



Curricular Unit: Rock, Paper, Probability

Curricular Unit Title Rock, Paper, Probability



One of the best games of chance...

Grade Level 7 (6-12)

Summary

These lessons explore probability using the popular game “rock, paper, scissors.” Independent and dependent event scenarios are created for students to find their probability of winning and apply their knowledge to a broader scenario.

Unit Schedule

This unit was developed for 2 consecutive class periods. Similar to textbook lessons, start with lessons on **Independent Probability** and then cover **Dependent Probability**.

Unit Overview

A lesson on independent probability covers how “rock, paper, scissors” is a fair game and the possible outcomes. In order to identify multiple independent events, a tournament bracket is proposed and students break out into “divisions” and complete a tournament, then answer questions about the probability that they will advance to certain rounds.

Dependent probability imposes the rule that students cannot use the same object consecutively, even in the situation of a tie. This shifts the probability of winning and shows the possibility of a defensive strategy (*i.e.* not winning vs. not losing) during each subsequent game. The activity thereafter focuses on creating a diagram showing possible outcomes and how that rule turns “rock, paper, scissors” into an unfair game.

Engineering Connection

In comparative studies, particularly those in the biomedical field, statistics are used to compare data sets and determine the effectiveness of treatments by calculating each treatment’s chance of occurring, known as probability. Experimental and theoretical probability are central concepts to the engineering field, since physical phenomena do not always follow the mathematical descriptions of behavior, known as *mathematical models*, because they are typically derived from idealized assumptions.

Subject Area(s)

Data Analysis & Probability, Measurement, Problem Solving

Keywords

rock, paper, scissors, probability, independent, dependent, tournament

Educational Standards

- PA Science:
 - 3.1.7 – Unifying themes
 - 3.2.7.B – Apply process knowledge to make and interpret observations
- PA Math:
 - 2.4.5.B – Use models, number facts, properties, and relationships to check and verify predictions and explain reasoning
 - 2.5.8.B – Verify and interpret results using precise mathematical language, notation and representations, including numerical tables and equations, simple algebraic equations and formulas, charts, graphs, and diagrams
 - 2.5.8.C – Justify strategies and defend approaches used and conclusions reached
 - 2.7.8.B – Present the results of an experiment using visual representations
 - 2.7.8.D – Compare and contrast results from observations and mathematical models

Related Lessons & Activities

Activities

- RPS - Independent Events, RPS - Dependent Events

Time Required

1 hour per Activity

Owner

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