



Standard #: MAFS.912.S-MD.2.7

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Analyze decisions and strategies using probability concepts (e.g., product testing, medical testing, pulling a hockey goalie at the end of a game). ★

Subject Area: Mathematics	Grade: 912
Domain-Subdomain: Statistics & Probability: Using Probability to Make Decisions	Cluster: Level 3: Strategic Thinking & Complex Reasoning
Cluster: Use probability to evaluate outcomes of decisions -	Date Adopted or Revised: 02/14
Content Complexity Rating: Level 3: Strategic Thinking & Complex Reasoning - More Information	Date of Last Rating: 02/14
Status: State Board Approved	

Related Courses

Course Number	Course Title
1200340:	Algebra 2 Honors (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
1210300:	Probability & Statistics with Applications Honors (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
1298310:	Advanced Topics in Mathematics (formerly 129830A) (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
1501300:	Personal Fitness (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
1501310:	Fitness Lifestyle Design (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
1501320:	Fitness Issues for Adolescence (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
1501390:	Comprehensive Fitness (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
1502460:	Self Defense Activities (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
1502470:	Recreational Activities (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
1502480:	Outdoor Education (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
1502490:	Care and Prevention of Athletic Injuries (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
0800300:	Health 1-Life Management Skills (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
0800310:	Health 2-Personal Health (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
0800330:	Personal, Social, and Family Relationships (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
0800350:	Adolescent Health Problems (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
0800360:	Advanced Health Explorations (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
0800370:	Parenting 1 (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
0800380:	Parenting 2 (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
0800390:	Health for Expectant Parents (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
7920050:	Access Health and Safety (Specifically in versions: 2014 - 2015, 2015 - 2017, 2017 - 2018, 2018 and beyond (current))
1800300:	Aerospace Science 1 (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
1800310:	Aerospace Science 2 (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
1800320:	Aerospace Science 3 (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
1800330:	Aerospace Science 4: Leadership Development (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
1800340:	Advanced Aerospace Science (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
1800350:	Aerospace Science 4:Transportation (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
1800360:	Aerospace Science 4 (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
1800400:	Leadership Education 1 (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
1800410:	Leadership Education 2 (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
1801300:	Leadership Education and Training 1 (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
1801310:	Leadership Education and Training 2 (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
1801320:	Leadership Education and Training 3 (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
1801330:	Leadership Education and Training 4 (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
1802300:	Naval Science 1 (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
1802310:	Naval Science 2 (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
1802320:	Naval Science 3 (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
1802330:	Naval Science 4 (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
1803300:	Leadership Education 1 (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
1803310:	Leadership Education 2 (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
1803320:	Leadership Education 3 (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
1803330:	Leadership Education 4 (Specifically in versions: 2014 - 2015, 2015 and beyond (current))
1501380:	Personal Fitness Trainer (Specifically in versions: 2014 - 2015, 2015 and beyond (current))

Related Access Points

Access Point

Access Points Number	Access Points Title
MAFS.912.S-MD.2.AP.7a:	Identify and describe the degree to which something is rated "good" or "bad"/desirable or undesirable based on numerical information (Identify and describe the degree to which a decision/strategy is rated "good" or "bad"/desirable or undesirable based on numerical Information.).

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.
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.

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: Expert

Name	Description
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?
Probabilistic Weather Modeling:	Meteorologist from Risk Management discusses the use of probability in predicting hurricane tracks.

Lesson Plan

Name	Description
Livestock Plans for Raising Red Nosed Reindeer:	This lesson about genetics and mutations investigates how red nosed reindeer could be raised in a livestock setting. Students will draw Punnett squares and design livestock plans for reproduction of red nosed reindeer.
Phalangelpodscribitis? - Analysis with Probability:	<p>Have you ever had a cold or some other ailment that was just a nuisance to you? You tried this medication and that medication in order to treat your self-diagnosis. However, when you have exhausted all your avenues, you find yourself at the Physician's office: paying the co-pay, getting a prescription, paying more to fill the prescription with hopes of not experiencing any of the side effects associated with the medicine, and if that particular medicine doesn't work, you are back at the doctor's office and switched to another.</p> <p>Well, Phalangelpodscribitis is a recently diagnosed ailment that will put a person's feet in motion. It isn't contagious but the treatment can be intense. In this lesson students will be presented with seven (7) medications that will help cure an individual of Phalangelpodscribitis. Students will be given the effectiveness of each medication, the cost to patients with and without insurance, and the possible side effects of each. Each team will be tasked with ranking these medications for a client in order to help him decide the pros and cons of the medications that should be used in treating Phalangelpodscribitis (PPS).</p> <p>Each team will be responsible for recording the procedure they used to rank the medications and to calculate the expected cost for the client when two medications must be administered since the first will prove ineffective for treatment alone. The team's suggestion brings results and the patient is cured!!</p> <p>Time has passed and Phalangelpodscribitis, currently known as PPS, has returned. Oh no! What will your team suggest when the doctor begins to discuss the patient's mortality rate as it is associated with the medication?</p>
The Monty Hall Problem or How to Outsmart a Game Show and Win a Car:	This lesson teaches students how to make decisions in the face of uncertainty by using decision trees. It is aimed for high school kids with a minimal background in probability; the students only need to know how to calculate the probability of two uncorrelated events both occurring (ie flipping 2 heads in a row). Over the course of this lesson, students will learn about the role of uncertainty in decision making, how to make and use a decision tree, how to use

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.

Problem-Solving Task

Name	Description
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.

Student Resources

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.
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