

Space Division Data Project

A journey into [data exploration](#) and [Tableau fundamentals](#)

About Tableau Academic Programs

This assignment is offered for free as part of the [Tableau Academic Programs](#) free ready-made curriculum. This content is free to any teacher teaching in a not-for-profit academic space. Along with this content, many additional resources are available. You can learn more about the program and apply by visiting the Tableau website. If you have any feedback or questions regarding this assignment, email us at tft@tableau.com.

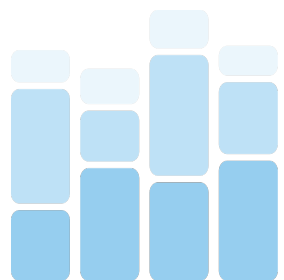
About the Project

This project uses a data set from [NASA.gov](https://www.nasa.gov), developed by the Meteoritical Society, to provide examples on how to explore and visualize data. Starting with the data exploration assignment, students are given a prompt that describes their role in the country's space division. Using this prompt, students must explore the data and make conclusions about what the data is telling them. The data visualization assignment explores Tableau and introduces key features such as filters, maps, and charts.

Each assignment aligns with portions of the Tableau ready-made curriculum. Further details on the alignment are available on the assignment page.

This project can be used in many ways. Each assignment will include both self-guided and guided tutorials you can share with your students. If you are already teaching Tableau in your classroom, this project can be used as working examples and a formative assessment of your content. If you are new to Tableau, this assignment can serve as a great introduction to key concepts and ideas.

This assignment is shared in several locations. Because of the sharing methods, it is not recommended this assignment be used for any formal assessment. This assignment is intended to provide supplemental learning to the content being taught in your classroom.



Space Division Project

Data Exploration and Preparation

Your country's space division recently hired you as a new data analyst. One of your first responsibilities is to analyze data on meteorites. In your initial meeting, you reviewed the data and discussed what they wanted to achieve. During this conversation, they revealed that they wanted to locate recent meteorites that have fallen to earth.

The goal of this project is to explore the data, decide what story your analysis should tell, and properly organize the data.

The data set titled, `explore_data.xlsx`, has been provided in the exercise files.

Learning Objectives

- Recognize variable and field types in a standard data set.
- Demonstrate proper data structure by splitting combined data fields.
- Assemble a data set into a proper format for effective visualization in Tableau.

Exploring Data

(If you are using the Tableau Data Literacy modules, this assignment aligns with the Module 3: Lecture One - Data Fundamentals.)

1. Looking at the data, what two variables do you find critical to the analysis?
2. Can we use the data to map where each meteorite has fallen?
 - a. If this is possible, what data field is critical for this?
 - b. Are there any changes to the data that would make this possible?
3. Can we determine the largest meteorites that have fallen to Earth?
4. Each column in the data set was initially created by a computer program. Do these names look correct? Do you see any issues that should be fixed?

Understanding Data Types

(If you are using the Tableau Data Literacy modules, this assignment aligns with the Module 4: Lecture One - Fields and Variables.)

1. Using the provided data, organize each data type into one of the following categories: Qualitative and Quantitative.
2. For the Quantitative data, highlight discrete values in blue and continuous values in green.



Qualitative	Quantitative

Preparing Your Data

(If you are using the Tableau Data Literacy modules, this assignment aligns with the Module 3: Lecture Two - Preparing your Data in Tableau.)

