Skyscraper Challenge!

Step-by-Step Instructions

Click on to listen to the audio on each slide!

For other activities, click on the Tech Trekker Logo

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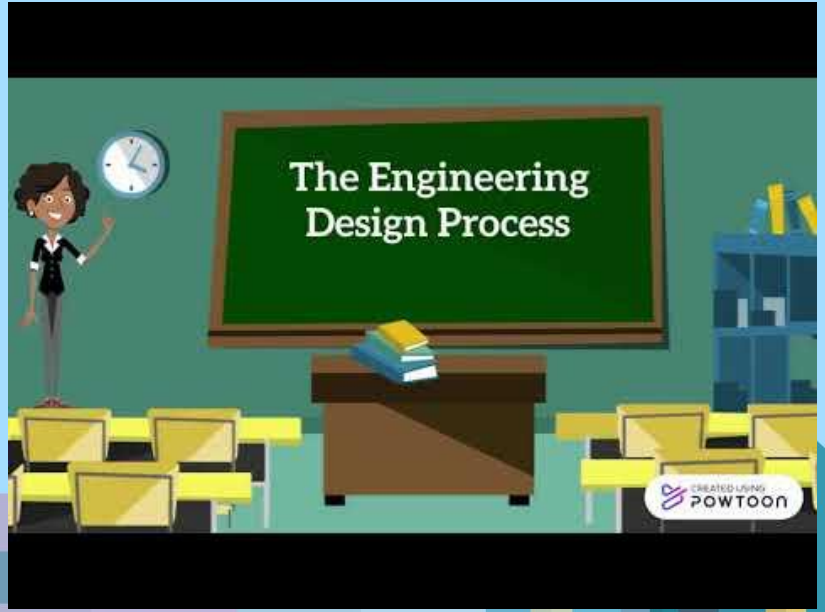
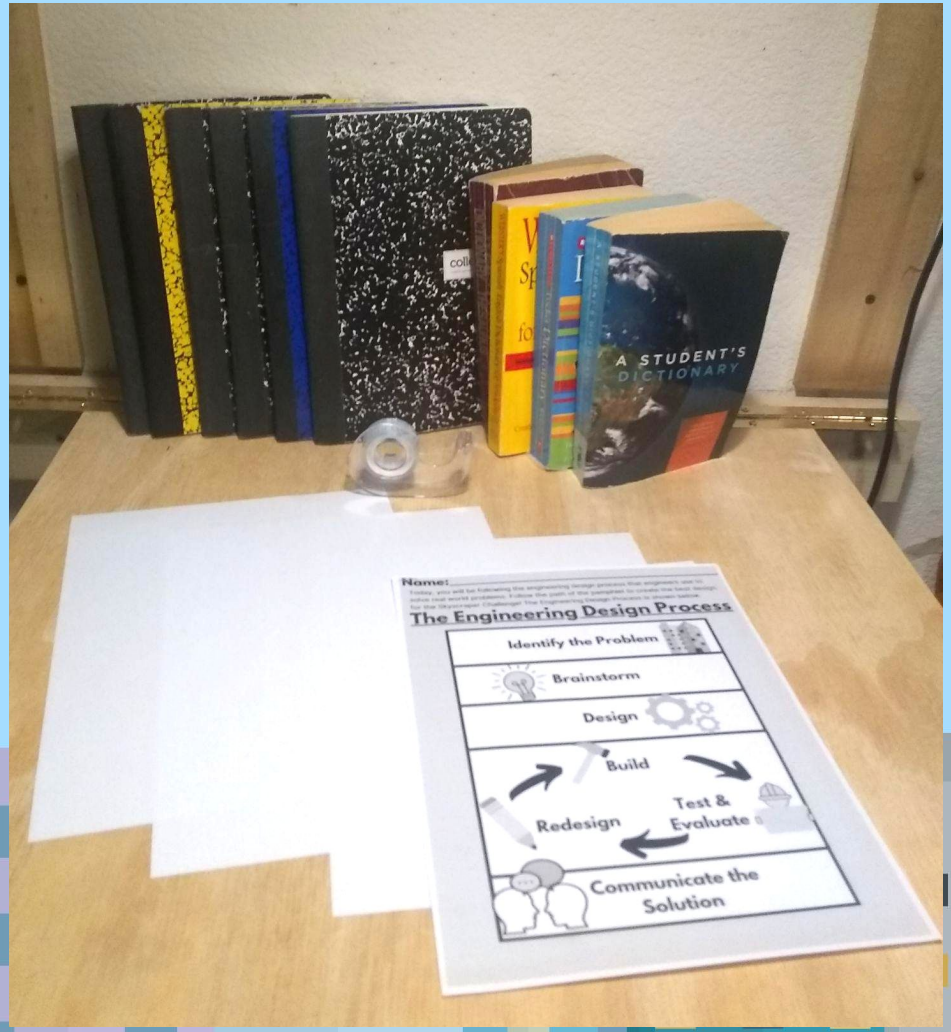
Process



In your activity pamphlet, read over the engineering design process and watch the video to get familiar with the engineering design process used in this experiment.



