

Probability: A Study of Chance

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Lesson Plan for Grades 6–8

Overview

The theory of probability is an important branch of mathematics with many practical applications in the physical, medical, biological and social sciences. An understanding of this theory is essential to the understanding of weather reports, medical findings, political doings and the provincial/state lotteries. Students have many misconceptions about probability situations.

Purpose

The purpose of this activity is to begin the process of helping students to learn the basic principles of probability.

Objectives

As a result of this activity the students will conduct an experiment to determine if a game is “fair,” collect data (table), conduct an analysis of the game (tree diagram), state and apply the rule (definition) for probability.

Resources/Materials

Overhead grid, overhead, pencils, paper

Activities and Procedures

1. Introduce the activity with a demonstration of the game “Rock, Scissors, Paper.”
2. Divide the class into pairs (player A and player B) and have them play the game 18 times.

3. Use an overhead graph grid to graph the wins of player A in red (how many A players won one game, two games and so on). Do the same for all B players in a different color.
4. Help students determine the range, mode and mean for each set of data. Compare the results.
5. Do a tree diagram to determine the possible outcomes.
6. Answer the following questions to determine if the game is fair.
 - a. How many outcomes does the game have? (9)
 - b. Label each possible outcome on a tree diagram as to wins for A, B or tie.
 - c. Count the wins for A. (3)
 - d. Find the probability that A will win in any round ($3/9 = 1/3$). Explain that probability means favorable outcomes/possible outcomes.
 - e. Count the probability that B will win in any round. ($3/9$)
 - f. Is the game fair? Do both players have an equal probability of winning in any round? (Yes)
7. Compare the mathematical model with what happened when the students played the game.

Tying It All Together

1. Use this as an introduction to a unit on probability.
2. Follow-up with discussion about how probability is used in different places in the world.
3. Play game again with three students, using the following rules:
 - a. A wins if all three hands are the same.
 - b. B wins if all three hands are different.
 - c. C wins if two hands are the same.

There will be 27 outcomes this time, that is, $3^3 = 27$.