

Water Conservation

Data Jam

DESCRIPTION

Students will learn how to use the CODAP tool to find a data trend and create a graph for their Water Conservation Data Jam project. They will also receive instructions on the possible explanation section of the report and begin working on their projects.

GRADE LEVEL
6-12

OBJECTIVES

Students will:

- Practice graphing using the CODAP tool
- Learn how to identify a data trend

TIME
45 MINUTES

MATERIALS

- Internet-connected device [1 per student or 1 per class with a projector]
- [PowerPoint presentation](#)
- [Student Report document](#)
- [Water Use Dataset](http://www.asombro.org/WCDJData) (asombro.org/WCDJData)
- [About the CODAP Dataset Video](#), transcript is available [here](#)

PREPARATION

1. Set up a computer with internet access and projector (if applicable) and prepare to show the PowerPoint.
2. Download and distribute the Student Report document for students to work on throughout the lesson.
3. If needed, set up an assignment using your remote learning platform (Canvas, Google Classroom, etc.).
 - a. Post links to the Introduction to the Water Conservation Data Jam video [<https://www.youtube.com/watch?v=Ax3lRXAbN0g>] and the Water Use Dataset webpage [<http://www.asombro.org/WCDJData>].
 - b. Here is the suggested text for the online assignment:
 - i. Remember a good data trend will:
 1. Show a pattern, not just one data point.
 2. Have more than one variable.
 3. Use only data from the dataset.
 4. Be specific.
 5. Include the main variable of the dataset.
 - ii. To turn in your Water Conservation Data Jam Report, you must:
 1. Have a one- or two-sentence Data Trend.
 2. Have a graph that shows the evidence for your data trend. This can be a photo of the graph generated using CODAP, a graph created with another program, or a hand-drawn graph.
 3. Write a Possible Explanation in paragraph form explaining why you think your trend occurred.

PROCEDURES

Introduction to Data Trend and Graph

1. **Slide 1:** today, we will begin working on the Water Conservation Data Jam by exploring a dataset on water use and finding a data trend using graphs.

2. **Slide 2:** last time, we discussed that the goal of a data jam is to explain a data trend to an audience that is unfamiliar with the topic. In our example data jam, we created a poem to illustrate the data trend that the percentage of people who use Instagram and Snapchat decreases with age. Here is the class poem we created last time.
3. **Slide 3:** you will start exploring the water use dataset for your projects. At the end of the project, you will turn in a Student Report PowerPoint/Google Slide presentation that includes the five report sections, a creative project, and an action plan. I will grade your project using this rubric, which you can find in your assignment and on the dataset website. You will see references to this rubric throughout this lesson.
4. **Slide 4:** we will get started on a few sections of your Student Report. You will have time to get a start on each of these sections, but you likely will not finish these during class time. Today's goals are to:
 - a. Make a claim by finding a data trend.
 - b. Provide the evidence for your data trend by making a graph.
 - c. Provide a possible explanation for your data trend.
5. **Slide 5:** after our last lesson, you should have examined the dataset and chosen one or more water uses that you would like to use for your project. If you have not chosen a water use, you can select one now. You also may have watched the "CODAP/ Data Trends" video; if so, that will help you today. If you have not watched that video, we will discuss CODAP and data trends, and you can watch it later as a reminder.
6. **Slide 6:** for the assignment you will begin today, download the Student Report PowerPoint or Google Slides from your online assignment/our class website, and add to the data trend, graph, and possible explanation in the report.
7. **Slide 7:** a data trend is a pattern in the data, the story the data tells us, or a relationship between two or more variables. Last time, we identified this data trend in our example: "The percentage of people who use Snapchat and Instagram decreases with age." The graph provides evidence for our data trend.
8. **Slide 8:** there are five criteria for a good data trend, and we can see all of them in the data trend from our example data jam. [Click to make each criterion appear.]
 - a. Your data trend should be a pattern, not just one data point. You should be comparing two variables or looking at a change over time.
 - b. Your trend should have more than one variable. This data trend includes the percentage of people who use social media and age. Your data trend does not need to include all the information on the dataset. For example, we chose only two social media platforms - Snapchat and Instagram.
 - c. You should only be using data from this dataset. You will not search online or in books for additional data for your data trend. We only used the data on the percentage of people who use each type of social media and their age group.
 - d. The data trend should be specific. For example, "younger people use social media more" is not specific enough because we do not know the type of social media you are talking about or the age of "younger people."
 - e. The data trend should include the main variable in the dataset. The percentage of people who use social media is the main variable in this dataset, and it is included in the data trend.
9. **Slide 9:** switch to the dataset website asombro.org/wcdjdata and demonstrate how to use CODAP to find a data trend. Teachers may find it helpful to watch [this video](#) before class to learn how to use CODAP.
10. Looking for data trends using CODAP.
 - a. In the example data jam, we reviewed the variables and changed variables on the graphs to look for a data trend. We will do these same steps with the water use dataset.
 - b. On this Water Conservation Data Jam website, we will use the dataset from ____ county (choose the county you would like the class to use).
 - c. Notice that this dataset has a background section and a section that gives details about each of the variables in the data table. Be sure to read these sections.
 - d. The default graph on the webpage has years on the x-axis and no variable on the y-axis. The CODAP tool allows you to change variables on your graph to look for patterns. To add variables to the graph, click on the variable name in the table and drag it to the axis. For example, to see how water used for power changes over time, **click on Power Use and drag it to the y-axis**

