

**Unit Title:** “How Likely Is It?”

**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>7.1 Complete simple probability experiments.</p> <p>7.2 Describe the relationship between experimental and theoretical probabilities.</p> <p>7.3 Interpret statements of probability.</p> <p>7.4 Develop strategies for finding experimental and theoretical probabilities.</p> <p>7.5 Use data displayed in graphs and tallies to find experimental probabilities.</p> <p>7.6 Organize data into lists or charts as a strategy for finding theoretical probabilities.</p>	<p>MA.E.2.3.1 The student compares experimental results with mathematics expectations of probabilities.</p> <p><i>Expectations</i> The student:</p> <ul style="list-style-type: none"><li>• Determines all possible outcomes of an event using a tree diagram or organized list.</li><li>• Calculates simple mathematical probabilities.</li><li>• Uses manipulatives to obtain experimental results, compares results to mathematical expectations, and discusses the validity of the experiment.</li></ul> <p>MA.E.2.3.2 The student determine odds for and odds against a given situation.</p>	<p>The student:</p> <p>M4h Represents and determine 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>M4j Predicts the result of a series of trials once the probability for one trial is known.</p>

	<p><i>Expectations</i> The student:</p> <ul style="list-style-type: none"><li>• Examines and describes situations that include finding the odds for and against a specified outcome.</li></ul>	
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## Desired Results

Enduring Understanding	Essential Questions	Knowledge and Skills
<p>Students will understand</p> <ul style="list-style-type: none"> <li>The terms chance and probability are applied to situations that have uncertain outcomes on individual trials but a regular pattern of outcomes over many trials.</li> <li>Probabilities are useful for predicting what will happen over the long run, yet a theoretical or experimental probability does not tell use exactly what will happen.</li> <li>Experimental probabilities can be good estimates of the theoretical probabilities if the experimental probabilities are based on many trials.</li> </ul>	<ul style="list-style-type: none"> <li>Why is probability a mathematics topic?</li> <li>How can we use mathematics to identify how probable an even may be?</li> <li>What probability is associated with an even that is certain? With an even that could never happen?</li> <li>What kind of experiments can be performed to find the probability of an event?</li> <li>Can we find ways to compare a probability found mathematically with a probability found experimentally?</li> </ul>	<p>Students will know</p> <ul style="list-style-type: none"> <li>Key terms (e.g., certain event, chances, equally likely events, event, experimental probability, impossible event, outcome, probability, theoretical probability)</li> <li>There are two ways to obtain probabilities: by gathering data from experiments and by analyzing the possible equally likely outcomes.</li> </ul> <p>Student will be able to</p> <ul style="list-style-type: none"> <li>Critically interpret statements of probability.</li> <li>Develop strategies for finding both experimental and theoretical probabilities.</li> <li>Organize data into list or charts of equally likely outcomes as a strategy for finding theoretical probabilities.</li> <li>Use graphs and tallies to summarize and display data.</li> <li>Use data displayed in graphs and tallies to find experimental probabilities.</li> </ul>

## Acceptable Evidence

Performance Tasks	Quizzes, Test, and Work Samples	Observations and Dialogues
<ul style="list-style-type: none"> <li><b>A first Look at Change</b> Students flip coins 30 times and then compute the experimental probability of a head occurring on a toss of a</li> </ul>	<p>Check-Up 1 Quiz A Check-Up 2</p>	<p>Teacher observations of students during work on performance tasks. Accountable talk during work on</p>

Performance Tasks	Quizzes, Test, and Work Samples	Observations and Dialogues
<p>coin. A computer is used to generate a larger set of data and produce a graph of the fraction of tosses that result in heads.</p> <ul style="list-style-type: none"> <li>• <b>More Experiments with Chance</b> Student experiment with marshmallows, find the experimental probabilities that each of two sizes of marshmallow will land on an end or a side. Individual groups' data are combined to produce a larger set of data so students get a better estimate of how the marshmallow will behave over the long run.</li> <li>• <b>Using Spinner to Predict Chances</b> Students continue the pattern of collecting data, analyzing data, and making predictions. The emphasis is on experimental data. If a large amount of data is collected, the experimental probabilities should be fairly close to the theoretical probabilities.</li> <li>• <b>Theoretical Probabilities</b> Probability is formally introduced in a game-show setting. The activity is used to form a working definition of probability and to emphasize specific characteristics of probability. Students are asked to make comparisons between experimental and theoretical probabilities, and they have their first experience with making an organized list to find theoretical probabilities.</li> <li>• <b>Analyzing Games of Chance</b> Students play and analyze games that involve arranging 12 marker in columns numbers 1 through 12. A pair of number cubes is rolled, and a marker is removed from the column whose number matches the sum for the number on the cubes. The first team to remove all their markers wins the game. Students list the possible outcomes of a roll of a pair of number cubes and use this information to map out winning strategies for the game.</li> <li>• <b>More About Games of Chance</b> Students design a simulation to find an experimental probability of winning a prize in a promotional contest involving scratch-off game cards. They are asked to find the theoretical probability of winning by making an organized list of the</li> </ul>	<p>Quiz B Unit Test</p>	<p>performance tasks.</p>

<b>Performance Tasks</b>	<b>Quizzes, Test, and Work Samples</b>	<b>Observations and Dialogues</b>
possible pairs of spots that could be scratched off.		