

Tuva User Guide

This user guide will help you become familiar with how to use the Tuva tools to create a variety of different graphs and charts, and how to use our modeling, statistics, and annotation features. For more detailed tutorials on using the Tuva tools, visit support.tuvalabs.com.

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1. Display Area

Toolbar: The toolbar displays the graph types and tools that can be used in Tuva. These are explained later in this guide.

Graphing Area: The graphing area displays the graph generated by the attributes selected.

Case Card: The case card organizes all of the attributes available for the dataset.

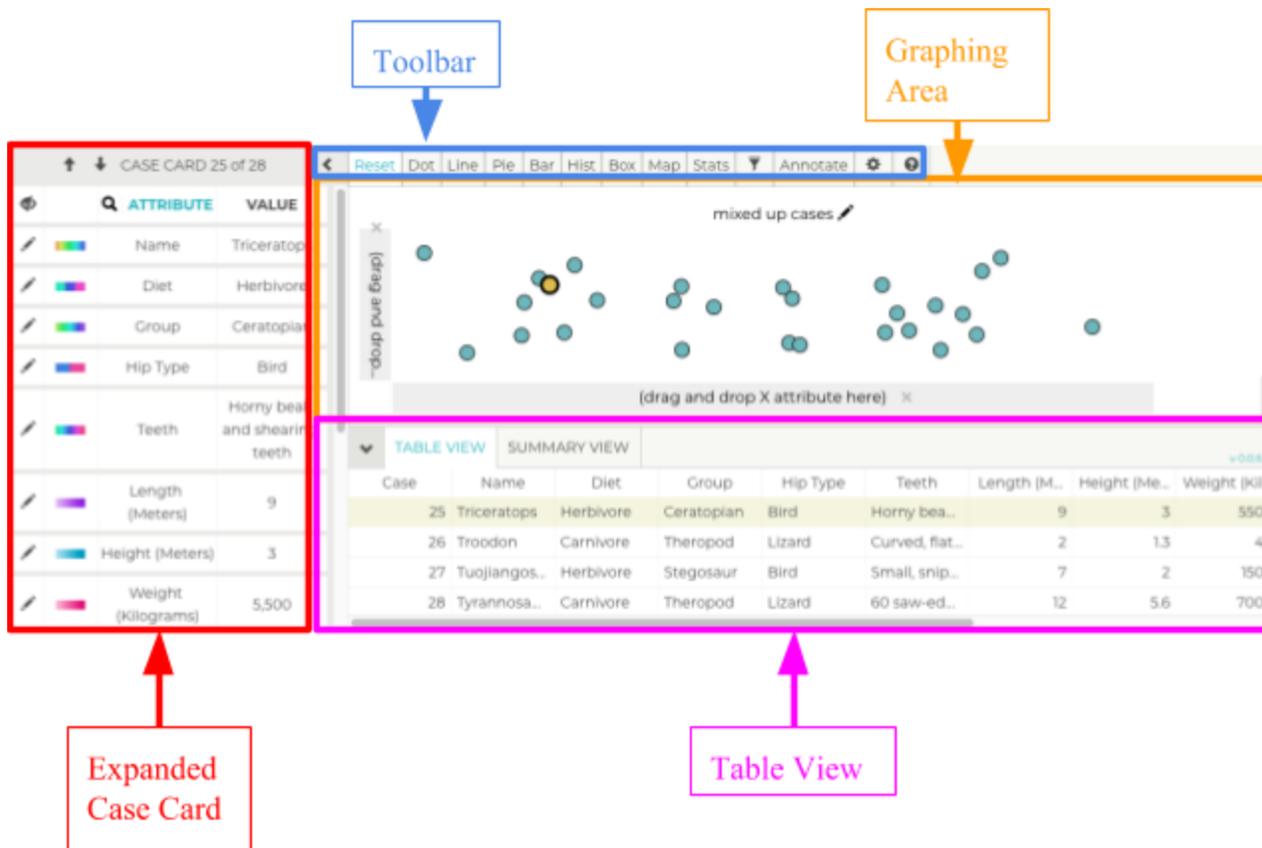
→ Click the arrow in the top right to expand (as shown here) or contract the menu.

The case card is organized into 3 columns:

1. Color- assigned gradient (numerical) or specific colors (categorical)
2. Attribute name
3. Value(s) for the attribute

*Editing attributes is covered in a later section.

Table View: The table view displays the spreadsheet of data being used to generate graphs



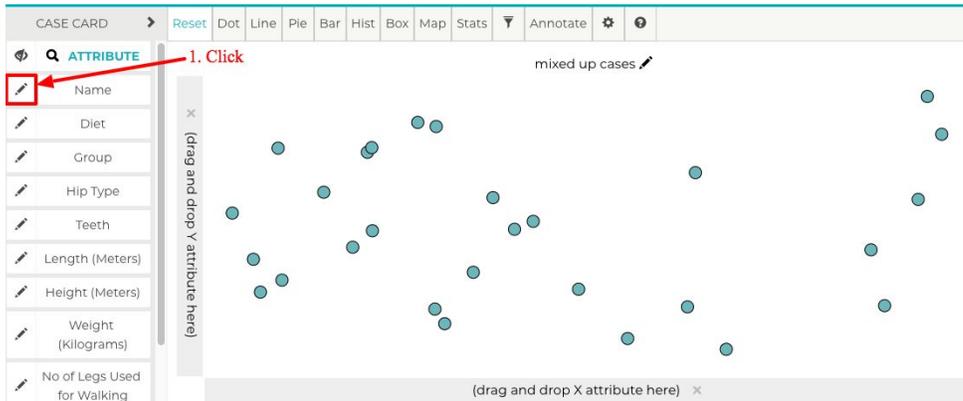
Display Area Connections

The Case Card, Graphing Area, and Table View are connected. Selecting a data point on the graph will highlight the row containing the data in the table view and change the values in the case card to reflect those for the data point. Clicking a row of the data table will highlight the data point in the graph and change the values shown in the case card.