- (Figure 1). The axis turns yellow. The graph now shows water used for power, in acre-feet, from 1995 to 2015 in five-year intervals.
- i. Look at the graph.
 - ii. Do you see a trend or pattern in the data?
- e. Now, perhaps I want to know if precipitation has any effect on the pattern I just saw. Since the measurement of precipitation is in inches and the numbers are much smaller than the water use for power values, I can add this to a second y-axis on the right side of the graph. **Drag Precipitation from the table to the secondary y-axis on the right side of the graph** (Figure 2).
- f. Does precipitation follow the same trend over time as water use for power (i.e., can

- precipitation patterns help explain the water use trend)? How would you write this data trend as a complete sentence?
- g. If you think you have made a mistake in CODAP or the graph does not look how you expect it to, you can just **refresh/reload your web browser**, and it will confirm that you want to reload the page. The page will reset to the original state, with years on the x-axis and nothing on the y-axis.
 - h. "Year" is the default variable on the x-axis, but you can change this by dragging another variable from the table to the x-axis, just like we did with the y-axis earlier.
 - i. For example, if you are interested in seeing if the human population affects

- residential water use, **drag Human Population from the table to the x-axis, and drag Residential Use to the y-axis.**
- i. Some other helpful tips for working in CODAP:
 - i. You can change the variables on each axis of a scatterplot by clicking on the axis label.
 - ii. Hover over a data point to see the data for that point (Figure 3).
 - iii. You can add multiple variables to one axis of the graph by dragging them to the yellow plus sign in the top left corner of the graph. The plus sign will not appear until you drag the variable onto the graph.
 - j. Creating the graph for your Student Report:
 - i. Once you find the data

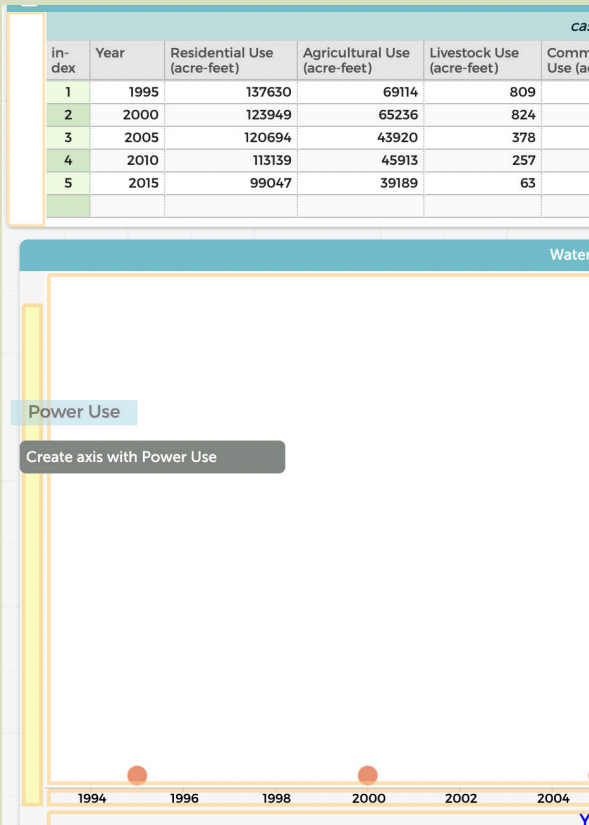


Figure 1. Adding the variable Power Use to the y-axis. Drag the variable name "Power Use (acre-feet)" to the y-axis to plot water used for power over time.