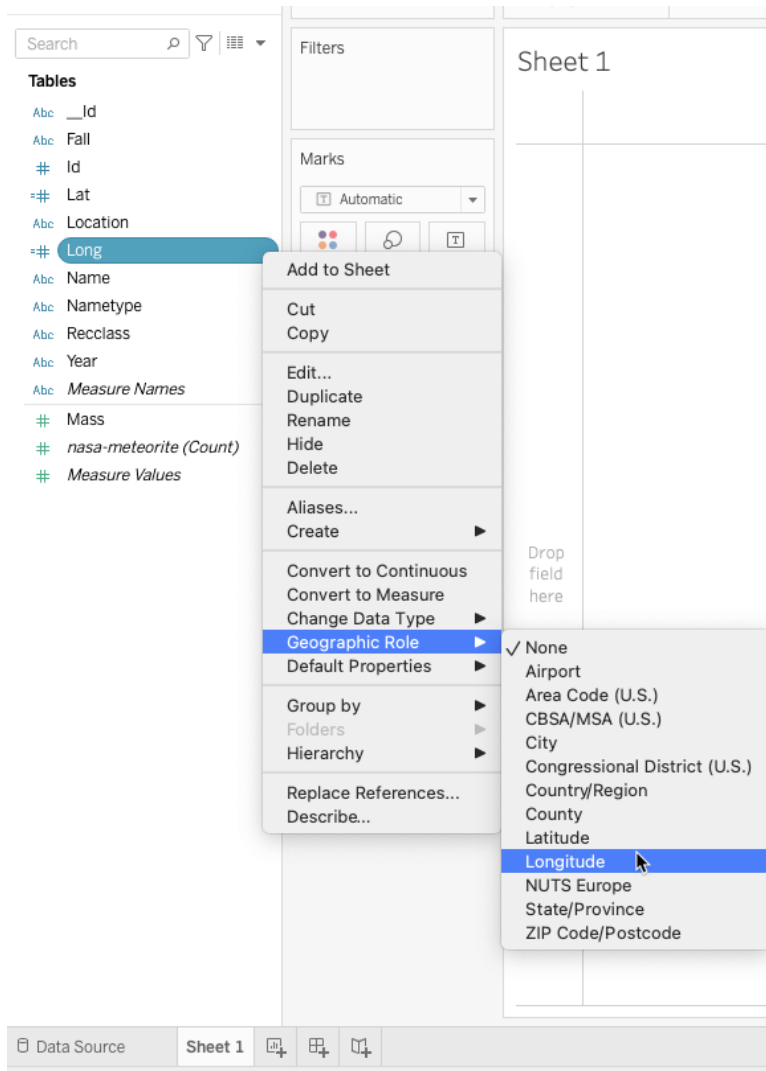
1. Open the data in Tableau using the starter workbook (explore_starter.twbx) located in the exercise files.
2. Split the location field.

Abc nasa-meteorite _id	Abc nasa-meteorite Fall	# nasa-meteorite Id	Abc nasa-meteorite Name	Abc nasa-meteorite Nametype	Abc nasa-meteorite Recclass	Abc nasa-meteorite Location	# nasa-meteorite Mass
row-hzx5-myx-f_ktcf	Fell	1	Aachen	Valid	L5	50.775 6.08333	21.00
row-rcr3.5w34_59cn	Fell	2	Aarhus	Valid	H6	56.18333 10.23333	720.00
row-gffa_citp-4gu8	Fell	6	Abee	Valid	EH4	54.21667 -113	107,000.00
row-tw78-y449.cqkk	Fell	10	Acapulco	Valid	Acapulcoite	16.88333 -99.9	1,914.00
row-adit.5t7p.agsg	Fell	370	Achiras	Valid	L6	-33.16667 -64.95	780.00
row-zsfi-twih-y4jz	Fell	379	Adhi Kot	Valid	EH4	32.1 71.8	4,239.00
row-5cxv_v2fi-v6z6	Fell	390	Adzhi-Bogdo (stone)	Valid	LL3-6	44.83333 95.16667	910.00
row-c679_ikmz-isc3	Fell	392	Agen	Valid	H5	44.21667 0.61667	30,000.00
row-6rg2.7zp5.y6ja	Fell	398	Aguada	Valid	L6	-31.6 -65.23333	1,620.00
row-9kil.huin-nim4	Fell	417	Aguila Blanca	Valid	L	-30.86667 -64.55	1,440.00

3. Rename Split 1 to "Lat".
4. Rename Split 2 to "Long".

# nasa-meteorite Id	Abc nasa-meteorite Name	Abc nasa-meteorite Nametype	Abc nasa-meteorite Recclass	Abc nasa-meteorite Location	Abc nasa-meteorite Year	# Calculation Location - Split 2
1	Aachen	Valid	L5	50.775 6.08333	1880-01-01T00:00:00.000	6.08
2	Aarhus	Valid	H6	56.18333 10.23333	1951-01-01T00:00:00.000	10.23
6	Abee	Valid	EH4	54.21667 -113	1952-01-01T00:00:00.000	-113.00
10	Acapulco	Valid	Acapulcoite	16.88333 -99.9	1976-01-01T00:00:00.000	-99.90
370	Achiras	Valid	L6	-33.16667 -64.95	1902-01-01T00:00:00.000	-64.95
379	Adhi Kot	Valid	EH4	32.1 71.8	1919-01-01T00:00:00.000	71.80
390	Adzhi-Bogdo (stone)	Valid	LL3-6	44.83333 95.16667	1949-01-01T00:00:00.000	95.17
392	Agen	Valid	H5	44.21667 0.61667	1814-01-01T00:00:00.000	0.62

5. Convert the Lat and Long data into a spatial data type.



6. Confirm the date is displayed in a discrete date format.

7. Rename the data type “Name” to “City”.



Teacher Notes

(This section should be removed before distributing the assignment.)

