

# Data Clubs

## CODAP Challenge Cards

### Instructions:

1. Print single-sided on letter-size paper.
2. Cut along the dotted line.
3. Fold each sheet vertically in half.

Each group of students should have one set of 35 cards.

These CODAP Challenge Cards were developed by the Data Clubs project, a collaboration of TERC, Inc., Science Education Solutions, and the Gulf of Maine Research Institute, funded by the National Science Foundation under grants DRL-1742255 and 1741989.

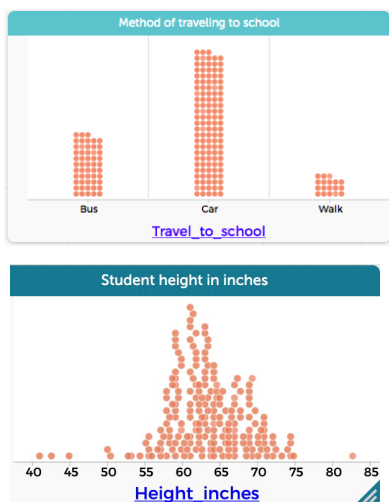
For more information on the Data Clubs project, visit [www.terc.edu/dataclubs](http://www.terc.edu/dataclubs)

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### 1 Graph one attribute

#### *The Basics*

Display the data from one “attribute” in order to see all the values for that attribute.



### 1 HINT

Click on the graph icon on the top left corner of the screen.



Drag a column heading (called an “attribute”) to the x axis at the bottom of the graph to see how the values are distributed.



## 2 Graph two attributes

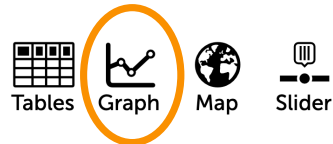
### The Basics

Organize the data in a graph with one attribute on the x axis and a different attribute on the y axis to see what you can find out.



## 2 HINT

Click on the graph icon on the top left corner of the screen.

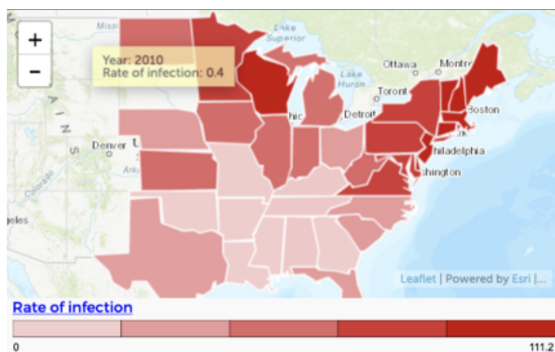


Drag column headings (called “attributes”) to the axes at the bottom (x axis) and left sides of the graph (y axis) to organize the data.

## 3 Map an attribute

### The Basics

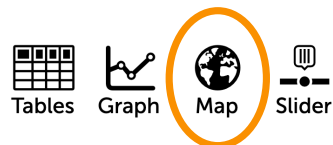
Explore the geographical distribution of the data.



Geographical datasets only

## 3 HINT

Click on the map icon at the top left corner of the screen.



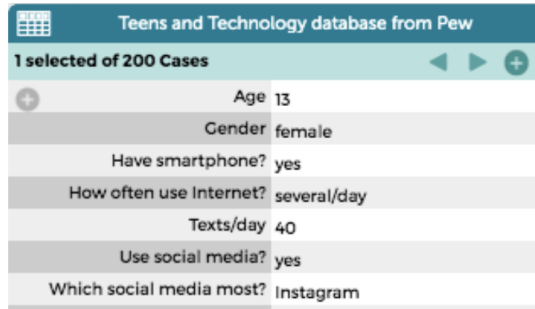
Drag an attribute from your table onto the map.



## 4 Look at a single case card

### *The Basics*

Display the data from one case in order to see all the attributes for that case.



The screenshot shows a single case card with the following attributes and values:

Teens and Technology database from Pew	
1 selected of 200 Cases	
Age	13
Gender	female
Have smartphone?	yes
How often use Internet?	several/day
Texts/day	40
Use social media?	yes
Which social media most?	Instagram

## 4 HINT

Go to the top left corner of the table and click on the card icon



Use the arrows to scroll through different cards.



Click on the top left corner again to go back to the table view.



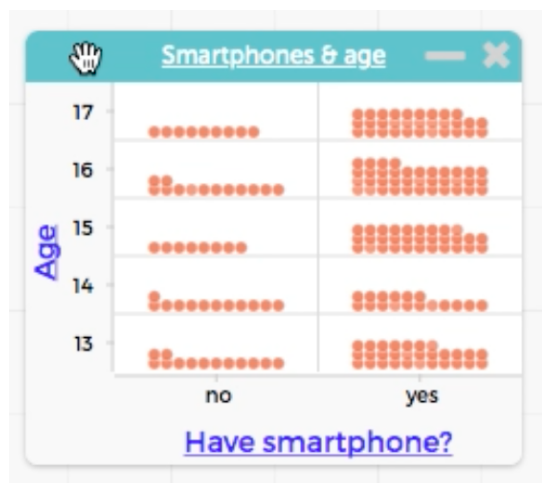
## 5 Move it

### *The Basics*

Move a graph or a table up, down, or off to the side to give yourself space on the screen to work.

