

Visible Elements in Photo



- A child's hand manipulating a large, translucent bubble with rainbow iridescence
- A bubble wand (white circular frame) at the base of the bubble
- Grass field and chain-link fence in background
- Outdoor paved surface (playground or court area)
- Bubbles appear thin-walled and delicate, showing color refraction

Reasonable Inferences

- From bubble structure: The bubble is fragile and will eventually pop; students could infer that bubbles require a thin film of soapy liquid to form and maintain their shape.
- From the wand and bubble size: Different wand sizes/shapes can produce different bubble sizes and shapes, suggesting design variations affect outcomes.
- From outdoor setting: Bubbles respond to air movement and environmental conditions (wind, temperature), making this a real-world variable to control or study.

Engineering Task

K-2 Challenge:

Design and build a bubble wand using a pipe cleaner or wire that makes the BIGGEST bubbles you can. Try different shapes (circle, square, triangle) and see which one makes the best bubbles. What shape works best?

3-5 Challenge:

Engineer a bubble wand system that produces bubbles at least 15 cm in diameter while lasting at least 5 seconds before popping. Test at least three different wand shapes or materials (wire, straws, pipe cleaners). Document which design performs best and explain why you think shape or material affects bubble size and durability.

EDP Phase Targeted

Imagine / Plan — This photo shows a successful bubble in action, which immediately suggests a design direction. Students don't need to identify a problem (bubbles already exist); instead, they can jump into planning variations on the bubble-wand design to optimize performance. The visible outcome invites rapid iteration.

Suggested Materials

- Pipe cleaners (various colors)
- Straws (plastic or paper)
- Wire or floral wire
- Bubble solution (commercial or teacher-made with dish soap, water, and corn syrup)
- Ruler or measuring tape (to check bubble diameter and duration)

Estimated Time

45–60 minutes (one class period): 5 min intro, 20 min wand building, 20 min testing/iteration, 10 min reflection and data recording.

Why This Works for Teachers

This task directly addresses NGSS ETS1.A (defining design problems) and ETS1.B (developing possible solutions), allowing students to test variables like shape and material while building and refining a simple, tangible product they can see fail and improve in real time.