Data Information

Data used in this assignment was generated from [Nasa Open Data Portal](#)

Assignment Prerequisites

Students should understand data structure and variable/field types. (If you are using the Tableau Data Literacy curriculum, this assignment aligns with Module 3 - Collection and Structure, and Module 4 - Variable and Field Types.)

Tableau Ready-Made Curriculum Alignment

Data Literacy One

- Module 3 - Preparing your Data
- Module 3 - Data Fundamentals
- Module 4 - Fields and Variables

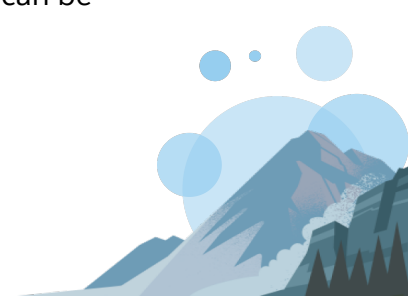
Additional Tableau Data Literacy Resources

Along with the Tableau curriculum, this content is highlighted in the [Build Your Data Literacy](#) Trail on Trailhead and the [Data Literacy for All](#) eLearning course.

Homework Walkthroughs

Part 1: Exploring Data

1. What are two data do you find critical to the analysis?
 - a. **Location**
 - b. **Mass**
2. Can we use the data to map where each meteorite has fallen? - **Yes**
 - a. If this is possible, what data field is critical for this? - **Location**
 - b. Are there any changes to the data that would make this possible? - **Yes, location would need to be broken into Latitude and Longitude format.**
3. Can we determine the largest meteorites that have fallen to Earth? - **Yes, using the mass column.**
4. Each column in the data set was initially created by a computer program. Do these names look correct? Do you see any issues that should be fixed?
 - a. **No, they are not all correct.**
 - b. **There are two "ID" columns.**
5. Oftentimes in data sets, extra data can be added that does not answer our questions. Looking at the data set, can you identify any columns that can be excluded from the set?
 - a. **NameType and first ID column.**



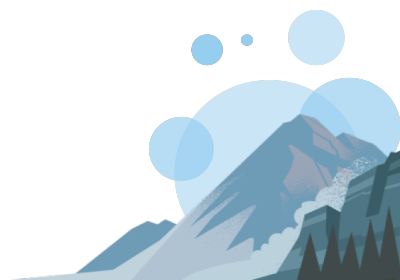
Part 3: Understanding Data Types

(If you are using the Tableau Data Literacy modules, this assignment aligns with the Module 4: Lecture One - Fields and Variables.)

1. Using the provided data, organize each data type into one of the following categories: Qualitative and Quantitative.
2. For the Quantitative data, highlight discrete values in blue and continuous values in green.

Qualitative	Quantitative
ID	Mass
Name	
Fall	
Recclass	Location
NameType	Year

Part 4: Preparing Your Data - See explore_final.twbx in the exercise files for the final solution.



Space Division Project

Data Visualization

Your country's space division recently hired you as a new data analyst. One of your first responsibilities is to analyze data on meteorites. After your initial exploration of the data, you are now ready to visualize the data.

The goal of this project is to visualize the provided data. You will create a Tableau Dashboard that details the 10 largest meteorites to hit Earth and where in the world every meteorite has landed. At minimum, you must display a map and bar chart. You can add any additional details you feel are important using the data provided.

To start this project, you have been provided with clean data via a packaged Tableau workbook.

- Located in the exercise files

Learning Objectives

- Demonstrate the use of spatial data by creating a Tableau map
- Develop a Tableau Dashboard using multiple views (worksheets)
- Demonstrate effective storytelling by using the Tableau Marks Card and Filters Shelf

Analyzing Data

Create a Calculated Field to display weight of meteorites by tons

1. Create a new calculated field named "Tons"
2. Divide Mass by 907185

Create a Bar Chart to display largest meteorites by location

1. Create a new sheet titled "Meteorite by City"
2. Create horizontal bar graph of fallen meteorites by city using the **City** dimension and **Tons** measure
3. Sort the graph in descending order using the axis sort icon
4. Filter the graph to only show top 10 largest (mass) fallen meteorites by city using the Top N filter feature

