

Student Worksheet

Scenario

A local toy company is calling on engineering teams to implement time saving methods to help them meet the demands of manufacturing their most popular product— “color bricks.” This toddler toy is made out of recycled brown bags and has been hugely popular. They are constantly selling out! The toy company needs to place an order for one million color bricks in just 3 days!

Assemble One Color Brick

See how fast you can assemble one color brick and still meet the criteria.

Criteria

- The brick must be made up of 2 brown bags.
- The brick must be filled with 4 pieces of recycled paper (lightly crunched up and stuffed into one bag. The other bag will cover this bag and the crunched up paper.)
- The largest sides of the brick must be filled with polka dots. (3 large 1” diameter & 3 medium 0.5” circles scattered per side). One side must have 3 blue and 3 green circles. The other side must have 3 red and 3 orange circles.
- The top and bottom of the brick must have 4 vertical 0.5” purple stripes with 0.5” in between each stripe.
- Both sides of the brick must have **Color Bricks** written in black marker. Letters must be centered on the sides and 1” in height and 5” long.

Constraint

Use only the materials provided.

Reflection

1) How long did it take you to make 1 color brick?

2) What was the easiest task and why?

3) What was the most challenging task and why?

4) Is there an easier and/or faster way to make the brick? If yes, describe

Design Challenge

Scenario

A local toy company is calling on engineering teams to implement time saving methods to help them meet the demands of manufacturing their most popular product— “color bricks.”

This toddler toy is made out of recycled brown bags and has been hugely popular. They are constantly selling out! The toy company needs to place an order for one million color bricks in just 3 days! They will award the contract to the engineering team that can make the bricks the fastest while meeting the quality control constraints.

Design Challenge

Each team (approximately 8-10 per team) will design an assembly line process that will make as many “color bricks” in 10 minutes as possible and still meet all of the quality control constraints.

Criteria

- Each brick must be made up of 2 brown bags.
- Each brick must be filled with 4 pieces of recycled paper (crunched up and stuffed into one bag. The other bag will cover this bag and the crunched up paper.)
- The largest sides of the brick must be filled with polka dots. (3 large 1” diameter & 3 medium 0.5” circles scattered per side). One side must have 3 blue and 3 green circles. The other side must have 3 red and 3 orange circles.

- The top and bottom of the brick must have 4 vertical 0.5” purple stripes with 0.5” in between each stripe.
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Criteria

You must only use the materials provided.

Planning Stage

Meet as a team and discuss the problem you need to solve. Then develop and agree on a process for solving the challenge. You’ll need to determine what materials you want to use.

Draw your design below, and be sure to indicate the description and number of parts you plan to use.

Design Challenge

Brainstorm designs for your assembly line:

Team Chosen Assembly Line Design:

Construction Phase

Build your assembly line. During construction you may decide you need additional materials or that your design needs to change. This is ok – just make a new sketch and revise your materials list.

Testing Phase

Each team will test their assembly line. If your design and process were unsuccessful, redesign and test again. Continue until you are happy with your solution. Be sure to watch the tests of the other teams and observe how their different designs worked.

Sketch your Final Design

Evaluation Phase

Evaluate your teams' results, complete the evaluation worksheet, and present your findings to the class.

1) Was the order of your assembly line tasks successful? If not, why?

2) Did you have enough people in your assembly line to have experts in one task? If not, how would it have changed your assembly line if you had more people?

3) Did your group meet the quality control criteria? If not, why?

4) If you had more time or different supplies what would you add, change, or do differently?

5) Was it hard to go fast and still meet the quality control criteria? What would it take to improve?

6) Did your team work together harmoniously and efficiently?

7) What are the benefits of the assembly-line method when compared to assembling a product individually?

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