


What's Inside?

Can you see what's inside the building holding it up? Under the bricks, siding, and sheetrock, many buildings have frames made of wood or steel. Like your skeleton, the frame of a building provides support. The shapes used in the frame must be sturdy and stable.

To win first prize in the Tiny Towers contest downtown, **design and build** the tallest tower possible using no more than 30 straws.

Identify the Problem



1. What is your task? 

Do Research

Examine the photos of building frames.



2. What is the purpose of a building frame? _____

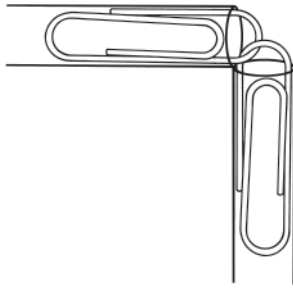


3. What shapes do you see in the frames? _____



4. Explain why there is often a reinforcing piece in corners of rectangle frames. _____

Go to the materials station(s). Gather 10 paper clips and two straws. Cut one of the straws into four equal pieces. Hook two paper clips together as if you were going to make a chain. Insert one of the paperclips into the end of one of the straw pieces. Insert the second paperclip into a second straw piece. This will make one corner of a straw square, as shown. Finish making the square.



- 5. How can you use the other straw and paperclips to stabilize the square you made so that it doesn't rock back and forth? _____

Try out your idea.

- 6. What other stable shapes can you make with straws and paperclips? **List** them, and then try to make them. _____

Go to the materials station(s). Pick up each material one at a time. Think about how it may or may not be useful in your design. Leave the materials where they are.


- 7. What are your design constraints? _____

Develop Possible Solutions

- 8. **List** five possible shapes you could use in your tower. _____

- 9. What shapes could you use for the base of your tower? _____

Choose One Solution

10. What shapes will you use in your tower?  _____

11. What shape will the base of your tower be? _____
12. **Draw** a diagram of the three-dimensional, self-supporting tower you will build.


Design and Construct a Prototype

Gather your materials plus a ruler and compass. You may use a maximum of 30 straws.

- 13.** To record the design details of your prototype, **draw** a picture of each two-dimensional shape you will use in your tower. **Label** the angles in each shape and the length in centimeters (cm) of each shape's sides.

Test the Prototype

Test your design. **Build** your three-dimensional, self-supporting tower. Keep building until your tower falls or you use the maximum number of straws.

- 14.** How high were you able to build your tower?  _____

Communicate Results

- 15.** **Compare your results** with your classmates' results. Fill in a class table with the following information.

Designer	Height	Shaped Used	Shape of Base

Evaluate and Redesign

- 16.** **Explain** how you would change your design to make your tower more stable or taller.
