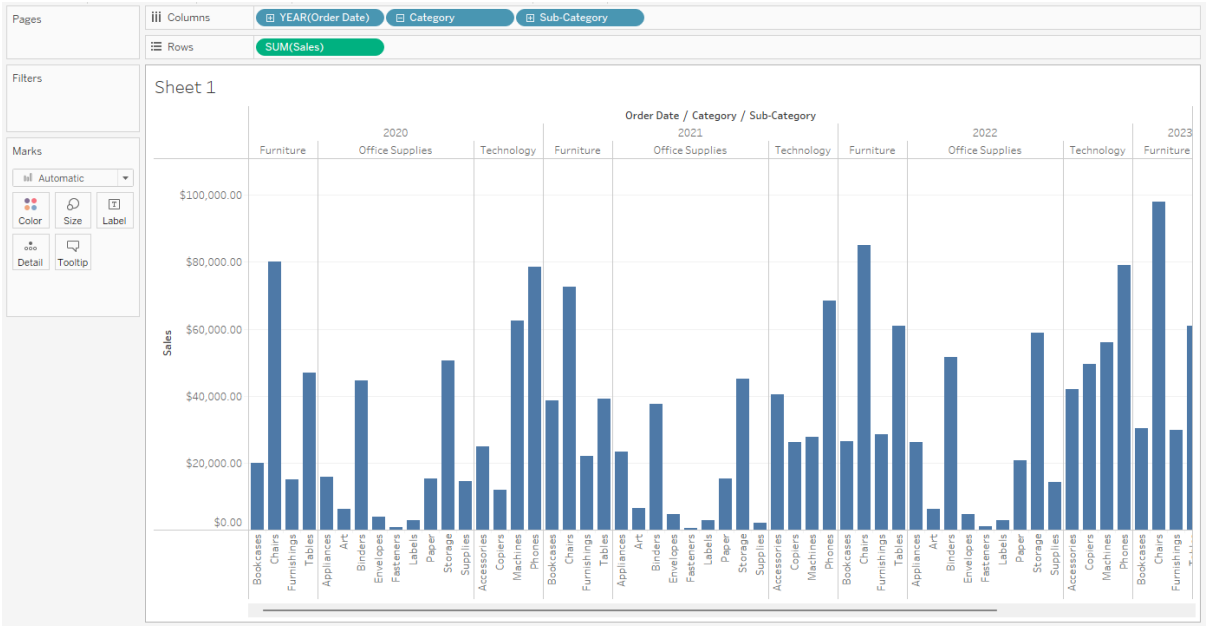
From this view, you can see that sales for furniture is growing faster than sales for office supplies, even though Office Supplies had a really good year in 2021. Perhaps you can recommend that your company focus sales efforts on furniture instead of office supplies? Your company sells a lot of different products in those categories, so you'll need more information before you can make a recommendation.

To help answer that question, you decide to look at products by sub-category to see which items are the big sellers. For example, for the Furniture category, you want to see details about bookcases, chairs, furnishings, and tables. Looking at this data might help you gain insights into sales and later on, overall profitability, so add sub-categories to your bar chart.

2. Double-click or drag **Sub-Category** to the **Columns** shelf.

Note: You can drag and drop or double-click a field to add it to your view, but be careful. Tableau makes assumptions about where to add that data, and it might not be placed where you expect. You can always click **Undo** to remove the field, or drag it off the area where Tableau placed it to start over.

Sub-Category is another discrete field. It creates another header at the bottom of the view, and shows a bar for each sub-category (68 marks) broken down by category and year.



Now you are getting somewhere, but this is a lot of data to visually sort through. In the next section, you will learn how you can add colour, filters, and more to focus on specific results.

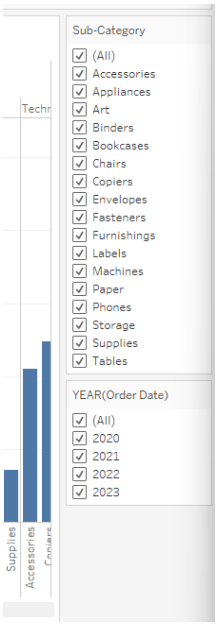
Step 3: Focus your results

You've created a view of product sales broken down by category and sub-category. You are starting to get somewhere, but that is a lot of data to sort through. You need to easily find the interesting data points and focus on specific results. Well, Tableau has some great options for that!

Filters and colours are ways you can add more focus to the details that interest you. After you add focus to your data, you can begin to use other Tableau Desktop features to interact with that data

Add filters to your view

You can use filters to include or exclude values in your view. In this example, you decide to add two simple filters to your worksheet to make it easier to look at product sales by sub-category for a specific year.



1. In the **Data** pane, right-click **Order Date** and select **Show Filter**.

2. Repeat the step above for the **Sub-Category** field.

The filters are added to the right side of your view in the reverse order that you selected them. Filters are card types and can be moved around on the canvas by clicking on the filter and dragging it to another location in the view. As you drag the filter, a line appears that shows you where you can drop the filter to move it.

Note: The **Get Started** tutorial uses the default position of the filter cards.

Add colour to your view

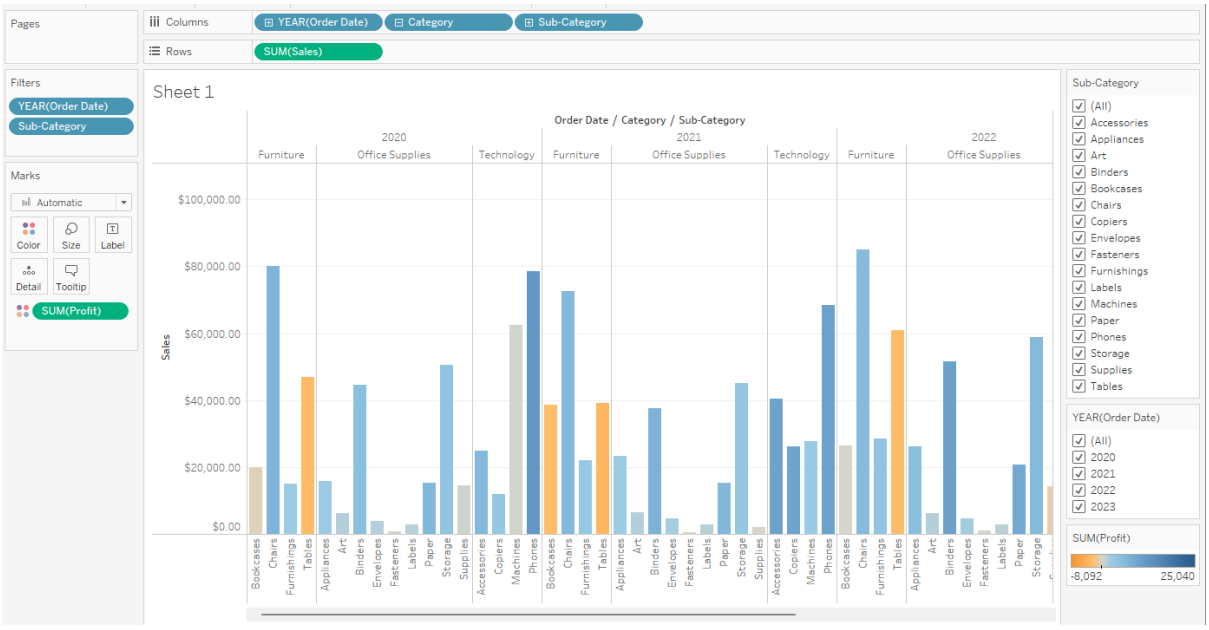
Adding filters helps you to sort through all of this data—but wow, that's a lot of blue! It's time to do something about that.

Currently, you are looking at sales totals for your various products. You can see that some products have consistently low sales, and some products might be good candidates for reducing sales efforts for those product lines. But what does overall profitability look like for your different products? Drag **Profit** to **Color** to see what happens.

From the **Data** pane, drag **Profit** to **Color** on the **Marks** card.

By dragging **Profit** to **Color**, you now see that you have negative profit in Tables, Bookcases, and even Machines (scroll right to see all years, or change **Standard View** to **Entire View**). Another insight is revealed!

Note: If your chart doesn't look like the following, check if you've dragged **Profit (bin)** instead of **Profit**.



Note: Tableau automatically added a colour legend and assigned a diverging colour palette because your data includes both negative and positive values.

Find key insights

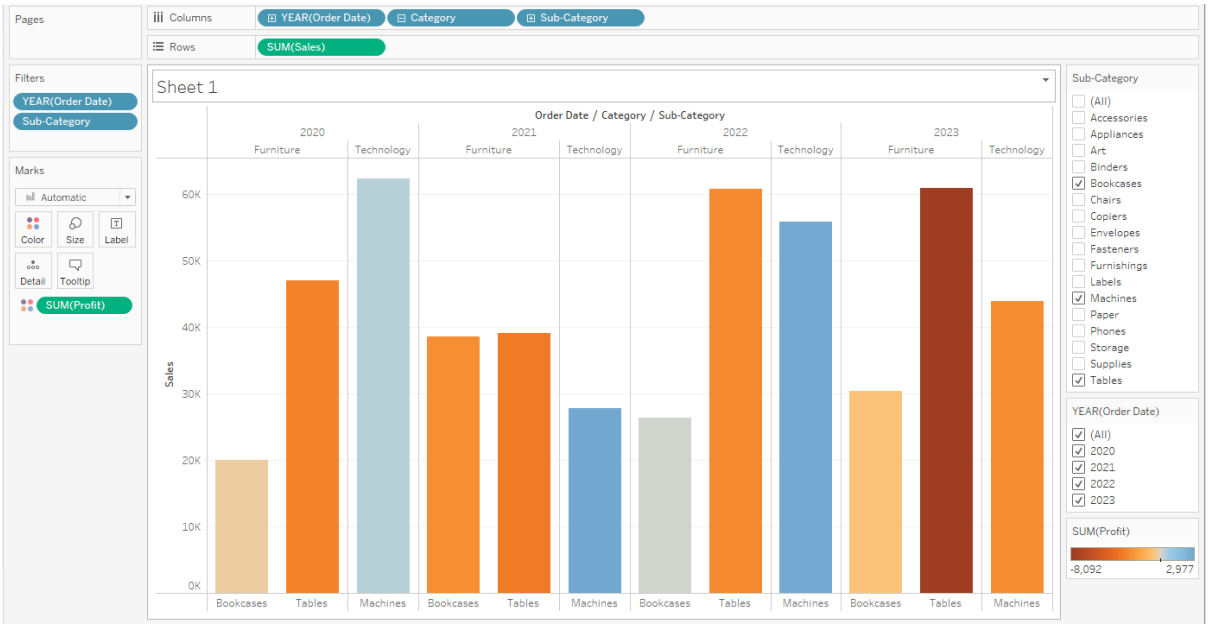
As you've learned, you can explore your data as you build views with Tableau Desktop. Adding filters and colours helps you better visualize your data and can identify problems right away.

The next step is to interact with your view so that you can begin drawing conclusions.

Looking at your view, you saw that you had some unprofitable products, but now you want to see if these products have been unprofitable year over year.

It's time to use your filters to take a closer look.

1. In the view, in the **Sub-Category** filter card, clear all of the check boxes except **Bookcases**, **Machines**, and **Tables**.



Now you can see that, in some years, Bookcases and Machines were profitable. However, recently Machines are unprofitable. While you've made an important discovery, you want to gather more information before proposing any action items to your boss.

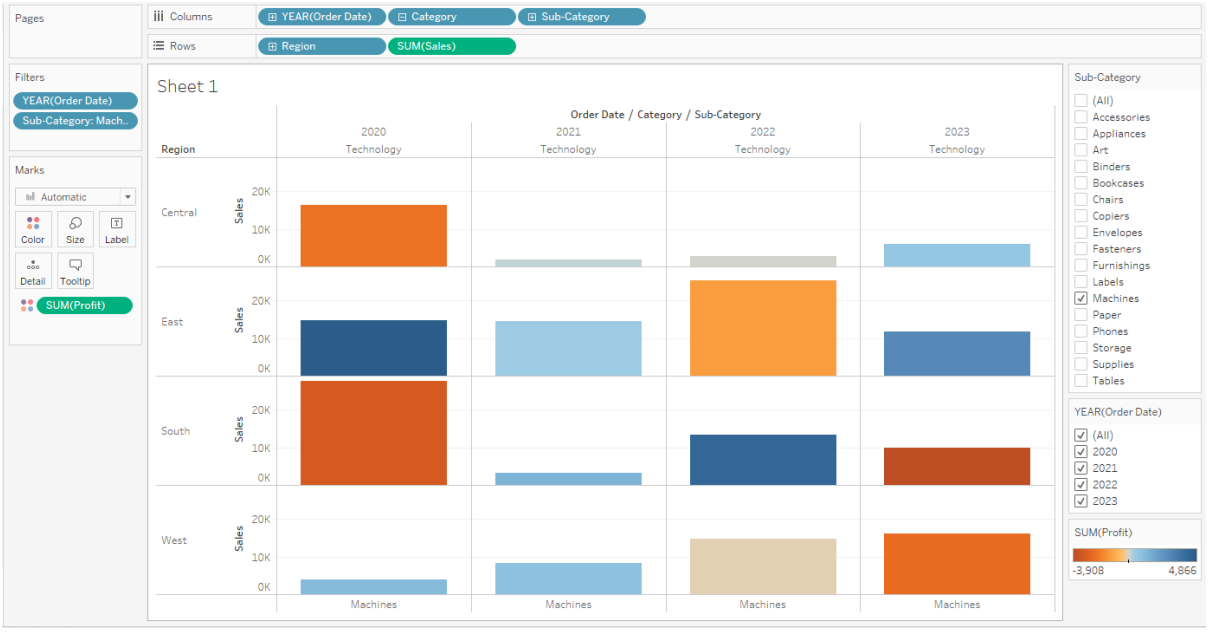
On a hunch, you decide to break up your view by region:

2. Select **All** in the **Sub-Category** filter card to show all sub-categories again.

3. From the **Data** pane, drag **Region** (from the **Location** hierarchy)to the **Rows** shelf and place it to the left of **Sum(Sales)**.

Tableau creates a view with multiple axes broken down by region.

Now you see sales and profitability by product for each region. By adding **Region** to the view and filtering the **Sub-Category** for Machines only, you notice that machines in the South are reporting a higher negative profit overall than in your other regions. You've discovered a hidden insight!



This view best encapsulates your work so far. Select **All** in the **Sub-Category** filter card (if you changed your filter) to show all sub-categories again, name the worksheet, and add a title.

4. At the bottom-left of the workspace, double-click **Sheet 1** and type **Sales by Product/Region**. **Tip**: Right-click on the title text above the view and choose **Edit Title...** to see why this happens, and other automated text options available.

You choose to focus your analysis on the South, but you don't want to lose the view you've created. In Tableau Desktop, you can duplicate your worksheet to continue where you left off.

