

Names:

# Design a Zoo

## Worksheet



**Introduction:** You and your team are going to design a zoo! In a group of three to five, collect data about the local zoo to determine the most popular exhibits and the costs associated with building and running a zoo. Using this information, create a model to determine the best exhibits for your zoo. Once you have a model, you will share it with your class. Your model must consider multiple sources of cost and have more than one exhibit. It should include a map of the zoo, a table of costs, and a suggested price of admission.

**Define the Problem:** Before you can start planning your zoo, 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 sorts of costs might be associated with a zoo exhibit? \_\_\_\_\_

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7. How can you quantitatively determine the success of a zoo? \_\_\_\_\_

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**Gather Information:** Now that you know what information you're looking for and how you'll use it to help plan a zoo, you need to collect that information. Do independent research or design a survey 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 zoo. Justify your numerical values, estimations, and decisions. Show all your work.

**Reflection:** It's almost time to show everybody your zoo! During your presentation, you should focus on the process you used to create your model. Your finished works (map, table of costs, and suggested admission price) 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? \_\_\_\_\_

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2. Is your solution useful for answering your question? \_\_\_\_\_

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3. Why would you recommend your model to someone? \_\_\_\_\_

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

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

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

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

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

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

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**Presentation:** When it's your turn, show your class your map, table of costs, and price of admission. 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!