

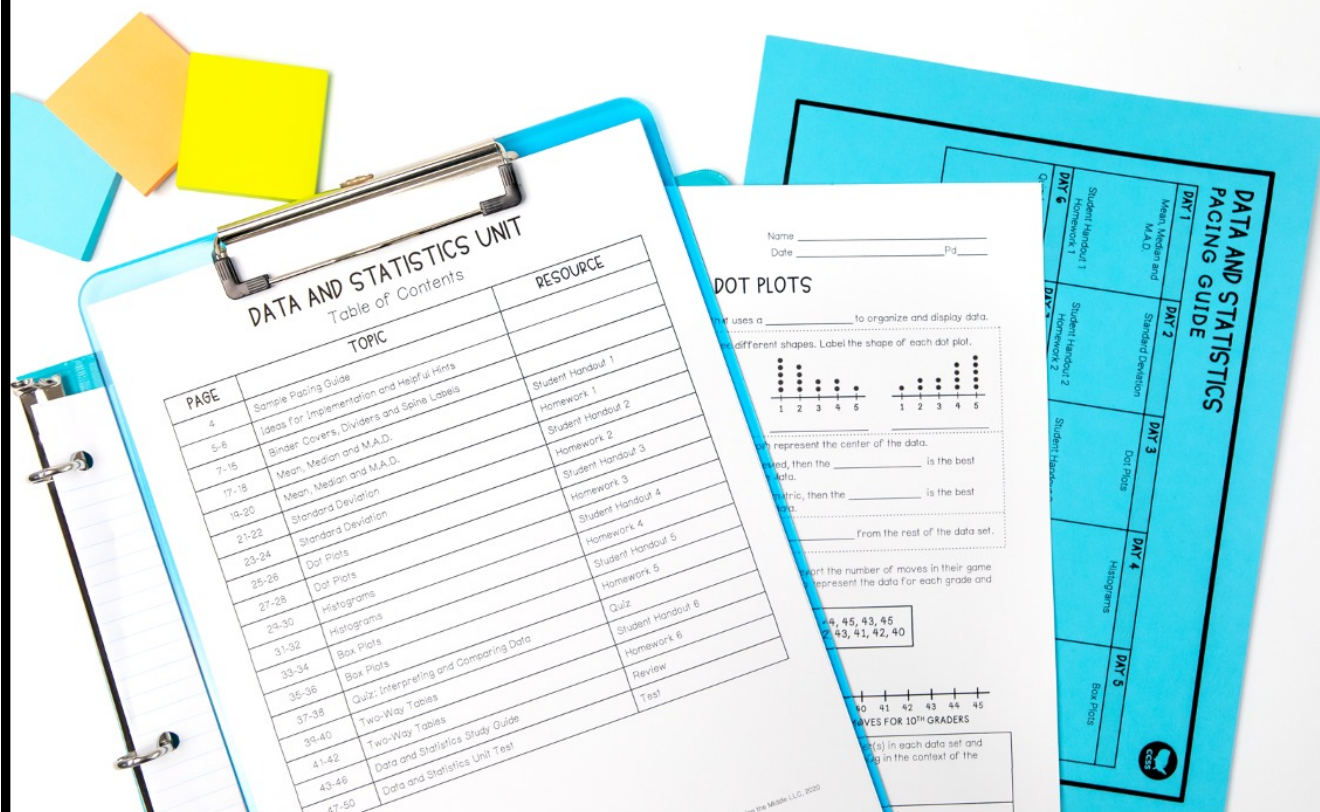
# learning focus:

- ✓ represent data using dot plots, histograms and box plots
- ✓ compare the center and spread of two or more data sets, accounting for outliers
- ✓ summarize categorical data for two categories in two-way frequency tables

# DATA & STATISTICS UNIT

## 9 DAY CCSS-ALIGNED UNIT

**ALG  
1**



A MANEUVERING THE MIDDLE® RESOURCE

# DATA & STATISTICS

**ALG  
1**

a 9 day CCSS-aligned unit

CCSS: S.ID.1, S.ID.2, S.ID.3, S.ID.5

**ready-to-go, scaffolded  
student materials**

## DATA AND STATISTICS UNIT

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## student friendly + real-world application

graphic organizers

Unit: Data and Statistics  
Student Handout 5

Name \_\_\_\_\_  
Date \_\_\_\_\_ Pd \_\_\_\_\_

### BOX PLOTS

A box plot displays a data distribution using \_\_\_\_\_ key numbers:

- \_\_\_\_\_ : the smallest piece of data
- \_\_\_\_\_ : the median of the lower half
- \_\_\_\_\_ : the middle of the data
- \_\_\_\_\_ : the median of the upper half
- \_\_\_\_\_ : the largest piece of data

**INTERQUARTILE RANGE (IQR)**

- The IQR is the range of the middle 50% of the data.
- The interquartile range is the difference between the first and third quartiles.
- The IQR is the best measure of spread if there are outliers.

