Unit 12 - Data Analysis and Probability

Content Area: **Mathematics**
Course(s): **Algebra I**
Time Period: **June**
Length: **14 days**
Status: **Published**

Unit Overview

This unit will cover the statistics portion of the Algebra 1 curriculum. Mean, median, mode, and range will be reviewed. New topics will include analyzing and describing histograms, box plots, and scatterplots and lines of best fit. The vocabulary used to describe these data plots will be discussed and used in class. This unit introduces topics of data analysis and how collecting and analyzing data helps with predictions.

Enduring Understandings

- Data can be organized in matrices or in intervals. Different measures can be used to interpret and compare sets of data. Separating data into subsets is a useful way to summarize and compare data sets.
- Different measures can be used to interpret and compare sets of data.

Essential Questions

- What are the different ways we can graphically represent a data set?
- How can an outlier effect a distribution?
- How can collecting and analyzing data help you make decisions or predictions?
- How can you make and interpret different representations of data?

Standards/Indicators

MA.K-12.1	Make sense of problems and persevere in solving them.
MA.S-ID.A.1	Represent data with plots on the real number line (dot plots, histograms, and box plots).
MA.K-12.2	Reason abstractly and quantitatively.
MA.S-ID.A.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.
MA.K-12.3	Construct viable arguments and critique the reasoning of others.
MA.S-ID.A.3	Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).
MA.K-12.4	Model with mathematics.
MA.K-12.5	Use appropriate tools strategically.
MA.N-Q.A.1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the

	scale and the origin in graphs and data displays.
MA.K-12.6	Attend to precision.
MA.N-Q.A.2	Define appropriate quantities for the purpose of descriptive modeling.
MA.K-12.7	Look for and make use of structure.
MA.K-12.8	Look for and express regularity in repeated reasoning.
MA.N-VM.C.6	Use matrices to represent and manipulate data, e.g., to represent payoffs or incidence relationships in a network.

Student Learning Objectives (SLOs)

- Represent data on the real number line (i.e. dot plots, histograms, and box plots) and use statistics to compare and interpret differences in shape, center, and spread in the context of the data (account for effects of outliers).

Lesson Titles

- Box and Whisker Plots
- Frequency and Histograms
- Measures of Central Tendency and Dispersion
- Organizing Data Using Matrices

Career Readiness, Life Literacies & Key Skills

TECH.9.4.2.CT.2	Identify possible approaches and resources to execute a plan (e.g., 1.2.2.CR1b, 8.2.2.ED.3).
TECH.9.4.2.CT.3	Use a variety of types of thinking to solve problems (e.g., inductive, deductive).
TECH.9.4.2.DC.6	Identify respectful and responsible ways to communicate in digital environments.
TECH.9.4.2.TL.2	Create a document using a word processing application.
TECH.9.4.2.TL.3	Enter information into a spreadsheet and sort the information.
TECH.9.4.2.IML.1	Identify a simple search term to find information in a search engine or digital resource.

Inter-Disciplinary Connections

LA.RST.9-10.1	Accurately cite strong and thorough evidence from the text to support analysis of science and technical texts, attending to precise details for explanations or descriptions.
LA.WHST.9-10.7	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.
9-12.HS-ETS1-4.5	Using Mathematics and Computational Thinking
9-12.HS-PS1-7.5	Mathematical and computational thinking at the 9–12 level builds on K–8 and progresses to using algebraic thinking and analysis, a range of linear and nonlinear functions including trigonometric functions, exponentials and logarithms, and computational tools for

statistical analysis to analyze, represent, and model data. Simple computational simulations are created and used based on mathematical models of basic assumptions.

Instructional Strategies, Learning Activities, and Levels of Blooms/DOK

- Histograms and describing the data
- Mean, median, mode, and range
- students will work as a team and explain their work
- #1- Blooms Knowledge - Remember previously learned information
- #2 - Blooms Comprehension - Demonstrate an understanding of facts
- #3 - Blooms Application - Apply Knowledge to actual situations
- #4 - Blooms Analysis - Break down objects or ideas into simpler parts and find evidence to support generalizations
- #5 - Blooms Synthesis - Compile component ideas into a new whole or propose alternative solutions
- #6 - Blooms Evaluation - Make and defend judgments based on internal evidence or external criteria
- Box plots
- review homework if need - answers posted on Edmodo
- review warm up
- Scatterplots
- students will work individually
- tutoring during Delsea One

Modifications

ELL Modifications

- Assess ELL students continuously using formative methods
- Be flexible with time frames and deadlines
- During Delsea One - one on one with a student who speaks the same language
- Intentional scheduling/grouping with student/teacher who speaks the same language if possible
- Offer resources for specific topics in primary language (Youtube web resources)
- Repeat, reword, clarify
- tutoring during Delsea One
- Use google translator, especially for application problems
- Using technology, such as but not limited to: graphing calculator and desmos

Equity Considerations

Climate Change

Students will make connections between math and STEM processes.

