Common Online Data Analysis Platform Start-up Guide

CODAP

Common Online Data Analysis Platform

a product of The Concord Consortium

This material is based upon work supported by the National Science Foundation under Grant Number IIS-1530578. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.

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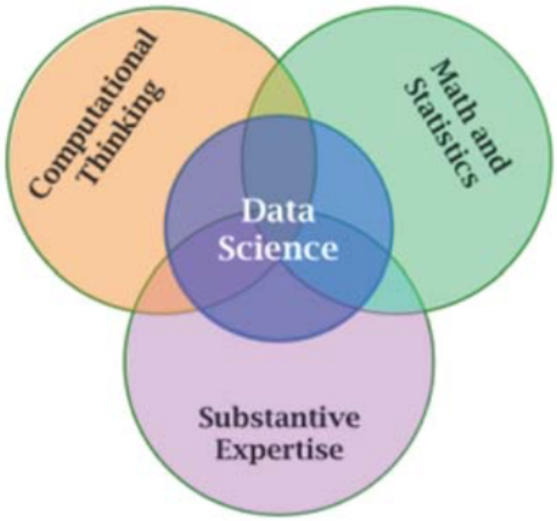
Background

What is Data Science?

Data science is an emerging discipline that brings together mathematics and statistics, subject matter expertise, and computational thinking. Data scientists make discoveries while looking at and analyzing data.



What is CODAP?

CODAP (Common Online Data Analysis Platform) is an easy-to-use data analysis environment that can be used in a wide variety of educational settings. CODAP is designed for grades 5 through 14, and aimed at teachers and curriculum developers. CODAP can be used across the curriculum to help students summarize, visualize, and interpret data, advancing their skills to use data as evidence to support a claim.

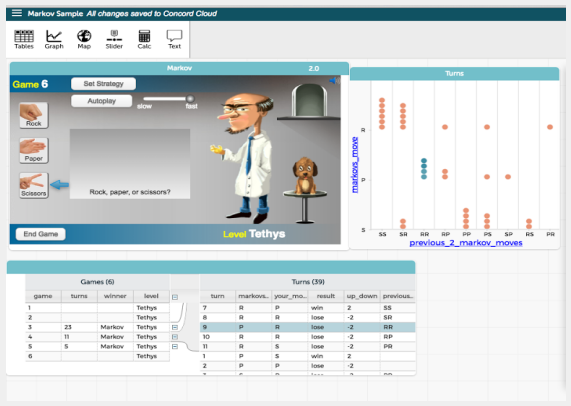
Just as language and numeric literacy involve understanding the world through words and mathematical constructs, data literacy involves understanding the world through data exploration.

Who is this guide for?

This guide is for those who want more details about how to use CODAP.

This guide was designed with a wide range of learners and educators in mind.

Here are a few examples of who might use this guide and how they might use it:



K-12 Teacher

Teachers can use CODAP with data of their own or start with several existing models.

Researcher

One of CODAP's keys to success is working with other successful National Science Foundation projects.

CODAP Developer

CODAP is free and runs in a web browser. It's also open source, which means that any developer can modify it.

Student

With CODAP, K-12 students can learn to work with data at every grade level.

What do I need in order to use this guide?

In addition to a love of exploring data and an open mind, some important resources include:

- **Desktop or laptop computer** for using CODAP
- **Internet connection** for connecting with CODAP online
- **A modern browser.** Chrome works best. Tablets are not yet fully supported.

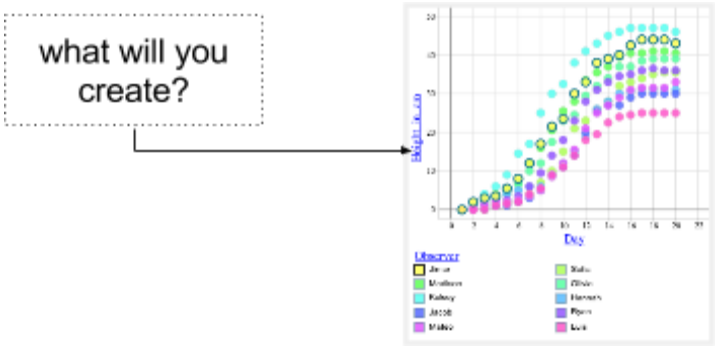
What is included in this guide?

Included in this guide are resources for starting up with CODAP:

Your First CODAP Graph

Are you ready to get started with CODAP? The activity described below is designed for those who are **completely new** to CODAP. **Not sure where to start?** For more support, check out the **Appendix** with more information.

What is the pattern of growth of plants over time?



