

Unit 6: Statistics and Probability

6th Grade Honors Mathematics

10 Class Meetings

Revised May 2024

Essential Questions

- When is it important to collect and organize data?
- How can collecting and organizing data help you to make decisions and predictions?

Enduring Understandings with Unit Goals

EU 1: Statistics is a powerful tool to seek answers to statistical questions and to understand data distributions and what inferences can be drawn about the data.

- Determine if a question is statistical

EU 2: Graphical representations of data, including dot plots, histograms, and frequency tables are useful to organize data.

- Given a set of data, create and use dot plots, histograms, and frequency tables to represent and organize that data

EU 3: When making decisions about data, it is valuable to consider both measures of center and measures of variation.

- Determine the mean, median, mode and range of a set of data
- Create and use box plots and circle graphs to analyze data

Standards

Common Core State Standards:

- **6.SP.A.1:** Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers.
- **6.SP.A.2:** Understand that a set of data collected to answer a statistical question has a distribution, which can be described, by its center, spread, and overall shape.
- **6.SP.A.3:** Recognize that a measure of center for a numerical data set summarizes all of its values with a single number, while a measure of variation describes how its values vary with a single number.
- **6.SP.B.4:** Display numerical data in plots on a number line, including dot plots, histograms, and box plots.
- **6.SP.B.5:** Summarize numerical data sets in relation to their context, such as by:
 - **6.SP.B.5.A:** Reporting the number of observations.
 - **6.SP.B.5.B:** Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.
 - **6.SP.B.5.C:** Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered.
 - **6.SP.B.5.D:** Relating the choice of measures of center and variability to the shape of the data

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distribution and the context in which the data were gathered.

ISAAC Vision of the Graduate Competencies

Competency 1: Write effectively for a variety of purposes.

Competency 2: Speak to diverse audiences in an accountable manner.

Competency 3: Develop the behaviors needed to interact and contribute with others on a team.

Competency 4: Analyze and solve problems independently and collaboratively.

Competency 5: Be responsible, creative, and empathetic members of the community.

Unit Content Overview

1. Understanding Statistics & Distributions

- Identify statistical questions
- Create dot plots, frequency tables, and histograms
- Vocabulary-statistics, statistical question, numerical data, dot plot, frequency table, tally, histogram

2. Measurements of Center & Variability

- Analyze the overall shape of dot plots and histograms
- Calculate mean, median, mode
- Determine which measure of central tendency best represents a data set.
- Examine how measures of center change when data is added or removed.
- Calculate range and interquartile range (spread and variability)
- Compare measures of center and spread
- Vocabulary-outlier, distribution, median, interquartile range, symmetrical, skewed left/right, measure of center, mean, mode, range, cluster

3. Box Plots & Circle Graphs

- Create and analyze box plots.
- Summarize numerical data
- Create and analyze circle graphs
- Vocabulary-box plot, lower quartile, upper quartile, range, median, difference, circle graph

Interdisciplinary Connection:

- Language Arts - Word Problems
- Science –
 - Unit 4: Earth's Evolution
 - Unit 5: Ecosystems & Human Impact

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Daily Learning Objectives with TWPS

Students will be able to...

- Examine statistical questions, determine what the attributes of a statistical question are and create statistical questions of their own.
 - TWPS- Which of the three statements below is a lie? Explain your mathematical thinking. *Two Truths and One Lie book, GR6 #31*
- Calculate the mean, median and mode of a data set.
 - TWPS- SBAC Practice: The coach of a wrestling team surveyed the weights of the students that registered for the team. The data is shown in the line plot. Determine whether each statement about the spread of the data is true. Explain your mathematical reasoning.
- Evaluate which measure of center best represents a data set and determine how measures of center change when data is added or removed.
 - TWPS- Which of the three statements below is a lie? Explain your mathematical thinking. *Two Truths and One Lie book, GR6 #34*
- Analyze data that is represented in a dot plot.
 - TWPS- Which of the three statements below is a lie? Explain your mathematical thinking. *Two Truths and One Lie book, GR6 #32*
- Construct dot plots, histograms, and frequency tables to represent data
 - TWPS- Which of the three statements below is a lie? Explain your mathematical thinking. *Two Truths and One Lie book, GR6 #33*
- Analyze and describe the overall shape of dot plots and histograms, including symmetry, skewness, outliers, and clusters.
 - TWPS- SBAC Practice: Owen asked 10 classmates how many text messages they each send per day. The results are in the list below. (0, 5, 39, 29, 0, 30, 14, 23, 25, 22). Click within the graph area to create a histogram for the number of text messages Owen's classmates send per day.
- Examine the spread and variability of a data set using the range and interquartile range
 - TWPS- SBAC Practice: Consider the data. (10, 6, 5, 19, 7, 15, 15) Determine whether each statement is true or false. Explain your mathematical reasoning.
- Compare and contrast measures of center and measures of spread to describe data sets.
 - TWPS- SBAC Practice: Consider the shape of this data on the dot plot. Based on the shape of the data, which would be the best measure of center? (Mean, Range, Median, or Interquartile Range) Explain your mathematical thinking.
- Construct box plots to represent data.
 - TWPS- Which of the three statements below is a lie? Explain your mathematical thinking. *Two Truths and One Lie book, GR6 #35*
- Analyze box plots and other representations and summarize numerical data in context.
 - TWPS- Which of the three statements below is a lie? Explain your mathematical thinking. *Two Truths and One Lie book, GR6 #36*

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Instructional Strategies/Differentiated Instruction

- Whole group instruction
- Guided notes
- Student-led instruction/discussions
- Independent problem-solving
- Collaborative problem-solving
- Graphic Organizer
- Cross-curricular problem solving (independent and collaborative)
- Accountable Talk
- Homework
- Word walls with visuals
- Small group instruction
- Manipulatives
- Interactive Notebook
- Highlighted directions

EL DIFFERENTIATED INSTRUCTION:

- Word Walls with visuals
- TWPS (Think, Write, Pair, Share)
- Pre-reading strategies
- Culturally responsive teaching
- Explicit Modeling
- Key Vocabulary
- Graphic Organizers
- Strategic Grouping
- Non-verbal Assessments
- Modified classwork and homework

Assessments

FORMATIVE ASSESSMENTS:

- Warm-ups
- TWPS
- Whiteboards
- Mid-class check-ins (Fist of 5; Thumbs up/mid/down)
- Exit Slips
- Accountable Talk Discussions
- Student-led instruction
- Classwork
- Homework

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SUMMATIVE ASSESSMENTS:

- Quiz - EU 1 and EU 2 (Edulastic)
- Edulastic Unit 6 Summative Assessment
- Unit Performance Task “Cell Phone Plan”- Isaac Rubric (#4- Problem Solving)

Unit Task

Unit Task Name: Cell Phone Plan

Description: In this task, taken directly from the practice SBAC website, students will help a friend choose a new cell phone plan. Students are given information about different cell phone plans. Based on the average talk time, texts, and photos used (EU3), students will find the best plan to fit their friends needs. Using the mean number of minutes their friend talks and the mean number of tests sent each day, students will create equations to find the cost of each plan and then determine and explain which plan would be best for their friend.

Evaluation: Summative Assessment and Problem Solving Rubric

Unit Resources

- Engageny
- Math In Focus
- Math Antics
- Edulastic
- Match Fishtank
- Khan Academy
- State Common Core Standards Transition Tasks
- www.map.mathshell.org
- Worksheets
- Calculator
- Laptops
- SBAC Prep Online
- Two Truths and One Lie
- Education.com