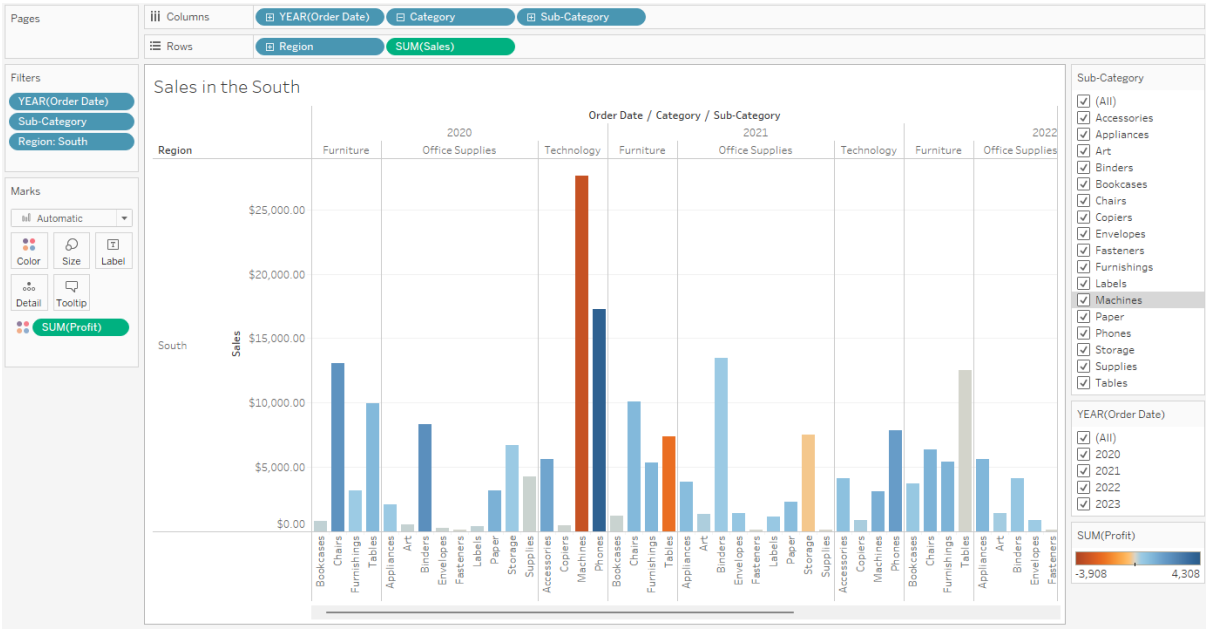
5. In your workbook, right-click the **Sales by Product/Region** sheet and select **Duplicate**.

6. Rename the duplicated sheet to **Sales in the South**.

7. In your new worksheet, from the **Data** pane, drag **Region** to the **Filters** shelf to add it as a filter in the view. **Note**: This is added as a hidden filter by default.

8. In the **Filter [Region]** dialog box, clear all check boxes except **South** and then click **OK**.

Your view updates to look like the image below.



Now you can focus on sales and profit in the South. You immediately see that machine sales had negative profit in 2020 and again in 2023. This is definitely something to investigate!

4. Save your work by selecting **File** > **Save As**. Give your workbook a name, such as *Regional Sales and Profits*.

Step 4: Explore your data geographically

You've built a great view that allows you to review sales and profits by product over several years. And after looking at product sales and profitability in the South, you decide to look for trends or patterns in that region.

Because you're looking at geographic data (the Region field), you have the option to build a map view. Map views are great for displaying and analysing this kind of information. Plus, they're just cool!

For this example, Tableau has already assigned the proper geographic roles to the **Country**, **State/Province**, **City**, and **Postal Code** fields. That's because it recognized that each of those fields contained geographic data. You can get to work creating your map view right away.

Build a map view

Start fresh with a new worksheet.

1. Click the **New worksheet** icon at the bottom of the workspace.

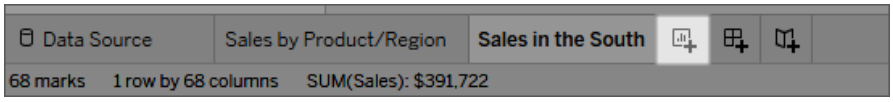
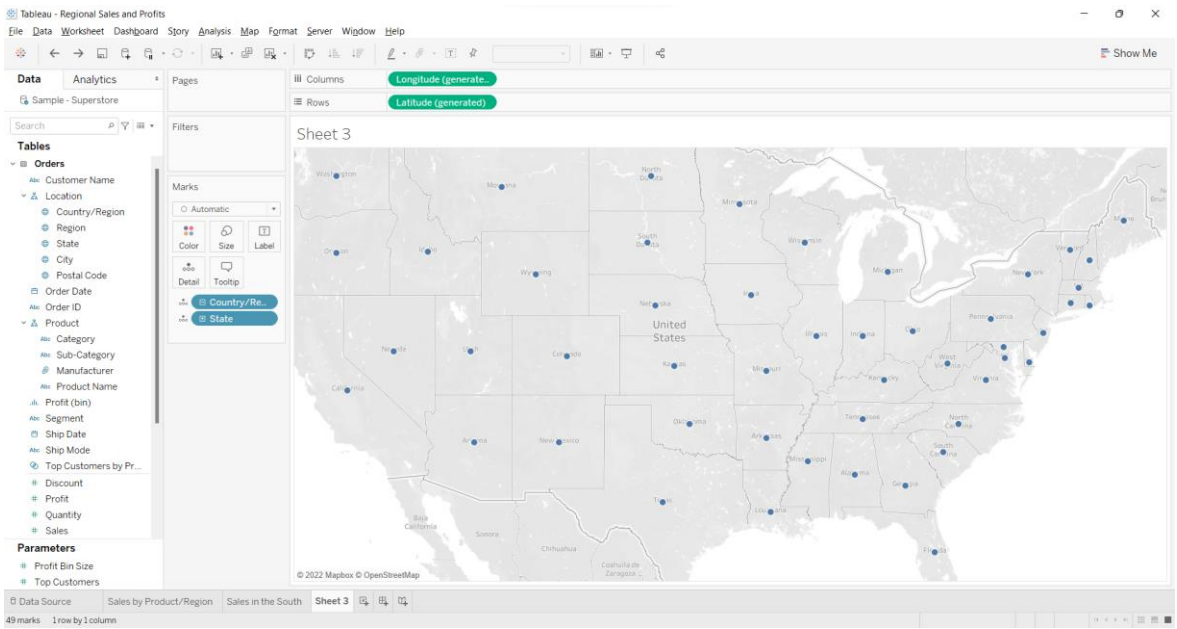


Tableau keeps your previous worksheet and creates a new one so that you can continue exploring your data without losing your work.

2. In the **Data** pane, double-click **State** to add it to **Detail** on the Marks card.

Now you've got a map view!



Because Tableau already knows that state names are geographic data and because the **State/Province** dimension is assigned the **State/Province** geographic role (right-click to view this), Tableau automatically creates a map view. There is a mark for each of the 48+ contiguous states in your data source.

Notice that the **Country/Region** field is also added to the view. This happens because the geographic fields in **Sample - Superstore** are part of a hierarchy. Each level in the hierarchy is added as a level of detail.

Additionally, **Latitude** and **Longitude** fields are added to the Columns and Rows shelves. You can think of these as X and Y fields. They're essential any time you want to create a map view, because each location in your data is assigned a latitudinal and longitudinal value.

Sometimes the Latitude and Longitude fields are generated by Tableau. Other times, you might have to manually include them in your data. See:

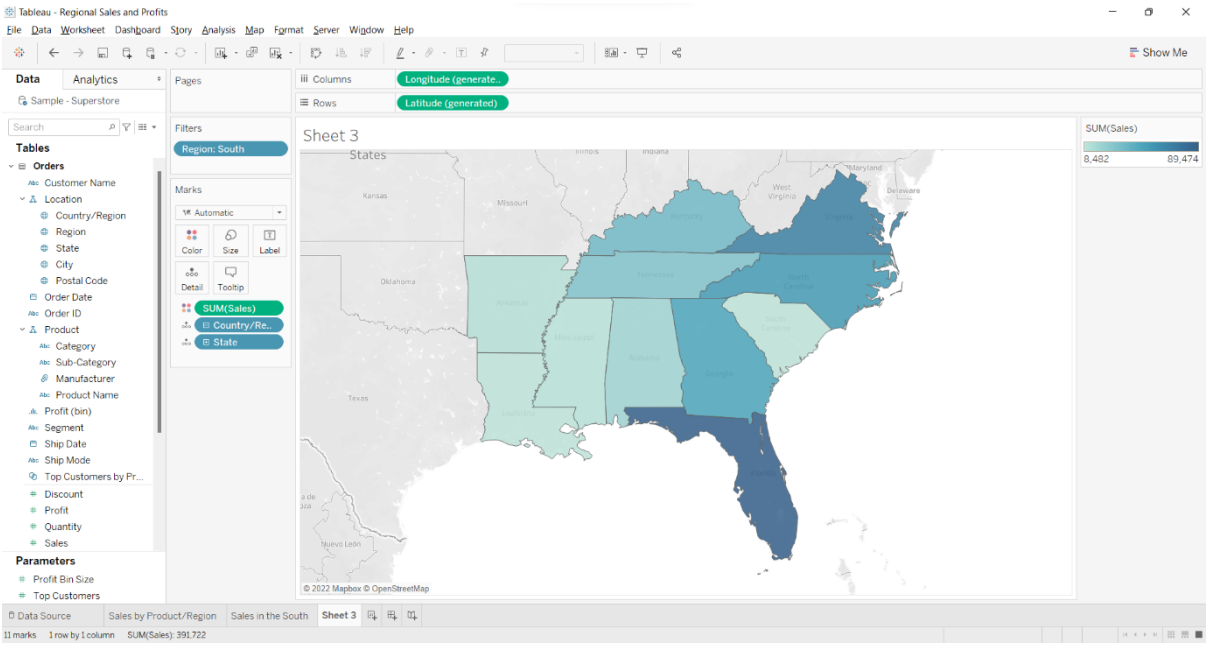
- Getting Started with Mapping: https://www.tableau.com/en-gb/learn/training
- Other Mapping videos (recorded for previous Tableau versions): https://www.tableau.com/learn/training/pre-2021.1-tableau-free-training-videos
- Mapping Help: https://help.tableau.com/current/pro/desktop/en-us/maps.htm

Now, having a cool map focused on 48+ states is one thing, but you wanted to see what was happening in the South, remember?

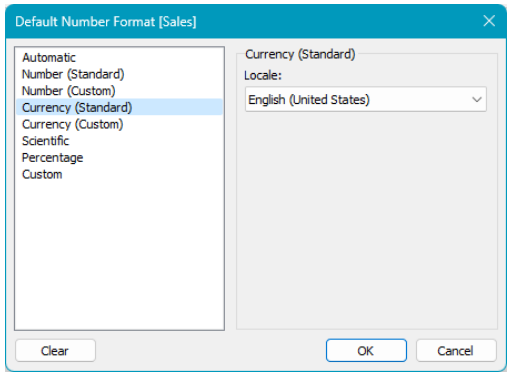
3. Drag **Region** to the **Filters** shelf, and then filter down to the **South** only. The map view zooms in to the South region, and there is a mark for each state (11 total).

Now you want to see more detailed data for this region, so you start to drag other fields to the Marks card:

4. Drag the **Sales** measure to **Color** on the Marks card.



The view automatically updates to a filled map, and colours each state based on its total sales. Hover over any state to see the **Sales** value in a tooltip: it has no units. Because you're exploring product sales, you want your sales to appear in USD. Click the **Sales** field on the **Data** pane, and select **Default Properties -> Number Format**. Select **Currency (Standard) -> English (United States)** and click OK. Now hover over any state to confirm the change.



Any time you add a continuous measure that contains positive numbers (like **Sales**) to **Color** on the Marks card, your filled map is coloured blue. Negative values are assigned orange.

Sometimes you might not want your map to be blue. Maybe you prefer green, or your data isn't something that should be represented with the colour blue, like wildfires or traffic jams. That would just be confusing!

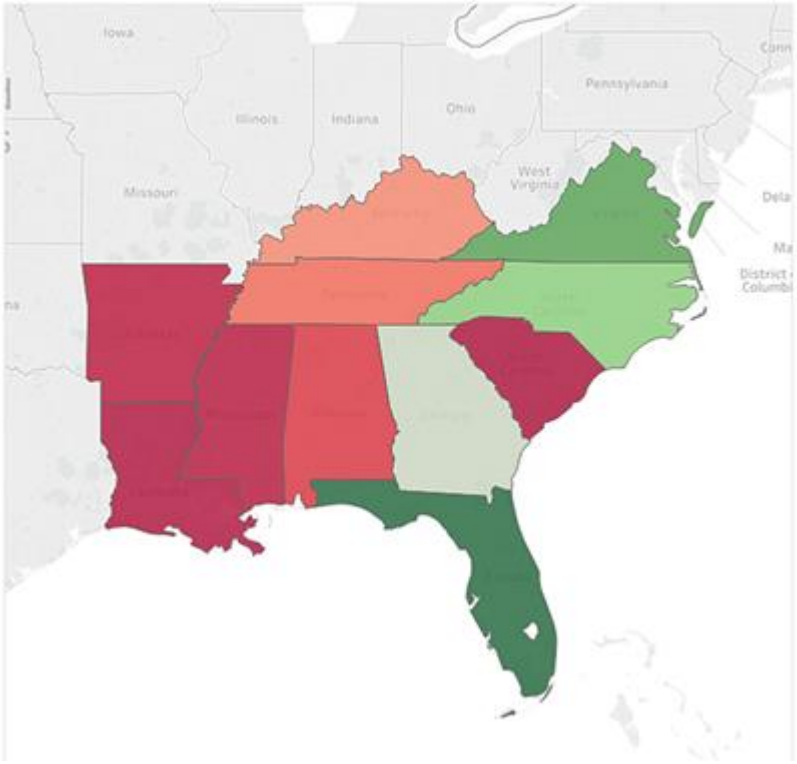
No need to worry, you can change the colour palette just like you did before.

5. Left-click **Color** on the Marks card and select **Edit Colors**.

For this example, you want to see which states are doing well, and which states are doing poorly in sales.

6. In the Palette drop-down list, select **Red-Green Diverging** and click **OK**. This allows you to see quickly the low performers and the high performers. **Tip**: Remember the cultural associations with colours. In Western societies, Red and Green may be viewed in opposite ways to Middle-Eastern/Asian societies. Tick the **Reversed** box in **Edit Colors** if needed.

Your view updates to look like this:



But wait. Everything just went red! What happened?

