

Finite: Statistics

ESTABLISHED GOALS:

Competencies:

- *Students will demonstrate the ability to use mathematics to model real world problems by building and analyzing the appropriate expression, equation, or function.*
- *Students will demonstrate the ability to apply statistical methods by summarizing, representing, and interpreting categorical and quantitative data.*
- *Students will demonstrate the ability to analyze and summarize text and integrate knowledge to make meaning of discipline-specific materials.*
- *Students will demonstrate the ability to produce coherent and supported writing in order to communicate effectively for a range of discipline-specific tasks, purposes, and audiences.*
- *Students will demonstrate the ability to speak purposefully and effectively by strategically making decisions about content, language use, and discourse style.*

Content Standards:

- HSS.ID.A.1 Represent data with plots on the real number line (dot plots, histograms, and box plots).
- HSS.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.
- HSS.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).
- HSS.ID.B.5 Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trends in the data.
- HSS.ID.B.6 Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.
- HSS.IC.A.1 Understand statistics as a process for making inferences about population parameters based on a random sample from that population.
- HSS.IC.A.2 Decide if a specified model is consistent with results from a given data-generating process, e.g., using simulation. For example, a model says a spinning coin falls heads up with probability 0.5. Would a result of 5 tails in a row cause you to question the model?

Transfer

*Students will be able to independently use their learning to **analyze and interpret data**.*

Meaning

ENDURING UNDERSTANDINGS

Students will understand that...

- statistics provides the tools for organizing, analyzing, and interpreting numerical data.
- data analysis can reveal interesting facts about data and be used to make predictions about future events.

ESSENTIAL QUESTIONS

- Is statistics a more valuable tool in the interpretation or explanation of data?

Acquisition

Students will know...

- *that the first step in studying data is to organize it in the form of tables or graphs.*
- *that the second step in studying data is to apply mathematical tools for analyzing the data.*
- *that “success” and “failure” are simply the customary names for the two possible outcomes and often do not indicate actual success or failure at anything.*
- *that sample means are necessary because determining a population mean is often impossible.*

vocabulary: *random variable; discrete, continuous, and finite random variables; probability distribution, histogram, frequency tables, Bernoulli trial, binomial random variable, measures of central tendency, variance, standard deviation, normal distribution*

Students will be skilled at...

- *classifying random variables.*
- *determining appropriate sample spaces.*
- *creating histograms.*
- *creating probability distributions.*
- *using technology to automate the calculations for frequency tables.*
- *calculating the probability distribution of binomial random variables.*
- *calculating measures of central tendency*
- *reading sigma notation*
- *determining the expected value of a finite random variable.*
- *determining the expected value of a binomial random variable.*
- *estimating the expected value from a sample.*
- *applying Chebyshev’s Rule*
- *finding probabilities for normal distributions.*

• HSS.IC.B.3 Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each. • HSS.IC.B.4 Use data from a sample survey to estimate a population mean or proportion; develop a margin of error through the use of simulation models for random sampling. • HSS.IC.B.5 Use data from a randomized experiment to compare two treatments; use simulations to decide if differences between parameters are significant. • HSS.IC.B.6 Evaluate reports based on data. • HSS.CP.A.1 Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events ("or," "and," "not"). • MP2 Reason abstractly and quantitatively. • MP3 Construct viable arguments and critique the reasoning of others. • MP5 Use appropriate tools strategically. • MP6 Attend to precision. • MP7 Look for and make use of structure. • MP8 Look for and express regularity in repeated reasoning.		
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Content Area Literacy Standards	21st Century Skills
• RST.9-10.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. • RST.9-10.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to <i>grades 9-10 texts and topics</i>. • RST.9-10.7 Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.	● <i>reason effectively</i> ● <i>use systems thinking</i> ● <i>solve problems</i> ● <i>access and evaluate information</i> ● <i>use and manage information</i> ● <i>be self-directed learners</i>

<i>Evaluative Criteria</i>	<i>Assessment Evidence</i>
	PERFORMANCE TASK(S):
	OTHER EVIDENCE:

<i>Summary of Key Learning Events and Instruction</i>		
<i>Science Integration</i>	<i>College, Career, and Civic Life Integration</i>	<i>Technology Integration</i>
<i>District Materials</i>	<i>Distance Learning/Field Trips</i>	<i>Technology Resources</i>