

### Visible Elements in Photo



- Three tall commercial buildings (brick, glass, and metal) of varying heights arranged close together
- An American flag mounted on a pole between the buildings, visibly affected by wind
- A large clock face embedded in a tan/cream-colored stone structure (appears to be a shorter building or pedestal)
- Rectangular window patterns and vertical metal ribbing on building facades
- The flag fabric is actively moving/rippling, indicating wind force

### Reasonable Inferences

- From the flag's movement: Wind is a significant force in this urban canyon; structures here must be stable enough to display objects without them falling or breaking.
- From the tall buildings close together: The narrow space between buildings may create wind tunneling effects, making conditions unpredictable.
- From the clock placement: Structures in public spaces need secure mounting systems to hold components safely and keep them visible/functional.

### Engineering Task

#### K-2 Challenge:

Build a tall, sturdy tower using blocks, straws, or sticks that can hold a small paper flag at the top. Your flag should wave in the air without your tower falling over. How tall can you make it before it tips?

#### 3-5 Challenge:

Design and build a structure that holds a flag or fabric securely at a height of at least 30 cm, using only paper tubes, wooden sticks, tape, and string. Your structure must:

- Stand upright without leaning
- Support a 20 cm x 20 cm paper flag at its peak
- Remain stable when you gently blow air at it (simulating wind)
- Use no more than 5 connectors (tape joints or tied sections)

Test your design by creating a wind-tunnel effect (fan on low speed, 1 meter away) and record whether the flag stays attached and the tower stays upright for 30 seconds.

### EDP Phase Targeted

**Ask / Define Problem** — This is the best starting point because the photo shows a real-world problem: how to safely and securely display an object (flag) in a challenging environment (tall buildings with wind forces). Students can identify the problem ("How do we keep things stable up high?") before imagining solutions.

### Suggested Materials

- Paper towel tubes or PVC pipes (for tower frame)
- Wooden craft sticks or dowels
- Masking tape or duct tape
- String or fishing line
- Paper or fabric scraps (for flag)
- Tape measure
- Optional: small fan for wind simulation

### Estimated Time

45–60 minutes (one 45-minute session for K-2; one 50-minute session for 3-5 including test cycles)

### Why This Works for Teachers

This task directly supports NGSS ETS1.A (defining engineering problems by identifying criteria and constraints) and ETS1.B (designing solutions by planning and testing), as students must identify what makes a tall structure stable and test their design against a simulated wind force.