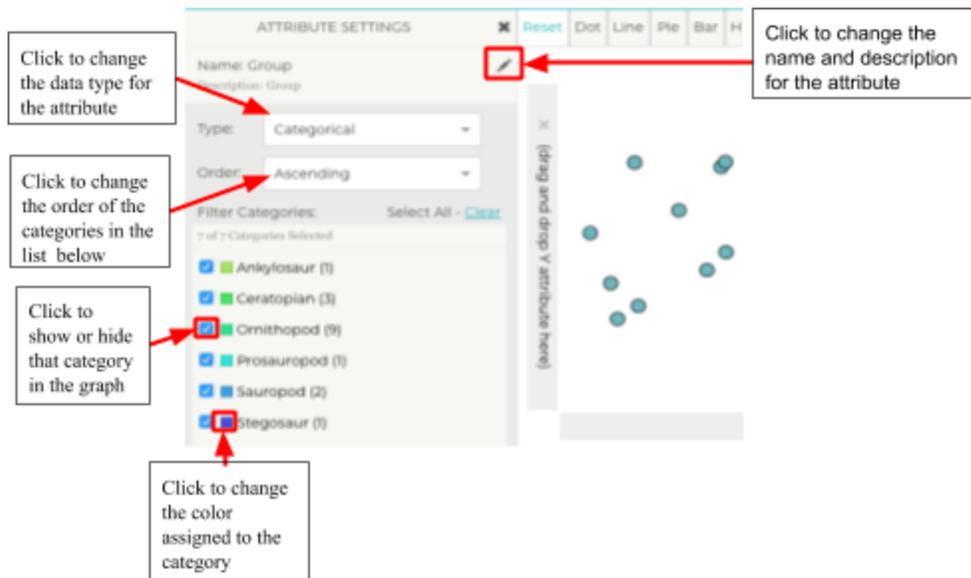
2. Edit Attribute Card

Attributes can be modified using the “Edit Attribute” function.

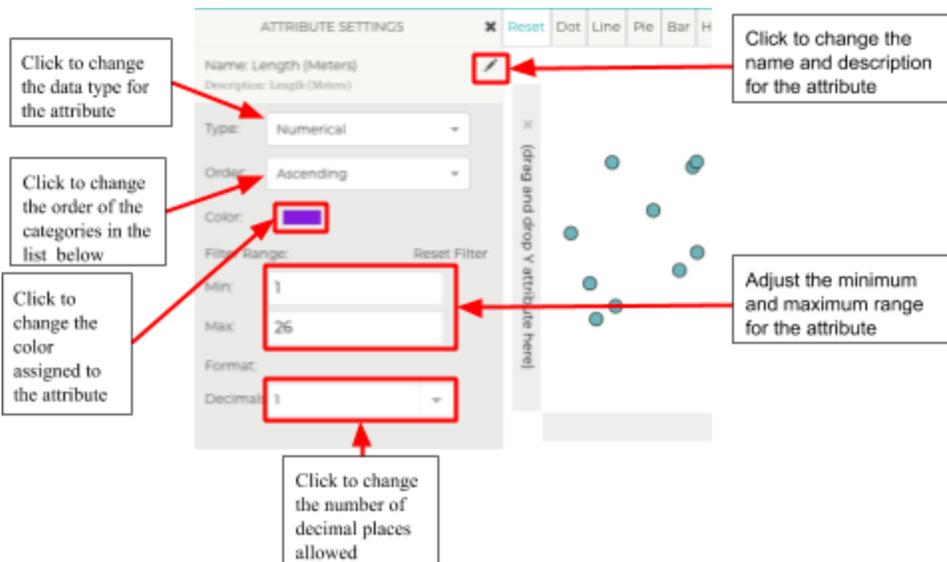
Accessing the Edit Menu for an Attribute



Editing a Categorical Attribute



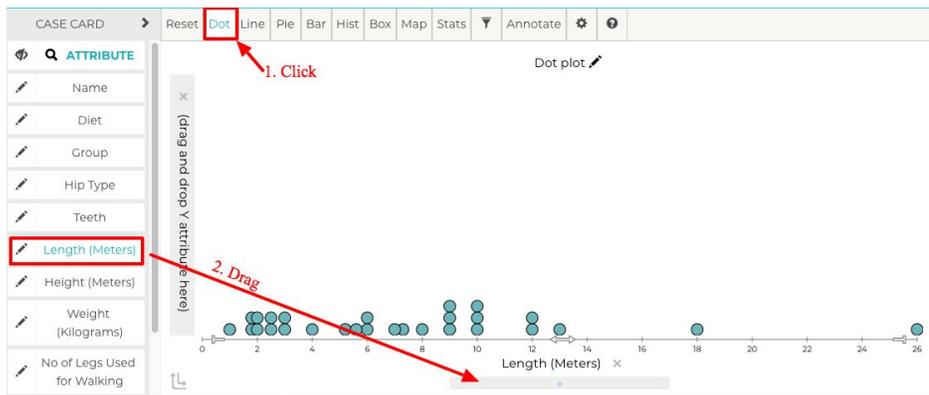
Editing a Numerical Attribute



3. Dot Plots

Dot plots are a simple, yet versatile way to visualize variability in one attribute (using one axis), or showing relationships between two quantitative attributes (using two axes, i.e. a scatter plot). Tuva will default to generating a dot plot if no other graph type is selected.

