TASK 3 Box Plots

Objectives

You will be able to

- Calculate range, five-number summaries, and interquartile range.
- Describe, interpret, and draw conclusions from the variability of a data set.
- Represent data using box plots.
- Understand that data sets can have similar centers but different variability.
- Create data sets that meet specific constraints.
- Understand ways in which measures change when new data is added to a set.

How can we use mathematics to compare what is typical and what is unique about our class?

Evaluation and Feedback

To evaluate your work, you will

- Complete a check for understanding about how to interpret a box plot.
- Draw a box plot.

Learning Task 3: Box Plots

As a group:

- You will make a box plot of the data from one of your questions from the "Who Are We?" survey.
- You will make a box plot of your data from your class's Sleep Logs.
- You will invent two sets of data to go with a box plot.

Vocabulary

- 1st quartile
- 3rd quartile
- five-number summary
- interquartile range
- maximum
- median
- minimum
- range
- variability

Connect to the Culminating Project

You will

- Make a box plot of the data from the question you chose from the "Who Are We?" survey.

LESSON 1

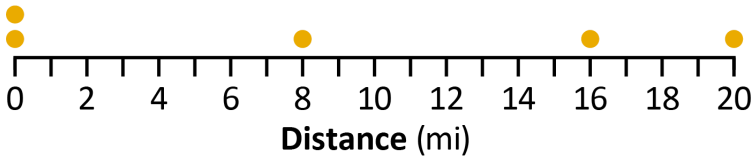
BUILD A BOX PLOT: PART I

WARM-UP

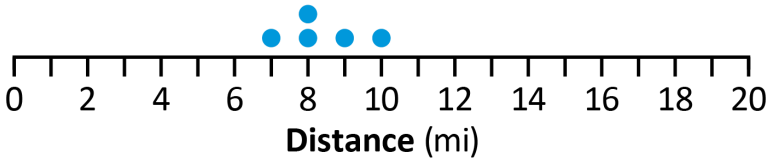
Analyze Data

1. Francisco and Reina built some rockets. They tested how far their rockets traveled in miles (mi), recorded the results, and represented the data using dot plots.

Distance Francisco's Rockets Traveled



Distance Reina's Rockets Traveled



Compare and contrast Francisco's rockets with Reina's rockets.

Francisco's Rockets	Reina's Rockets
Both	

2. Remember to update your Sleep Log.

LESSON 1 • BUILD A BOX PLOT: PART I

PROJECT ACTIVITY

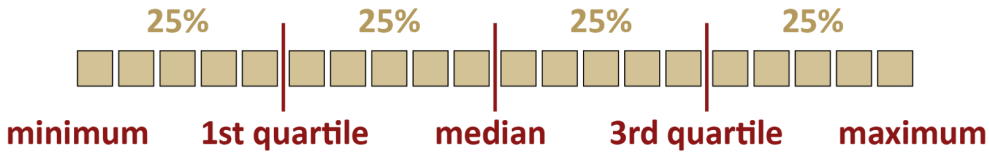
Build a Box Plot

Use the same data your team used for your dot plot from the "Who Are We?" survey to work on this activity.

1. Put each piece of data on a separate sticky note.
2. Order your sticky notes from least to greatest on chart paper.
3. On the back of your chart paper, create a five-number summary for your data. Show how you did this using your sticky notes.

   Your five-number summary must include:

   minimum, maximum, median, 1st quartile, 3rd quartile



4. Use your minimum and your maximum to create a number line that you can plot all your data on.
5. Use your five-number summary and your number line to create a box plot. You will have a chance to finish your box plot in the next lesson.
6. Keep your sticky notes to answer questions about your box plot when you are finished.

LESSON 2

BUILD A BOX PLOT: PART II

WARM-UP

Physical Box Plot

1. Create a human box plot with your class following your teacher's instructions.
2. As you look at the box plot, answer these questions.
    - What is the range of this data?
    - What is the interquartile range of this data?
    - What fraction of the data occurs below or above the median?
    - What fraction of the data occurs within this whisker?
    - Does this longer whisker represent more data than the shorter one?
3. Update your Sleep Log.

PROJECT ACTIVITY

Continue Working on Box Plot

- Continue to work on the box plot you started in the previous lesson.

