Unit 6: Statistics and Probability
6th Grade Mathematics

10 Class Meetings

Revised June 2022

Essential Questions

- When is it important to collect and organize data?
- How can collecting and organizing data help you to make decisions and predictions?
- How do certain careers utilize the summary of data sets?

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.

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- **6.SP.B.5.D:** Relating the choice of measures of center and variability to the shape of the data 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 *Do Now Activities*

Students will be able to…

- Examine statistical questions.
  - Do Now-solve algebraic equations and inequalities
- Analyze data that is represented in a dot plot.
  - Do Now-solve algebraic equations and inequalities.
- Construct dot plots, histograms, and frequency tables to represent data
  - Do Now-solve order of operations problems
- Analyze and describe the overall shape of dot plots and histograms, including symmetry, skewness, outliers, and clusters.
  - Do Now-simplify algebraic expressions
- Calculate the mean, median and mode of a data set.
  - Do Now-solve algebraic equations
- Evaluate which measure of center best represents a data set and determine how measures of center change when data is added or removed.
  - Do Now-solve algebraic expressions, equations, and inequalities.
- Examine the spread and variability of a data set using the range and interquartile range
  - Do Now-Find area of polygons
- Compare and contrast measures of center and measures of spread to describe data sets.
  - Do Now-find area of polygons
- Construct box plots to represent data.
  - Do Now- find volume of rectangular prisms
- Analyze box plots and other representations and summarize numerical data in context.
  - Do Now-find volume of rectangular prisms

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

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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 (SBAC)
- Whiteboards
- Mid-class check-ins
- Exit Slips
- Accountable Talk Discussions
- Do Now
- Student-led instruction
- Homework

SUMMATIVE ASSESSMENTS:

- Quiz - EU 1 and EU 2 (Edulastic)
- Quiz - EU 3 (Edulastic)
- IAB
- Unit Performance Task "Water Flowing into the Chesapeake Bay"- Isaac Rubric (#4- Problem Solving)

Unit Task

Unit Task Name: Water Flowing into the Chesapeake Bay

Description: In this task, students will use publicly available data to summarize and compare mean annual streamflow into the Chesapeake Bay over the past seven decades. This task will provide practice with Box-and-whisker plots, calculating the median, first quartile, third wuartile, maximum and minimum of a data set, reasoning instinctively about data, using, analyzing and interpreting data tables and summaries and constructing arguments based on data.

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Evaluation: Summative Assessment and Problem Solving Rubric

Unit Resources

- Engageny
- Math In Focus
- Math Antics
- Edulastic
- Match Fishtank
- Khan Academy
- www.map.mathshell.org
- Worksheets
- Calculator
- Laptops
- SBAC Prep Online