Probability Project: Designing Your Own Board Game

Project Overview

For this assignment you are to design and create your own board game. Of course it is not just as simple as that. The purpose of this project is to investigate games of chance by using the probability concepts you have learned and applying them in designing, creating, and analyzing your own game. Further, once we have had a chance to experiment with everyone’s game, you will take time to reflect on the observations you have made and discuss how this could be relevant outside of the classroom. You may work in groups of 2-3 to complete your board game – choose wisely! When planning your game, you must think through the following criteria:

* Your game should include a deck of cards, dice, spinner or something else that will allow for the probability component of the project.
* Your game must be quickly played so that multiples trials can be conducted in a class period.
* Your game should be ***unique***, i.e., you cannot replicate something that already exists; however you are allowed to modify or adapt a current game. This means that I should not see the exact same game twice in class.
* Keep in mind we will be playing the games you create so a model or a playable scale model needs to be put together in order play. The key word here is that the game is ***playable***! This means that the game is understandable, can be played within the confines of the classroom, and has all accessible materials.
* You are not providing prizes ☺
* Your game MUST be based around concepts that you have learned in either Science, Social Studies or **BOTH** this year (ie: facts, guessing games, trivia) and all information must be detailed and **CORRECT.**
* You need be able to calculate the probabilities of the outcomes of your game and more importantly, you must also be able to explain it (remember.. reasoning is so important!) As always, I encourage you to challenge yourself and to be creative as possible but don’t make it so complicated that you can’t sleep at night! This does not mean to do the minimum either, as these aspects will be taken into consideration to evaluate you and your group.
* And lastly, your game does not have to be fair, but should be honest.

Project Requirements

In addition to creating a model of your game, you are also expected to provide a write-up and oral presentation (1 per group with everyone in the group being given a certain piece of the write up and presentation that they are responsible for). The write up should answer the following questions/topics addressed in this outline.

1. Introduction (1 paragraph) – This section should provide an overview of your game.
   1. What is the objective of the game?
   2. How much does it cost to play?
2. Instructions (bullet point and easy to read)
   1. How do you play?
   2. What are the rules of the game?
3. Description of Game
   1. What is needed to play the game? (List all materials)
   2. Are there any special terms that need to be defined?
   3. Draw a labeled diagram of the game
4. Probability Analysis
   1. What are the probabilities of all the possible outcomes?
      1. Theoretical Probabilities
      2. Experimental Probabilities (collected on Game Day)
   2. What is the most likely outcome?
   3. What is the least likely outcome?
   4. Based on your probabilities and outcomes, is your game fair? Explain.
5. Reflection (1 paragraph)
   1. Did you learn anything new from working with your group?
   2. Among the presented games, was their one that you liked more than your own groups? Explain.
   3. Having seen the other games, would you change any aspect of your own group’s game? Explain.
   4. In what ways can you see using probability in your daily life?

Items I-IV addressed in this outline should be completed as a group. Item V is to be accomplished individually.

These guidelines are skeletal. To obtain the highest grade possible, you must go above and beyond these requirements.

Game Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Group Names: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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| **Grading Rubric** | | | | |
| **CATEGORY** | **4** | **3** | **2** | **1** |
| Game | Students create a fully functioning game that students can play. They bring all of the game materials to class. | Students create a game that students can play. There may be slight over-sights, but overall the game can be played. | Students create a game, but it cannot be played in class. | Students have an idea for a game. |
| Instructions | Instructions are clear and easy to follow. The game can be played by others without referring to the game creators for help. | Instructions are somewhat clear and easy to follow. The game can be played by others with minimal interaction with creators of the game. | Group has written instructions but they are unclear and a verbal description of the game is necessary. | Instructions are incomplete. |
| Group Write-Up | Group has comprehensive write-up including: introduction, instructions, game description and probability analysis. The write-up has been thoughtfully prepared and provides insight into the actions of the group. | Group has write-up including: introduction, instructions, game description and probability analysis. The write-up provides some insight into the actions of the group. | Group has an incomplete write-up including some of the following: introduction, instructions, game description and probability analysis. | An attempt at a write-up is made. |
| Probability Analysis | Group provides accurate analysis of the math behind their game. The idea of a fair game is clearly explained in terms of their project and an alternative for making their game fair is presented. | Group provides somewhat accurate analysis of the math behind their game. The idea of a fair game is explained in terms of their project. An attempt at providing an alternative for making their game fair is presented. | Group provides some analysis of the math behind their game. The idea of fair game is mentioned. | Group attempts some sort of analysis of their probability. |
| Individual Reflection | Reflection clearly explains students thought process during the project. The relevance of the project is clearly described. | Reflection attempts to explain students thought process during the project. The relevance of the project is described. | Reflection attempts to explain students thought process during the project. | Some attempt at a reflection is made. |
| Neatness and Organization | The work is presented in a neat, clear, organized fashion that is easy to read. | The work is presented in a neat and organized fashion that is usually easy to read. | The work is presented in an organized fashion but may be hard to read at times. | The work appears sloppy and unorganized. It is hard to know what information goes together. |
| Theme | The game has a clear theme that relates back to a wide variety of concepts learned for their year group with accurate data and they are able to explain their concepts with detail. | The game has a theme that relates back to some concepts learned for their year group with mostly accurate data and they are able to explain their concepts with some detail. | The game has a theme that relates back to some concepts learned for their year group with mostly accurate data. They are able to explain their data with some detail. | The game has no theme that relates back to any concepts learned for their year group. |