Dot Plot w/ Single Numerical or Categorical Attribute



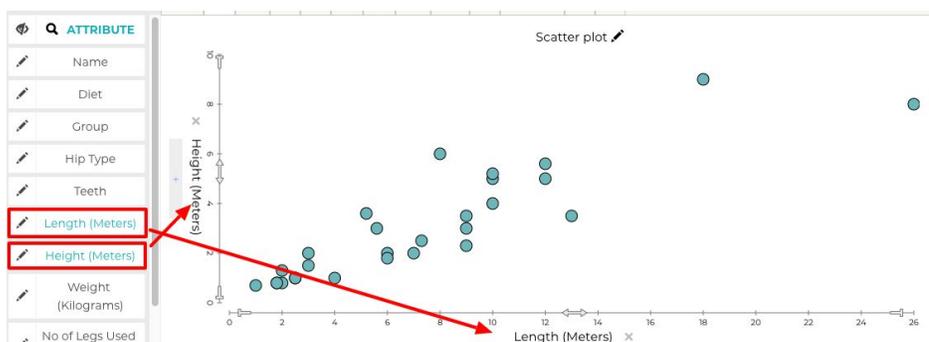
- Click **Dot**
- Drag a **numerical or categorical attribute** to the x-axis

Dot Plot w/ One Numerical and One Categorical Attribute



- 1. Click **Dot**
- 2. Drag a **categorical attribute** to the y-axis
- 3. Drag a **numerical attribute** to the x-axis

Scatterplot (Two Numerical Attributes)



- Click **Dot**
- Drag a **numerical attribute** to each axis

4. Line Graphs

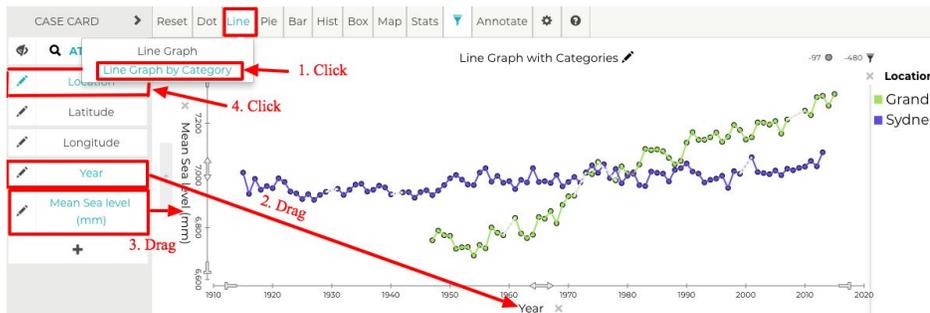
Line graphs are a good way to show how two quantitative attributes relate to each other when one is on a continuous scale and there is an order to the x-axis data, such as how something changes through time. Tuva allows a third attribute to be highlighted to reveal patterns in how it is associated with the other two attributes.

Line Graph w/ Two Numerical Attributes



- 1. Hover over **Line** and select **Line Graph** from the dropdown menu
- 2. Drag a **numerical attribute** to x-axis
- 3. Drag a **numerical attribute** to y-axis

Line Graph by Category w/ Two Numerical Attributes



- 1. Hover over **Line** and select **Line Graph by Category** from the dropdown menu
- 2. Drag a **numerical attribute** to each axis
- 3. Single click a **categorical attribute** to color the lines by category

5. Pie Graphs

Pie graphs show how a whole group is divided into proportional parts.

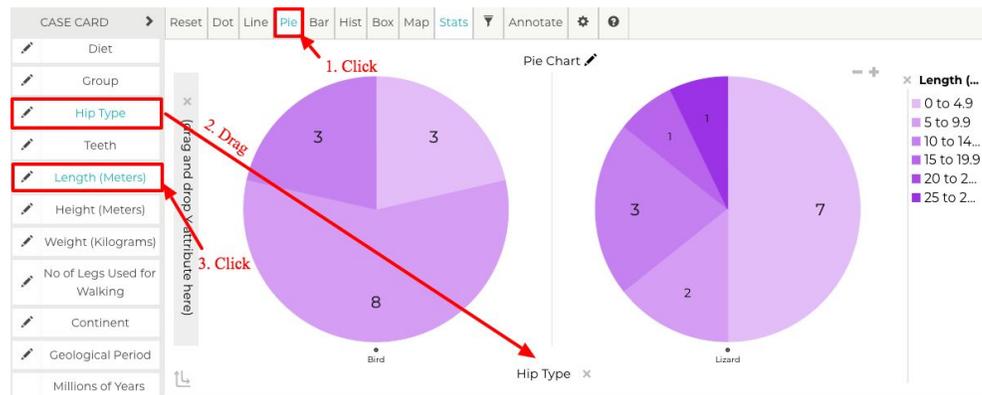
Pie Graph w/ One Numerical or Categorical Attribute



