

Water Conservation

Data Jam

DESCRIPTION

As an introduction to the Water Conservation Data Jam, students participate in an interactive data jam with their classmates using a dataset on social media. Once they have been introduced to all the project components, they learn how to start exploring the water dataset they will use for their own projects.

GRADE LEVEL 6-12

OBJECTIVES

Students will:

- Understand the components of a data jam
- Practice finding a data trend and developing a creative project using a sample dataset
- Apply their understanding to the water use dataset

TIME
45 MINUTES

MATERIALS

- Computer and projector (if needed) to show PowerPoint [1 per class]
- Introduction to the Water Conservation Data Jam video
- PowerPoint presentation
- Class Poem Document [fillable PDF]
- <u>Social Media Use Dataset</u> [1 per student or 1 class set]
- 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]

PREPARATION

- 1. Optional: prepare your own Water Use Dataset for a county near you instead of using the datasets available from Asombro.
- 2. Set up a computer and projector and prepare to show the PowerPoint.
- 3. Prepare to use the Class Poem Document and PowerPoint to guide students through creating a class poem together as an example data jam project. You can choose to either add the sentences students will write to the Class Poem Document during class or collect students' sentences, add them to the document later, and show it to the class during the next lesson.
- 4. Have students watch the three-minute <u>Introduction to the Water Conservation Data Jam video</u>. You can either assign this as homework before the lesson or watch the video together in class, the transcript is <u>available here</u>.
- 5. Print a class set of the Social Media Dataset. These can be collected and reused if you have multiple classes.
- 6. If needed, set up an assignment in your online learning platform (Canvas, Google Classroom, etc.). Here is some suggested text for the online assignment:

If you did not watch the Introduction to the Water Conservation Data Jam video, you can find it here: https://www.youtube.com/watch?v=Ax3IRXAbN0q

Before the next class:

- Read the Background and Procedures sections of the Water-Use Dataset.
- 2. Choose a water-use category that you are interested in investigating.

PROCEDURES

Introduction

- 1. **Slide 1**: New Mexico is a dry state, and it is essential to find ways to conserve our limited water resources. You will think about this as you complete your Water Conservation Data Jam project. You will learn how to interpret a set of data, find a creative way to represent a data trend, and develop an action plan to address water conservation issues. Today, we will learn about the different parts of a data jam by doing an example data jam together before you start on your own projects.
- Slide 2: data are important, and they can tell us what is going on in the world. You have probably seen something like this graph of COVID-19 cases in New Mexico.
- 3. **Slide 3**: data can also be fun and tell you about individuals. This graph shows my desire for ice cream throughout the day, and we can see a pattern. My desire for ice cream is low in the morning, and it increases throughout the day. Educators can change the title and y-axis of this graph to make it about something more applicable to themselves.
- 4. **Slide 4**: now it is your turn to create a graph that shows a data trend about you. This graph has the time of day on the x-axis, and the y-axis is unlabeled. You will pick the label for the y-axis of this graph that best describes you. The graph shows that your choice for the y-axis label needs to be something that increases steadily throughout the day.
 - a. Your choices are: A. My desire for Takis; B. Loudness of my voice; C. Strangeness of filters I use for a selfie; or D. My fear of being attacked by zombies. Educators may edit these options to fit their class or allow students to make up their own label. Ask students to share their choices, and make a note of which choice was the most popular.
 - b. Explain that [A, B, C, or D] was the most popular answer, which

- means that, for example: "In this class, students' desire for Takis increases steadily throughout the day." This one-sentence explanation of a pattern in data is called a **data trend**.
- We used fabricated data for this example, but in the Water Conservation Data Jam, you will use actual data collected by scientists.

Overview of Introduction Video Content

- Slide 5: the Water Conservation
 Data Jam has two goals. One
 goal is finding a creative way to
 represent a data trend so that a
 non-scientist can understand it.
 You will do this by writing a short
 report with seven sections and
 making a creative project.
- 2. **Slide 6**: this is an example from a dataset that you will not use about kangaroo rat populations.
 - a. This student was given a dataset from a study on kangaroo rat populations from 1995 2007. Data were collected during the Small Mammal Exclusion Study at the Jornada Basin LTER (Long-Term Ecological Research) site near Las Cruces, NM.
 - b. The student examined the dataset and noticed a data trend or pattern in the data. They wrote the data trend in a complete sentence: "While the kangaroo rat population size was relatively constant over time, it was much higher in 1998 and 2000."
 - c. Then, the student came up with a creative way to show that data trend: piñatas shaped like kangaroo rats. The circumference of each piñata is scaled to the number of kangaroo rats caught by scientists; one centimeter of circumference represents one kangaroo rat. You can see the data trend by looking at the piñatas. The piñatas are bigger in 1998 and 2000 and smaller in the other years.

- 3. **Slide 7**: after identifying a data trend and representing it creatively, the second goal is to propose an action plan to address the water conservation issue you identified in your data trend.
- 4. **Slide 8**: your action plan will present a solution to the water conservation issue you identified in your data trend. This is a student sample of an action plan from a previous class. They identified a data trend about water use by livestock and presented an action plan to store water for animals.