Follow Up Questions

1. What city has the largest known meteorite?
2. What is the size, in tons, of the largest found meteorite?



Display meteorite landing locations using a map

1. Create a new sheet and name it “Meteorites by Location”
2. Create a Symbol Map using the Lat and Long dimensions
3. Change the size of each Mark using the Tons measure
4. Change the color of the Marks using the Fall dimension
5. Edit the ToolTip to include Tons, Year, City, and Fall Status

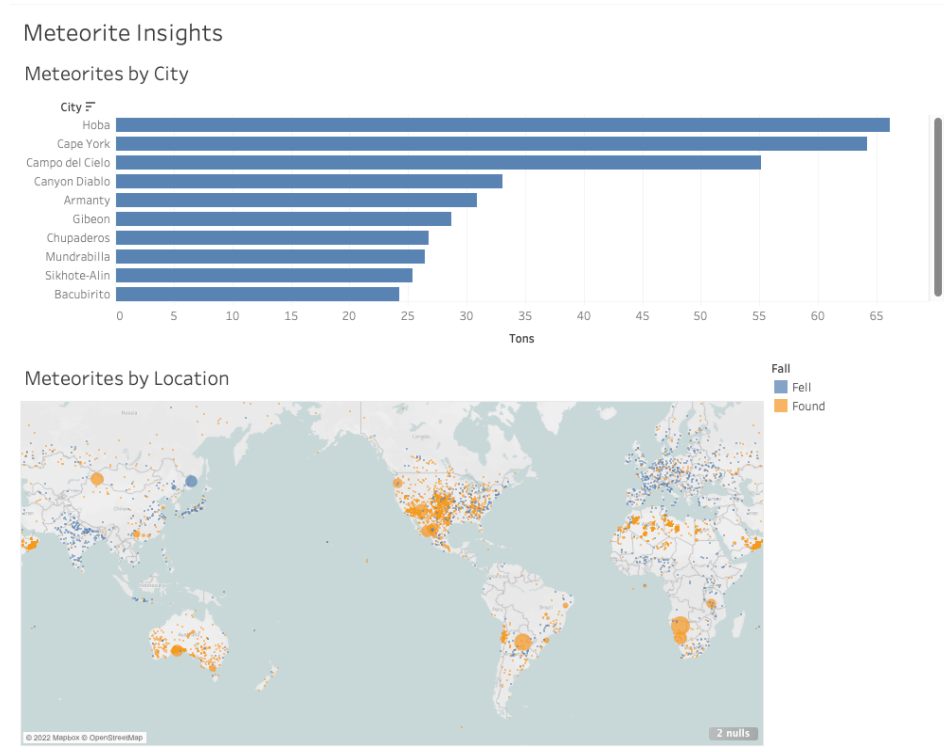
Follow-up Questions

1. Which continent has the least found meteorites?
2. Which continent has the most found meteorites?

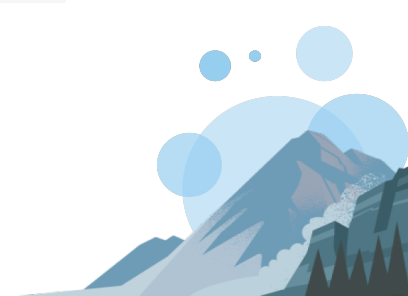
Sharing Insights

Create a dashboard that displays the sheets

1. Create a new Dashboard and name it “Meteorite Insights”
2. Check the box to show the title of the dashboard
3. Drag Meteorites by City to the view
4. Drag Meteorites by Location to the view
5. Display the legend in the same container as the map



(Example of final dashboard)



Teacher Notes (This section should be removed before distributing the assignment.)

This assignment can be taught in two different ways. If your students are familiar with Tableau, using the self-guided assignment will challenge their skills in Tableau. If your students are new to Tableau, the guided teaching assignment will walk the students through the assignment.

Self-guided assignment - The above assignment assume students have a familiarity with Tableau. Students should have an understanding of the Tableau interface. Understanding of the Tableau Fundamentals of Charts, Filters, Calculations and Creating Dashboards.

Guided teaching assignment - If students are new to Tableau, use the assignment walkthroughs below to teach the specific Tableau concepts.

Data Information

Data used in this assignment was generated from [Nasa Open Data Portal](#)

This project includes a starter (visualize_starter.twbx) and final (visualize_final.twbx) workbook. These are included in the provided exercise files.

Tableau Desktop Training Alignment

If you are teaching Tableau Desktop fundamentals or Tableau Certification prep, below are the topics that align with this assignment.

