

Standard #: MAFS.912.S-IC.1.2

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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 [★](#)

Grade: 912	
Cluster: Understand and evaluate random processes underlying statistical experiments. (Algebra 2 - Supporting 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))
1200335:	Algebra 2 for Credit Recovery (Specifically in versions: 2014 - 2015, 2015 - 2019 (course terminated))
2100365:	African History Honors (Specifically in versions: 2015 and beyond (current))
7912095:	Access Algebra 2 (Specifically in versions: 2016 - 2018, 2018 - 2019, 2019 and beyond (current))

Related Resources

Virtual Manipulative

Name	Description
Advanced Fire Simulator - Shodor:	In this online activity, students burn a simulated forest and adjust the probability that the fire spreads from one tree to the other. This simulation also records data for each trial including the burn probability, where the fire started, the percent of trees burned, and how long the fire lasted. This activity allows students to explore the idea of chaos in a simulation of a realistic scenario. Supplemental materials, including background information about the topics covered, a description of how to use the application, and exploration questions for use with the java applet are linked to the applet.
Interactive Marbles:	This online manipulative allows the student to simulate placing marbles into a bag and finding the probability of pulling out certain combinations of marbles. This allows exploration of probabilities of multiple events as well as probability with and without replacement. The tabs above the applet provide access to supplemental materials, including background information about the topics covered, a description of how to use the application, and exploration questions for use with the Java applet.
Simple Monty Hall:	In this activity, students select one of three doors in an attempt to find a prize that is hidden behind one of them. After their first selection, one of the doors that doesn't have the prize behind it is revealed and the student has to decide whether to switch to the one remaining door or stay on the door of their first choice. This situation, referred to as the Monty Hall problem, was made famous on the show "Let's Make A Deal" with host Monty Hall. This activity allows students to explore the idea of conditional probability as well as unexpected probability. This activity includes supplemental materials, including background information about the topics covered, a description of how to use the application, and exploration questions for use with the java applet.
Spinner:	In this activity, students adjust how many sections there are on a fair spinner then run simulated trials on that spinner as a way to develop concepts of probability. A table next to the spinner displays the theoretical probability for each color section of the spinner and records the experimental probability from the spinning trials. This activity allows students to explore the topics of experimental and theoretical probability by seeing them displayed side by side for the spinner they have created. This activity includes supplemental materials, including background information about the topics covered, a description of how to use the application, and exploration questions for use with the java applet.

Perspectives Video: Expert

Name	Description
Birdsong Series: Mathematically Modeling Birdsong:	Richard Bertram discusses his mathematical modeling contribution to the Birdsong project that helps the progress of neuron and ion channel research.
History of Probability and the Problem of Points:	What was the first question that started probability theory?
How Math Models Help Insurance Companies After a Hurricane Hits:	Hurricanes can hit at any time! How do insurance companies use math and weather data to help to restore the community?
Hurricanes & Strong Deep Ocean Currents:	COAPS oceanographer Steve Morey describes how math is used to help research hurricanes and strong deep ocean currents that could effect deep water oil rigs.
MicroGravity Sensors & Statistics:	Statistical analysis played an essential role in using microgravity sensors to determine location of caves in Wakulla County.
Probabilistic Weather Modeling:	Meteorologist from Risk Management discusses the use of probability in predicting hurricane tracks.

Problem-Solving Task

Name	Description
Block Scheduling:	In this task, output is given from a computer-generated simulation, generating size-100 samples of data from an assumed school population of 2000 students under hypotheses about the true distribution of yes/no voters. Students are asked to draw conclusions about reliability using simulated distributions.
Sarah, the Chimpanzee:	The purpose of this task is to give students experience in using simulation to determine if observed results are consistent with a given model (in this case, the "just guessing" model).
Unexpected Answers:	This lesson is designed to introduce students to statistical situations where the probabilities or outcomes might not be what is first expected. The lesson provides links to discussions and activities motivated by the idea of unexpected answers. Finally, the lesson provides links to follow-up lessons designed for use in succession with an introduction to probability and unexpected answers in probability.

Lesson Plan

Name	Description
CollegeReview.com:	This is a model-eliciting activity where students have been asked by a new website, CollegeReview.com, to come up with a system to rank various colleges based on five categories; tuition cost, social life, athletics, education, city population and starting salary upon graduation.
Interpreting Statistics: A Case of Muddying the Waters:	This lesson is intended to help you assess how well students are able to: <ul style="list-style-type: none"> • Interpret data and evaluate statistical summaries. • Critique someone else's interpretations of data and evaluations of statistical summaries. The lesson also introduces students to the dangers of misapplying simple statistics in real-world contexts, and illustrates some of the common abuses of statistics and charts found in the media.
Tree Diagrams and Probability:	This lesson is designed to develop students' ability to create tree diagrams and figure probabilities of events based on those diagrams. This lesson provides links to discussions and activities related to tree diagrams as well as suggested ways to work them into the lesson. Finally, the lesson provides links to follow-up lessons designed for use in succession with the current one.

Teaching Idea

Name	Description
Conditional Probability and Probability of Simultaneous Events:	This lesson is designed to further students' practice with probability as well as introduce them to conditional probability and probabilities of simultaneous independent events. The lesson provides links to discussions and activities related to conditional and simultaneous probabilities as well as suggested ways to integrate them into the lesson. Finally, this lesson provides links to follow-up lessons designed for use in succession with this one.

Perspectives Video: Professional/Enthusiast

Name	Description
Hurricane Dennis & Failed Math Models:	What happens when math models go wrong in forecasting hurricanes?
Hydrologic Modeling and Reservoir Simulation:	Dr. Tom Van Lent and Rajendra Paudel describe how modeling and simulation of water reservoirs are used to inform decisions about regulation of water flow in the Everglades.
Modeling the Everglades with Mathematics:	Dr. Tom Van Lent and Rajendra Paudel describe how hydrologic modeling is used to evaluate environmental conditions in the Everglades.

Video/Audio/Animation

Name	Description
MIT BLOSSOMS - Flu Math Games:	This video lesson shows students that math can play a role in understanding how an infectious disease spreads and how it can be controlled. During this lesson, students will see and use both deterministic and probabilistic models and will learn by doing through role-playing exercises. There are no formal prerequisites, as students in any high school or even middle school math class could enjoy this learning video. But more advanced classes can go into the optional applied probability modeling that accompanies the module in a downloadable pdf file. The primary exercises between video segments of this lesson are class-intensive simulation games in which members of the class 'infect' each other under alternative math modeling assumptions about disease progression. Also there is an occasional class discussion and local discussion with nearby classmates.

Name	Description
Replacement and Probability:	This lesson is designed to develop students' understanding of sampling with and without replacement and its effects on the probability of drawing a desired object. The lesson provides links to discussions and activities related to replacement and probability as well as suggested ways to work them into the lesson. Finally, the lesson provides links to follow-up lessons that are designed to be used in succession with the current one.

Assessment

Name	Description
Sample 4 - High School Algebra 2 State Interim Assessment:	This is a State Interim Assessment for 9th-12th grade.

Text Resource

Name	Description
Understanding Uncertainty: What Was the Probability of Obama Winning?:	This informational text resource is intended to support reading in the content area. The article examines various factors that changed the uncertainty of whether Barack Obama would win the 2008 election. Specifically, the article discusses probability, the science of quantifying uncertainty. The article questions common methods for assessing probability where symmetrical outcomes are assumed. Finally, the author explains how to use past evidence to assess the chances of future events.

Student Resources

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