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“Plum Stones”

This is an adaptation on the original game played

Grade level: Grades 5-9

Topic: Data and Probability

Curriculum Competency Connections:

Grade 5-7:

- Use mathematical vocabulary and language to contribute to mathematical discussions
- Visualize to explore mathematical concepts
- Engage in problem-solving experiences that are connected to place, story, cultural practices and perspectives relevant to local First Peoples communities, the local community, and other cultures
- Develop, demonstrate, and apply mathematical understanding through play, inquiry, and problem solving
- Demonstrate and apply mental math strategies
- Incorporate First Peoples worldviews and perspectives to make connections to mathematical concepts

Grade 8-9:

- Represent mathematical ideas in concrete, pictorial, and symbolic forms
- Explain and justify mathematical ideas and decisions
- Incorporate First Peoples worldviews and perspectives to make connections to mathematical concepts
- Engage in problem-solving experiences that are connected to place, story, cultural practices and perspectives relevant to local First Peoples communities, the local community, and other cultures
- Use reasoning and logic to explore, analyze, and apply mathematical ideas

Objectives:

- define the difference between theoretical and experimental probability
- recall information about the origin of plum stones and how it relates to First Peoples
- calculate the experimental and theoretical probability

Materials:

5 Plum Stones (or wooden chips that have the shape of the moon on one side and a star on the other side. These may have to be created)

Worksheet

Pencils

Description of Activity:

First, the teacher will introduce the history of the game and what a plum stone is (this description is located on the worksheet). Then, the teacher will ask the student(s) to take all five plum stones and roll them along the table or floor (like dice). Each student will keep track of whether a moon or a star faced up on each plum stone after the toss. They will repeat this 10 times and answer the questions on the worksheet.

For the grade 8/9 students, after they have completed this activity, they will be asked to answer the challenge questions.

Variations/extensions:

This can be used at a variety of grade levels. Instead of plum stones, coins, cards, die, or any other tool that has two or more contrasting sides, can be used (as long as the tool used has discrete answers). It can be used at the higher levels to comprehend theoretical vs. experimental probability while introducing combinatorics and permutations (ask them to test the probability using a coin; ask them to find the number of ways the results of tossing X coins can be arranged (ie: if $X = 2$, HT, TH))

PLUME STONE ACTIVITY

History of the Plum Stone:

Games play an important role in the cultures of First Peoples. Games were played differently depending on the tribe; they were different in the material used and rules of the game. The different tribes had various opinions about who could play the game, times of the year that games were played, whether the game was related to a type of religious activity, ceremony, or festival. Some games even had certain purposes such as religion, amusement, for children to learn skills, social interaction between tribes, and gambling to distribute wealth. Women traditionally played the plum stones game in pairs.

Traditionally, this game is played with plum stones that have three out of the five plum stones burned black on one side and white on the other side while the remaining two plum stones have a five-pointed star on one side and a crescent moon on the other.

Directions:

- 1) There are five plum stones. Pick up all five plum stones and roll them along the table or floor like dice.
- 2) Record on a sheet of paper the results found (how many stones showed a moon and how many stones showed a star).
- 3) Repeat this nine more times.

Questions:

- 1) What is the probability that a moon will face up?
- 2) What is the probability that a star will face up?
- 3) What is the probability that two moons will face up? Three moons? Four moons? Five moons? How do you know?
- 4) What is the probability that two stars will face up? Three stars? Four stars? Five stars? How do you know?
- 5) What do you notice?
- 6) What have you learned?

Challenge Questions:

- 1) If we had 6 plum stones, what is the probability that exactly one moon will face up? Two moons? Three moons? Four moons? Five moons? Six moons?
- 2) If we had 6 plum stones, what is the probability that exactly one star will face up? Two stars? Three stars? Four stars? Five stars? Six stars?
- 3) Can you predict the probability for 10 stones? What do you notice?
- 4) What is the difference between theoretical and experimental probability (hint: what is the difference between theory and an experiment)?
- 5) Where one might use this in everyday life?
- 6) What have you learned?