

# Technology Connected Lesson Plan

Technology Integration Program

<b>Lesson Plan Number</b> (Check one Box)	<b>1</b>	<b>2</b>	<b>3</b>
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<b>Name</b>	Tammy M. Keith
<b>Title</b>	Casino Lab
<b>Grade Level</b>	10-12
<b>Subjects</b>	Advanced Placement Statistics/Advanced Statistics

## Intended Learning

<b>QCC Objectives/ISTE Standards</b>	<p><b><u>QCC Objectives:</u></b></p> <p><b>1</b> Organizes, summarizes, characterizes, and interprets data from practical situations using relevant data sets by constructing tables, graphs, and charts including frequency distributions, histograms, line plots, stem-and-leaf plots, box plots, and scatter plots for bivariate data</p> <p><b>7</b> Identifies sound examples of applying statistics in decision making and corrects misuses of statistics.</p> <p><b>8</b> Distinguishes between samples and populations, identifies characteristics of representative samples to minimize bias and error, and recognizes the variability among repeated samples drawn from the same population</p> <p><b>9</b> Understands the concept of randomness as applied to sample selection and identifies other sampling techniques appropriate to given situations</p> <p><b>11</b> Collects and analyzes data using experimental models and random number tables and generators</p> <p><b>12</b> Interprets the outcomes of the data analysis and communicates the results.</p> <p><b>13</b> Uses student-generated data sets, games of chance, manipulatives, and historic data to estimate probabilities with the empirical approach. Applies the results obtained from active experiments to illustrate the Law of Large Numbers and to develop the concept of theoretical probability.</p> <p><b>14</b> Uses the eight-step process to build a model for simulating a given practical problem situation and uses manipulative materials, random number generators, calculators, and computers to perform the simulation to provide an approximation to the solution of the problem</p>
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	<p><b>15</b> Performs simulations for problems where the probability of success is known or unknown and performs simulations for situations with several key components</p> <p><b>16</b> Applies counting techniques and calculates the probability of the union and the intersection of two events, the probability of the complement, and conditional probability</p> <p><b>17</b> Distinguishes between odds and probabilities and finds the odds associated with given events</p> <p><b>18</b> Assigns probabilities to the outcomes of a random variable and calculates expected value</p> <p><b>19</b> Distinguishes between discrete and continuous distributions and solves problems using probability distributions, including binomial, normal, Poisson, and chi square</p> <p><b>ISTE Standards (all)</b></p> <p><b>1</b> Basic operations and concepts</p> <p><b>2</b> Social, ethical, and human issues</p> <p><b>3</b> Technology productivity tools</p> <p><b>5</b> Technology research tools</p> <p><b>6</b> Technology problem-solving and decision-making tools</p> <p><b>ISTE Standards (9-12)</b></p> <p><b>1</b> Identify capabilities and limitations of contemporary and emerging technology resources and assess the potential of these systems and services to address personal, lifelong learning, and workplace needs. (2)</p> <p><b>2</b> Make informed choices among technology systems, resources, and services. (1, 2)</p> <p><b>3</b> Analyze advantages and disadvantages of widespread use and reliance on technology in the workplace and in society as a whole. (2)</p> <p><b>4</b> Demonstrate and advocate for legal and ethical behaviors among peers, family, and community regarding the use of technology and information. (2)</p> <p><b>6</b> Evaluate technology-based options, including distance and distributed education, for lifelong learning. (5)</p> <p><b>7</b> Routinely and efficiently use online information resources to meet needs for collaboration, research, publication, communication, and productivity. (4, 5, 6)</p>
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	<p><b>8</b> Select and apply technology tools for research, information analysis, problem solving, and decision making in content learning. (4, 5)</p> <p><b>9</b> Investigate and apply expert systems, intelligent agents, and simulations in real-world situations. (3, 5, 6)</p> <p><b>10</b> Collaborate with peers, experts, and others to contribute to a content-related knowledge base by using technology to compile, synthesize, produce, and disseminate information, models, and other creative works. (4, 5, 6)</p>
<b>Technology Connections</b>	<ul style="list-style-type: none"> <li>• Fathom, Minitab, or TI-83 plus random number generator</li> <li>• Internet</li> </ul>
<b>Performance Objectives</b>	<ul style="list-style-type: none"> <li>• After completion of the lesson, students will be able to compare and contrast probabilities for different games of chance.</li> <li>• Students will be able to construct appropriate simulations for random phenomena.</li> <li>• Students will be able to evaluate the mathematical “fairness” of various games of chance.</li> </ul>
<b>The Learning Process</b>	Collaborative Groups
<b>Materials Needed</b>	<ul style="list-style-type: none"> <li>• 2 dice</li> <li>• 2 decks of cards</li> <li>• roulette wheel</li> <li>• Fathom, Minitab, or TI-83 random number generators</li> <li>• Internet</li> </ul>
<b>Procedures</b>	In groups, students will rotate through a “casino.” They will play each game 20 times using the actual apparatus and then they will develop a simulation for the computer or graphing calculator that will model the game. They will use the data to compare the simulation with the actual game and answer questions regarding the probabilities of games of chance and the game show “Let’s Make a Deal”.
<b>Design Qualities</b>	<p><b>1. Content and Substance</b></p> <ul style="list-style-type: none"> <li>• Exploration</li> <li>• Discussion</li> <li>• Assess prior knowledge</li> <li>• Applicable to real world</li> <li>• Internet</li> <li>• Differentiated instruction</li> <li>• Technology</li> <li>• Manipulative/concrete objects</li> <li>• Resource centers</li> <li>• Real life experiences</li> <li>• National organization standards</li> </ul>