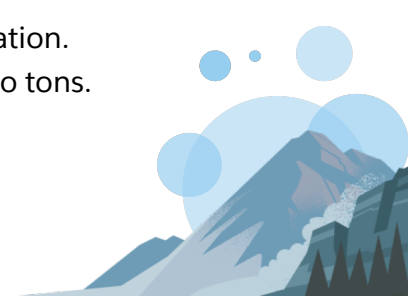
- [Using Spatial Data](#)
- [Converting Dimension and Measures](#)
- [Using filters](#)
- [Creating calculations](#)
- [Using Tableau marks](#)
- [Creating Dashboards](#)

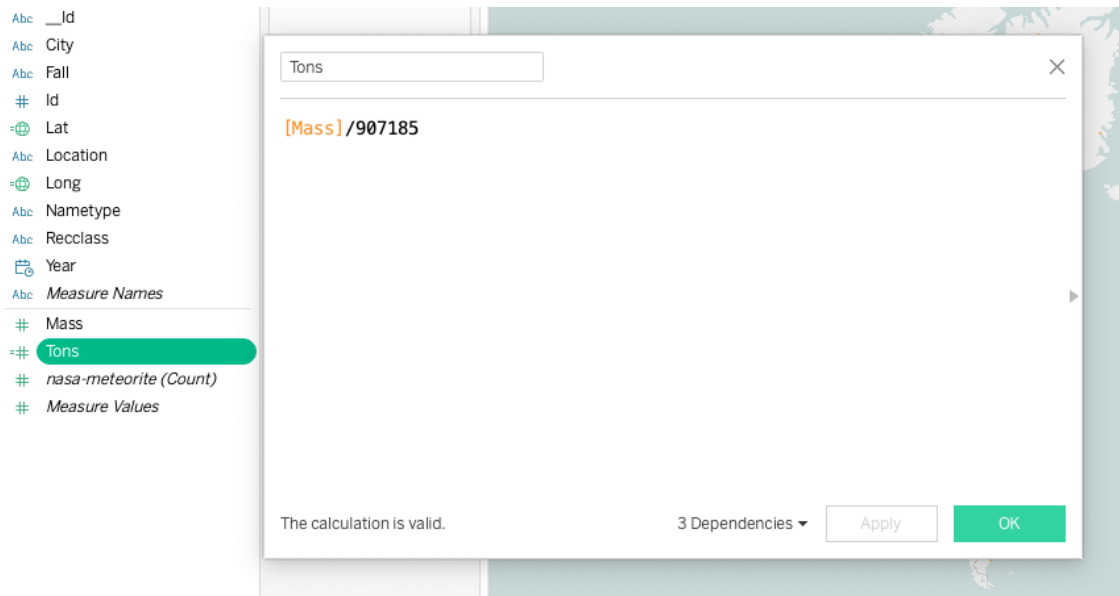
Self-Guided Assignment Walkthrough

Detailed instructions on how to complete the assignment.

Calculated Field

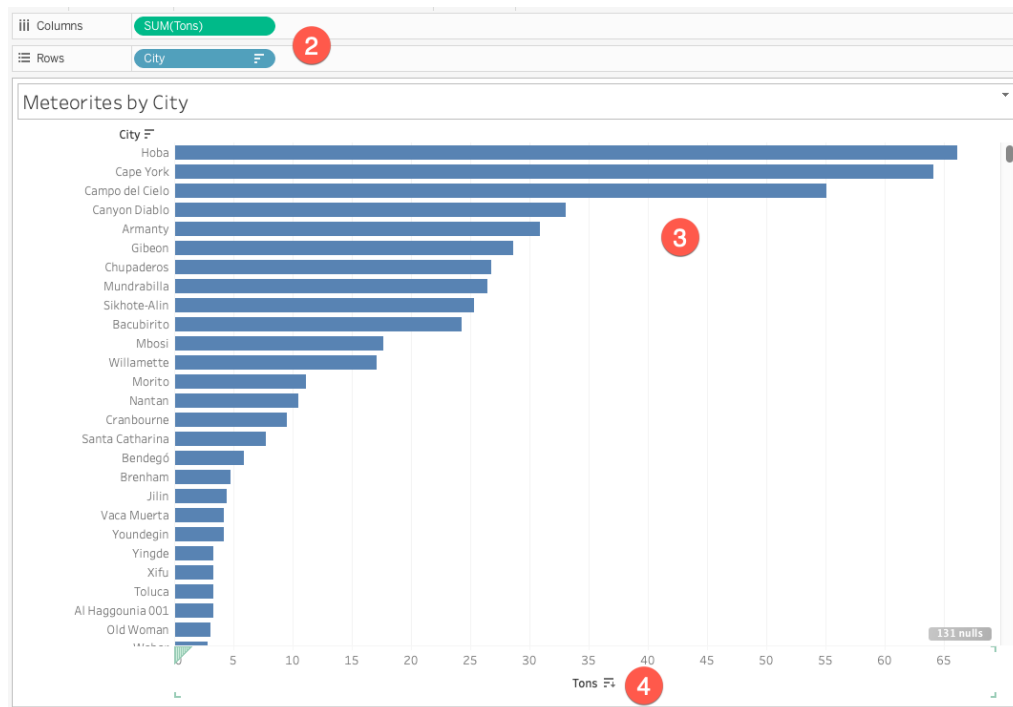
1. Navigate to the Analysis section of the Tableau Navigation Bar.
2. Select Calculated Field on the dropdown menu.
3. Rename the calculation to “Tons”.
4. In the text box, type “Mass” to pull in the Mass measure in the calculation.
5. Add the division symbol followed by the “907185” to convert grams to tons.