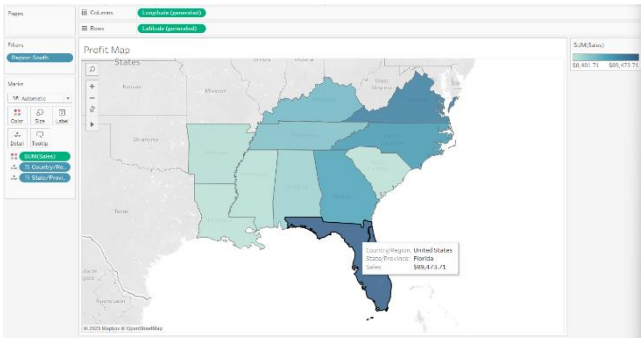
The data is accurate, and *technically* you can compare low performers with high performers, but is that really the whole story?

Are sales in some of those states really that terrible, or are there just more people in Florida who want to buy your products? Maybe you have smaller or fewer stores in the states that appear red. Or maybe there's a higher population density in the states that appear green, so there are just more people to buy your stuff.

Either way, there's no way you want to show this view to your boss because you aren't confident the data is telling a useful story.

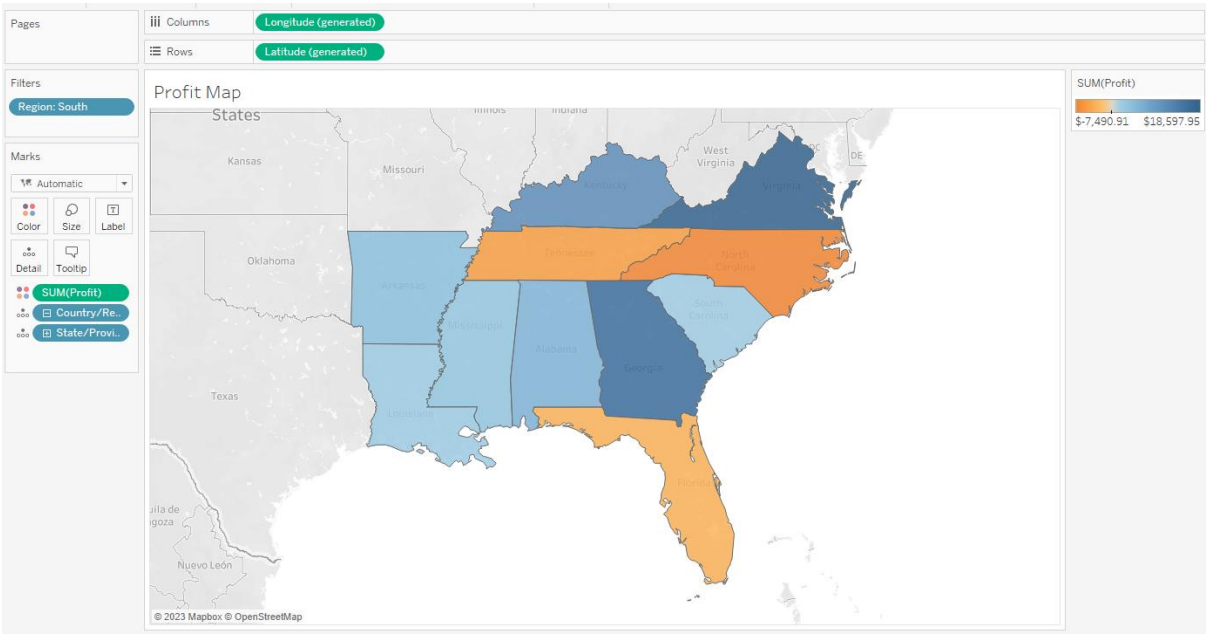
7. Click the **Undo** icon in the toolbar to return to that nice, blue view.

There's still a colour problem. Everything looks dandy—that's the problem!



At first glance, it appears that Florida is performing the best. Hovering over its mark reveals a total of 89,474 USD in sales, as compared to South Carolina, for example, which has only 8,482 USD in sales. However, have any of the states in the South been profitable?

8. Drag **Profit** to **Color** on the Marks card to see if you can answer this question.



Now that's better! Because profit often consists of both positive and negative values, Tableau automatically selects the **Orange-Blue Diverging** colour palette to quickly show the states with negative profit and the states with positive profit.

It's now clear that Tennessee, North Carolina, and Florida have negative profit, even though it appeared they were doing okay—even great—in **Sales**.

Step 5: Drill down into the details

To find out why the three states have a negative profit, you decide to drill down even further and focus on what's happening in those three states alone.

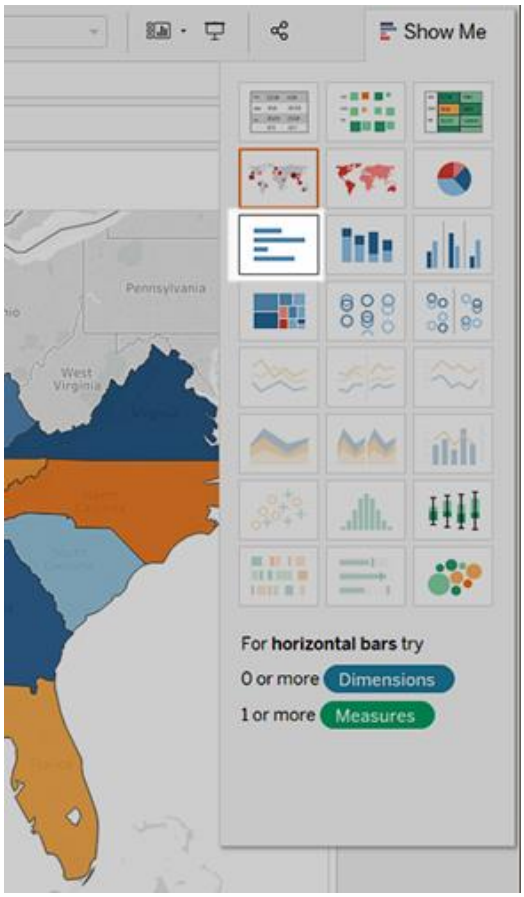
Pick up where your map view left off

As you saw in the last step, maps are great for visualizing your data broadly. A bar chart will help you get into the nitty-gritty. To do this, you create another worksheet.

1. Double-click **Sheet 3** and name the worksheet **Profit Map**.

2. Right-click **Profit Map** at the bottom of the workspace and select **Duplicate** . Name the new sheet **Negative Profit Bar Chart**.

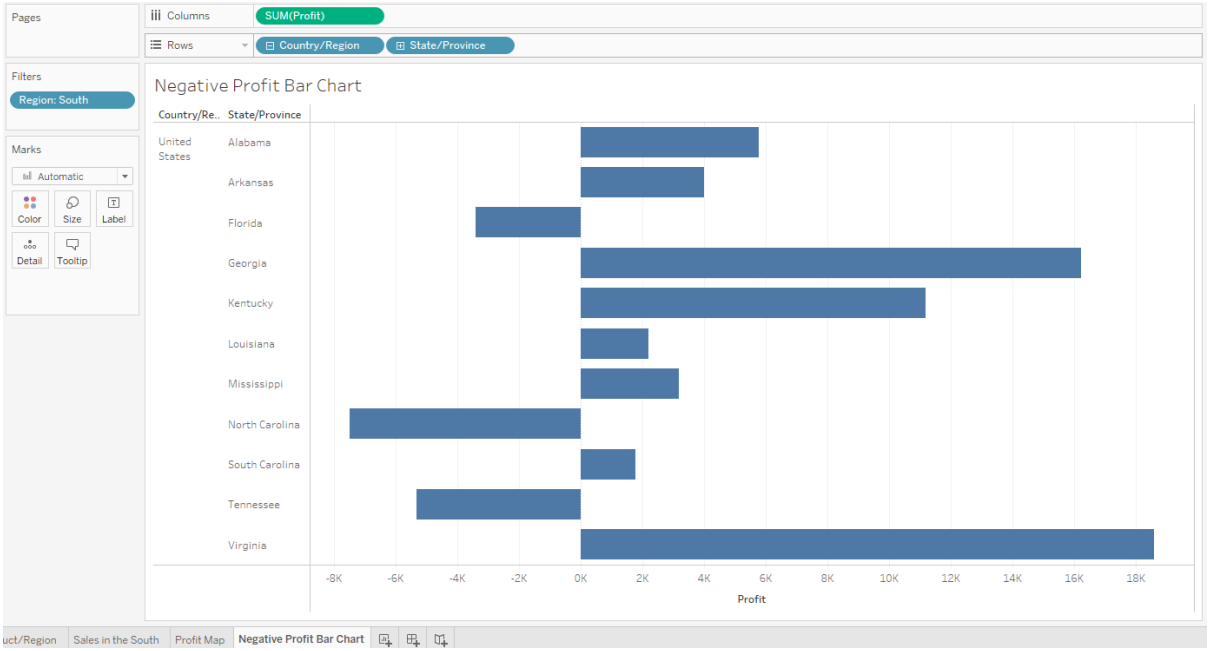
3. In the Negative Profit Bar Chart worksheet, click **Show Me**, and then select **horizontal bars**.



Show Me highlights different chart types based on the data you've added to your view.

Note: At any time, you can click **Show Me** again to collapse it.

You now have a bar chart again—just like that.



4. To select multiple bars on the left, click and drag your cursor across the bars between **Tennessee**, **North Carolina**, and **Florida** (i.e. the negative profit bars). On the tooltip that appears, select **Keep Only** to focus on those three states.

Note: You can also right-click one of the highlighted bars, and select **Keep Only**.

Notice that an ***Inclusions*** field for **State** is added to the **Filters** shelf to indicate that certain states are filtered from the view. The icon with two circles on the field indicates that this field is a **set**. You can edit this field by right-clicking the field on the **Filters** shelf and selecting, **Edit Filter**.

Now you want to look at the data for the cities in these states.

5. On the **Rows** shelf, click the **plus** icon on the **State** field to drill-down to the City level of detail.

There's almost too much information here, even if we sort the **State** by **Field** & **SUM(Profit)**, so you decide to filter the view down to the cities with the most negative profit by using a **Top N Filter**.

Note: After sorting, we see the 7 cities with the worst profit seem to be:

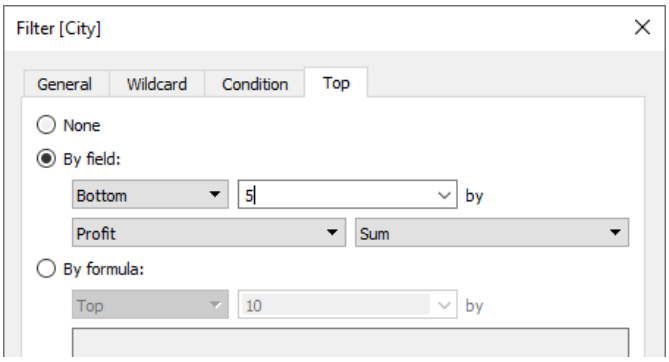
1. Burlington (NC)
2. Jacksonville (FL)
3. Concord (NC)
4. Memphis (TN)
5. Knoxville (TN)
6. Miami (FL)
7. Clarksville (TN)
8. … but why does Tableau show Jacksonville here as 2nd-least profit for North Carolina?

Create a Top N Filter

You can use a **Top N Filter** in Tableau Desktop to limit the number of marks displayed in your view. In this case, you want to use the Top N Filter to hone in on poor performers.

1. From the Data pane, drag **City** to the **Filters** shelf.

2. In the Filter dialog box, select the **Top** tab, and then do the following:



   a. Click **By field**.

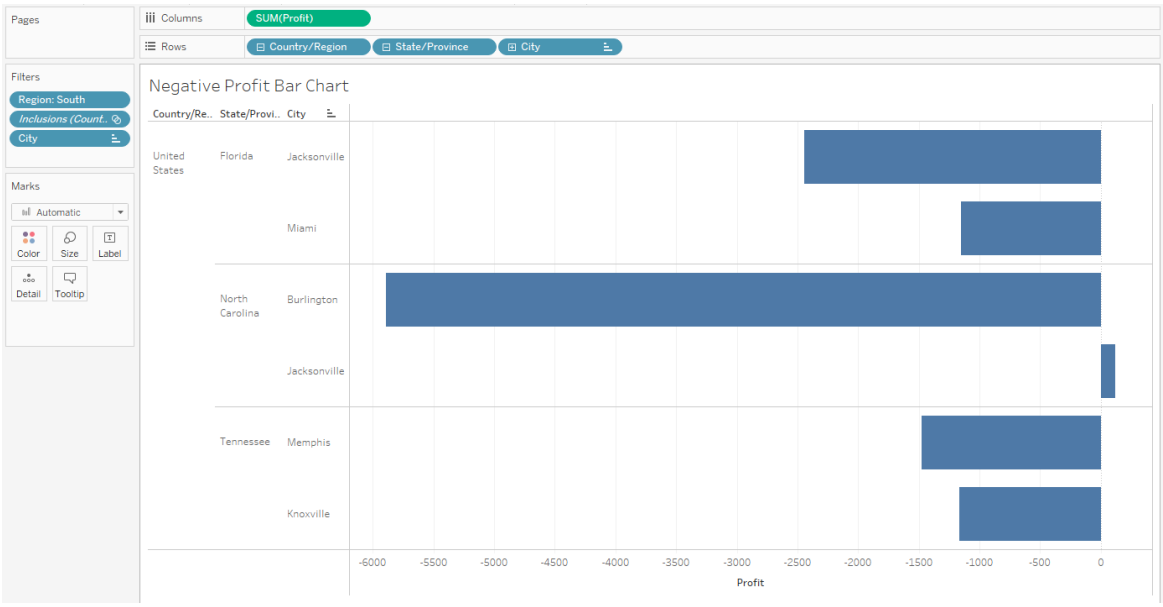
   b. Click the **Top** drop-down and select **Bottom** to reveal the poorest performers.

   c. Type **5** in the text box to show the bottom 5 performers in your data set.

      Tableau Desktop has already selected a field (**Profit**) and aggregation (**Sum**) for the **Top N Filter** based on the fields in your view. These settings ensure that your view will display only the five poorest performing cities by sum of profit.

   d. Click **OK**.

What happened to the bar chart? Does it show the list of cities with the 5 lowest profit values we expected? That's a great question: it doesn't. Miami (FL) is actually 6th lowest, Jacksonville (NC) is not even negative, and we've got six (not five) cities being displayed!



This is a great opportunity to introduce the **Tableau Order of Operations**.

The Tableau Order of Operations, also known as the query pipeline, is the order that Tableau performs various actions, such as the order in which it applies your filters to the view. Tableau applies filters in the following order:

The order that you create filters in, or arrange them on the **Filters** shelf, doesn't change the order in which Tableau applies those filters to your view.

The good news is you can tell Tableau to change this order when you notice something strange happening with the filters in your view. In this example, the **Top N Filter** is applied before the **Region** dimension inclusion filter according to the Order of Operations: but we actually want the reverse (focus on 3 states, then find the 5 poorest performing cities by sum of profit). Also, Jacksonville appears as a city in both Florida & North Carolina.

