

Standard #: MAFS.912.S-IC.2.4

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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. ★

Grade: 912	
Cluster: Make inferences and justify conclusions from sample surveys, experiments, and observational studies. (Algebra 2 - Major Cluster) - Clusters should not be sorted from Major to Supporting and then taught in that order. To do so would strip the coherence of the mathematical ideas and miss the opportunity to enhance the major work of the grade with the supporting clusters.	Date Adopted or Revised: 02/14
Content Complexity Rating: Level 2: Basic Application of Skills & Concepts - More Information	Date of Last Rating: 02/14
Status: State Board Approved	

Related Courses

Course Number	Course Title
1200330:	Algebra 2 (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
1200340:	Algebra 2 Honors (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
1207310:	Liberal Arts Mathematics (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
1210300:	Probability & Statistics with Applications Honors (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
2107310:	Psychology 2 (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
1200335:	Algebra 2 for Credit Recovery (Specifically in versions: 2014 - 2015, 2015 - 2019 (course terminated))
2100335:	African-American History (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
2106410:	Humane Letters 1 - History (Specifically in versions: 2019 and beyond (current))

Related Access Points

Access Point

Access Points Number	Access Points Title
MAFS.912.S-IC.2.AP.4a:	Understand that the margin of error produces a range of values.
MAFS.912.S-IC.2.AP.4b:	Use the sample data to create a proportional relationship to find the population data. For example, if there are 10 squirrels living in a 200 square foot area, how many squirrels are in a 2000 square foot area?
MAFS.912.S-IC.2.AP.4c:	Use the sample data to estimate the population mean.

Related Resources

Perspectives Video: Professional/Enthusiast

Name	Description
Camera versus Trap Sampling: Improving how NOAA Samples Fish :	Underwater sampling with cameras has made fishery management more accurate for NOAA scientists.
Filtering Noise from a Data Sample:	Safe water? Safe soil? How can we calibrate our equipment to detect small levels of pollutants and ignore other substances in the sample?
Fishery Independent vs Dependent Sampling Methods for Fishery Management:	NOAA Scientist Doug Devries discusses the differences between fishery independent surveys and fishery independent surveys. Discussion includes trap sampling as well as camera sampling. Using graphs to show changes in population of red snapper.
Nestle Waters & Statistical Analysis:	Hydrogeologist from Nestle Waters discusses the importance of statistical tests in monitoring sustainability and in maintaining consistent water quality in bottled water.
Sample Size and Shark Research:	Deep sea shark researcher, Chip Cotton, discusses the need for a Power Analysis to determine the critical sample size in order to make inferences on how oil spills affect shark populations.
Sampling Strategies for Ecology Research in the	Will Ryan describes methods for collecting multiple random samples of anemones in coastal marine environments.

Perspectives Video: Teaching Idea

Name	Description
Ecological Sampling Methods and Population Density:	Dr. David McNutt explains how a simple do-it-yourself quadrat and a transect can be used for ecological sampling to estimate population density in a given area.
Pitfall Trap Classroom Activity:	Patrick Milligan shares a teaching idea for collecting insect samples.

Lesson Plan

Name	Description
Hot Coffee Coming Through:	In this lesson, students will explore data collection using the temperature probe sensor and perform statistical analysis of the data. Students will use a scientific method of inquiry to plan an investigation to determine which coffee mug is the best. This activity is meant to allow students to use a variety of skills they have acquired throughout a statistics unit in a problem based STEM challenge. Due to the multiple skills there are many standards that are covered. There are two options for this lab. The first student handout is for students at an average high school statistics level (Algebra 1) and will allow for standard deviation and graphical analyses of the data. The second option is for advanced students that have been exposed to hypothesis testing of claims (Algebra 2 or AP Stats).
Sea Otter Spotter - A Population Growth Curve Using Southern Sea Otter Census Data:	Students explore the world of population biology using the sea otter as a case study. The lesson involves reading technical reports from the US Fish and Wildlife Service as well as reading information about the sea otter from non-governmental organizations. Students are introduced to a specialized wildlife capture technique and monitoring of the endangered population through annual census data. Using that data students explore the limiting factors affecting sea otter growth and apply mathematical knowledge to analyze population growth curves. Students also produce an argument on whether the sea otter has met criteria and should be removed from the endangered species list.
The Cereal Prize Estimation:	How many boxes of cereal would you have to purchase in order win all six prizes? This lesson uses class data collected through simulations to allow students to answer this question. Students simulate purchasing cereal boxes and create a t-confidence interval with their data to determine how many boxes they can expect to buy.
The Election Resource:	This lesson is designed for students who enrolled in an elementary statistics or math for college readiness class who are at the stage of collecting and analyzing data. In their algebra 1 class, they were introduced to statistical topics such as line of best-fit and equation of a line as they relate to real-world meaning.

Perspectives Video: Expert

Name	Description
Mathematically Modeling Hurricanes:	Entrepreneur and meteorologist Mark Powell discusses the need for statistics in his mathematical modeling program to help better understand hurricanes.
Statistical Inferences and Confidence Intervals :	Florida State University Counseling Psychologist discusses how he uses confidence intervals to make inferences on college students' experiences on campus based on a sample of students.
Statistical Sampling Results in setting Legal Catch Rate :	Fish Ecologist, Dean Grubbs, discusses how using statistical sampling can help determine legal catch rates for fish that may be endangered.

Video/Audio/Animation

Name	Description
MIT BLOSSOMS - Is Bigger Better? A Look at a Selection Bias that Is All Around Us:	This learning video addresses a particular problem of selection bias, a statistical bias in which there is an error in choosing the individuals or groups to make broader inferences. Rather than delve into this broad topic via formal statistics, we investigate how it may appear in our everyday lives, sometimes distorting our perceptions of people, places and events, unless we are careful. When people are picked at random from two groups of different sizes, most of those selected usually come from the bigger group. That means we will hear more about the experience of the bigger group than that of the smaller one. This isn't always a bad thing, but it isn't always a good thing either. Because big groups "speak louder," we have to be careful when we write mathematical formulas about what happened in the two groups. We think about this issue in this video, with examples that involve theaters, buses, and lemons. The prerequisite for this video lesson is a familiarity with algebra. It will take about one hour to complete, and the only materials needed are a blackboard and chalk. The downloadable Teacher's Guide found on the same page as the video, provides suggestions for classroom activities during each of the breaks between video segments.

Assessment

Name	Description
Sample 1 - High School Algebra 2 State Interim Assessment:	This is a State Interim Assessment for 9th-12th grades.
Sample 2 - High School Algebra 2 State Interim Assessment:	This is a State Interim Assessment for 9th-12th grades.
Sample 3 - High School Algebra 2 State Interim Assessment:	This is a State Interim Assessment for 9th-12th grades.

Text Resource

Name	Description
Sample Size Calculation:	<p>This informational text resource is intended to support reading in the content area. This article describes the important process used when setting up trials for statistical investigation. The article explains each parameter that is needed to calculate the sample size, then provides examples and illustrates the process. This article will enhance an upper level math course's study of statistics after significance levels and basic inferential statistics concepts have been taught.</p>
Scientists See the World Differently:	<p>This informational text resource is intended to support reading in the content area. Pew Research Center surveyed scientists and the general public on 12 science oriented issues, including genetically modified foods, vaccines, nuclear power and evolution. Results of the survey showed large discrepancies between the thoughts, causes and recommendations on the issues of the scientists and the general public. Sample sizes and margins of errors are given on the survey results which are represented in percent form. The overall survey showed that the public and the scientists see the world very differently.</p>