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# Tower Building Activity

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## Process

### Objective

Work as a team to make the tallest tower possible using only the materials provided.

### Materials

Recycled newspapers

Masking tape

### Rules

- Like a real building, the tower must support itself. It may not be attached to the floor, or suspended from the ceiling.
- Each team will have 10 minutes to build their tower.

### Learning Objectives

Students will develop a basic understanding of design, engineering, motion, forces, teamwork, and prototyping.

### Procedures

1. Break students into groups of 2-3 students.
2. Provide students with materials.
3. Without priming the students, instruct them to build the tallest tower they can using only the materials provided. Inform them that they will have 10 minutes to do so. Tell them that their tower must support itself.
4. At the conclusion of the 10 minutes, stop all student work. Provide some comments on the team's creations. Which is tallest? Which are most structurally sound? Why? This commentary will help students break the problem down into smaller, more manageable pieces.
5. Give each team 5 additional minutes to refine their towers. Improvements should be based on the previous group discussion.
6. The team that built the tallest tower is determined to be the winner.
7. Discuss the process with the reflection questions below.

### Tips to Provide Students

- Look at how other things in the room stand. How do you stand? How does a table or chair stand?
- Look at how structures in the built environment are assembled. How does a building stand?
- Look around you. What are other groups doing?

# Reflection Questions

1. How did your first solution differ from your second, refined solution? What factors influenced the changes you made in your second solution?
2. Describe the tallest tower that was built. If it wasn't yours, how did it differ from yours? What aspects of its design enabled it to be taller?
3. How might your design solution change if you had access to different materials? Why?
4. Describe the process your group went through to develop your tower. How might your design be different without your other team members?

## Next Generation Science Standards (NGSS) Alignment:

### **Grades 2-5**

#### **Matter and its Interactions**

2-PS1-2. Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose. Motion and Stability: Forces and Interactions

3-PS2-1. Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object.

### **Grades 2-5**

#### **Engineering Design**

3-5-ETS1-1. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.

3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

### **Grades 6-8**

#### **Engineering Design**

MS-ETS1-1. Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.

MS-ETS1-2. Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.

### **Grades 9-12**

#### **Engineering Design**

HS-ETS1-2. Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.