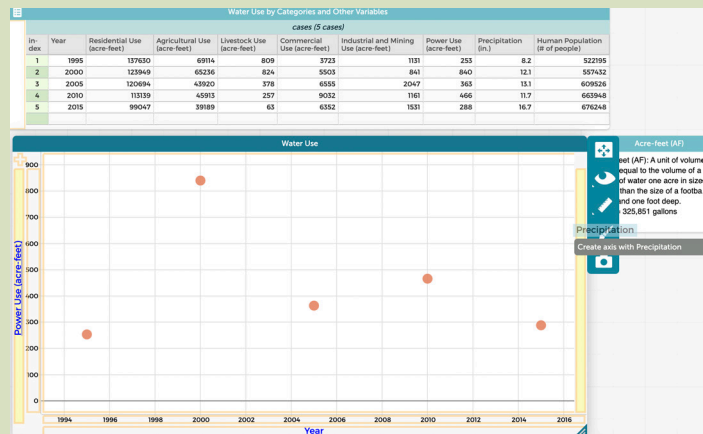


Figure 2. Adding Precipitation (in.) to the secondary (right) y-axis. Drag the variable name "Precipitation (in.)" to the y-axis on the right side of the graph to plot precipitation with its own y-axis scale.

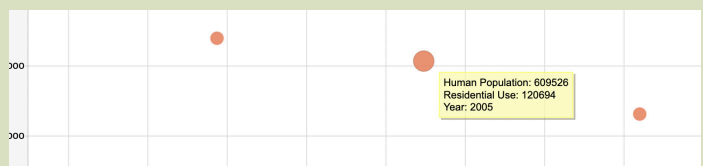


Figure 3. Hover over a point to see the data.

- trend you want to use for your project, the next step is to properly label your graph and take a picture of it for your Student Report.
- ii. CODAP will automatically label the y-axis and x-axis. Make sure these accurately reflect the variables in your data trend.
 - iii. The title of the graph will automatically be labeled "Water Use." To change the title, double-click on the title and type your graph title.
 - iv. There are two options for capturing your graph to add it to your report:
 1. Take a **screenshot**.
 2. Use the **camera icon** on the right side of the graph (Figure 4). Click on the camera icon, scroll to Export Image, then download the image. CODAP will place the graph's title at the bottom of your graph when you export the image.
 - v. The [dataset video](#) (on

YouTube) will give you additional tips for working with scatterplots, finding a data trend, and creating a graph. The dataset video is available by clicking on the pink box on the dataset page (Figure 5).

- k. Refresh the webpage and remind students that they will be working from this dataset page during work time at the end of class. Switch back to the PowerPoint slides.
11. **Slide 10:** your graph (a) helps you write your data trend, (b) is a visual representation of the pattern in the data, (c) shows a relationship between two or more variables, and (d) includes a title and axis labels. The rubric explains the grading criteria for the graph, which is worth 10 points: The graph of data trend is a clear representation of the data trend. It includes a title, axis labels, and a legend (if necessary). Computer-generated or hand-drawn graphs are acceptable.