Example Data Jam with a Social Media Dataset: Finding a Data Trend

- 1. **Slide 9**: to complete the Water Conservation Data Jam, you will:
 - a. Identify a data trend from a water dataset.
 - b. Make a creative project.
 - c. Design an action plan.
 - d. Complete your written report. Today, we are going to do an example data jam project together as a class to learn about all the parts that you will include in your own data jam project.
- 2. **Slide 10**: the first thing we do in a data jam is look for data trends. A data trend is a story told by the dataset, a pattern in the data, or a relationship between two or more variables. It should be one to two sentences. At the beginning of class, we identified a data trend using the graphs of made-up data. (Remind students of the data trend from your class.) The student project shown earlier included the data trend: "While the kangaroo rat population size was relatively constant over time, it was much higher in 1998 and 2000."
- 3. **Slide 11**: hand out copies of the Social Media Dataset. For your project, you will use a dataset about water. Today, we will do an example data jam using a dataset about social media. This dataset is set up the same way as the dataset you will be using for your own project, so everything we do today will help you with your own project.

WATER CONSERVATION DATA JAM B-03 EXAMPLE DATA JAM - PDF VERSION

- 4. Explain each section of the dataset.
 - a. At the top of the dataset page is the **background section** (Figure 1), which provides general information about the topic. For example, this background section explains that social media has been around less than 30 years but is used by hundreds of millions of people globally and is important to the economy.
 - b. The **procedures section** (Figure 2) explains how the data were collected. Remember that you do not collect your own data for the Water Conservation Data Jam. Instead, you are using an existing dataset. It is still important to understand who

- collected the data and how they were collected. These data come from a research group that did a survey in 2018 asking people which social media platforms they used.
- 5. **Slide 12**: note that data are shown in a table and a graph.
 - a. What kind of graph do you see? [Answer: scatterplot]
 - b. When we are looking for a data trend, the first thing we need to do is figure out which variables are included in the dataset. Variables are things that are measured or things we have data on. They can be found in the title and column headings of tables and the titles, axis labels, and legends of graphs.
 - c. What variables do you see

- in this dataset? [Answer: age group, social media platforms (YouTube, Facebook, Instagram, Snapchat), percentage of people who use each platform, technology owned (smartphone, laptop or desktop computer), and percentage of people that use each technology]
- 6. **Slide 13**: there are a lot of data in this dataset, so to find a data trend, you should focus on one or two variables by sketching your own graph. With just Instagram on the graph, what data trend do you see? [Answer: The percentage of people who use Instagram decreases with age.] This is a good example of a data trend.
- 7. **Slide 14**: now that we have found one data trend, let us see if we find any others by adding a third variable to the graph. If you compare YouTube and Instagram, you see that "more people use YouTube than Instagram in every age group". That is another good data trend.
- 8. **Slide 15**: let us try a different set of variables by making a different graph by adding Snapchat and Instagram to the graph by age. The data trend here is that the percentage of people using Snapchat and Instagram decreases with age. Any one of these three we found already would be good data trends.
- 9. **Slide 16**: a good data trend needs to include the main variable in the dataset. In this example dataset, we need to include the percentage of people who use social media. Additional variables are given (e.g., the percentage of people who own a smartphone), and we can use them to explain our data trend.
- 10. Slide 17: in the next lesson you will use similar strategies that we used with this social media dataset to look for data trends in a water-use dataset for your own projects.
- 11. **Slide 18**: there are five qualities of a good data trend. A data trend will:

SOCIAL MEDIA USE – SAMPLE DATASET

BACKGROUND:

Social media platforms are web-based tools that create a community for sharing content and messages online. The first social media sites were created in the late 1990's and early 2000's. These early sites have been replaced by other sites and applications that are used by millions of people around the world. Social media now accounts for more than 24 billion dollars in global revenue.

Social media has become a major part of modern society used by hundreds of millions of people around the world. It serves as an important marketing tool for businesses and allows users to stay up to date with current events. On average, in 2019 people spent more than two hours per day on social media.

Figure 1. Background section of dataset

DDCCEDI IDES

Researchers from the Pew Research Center studied trends in use of technology and social media in the United States. They used surveys to collect data between January and April of 2018. These were the methods used to collect data:

- Surveys were conducted over the phone, by mail, and in person.
- Researchers wrote survey questions based on their study goals. The questionnaire was tested by interviewing a small number of people, and questions were modified based on the quality of responses given and understanding of the question's phrasing.
- A total of 3,803 adults and teens living in the US responded to the survey.
 Calls were made randomly through a random digit dialing software. People who
- cell phone were offered a \$5 cash incentive for participating.

 Researchers used a process called "data weighting" to ensure the data was representative of the gender, age, education level and

responded to the survey on their

ethnicity of the US population.

Results were published in two different papers, one that focused on teen use of social media and one focusing on adults.