Use your understanding of box plots to answer the following questions.

- The following data set represents the number of employees at TechTops who live on a small island. Use the data to create a five-number summary.
 

46, 50, 55, 51, 62, 64, 62, 55
--------------------------------

Min: \_\_\_\_\_ Q3: \_\_\_\_\_  
Q1: \_\_\_\_\_ Max: \_\_\_\_\_  
Med: \_\_\_\_\_ IQR: \_\_\_\_\_
- The box plot represents the number of employees at TechTops who spend on their computers. Use the information in the box plot to circle the statement(s) that are true.
  - a. One-fourth of the employees spend 11-15 minutes.
  - b. One-fourth of the employees spend 11-15 minutes.
  - c. Half of the employees spend 20-29 minutes.
  - d. The employee with the longest commute is 29 minutes.
  - e. There are more employees who drive to work than those who do not.

The shape of a box plot can be described using the terms shown below. Describe the features of the box plot shapes under each representation.

SHAPE	SYMMETRIC	SKEWED RIGHT	SKEWED LEFT

**OUTLIER** The IQR can be used as a mathematical way to identify outliers.

A survey was conducted of monthly electricity usage in California and Middleton, Wisconsin. The data is summarized in the table below. Use the data to sketch two box plots on the number line.

CITY	Min	Q1	Median	Q3	Max
IRVINE	330	330	330	330	330
MIDDLETON	950	950	950	950	950

- Describe the difference in electricity usage between the two cities. Use shape and measures of center to justify your answer.
- Two additional households report their electricity usage in each city. Determine if these data points would be considered outliers.
 

CITY	Value
IRVINE	330 kWh
MIDDLETON	950 kWh

Unit: Data and Statistics  
Homework 5

Name \_\_\_\_\_  
Date \_\_\_\_\_ Pd \_\_\_\_\_

### BOX PLOTS

Nora recorded the number of passengers on several flights leaving Newark Airport from two different airlines. The data is summarized in the table at the right.

- Use the data to sketch two box plots on the given number line.
 

	JETT AIRLINES	SKYE AIRLINES
Min	67	64
Max	95	98
Q1	77	71
Median	86	75
Q3	90	86
- Which is a true statement about the data?
  - a. The fourth quartile represents the greatest spread in data for Skye Airlines.
  - b. The IQR of Jett Airlines is greater than the IQR for Skye Airlines.
  - c. Both a and b are true.
  - d. Neither a nor b are true.
- Two additional flights left Newark Airport after Nora recorded the data. Determine if these data points would be considered outliers.
 

AIRLINE	Passengers
JETT AIRLINES	105 passengers
SKYE AIRLINES	48 passengers
- Based on the box plots, which airline seems to have a more consistent number of passengers on its flights? Explain your choice.
- If Chandler wants a better chance of having an empty seat next to him on his flight, which airline should he take? Justify your reasoning.

6. Circle the name of any student who made a true statement about the data.

WESLEY	D'ANNA	YESENIA
Half of the flights for Jett Airlines had at least 86 people.	Less than 25% of the flights for Skye Airlines had more than 87 people.	The mean for Skye Airlines should be less than 75 passengers.

skill application

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streamline your planning  
process with unit overviews

- ✓ key vocabulary
- ✓ vertical alignment

sample  
pacing  
calendar

### DATA AND STATISTICS OVERVIEW

STANDARDS

**S.ID.1** Represent data with plots on the real number line (dot plots, histograms, and box plots).

**S.ID.2** Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.

**S.ID.3** Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).

**S.ID.5** Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trends in the data.

### BIG IDEAS

- Graphs on the number line interpret sets of data.
- Differences in shape, center about the data.
- Appropriate statistics (i.e. r data sets based on the cha
- Categorical data can be su recognize possible associa

### ESSENTIAL QUESTION

- What measures of center a distributed data?
- What might cause a data s
- How are mean and median
- How are mean absolute de
- When are two-way tables n

