

Building by Design



Period	Group Members	

You and your group represent a design think tank that has been contacted by a well known toy company. This company is reaching out to talented young individuals such as yourselves with a challenge to design the next great modular building toy (modular means that it's made of several individual pieces that can be assembled and taken apart: building blocks, k'nex, legos, tinker toys, etc.).

Your Task:

Design, build, and market a modular building toy prototype according to the client's requirements

Before your clients are willing to give you their business, you must prove that your proposed design can truly satisfy the most common requests made by consumers

Consumer Requests
<ul style="list-style-type: none">• "I want to be able to build a tower as tall as me!" - <i>Jonathan (3 years old)</i>• "I think it would be really cool if it could be strong enough to hold my 3 month old baby brother" - <i>Maddie (7 years old)</i>• "I only want to play with a construction toy that looks cool" - <i>Tobias (13 years old)</i>• "I like to build bridges with my toys, it would be awesome if I could make one that can go over my shoe!" - <i>Eva (9 years old)</i>• "I only play with my toys outside and I don't want my tower to topple in the wind!" - <i>Carly (13 years old)</i>• "My brother is always bumping my table, I don't want the tower to fall because the table moves..." - <i>Peyton (11 years old)</i>• "I really like it when my building toys come with instructions for some different designs" - <i>Peter (12 years old)</i>

You also will need to fit within the guidelines of the company's manufacturing limits

Manufacturing Limits
<ul style="list-style-type: none">• "We can't afford to produce more than 3 unique modular construction set pieces. This means that you can have more than 3 different pieces but only 3 different designs. Each piece within a design should be pretty much identical to the others"• "Our packaging plant is really basic (it's an old shoebox folding machine) so all of your pieces must fit within the dimensions of a standard shoebox"

Prototype guidelines
Since it's costly to set up machinery for a test design, you must provide a proof of concept that is made out of paper products (paper, tagboard, cardboard, etc), glue, and tape. All other materials must be approved

What do you still need?

Your clients are very busy and need all questions delivered to them all at once. Read through your task again and record any questions that you still have in the **Need to Know** box. During the question time, record any new important info in the **Additional Information** box.

Need to Know
<ul style="list-style-type: none">•
Additional Information
<ul style="list-style-type: none">•

Criteria:

Make a list of the properties that would be NICE to have (these should be quantitative when possible)

<ul style="list-style-type: none">•

Constraints:

Make a list of the properties that your design **MUST** have (these should be quantitative when possible)

<ul style="list-style-type: none">•

Problem Statement

We as (our role) seek to (our task) in order to (reasons for design) for (our stakeholders).

--

Design Exploration - Brainstorming

Before you dive into the materials and start building, it's important to take a step back and develop a game plan

Rules for Brainstorming	
Go for numbers, as many ideas as possible	Don't judge, be positive and encouraging
Be visual, sketches help	Build on the ideas of others
Headline your idea, then quickly move on	Stay on Topic
One voice at a time. Everyone Shares	Encourage wild ideas
<i>Think independently for the first 5 minutes... then compare ideas to create your group list</i>	

What should the design look like?

Sketch drawings to present your ideas. You can store them in the space below by taking a picture or screenshot and importing a photo.

Prototype Time: Building, Testing, and Redesigning

Decide on two or three ideas from your group's brainstorming phase and compare them to the list of criteria and constraints that you developed. Come to a consensus on a design that is most promising in satisfying as many criteria and constraints as possible and begin prototyping.

Your idea will most likely change once you see start working on your prototype. **It is ok and recommended to test and redesign throughout this process!!** You are trying to come up with the best product.

Add pictures below of this process so that you have some "behind-the-scenes" documentation for your clients:

Polishing and Marketing

Once you have settled on a design that you think is going to please the customers, work together to finish your modular building set.

Final Design

Include pictures and the total number for each of the three unique designs in your proposal. *If you have less than three, just leave the rest blank.*

Total Count =	Total Count =	Total Count =

Rubric

Engineering Design Process	Define the task - What problem did you and your team solve?	0	1	★
	Define the constraints and criteria - Include at least 3 relevant factors that should be included in your design	0	1	2
	Brainstorm - evidence of multiple ideas before any prototypes are even constructed	0	1	2
	Prototyping - photos documenting the prototyping process	0	1	2
Customer Tests	Height -	0	1	★
	Strength -	0	1	★
	Bridge -	0	1	★
	Stability -	0	1	★
	Appearance -	0	1	★
	Instructions -	0	1	★
Manufacturing Requirements	All pieces fit inside the box	0	1	2
	No more than three unique designs are used	0	1	2
Marketing	Create an advertisement to promote your product	0	1	2
	2 minute presentation shows evidence of preparation	0	1	2
Groupwork	Everyone is involved in presentation	0	1	2
	Individual participation	0	1	2
"Wow Factor"	Extra credit for above and beyond	0	1	2
Comments:		Total: / 25		

