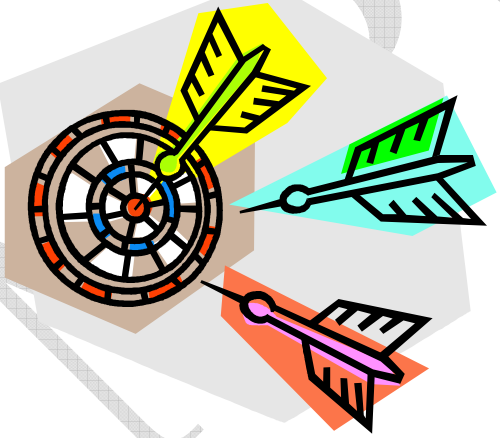
CurrTech Integrations

What's My Chance of Winning?



MATHEMATICS

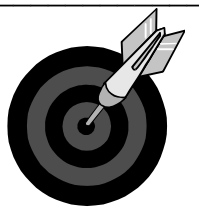
GRADE 7

Item # 7.1.03

STUDENT BOOKLET

Name: _____

What's My Chance of Winning?



Activity #1

The school board has stated that it will approve games of chance at the annual student fair/community festival. You can earn money for your school related sport or activity by designing and operating a game.

Develop a game that you will use in the fair. You must determine the cost of materials, prizes and what you will charge an individual to play to ensure a reasonable profit. (The ratio of cost to income will be 1 to 3). From this ratio you will determine the games required probability of winning to meet your profit margins. Assume that 500 people will play your game (or a number of players approved by the class).

Submit the following in your report to have your game approved by the school board.

Include the following:

a) A detailed description of how to play the game.

b) One aspect of the game that can be manipulated to affect the probability of winning with an explanation of how it will affect the probability.

c) A diagram of the game.

d) A list of required materials and costs even if the cost is zero.

e) The prize for each winner and what it will cost.

f) What each individual will be charged to play.

g) All details explaining how you will meet the cost to income ratio of 1 to 3 (include calculation for: total cost, total income, and number of winners.

h) The required probability of winning.

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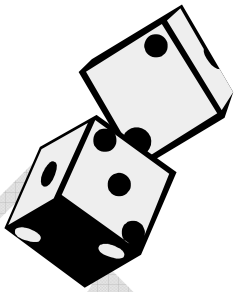

Activity #2

Games with a Theoretical Probability:

Calculate the theoretical probability of winning your game. Show all work. Then, using a working proto-type of your game, construct a probability table for your game to investigate the actual probability of winning. This table will display the following:

a) A title identifying the name of the game.

b) A total number of attempts.

c) The number of wins

d) The number of losses.

The total number of attempts should be at least three times the theoretical probability to get accurate results.

Summarize the results of your table in a paragraph. Include a comparison of the theoretical to actual probability. If they do not match, what might account for the difference?

Reread the original description of your game. Then rewrite it to reflect the changes you made to get the required probability from Activity 1. Then submit a typed copy for formal approval.

Name _____

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Activity #2

Games with No Theoretical Probability

Use a working proto-type of your game to test the effect of modifying an aspect of the game that you identified in Activity 1. Construct a probability table to record the results of your test. This table will display:

a. A title identifying the game.

b. The aspect of the game that is being manipulated to affect the probability of winning, and its value for each test.

c. The total number of attempts.

d. The number of wins.

e. The number of losses.

You must keep changing the aspect of the game until you reach your preset (Activity I) probability of winning. For each change in the aspect of the game, you must continue testing the game until you have two wins and then calculate the probability of winning. If it doesn't match the value required from Activity 1, then change the value of the aspect that you are modifying and test again. Every time an aspect of the game is changed, the probability table must show the corresponding number of win and losses.

Summarize the results of your table in a paragraph. Include a discussion of the effect of the aspect of the game that you manipulated. Did it affect the game the way you thought it would? Were you able to achieve the required probability form Activity 1? What other aspects of the game could be manipulated to effect the probability, and would any of these have been easier to control?

Reread the original description of your game. Then rewrite it to reflect the changes you made to get the required probability from Activity 1. Then submit a typed copy for formal approval.

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Activity #3

You will be designing and operating a spinner game at the school fair for your class. Winners will be awarded a stuffed animal has already been chosen. Each stuffed animal cost $3.25. You expect 500 people to play your game. The wood, paint and hardware for the spinner costs $15.

Apply what you have learned in class, Activity #1, and Activity #2 to determine a combination of what you will charge an individual to play and the probability of winning. Set up and solve a proportion to get a ratio cost to income of 1 to 3. Show all work including: total cost, total income, number of winners, and probability of winning.

Summarize your results in a paragraph explaining how you will run the game. Include what you will charge each individual to play, the probability of winning that you calculated, and how you would design the spinner to attain the required probability of winning.