→ Click Pie

→ Single click a **numerical or categorical attribute**

Pie Graph w/ One Categorical and One Numerical Attribute

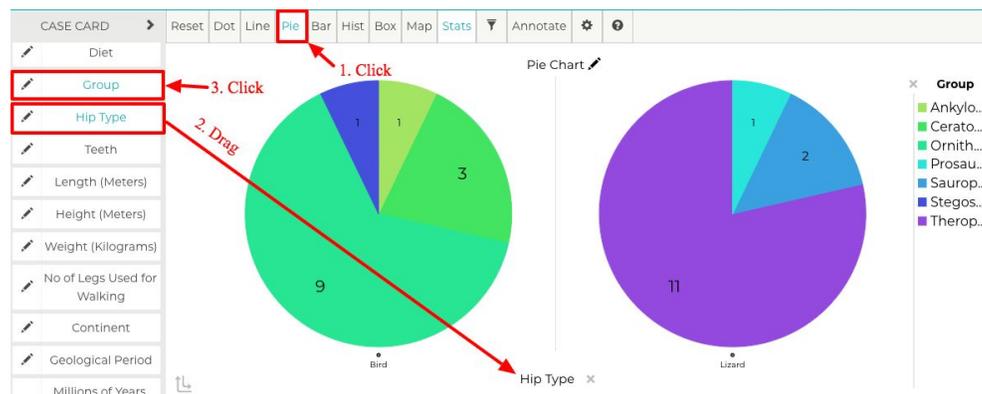


→ Click Pie

→ Drag a **categorical attribute** to an axis

→ Single click a **numerical attribute**

Pie Graph w/ Two Categorical Attributes



→ Click Pie

→ Drag a **categorical attribute** to the x-axis

→ Single click a different **Categorical attribute**

6. Bar Graphs

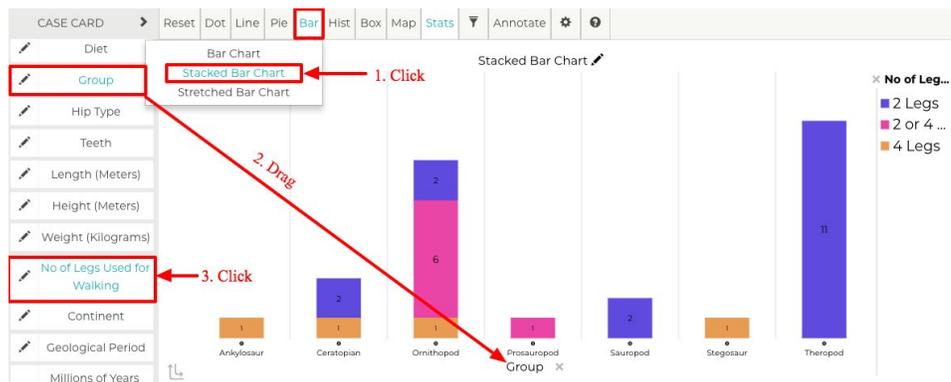
Bar graphs allow you to compare two or more categories in a numerical aspect, such as heights of different individual students. **Stacked bar charts** allow you to compare a categorical attribute in a numerical aspect or a numerical attribute *and* its proportional make-up of subgroups within a second categorical attribute. **Stretched bar charts** provide a way to visualize the proportional make-up of a categorical attribute within two other categorical attributes.

Bar Chart w/ Two Attributes



- Hover over **Bar** and select **Bar Chart**
- Drag a **categorical attribute** to an axis
- Drag a **numerical attribute** to the other axis

Stacked Bar Chart w/ Two Attributes



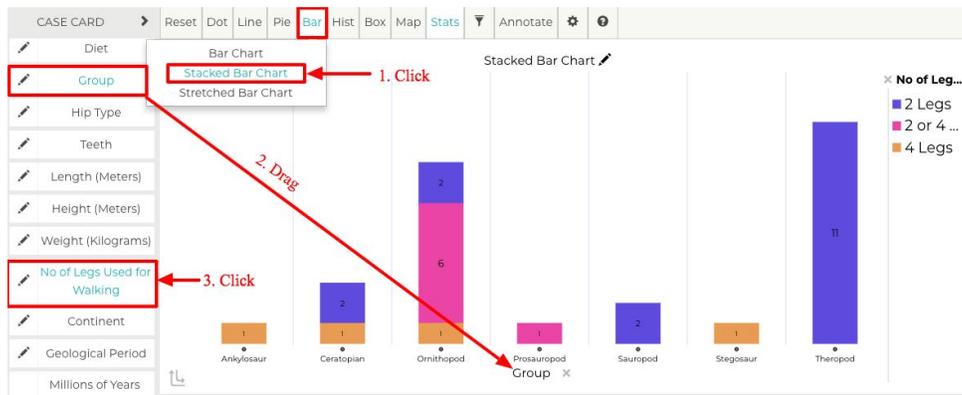
- 1. Hover over **Bar** and select **Stacked Bar Chart**
- 2. Drag a **categorical attribute** to an axis
- 3. Single click a **numerical or categorical attribute**

