*Unit 4-Statistics

Content Area: **Mathematics**
Course(s):
Time Period: **Marking Period 2**
Length: **12 Blocks**
Status: **Published**

Enduring Understandings

By examining the way in which statistical data was collected and presented, students will have a better understanding of meaning of the data.

Statistics lies at the heart of the type of quantitative reasoning necessary for making important advances in the sciences, such as medicine and genetics, and for making important decisions in business and public policy.

Essential Questions

How does one properly present statistical data in order to prevent manipulation or misinterpretation?

How does statistics relate to other fields, especially medicine?

Content

- Sampling techniques
- Proper use of statistics
- Frequency Distributions
- Statistical Graphs
- Measures of Central Tendency
- Measures of Dispersion
- The normal curve
- Linear Correlation and Regression

Skills

- Determine the type of sampling used in obtaining the data sown.
- Determine the validity of the statistics being reported in real life scenarios.
- Construct a frequency distribution with classes from a given set of data.
- Construct a circle graph and determine the central angle for each set of data.
- Construct a frequency polygon from a histogram.
- Find the mean, median, midrange, and mode from a set of data.

- Find the measures of position from a set of data.
- Find the measures of dispersion from a set of data.
- Find the standard deviation for real life scenarios.
- Determine the shape of distribution of the data.
- Find the z score for a normal distribution.
- Find the percent of data between any two values.
- Find the linear correlation coefficient.
- Determine the level of significance for a set of data.
- Determine the equation for the line of best fit.

Resources

Text: *A Survey of Mathematics with Applications, Pearson 2005*

Each skill is aligned to the text as a reference.

Determine the type of sampling used in obtaining the data sown. (13.1)

Determine the validity of the statistics being reported in real life scenarios. (13.2)

Construct a frequency distribution with classes from a given set of data. (13.3)

Construct a circle graph and determine the central angle for each set of data. (13.4)

Construct a frequency polygon from a histogram. (13.4)

Find the mean, median, midrange, and mode from a set of data. (13.5)

Find the measures of position from a set of data. (13.5)

Find the measures of dispersion from a set of data. (13.6)

Find the standard deviation for real life scenarios. (13.6)

Determine the shape of distribution of the data. (13.7)

Find the z score for a normal distribution. (13.7)

Find the percent of data between any two values. (13.7)

Find the linear correlation coefficient. (13.8)

Determine the level of significance for a set of data.(13.8)

Determine the equation for the line of best fit. (13.8)

https://sites.google.com/a/npsne.org/cmuellernhs/probability-and-statistics/class-notes

https://www.youtube.com/watch?v=3Ll5wqUAMWE&feature=youtu.be

https://www.youtube.com/watch?v=dKytDfYD6tM&feature=youtu.be

http://www.merrimack.k12.nh.us/webpages/csmith/ap_statistics.cfm

http://www.wlwv.k12.or.us/Page/8380

http://www.math.ccsu.edu/mitchell/GameShow.pdf

http://betterlesson.com/community/directory/high_school/statistics

Standards

NJSLS 2016

Math Analysis

Interpreting Categorical and Quantitative Data

A. Summarize, represent, and interpret data on a single count or measurement variable

1. Represent data with plots on the real number line (dot plots, histograms, and box plots).

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.

3. Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).

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.

1 Make sense of problems and persevere in solving them.

Mathematically proficient students start by explaining to themselves the meaning of a problem and looking for entry points to its solution. They analyze givens, constraints, relationships, and goals. They make conjectures about the form and meaning of the solution and plan a solution pathway rather than simply jumping into a solution attempt. They consider analogous problems, and try special cases and simpler forms of the original problem in order to gain insight into its solution. They monitor and evaluate their progress and change course if necessary. Older students might, depending on the context of the problem, transform algebraic expressions or change the viewing window on their graphing calculator to get the information they need. Mathematically proficient students can explain correspondences between equations, verbal descriptions, tables, and graphs or draw diagrams of important features and relationships, graph data, and search for regularity or trends. Younger students might rely on using concrete objects or pictures to help conceptualize and solve a problem. Mathematically proficient students check their answers to problems using a different method, and they

continually ask themselves, “Does this make sense?” They can understand the approaches of others to solving complex problems and identify correspondences between different approaches.

2 Reason abstractly and quantitatively.

Mathematically proficient students make sense of quantities and their relationships in problem situations. They bring two complementary abilities to bear on problems involving quantitative relationships: the ability to *decontextualize*—to abstract a given situation and represent it symbolically and manipulate the representing symbols as if they have a life of their own, without necessarily attending to their referents—and the ability to *contextualize*, to pause as needed during the manipulation process in order to probe into the referents for the symbols involved. Quantitative reasoning entails habits of creating a coherent representation of the problem at hand; considering the units involved; attending to the meaning of quantities, not just how to compute them; and knowing and flexibly using different properties of operations and objects.

6 Attend to precision.

Mathematically proficient students try to communicate precisely to others. They try to use clear definitions in discussion with others and in their own reasoning. They state the meaning of the symbols they choose, including using the equal sign consistently and appropriately. They are careful about specifying units of measure, and labeling axes to clarify the correspondence with quantities in a problem. They calculate accurately and efficiently, express numerical answers with a degree of precision appropriate for the problem context. In the elementary grades, students give carefully formulated explanations to each other. By the time they reach high school they have learned to examine claims and make explicit use of definitions.

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	Understand and evaluate random processes underlying statistical experiments
MA.S-IC.A.1	Understand statistics as a process for making inferences about population parameters based on a random sample from that population.