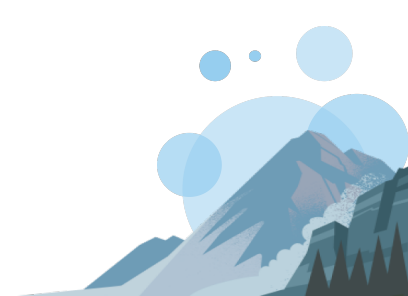
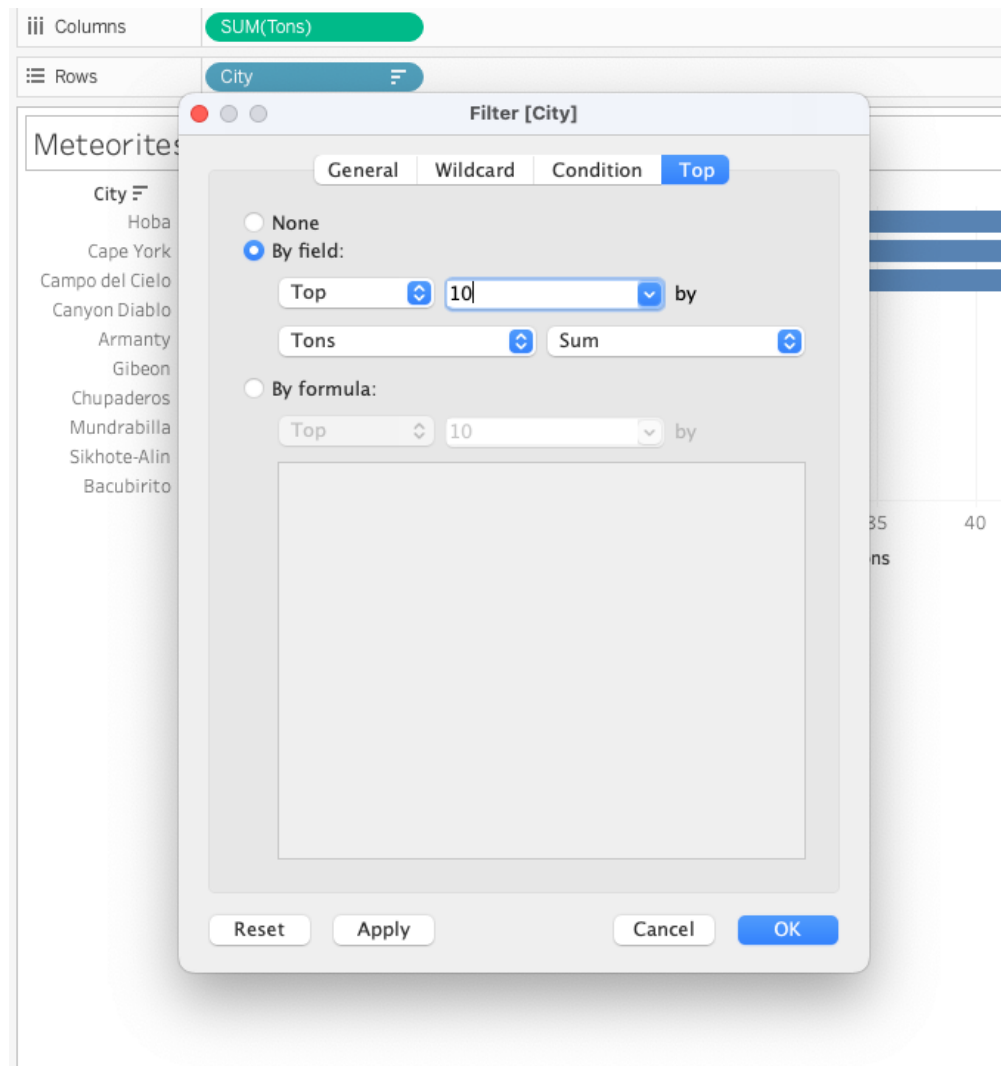