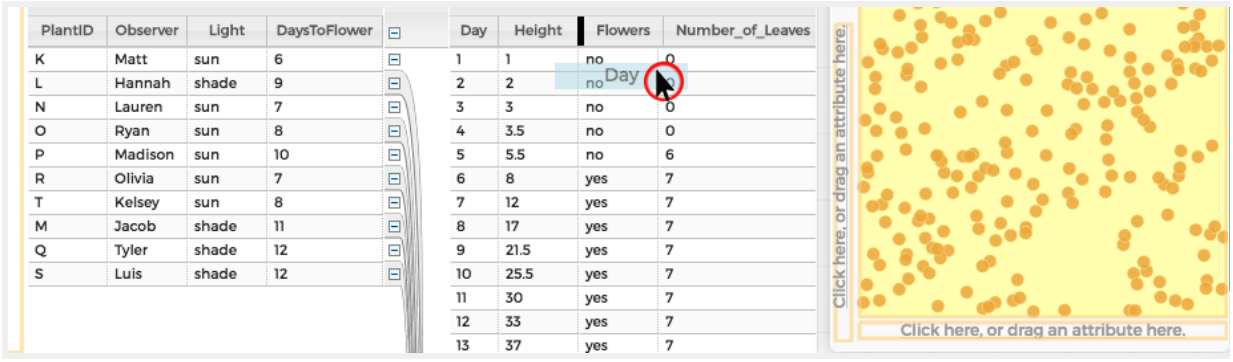
Objectives:

By completing this activity, you will:

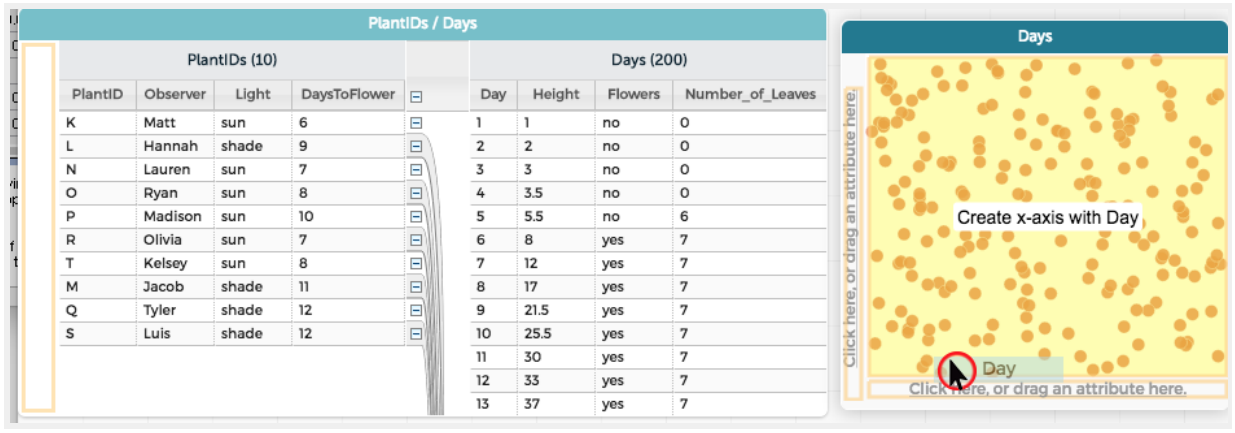
- Be introduced to CODAP and the CODAP environment.

Start Here

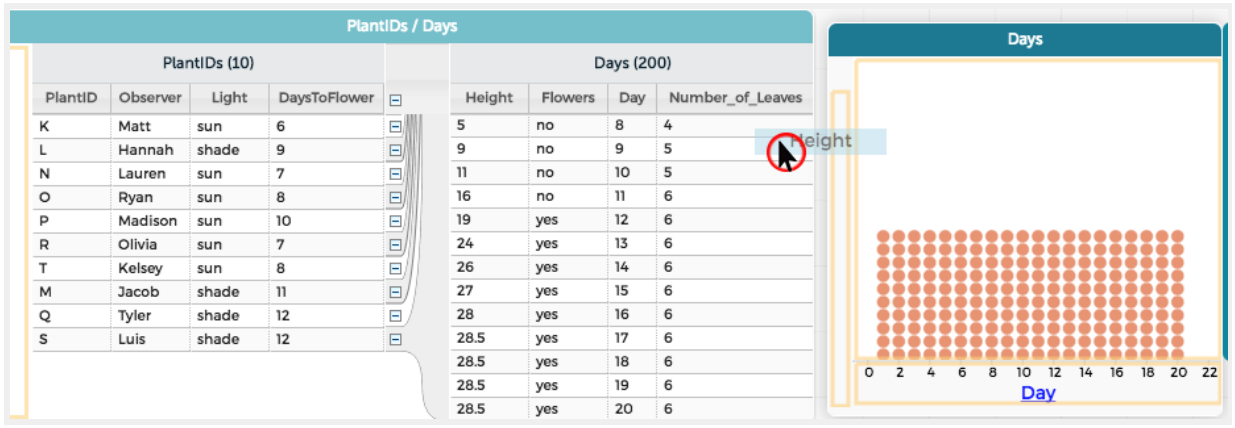
- Open a web browser and navigate to the CODAP document: bit.ly/CODAPStart.
- Drag the "Day" column header (attribute) from the “Days” table to the horizontal (x) axis and the "Height" attribute to the vertical (y) axis.