Materials Needed:

- 3 Sheets of Paper
- Scotch Tape
- Books
- Activity Pamphlet

Step 1: Identify the Problem

You are a structural engineer whose job is to design buildings of any size. Today, your client is tasking you to design and build the strongest base for a skyscraper! Using the engineering design process, how are you going to build the strongest base?

Step 2: Brainstorm

Write in the Brainstorm section how you plan on making the strongest structure! Think about the different shapes that you might make the strongest structure.

Step 3: Limitations and Constraints

Oh no! You got a call from the client ()! The client says that the only materials you have available are a single 8 1/2" by 11" sheet of paper and 6 inches of tape!

Step 4: Design

Draw 3 designs of your structures in the design section (). Consider the limitations and constraints of the materials in each of your designs. Think of the design drawings as blueprints that anyone could pick up and understand your thinking.

Step 5: Build

It's time to build your design! Remember to only use 6 inches of tape and one 8 1/2" by 11" piece of paper to follow one of the three designs you created.

If you are struggling to design or build your structure, click the button below for an example.

Example

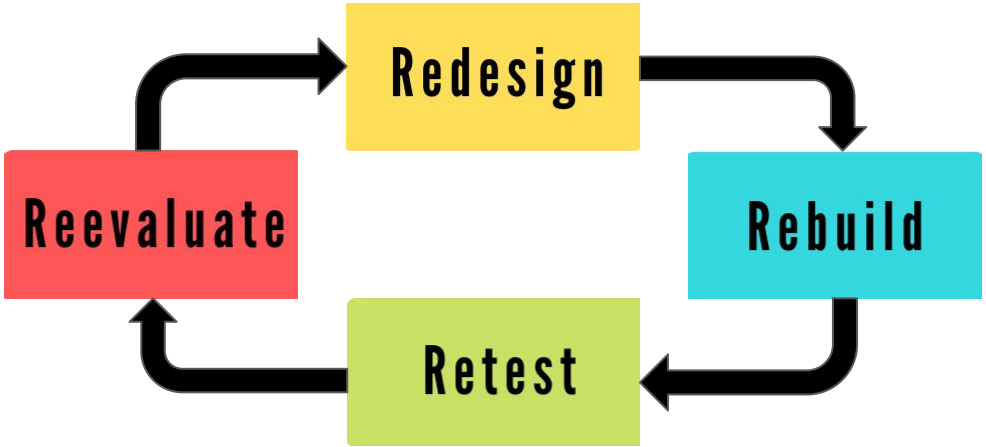
Step 6: Test and Evaluate

Place your base on a flat surface. Slowly add more books one at a time on the structure until it collapses.

Step 6: Test and Evaluate Continued

Write how many books your structure could hold before it collapsed. Also, write down how you think you could improve your design.

Step 7: Redesign, Rebuild, Retest and Reevaluate



Go through each of the steps on the left of this slide to improve your structure. If you don't remember how to complete each step, click the buttons on the left.

Step 8: Share Your Solution

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Did you do this activity with a group? Share what you found. You can also tell family and friends. Engineers always communicate their results!

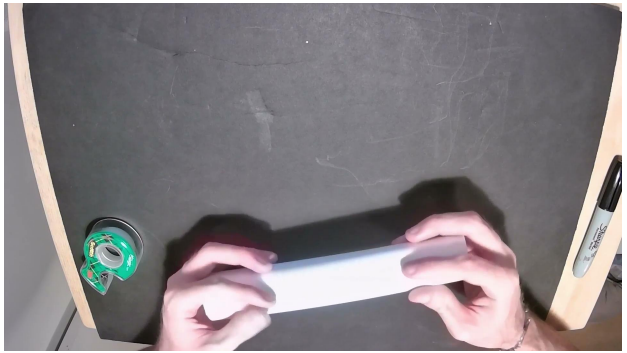
Warning!

The next slide contains the explanation to what shape makes the best structure. Please be sure that you have finished the previous steps before you move to the next slide.

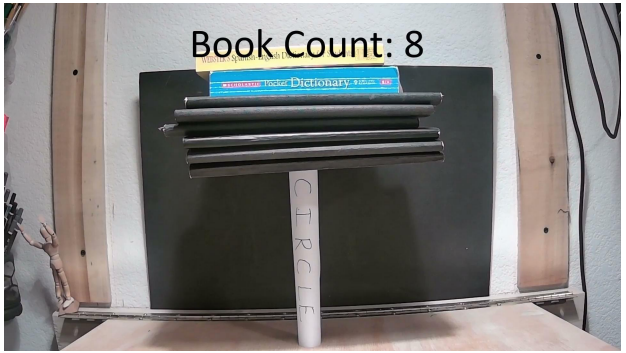
Explanation

The shape that can hold the most books is the circle base structure, also known as the cylinder. This is because other shapes, like a square or triangle, have edges that cause the force to be focused at weak points. However, circles don't have edges meaning that the force is distributed evenly.

