

Unit Title: “What Do You Expect?”

Course: Middle School Mathematics

Subject Area: Mathematics

Time Frame: 20 days

Standards

Middle School Mathematics Standards	Sunshine State Standards Benchmarks	NCEE New Standards
<p>The student will:</p> <p>15.1 Review the understanding of experimental and theoretical probabilities and the relationship between them.</p> <p>15.2 Make the distinction between single, specific outcomes and sets of outcomes that comprise an event.</p> <p>15.3 Analyze situations involving independent events.</p> <p>15.4 Analyze situations involving dependent events.</p> <p>15.5 Use probability and equivalent fractions to find expected values.</p> <p>15.6 Develop a variety of strategies for analyzing probabilities, such as using lists, counting trees, and area models.</p> <p>15.7 Determine the expected value of a chance situation.</p>	<p>MA.E.2.3.1 The student compares experimental results with mathematical expectations of probabilities.</p> <p><i>Expectations</i> The student:</p> <ul style="list-style-type: none">• Obtains experimental results using manipulatives.• Explains observed difference between mathematical and experimental results.• Calculates simple mathematical probabilities for independent and dependent events. <p>MA.E.2.3.2 The student determine odds for and odds against a given situation.</p> <p><i>Expectations</i> The student:</p> <ul style="list-style-type: none">• Computes the mathematical odds for and against a specified outcome in given real-	<p>The student will:</p> <p>M4h Represents and determines probability as a fraction of a set of equally likely outcomes; recognizes equally likely outcomes, and constructs sample spaces.</p> <p>M4i Makes predictions based on experimental or theoretical probabilities.</p> <p>M4i Predicts the results of a series of trials once the probability for one trial in known.</p>

Middle School Mathematics Standards	Sunshine State Standards Benchmarks	NCEE New Standards
	world experiments.	

Desired Results

Enduring Understanding	Essential Questions	Knowledge and Skills
<p>Students will understand</p> <ul style="list-style-type: none"> The term <i>probability</i> is applied to situations that have uncertain outcomes on individual trials but a predictable pattern of outcome over many trials. Probability, whether obtained through theoretical analysis or experimentation, are useful for predicting what should happen over the long run. Probability does not tell us what will happen. 	<ul style="list-style-type: none"> In what type of situations can probability be used to help make a decision? What are the possible outcomes for a given situation? What techniques can be used to list all the possible outcomes? Are the outcomes equally likely? Can theoretical probabilities be calculated, or do we always need to find experimental probabilities? What is the method of telling whether events are dependent or independent? Is this a fair game? If it is not fair, how can the rules or the scoring system be changed to make it fair? If a game is played several times, what will be the expected value, or the average payoff? 	<p>Students will know</p> <ul style="list-style-type: none"> Key terms (e.g., counting tree, expected value, long-term value, equally likely, event, experimental probability, fair game, outcome, probability, random, theoretical probability) <p>Students will be able to</p> <ul style="list-style-type: none"> Understand the distinction between single, specific outcomes and sets of outcomes that comprise an event. Analyze situations involving independent events. Analysis situations involving dependent events. Understand how to use probabilities and equivalent fractions to find expected value. Determine whether games of chance are fair or unfair and find ways to make unfair games fair. Develop a variety of strategies for analyzing probabilities, such as using lists, counting trees, and area models. Determine the expected value of a chance situation. Use probability and expected value to make decisions.

Acceptable Evidence

Performance Tasks	Quizzes, Test, and Work Samples	Observations and Dialogues
<ul style="list-style-type: none"> • Evaluating Games of Chance Students explore games that involve drawing colored blocks from a bucket and spinning spinners. In the process of analyzing the games, they review some of the basic concepts of probability developed in M/J Mathematics 1. • Analyzing Number-Cube Games Students explore games that involve rolling two number cubes and computing the sum or product of the numbers that are rolled. In the process, they continue to review some of the basic concepts of probability, including finding experimental probabilities, listing outcomes to find theoretical probabilities, comparing experimental probabilities with theoretical probabilities, and deciding whether a game is fair. • Probability and area In the context of a computer game, students are introduced to relating probabilities to the area of a grid, which helps prepare them for analyzing probabilities using the area model. • Analyzing Two-Stage Games Student encounter probability situations in which one even depends on another. They use an area model to analyze the probabilities of two or more such dependent events. • Expected Value Students use spinners to simulate free-throw situations in basketball and employ area models to find the probabilities involved with players who have different free-throw averages. Students are formally introduced to the concept of expected value, or long-term average. • Carnival Games Students analyze a variety of proposed carnival games. They apply and extend strategies and ideas from earlier investigations. They continue to develop techniques for conducting simulations, analyzing situations to find all possible outcomes, and finding expected value to determine the 	<p>Check-Up 1 Quiz A Check-Up 2 Quiz B Unit Test</p>	<p>Teacher observations of students during work on performance tasks. Accountable talk during work on performance tasks.</p>

Performance Tasks	Quizzes, Test, and Work Samples	Observations and Dialogues
<p>profitability of a game. Students also confront the issue of how the dependence of the outcomes of one action on another action affects the probabilities in a situation.</p> <ul style="list-style-type: none"> Analyzing Sequences of Outcomes Students investigate two problems that are essentially the same mathematically. Predicting the sex of puppies in a litter and guessing on a true-false quiz. In each problems, students use counting trees to analyze sequences of equally likely outcomes. 		

