

Standard #: MAFS.912.S-IC.2.3

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Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each. ★

	Grade: 912
Cluster: Make inferences and justify conclusions from sample surveys, experiments, and observational studies. (Algebra 2 - Major Cluster) -	Date Adopted or Revised: 02/14
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.	
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))
2002340:	Experimental Science 1 Honors (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
2002350:	Experimental Science 2 Honors (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
2002360:	Experimental Science 3 (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
2002370:	Experimental Science 4 (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.3a:	Understand that statistics can be used to gain information about a population by examining a random sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population.
MAFS.912.S-IC.2.AP.3b:	Identify the purpose of sample surveys, experiments and observational studies.
MAFS.912.S-IC.2.AP.3c:	Use measures of center tendency (mean, median, mode) and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations. For example, decide whether the words in a chapter of a seventh-grade science book are generally longer than the words in a chapter of a fourth-grade science book.
MAFS.912.S-IC.2.AP.3d:	Identify the differences between sample surveys, experiments and observational studies.

Related Resources

Lesson Plan

Name	Description
	Can your school use \$5000? What school doesn't?! Well, the money is available, but the student body must decide how the money will be spent! 5K and No More - Producing Data will enable students to fantasize about what they would do to improve their school if given the opportunity to answer the question, "How would \$5000 best be spent at your school?" The activity begins with students distinguishing the differences between a sample survey, an experiment, and an observational study through a pre-activity. After which, the students are given five (5) scenarios in which they must discuss the pros and

[5K and No More - Producing Data:](#)

cons of each. In life we want things to be fair, so students must constantly think about bias. The company in this MEA desires the most efficient and effective way to collect information from the students without having to talk to everyone ... who has that kind of time!

Now, just when the students have found the most efficient and effective way to get students to share their thoughts on where the money should go, more information is revealed about the High School. How do we account for the brains and the brawn, the perfect attendee and the most missed days, or for the goth or skater?

Your Savvy Statisticians in the making will figure it out and tell you ALL about it.

[A TASTEFUL Experiment:](#)

This purpose of this lesson is to enhance students' understanding of the research question that is really being addressed by experiments, observational studies and research. Through the use of a very simple question about which brand of soda that students prefer, the discussion allows the teacher and students to dig deeper into the idea that what you think a study is asking may not really be what is being found. Students will actually do an experiment, observational study and survey with only a superficial examination of the research question. (They are doing a quick TASTE TEST.) It is only after the activity that the students will try to decide precisely what they were researching and to whom this study can be generalized.

[Gr 9-12 Adaptations in Everglades Ecosystems, Lesson 3: Crossing Lines:](#)

Students will be able to explain the concepts of ecotone and edge effect and describe how the edge effect relates to biological diversity in a watershed.

Perspectives Video: Professional/Enthusiast

Name	Description
How to Build a Research Study on Education:	This researcher explains common methods behind randomized studies in the social sciences, specifically in education.

Text Resource

Name	Description
How to Win at Rock-Paper-Scissors:	This informational text resource is intended to support reading in the content area. This article describes a new study about the game rock-paper-scissors. The study reveals that people do not play randomly; there are patterns and hidden psychology players frequently use. Understanding these potential moves can help a player increase their winning edge. As part of interpreting the results of the study, the article references the Nash equilibrium and the "win-stay lose-shift" strategy.
Sample Size Calculation:	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.

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.

Problem-Solving Task

Name	Description
Strict Parents:	This task challenges students to describe parameter of interest for the given context, and design a sample survey.
Words and Music II:	The purpose of this task is to assess (1) ability to distinguish between an observational study and an experiment and (2) understanding of the role of random assignment to experimental groups in an experiment.

Student Resources

Name	Description
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[Words and Music II:](#) The purpose of this task is to assess (1) ability to distinguish between an observational study and an experiment and (2) understanding of the role of random assignment to experimental groups in an experiment.

Parent Resources

Name	Description
Words and Music II:	The purpose of this task is to assess (1) ability to distinguish between an observational study and an experiment and (2) understanding of the role of random assignment to experimental groups in an experiment.