

## **Title**

The Odds Are Good: Probability for Grades 6-8

## **Target Audience**

This course is intended for pre-service and in-service grades 6-8 teachers.

## **Course Description**

This course is designed to give middle school educators new strategies for teaching probability. Learners study the latest recommendations from the NCTM so that they may implement the appropriate standards in their probability teachings. Learners explore new technologies and teaching tools for use in the classroom, such as Web-based interactives and sample lesson plans created by experts. As a final task, learners will develop a set of lessons or a unit on probability that meets the NCTM standards, uses technology as a teaching tool, and incorporates the pedagogical strategies presented in this course.

## **Facilitator**

See instructor/facilitator sheet

## **Credits**

To be determined by college or university.

## **Goals and Objectives**

Learners will:

- Review and develop an understanding of the student expectations that NCTM promotes for data analysis and probability in grades 6-8.
- Be able to implement the NCTM standards for teaching probability.
- Experience and appreciate the advantages of Web-based activities in lesson plans on probability.
- Learn to evaluate and select appropriate Web-based activities related to probability.
- Develop a set of lessons or a unit on probability that integrates the use of technology as part of the instructional process.

## **Outline of Content and Assignments**

After previewing the course introductory information (Overview, Session Summary, and Assessment), learners will proceed to the Assignments section to complete the following six sessions, working through each in order. Each session includes assignments and discussion questions. The last session provides instructions for the final project, which learners should complete and deliver as indicated in the section.

### **Session 1: Review the NCTM Standards for Teaching Mathematics**

Learners will:

- Read "Critical Response Skills"



- "Resources for Teaching and Learning about Probability and Statistics"

Explore

- "Probability Tutorial"
- "Harcourt Animated Math Glossary"
- "Statistics Glossary"

Examine NCTM standards

- Examine standards that NCTM promotes for Data Analysis and Probability
- Examine the standards for Data Analysis and Probability Grades 3-5
- Examine the standards for Data Analysis and Probability Grades 6-8

Record in their learning log

- After reading "Science for All Americans," learners will enter questions that they think their students should be asking when the students write an analysis of their data and when reading an analysis of another student's data.
- After reading "Critical Response Skills," learners will reflect on their understanding of probability concepts.
- After reading "Resources for Teaching and Learning about Probability and Statistics," learners will log their experience and reflect on recommendations for improving the instruction of Data Analysis and Probability.
- After exploring the tutorial on probability, learners will enter notes on concepts that are new to them.
- Upon examination of NCTM standards, learners will log underlying skills that should be developed as students study Data Analysis and Probability.

Participate in an online discussion

- After reviewing the articles and resources, learners will post on the Discussion Board how they learned probability concepts, what they want their students to gain from this instruction, and how to implement NCTM standards in the instruction process.

### Session 2: Use Simulations to Explore Probability

Learners will:

Explore Simulations

- "The Technology Principle"
- "The Cereal Box Problem"
- "Rock Around the Clock"

Review lesson plan

- Rock Around the Clock

View

- "Rock Around the Clock," videos 1, 2, and 3

Record in their learning log

- After reviewing the Rock Around the Clock lesson plan, learners will take notes on their experience with this lesson.
- After watching the videos, learners will analyze aspects from the teacher and the lesson that made the simulation session successful and extend its use to the learner's classroom.
- Upon reviewing NCTM principles and standards, the learner will discuss the benefits of incorporating simulation exercises and technology in the classroom.

Participate in an online discussion

- Upon completion of all the assignments and readings, learners will go to the Discussion Board and respond to the following assignments:
  - Develop a model that will be useful for students to follow when they are creating a simulation. Be sure to include the question, the desired events, the probability of the events occurring, how the occurrence of an event will be represented, how you know when the simulation is done, what will be recorded, and how the results will be reported.
  - As you introduce the art and technique of simulations to your students, when and how do you plan to introduce the technology that will enhance student understanding of the process?

Session 3: Use Simulations to Explore Probability

Learners will:

Explore

- “Pascal’s Triangle”
- “Introduction to Probability Models”
- Ken White’s Coin-Flipping Page

Review lesson plans

- Remove One
- The Smithville Families

View

- “Remove One,” videos 1 and 2
- “The Smithville Families,” videos 1 and 2

Record in their learning log

- Upon reviewing the lesson plans, the learners will reflect on the lesson and strategies for use in their own classrooms.
- Upon watching the videos, the learner will simulate and analyze the lessons demonstrated.
- After exploring various Web resources, learners will log and share observations on how to implement these resources in the classroom and strategies for encouraging students to take advantage of these resources.