To fix the chart, we could add a filter to context. This tells Tableau to filter that field first, regardless of where it falls on the order of operations. But which field do you add to context? There are three fields on the **Filters** shelf: **Region** (a dimension filter), **City** (a top N filter), and ***Inclusions (Country, State) (Country, State)*** (a set).

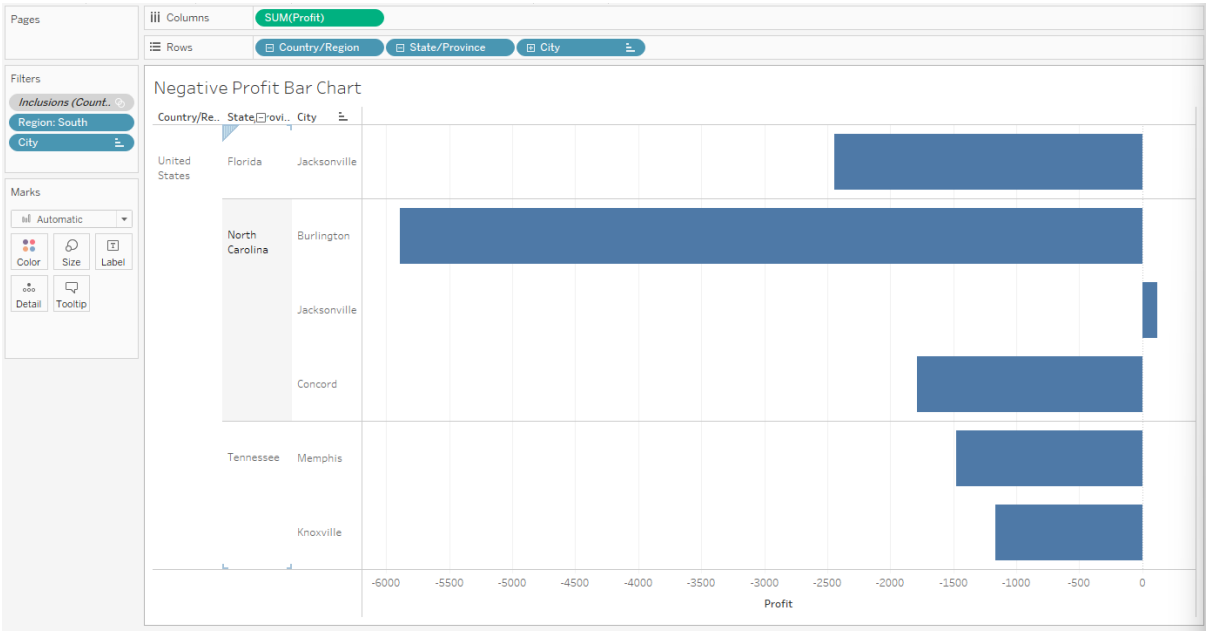
If you look at the order of operations again, you know that the set and the top N filter are being applied before the dimension filter. But do you know if the top N filter or the set filter is being applied first? Let's find out.

3. On the **Filters** shelf, right-click the **City** field and select **Add to Context**.

The **City** field turns gray and moves to the top of the **Filters** shelf, but nothing changes in the view. So even though you're forcing Tableau to filter **City** first, the issue isn't resolved.

4. Click **Undo** (**Ctrl-z**).

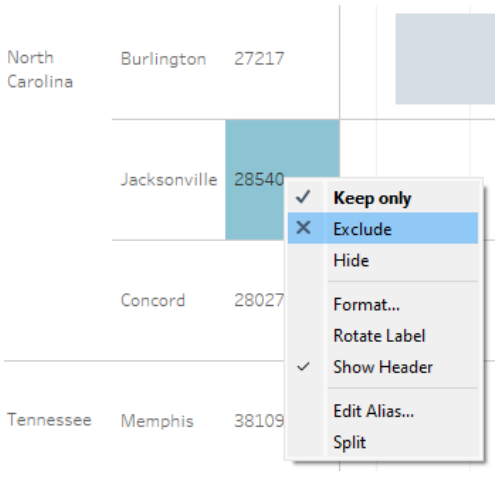
5. On the **Filters** shelf, right-click the ***Inclusions (Country, State) (Country, State)*** set and select **Add to Context**.



The ***Inclusions (Country, State) (Country, State)*** set turns gray and moves to the top of the **Filters** shelf. Now, Miami (FL) disappears and Concord (TN) appears, as required.

You're on to something! But there are still six cities in the view, including Jacksonville, North Carolina, which has a positive profit. Why would a city with a positive profit show up in the view when you created a top N filter that was supposed to filter out profitable cities?

Jacksonville, North Carolina is included because **City** is the lowest level of detail shown in the view. For Tableau Desktop to know the difference between Jacksonville, North Carolina, and Jacksonville, Florida, you need to drill down to the next level of detail in the location hierarchy, which, in this case, is **Postal Code**. After you add **Postal Code**, you can exclude Jacksonville in North Carolina without also excluding Jacksonville in Florida.



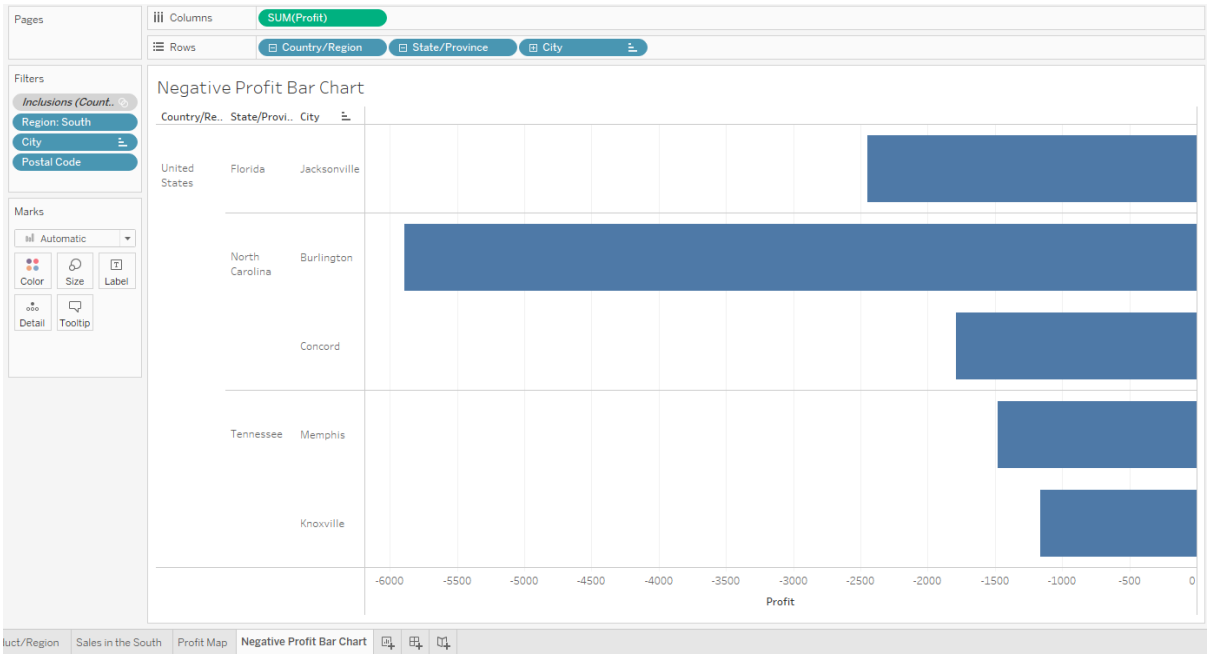
6. On the **Rows** shelf, click the plus icon on **City** to drill down to the **Postal Code level of detail.**

7. Right-click the postal code for Jacksonville, North Carolina, **28540**, and then select **Exclude**.

Postal Code is added to the **Filters** shelf to indicate that certain members in the **Postal Code** field have been filtered from the view. Even when you remove the **Postal Code** field from the view, the filter remains.

8. Drag **Postal Code** off the **Rows** shelf.

Your view updates to look like this:



Now that you've focused your view to the least profitable cities, you can investigate further to identify the products responsible.

Identify the troublemakers

You decide to break up the view by **Sub-Category** to identify the products dragging profit down. You know that the **Sub-Category** field contains information about products sold by location, so you start there.

1. Drag **Sub-Category** to the **Rows** shelf, and place it to the right of City.

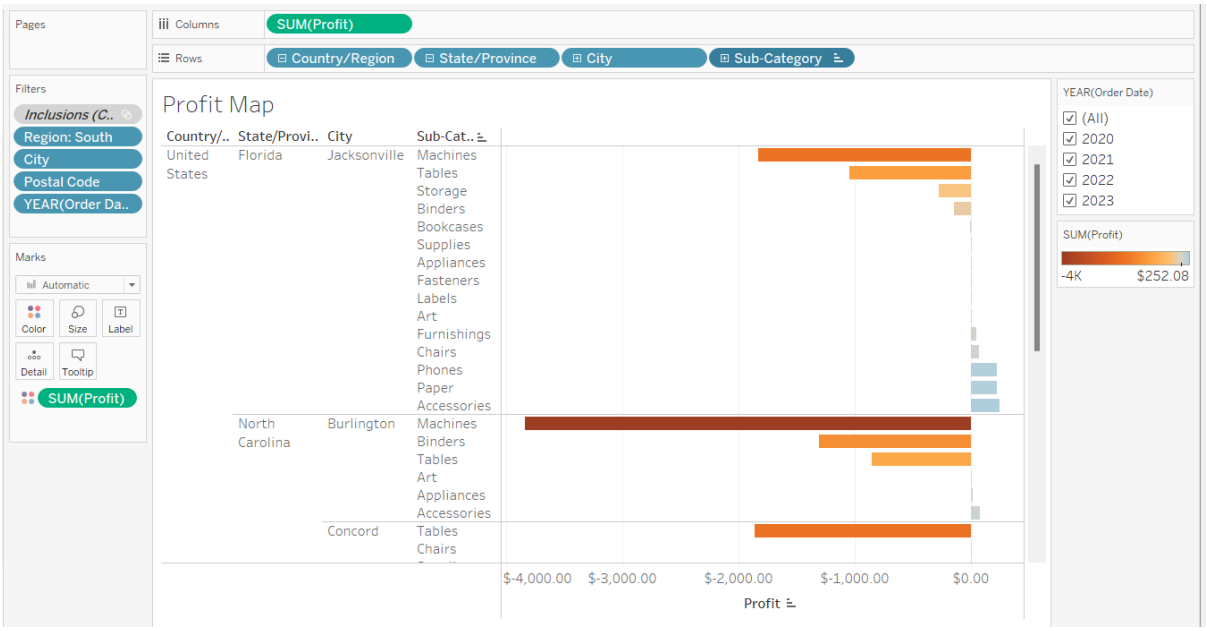
2. Drag **Profit** to **Color** on the Marks card to make it easier to see which products have negative profit.

3. In the Data pane, right-click **Order Date** and select **Show Filter**.

You can now explore negative profits for each year if you want, and quickly spot the products that are losing money.

Machines, tables, and binders don't seem to be doing well. **Tip**: Try different Sort settings to try to see the worst in each **Sub-Category** (e.g. **Data source order** vs **Field** vs **Nested**).

So what if you stop selling those items in Jacksonville, Concord, Burlington, Knoxville, and Memphis?



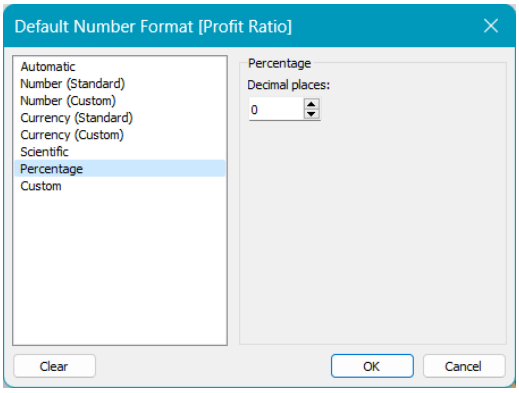
Verify your findings

Will eliminating binders, machines, and tables improve profits in Florida, North Carolina, and Tennessee? To find out, you can filter out the problem products to see what happens.

1. Go back to your map view by clicking the **Profit Map** sheet tab.

2. In the Data pane, right-click **Sub-Category** and select **Show Filter**.

A filter card for all of the products you offer appears next to the map view. You'll use this filter later.



3. From the Data pane, drag **Profit**, **Profit Ratio** and **State** to the **Label** Marks card. To format the **Profit Ratio** as a percentage, right-click **Profit Ratio** (in the Data pane) and find **Number Format**. Then, for **Default Numbers**, choose **Percentage** and set the number of decimal places you want displayed on the map. For this map, we'll choose zero decimal places.

Now you can see the exact profit of each state without having to hover your cursor over them.

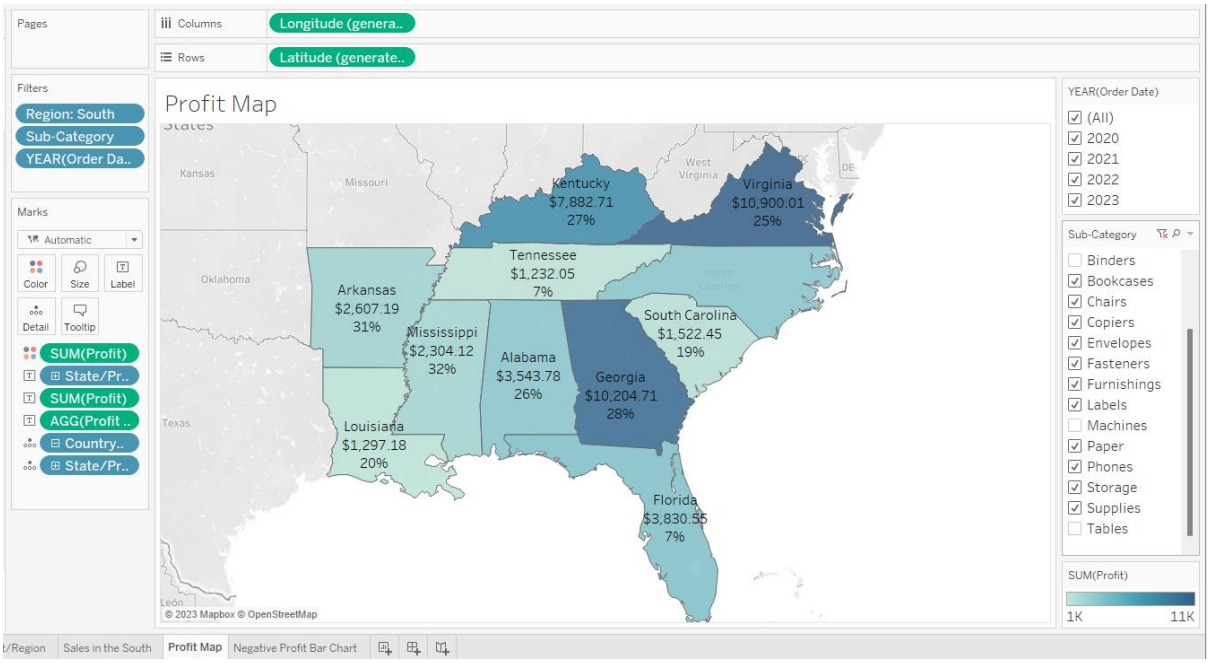
4. In the Data pane, right-click **Order Date** and select **Show Filter** to provide some context for the view.