Creating Bar Graph

1. Create a new sheet and rename it “Meteorite by City”.
2. Drag City to the Rows shelf and Tons to the Columns shelf.
3. Ensure the view is displaying the data using Horizontal bars. You can check this by clicking the Show Me tab in the top right corner.
4. Adjust the Sort to display in descending order by clicking the Sort icon on the horizontal axis.

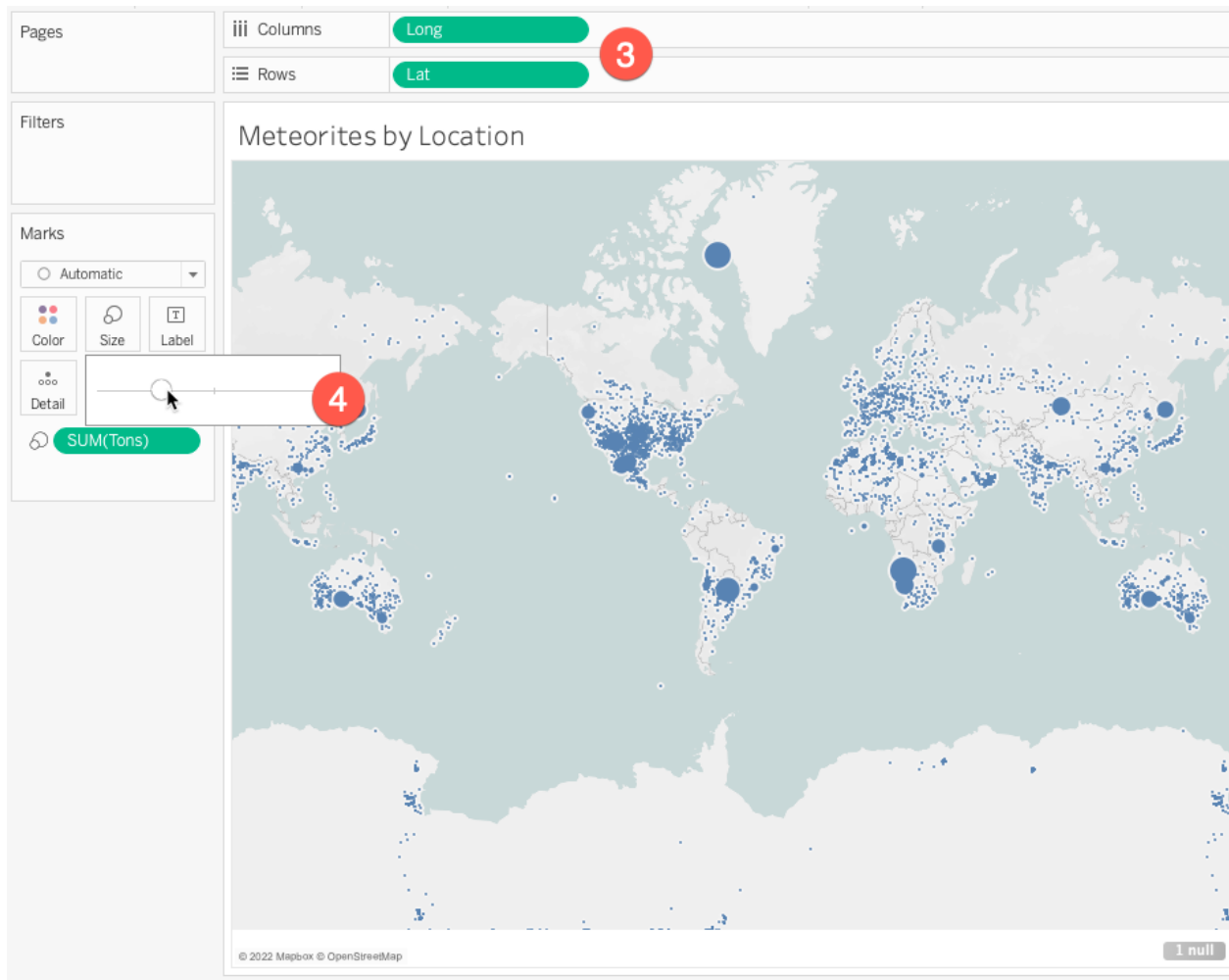


5. Drag the City dimension to the Filters shelf to open the Filters dialog box.
6. Click on the Top tab and check the By Field box.
7. Set the Top to 10 and By to Tons and Sum.

