## Foundational <br> Understandings

- Data can be represented with dots in a dot plot.
- Basic frequency data can be interpreted with dot plots.
- Data can be compared using mode and mean.


## Mastery Objectives

- Create a dot plot
- Identify the spread of data
- Interpret basic frequency data from dot plots
- Identify mode as the highest frequency within a data set
- Identify mean as the average
- Use a calculator to calculate mean


## Challenge Objectives

- Understand the impact of an outlier on statistics
- Recalculate data eliminating the outlier


## Materials

## Supplied

- 2-column T-chart
- Teaching Dot Plot Graphic Organizer
- Number Lines: 0-10, 11-21
- Access Algebra Student Book (pgs. 4-8)
- Vocabulary cards: data, dot plot, axis, horizontal, vertical, histogram
- Calculator
- Calculator Task Analysis for Addition card
- Calculator Task Analysis for Division card
+| Number cards: 1-10Problem statements (Appendix D)


## To Bring From Home

+ Post-it NotesSmall dot stickers or bingo daubersPictures of emotions: grumpy, tired, bored, happy, energetic, sleepyAlphabet and number stampsAdditional calculators so each student has oneGlue stick


## Lesson Preparation

1. Using a dry-erase marker, write the word Rested at the top of one column of the T-chart and Not Rested at the top of the other column.
2. $+\ddagger$ Project the Dot Plot Graphic Organizer (found on the flash drive) and the data set from the Student Book onto a whiteboard so you can demonstrate the steps during this lesson.
3.     + Program AAC devices with response options: Numbers 1-10; emotions, such as grumpy, tired, bored, happy, energetic, sleepy.

## Prompts for Modeling

Model each step of the Task Analysis in the Student Book. Have students follow your model. If needed, prompt using the least intrusive prompt (LIP) as follows:

If a student does not respond, give a verbal prompt (e.g., Write the problem on the lines in your Student Book).


If the student still does not respond or responds incorrectly, model the step again and repeat your verbal prompt to give the student another opportunity to respond.


If still no response, physically guide the student to complete the step.

## Engage the Students

## Teacher Task <br> Analysis

1. Engage the students and introduce the lesson.
2. Review the vocabulary terms.


## Teacher Instructions

Set up the day's lesson: Today, we're going to use statistics to help us answer a question. Statistics is a kind of math that uses numerical data. Without data to talk about or to analyze a question, statistics would not exist. There is a story-with characters, plots, and problems-to be uncovered behind data. The data can be exciting or disappointing. Today you will learn how to follow the steps of a Task Analysis to solve a problem.

Let's start by reviewing this unit's vocabulary words.

Use the Vocabulary cards to review each term and definition using the constant time-delay procedure described on page 33.

## Definitions:

- data: a collection of information expressed as numbers (quantitative)
- dot plot: a graph that displays data as dots on a number line
- axis: a reference line drawn on a graph
- horizontal: going in a side-to-side direction
- vertical: going in an up-down direction

Student Response

Responds by selecting the correct Vocabulary card given 4 cards to choose from

## For Students With Emerging Skills

Responds by selecting or eye-gazing to the correct Vocabulary card given 2 or 3 cards to choose from


Teach the Task Analysis





|  |  |  |  |
| :---: | :---: | :---: | :---: |
| Student Task Analysis | Teacher Instructions | Student Response | For Students With Emerging Skills |
|  | Good work. What is the next number in the data set? Yes, 10. I'll put a dot in the column above the number 10 . Model, then wait for students to do the same. | Responds 10 | Points to 10 |
|  | Repeat for each number in the data set. |  |  |
|  | Very good. You have graphed the data so where will you check off that step? Very good. | Checks off $(\sqrt{ })$ Step 5 on the Task Analysis | Finds Step 5 on the Task Analysis and checks it off $(\sqrt{ })$ with your help |
| 6. Calculate the mode. | Now that we have added all of the dots on the dot plot, we can see the hours per night that most of Zane's classmates sleep. Most sleep 9 hours per night. Point to 9 on your dot plot. | Points to 9 | Points to 9 or points to where you are pointing |
|  | In statistics, mode is the value-the number-that occurs the most frequently in a data set. Remember, Zane is trying to find out how many hours per night he should sleep to get plenty of rest. He asked classmate who seemed well-rested. |  |  |
|  | Look at the dot plot. How many hours per night do most people sleep? This is the amount with the most frequency. Wait for students to respond. | Points to the mode (hours per night that most classmates sleep) | Given 2 or 3 choices (cover all columns but 2 or 3 with a Post-it Note), chooses the most (the highest number of dots) |
|  | Yes, 9 hours. 9 hours is the mode-the most. The mode tells us that most of Zane's well-rested classmates sleep 9 hours per night. Let's record that information on the Data Table. | Records data on the Data Table | Stamps or sticks the number onto the Data Table |
|  | We have finished Step 6. Let's check off that step. | Checks off $(\sqrt{ })$ Step 6 on the Task Analysis | Finds Step 6 on the Task Analysis and checks it off $(\sqrt{ })$ with your help |

## Student Task Analysis

7. Calculate the mean.

## Teacher Instructions

Looking at the most hours, the mode, is important information, but I think it would be useful to look at the data in another way, too.

The mean is the average amount. If Zane wanted to figure out on average how many hours of sleep his classmates get, he would look at the mean-the average. The average could also help him decide how many hours he should be sleeping before Friday's big game.

To calculate the average number of hours his well-rested classmates sleep per night, we don't need a dot plot. What is another word for average? Yes, mean. He will calculate the mean.

If we add up all of the data in the data set and divide the data by the total number of data points, we can find the mean.

We can use the Mean Graphic Organizer in your Student Book to calculate the mean. Put all of the data from the data set into the graphic organizer in your Student Book. Demonstrate how to write each data point in each box of the graphic organizer. Then show students how to use the calculator to add the data points and divide by the number of data points.

The mean tells us the average hours per night Zane's well-rested classmates sleep. The mean we calculated is 8.4. Record the mean on your Data Table.

## Student Response

Responds with the word mean

Uses the Mean Graphic Organizer and a calculator to find the mean of the data set

Records the mean on the Data Table

## For Students With Emerging Skills

Repeats the word mean after you

Stamps, writes, or sticks the correct number in the graphic organizer; uses the Calculator Task Analysis for Addition to add data points and the Calculator Task Analysis for Division to divide OR

Matches numerals and symbols from the graphic organizer to the calculator



## Challenge Problem

To add challenge to the lesson, read this extension to the math story aloud to students who are ready for a challenge: Zane saw his classmate who slept 5 hours per night sleeping during biology. He realized that maybe this student was not well-rested after all. An outlier is a number that is very different than the other numbers in a data set. In this data set, the number 5 is different than the other numbers because it is a lot less than 8,9, or 10 . Zane decides to take the outlier out of the data set and recalculate the mean to see if that changes the average hours per night.
Have students recalculate the mean for hours of sleep using the 9 remaining data points. Compare the difference in hours of sleep per night without the outlier.

## Answer

$79 \div 9=8.8$ (rounded) is the mean without the outlier.

## Answer Reys



## Answer Reys