Stacked Bar Chart w/ Three Attributes



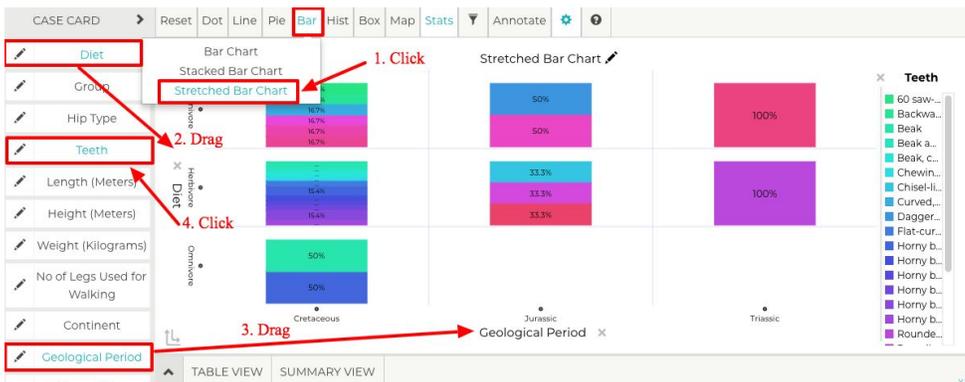
- Hover over **Bar** and select **Stacked Bar Chart**
- Drag a **categorical attribute** to the x-axis
- Drag a **numerical attributes** to the y-axis
- Single click a different Numerical or Categorical attribute

Stacked Bar Chart w/ Two Attributes



- 1. Hover over **Bar** and select **Stretched Bar Chart**
- 2. Drag a **categorical attribute** to an axis
- 3. Single click a **numerical** or **categorical** attribute

Stretched Bar w/ Three Attributes



- 1. Hover over **Bar** and select **Stretched Bar Chart**
- 2. Drag a **categorical attribute** to an axis
- 3. Drag another **categorical attributes** to the other axis
- 4. Single click a different **categorical attribute**

7. Histograms

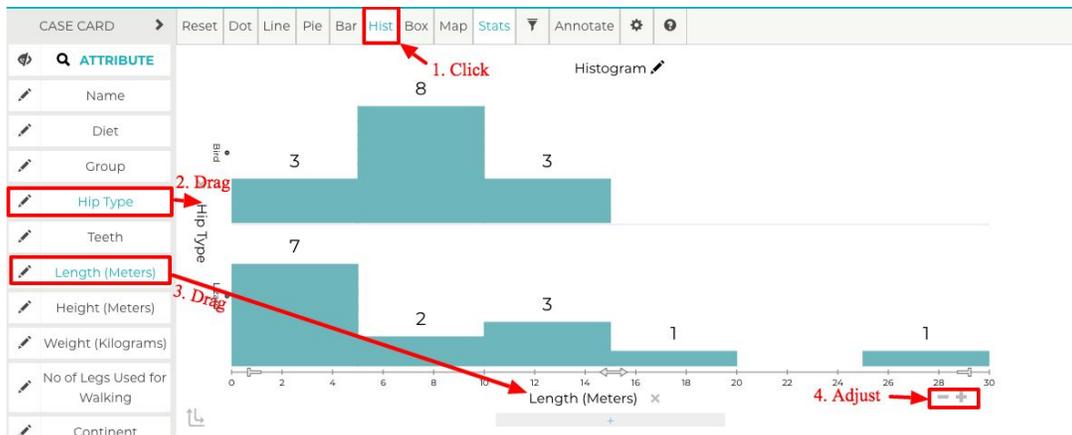
Histograms are another way to show the frequency of numeric values, similar to a one-axis dot plot.

Histogram w/ One Numerical Attribute



- Click **Hist**
- Drag a **numerical attribute** to the x-axis
- Click the **+** or **-** to adjust the number of bins

Histogram w/ One Numerical and One Categorical Attribute

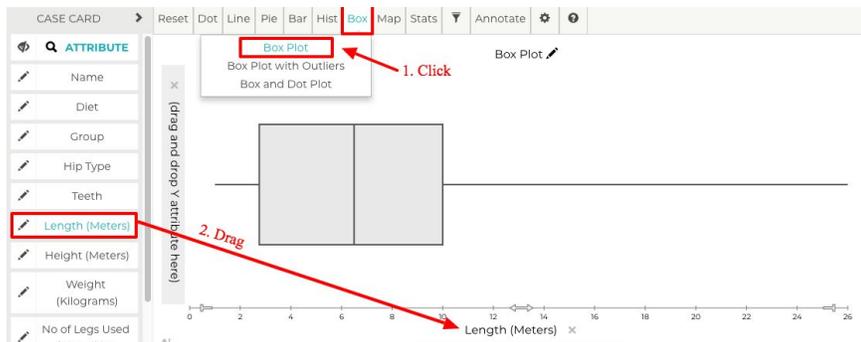


- Click **Hist**
- Drag a **categorical attribute** to an axis
- Drag a **numerical attribute** to the other axis
- Click the **+** or **-** to adjust the number of bins

8. Box Plots

Box plots, like histograms and dot plots, show how a numerical attribute is distributed along a single axis.