## 5 HINT

Click on the blue-green bar at the top of a graph or table and then drag. Don't click anywhere where there is writing or symbols—just click on the colored part.





## 6 Remove an attribute from an axis

### *The Basics*

Remove an attribute from either the x or y axis of a graph.

## 6 HINT

Make a graph first. Click on the name of the attribute on one axis. Scroll down to the bottom of the list, and select “Remove Y” or “Remove X.”



## 7 Change the size

### *The Basics*

Make your graph or table really big on the screen so you can see lots of detail. Or, make it really small to make space for other things.

## 7 HINT

Hover the cursor on the edge or bottom right corner of the graph or table. When you see the arrow, click and drag to resize.

The screenshot shows a table titled "Lyme Data 2006 to 2017" with a subtitle "States (443 cases)". The table has four columns: "in-dex", "State", "Deer tick found?", and "Yes". The first three rows are visible, with the first row highlighted in green. A mouse cursor is hovering over the bottom right corner of the table, where a small arrow indicates a resize handle.

in-dex	State	Deer tick found?	Yes
48	Delaware	Yes	
49	Florida	Yes	
50	Florida	Yes	



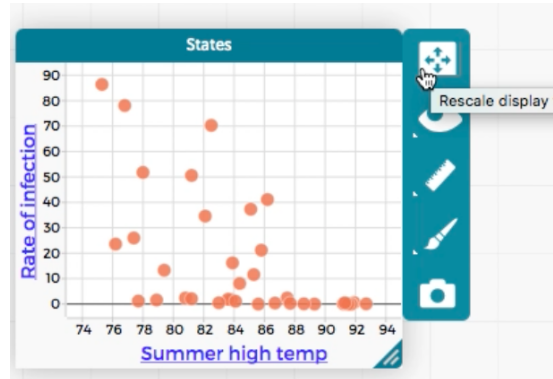
## 8 Rescale

### *The Basics*

Restore the graph to what it used to look like. Use this move to show all the data after you have scrolled through the axes or changed the scale.

## 8 HINT

Click on the graph and find the Rescale button with four arrows right above the eye.



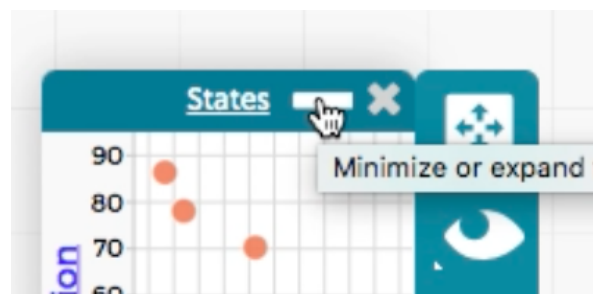
## 9 Minimize

### *The Basics*

Minimize your graph or table in order to get it out of the way while allowing you to go back to it later.

## 9 HINT

Find the minus sign “–” at the top right corner of the graph. Don’t click the “x” or you’ll lose what you were working on!





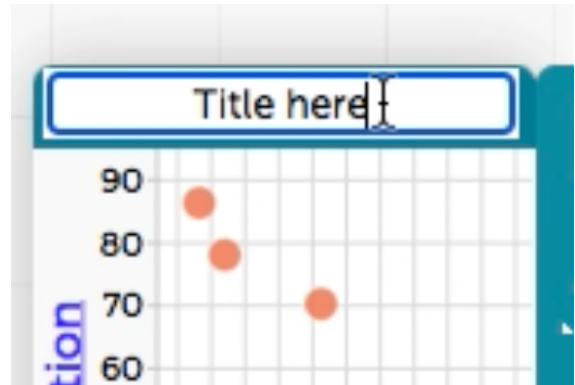
## 10 Add a title

### *The Basics*

Add a title to a graph that you have made.

## 10 HINT

Click on the white writing in the blue-green bar at the top of your graph.



Write a title that helps explain what the graph is showing.

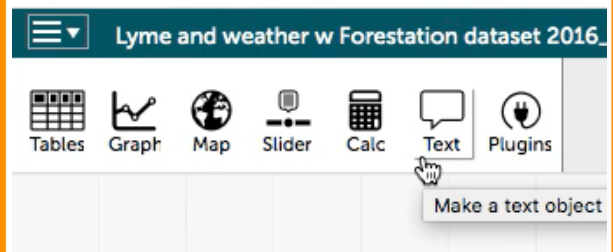
## 11 Add text

### *The Basics*

Add a text box explaining what a graph or table is showing.

## 11 HINT

Click on the text box, drag it where you want it, and type inside the box.





