

Visible Elements in Photo



- A clear plastic dome or hemisphere filled with water and ice crystals
- A blue plastic tray or container serving as a base
- White crystalline ice formations inside the dome, radiating outward
- Classroom workspace with paper towels nearby
- Small materials (flashlight, batteries, toy vehicle) in the background

Reasonable Inferences

1. From ice crystal patterns – The radiating ice formations suggest rapid freezing or directional heat loss, implying that water freezes differently depending on temperature and cooling speed.
2. From dome placement on tray – The tray is designed to catch meltwater, indicating that students are observing and managing phase change and liquid runoff.
3. From classroom context – The presence of towels and contained setup suggests this is an active experiment where students need to observe, measure, and troubleshoot melting or freezing conditions.

Engineering Task

K-2 Challenge:

"Your ice ball is melting! Design a way to keep it frozen for as long as possible using blankets, boxes, or other materials. Test your design and see which one works best to slow down the drips."

3-5 Challenge:

"Design an insulated container that slows the melting of a frozen water dome by at least 50% compared to an uninsulated dome. Your container must allow observation of the ice inside and fit on a standard tray. Test two different insulation materials and measure the time it takes for meltwater to drip. Which material works better and why?"

EDP Phase Targeted

Create / Test

This photo captures an active experiment, making it ideal to start in the Create/Test phase. Students can immediately iterate on insulation designs, collect meltwater data, and compare real results. The visible ice dome is already a prototype, so jumping to construction and testing builds momentum and engagement.

Suggested Materials

- Bubble wrap, foam sheets, or craft foam
- Paper towels and absorbent cloth
- Small plastic or shoebox containers
- Ice packs, newspaper, or crumpled paper for stuffing

- Measuring cups and timers

Estimated Time

Two 30-minute sessions:

- Session 1: Insulation design and setup (15 min), initial testing (15 min)
- Session 2: Data collection, observation, and redesign or comparison (30 min)

Why This Works for Teachers

This task directly addresses NGSS 3-5-ETS1-1 (Ask and define a problem) and 3-5-ETS1-2 (Plan and conduct fair tests) because students must identify the cooling problem, propose insulation solutions, and gather measurable evidence to evaluate their designs against a clear success criterion (50% slower melting).