Box Plot w/One Numerical Attribute



→ Hover over **Box** and select **Box Plot**

→ Drag a **numerical attribute** to the x-axis

Box Plot w/One Numerical and One Categorical Attribute

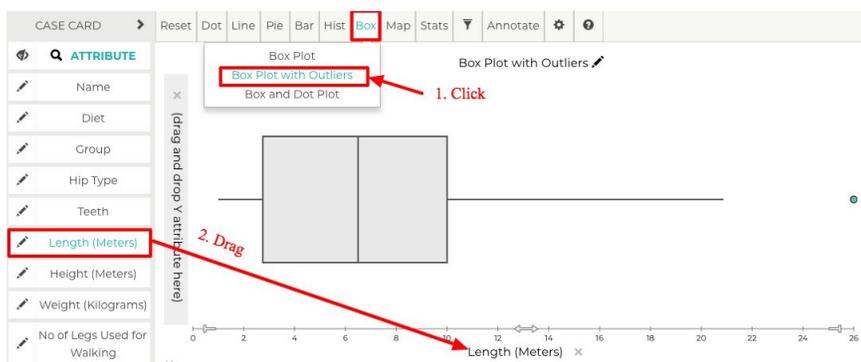


→ Hover over **Box** and select **Box Plot**

→ Drag a **categorical attribute** to the y-axis

→ Drag a **numerical attribute** to the x-axis

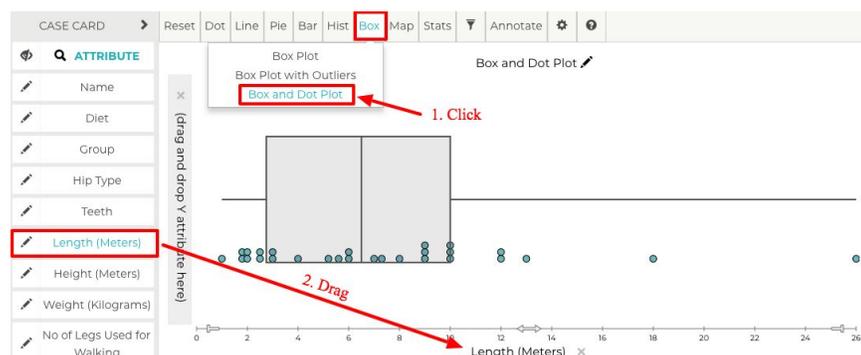
Box Plot w/Outliers



→ Hover over **Box** and select **Box Plot with Outliers**

→ Drag a **numerical attribute** to the x-axis

Box and Dot Plot

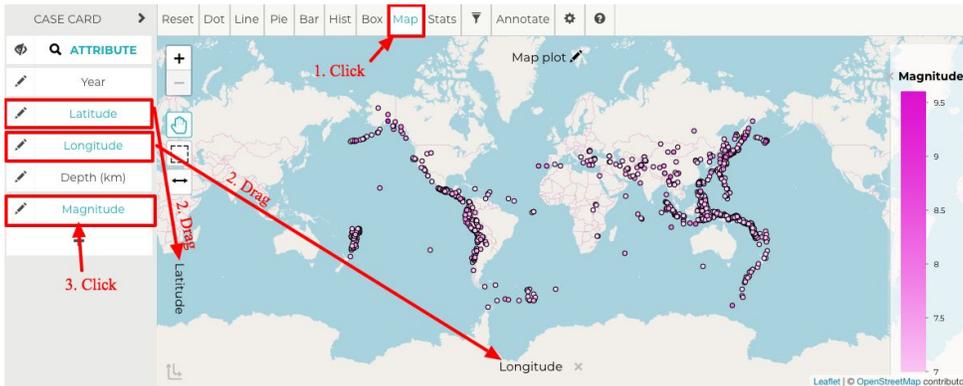


→ Hover over **Box** and select **Box and Dot Plot**

→ Drag a **numerical attribute** to the x-axis

9. Map

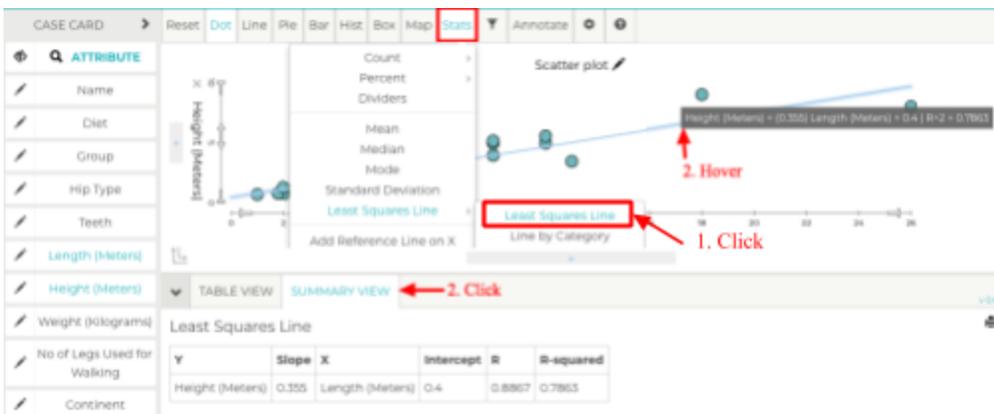
Maps show spatial distribution of a numerical or categorical attribute. To make a map, latitude and longitude must be included as attributes.