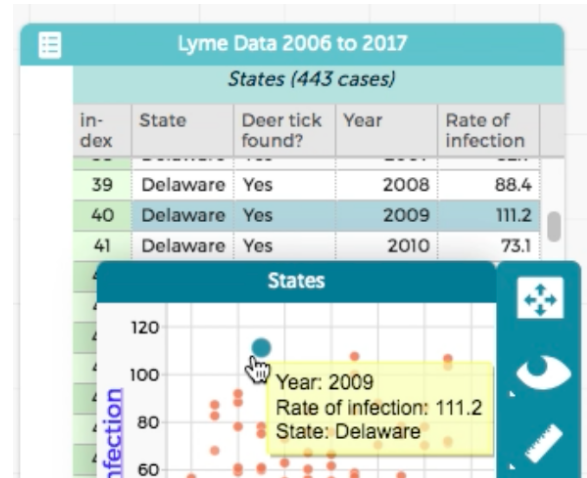
## 12 Find the same case in two or more visualizations

### *The Basics*

Click on any data point in a graph, table, or map, then find that same case in a different map, table, or graph.

## 12 HINT

When you select a case (or data point) that same case will turn blue in any map, table, or graph that you have open.



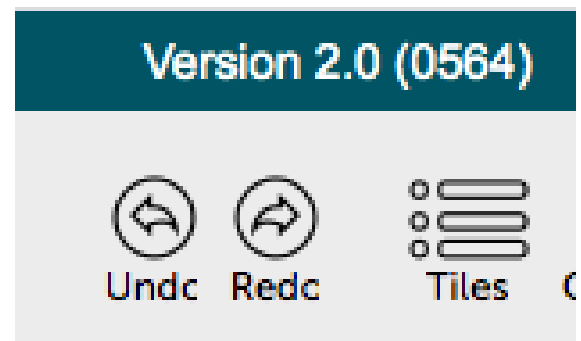
## 13 Undo and Redo

### *The Basics*

Reverse your most recent action. If you change your mind, you can "redo" to restore it.

## 13 HINT

Find the back arrow in the top right corner of the screen. You'll see the "redo" (forward arrow) right next to it.





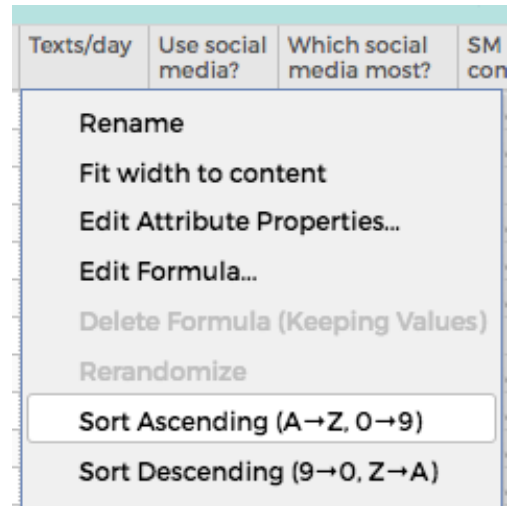
## 14 Sort in a table

### *The Basics*

Sort data in a table in alphabetical, numeric, or chronological order for a single attribute.

## 14 HINT

In the top row of the table, click on the attribute you are interested in. Select “Sort Ascending” or “Sort Descending.”



## 15 See a list of all your graphs, maps, and tables

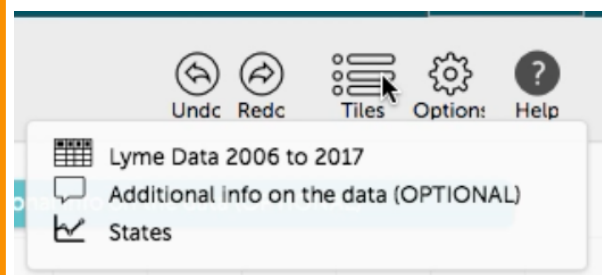
### *The Basics*

Find all the graphs, maps, and tables you made in one place. This can help if you’ve got a lot open on your screen at once.

## 15 HINT

Click on “Tiles” in the top right corner of your screen. Click on any of the items in the list to bring it to the front.

Bonus hint: Make sure to label all of your graphs and maps so you’ll be able to find them in the list.





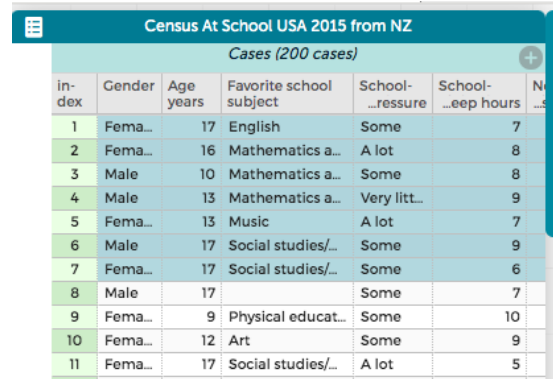
## 16 Select a group of cases in a table

### Filtering and Grouping

Select and highlight a set of cases in a table that you'd like to separate from the others.

## 16 HINT

To select multiple rows in a table, hold down the “command” key and then click on each row you want to select (or hold down “shift” to select a group of adjacent rows).



