**Introduction:** You and your team are going to redesign your playground! In a group of 3 – 5, do research about your playground to determine the popularity of pieces of playground equipment. Using this information, create a model to determine ways to improve your current playground. Once you have a model, you will share it with your class. Your model must consider the cost of renovations or building a new playground as well as the layout of your current playground. Your solution should include a blueprint of more efficient proposed playground, and a budget for your new playground, including ranking that helped you determine which pieces of playground equipment to invest in.

**Define the Problem:** Before you can start planning your playground, 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? ______________
   ____________________________________________________________________________
   ____________________________________________________________________________
   ____________________________________________________________________________
6. What makes a playground more efficient? ____________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________

7. How can you determine and rank popularity of playground equipment? ____________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________

Gather Information: Now that you know what information you’re looking for and how you’ll use it to help create your playground, you need to collect that information. Do research to gather the information you’ll need in your model. Write it down.

Do the Math: Take the information you’ve gathered and use your mathematical tools to create a mathematical model of your playground. Justify your numerical values, estimations, and decisions. Show all your work.
Reflection: It’s almost time to show everybody your playground model! During your presentation, you should focus on the process you used to create your model. Your finished works (blueprint and budget for the playground) 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 playground blueprint. 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!