Standard #: MAFS.912.S-ID.3.9

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Distinguish between correlation and causation. ★

Subject Area: Mathematics

Grade: 912

Domain-Subdomain: Statistics & Probability: Interpreting Categorical & Quantitative Data

Cluster: Level 2: Basic Application of Skills & Concepts

Cluster: Interpret linear models. (Algebra 1 - 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

Assessed: Yes

TEST ITEM SPECIFICATIONS

Assessed with:

MAFS.912.S-ID.2.6

Related Courses

Course Number	Course Title
1200310:	Algebra 1 (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
1200320:	Algebra 1 Honors (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
1200380:	Algebra 1-B (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
1200400:	Intensive 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))
7912090:	Access Algebra 1B (Specifically in versions: 2014 - 2015, 2015 - 2018, 2018 - 2019, 2019 and beyond (current))
1200315:	Algebra 1 for Credit Recovery (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
1200385:	Algebra 1-B for Credit Recovery (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
7912075:	Access Algebra 1 (Specifically in versions: 2014 - 2015, 2015 - 2018, 2018 - 2019, 2019 and beyond (current))

Related Access Points

Access Point

Access Points Number	Access Points Title
MAFS.912.S-ID.3.AP.9a:	Given a correlation in a real-world scenario, determine if there is causation.

Related Resources

Lesson Plan

Name	Description
"r" you ready to study correlation?:	In this lesson students will determine whether their is a relationship between two variables through a Perspectives Video and real-life examples. Students will learn about confounding variables and investigate why correlation does not imply causation.
Correlation or Causation: That is the question:	Students will learn how to analyze whether two events/properties demonstrate a correlation or causation or both. They will learn what factors are involved when evaluating whether or not correlated events demonstrate causation. If two events are claimed to be causal when they are not, they will be able to determine why and which (if any) causal fallacies are present. At the close of the lesson students will be given situational data and develop a newscast that assumes causation when in fact there is no causal link. Students who are observing will analyze each presentation and

	determine which (if any) causal fallacy was used (or explain why the newscast is correct in their assumption of causality).
Heart Rate and Exercise: Is there a correlation?:	In this lesson, Algebra 1 students will use supplied heart rate data to determine if heart rate and the amount of time spent exercising each week are correlated. Students will create their own scatter plots and lines of best fit for the data and study correlation using GeoGebra. Students will gather evidence to support or refute statistical statements made about correlation. The lesson provides easy to follow steps for using GeoGebra, a free online application, to generate a correlation coefficient for two given variables.
Height vs. Shoe Size:	This resource provides a single 50-minute period introductory lesson on Correlation, the Correlation Coefficient, and Correlation vs. Causation. The lesson is structured around collecting data from a survey at the beginning of class to be used in creating scatter plots and analyzing them using technology. Students engage in discussion activities that challenge their thoughts on linked variables in the media.
Is Milk Killing People?:	Students will explore correlation and causation from data through class discussions of real world examples. They will know positive, negative, strong, and weak correlation. Students make predictions regarding feasibility of causation by analyzing graphs and scatter plots of data. Students will participate in an experiment where they will generate and analyze their own data. They will come to conclusion regarding variations in data, correlation and causation. Students are encouraged to explain and justify their responses. Teacher will facilitate discussion of leading question to be geared towards the learning objectives. During the lesson, students will be assessed by several formative assessments and a summative assessment at the conclusion. The lesson includes the a worksheet and data collection sheets to be concluded.
Smarter than a Statistician: Correlations and Causation in the Real World!:	Using Cornell Notes and a PowerPoint Presentation, students will learn to distinguish between correlation and causation. They will build their skills by playing two interactive digital games that are included in the lesson. The lesson culminates with a research project that requires students to find and explain the correlation between two real world events.
What's So Funny About Correlation?:	Students investigate correlation and causation through the medium of cartoons. Students construct arguments in favor of and against causal relationships between two strongly correlated events and decide which one is more reasonable. Students create cartoons representing the idea that correlation does not imply causation.

Problem-Solving Task

Name	Description
Coffee and Crime:	This problem solving task asks students to examine the relationship between shops and crimes by using a correlation coefficient.
Golf and Divorce:	This is a simple task addressing the distinction between correlation and causation. Students are given information indicating a correlation between two variables, and are asked to reason out whether or not a causation can be inferred.

Perspectives Video: Professional/Enthusiast

Name	Description
Correlation and Causation in a Scientific Study:	Watching this video will cause your critical thinking skills to improve. You might also have a great day, but that's just correlation.

Text Resource

Name	Description
Does Sour Cream Cause Bike Accidents?:	This informational text resource is intended to support reading in the content area. Many people are confused about the concept of correlation versus causation. To help demonstrate the misconception in a light and humorous way, this article describes the work of Tyler Vigen. The Harvard student graphs data that are highly correlated but clearly unrelated. The "spurious correlations" help debunk the myth that if there is a correlation, then there is a causal relationship. The article emphasizes that rational human thought is essential to process the relationships and is necessary for studying statistics.