Index	Gender	Age years	Favorite school subject	School...ressure	School...leep hours	N...
1	Fema...	17	English	Some	7	
2	Fema...	16	Mathematics a...	A lot	8	
3	Male	10	Mathematics a...	Some	8	
4	Male	13	Mathematics a...	Very litt...	9	
5	Fema...	13	Music	A lot	7	
6	Male	17	Social studies/...	Some	9	
7	Fema...	17	Social studies/...	Some	6	
8	Male	17		Some	7	
9	Fema...	9	Physical educat...	Some	10	
10	Fema...	12	Art	Some	9	
11	Fema...	17	Social studies/...	A lot	5	

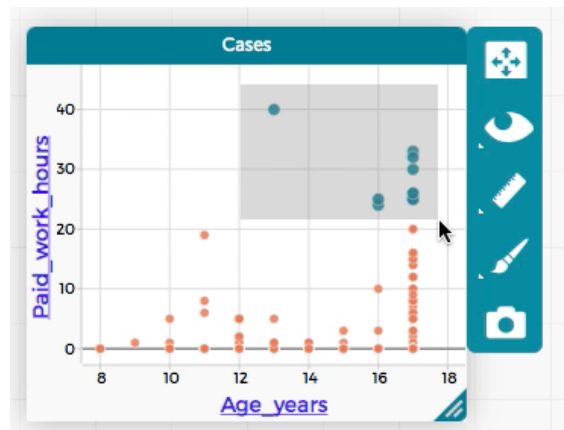
## 17 Select a group of cases in a graph

### Filtering and Grouping

Select and highlight a set of cases in a graph that you'd like to separate from the others.

## 17 HINT

To select multiple points on a graph, hold down the “command” key and then click on each point you want to select. You can also click and drag across a group of points to highlight them all.





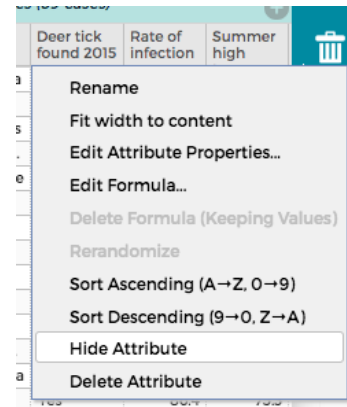
## 18 Hide an attribute in a table

### *Filtering and Grouping*

Temporarily hide an attribute (column) in a table so you no longer see that attribute or its values.

## 18 HINT

Click on the name of the attribute in the top row of the table, scroll down in the menu that appears and select “hide attribute.” To make hidden attributes reappear, click on the eye menu and select “show hidden attributes.”



## 19 Hide cases in a graph or map

### *Filtering and Grouping*

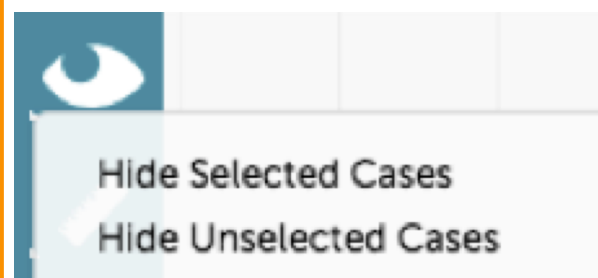
Hide some of the data on your map or graph so you can focus on only the data you want to see.

## 19 HINT

Select data points either on the table, map, or graph.

Click on the eye on the sidebar of the map or graph.

Select “hide selected” and watch them disappear. Try hiding “unselected” cases, too!





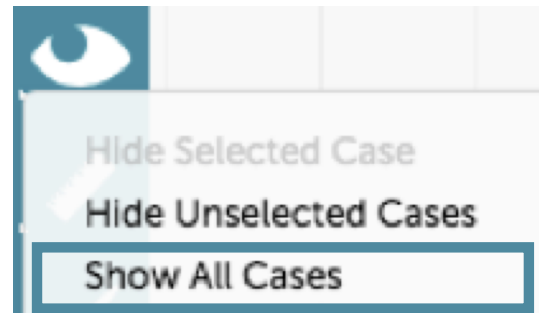
## 20 Reveal hidden data

### Filtering and Grouping

Bring back the data you've hidden so you can see everything again.

## 20 HINT

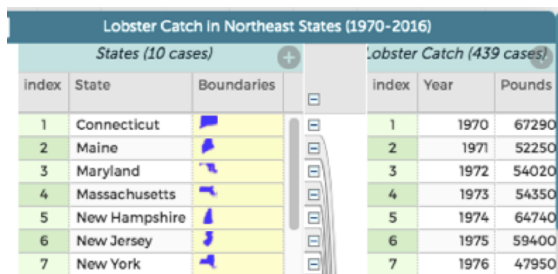
Using the “eye” menu, choose “show all cases.”



## 21 Reorganize a table

### Filtering and Grouping

Organize the data in the table according to an attribute that you are interested in.

