02 One-Variable Statistics

Content Area: **Math**
Course(s):
Time Period: **Full Year**
Length: **Type Length of Unit**
Status: **Published**

General Overview, Course Description or Course Philosophy

The goal of this course is to expose students to practical mathematics that they can expect to encounter in their world. Students who complete this course will be proficient in gathering, displaying, and interpreting statistics in context. In the later part of the course, students will be exposed to discrete mathematics topics that can be directly applied to a wide variety of fields, including computer science, business, manufacturing, life sciences, and mathematics.

OBJECTIVES, ESSENTIAL QUESTIONS, ENDURING UNDERSTANDINGS

Statistics is a branch of mathematics working with data collection, organization, analysis, interpretation, and presentation.

In applying statistics to a scientific, industrial, or social problem, it is conventional to begin with a statistical population or a statistical model (such as a chart, table, histogram, box plot, etc.) to be studied.

CONTENT AREA STANDARDS

MA.S-ID.A.1	Represent data with plots on the real number line (dot plots, histograms, and box plots).
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.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.S-ID.A.4	Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages. Recognize that there are data sets for which such a procedure is not appropriate. Use calculators, spreadsheets, and tables to estimate areas under the normal curve.
MA.S-IC.A.2	Decide if a specified model is consistent with results from a given data-generating process, e.g., using simulation.

RELATED STANDARDS (Technology, 21st Century Life & Careers, ELA Companion Standards are Required)

LA.RI.11-12.7	Integrate and evaluate multiple sources of information presented in different media or formats (e.g., visually, quantitatively) as well as in words in order to address a question or

	solve a problem.
LA.11-12.SL.11-12.2	Integrate multiple sources of information presented in diverse formats and media (e.g., visually, quantitatively, orally) in order to make informed decisions and solve problems, evaluating the credibility and accuracy of each source and noting any discrepancies among the data.
CRP.K-12.CRP2	Apply appropriate academic and technical skills.
CRP.K-12.CRP4	Communicate clearly and effectively and with reason.
CRP.K-12.CRP7	Employ valid and reliable research strategies.
CRP.K-12.CRP8	Utilize critical thinking to make sense of problems and persevere in solving them.
CRP.K-12.CRP11	Use technology to enhance productivity.
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.5	Create a report from a relational database consisting of at least two tables and describe the process, and explain the report results.
TECH.8.1.12.C.CS2	Communicate information and ideas to multiple audiences using a variety of media and formats.
TECH.8.1.12.C.CS4	Contribute to project teams to produce original works or solve problems.
TECH.8.1.12.E.CS2	Locate, organize, analyze, evaluate, synthesize, and ethically use information from a variety of sources and media.
TECH.8.1.12.E.CS4	Process data and report results.
TECH.8.1.12.F.CS3	Collect and analyze data to identify solutions and/or make informed decisions.

STUDENT LEARNING TARGETS

Declarative Knowledge

Students will understand that:

- In the study of statistics, data consist of individuals and varibles that give information about individuals; an individual can be an object or a person; a variable is an attribute, such as a measurement or a label.
- Variables are classified as either categorical or quantitative.
- A histogram is a representation of the distribution of numerical data in one variable; a histogram is an estimate of the probability distribution of a continuous variable.
- A box plot is a representation of the percentile distribution of numerical data in one variable.
- A relative frequency table is a chart showing the popularity or mode of a certain type of data based on the population samples.
- Based on factors such as how data is skewed, one measure of center (mean, median, mode) may be more appropriate or useful than another when describing the data set.

Procedural Knowledge

Students will be able to:

- Identify individuals and variables in a data set.
- Conduct an experiment by collecting data through a poll, display data using a chart.
- Classify variables as categorical or quantitative.
- Create a histogram by hand and by using the graphing calculator.
- Describe a histogram by the shape of the graph (symmetric, skewed left/right, etc.) and identify outliers using the 1.5xIQR rule.
- Find and interpret the median of a distribution of quantative data.
- Calculate the mean and median of a distribution of quantative data using histograms and boxplots.
- Compare the mean and median and determine the most appropriate measure of center in a given scenario.
- Create and interpret boxplots of quantitative data; find where data lies in terms of percentages/percentiles from data set.
- Create a relative frequency graph.

EVIDENCE OF LEARNING

Formative Assessments

Observations

Task completion

Student journals and notebooks

Cooperative team work

Summative Assessments

Project completion

Task completion on unit assessments

RESOURCES (Instructional, Supplemental, Intervention Materials)

Statistics and Probability with Applications (High School) Third Edition, Starnes & Tabor, 2016

Digital Launchpad book companion

INTERDISCIPLINARY CONNECTIONS

Educational tech applications

ACCOMMODATIONS & MODIFICATIONS FOR SUBGROUPS

See link to Accommodations & Modifications document in course folder.