A filter card for YEAR(Order Date) appears in the view. You can now view profit for all years or for a combination of years. This might be useful for your presentation.

5. Clear **Binders**, **Machines**, and **Tables** from the list on the Sub-Category filter card in the view.

Recall that adding filters to your view lets you include and exclude values to highlight certain parts of your data.

As you clear each member, the profit for Tennessee, North Carolina, and Florida improve, until finally, each has a positive profit.



Hey, you made an interesting discovery!

Binders, machines, and tables are definitely responsible for the losses in Tennessee, North Carolina, and Florida, but not for the rest of the South. Do you notice how profit actually decreases for some of the other states as you clear items from the filter card? For example, if you toggle **Binders** on the **Sub-Category** filter card, profit drops by four percent in Arkansas. You can deduce that Binders are actually profitable in Arkansas.

You want to share this discovery with the team by walking them through the same steps you took.

6. Select **(All)** on the **Sub-Category** filter card to include all products again.

Now you know that machines, tables, and binders are problematic products for your company. In focusing on the South, you see that these products have varying impacts on profit. This might be a worthwhile conversation to have with your boss.

Next, you'll assemble the work you've done so far in a dashboard so that you can clearly present your findings

Step 6: Build a dashboard to show your insights

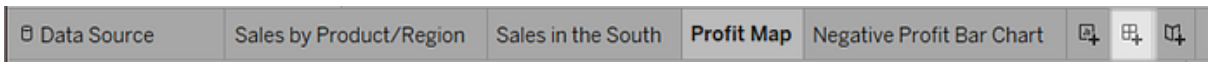
You've created four worksheets, and they're communicating important information that your boss needs to know. Now you need a way to show the negative profits in Tennessee, North Carolina, and Florida and explain some of the reasons why profits are low.

To do this, you can use dashboards to display multiple worksheets at once, and—if you want—make them interact with one another.

Set up your dashboard

You want to emphasize that certain items sold in certain places are doing poorly. Your bar graph view of profit and your map view demonstrate this point nicely.

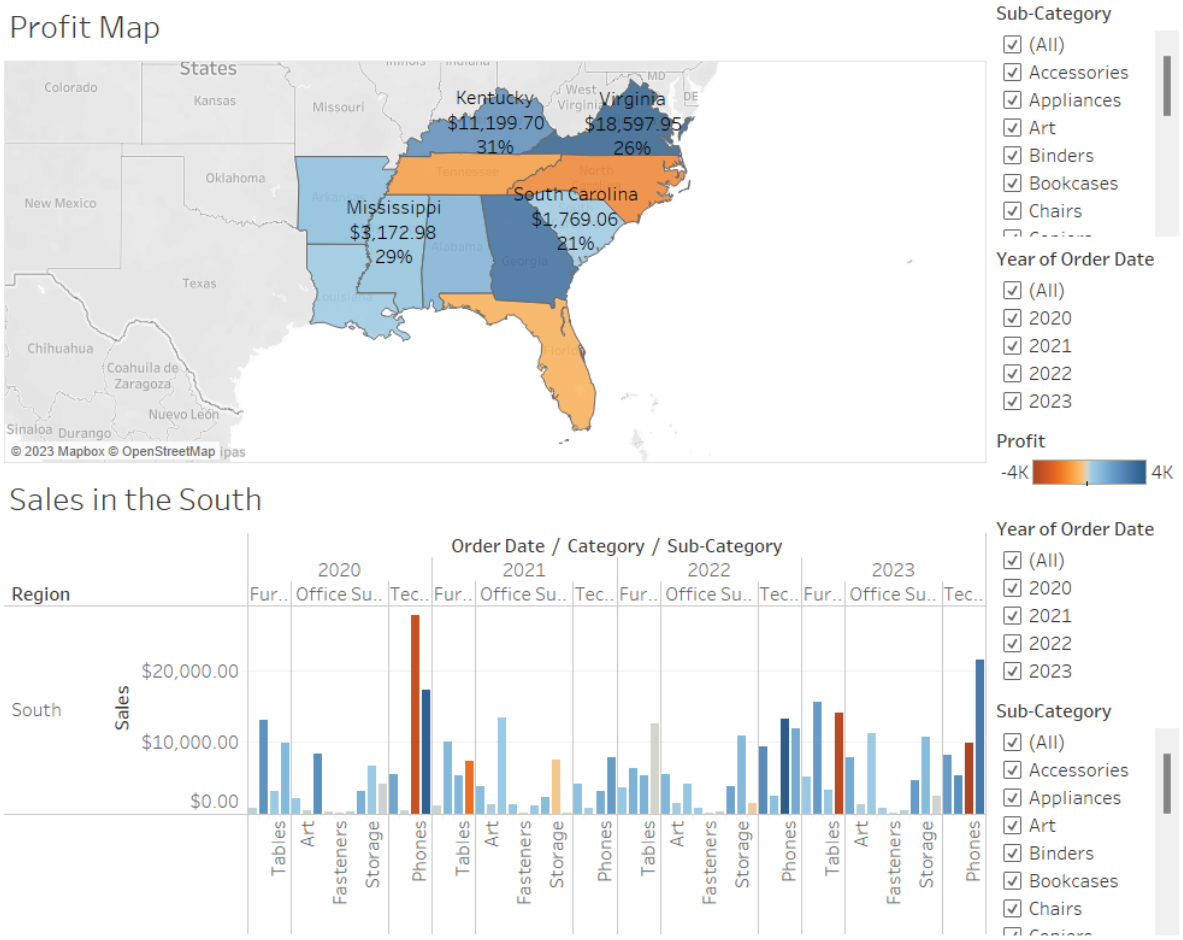
1. Click the **New dashboard** button.



2. In the **Dashboard** pane on the left, you'll see the sheets that you created. Drag **Sales in the South** to your empty dashboard.

3. Drag **Profit Map** to top half of your dashboard. When you see the grey box covers the top half (not left half) of the canvas, and drop it on top of the **Sales in the South** view.

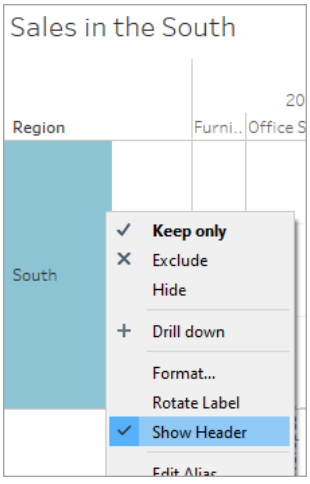
Your view will update to look like this (in **Presentation Mode**):



Now you can see both views at once!

But sadly, the bar chart is a bit squished, which isn't helping your boss understand your data.

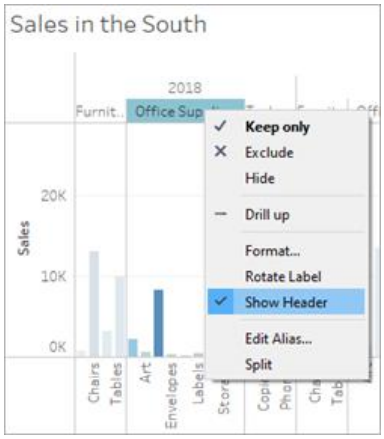
Arrange your dashboard



It's not easy to see details for each item under **Sub-Category** from your **Sales in the South** bar chart. Also, because we have the map in view, we probably don't need the **South region** column in **Sales in the South**, either.

Resolving these issues will give you more room to communicate the information you need.

1. On **Sales in the South**, right-click in the column area under the **Region** column header, and clear **Show header**.



2. Repeat this process for the **Category** row header.

   You've now hidden unnecessary columns and rows from your dashboard while preserving the breakdown of your data. The extra space makes it easier to see data on your dashboard, but let's freshen things up even more.

3. Right-click the **Profit Map** title and select **Hide Title**.

   The title ***Profit Map*** is hidden from the dashboard and even more space is created.

4. Repeat this step for the **Sales in the South** view title.

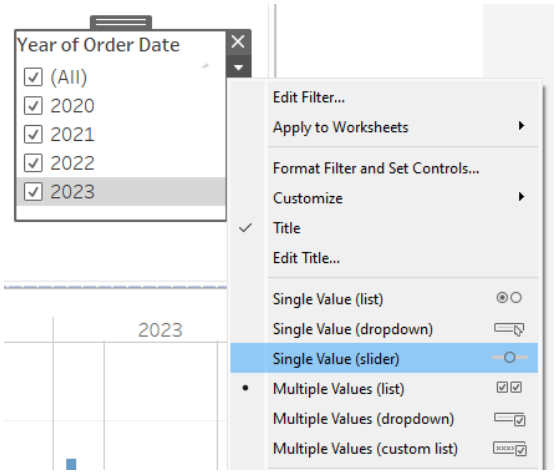
5. Select the first **Sub-Category** filter card on the right side of your view, and at the top of the card, click the **Remove** icon .

6. Repeat this step for the second **Sub-Category** filter card and one of the **Year of Order Date** filter cards.

7. Click on the **Profit color legend** and drag it from the right to below **Sales in the South**.

8. Finally, select the remaining **Year of Order Date** filter, click its drop-down arrow, and then select **Floating**. Move it to the white space in the map view. In this example, it is placed just off the East Coast, in the Atlantic Ocean.

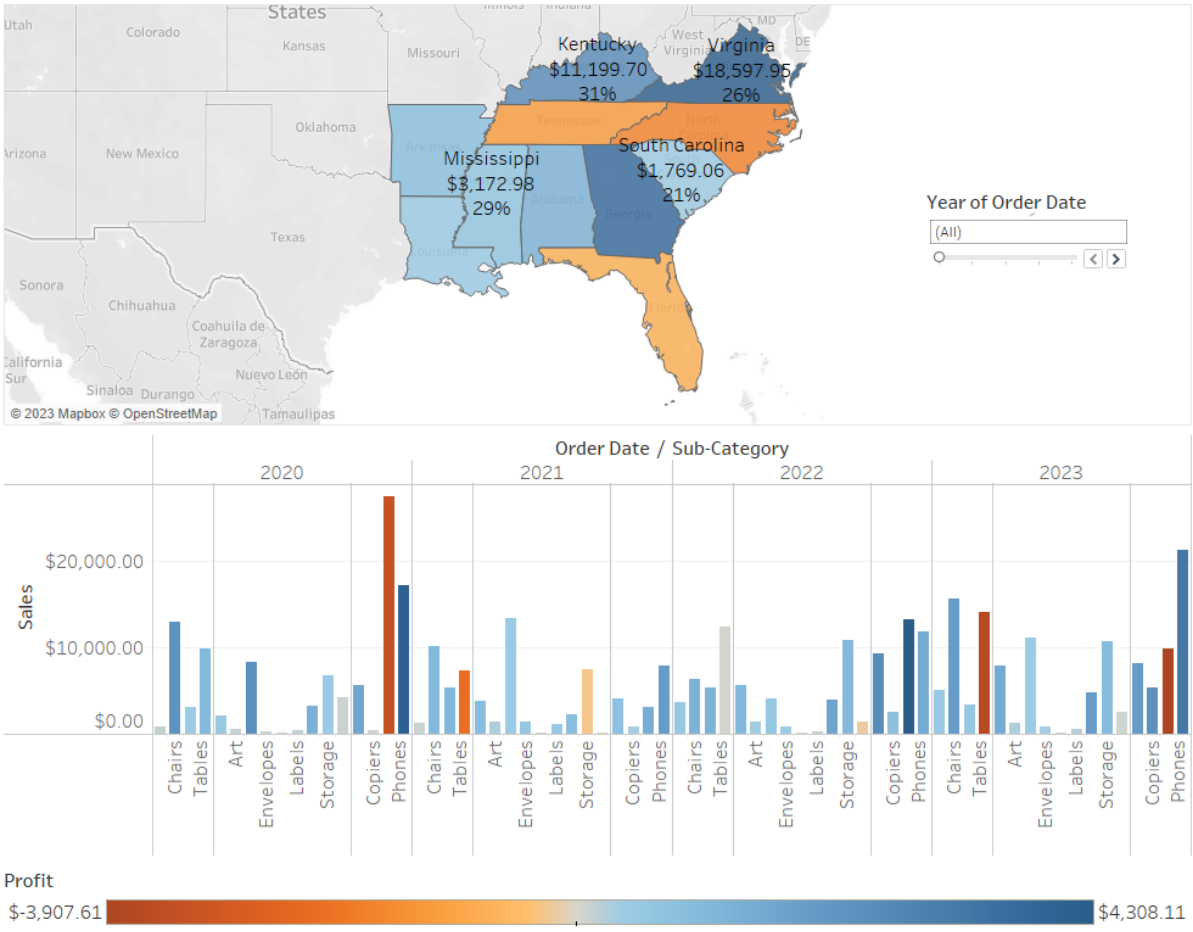
Try selecting different years on the **Year of Order Date** filter. Your data is quickly filtered to show that state performance varies year by year on the map but maybe not the column chart (or vice versa). We'll fix that, but first it could be made even easier to compare.



9. Click the drop-down arrow at the top of the **Year of Order Date** filter, and select **Single Value (Slider)**.

10. Click on the empty white space to the right of the charts and then **Remove from Dashboard**.

Your view updates to look like this:



Your dashboard is looking really good! Now, you can easily compare profit and sales by year. But that's not so different from a couple pictures in a presentation—and you're using Tableau! Let's make your dashboard more engaging.

Add interactivity

Wouldn't it be great if you could view which sub-categories are profitable in specific states?

1. Select **Profit Map** in the dashboard, and click the **Use as filter** icon in the upper right corner.

2. Select a state within the South region of the map.

   The **Sales in the South** bar chart automatically updates to show just the sub-category sales in the selected state. You can quickly see which sub-categories are profitable.

3. Click an area of the map other than the coloured Southern states to clear your selection.

You also want viewers to be able to see the change in profits based on the **Order Date**.

4. Select the **Year of Order Date** filter, click its drop-down arrow, and select **Apply to Worksheets** > **Selected Worksheets**.

5. In the **Apply Filter to Worksheets** dialog box, select **All in dashboard**, and then click **OK**.

This option tells Tableau to apply the filter to all worksheets in the dashboard that use this same data source.

Explore state performance by year with your new, interactive dashboard!

