Gold Seal Lesson

Author(s): *Marsha Kucker*			*Lesson Title:* *Working with Probability*			
Grade Span			*ICLE Application Model*			
K-4	*5-8*	*9-12* *XX*	*A*	*B*	*C*	*D* *XX*

Instructional Focus:

Speaking – Students speak for a variety of purposes and audiences with sophistication and complexity appropriate to the grade level.
Listening – Students listen for a variety of purposes appropriate to the grade level.
Number Operations and Concepts – Students use number, number sense, and number relationships in a problem-solving situation. Students communicate the reasoning used in solving these problems.
Statistics and Probability – Students use statistics and probability to analyze given situations and the results of experiments. Students communicate the reasoning used in arriving at a conclusion.
Problem Solving and Mathematical Reasoning – Students apply a variety of problem-solving strategies to investigate and solve problems from across the curriculum as well as from practical applications.
Algebraic Concepts and Relationships- Students use algebraic methods to investigate, model and interpret patterns and functions involving numbers, shapes, data, and graphs in a problem-solving situation. Students evaluate and communicate the reasoning used in solving these problems.

Performance Task

This lesson will increase the student's knowledge of probability using one die and a computer spreadsheet to record their responses.

1. Divide the students into groups of two.

2. Ask students to determine who will be the recorder and who will conduct the probability experiment. One student will roll the die; the other will record the data (the number is rolled). Each group will roll the die 50 times. Ask students to make predictions before they begin and compare numbers to the end results.

3. The data should be entered on a computer spreadsheet. The "rolls" should be numbered, and the die total for that roll recorded.

4. Students should share their results and compare with that of the other groups. What conclusions can be reached? Students should write out their original hypotheses and their conclusions in the math journals.

This activity meets specific competencies and indicators as outlined in the National Career Development Guidelines.

ICLE Essential Skills

Apply in writing the rules and conventions of grammar, usage, punctuation, paragraphing and spelling. (ela 1)
Follow oral or written directions. (ela 4)
Use brainstorming, role playing, and standard problem solving strategies to define a problem and suggest solutions. (ela 19)
Gather information such as data, facts, ideas, concepts, and generalizations from oral sources. (ela 51)
Participate in a one-on-one conference by relating essential information, asking questions on the topic, and using language to clarify information. (ela 69)
Perform operations with signed (positive and negative) numbers, including decimals, ratios, percents, and fractions. (math 1)
Understand basic algebraic properties (i.e., commutative: ab=ba; associative: ab (c)= a(bc); and distributive: a(b+c) = (ab)+(ac)). (math 3)
Understand the best procedures for statistical data collection, organization, and display including making estimates and predictions and drawing inferences.
Understand the characteristic differences between theoretical and empirical probability (e.g., the theoretic probability of rolling a six on a die is 1/6; empirical probability is derived from repeated experimentation or accumulated statistics. (m 20)
Know how to determine combinations (i.e., the various grouping a set may be arranged in without regard to order). (m 43)
Use the Counting Principle to determine the probability of events occurring jointly (e.g., if one activity can occur in any of m ways and another in any one of n ways, then the total number of ways both activities can occur is mn). (m 56)

Scoring Guide:

See attachment: Working With Probability Scoring Rubric Chart

Keywords

English Language Arts	Mathematics	Science
Reading	**Algebra** Correlation Manipulatives Math in daily life Problem solving Patterns	**Earth Science**
Writing	**Geometry**	**Life Science**
Communications Listening Discussion Illustration	**Statistics** Charts Data analysis Data collection Data display Manipulatives Prediction Probability Problem solving	**Chemistry**
Literature	**Calculus**	**Physics**
Other	**Trigonometry**	**Other**
	Other	

Chart
SCORING RUBRIC

3	**BEYOND**	Analyzed and readily understood the task. Developed an efficient and workable strategy. Showed explicit evidence of carrying out the strategy. Synthesized and generalized the conclusion. Shows evidence of mastering the basic concepts of probability.
2	**AT LEVEL**	Understood the task. Developed a workable strategy. Some evidence of carrying out a strategy but not always clear. Shows evidence of beginning to master the basic concepts of probability.
1	**NOT YET AT**	Partially understood the task. Appropriate strategy some of the time. Possible evidence of a plan – not clear. Partial understanding of the basic concepts of probability.
0		Totally misunderstood. Inappropriate, unworkable strategy. No evidence of carrying out a plan. No evidence of understanding the basic concepts of probability.