### DATA AND STATISTICS PACING GUIDE

DAY 1	DAY 2	DAY 3	DAY 4	DAY 5
Mean, Median and M.A.D.	Standard Deviation	Dot Plots	Histograms	Box Plots
Student Handout 1 Homework 1	Student Handout 2 Homework 2			
DAY 6	DAY 7			
Quiz: Interpreting and Comparing Data	Two-Way Tables			
Quiz 1	Student Handout 6 Homework 6			

### DATA AND STATISTICS OVERVIEW

TOPIC	TEACHING TIPS
Mean, Median and M.A.D.	<ul style="list-style-type: none"><li>• While students have covered these topics in previous grades and may be familiar with the steps, be sure to include time for discussion on what these measures mean.</li><li>• For extension, consider asking students to create their own data sets. For example, ask students to create a data set with 5 values that has both a mean and M.A.D. that are greater than 1.</li><li>• Search <a href="#">desmos.com</a> for an activity called "What's My Number" for an engaging and fun way to "develop students' intuition for mean absolute deviation."</li></ul>
Standard Deviation	<ul style="list-style-type: none"><li>• Search <a href="#">khanacademy.org</a> for "Calculating standard deviation step by step." The article breaks down the formula for standard deviation and explaining why it is valuable to practice it by hand, even though statisticians use computers to calculate standard deviation in the real-world.</li><li>• Students will expand on real-world applications of standard deviation in Algebra 2, so it is more of an introductory concept at this level.</li><li>• <a href="#">Click here</a> for a resource to help better understand the standard deviation formula.</li></ul>
Dot Plots, Histograms and Box Plots	<ul style="list-style-type: none"><li>• Search <a href="#">desmos.com</a> for an activity called "Creating Histograms" for an interactive way to practice creating and understanding histograms.</li><li>• At this level, be sure to build in time to thoroughly discuss, interpret and compare the representations of data.</li><li>• Discuss the idea of outliers with each representation. Allow students to discuss and reason why they would determine a data point to be an outlier or not before introducing the outlier formula. Use the variety of students' answers to show the need for a formula to determine outliers in a data set.</li></ul>
Two-Way Tables	<ul style="list-style-type: none"><li>• <a href="#">Click here</a> for an online game to practice two-way tables.</li></ul>

teaching  
ideas

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## unit study guide + assessments



quizzes



editable unit test

Unit: Data and Statistics  
Quiz

Name \_\_\_\_\_  
Date \_\_\_\_\_ Pd \_\_\_\_\_

**QUIZ: INTERPRETING AND COMPARING DATA**

Show all work and record your solutions in the box at the right.

1. Given the set of numbers below, which of the following is a true statement?

**2, 48, 20, 19**

Answers

1. \_\_\_\_\_  
2. \_\_\_\_\_

a. The mean is 20.  
b. The mean and the median are equivalent.  
c. The mean absolute deviation is 14.  
d. All of the above are true.

2. Jolene constructed a dot plot that shows the distribution of data. What would you expect the mean and the median of the data set to be?

a. The mean should be greater than the median.  
b. The mean should be less than the median.  
c. The mean and the median should be similar.  
d. There isn't enough information to tell.

3. Mrs. Navarro and Mr. Pearson recorded the number of minutes it took several of their students to complete a quiz. Use the 5-number summary of the results to construct two box plots below. Then use the box plots to answer the questions.

**# OF MINUTES**

10      20      30      40

4. Which class had the greatest variability in the number of minutes it took to complete the quiz? Determine the value of the IQR for each teacher to justify your answer.

Mrs. Navarro: \_\_\_\_\_  
Mr. Pearson: \_\_\_\_\_

Unit: Data and Statistics  
Review

Name \_\_\_\_\_  
Date \_\_\_\_\_ Pd \_\_\_\_\_

**DATA AND STATISTICS STUDY GUIDE**

Solve each problem below. Be sure to ask questions if you need more help with a topic.

**I CAN COMPARE AND INTERPRET THE SHAPE, CENTER AND SPREAD OF DATA SETS.**

	DAMIEN	TONY
1. Find Damien's mean and median tip amounts.		
2. Find Tony's mean and median tip amounts.		
3. Compare Damien's mean and median tip amounts. Explain why one might be greater than the other.		
4. Find the mean and median tip amounts for both Damien and Tony.		
5. Use the tables to help you find the mean and median absolute deviation for Damien and Tony.		
6. Whose M.A.D. value is greater, and does that mean in the context of the situation?		
7. If the \$28 tip was removed from Damien's data set, how would the mean and median absolute deviation amounts be affected?		

ALGEBRA 1 CURRICULUM

# DATA AND STATISTICS

UNIT TWELVE: ANSWER KEY

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answer keys included