Box Plots

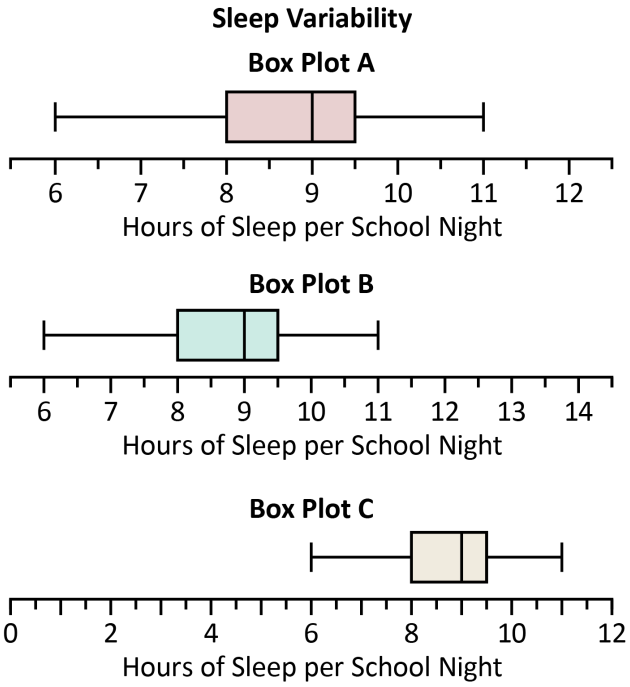
LESSON 3

SLEEP VARIABILITY

WARM-UP

Interpret Box Plots

Students at another school are also tracking the number of hours of sleep they get each night. They recorded 41 responses (observations) for a particular school night. Three different groups made the box plots below using the exact same data.



1. Why do these box plots look so different?

2. Which box plot best supports the argument that students at this school mostly sleep about the same amount? Why?

3. Which box plot best supports the argument that students at this school mostly sleep different amounts? Why?

PROJECT ACTIVITY

Sleep Variability

1. Create a five-number summary (minimum, first quartile, median, third quartile, and maximum) using the sleep data that your teacher specifies. Show how you did this.

2. Use your five-number summary to create a box plot.

3. What is the range of your data?

4. What is the interquartile range of your data?

5. What do box plots allow you and other observers to learn about a data set?

LESSON 4

INVENT DATA SETS

WARM-UP

Five-Number Summary

1. Create a five-number summary for the data set below. Show how you did this.
   {3, 4, 2, 3, 5, 2, 2, 1 }
   Minimum =
   1st quartile =
   Median =
   3rd quartile =
   Maximum =

2. Create a five-number summary for the data set below. Show how you did this.
   {0, 12, 2, 6, 3.5, 4, 3 }
   Minimum =
   1st quartile =
   Median =
   3rd quartile =
   Maximum =

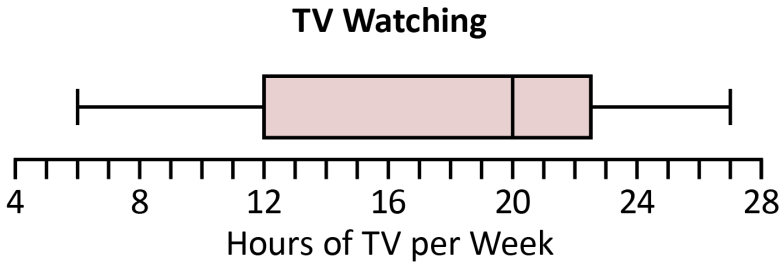
3. Choose one of these data sets and create a box plot of the data.

4. What is the range of your box plot? What is the interquartile range (IQR)?
   Range =
   IQR =

PROJECT ACTIVITY

Invent Data Sets

In 2014, 30 sixth graders from across the country were asked, "How many hours of TV do you watch per week?" Here is the box plot of that data set.



1. Invent two sets of data that the box plot above could represent. Show the calculations for the five-number summary for both invented sets of data.

Data Set 1	Data Set 2

2. Explain your strategies for inventing your two data sets.

3. What observations can you make about the difference between your two invented data sets?

Data Set 1	Data Set 2
Both	

LESSON 5
COMPARE REPRESENTATIONS

WARM-UP

Dot Plots to Box Plots

- Convert one of the dot plots from Learning Task 1 into a box plot. Then, compare and contrast the two representations.

Dot Plot	Box Plot
Both	

PROJECT ACTIVITY

Data Sets and Box Plots

- Continue to work on the "Invent Data Sets" activity from the last lesson and on any other unfinished work.

CHECK FOR UNDERSTANDING

Test your knowledge of box plots using the Check for Understanding • Interpret Box Plots.