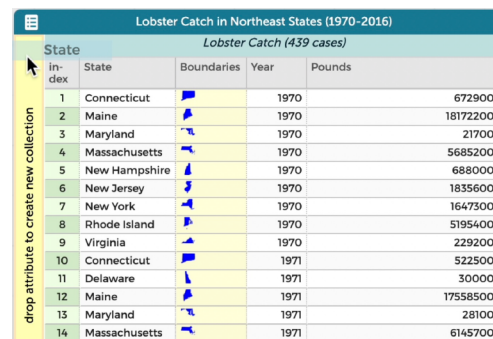


States (10 cases)			Lobster Catch (439 cases)		
index	State	Boundaries	index	Year	Pounds
1	Connecticut		1	1970	67290
2	Maine		2	1971	52250
3	Maryland		3	1972	54020
4	Massachusetts		4	1973	54350
5	New Hampshire		5	1974	64740
6	New Jersey		6	1975	59400
7	New York		7	1976	47950

## 21 HINT

Drag the attribute you are interested in all the way to the left side of the table. You will see an instruction to “Drop attribute to create a new collection.”

This will “collect” the data together that share the same values for your attribute.



Lobster Catch in Northeast States (1970-2016)				
State	index	Boundaries	Year	Pounds
Connecticut	1		1970	672900
Maine	2		1970	18172200
Maryland	3		1970	21700
Massachusetts	4		1970	5685200
New Hampshire	5		1970	688000
New Jersey	6		1970	1835600
New York	7		1970	1647300
Rhode Island	8		1970	5195400
Virginia	9		1970	229200
Connecticut	10		1971	522500
Delaware	11		1971	30000
Maine	12		1971	17558500
Maryland	13		1971	28100
Massachusetts	14		1971	6145700



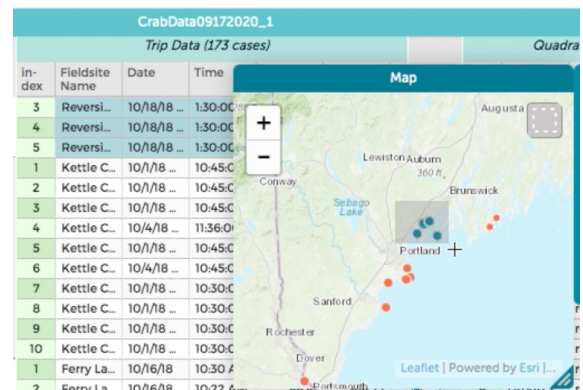
## 22 Select all the data from an area on the map

### *Filtering and Grouping*

Select all the data from an area on the map, including multiple cases of data from the same point.

## 22 HINT

Click on the box in the top right corner of the map, then drag the cursor over the area you want to select. This only works on data that shows up as points on a map.



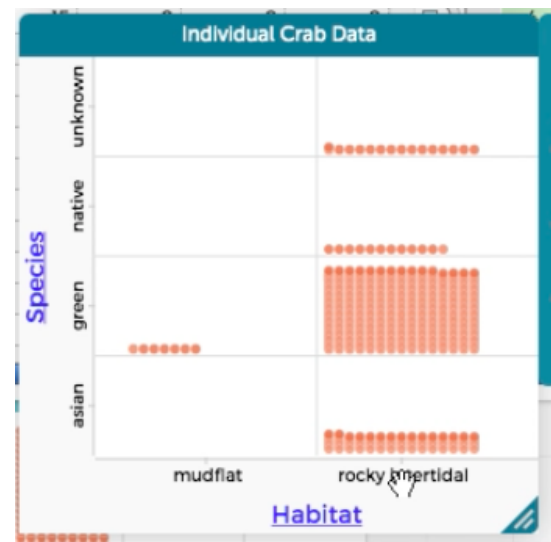
## 23 Reordering categories in a graph along the axis

### *Visualizing the Data*

Change the order in which categories are displayed on the x axis of a graph.

## 23 HINT

Click on the name of category below the axis and drag it where you want it to be along the axis.





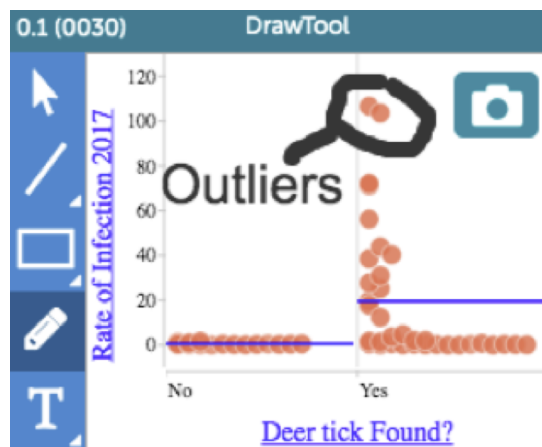
## 24 Annotate (label) a graph or map

### Visualizing the Data

Take a snapshot of your graph and then circle or underline interesting data points. Add text to give meaning, too.

## 24 HINT

Go to the camera icon and select “open in draw tool.” Click on the pencil icon in the draw tool and then annotate away!