Explanation: Build and Test



Build



Test

Extension

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See if you can find any cylinder or circle base structures in real life or online! Share what you find with your classmates, parents, teachers, or on the Tech Trekker chat! Click on the Tech Trekker logo to visit the Tech Trekker Chat.

Thank You!

Click on our logo for more activities!

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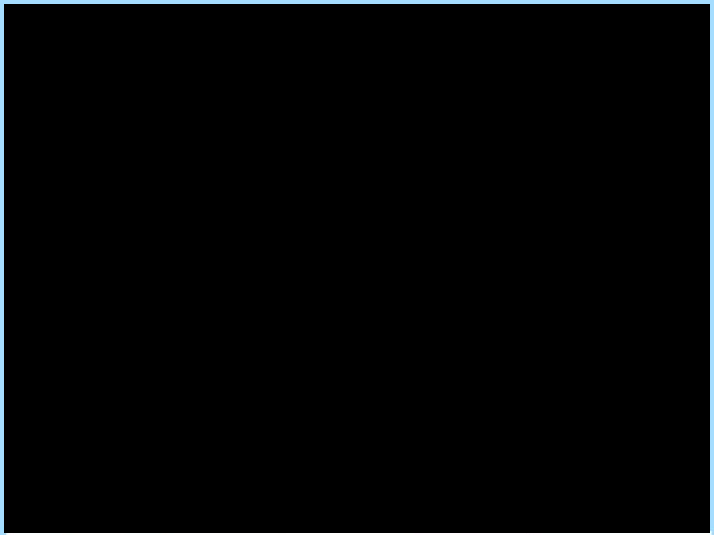
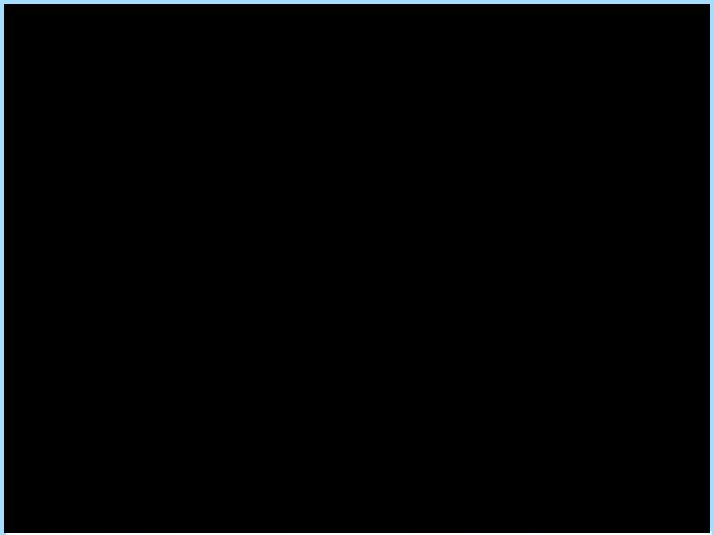


Return

Square

Watch the video to see how to create a square base structure. After you are done watching the video, click on the red return button.



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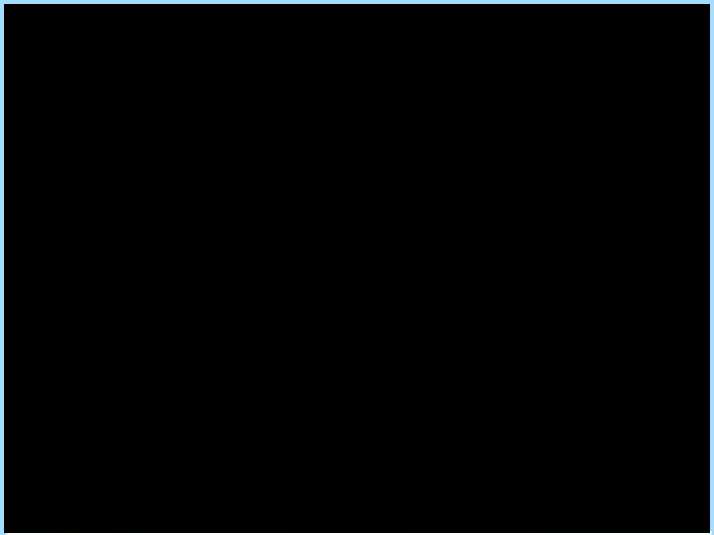

Return

Square

Watch the video to see how to create a square base structure. After you are done watching the video, click on the red return button.

Rebuild

It's time to build your new design! Remember to only use 6 inches of tape and one 8 1/2" by 11" piece of paper to follow your redesign drawing.

Return

If you are struggling to design or build your structure, click the button below for an example.

Example

Retest and Reevaluate

Place your newly built base on a flat surface. Slowly add more books one at a time on the structure until it collapses.

Return

Retest and Reevaluate Continued

Write how many books your newly structure could hold before it collapsed. Also, write down how you think you could improve your design.

Return

Redesign

Draw a new design using what you've learned from your previous test. Remember to consider the limitations and constraints of the materials in your redesign and to draw your design so that anyone can follow your steps.

Return