Possible Explanation & Accessing the Student Report

1. **Slide 11:** your Student Report will include a **possible explanation** for the data trend.
 - a. The possible explanation should provide a reason for your data trend. It can be your best guess based on other information on the dataset or something you already know. What could the pattern mean? How could that pattern occur? Your possible explanation just needs to be a reasonable (possible) explanation; it may or may not be the true explanation.
 - b. In your Student Report, you will write one to two paragraphs to provide a possible explanation for your data trend.
 - i. Encourage students to look at the background information on the dataset for each water-use category in their data trend.
 - c. This section of the project is worth 10 points. The rubric states, "The possible

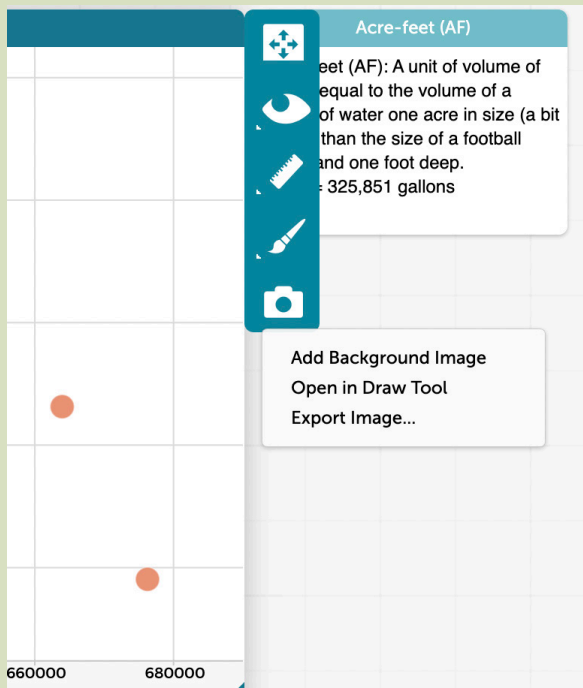


Figure 4. Use the camera icon to take a picture of the graph and export it to Google Drive or a local file.



Figure 5. Watch the dataset video for additional tips on working with the water use dataset.

explanation section contains a reasonable explanation for the data trend. The explanation is consistent with scientific concepts.”

2. **Slide 12:** here is the possible explanation from our example data jam project. It helps explain the data trend “The percentage of people who use Snapchat and Instagram decreases with age.” We used background information on the dataset and the data showing that cell phone use also decreases with age.
3. Show students where they can find and download the Student Report PowerPoint or Google Slides that they will be working on today.

Work Time

1. **Slide 13:** depending on the amount of class time left, give students 15 minutes or more to begin their projects. Give students the URL for the dataset page and remind them which county’s data they will be using: <http://asombro.org/wcdjdata/>
 - a. You will have 15 minutes to work independently on your project. Here are the suggested steps:
 - i. Watch the dataset video linked on the page as the big pink square.
 - ii. Explore the dataset by graphing the data to find a data trend.
 - iii. Once you have a data trend you like, type it as a one- to a two-sentence statement in your Student Report.
 - iv. Add axis labels and a title to a graph showing your data trend.
 - v. Take a screenshot of your graph and add it to your Student Report.
 - b. You will probably not have time to complete all of this work. Use this time to get started, and please ask questions.
 - c. Your 15 minutes begins now. [Click to start the timer.]

Workshop Data Trends

1. **Slide 14:** have students share their data trends if there is time. Discuss a few trends and point out good qualities and places for improvement.
 - a. Remember, a good data trend will:
 - i. Show a pattern, not just one data point.
 - ii. Have more than one variable.
 - iii. Use only data from the dataset.
 - iv. Be specific.
 - v. Include the main variable of water use.
2. **Slide 15:** here are some examples of good data trends from Doña Ana County. These examples will give you an idea of how to write your own data trend. Read as many as you can in the time available.
 - a. Residential use of water increased steadily until 2010 before decreasing.
 - b. Commercial water use hit a peak in 2005 before starting to decline, but it has still not declined to 1995 and 2000 levels.
 - c. Residential use of water does NOT increase in years with higher precipitation. In fact, residential water use generally decreased with higher annual precipitation.
 - d. Neither water for agriculture use nor residential use increase in a simple correlation with the human population.

use CODAP and how to select a data trend, the dataset video, an example project, and the rubric.

- c. The next steps of the Water Conservation Data Jam will be (a) making a creative representation that shows the data trend you chose today, (b) developing an action with a possible solution, and (c) sharing your project with others.

Wrap-Up

1. **Slide 16:** today, we worked on the data trend, graph, and possible explanation.
 - a. Your assignment is to complete these three sections before our next meeting for this project.
 - i. The social media example Student Report is on the website if you need to reference it as a reminder of what to include in these three sections.
 - b. You have many resources available: videos on how to