Formative Assessment

Name	Description
Does Studying Pay?:	Students are given a scenario describing an association between two variables and are asked to determine if one variable is a cause of the other.
Does the Drug Cause Diabetes?:	Students are given a statement of association between two variables and are asked to determine if one variable is a cause of the other.
Listing All Possible Causal Relationships:	Students are asked to identify all possible causal relationships between two correlated variables.
Sleep and Reading:	Students are asked to interpret a correlation coefficient in context and describe a possible causal relationship.

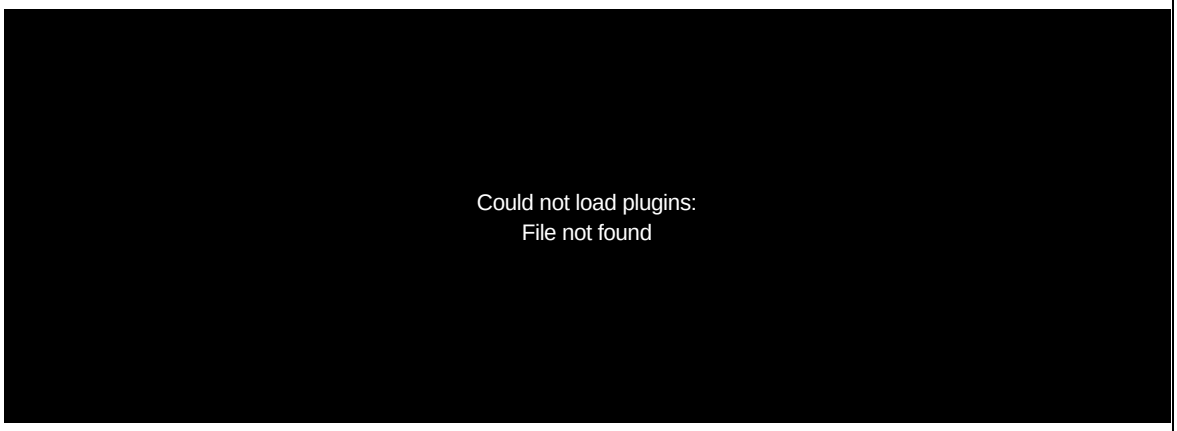
Perspectives Video: Expert

Name	Description
PTSD: Correlation vs Causation:	Jens Foell discusses the link between correlation and causation in PTSD patients.
The Criminal Brain and Correlation vs. Causation:	Florida State Researcher, Jens Foell, discusses the importance of understanding correlation versus causation when researching personality traits and criminal behavior.

Assessment

Name	Description
Sample 1 - High School Algebra 1 State Interim Assessment:	This is the State Interim Assessment for high school.
Sample 4 - High School Algebra 1 State Interim Assessment:	This is a State Interim Assessment for 9th-12th grades.

Unit/Lesson Sequence

Name	Description
Sample Algebra 1 Curriculum Plan Using CMAP:	This sample Algebra 1 CMAP is a fully customizable resource and curriculum-planning tool that provides a framework for the Algebra 1 Course. The units and standards are customizable and the CMAP allows instructors to add lessons, worksheets, and other resources as needed. This CMAP also includes rows that automatically filter and display Math Formative Assessments System tasks, E-Learning Original Student Tutorials and Perspectives Videos that are aligned to the standards, available on CPALMS. Learn more about the sample Algebra 1 CMAP, its features and customizability by watching the following video:  Using this CMAP To view an introduction on the CMAP tool, please click here. To view the CMAP, click on the "Open Resource Page" button above; be sure you are logged in to your iCPALMS account. To use this CMAP, click on the "Clone" button once the CMAP opens in the "Open Resource Page." Once the CMAP is cloned, you will be able to see it as a class inside your iCPALMS My Planner (CMAPs) app. To access your My Planner App and the cloned CMAP, click on the iCPALMS tab in the top menu. All CMAP tutorials can be found within the iCPALMS Planner App or at the following URL: http://www.cpalms.org/support/tutorials_and_informational_videos.aspx

Student Resources

Name	Description
Coffee and Crime:	This problem solving task asks students to examine the relationship between shops and crimes by using a correlation coefficient.
Correlation and Causation in a Scientific Study:	Watching this video will cause your critical thinking skills to improve. You might also have a great day, but that's just correlation.
Golf and Divorce:	This is a simple task addressing the distinction between correlation and causation. Students are given information indicating a correlation between two variables, and are asked to reason out whether or not a causation can be inferred.

Parent Resources

Name	Description
Coffee and Crime:	This problem solving task asks students to examine the relationship between shops and crimes by using a correlation coefficient.
Correlation and Causation in a Scientific Study:	Watching this video will cause your critical thinking skills to improve. You might also have a great day, but that's just correlation.
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