- Click **Map**
- Drag **Latitude** to the y-axis and **Longitude** to the x-axis
- Single click a **numerical** or **categorical** attribute to color code the data

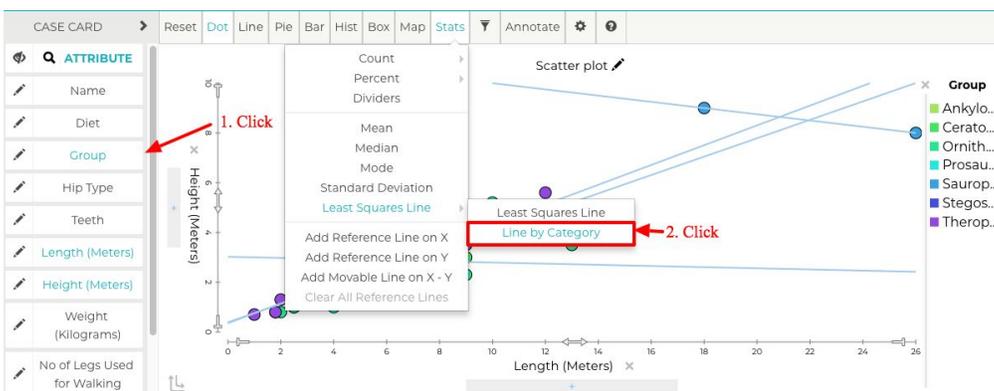
10. Line-of-Best Fit

Least Squares Line



- Follow the instructions for setting up a **Scatter Plot**
- Hover over **Stats**, then **Least Squares Line** and click **Least Squares Line**
- Hover over the line or click **Summary View** to see values for the line

Least Squares Line by Category



- Follow the instructions for setting up a **Scatter Plot**
- Click a **categorical** attribute
- Hover over **Stats**, then **Least Squares Line** and click **Least Squares Line**

11. Statistics

Tuva allows you to display several statistical measures in the graph and in a summary table.

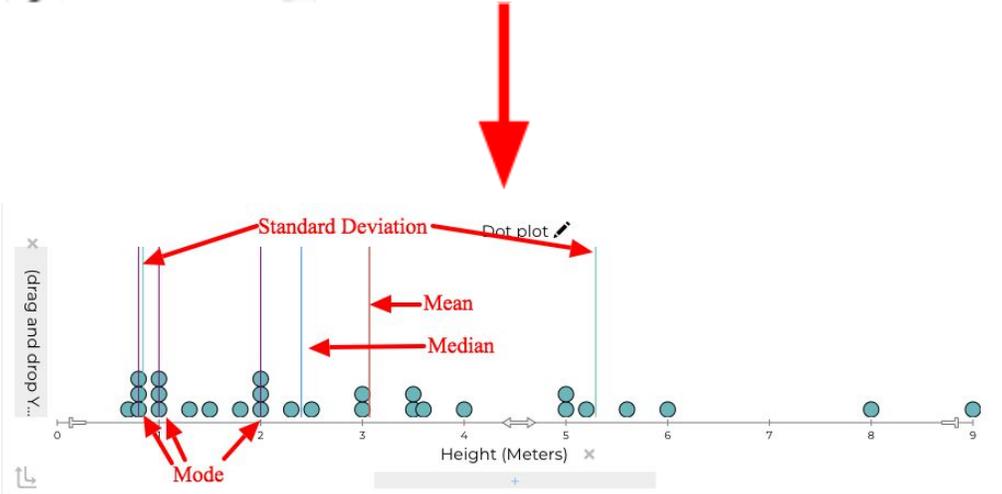
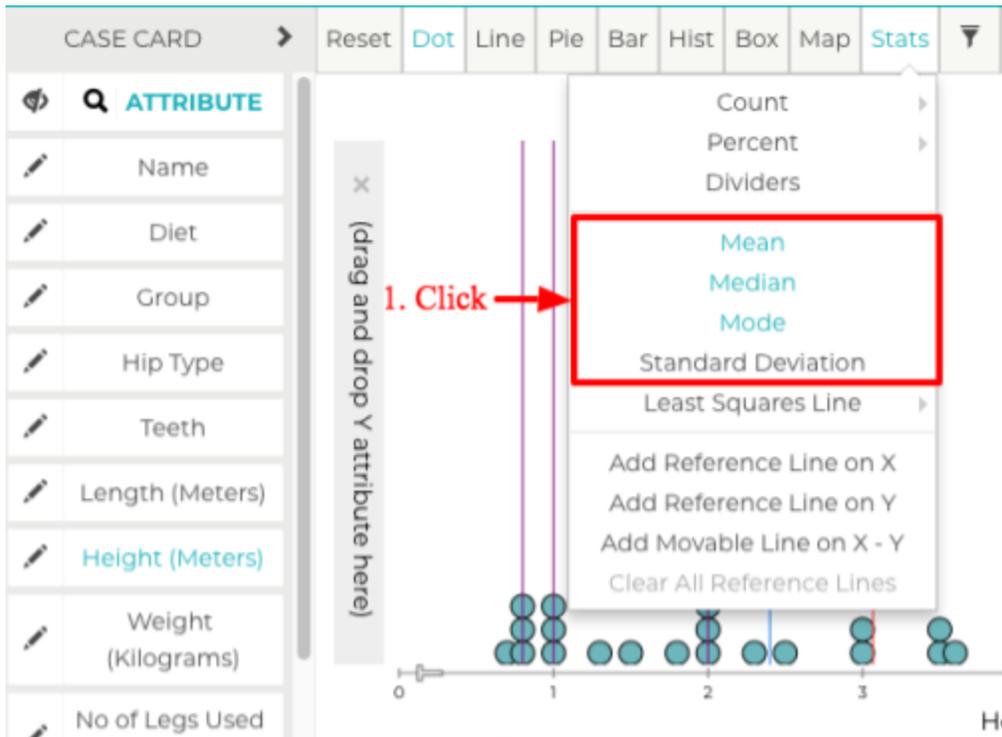