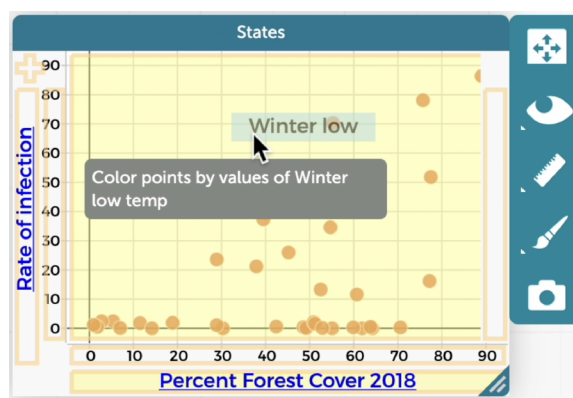
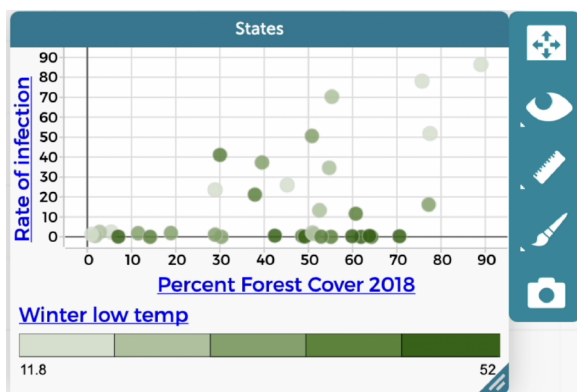
## 25 Add a third attribute to a graph

### Visualizing the Data

Add a third attribute to a graph to color code the data.

## 25 HINT

Drag the attribute that you want to add to the middle of your graph. Now you can look for patterns involving 3 attributes.





## 26 Scroll through an axis on a graph

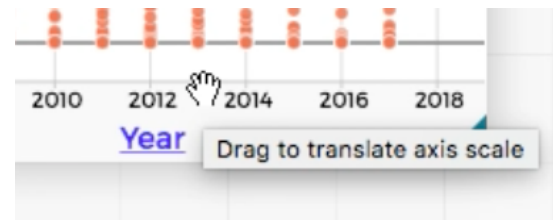
### *Visualizing the Data*

Move either the x or y axis without changing the scale. This helps you see all the data in a graph.

Numerical attributes only

## 26 HINT

Hover the cursor over the axis until the hand is pointing toward the middle of the graph. Click and drag from side to side.



## 27 Change the scale of an axis on a graph

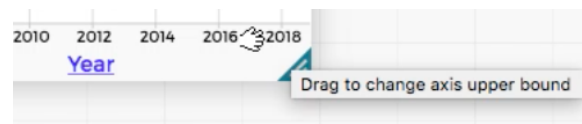
### *Visualizing the Data*

Change the range of values shown along an axis in your graph. This makes the data look either more squished together or more spread apart.

Numerical attributes only

## 27 HINT

Hover the cursor over the axis until the hand is pointing in the direction you want to drag the numbers. Click and drag.

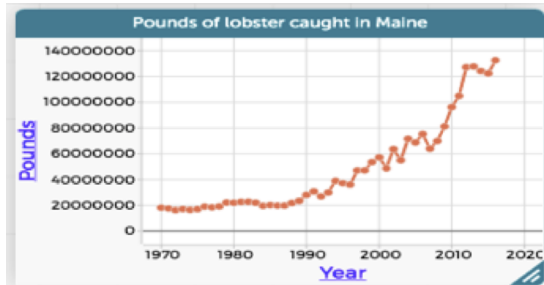




## 28 Connect the dots

### Visualizing the Data

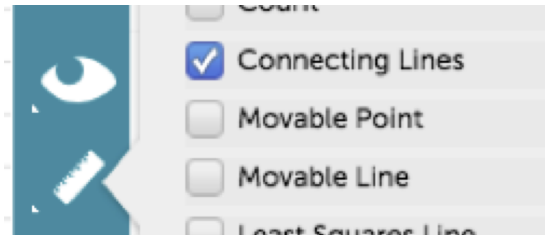
Add connecting lines between data points.



Two numerical attributes only

## 28 HINT

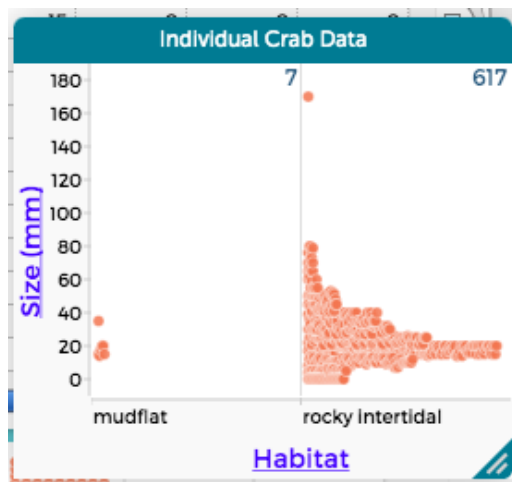
Start by making a graph with a numeric attribute in the x axis (like year). Go to the graph tools and find "Connecting Lines."



