**Subject area/course**: Mathematics/Statistics

**Grade level/band**: 10-12

**Task source**: Summit Public Schools; Author: Joanna Hefty

**Casino Night**

**STUDENT INSTRUCTIONS**

1. **Task context**:

Do you want to make money? You might think that gambling is a quick way to make money. Did you know that casino games are designed so that the casino makes money off of you in the long term? Even the lottery is designed this way. How do casinos ensure that they will take your money?

What makes for a good casino game? Generally speaking . . .

* The game is relatively easy to learn.
* A large number of games can be played in succession quickly.
* The game has somewhat large short-term variability but long-term stability (meaning, it is not uncommon for people to win several times in a row but in the long run, the casino makes a profit).
* The game has quirky twists in its rules that keep the game from being mundane (usually accomplished by different bet types, drawing schemes if a card game, manipulatives, etc.)

1. **Final product**:

You will design a new casino game. It should meet all of the objectives above. Along with your game, you will submit a completed expected value table that shows the expected value for all possible outcomes in your game as well as the standard deviation. (These expected values can be computed by probability calculations or by extensive, documented simulation.) You will use these calculations to sell the game to a Caesar’s Palace Casino in a commercial.

**Procedure**

1. Create a new casino game. The game must be played using either one or more dice, one or more coins, one or more cards, or a combination of any two of the three. Your game must involve compound events and conditional probability.
2. Decide on the rules for your game. The game can be a multi-stage game with increased winnings for each stage, or just have different payoffs for the different outcomes of the game.
3. Determine the possible outcomes for the game. Calculate the probability of the possible outcomes that can occur in your game, and create a probability distribution table for the outcomes.
4. Compute the expected value of the game, and decide on the cost to play. Keep in mind that a casino is in the business to make money. If the game is too expensive, however, no one will want to play.
5. Calculate the standard deviation. This will determine how much people will want to keep playing the game.
6. Decide on a name for your game. The game should have a catchy name to entice people to play it.
7. Create a commercial to convince casinos to use your game using evidence from your calculations (see Item B, *Casino Night Commercial*, for instructions and requirements).

**Additional Information**

1. **Knowledge and skills you will need to demonstrate on this task:**

* Designing processes and procedures
* Interpreting data/info
* Justifying/constructing an explanation
* Modeling
* Multimedia in oral presentation
* Precision

1. **Materials needed:**

You will need access to the Internet for brief research, as well as access to computers and video equipment to create your commercial.

Documents required:

* Item A. Casino Lab
* Item B. Casino Night Commercial

1. **Time requirements:**

This task will take about two weeks.

1. **Scoring:**

Your work will be scored using the Summit Public Schools Casino Night rubric. You should make sure you are familiar with the language that describes the expectations for proficient performance.