Participate in an online discussion

- After exploring and examining the Web sites, lesson plans, and videos, learners will go to the Discussion Board to respond to the following questions:
  - How will you help your students discover that there is more than one way to have a one-girl family of five children in Smithville Families and to know when they have them all?
  - When can you say that you have done enough trials and that you can be fairly certain that you know the general shape of the graph that the data will generate?
  - What advantages and disadvantages do you see in having students use computer simulations to solve probability problems?

Session 4: Use Statistics and Probability to Play a Game

Learners will:

Review lesson plan

- Fantasy Baseball lesson plan
- 



View

- “Fantasy Baseball,” videos 1 and 2

Explore Web sites

- Adjustable Spinner
- Circles and Spinners game
- Yahoo!igans! Sports and Recreation: Baseball
- “Slam Baseball!” Current year’s Baseball Statistics

Participate in an online discussion

- After completing all readings and assignments, learners will pick one activity (Circles and Spinners, an abbreviated form of Fantasy Baseball, or a complete game of Fantasy Baseball) and go to the Discussion Board to complete and discuss the following:
  - Describe the organization plan you will have in place in your classroom to facilitate the success of this activity.
  - Provide a short outline of your current schedule. Develop a rationale for how much class time you are going to devote to this activity.
  - What math skills will your students need to have to be successful in this activity? Provide a rationale as to why they need the skills you have outlined.
  - How would you alter this activity or use the alternative activity to better suit the needs of you and your students?

Session 5: Use the Web to Locate Ideas for Your Curriculum

Learners will:

Browse and explore

- “Guidelines for Evaluating Web Sites”
- “Illuminations” (NCTM Standards)
- Public Discussions at The Math Forum
- Teacher Talk
- “Ask Dr. Math”
- “Quandries and Queries”
- The Math Forum
- PBS TeacherSource: Math
- The Data Library
- TrackStar

Participate in an online discussion

- After reviewing the articles and resources, learners will post on the Discussion Board the resources they found valuable and applicable to an existing lesson plan. In the same posting, they will share the criteria used in the selection process and include a rationale for its support of the NCTM standards.

Session 6: Final Project - Develop Your Own Lesson Plans

Learners will:

Complete a final project

Create a lesson focusing on the Data Analysis or Probability Standards and integrates the use of technology to facilitate the process. To complete their final project, learners will respond to the following:

- Create a classroom lesson that integrates technology and focuses on the Data Analysis and Probability Standards.
- Identify the related NCTM standards for Data Analysis and Probability.



- Create pre- and post- assessments for the students to help you plan your instruction. Think about how to assess what your students know before the lesson and what they have learned after the lesson. In developing an authentic assessment (related to a real life problem) you want to be able to see the skill in practice by the student.
- Include at least one remediation suggestion or one extension suggestion.
- Implement your lesson or unit.
- Create a 2-3 page reflection paper that describes the lesson. In your paper include the following: the pedagogical strategies you used in this lesson.
- a description of what went well and what you would change.
- the criteria you used to choose the technology you integrated into your lesson.
- provide student work samples and capture student comments about their learning experience (optional).
- observations you made about your students' learning — from the students' point of view, discuss what areas they were having difficulties with and what areas they found easier.
- Submit your reflection paper, lesson plan, and samples of student work to your facilitator. A description of the lesson

Post the final paper on the Discussion Board. Review the final projects of other learners and provide feedback focusing on suggestions for improvements, remediation, and extension activities.

## **Schedule**

This course is scheduled to take approximately 15 hours to complete readings, activities, video, assignments, reflections and a final project.

## **Requirements**

Learners are expected to:

- Complete all assignments
- Maintain an online journal
- Participate regularly in discussion boards

## **Materials (hardware, software, plug-ins)**

Technical Requirements

- Word processor
- Internet service provider
- E-mail

## **Academic Dishonesty Policy**

To be inserted by university institution only

## **Evaluation**

This course is evaluated on a letter grade basis, and may be available for graduate credit. See graduate credit details pertaining to specific graduate credit institutions.