Lab Framework

Text:CORD Classic
Unit number and title: Unit 20 Rock, Paper, Scissors - The Study of Chance
Developed by:

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Date:6/28/2011

Lab Title
Probability and Gaming

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Short Description: The purpose of this activity is to introduce basic information on probability and statistics. It can be used as an introduction to a unit on probability.

LAB PLAN

TEACHER: Teacher Prep/ Lesson Plan

- **Lab Objective**

   After this activity, the student will be able to determine whether or not the game is fair and be able to interpret and display the data obtained.

- **Statement of pre-requisite skills needed** (i.e., vocabulary, measurement techniques, formulas, etc.)
   Basic math skills

- **New Vocabulary**

   Probability: The numerical measure of the chance that a particular event will occur, depending on the possible events. The probability of an event, P(E), is always between 0 and 1, with 0 meaning that there is no chance of occurrence and 1 meaning a certainty of occurrence.

   Predict: To tell about or make known in advance, especially on the basis of special knowledge or inference.

   Prediction: A prediction is a description of what will happen before it happens. It is a foretelling that is based on a scientific law or mathematical model.

   Odds: A ratio of probabilities in favor of, or against the occurrence of an event. The odds in favor = P(an event can occur) : P(an event cannot occur). The odds against = P(an event cannot occur) : P(an event can occur).

- **Materials List**
   Paper and Pencil
   Two sets of hands

- **GLEs addressed**

   Math: 1.1.1.Understand and apply concepts and procedures from number sense—number and numeration; computation; estimation.

   1.1.4.Understand and apply concepts and procedures from probability and statistics—probability; statistics.

   2.2.2.Construct solutions—select and use relevant information; apply appropriate strategies and procedures; determine a solution that is viable and mathematically correct.

   3.3.1.Analyze information—analyze and compare mathematical information.

3.3.3.Verify results—justify results; check for reasonableness of results; validate thinking.

5.5.2.Relate mathematical concepts and procedures to other disciplines—identify and use mathematical patterns, thinking, and modeling in other subject areas; describe examples of contributions to the development of mathematics.

5.5.3.Relate mathematical concepts and procedures to real-world situations—understand how mathematics is used in everyday life and in career settings.

Reading: 3.2 Read to perform a task.

Writing: 3.3 Knows and applies writing conventions appropriate for the grade level.

- **Leadership Skills**

    1.4 The student will be involved in activities that require applying theory, problem-solve, and use critical and creative thinking skills while understanding outcomes of related decisions.

- **SCAN Skills**
- Basic Skills
- A. Locates, understands, and interprets written information prose and documents including manuals, graphs and schedules – to perform tasks
- C. Identifies relevant details, facts and specifications
- Writing
- A. Communicates thoughts, ideas, information, and messages in writing
- B. Records information completely and accurately
- Arithmetic
- A. Performs basic computations
- B. Uses basic numerical concepts such as whole numbers and percentages in practical situations
- Mathematics
- A. Approaches practical problems by choosing appropriately from a variety of
- mathematical techniques.
- B. Uses quantitative data to construct logical explanations for real world situations
- Listening
- A. Receives, attends to, interprets, and responds to verbal messages and other cues such as body language in ways that are appropriate to the purpose

- **Set-up information**

    Divide the class into pairs and have them play the game eighteen times. A rock is a closed fist. Paper is palm on palm, and scissors is the number two horizontally. The student hits their other hand twice, and on the third time gives the symbol they wish. A rock beats scissors. Paper beats rocks, and scissors beats paper. Instruct the students to keep a record of wins and losses. See handout

- **Lab organization**(-Grouping/leadership opportunities/cooperative learning expectations; -**Timeline required)**

    1 Class Period - Students will work in pairs

- **Teacher Assessment of student learning** (scoring guide, rubric)

    Successful completion of the task and accompying worksheet.

    Class participation

- **Summary of learning** (to be finished after student completes lab)

    -discuss real world application of learning from lab

    -opportunity for students to share/present learning

Discuss what results were most unusual and not so unusual.

- **Optional activities**
    Use cards to determine the chance of getting an Ace of Spaids
- **Career Applications**
    Prompt students for career choices that involve Probability.
    Weather Person
    Insurance Agent
    Medical Personal
    Lawyer
    Accountant

LAB TITLE: Probability and Gaming
STUDENT INSTRUCTIONS:

- **Statement of problem addressed by lab**
  Is the game Rock, Paper, Scissors Fair?

- **Grouping instructions and roles**
  Work in pairs both students are to track your own scores on the traking sheet provided

- **Procedures** – steps to follow/instructions
  Rules of Play:
  A rock is a closed fist. Paper is palm on palm, and scissors is the number two horizontally. You are to hit your other hand twice, and on the third time give the symbol you wish.
  A rock beats scissors.
  Paper beats rocks
  Scissors beats paper.

- **Outcome instructions**
  Keep a record of wins and losses.
  Once your group has finished, record the results for player A is one color, and player B in another color.

  Compute - mean, mode, and range each set of data

  Now draw a tree diagram to show all possible outcomes.

  Answer the following questions to determine if the game is fair.
  1. How many outcomes does the game have?

  2. Label each possible outcome on the tree diagram as to win for a, b, or tie.

  3. Count the number of wins for A.

  4. Find the probability A will win in any round.

  5. Count the number of wins for B.

  6. Find the probability B will win in any round.

  7. Is the game fair? Do both players have an equal probability of winning any round?

  8. Compare the mathematical model with what happened when the students played the game.

  9. How do you think probability is used in the real world?

- **Assessment instructions** (peer-teacher)
  Varify results.

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Lab Data Collection

Student: _____ **Date:** _____

Unit: _____

Lab Title:

Criteria: Write the problem/objective in statement form

Data Collection: Record the collected/given data

	A	B
Rock		
Paper		
Scissors		
Total		

Calculations: Complete the given calculations to solve for an answer(s)
Compute the
*Mean
*Median
*Mode
*Range each set of data.

Draw a tree diagram to show all possible outcomes.

Summary Statement:

Other Assessment(s)
Answer the following questions to determine if the game is fair.
1. How many outcomes does the game have?

2. Label each possible outcome on the tree diagram as to win for a, b, or tie.

3. Count the number of wins for A.

4. Find the probability A will win in any round.

5. Count the number of wins for B.

6. Find the probability B will win in any round.

7. Is the game fair? Do both players have an equal probability of winning any round?

8. Compare the mathematical model with what happened when the students played the game.

9. How do you think probability is used in the real world?