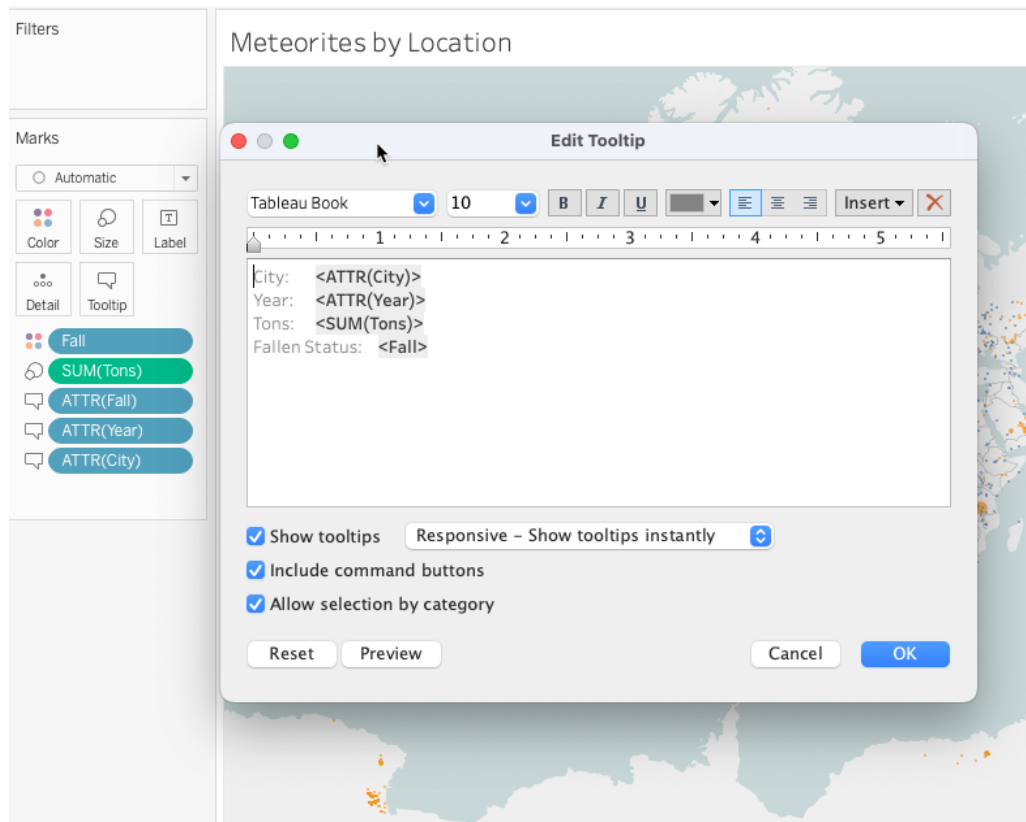


Creating a Map

1. Create a new sheet and rename it “Meteorites by Location”.
2. Locate the dimensions titled Lat and Long.
3. Drag “Long” to the columns shelf and “Lat” to the rows shelf to create a symbol map.
4. Drag the “Tons” measure to the size mark. This will display the size of each meteorite based on weight. (Clicking on the size mark presents a slider. Use this slider to adjust the size of each mark.)



5. Drag the “Fall” dimension to the color mark.
6. Click the color mark icon and adjust the opacity to 75%.
7. Drag Year, City, and Fall to the Tooltip.
8. Rename “Fall” to “Fallen Status”.
9. Click the Tooltip mark and remove the “Long” and “Lat” information.
10. Edit the Tooltip to display the information in the following order - City, Year, Tons, Fall.



Build a Dashboard

1. Create a new Dashboard and rename it “Space Division”.
2. Check the box on the Dashboard pane to “Show dashboard title”.
3. Drag the Meteorite by City and Meteorites by Location views to the Dashboard.
4. Select the Tons legend (located on the right side of the dashboard) and open the “More Options” menu. Remove this item from the Dashboard.
5. Drag the Fall legend to the Meteorites by Location view. Adjust the width of the area to your desired width.

Follow up questions - ANSWERS

1. What city has the largest known meteorite? *Hoba*
2. What is the size, in tons, of the largest found meteorite? *66.14*
3. Which continent has the least found meteorites? *Europe*
4. Which continent has the most found meteorites? *Africa*