Students analyze the melting of the polar ice caps and its effects on the Earth and humanity

How fast are the polar ice caps melting, and why is this rate important to human life on Earth?

https://www.oercommons.org/authoring/7876-climate-change-cross-curricular-math-english-scien/view

https://jancovici.com/en/climate-change/risks/will-oceans-submerge-everything/

SCI.HS-ESS1-1	Develop a model based on evidence to illustrate the life span of the sun and the role of nuclear fusion in the sun's core to release energy that eventually reaches Earth in the form of radiation. Using Mathematics and Computational Thinking

Asian American/ Pacific Islander Considerations

https://ideas.ted.com/8-asian-americans-and-pacific-islanders-whose-innovations-have-changed-your-life-really/
https://www.ngpf.org/blog/math/math-monday-celebrating-aapi-mathematicians/

Diana Ma is a statistician who has built a career out of her two passions: basketball and math. As a Data Scientist for the Lakers, she works in basketball operations and does analysis involving player evaluation, roster construction, and in-game strategy.

Shakuntala Devi is known as "The Human Computer", Shakuntala Devi was a famous mathematician who holds the Guinness World Record for the "Fastest Human Computation." In addition to her computational prowess, Devi was also an outspoken LGBTQ+ advocate, novelist, and political hopeful. Her life story was adapted into the biopic Shakuntala Devi in 2020.

Dr. Kamuela Yong is an associate professor of mathematics at the University of Hawai'i–West O'ahu. He is the first Native Hawaiian to earn a Ph.D. in applied mathematics and is the co-founder of the organization Indigenous Mathematicians.

LGBTQ and Disabilities

LGBTQ:

Sir Francis Bacon (1561–1626)

Florence NightingaleFrancis Bacon | Philosophy, Scientific Method, & Facts | Britannica(1820-1910)

George Washington Carver (1861-1943)

Sara Josephine Baker (1873-1945)

Alan Turing (1912-1954)

Allan Cox (1926-1987)

Sally Ride (1951-2012)

Ben Barres (1954-2017)

Ruth Gates (1962-2018)

Tim Cook (1960)

STEM

Disabilities:

Leonardo da Vinci (1452-1519)- Dyslexia

Isaac Newton (1664-1727)- Epilepsy

Thomas Edison (1847-1931)- Hearing

Charles Darwin (1809-1882)- Stutter, Dyslexia

Alexander Graham Bell (1847-1922)- Deaf

Albert Einstein (1879-1955)- Aspergers

Florence B. Seibert (1897-1991)- Mobility

Stephen Hawking (1942-2019)- ALS

John Forbes Nash (1928-2015)- Schizophrenia

Temple Grandin (1947)- Autism

IEP & 504 Modifications

- Allow re-takes only after a tutoring session
- Assessments will allow for calculator use and/or other math tools
- Keep updated videos on google classroom for reinforcement outside of the classroom
- Less questions overall or possibly break the test into two parts
- speaking to students privately when redirecting behaviors
- tutoring during Delsea One
- Upload several youtubes on the concepts that are in this specific unit

G&T Modifications

- Ask students' higher level questions that require students to look into causes, experiences, and facts to draw a conclusion or make connections to other areas of learning
- Employ differentiated curriculum to keep interest high
- Flip the lessons to push further ahead
- Flip the lessons using videos of more in depth work
- Include more in depth problems involving application
- tutoring during Delsea One
- Videos that offer extra practice and examples in all areas are posted on google classroom and taken from: mathispower4u

At Risk Modifications

- Refer students to Organizational Management
- Require Delsea One tutoring
- Stay in contact with parents/guardians and guidance counselors on student progress
- tutoring during Delsea One

Alternate Assessment

Performance tasks

Project-based assignments

Problem-based assignments

Presentations

Benchmark Assessment

Skills-based assessment- math practice

Formative Assessment

- Connecting previous lessons
- Connecting vocab with root words
- Discussion including vocab review/recall
- Guided review
- Homework/classwork
- Mathxlforschool
- NJSLA Math type of question
- Pass out of class
- SAT question of the day
- Skill needed to do lesson
- Teacher Observation
- Turn to your partner and discuss
- Warm up review
- White boards

Summative Assessment

- Quiz on Box and Whisker Plots
- Quiz on Central Tendancy
- Quiz on Histograms
- Quiz on Matrices

Resources & Materials

- Colored pencils/highlighters
- Google Slides
- Mathispower4u video clip to introduce or demonstrate concepts
- Pearson 2015 Algebra 1 Textbook
- Teacher generated Worksheets
- White board paddles

Technology

- Chromebooks
- Desmos
- Edpuzzle
- Equatio
- Google Classroom
- Google Forms
- Graphing Calculator
- Mathway
- Mathxlforschool
- PearDeck
- Remind
- Video Clips

TECH.8.1.12	Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.
TECH.8.1.12.A.4	Construct a spreadsheet workbook with multiple worksheets, rename tabs to reflect the data on the worksheet, and use mathematical or logical functions, charts and data from all worksheets to convey the results.
TECH.8.1.12.A.CS1	Understand and use technology systems.
TECH.8.1.12.A.CS2	Select and use applications effectively and productively.