**CARNIVAL GAME PROJECT**

The purpose of this project is to create a playable carnival game that can be used to calculate experimental and theoretical probabilities of winning prizes and to calculate the expected expenses, revenue, and profit of playing your game. For this project, we will create groups of 4. The steps described below will need to be completed to fulfill the requirements of this project. This project will count as a TEST GRADE and a QUIZ GRADE. Steps 1 through 4 will result in a TEST GRADE and steps 5 and 6 will result in a QUIZ GRADE.

**Step 1: Choose carnival game. This part is due by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.**

Your group needs to choose a carnival game that you can build/create yourself and that involves probability to win prizes. You must get approval from me for your carnival game choice. Please note that no two groups will be allowed to build the same carnival game. The following are suggestions for carnival games. You don’t have to use one of these ideas, but your game must be approved by me and must be school-appropriate in all aspects.

* Ring Toss – using 2-liter bottles as the targets and a ring made of rope or plastic
* Bean Bag Toss – using a target made out of plywood or foam with a hole in it to toss a beanbag through
* Can Knockdown – using cans to create a pyramid with a rubber ball being used to knock down the cans
* Bucket Toss – created by attaching 3 or 4 small buckets or cans to a board about 6 inches apart and having players try to toss a ball into the buckets in order from the closest to the farthest away
* Number Wheel – make a spinner that contains numbered sections or sections that identify prizes
* Dice Game – uses dice built by hand and labeled as you want for the purpose of the game.
* Balloon Darts – Velcro balls are thrown against a board. You can award prizes based on the number of balloons popped, or attach a tag to each balloon that states the prize won. (we may need to do this with Velcro balls and not darts).
* **Tin Pan Alley** – The player rolls a ball down a ramp with holes in it. Underneath the holes are buckets. The player must get 2 of the 3 balls in the same whole to win a prize. Different prizes can be awarded on the difficulty of each hole.

To complete this part of the project, your group must submit a written proposal for your game. Remember that no two groups will be allowed to complete the same carnival game – first come, first serve.

**Deliverables Include:**

1. Describe your carnival game
2. The materials it will take to build your carnival game
3. A basic summary of the rules of your game that will determine how a player wins a prize from your game.
4. A color sketch that is to scale of your game.

**Step 2: Build carnival game and create the rules of play. This part is due on \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.**

Your group needs to actually build/create your carnival game. Your carnival game can take up no more space than 4 square feet. It must be able to be brought to school and must be totally school-appropriate in all aspects. You must provide whatever is necessary to play your game such as a rubber ball, a bean bag, a ring, etc. Your game must be playable and must be able to stand up to being played by at least 50 people. You will need to create the rules that govern how your game is played and how players will win prizes. You need to write your rules on poster board so they can be displayed with your game. You will be required to gather data from at least 50 people who play your game so you can calculate the empirical probabilities of the various outcomes for your game. We will conduct this carnival for the PE students.

**Deliverables Include:**

1. A working game, with all pieces and parts, decorated, colorful, attractive, and safe
2. Print out of the rules of your game

A poster board with your rules clearly illustrated and made attractively will be produced after we have tried the game and finalized our rules..

**Step 3: Calculate the empirical and theoretical probabilities. This part is due \_\_\_\_\_\_\_\_\_\_\_\_\_\_.**

Your group will need to calculate the theoretical probabilities of the various outcomes for your game using the probability rules we have been studying. In addition, your group will need to calculate the empirical probabilities of the various outcomes for your game using the results gathered from having at least 50 people play your game. You will need to record the results from these 50 people in a table to serve as documentation. As always, justification/explanation must be provided for all numbers and calculations.

**Deliverables Include:**

1. Theoretical probability calculations for your game
	1. Shows all math work
	2. Shows all assumptions and justifications and explanations
2. Results from 50 or more trials of your game being played by classmates, teachers, administrators
	1. Original Log kept at the game to record it.
	2. Typed and sorted log using Microsoft Excel or Microsoft Word.
3. Empirical probability calculations for your game
	1. Show all math work
	2. Show all justifications and explanations
4. Comparison of Theoretical to Empirical
	1. Were you close, were you far off – why, what happened.

**Step 4: Calculate expenses, revenue, and profit. This part will be due on: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

Your group needs to calculate the expected profit from your game if 100 people were to play it. You will need to gather/determine the following information to calculate this value: the cost of the materials to build your game, the cost of prizes and the expected number of prizes that will be won, and the amount you would charge to play your game if it were at a true carnival. As always, justification/explanation must be provided for all numbers and calculations.

**Deliverables Include:**

1. Calculations of expected profit for the game.
2. Budget for the Game
	1. Cost of prizes
	2. Cost of staff (use $7 an hour/per person for all work spent creating and manning the game)
	3. Cost of materials
	4. Tickets Received = Gross Revenue
	5. Net Revenue = Gross Revenue minus all expenses.
	6. Profit per each dollar received.
3. Justifications for your budget and expected profit and price charged to pay.