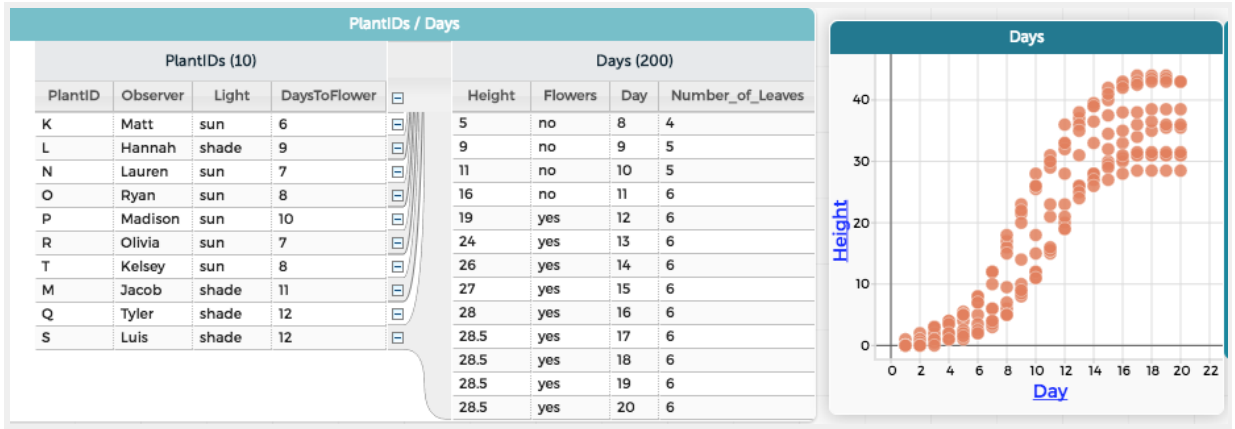
1. Drag “Day” to the horizontal axis in a graph window.



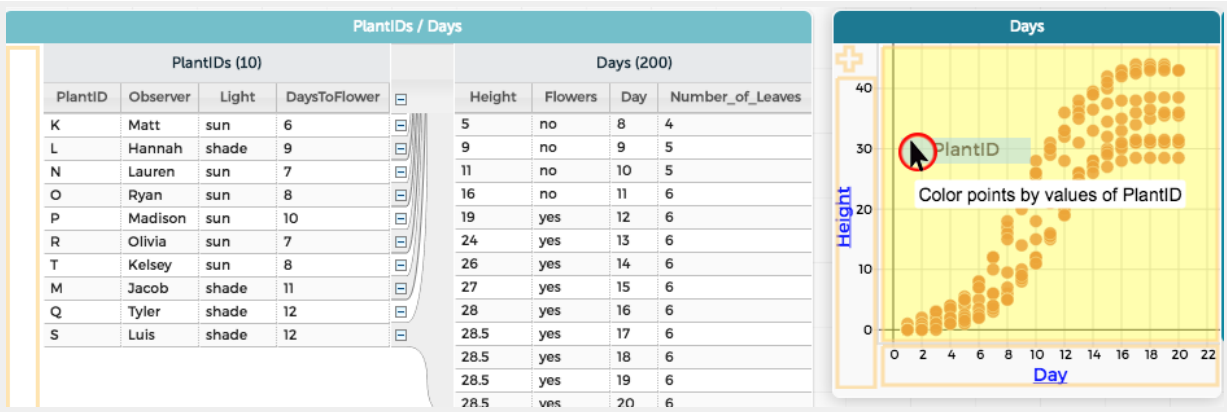
2. Drop the "Day" attribute onto the horizontal (*x*) axis.



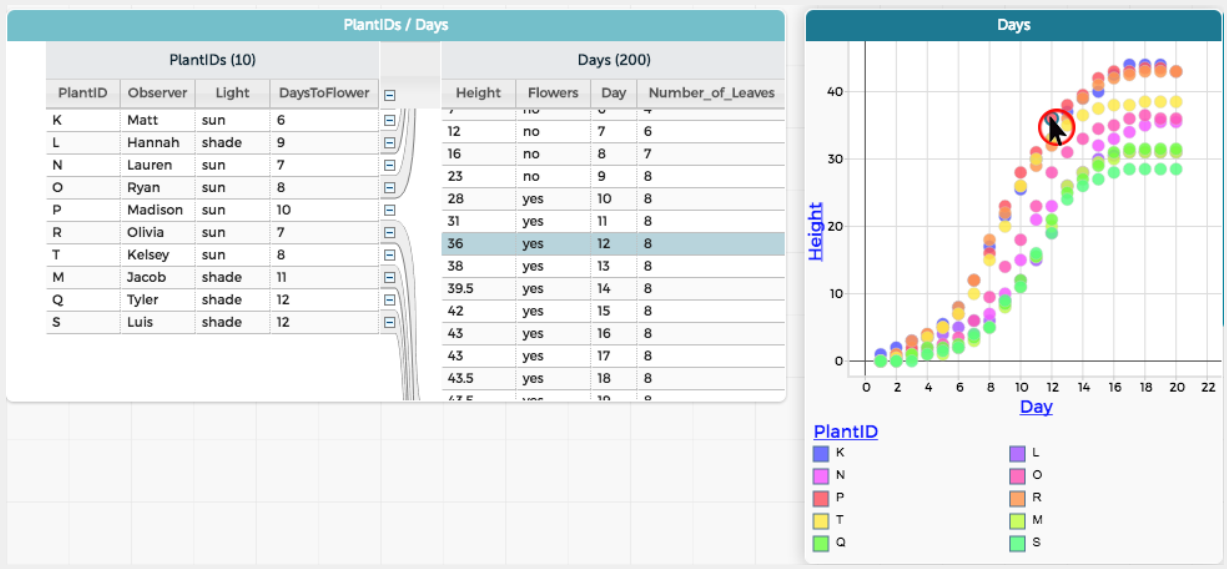
3. Drop the "Height" attribute to the vertical (*y*) axis.



4. Make a graph!



5. Drag the "PlantID" attribute into the center of the graph.



6. Click on the data points to explore the data in the graph and in the table.

- **See the data!** Drag the "PlantID" attribute from the "Days" table to the middle of the graph.
- **Experiment** with clicking on table rows, graph points, and colored legend keys.

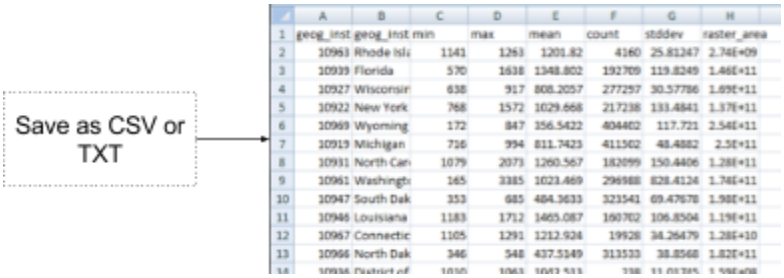
Exploring CODAP

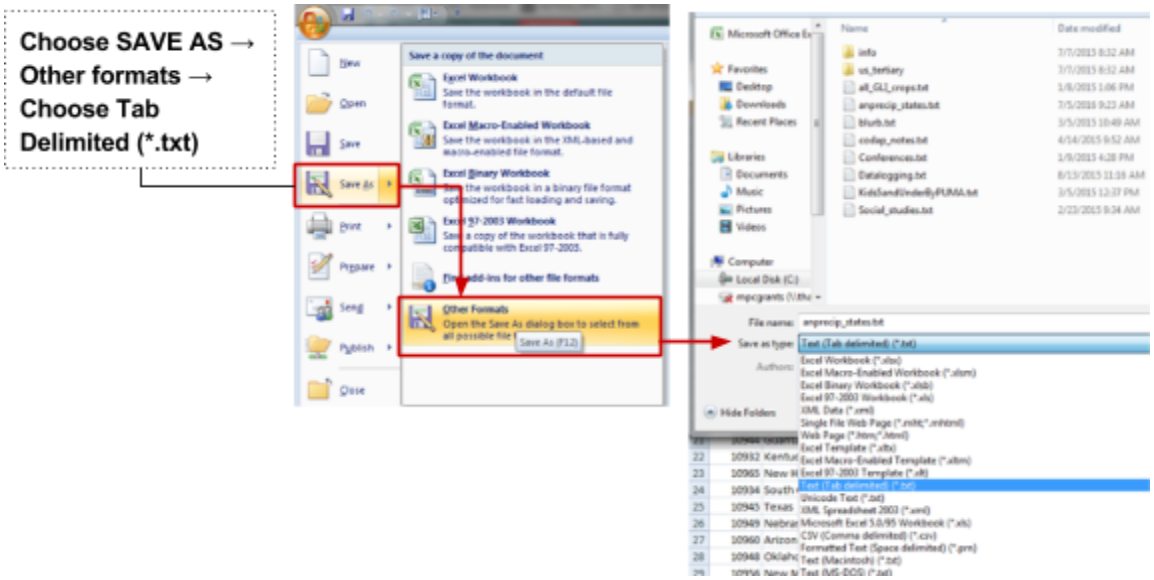
CODAP Toolbar

- **≡ Menu:** Opens the menu for document management in CODAP.
- **Document title**: The title of the document. You can change the document title by selecting the text.
- **Help Menu:** Opens up the CODAP Help website.
- **Tables:** Opens a table with the data loaded in the current CODAP page. You may organize and re-label any of the columns.
- **Graph:** Opens a graph containing the data. Initially, the graph shows random points. You may organize the data by dragging and dropping column headers from your existing tables. You may change the attributes graphed by clicking on the graph axes.
- **Map:** Allows you to see the data on a map. Maps are only available if the data includes longitudes and latitudes.
- **Slider:** Moves horizontally to control a variable, such as the volume of a sphere while “sliding” the radius.
- **Calculator:** Provides a simple calculator.
- **Text:** Allows you to write text notes.
- **Undo / Redo**: Allows you to undo / redo an action in CODAP.
- **Tiles:** Allows you to see the component open in the CODAP document.
- **Options**: Opens the options menu bar. The options allow you to display an embedded web page, configure a Teacher’s guide in a CODAP document, and send the CODAP team feedback.