## 29 Get a count of the data

### Statistical Tools

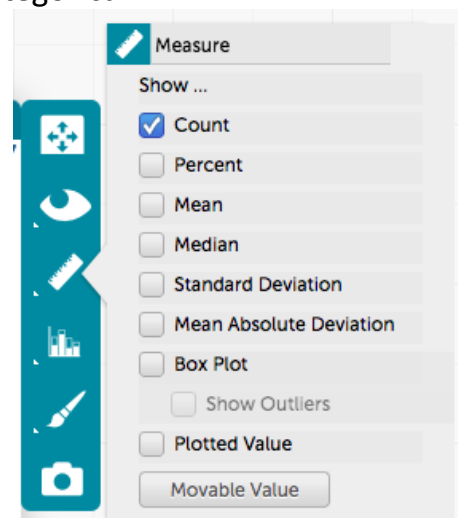
Show the number of cases on a graph.



At least one categorical variable

## 29 HINT

Click on the ruler to the right of the graph and select "Count." Note that for this to work, one or both of the attributes on the x or y axes must be categorical.

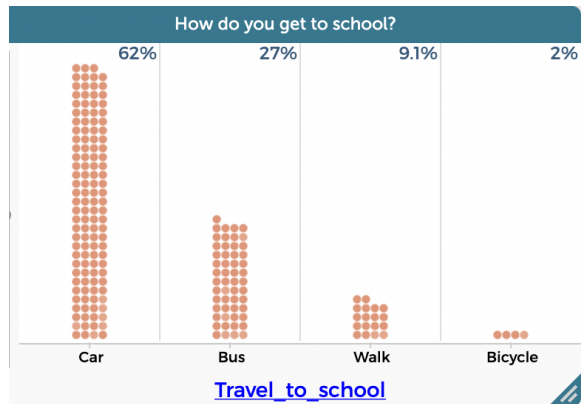




30

## Statistical Tools

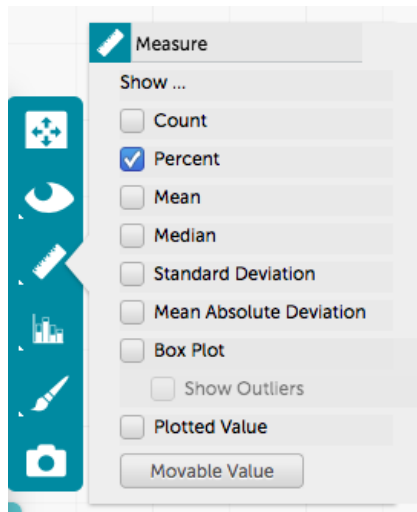
Show the percentage of cases in each portion of the graph.



## At least one categorical variable

30

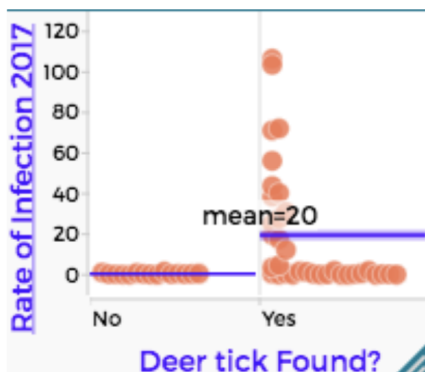
Click on the ruler to the right of the graph and select “Percent.” You can specify the type of percent: by row, by column, or by cell.



31

## Statistical Tools

Create a graph of a numeric attribute. What is the middle value (median) of the distribution? What is the average value (mean)?

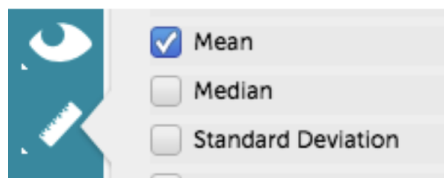


**[One numerical] OR [one numerical and one categorical attribute]**

## 31

Click on the ruler icon. Select “Median” or “Mean.” It tells you what value is in the median or mean for the distribution and draws a line to show you where that value falls on the graph. Hover over the line to find the exact value.

Note that for this to work, the attributes on the x and y axes cannot both be numeric attributes