Rename and go

You show your boss your dashboard, and she loves it. She's named it "Regional Sales and Profit," and you do the same by double-clicking the **Dashboard 1** tab and typing **Regional Sales and Profit**.

In her investigations, your boss also finds that the decision to introduce machines in the North Carolina market in 2023 was a *bad idea*.

Your boss is glad she has this dashboard to explore, but she also wants you to present a clear action plan to the larger team. She asks you to create a presentation with your findings.

Good thing you know about stories in Tableau.

Step 7: Build a story to present

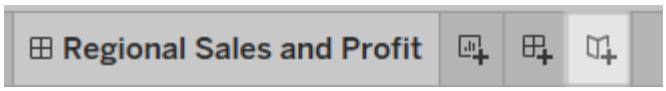
You want to share your findings with the larger team. Together, your team might reevaluate selling machines in North Carolina.

Instead of having to guess which key insights your team is interested in and including them in a presentation, you decide to create a story in Tableau. This way, you can walk viewers through your data discovery process, and you have the option to interactively explore your data to answer any questions that come up during your presentation.

Create your first story point

For the presentation, you'll start with an overview.

1. Click the **New story** button.

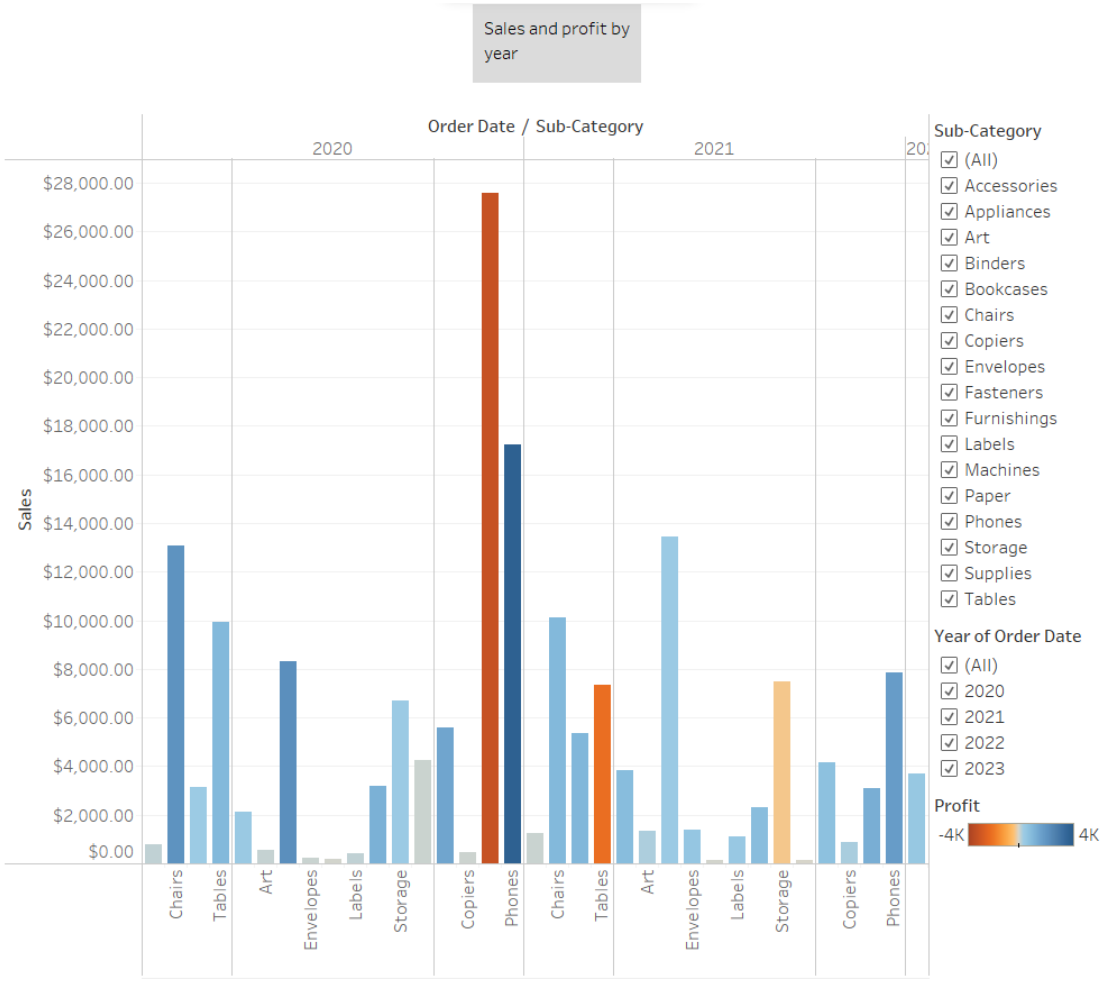


You're presented with a blank workspace that reads, *Drag a sheet here*. This is where you'll create your first story point.

Blank stories look a lot like blank dashboards. And like a dashboard, you can drag worksheets over to present them. You can also drag dashboards over to present them in your story.

2. From the **Story** pane on the left, drag the **Sales in the South** worksheet onto your view.

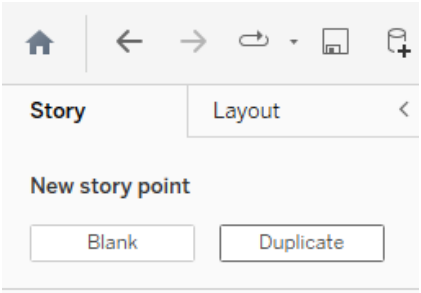
3. Add a caption—maybe "Sales and profit by year"—by editing the text in the gray box above the worksheet.



This story point is a useful way to acquaint viewers with your data.

But you want to tell a story about selling machines in North Carolina, so let's focus on that data.

Highlight machine sales



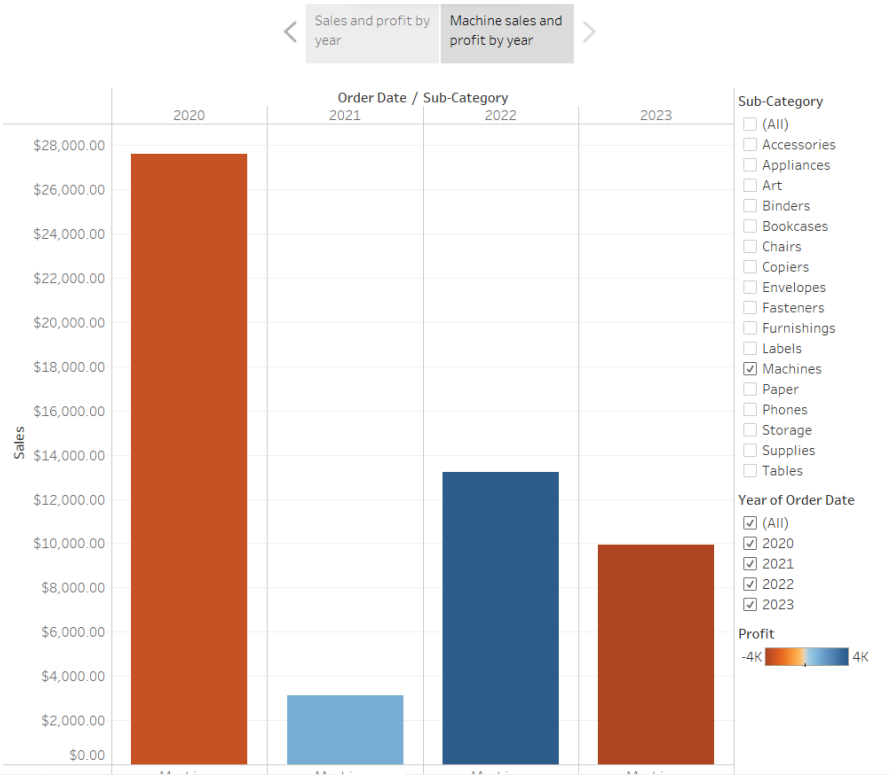
To bring machines into the picture, you can leverage the **Sub-Category** filter included in your Sales in the South bar chart.

1. In the **Story** pane, click **Duplicate** to duplicate the first caption.

Continue working where you left off, but know that your first story point will be exactly as you left it.

2. Since you know you're telling a story about machines, on the **Sub-Category** filter, clear the selection for **(All)**, then select **Machines**. Now your viewers can quickly identify the sales and profit of machines by year.

3. Add a caption to underscore what your viewers see, for example, "Machine sales and profit by year."



You've successfully shifted the focus to machines, but you realize that something seems odd: in this view, you can't single out which state is contributing to the loss.

You'll address this in your next story point by introducing your map.

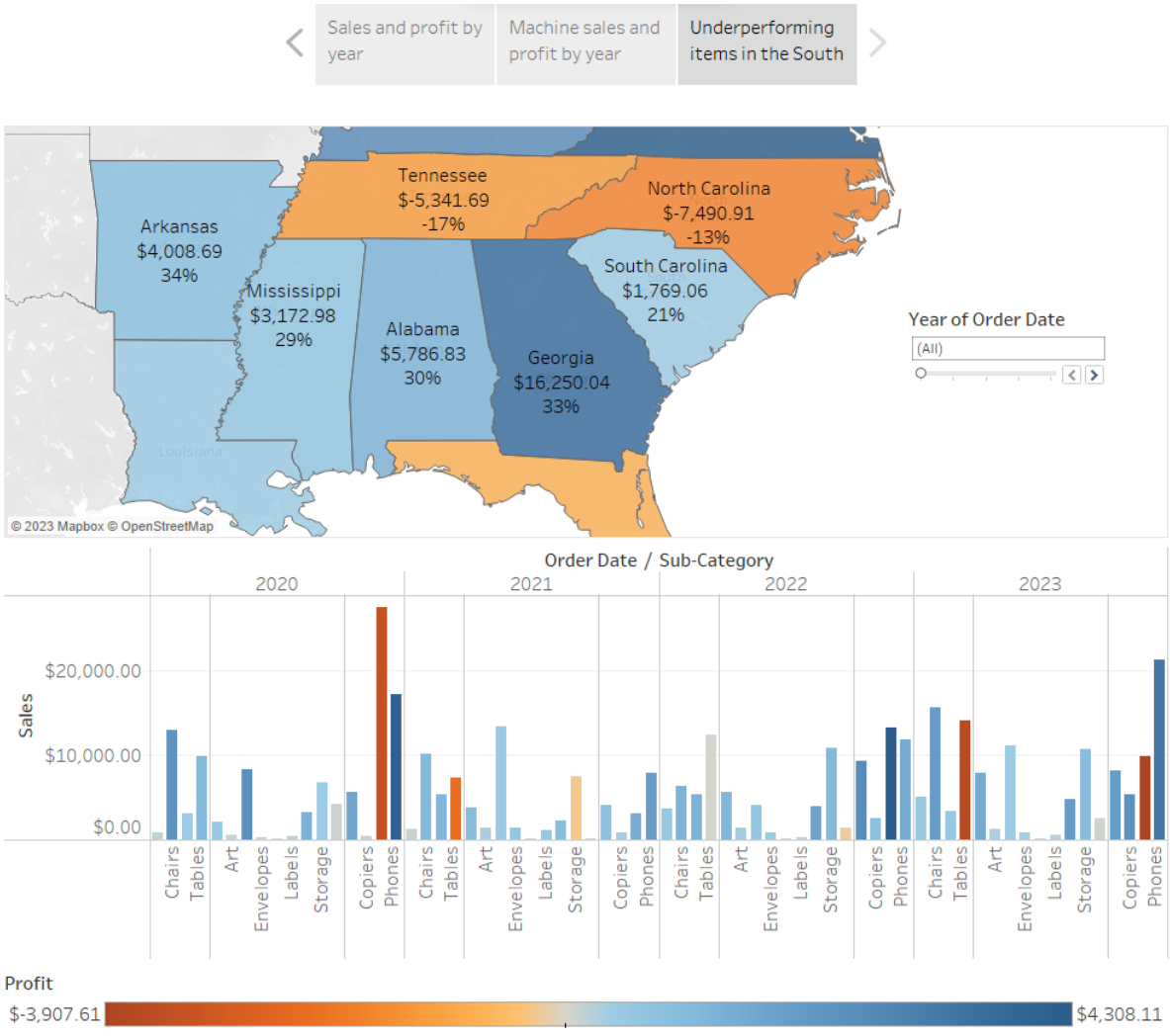
Make your point

The bottom line is that machines in North Carolina lose money for your company. You discovered that in the dashboard you created. Looking at overall sales and profit by year doesn't demonstrate this point alone, but regional profit can.

1. In the **Story** pane, select **Blank**. Then, drag your dashboard **Regional Sales and Profit** onto the canvas.

This gives viewers a new perspective on your data: Negative profit catches the eye.

2. Add a caption like, "Underperforming items in the South."



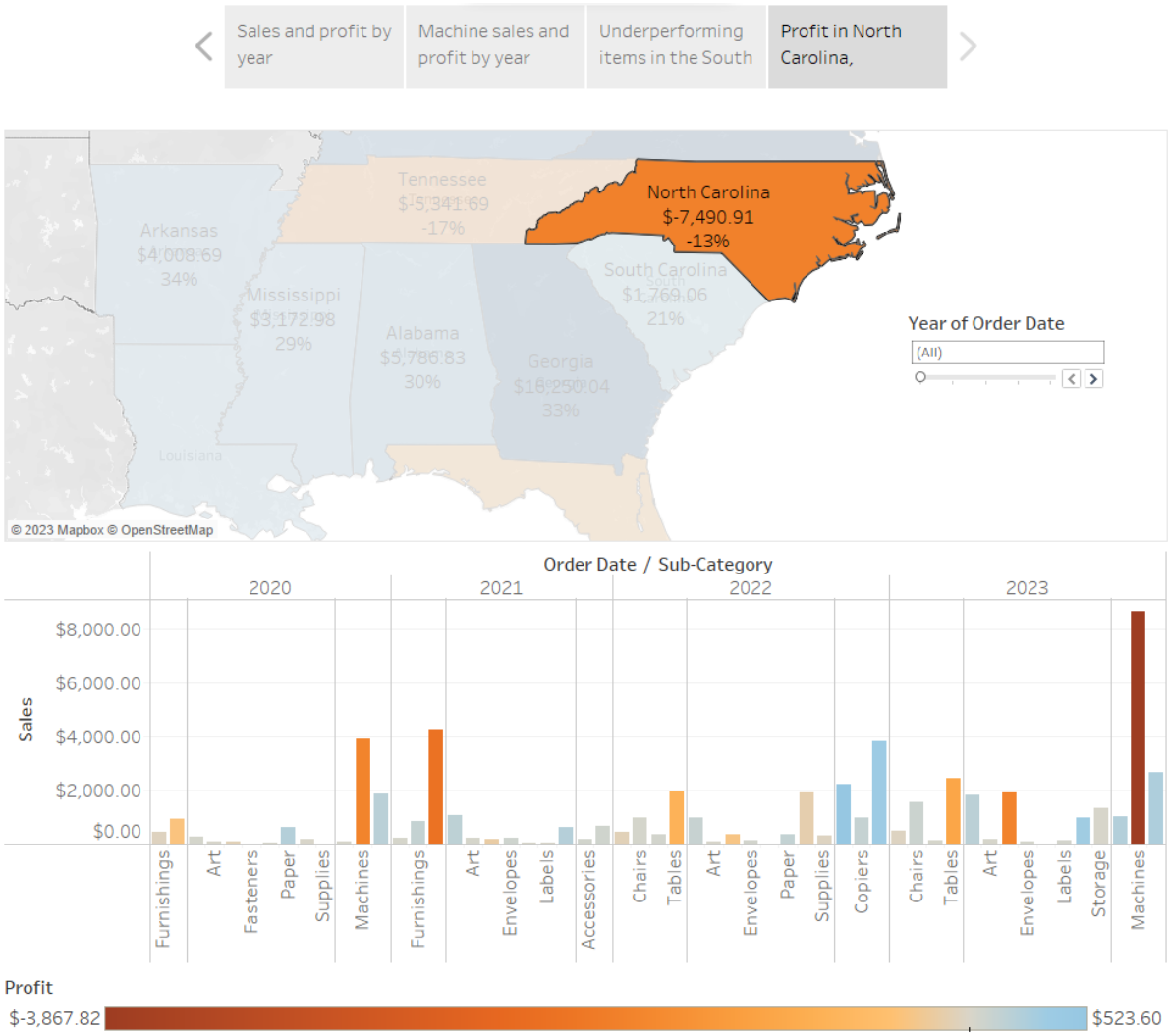
To narrow your results to just North Carolina, start with a duplicate story point.

