Precipitation Snow

Earth & Space Science | Engineering Design Process

Engineering Challenge

Visible Elements in Photo

- Red brick buildings with slate roofs arranged in a courtyard
- Climbing ivy or vines covering walls and structures
- Snow or hail falling heavily across the scene
- Metal umbrellas or circular canopies in the foreground courtyard
- Metal fence or gate structures on the perimeter
- Bare and leafed tree branches framing the space

Reasonable Inferences

- From falling precipitation + outdoor courtyard: People need protection from snow/rain when moving through or gathering in open spaces.
- From metal umbrellas + buildings: Existing structures provide some shelter, but the umbrella design suggests current solutions may be inadequate or temporary.
- From climbing vines + walls: Natural or semi-natural materials can adhere to and protect building surfaces from weather exposure.

Engineering Task

K-2 Challenge:

"Design a cozy shelter to keep people dry when snow falls. Use materials to make a small roof or covering that stays up on its own. Test it by pouring water on top—does the water drip away, or does it soak through?"

3-5 Challenge:

"Design a weather shelter for a snowy courtyard that meets these criteria: (1) spans at least 30 cm across, (2) is made from at least two different materials, (3) keeps a paper towel dry when water is poured on top for 10 seconds, and (4) stands without support from hands. Test your design and explain what worked and what you'd change."

EDP Phase Targeted

Ask / Define Problem — This phase fits best because the photo shows a real environmental challenge (heavy precipitation in an open space) with visible evidence of existing attempts at solutions (the umbrellas). Students must first identify why shelter is needed before designing one.

Suggested Materials

- Plastic cups, containers, or plastic wrap
- Aluminum foil or wax paper
- Popsicle sticks, straws, or small dowels
- Tape (masking or duct tape)
- Paper towels or cloth scraps
- Water in a spray bottle or pitcher (for testing)

Estimated Time

45–60 minutes (one class period):
- 10 min: Observation and problem discussion
- 15 min: Planning and sketching
- 20 min: Building
- 10 min: Testing and reflection

Or Two 30-minute sessions if iteration is included.

Why This Works for Teachers

This task directly addresses NGSS ETS1.A ("defining and delimiting engineering problems") by asking students to identify a real need (protection from precipitation) and design a solution with testable success criteria, making abstract weather science tangible and actionable.