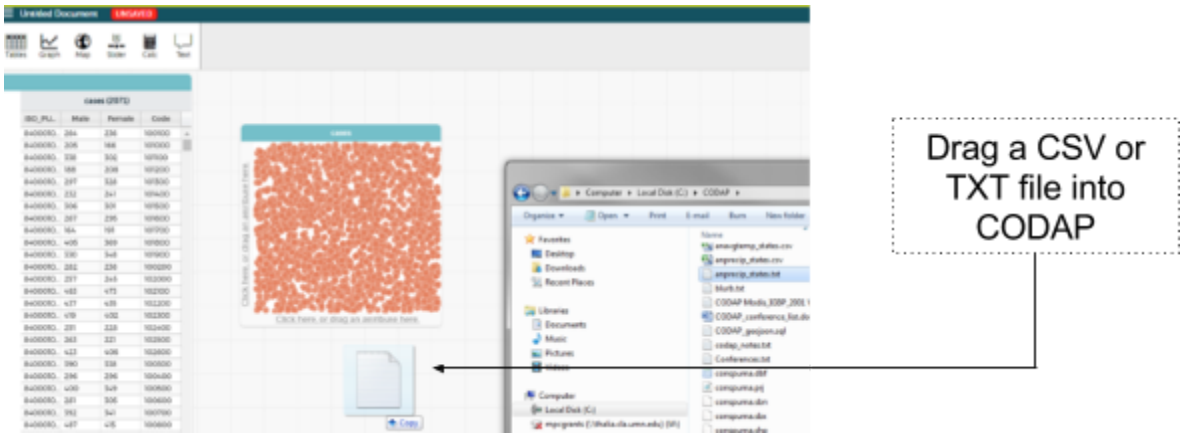
Load Your Own Data into CODAP

You can load **your own data** into a CODAP document by saving a comma separated values file (CSV) or text file (TXT). For example, the image on the right shows an Excel spreadsheet with the max, min, and average precipitation for 50 states.

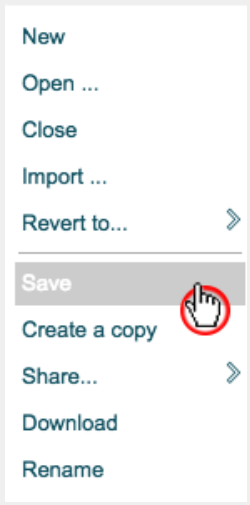


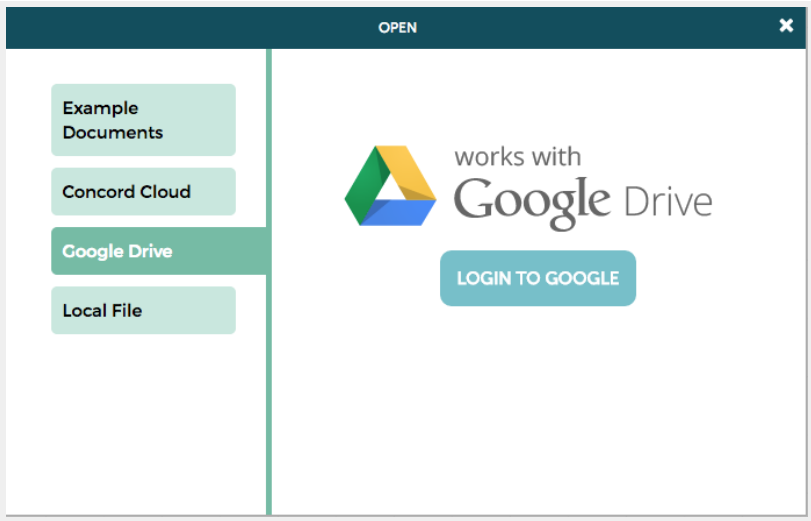


- From the Finder or Windows, **drag the file into CODAP** in a browser window. CODAP will open the file as a new CODAP document.



Save a CODAP File





Save to Google Drive

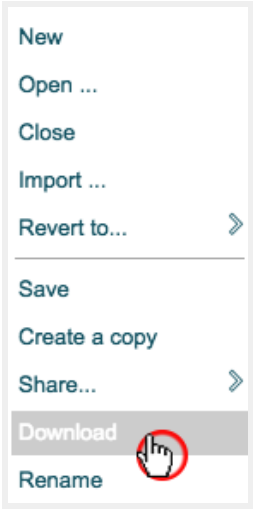
You can save a CODAP file using several methods. The following gives instruction on how to save to the CODAP Portal using Google Drive.

1. Click on the ≡ menu. Select “Save…”
2. A prompt will appear. Select the “Google Drive” tab (second option).
3. Follow the Google Drive dialogue. You can now save CODAP files (with a .json extension) to Google Drive.