1. Select **Duplicate** to create another story point with your Regional Profit dashboard.

2. Select **North Carolina** on the map and notice that the bar chart automatically updates.

3. Select **All** on the Year of Order Date filter card.

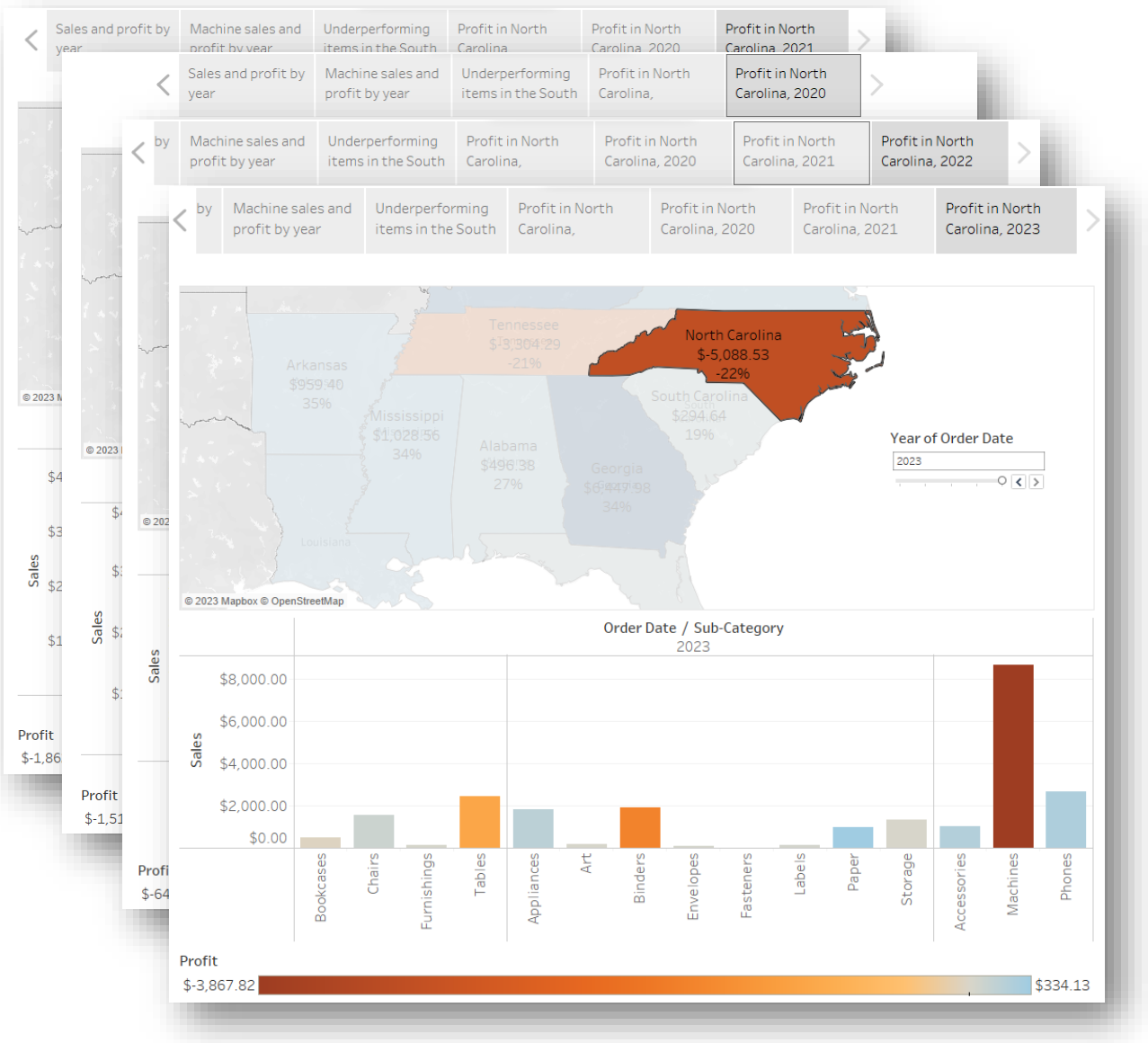
4. Add a caption, for example, "Profit in North Carolina, 2020-2023."



Now you can walk viewers through profit changes by year in North Carolina. To do this, you will create four story points:

1. Select **Duplicate** to begin with your **Regional Profit** dashboard focused on North Carolina.

2. On the **Year of Order Date** filter, click the right arrow button so that **2020** appears.



3. Add a caption, for example, "Profit in North Carolina, 2020," and then click **Duplicate**.

4. Repeat steps 2 and 3 for years 2019, 2020, and 2021.

Now viewers will have an idea of which products were introduced to the North Carolina market when, and how poorly they performed.

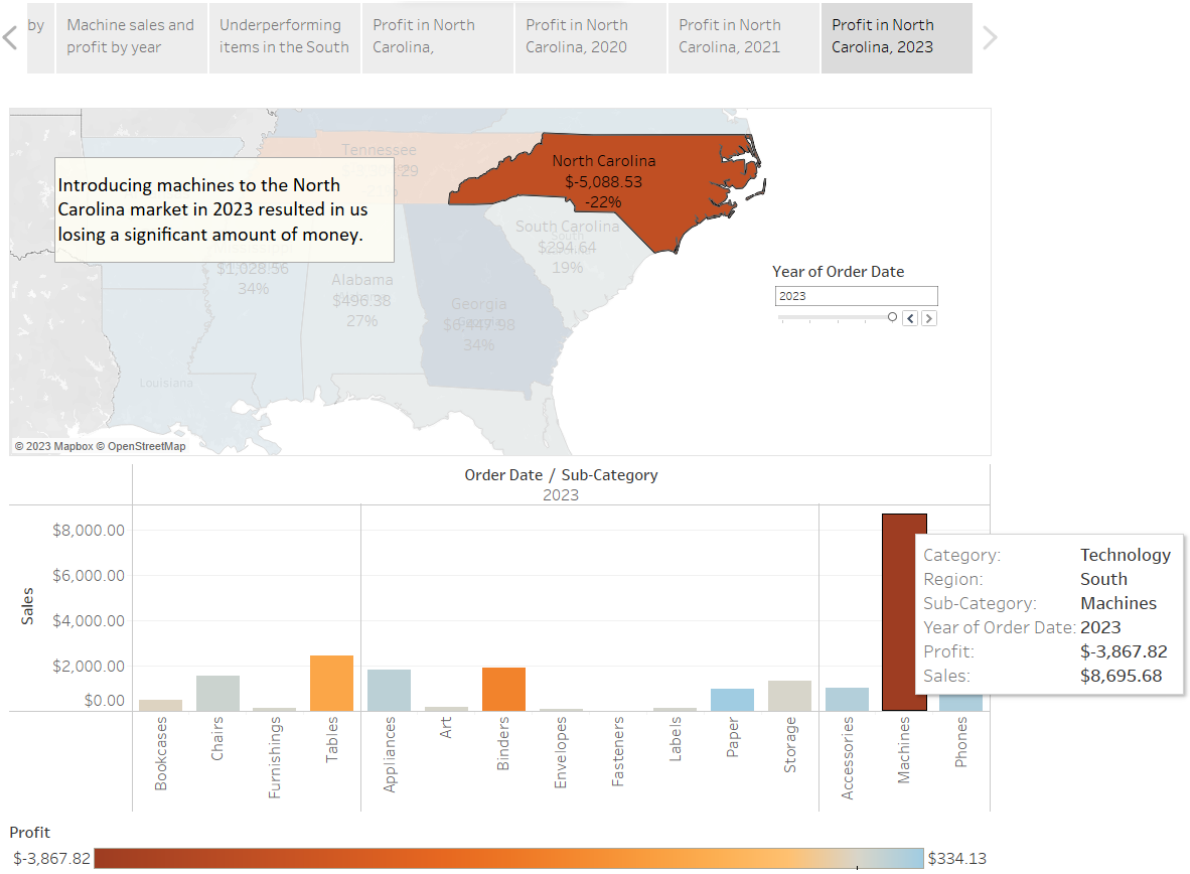
Finishing touches

On this story point that focuses on data from 2023, you want to describe your findings. Let's add more detail than just a caption.

1. In the left pane, select **Drag to add text** and drag it onto your view.

2. Enter a description for your dashboard that emphasizes the poor performance of machines in North Carolina, for example, "Introducing machines to the North Carolina market in 2023 resulted in losing a significant amount of money."

For dramatic effect, you can hover over Machines on the **Sales in the South** bar chart while presenting to show a useful tooltip: the loss of nearly $4,000.



And now, for the final slide, you drill down into the details.

3. In the **Story** pane, click **Blank**.

4. From the **Story** pane, drag **Negative Profit Bar Chart** to the view.

5. In the **Year of Order Date** filter card, narrow the view down to **2023** only.

You can now easily see that the loss of machine profits was solely from Burlington, North Carolina.

6. In the view, right-click the **Burlington** mark (the bar) and select **Annotate** > **Mark**.

7. In the Edit Annotation dialog box that appears, delete the filler text and type: "Machines in Burlington lost nearly $4,000 in 2021."

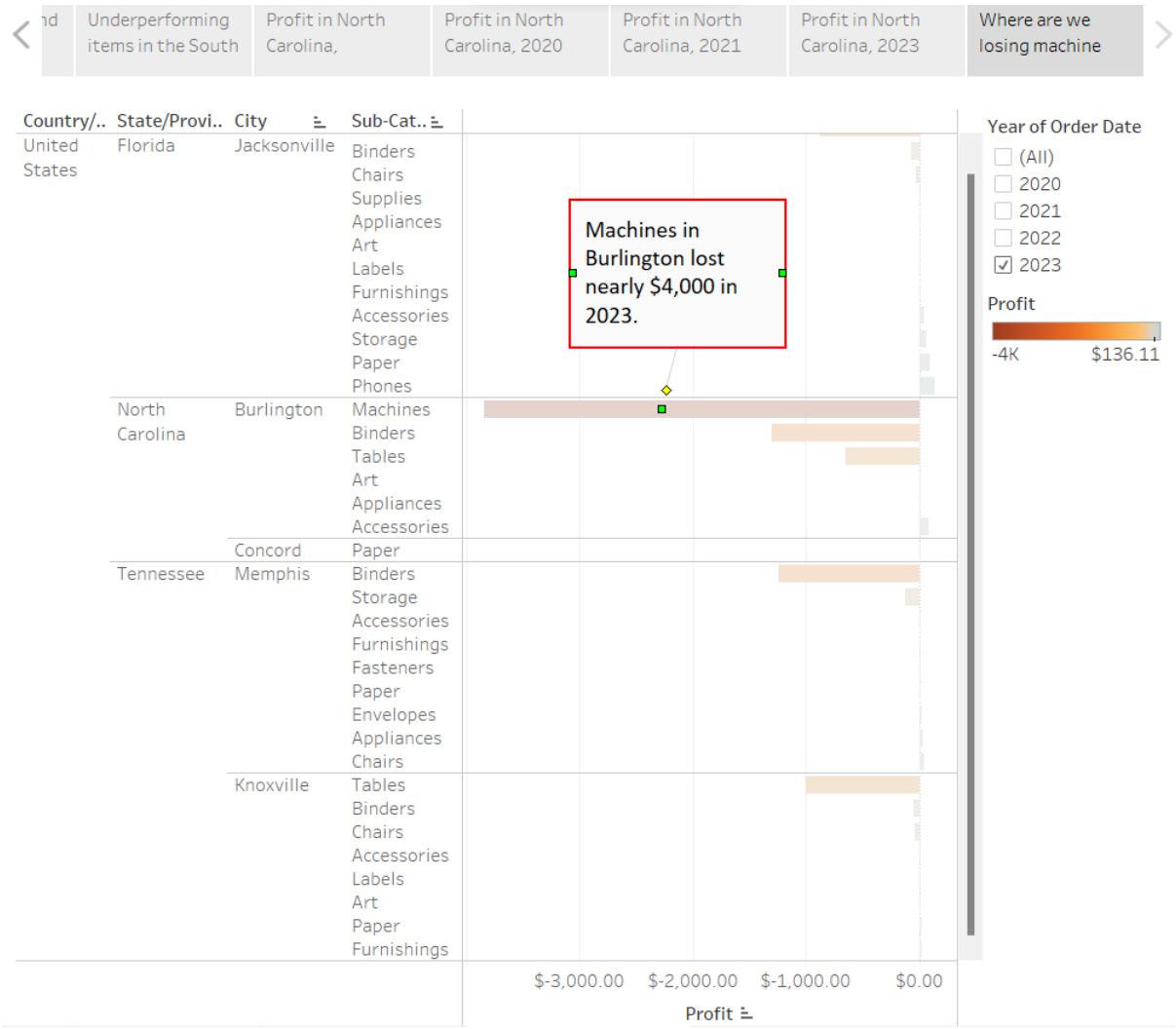
8. Click **OK**.

9. In the view, click the annotation and drag it to adjust where it appears.

10. Give this story point the caption: "Where are we losing machine profits in North Carolina?"

11. Double-click the **Story 1**tab and rename your story to "Improve Profits in the South".

12. Review your story by selecting **Window** > **Presentation mode**.



After you present

Your presentation went very well. The team is convinced that there is work to be done to increase profit in Burlington, North Carolina. And, they're curious to know why machines did so poorly in the first place. Your boss is thrilled—not only have you identified a way to address negative profit, you've got the team asking questions about their data.

