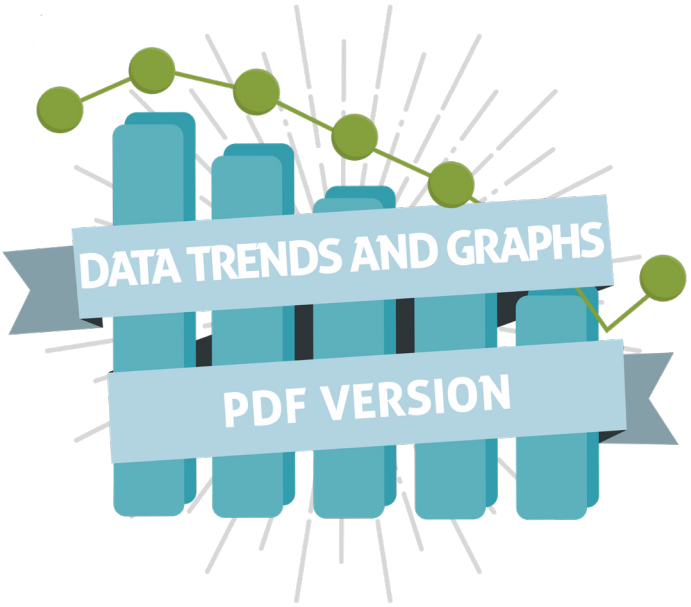
Water Conservation



Data Jam

DESCRIPTION

Students will learn how 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 data pages
- 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 (choose one):
  - o Student Report document as a slideshow
  - o Student Report Rough Draft Workbook [1 per student]
- About the PDF Dataset Video, transcript is available here
- Water Use Dataset [1 per student; choose a county]
  Bernalillo, Chaves, Cibola, Doña Ana, Lea, Luna, Rio Arriba, Sandoval, San Juan, Santa Fe, Valencia
- Rubric [1 per student]
- Social Media Sample Project
- Optional: additional graphing paper for student use

PREPARATION

1. Set up a computer and projector (if applicable) to show the PowerPoint.
2. Download and distribute the Student Report document as a slideshow or workbook for students to work on throughout the lesson.
3. Have a copy of the Social Media Example Project available for students to refer to if needed.
4. Have students watch the six-minute video: About the PDF Dataset. You can either assign this as homework or watch the video together in class. Transcript is available here.
5. If needed, set up an assignment for homework that tells students their Student Reports must:
   a. Have a one- or a two-sentence Data Trend.
   b. Have a Graph that shows evidence for the data trend. This can be a photo of the graph created on the computer or a hand-drawn graph.
   c. Include a Possible Explanation in paragraph form explaining a possible reason for the data trend.

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. Show the Social Media Sample Project, which was completed using the Social Media Use dataset.

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. Give students a copy of the rubric if they don't yet have one. I will grade your project using the rubric. 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 start these sections, but you likely will not finish 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 may also have watched the Data Trends video; if so, that will help you today. If you have not watched that video, we will discuss the data and data trends, and you can watch it later as a reminder.
6. **Slide 6/7**: [choose to use either slide six or slide seven depending on how you will have students complete their report.] For the assignment you will begin today, you have the Student Report (PowerPoint, Google Slides, or workbook) to begin to complete. We will be focusing on adding information for the data trend, graph, and possible explanation into this report.
7. **Slide 8**: 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 data jam: "The percentage of people who use Snapchat and Instagram decreases with age." The graph provides evidence for our data trend.
8. **Slide 9**: 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 what 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.
   f. The rubric explains the grading criteria for the data trend section of your report. This section is worth 15 of the 100 points, and the data trend should be one or two sentences that describe a clear pattern in the data. It should be specific and include more than one variable.
9. **Slide 10**: looking for data trends.
   a. In the example data jam, we reviewed the variables and then explored the data to look for a data trend. We will do these same steps with the water use dataset.
   b. We will be using the dataset from Doña Ana County. Your data may be different from the data in this example.
   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.
10. **Slide 11**: start by graphing two variables. We suggest you use "Year" as one of your variables and put it on the x-axis (the horizontal axis). Then, add one of the water use categories to the y-axis (the vertical axis).
11. **Slide 12**: for example, this graph shows how water for Power Use changes over time from 1995 to 2015 in Doña Ana County.
    a. Do you see a trend or pattern in the data?
    b. If not, try graphing another water use variable or investigate the effect of a third variable.
12. **Slide 13**: you can add additional information like Precipitation or Human Population by adding a second y-axis on the right side of the graph, using a scale appropriate for this other variable.
13. **Slide 14**: this graph shows both water for power use and precipitation plotted on the same graph, with years on the x-axis.
    a. Do you see a trend or pattern in these data? Does water use for power follow the same pattern as changes in precipitation from 1995 to 2015?
14. **Slide 15**: if you would prefer not to use Year as a variable, you can put Precipitation or Human Population on the x-axis. Suppose you wanted to explore

the relationship between Human Population and Residential Water Use. In that case, you could plot Human Population on the x-axis (horizontal axis) and Residential Water Use on the y-axis. Each point would represent the data for these variables in a given year.

15. **Slide 16**: this graph compares Human Population and Residential Water Use
    a. Do you see a trend or pattern in this data? Does residential water use increase steadily as the human population increases?
16. **Slide 17**: once you have found your data trend, you need to create a graph for your Student Report. You can create your graph by drawing it or using a computer program. Either way, 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

1. **Slide 18**: 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 explanation section contains a reasonable explanation for the data trend. The explanation is consistent with scientific concepts."
2. **Slide 19**: for example, 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 or make sure they each have a copy of the Report Rough Draft Workbook.

Work Time

1. **Slide 20**: depending on the amount of class time left, give students 15 minutes or more to begin their projects.
    a. You will have 15 minutes to work independently on your project. Here are the suggested steps:
        i. Explore the dataset by graphing the data to find a data trend.
        ii. Once you have a data trend you like, write it as a one- to a two-sentence statement in your Student Report.
        iii. Create your graph. Make sure it includes axis labels and a title. It should only include data relevant to your data trend.
        iv. Add your graph to your 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 21**: 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 22**: 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.

Wrap-Up

1. **Slide 23**: 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.
    b. 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.