Figure 2. Procedures section of dataset

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- a. Show a pattern, not just one data point.
- b. Have more than one variable.
- c. Only data found on the dataset. In a data jam, you should not collect your own data or find data from other sources.
- d. Be specific.
- e. Include the main variable. In the social media example, the main variable was the percentage of people who use social media.
- 12. **Slide 19**: keeping the criteria on the previous slide in mind, which of these data trends is a good data trend for our example data jam project? Option 1 is "Teenagers who use Facebook don't have any friends." Option 2 is "85% of teenagers use YouTube." Option 3 is "The percentage of people who use Snapchat and Instagram decreases with age." Have students vote by holding up one, two, or three fingers. If teaching remotely, you can use a poll or chat.
 - a. Option 3 is the best data trend because it meets all of the criteria of a good data trend.
 - b. Option 1 does not work because our dataset did not include any information about how many friends people have.
 - c. Option 2 does not work because it is a data POINT, not a data TREND. This statement can be graphically represented using only one number from the data table, and a data trend needs to include multiple data points.
- 13. **Slide 20**: this data trend shows a pattern in the data.
 - a. It has more than one variable (percentage of people who use Instagram, percentage of people who use Snapchat, and age group).
 - b. It only uses data from the dataset we were given.
 - c. It is specific and explains the variables we used. "Younger people use Instagram and Snapchat less" is an example of a data trend that is not specific enough.
 - d. It includes the main variable in

- the dataset: the percentage of people who use social media.
- e. Once you have identified a data trend and written it in a single sentence, you will need a graph that shows that data trend.

Example Data Jam with a Social Media Dataset: Possible Explanation and Creative Representation

- 1. **Slide 21**: you will also come up with a possible explanation that explains your data trend. Do not include this explanation in your data trend it has its own section. In this section, you should try to explain why the data trend you identified is true. Think about what the pattern could mean. This is where you can look for additional information outside the dataset.
- 2. Slide 22: once you have identified a data trend, you will develop a creative way to show that trend. A creative project represents your data trend in a new and unusual way, like the student who made piñatas to show kangaroo rat population data. You should look at a creative project and see the data trend; we can see from the large piñatas which years had higher kangaroo rat populations. You can use symbols, objects, actions, or words to represent the data. Videos, pictures, words (like a poem or song), models, and food are just a few examples of ways you can represent a data trend.
- 3. **Slide 23**: these projects are examples made to represent the data trend: "the percentage of people who use Snapchat and Instagram decreases with age." The slide shows a picture of a model made with beads, an infographic with social media logos, and a screenshot from a video of a student bouncing a basketball to represent the data.
- 4. **Slide 24**: another example of a creative project is a poem. As a class, we are going to make a poem that shows our example data trend.

- a. Our data trend only talks about Snapchat and Instagram, so we do not need to include other social media platforms.
- b. We want the number of words in each sentence of the poem to represent the percentage of people in each age group that use that social media.
 - i. We could make each word represent 1% of people, but that would mean, for example, we would need a 72-word sentence to represent Instagram use by 13-17-year-olds.
 - ii. Instead, we decided to make one word represent 3% of people in the age group who use the social media platform. To figure out the number of words in each sentence, each number from the data table was divided by 3 (and rounded to the nearest whole number).
- c. Each student will write one sentence of the poem. The first two sentences are filled out already as examples. For example, the first sentence represents the percentage of 13-17-year-olds who use Snapchat and has 23 words: "#Snapchatslaps! It's lit and not for Boomers, the filters update and keep it fresh, which piques my interest and makes it the best!"
- d. The second sentence represents the percentage of 13-17-year-olds who use Instagram and has 24 words: "Lots of teens use social media, Instagram is pretty popular, I don't know why people like it, I have never used it even once."
 - i. This example shows that even if you do not use the social media platform you are assigned to write about, you can still write a sentence about it.
- e. Each student is assigned one age group and social media platform combination based on the first letter of your first name.

WATER CONSERVATION DATA JAM B-05 EXAMPLE DATA JAM - PDF VERSION

These assignments are listed on the slide. For example, if your first name starts with A, you will write a sentence with 23 words about how 18-29-year-olds use Snapchat.

f. Tell students to write their sentences with the correct number of words and label the app name and corresponding age group. Compile student responses into one poem using the Class Poem Document, and share it during the next lesson.

students know that they should review the rubric so that they are aware of each component of the final report and the point value for each component.

Wrap-Up

- 1. **Slide 25**: today, we did an example data jam using a dataset about social media. In the next class, you will be using the same steps and tools we used today to start your own data jam project to explore water use data. Here are the steps:
 - a. Choose one or more water-use categories on the dataset that you will be given.
 - b. Graph some of the data to find a data trend.
 - c. Make a creative project that shows that data trend.
 - d. Make an action plan based on that trend.
 - e. Compile a report in a slide presentation that includes title, data trends, graph, possible explanation, creative project, action plan, and brief reflection.
- 2. **Slide 26**: finding a data trend is the first step in Water Conservation Data Jam, and it is crucial in moving forward with the project. Your creative project and action plan both need to be based on your data trend.
- 3. Slide 27: in our next lesson, we will learn more about finding a data trend. Pass out copies of the Water Use Dataset and the rubric, and explain the homework assignment to students. Before the next class, students should read the background and procedures section and choose a water-use category they are interested in investigating. Discuss the grading rubric for the Water Conservation Data Jam. Let