To keep the lessons fresh in their minds, your boss asks you to email your team a document with your findings. It's a good thing that you know about sharing your visualizations with Tableau Server and Tableau Public.

Step 8: Share your findings

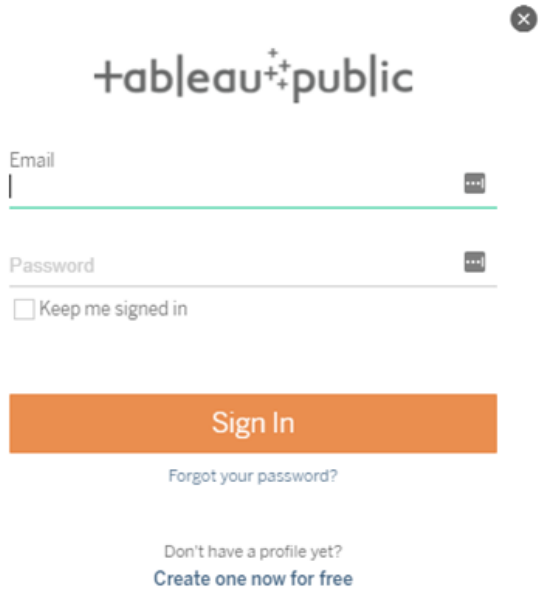
You've done a bunch of work—great work—to learn that Burlington, North Carolina needs some fine tuning. Let's share this information with your teammates.

You want to share the story. You can use either Tableau Public, or Tableau Server if you have access to a Tableau server. Here, we're only looking at Tableau Public.

Note: *When you publish to Tableau Public, as the name suggests, these views are publicly accessible. This means that you share your views as well as your underlying data with anyone with access to the internet.*

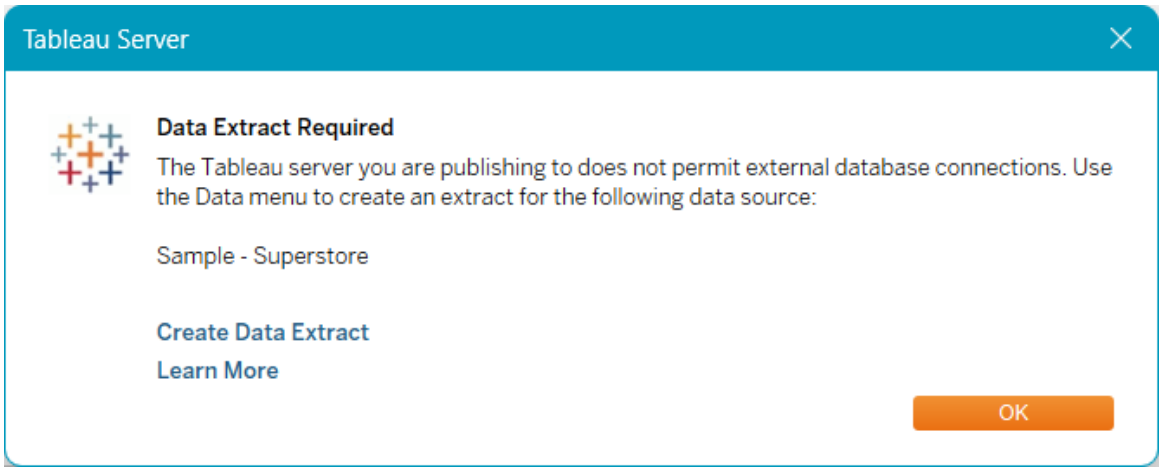
1. Select **Server** > **Tableau Public** > **Save to Tableau Public**.

2. Enter your Tableau Public credentials in the dialog box.

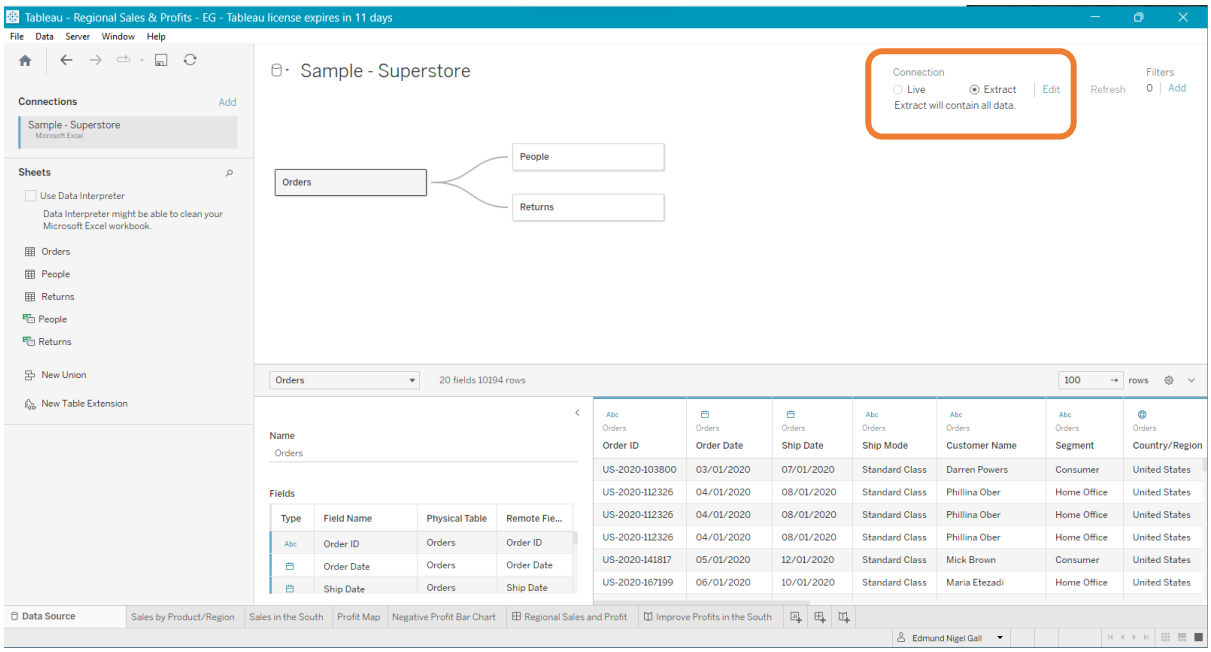


If you don't have a Tableau Public profile, click **Create one now for free** and follow the prompts.

3. If upon login you see this dialog box, click **OK**:

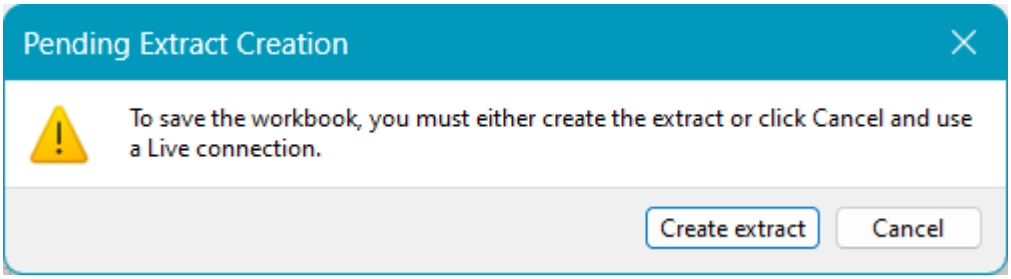


4. Open the **Data Source** page. Then in the top-right corner, change the **Connection** type from **Live** to **Extract**.



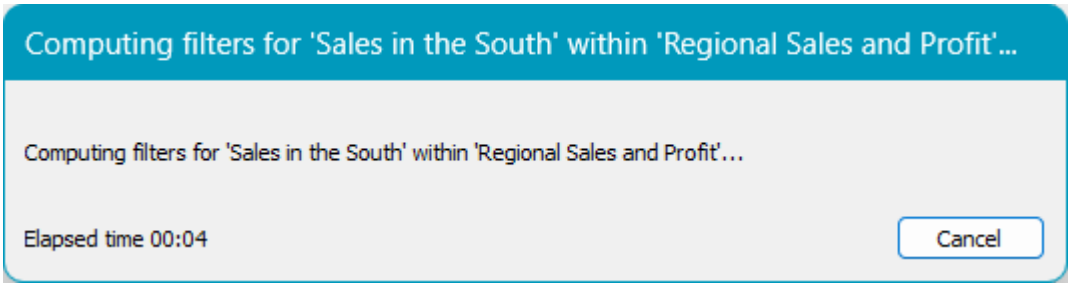
5. Click on the **Save** icon  in the top left menu.

6. Click on **Create extract** in the popup window that appears:

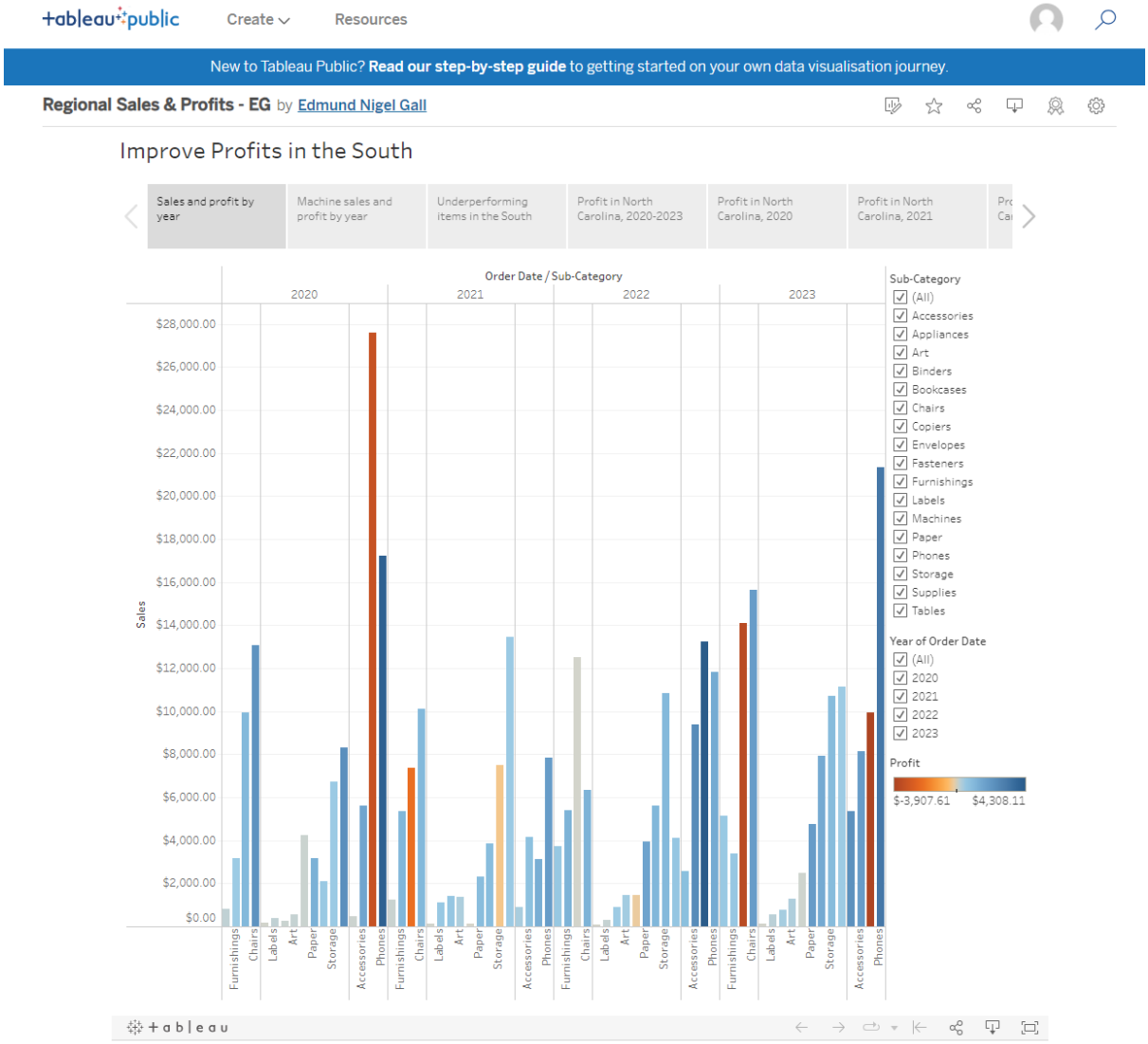


7. Select a location to save the extract (a **.hyper** file) and click **Save**.

8. For the second (and last) time, select **Server** > **Tableau Public** > **Save to Tableau Public**. You should see a popup window showing progress until complete.



9. When your browser opens, review your embedded story. It will look like this:



10. Click **Edit Details** (pen icon next to **Details** below the report) to update the title of your viz, add a description, and more.

11. Click **Save**.

Your story is now live on the web.

12. To share with colleagues, click **Share** at the bottom of your viz.

13. How do you want to share your story?

    a. Embed on your website: Copy the **Embed Code** and paste it in your web page HTML.

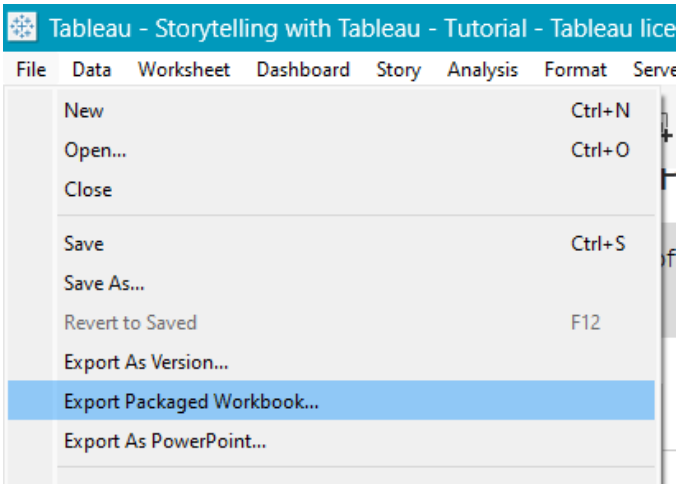
    b. Send a link: Copy the **Link** and send the link to your colleagues.

    c. Send an email using your default email client by clicking the email icon.

    d. Share on Twitter or Facebook by clicking the appropriate icon.

How to Submit a Tableau file for Coursework

If you use Tableau for your coursework, you will need to export your file as a **Packaged Workbook** before submitting it.



1. Save your Tableau file first with a **.twb** file extension, to ensure you've saved any changes.

2. Click on **File** then **Export Packaged Workbook…** to save your file with a **.twbx** file extension.

3. Select where you wish to save the exported file and click **Save**.

4. Submit the **.twbx** file to Blackboard using the instructions for submitting S**upporting Files**.