TABLE VIEW SUMMARY VIEW

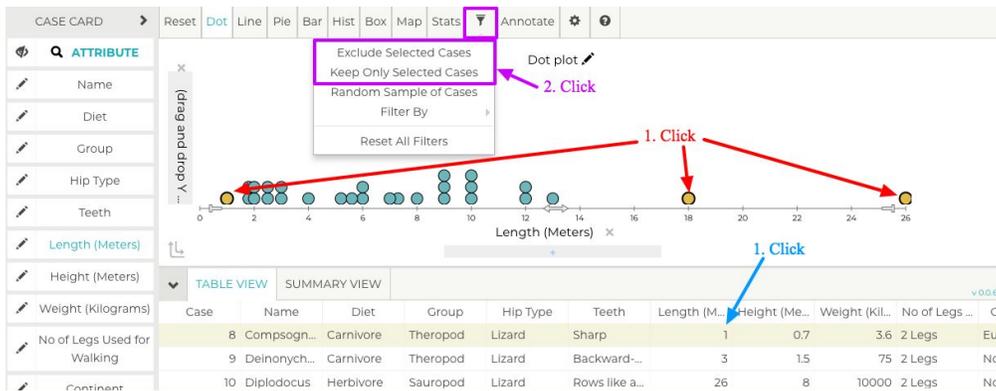
	Height (Meters)
Mean	3.1
Median	2.4
Mode	0.8, 1, 2
Std. Deviation	2.2

Click Summary View to see the values

12. Filtering

You can filter out selected ranges or categories of the data to focus only on the parts of the dataset that are of interest. This can be accomplished through the filter icon in the toolbar or by changing the attribute settings from the Case Card.

Exclude/Keep Only Selected Cases



- Click data points in the graphing area to select them. Hold shift while clicking to select more than one. Or...
- Click a row in **Table View** to select a data point. Then...
- Hover over the filter icon and click **Exclude Selected Cases** to remove those data points. Or...
- Hover over the filter icon and click **Keep Only Selected Cases** to remove those data points

Filtering from the Case Card (Numerical Attributes)

- Expand the case card and click the pencil icon next to the numerical attribute for which you want to filter
- In the attribute settings, enter the desired range for the data set

Filtering from the Case Card (Categorical Attributes)

The image shows two panels. The left panel is a 'CASE CARD 1 of 28' with a table of attributes and values. A red box highlights the pencil icon next to the 'Group' attribute, with a red arrow pointing to it and the text '1. Click'. The right panel is 'ATTRIBUTE SETTINGS' for the 'Group' attribute. A red box highlights the 'Filter Categories' section, with a red arrow pointing to it and the text '2. Click'. Below this, several categories are listed with checkboxes, including 'Ankylosaur (1)', 'Ceratopian (3)', 'Ornithopod (9)', 'Prosauropod (1)', 'Sauropod (2)', and 'Stegosaur (1)'. A red arrow points from the 'Group' attribute in the case card to the 'Filter Categories' section in the settings panel.

ATTRIBUTE	VALUE
Name	Albertosaurus
Diet	Carnivore
Group	Theropod
Hip Type	Lizard
Teeth	Saw-edged
Length (Meters)	9
Height (Meters)	3.5
Weight (Kilograms)	1,500
No of Legs Used for Walking	2 Legs

- Expand the case card and click on the pencil icon next to the categorical attribute for which you want to filter
- In the attribute settings, click and uncheck the boxes to filter out a category

Random Sample of Cases

The image shows a 'RANDOM SAMPLE' dialog box with a 'Sample Size' field containing the number '7'. A red box highlights the 'Sample' button, with a red arrow pointing to it and the text '3. Click'. A red arrow points from the 'Sample Size' field to the text '2. Enter Value'. A context menu is open over the dialog box, with a red box highlighting the 'Random Sample of Cases' option, and a red arrow pointing to it with the text '1. Click'. Below the dialog box is a scatter plot with 'Length (Meters)' on the x-axis and a y-axis labeled '(drag and drop attribute here)'. The plot shows several data points represented by blue circles.

- Hover over the filter icon and click **Random Sample of Cases**
- Enter the desired number of data points under **Sample Size**
- Click **Sample** to generate a new Random sampling

13. Annotation Tools

Tuva provides several annotation tools that you can use to highlight, label, or differentiate parts of the graph that are of special interest.



- Hover over **Annotate** and select a tool from the dropdown
- Click and drag on the screen to draw with the tool
- Click and drag the box to the right of the annotation to resize
- Click the colored dot to change the color of the annotation