Names:

Beanbag Toss
Worksheet

Introduction: You and your team are going to build a beanbag toss at a carnival! In a group of 3 – 5, toss beanbags at targets with different difficulties to determine how accurate a beanbag toss game is with different parameters. Using this information, create a model to determine how the accuracy of the beanbag toss game changes with your changing parameter. Also propose a set of rules that make the game challenging. Once you have a model, you will share it with your class. Your model must consider only one parameter that changes the game, and it must remain fair. Your solution should include a table of accuracy data, predictions about how accuracy changes, and a set of rules to play your game.

Define the Problem: Before you can start planning your beanbag toss game, you need to be specific about what you're measuring so that you can justify your design.

1. What kind of information do you need to know to make a model? _____
   _____
   _____
   _____

2. What are some important quantities? Are they quantities which are required by the model, or quantities which are provided by the model? _____
   _____
   _____
   _____

3. How can you get this information? What kinds of data can you gather? _____
   _____
   _____
   _____

4. Does each quantity have only one value, or can it have a range of values? _____
   _____
   _____
   _____

5. What mathematical tools could you use in your model? _____
   _____

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6. What accuracy makes the game challenging but still fair? Is there some other factor than accuracy to consider? _____

_____

_____

_____

7. What challenges in tossing a beanbag can be quantified? How? _____

_____

_____

_____

8. How should points be earned? _____

_____

_____

_____

Gather Information: Now that you know what information you're looking for and how you'll use it to help design a fair, challenging game of beanbag toss, you need to collect that information. Do research to gather the information you'll need in your model. Write it down on the provided chart.

Trial	Number of Hits	Number of Misses	Accuracy

Do the Math: Take the information you've gathered and use your mathematical tools to create a mathematical model of your beanbag toss game. Justify your numerical values, estimations, and decisions. Show all your work.

Reflection: It's almost time to show everybody your game! During your presentation, you should focus on the process you used to create your model. Your finished works (table of accuracies, model of how accuracy changes, and suggested level of challenge) are important, but reflect on these questions before your presentation to help you justify your model. Remember to explain why the decisions you made were reasonable!

1. Is your solution reasonable? Why or why not? _____
   _____
   _____
   _____

2. Is your solution useful for answering your question? _____
   _____
   _____
   _____

3. Why would you recommend your model to someone? _____
   _____
   _____
   _____

4. What mathematical tools did you use, and how did they help solve the problem? _____
   _____
   _____
   _____

5. What did you change in your model throughout the modeling process? _____
   _____
   _____
   _____

6. Are there situations where your solution wouldn't work or your model wouldn't apply? __
   _____
   _____
   _____

7. How would you need to change your model to apply to more situations? _____
   _____

_____

_____

8. If you had more time, what else would you do? _____

_____

_____

_____

9. Are there any mathematical tools or pieces of information that would have been helpful to have? _____

_____

_____

_____

Presentation: When it's your turn, show your class your game. If your teacher has a rubric, check to see how to make your presentation better. Don't forget to explain why you did what you did!