Download a CODAP Document

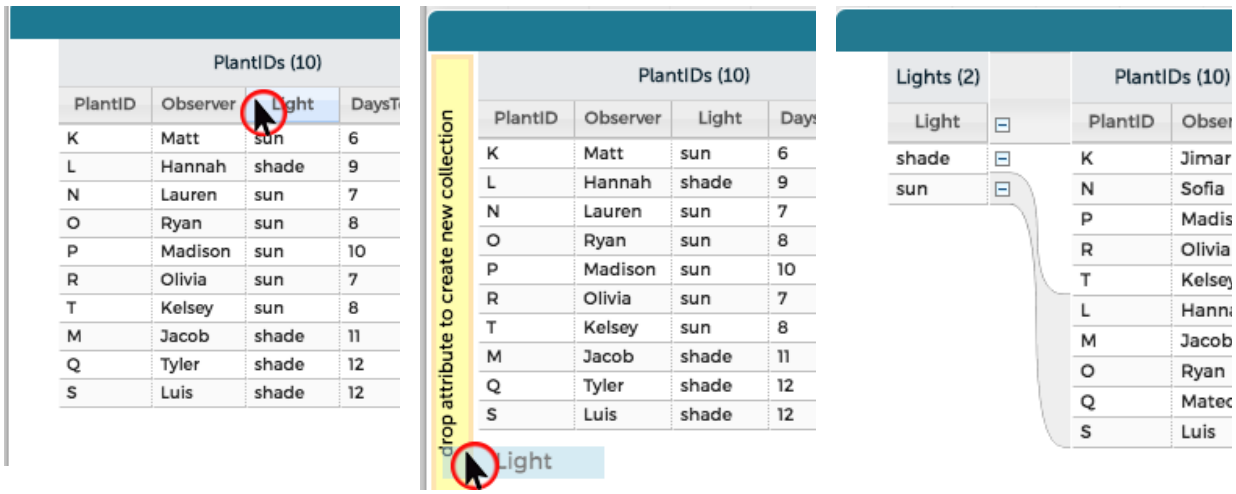
You can download a CODAP file to your local hard drive.

1. Open the ≡ menu. Select “Download.”
2. Save the CODAP document to your local hard disk.
3. The CODAP document will be downloaded as a JSON file.

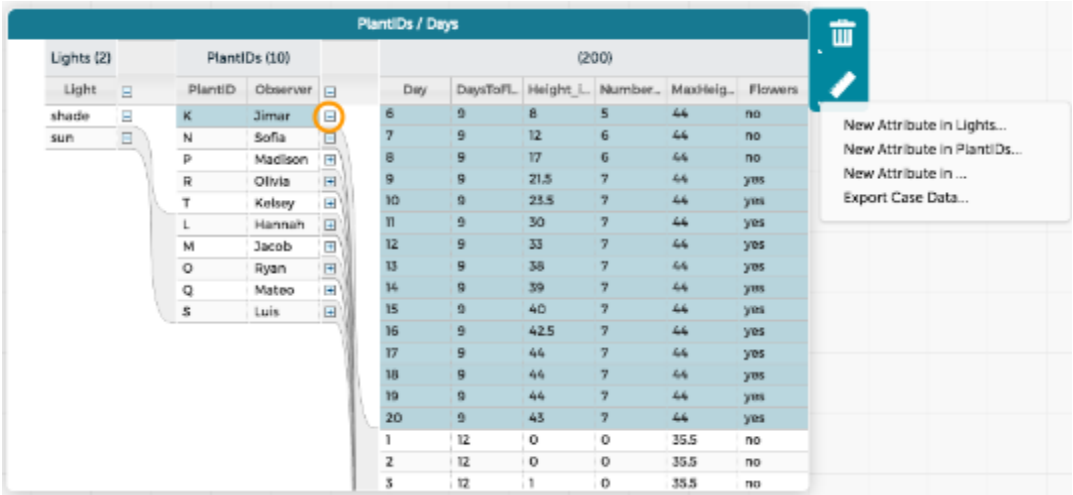


Tables

Tables in CODAP allow for data levels represented in a hierarchical structure.



- **CODAP's tables** display parent-level data on the left-hand side and child-level data on the right.
- **Change column widths** by dragging the separators between titles in the column header.
- **Collapse and expand** child case (data) tables by clicking the plus (+) sign symbol next to the left-hand table rows.



- Click on a **column header** to edit the name or formula of an attribute.
- **Click on parent or child data rows** to highlight associated data within CODAP.
- **Use the ruler menu item** in the upper right to add new attributes, delete selected cases, and more.

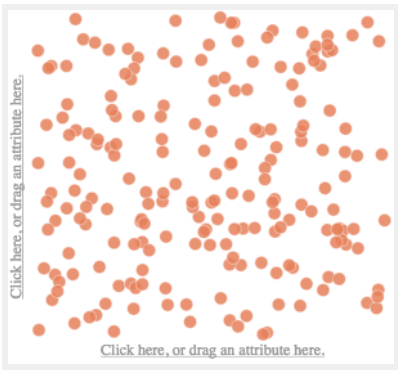
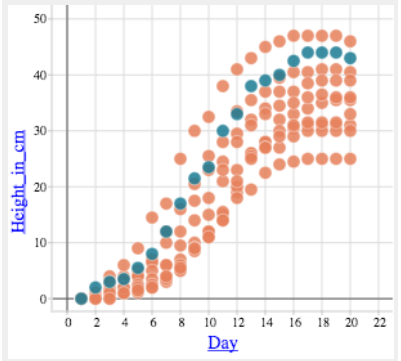
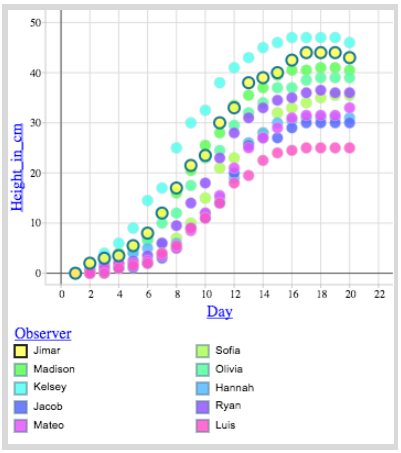
Table menu items

Trash: Remove data from your dataset

Ruler: Add attributes to your dataset

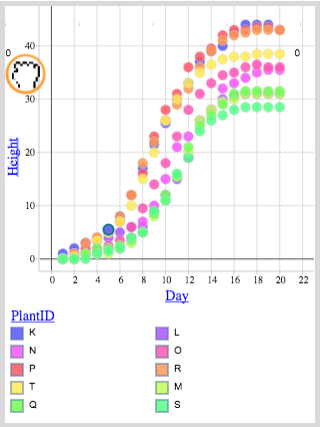
Graphs

Getting started with graphs

		
Initially, data points are randomly distributed in the graph.	Drag the attributes from the table to the axis to organize the data.	Drop a column header in the center of a graph to color the data points by the attribute.

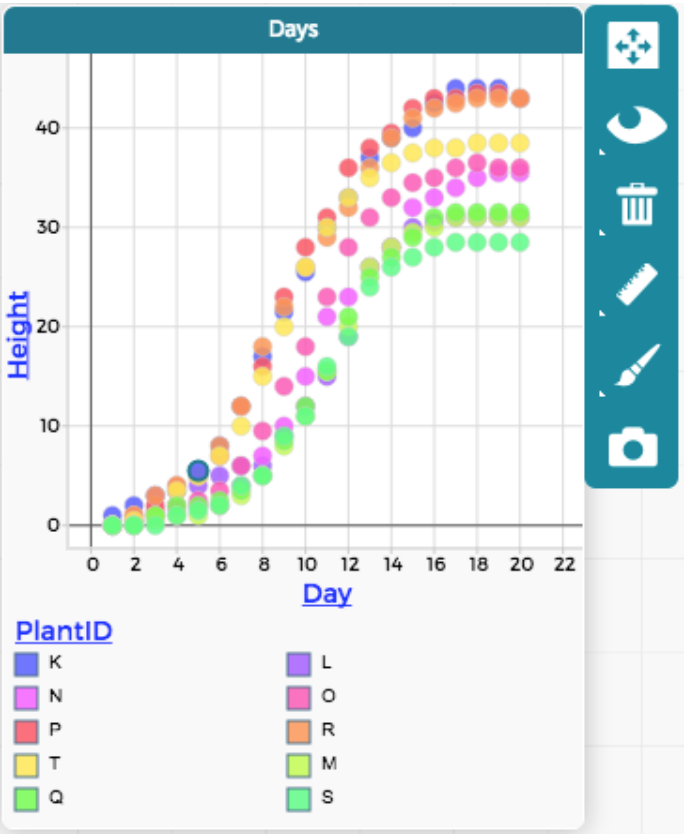
- **Create a new graph.** Once you have created at least one table in CODAP, click the graph button on the top toolbar.
    - *Note:* Graphs start as a configuration of randomly scattered data points.
- **Drag attributes (variables)** from the column headers of the tables onto the horizontal (x) and vertical (y) axes to view a graph of those variables.
- **Create additional graphs** to explore different relationships.

How to edit graphs



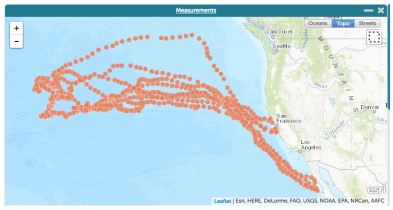
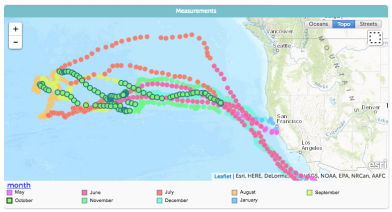
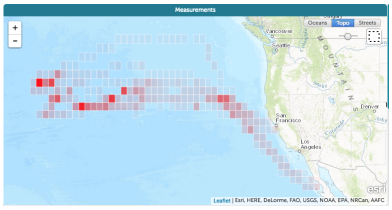
- **Drag axes** to change the graph's scale and origin (see left).
- **Drop an attribute onto the center of a graph** to color the display according to the attribute.
- **Change the graph axes.** Drag new attributes to the axes. Or click on the axis title to display a menu of attributes.
- **Click on the ruler menu item:** to show or hide connecting lines between points, add a moveable line to your graph, or plot any of a wide variety of functions on top of the graph's data.

Graph menu items



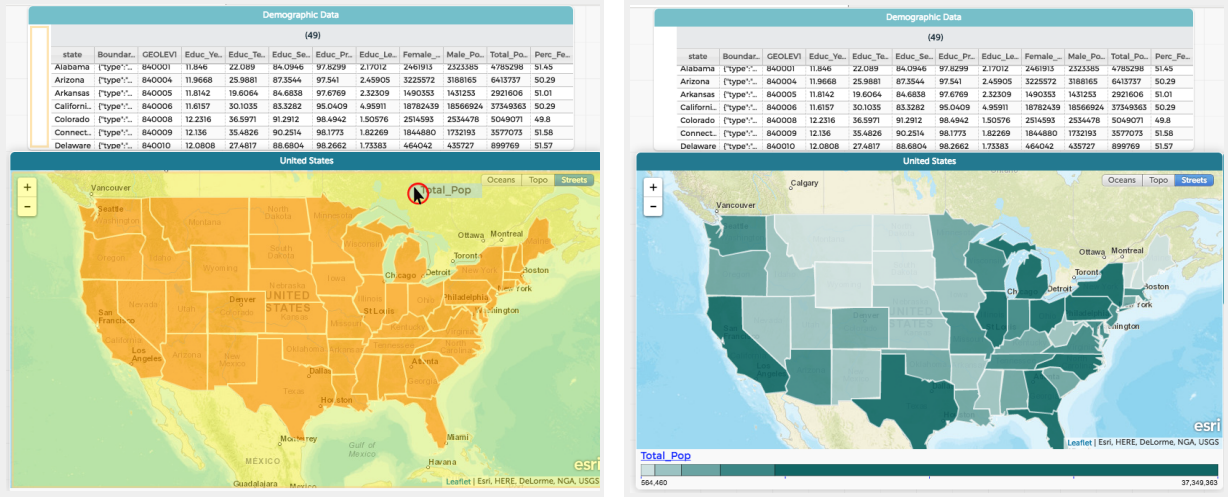
Rescale. Rescale your graph. The Rescale item is not always visible.
Eye. Show or hide data based on selections.
Trash. Remove an attribute from your dataset.
Ruler. Calculate statistics, including mean, median, and standard deviation.
Paintbrush. Change the color and point size of your data.
Camera. Screen capture your graph and save the PNG file.
Menu Title. You can change the title of the menu at the top of the component window.

Maps

		
If latitude and longitude data are included in a data set, CODAP can plot the data points on a map.	Drop an attribute (column header) from the table on the map to view the data mapped for that attribute.	To view data by frequency, click on the ruler menu on the right of the graph, and select “Show grid.”

Getting started with maps

- **Display a map.** Click the map menu item on the toolbar. If a table within CODAP **contains mapping data** (columns labeled as longitude and latitude), a map of the corresponding points will be displayed automatically. If the table does not contain mapping data, a Google API map opens, without CODAP data.
- **Toggle between map styles** (oceans, topo, or street) using the buttons in the map's upper right corner.
- **View data by frequency.** Select the “**Show Grid**” tool from the ruler menu item to view data on the maps in coarse-grained bins. Use the slider displayed during grid view to adjust the size of the grid cells and discover new patterns.
    - *Note*: Deselect “Points” from the ruler menu item to focus solely on the grid view.
- **Drag and drop** an attribute from a table onto the map to view mapped data for that attribute.
- **To adjust the map's center point** drag on the map. Click the dotted square at the map's upper right to enable a selection crosshairs. Use the eye menu to hide or view only the selected cases.



If a CODAP document contains map boundary data, CODAP will display the information on a map. For example, this graph contains information about the Total Population in the United States.

Maps with Boundaries

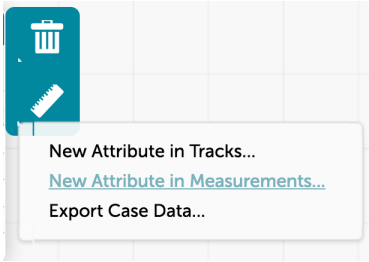
- **Display maps with geographic boundaries.** CODAP can also create maps with geographic boundaries if the boundary information is included in a data set. To do so, drag an attribute onto the map.

Diving Deeper

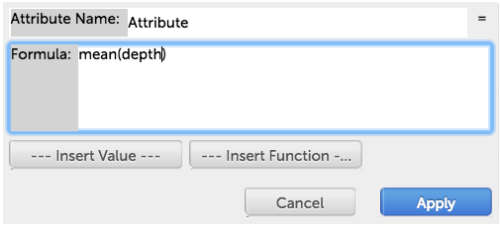
Functions

CODAP can compute values by formula. For example, you can use a function to generate simulated data. You can also define an attribute based on computations performed on other attributes.

To create a new attribute, in a table, click on the ruler menu item. Select "New Attribute in [title of your parent or child table]"



The formula engine will appear. Name your new attribute and type in or insert the formula of your choice.



Formula editor

- **Show Movable Line**. You can click and drag a moveable line from the ruler menu so that it goes through the points on your graph.
    - If you decide that your line should always pass through the origin (0, 0) on the graph, choose **Lock Intercept at Zero** from the ruler menu.
- **Click the ruler icon** in the upper-right corner of the graph window to see the commands.

Appendix

Handy Links

Type	Description	Link
CODAP Help	The Help website for CODAP includes articles and how-tos for CODAP.	https://codap.concord.org/help/
CODAP Introduction	The CODAP project page includes an overview / introduction to CODAP.	https://codap.concord.org/
CODAP Functions	List of functions and their uses in CODAP.	https://codap.concord.org/help/functions
Data Science Games Project	The Data Science Games project includes an overview of the project.	https://concord.org/projects/data-science-games
Resource	Data Science Games Summer Professional Workshop Web pageincludes session materials.	http://dsg.concord.org/pd/
Video	CODAP overview video	https://vimeo.com/164482346