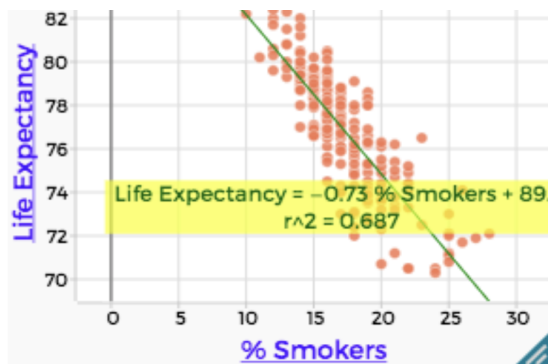




## 32 Visualize a trend

### Statistical Tools

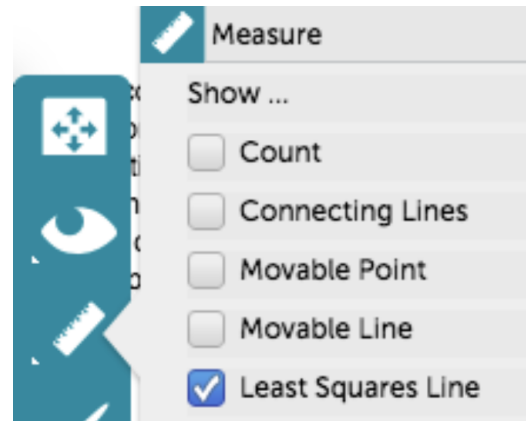
Add a least squares line to a graph to see how strong a correlation or a trend there is between two attributes.



Two numerical attributes only

## 32 HINT

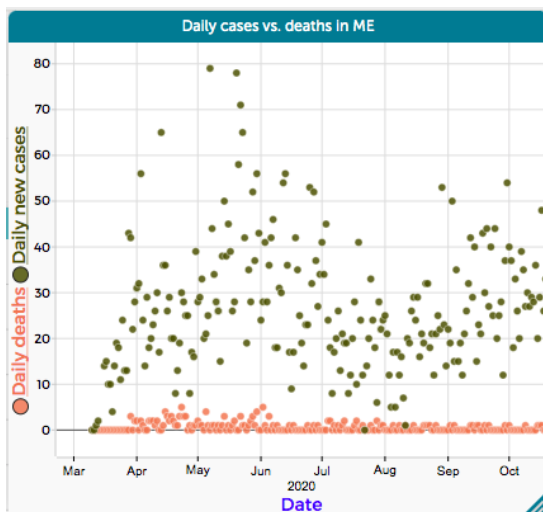
Click on the ruler icon. Select "least squares line." For this to work, both axes of the graph must have numeric data.



## 33 Graph multiple attributes on the y axis

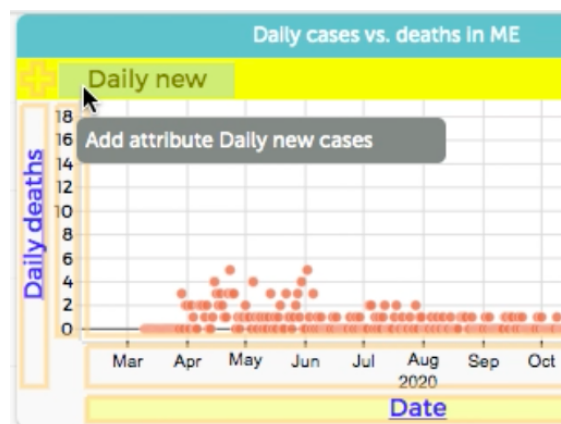
### Advanced Data Moves

Compare two or more attributes by graphing them on the same y axis.



## 33 HINT

After you've graphed one or more attributes on the y axis, grab the name of the new attribute you want to graph and move it to the top of the y axis. Drop it where the yellow bar appears.

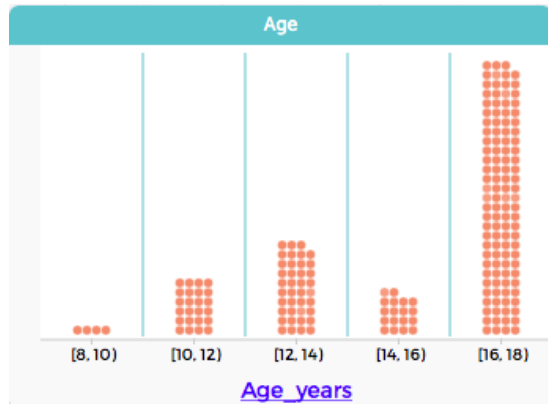




### 34 Group numerical data into bins

#### Advanced Data Moves

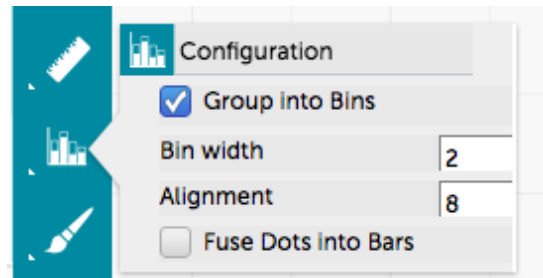
Group numerical data on a graph into multiple bins representing different numeric ranges.



Numerical attributes only

### 34 HINT

Click on the bar chart icon to the right of the graph. Select “Group into Bins.” Note that you can change the bin width. Note that for this to work, the attributes on the X and Y axes cannot both be numeric attributes



### 35 Create formula to calculate or convert values in a table

#### Advanced Data Moves

Create a formula to calculate new values or convert values to a new format and put them in a new column in a CODAP table.

### 35 HINT

Create a new column. Click on the name of the new column and select “Edit Formula.”

To add an attribute already in the table to the formula, click “Insert Value.” “Insert Function” allows you to do more advanced built-in functions, including statistical analyses.