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	<p><b>2. Organization of Knowledge</b></p> <ul style="list-style-type: none"><li>• Graphic organizers</li><li>• Integration of technology and other resources</li><li>• Cooperative learning opportunities</li><li>• Hands-on experiences</li><li>• Work is designed so that it makes sense to the students and they can apply it to real world experiences</li></ul> <p><b>3. Product Focus</b></p> <ul style="list-style-type: none"><li>• Clear expectation of what the product will be and how it is related to learning</li><li>• Show clear examples/samples</li><li>• High interest resources and student-based products</li></ul> <p><b>4. Clear and Compelling Product Standards</b></p> <ul style="list-style-type: none"><li>• On-going assessment</li><li>• "Begin with the end in mind"</li><li>• Model the process</li><li>• Communicating how information obtained will prepare them to become life-long learners and to interact in the environment</li><li>• Allow for student input and student expectations</li><li>• Peer evaluation</li></ul> <p><b>5. Protection from Adverse Consequences for Initial Failure</b></p> <ul style="list-style-type: none"><li>• Students given "open-ended" activities that allow for more than one correct response.</li><li>• Student self-evaluations allow them to monitor their own progress</li><li>• Frequent student-teacher conferences</li><li>• Dry run</li></ul> <p><b>6. Affirmation of Performance</b></p> <ul style="list-style-type: none"><li>• Oral and written feedback</li></ul> <p><b>7. Affiliation</b></p> <ul style="list-style-type: none"><li>• Partner work</li><li>• Strategic grouping</li><li>• Teach roles and responsibilities</li><li>• Make sure that rubrics address individual and group work</li></ul>
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	<p><b>8. Novelty and Variety</b></p> <ul style="list-style-type: none"><li>• Higher level/order thinking</li><li>• Varied use of technology/media</li><li>• Variety of materials</li><li>• Peer interaction/buddy classes</li><li>• Information relevant to real life</li><li>• Engage different learning styles</li><li>• Innovative projects and activities</li><li>• Differentiated learning and instruction</li></ul> <p><b>9. Choice</b></p> <ul style="list-style-type: none"><li>• Use wide range of technology</li></ul> <p><b>10. Authenticity</b></p> <ul style="list-style-type: none"><li>• Activities are meaningful to students</li></ul>
<b>Classroom Management</b>	Since this is a student focused activity, use a timer so that students know they have to stay on task or time will run out for their game.
<b>Related URLs</b>	<a href="http://www.stat.sc.edu/~west/javahtml/LetsMakeaDeal.html">http://www.stat.sc.edu/~west/javahtml/LetsMakeaDeal.html</a>
<b>Assessment</b>	The worksheet problems will be graded for accuracy based on the individual results obtained by the group. Since this is a random activity, it is very unlikely that two groups will get the exact same data for either the game or the simulation.

## Attachments

<b>File Attachments</b>	<a href="#">Worksheet</a>
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