**Step 5: Prepare a PowerPoint presentation. This part is due on \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.**

Your group needs to prepare a PowerPoint presentation that will complement a 10 to 13 minute oral presentation to be given by your group during the week of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Your PowerPoint presentation should include slides on the following information: the details of your carnival game including the rules of play, the expected expenses, revenue and profit of your game, and the theoretical and empirical probabilities for your outcomes. You must submit a printed copy of your PowerPoint on the due date with no more than four slides printed per page.

**Deliverables Include:**

Power Point Presentation – colorful, creative, and appropriate

* 1. Intro slide
	2. Name of group members slide
	3. Tell us about the game, describe it, rules

-Materials list slide

* 1. Theoretical probabilities

- Assumptions

- Mathematical calculations shown

* 1. Results shown for the 50 data
	2. Empirical probabilities slide

- Mathematical calculations shown

* 1. Comparison to between theoretical and empirical

- Conclusions and rational for differences between the two.

* 1. Budget and expected profit
	2. Conclusion

**Step 6: Prepare an oral presentation. This part is due the week of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.**During the week of \_\_\_\_\_\_\_\_\_\_\_, your group will have a 10 minute block of time to present your project to the class and to answer questions from the class and from me. This is expected to be a formal and professional presentation to the class. Your group should prepare an oral presentation that needs to last 7 to 8 minutes. The remaining time of your 10 minute block is reserved for questions. Your PowerPoint will obviously be used to complement your oral presentation. In addition, you can have additional relevant information to your presentation displayed on poster board, presentation paper, or a display board. Your group needs to educate the class on the following aspects of your carnival game: the rules of play, the expected expenses, revenue and profit, and the theoretical and empirical probabilities. In addition, you need to discuss the difference between your theoretical and empirical probabilities, why you think a carnival would be interested in using your game, and any learning experiences you had along the way. All group members are expected to equally participate in this presentation. Your grade on this part of the project will consist of points earned by your group on the PowerPoint and the overall presentation and points earned individually on your part of the presentation and your participation in the question/answer session of your project as well as in the question/answer sessions of other projects.

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Period: \_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**CARNIVAL GAME RUBRIC (Steps 1 to 4)**

You will receive one TEST grade for this part of the project according to the following rubric. Please remember that only meeting my expectations will not result in a grade of A on this project.

 **E – Excellent G – Good A – Acceptable**

 **N – Needs Improvement U - Unacceptable**

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| --- | --- | --- | --- | --- | --- |
| **Graded Criteria** | **E** | **G** | **A** | **N** | **U** |
| **Quality of Game (25 points):** Does it match your proposal? Does your game involve probability to win? Is it playable? Is it professional in appearance? Does it display the highest quality of work? | 1015 | 812 | 69 | 46 | 23 |
| **Rules of the Game (15 points):** Are the rules clear? Are there multiple ways to win different levels of prizes? Are the rules neatly presented? | 105 | 84 | 63 | 42 | 21 |
| **Theoretical and Empirical Probabilities (30 points):** Are the theoretical probabilities calculated correctly and fully supported? Was adequate data gathered to calculate the empirical probabilities? Are the empirical probabilities calculated correctly and fully supported?  | 1515 | 1212 | 99 | 66 | 33 |
| **Expenses, Revenue, and Profit (30 points):** Are expenses of the games summarized and explained? Are revenues expected from the game summarized and explained? Is the expected profit correctly calculated if 100 people play your game? | 101010 | 888 | 666 | 444 | 222 |
| **FINAL GRADE:** |  |

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Period: \_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**CARNIVAL GAME RUBRIC (Steps 5 to 6)**

You will receive one QUIZ grade for this part of the project according to the following rubric. Please remember that only meeting my expectations will not result in a grade of A on this project.

 **E – Excellent G – Good A – Acceptable**

 **N – Needs Improvement U - Unacceptable**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Graded Criteria** | **E** | **G** | **A** | **N** | **U** |
| **Power Point presentation (25 points):** Does your PowerPoint include all required information in a way that will support your oral presentation?Is it neat and professional in appearance? | 1510 | 128 | 96 | 64 | 32 |
| **Oral Presentation (50 points): How well did your group present the following required information:**Overall description of game and rules of playExpected expenses, revenue, and profitTheoretical and empirical probabilitiesDifference between the two probabilitiesWhy a carnival would be interested in your gameLearning experiences  | 101015555 | 8812444 | 669333 | 446222 | 223111 |
| **Personal Grade (25 points):**Did you equally participate in the presentation? Was your part of the presentation professional? Were you knowledgeable about your part of the project? Did you participate in the question/answer session for your group? Did you justify any answers you gave? Were you knowledgeable about your project?  | 1510 | 118 | 86 | 44 | 22 |
| **FINAL GRADE:** |  |

Overall comments: