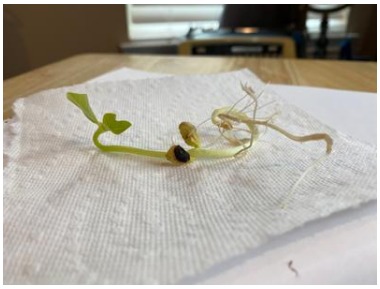
Parts of a Plant

Life Science | Engineering Design Process

Engineering Challenge

Visible Elements in Photo



- A seedling plant with green stem and two small leaves on the left side
- Dried seed pods or plant remnants on thin, tan-colored stems on the right side
- White paper towel or absorbent cloth as the base surface
- Wooden table surface in the background
- Blurred office/classroom equipment in the far background

Reasonable Inferences

- From seedling + dried pods together !' This appears to be a plant life cycle display, suggesting the plant has progressed from seed to growth stage; students may be observing or documenting growth over time.
- From paper towel base !' The seedling is being grown in a moisture-retaining environment, implying a need to control water access and air circulation for root development.
- From mixed stages !' The contrast between living and dead plant material suggests students are comparing different plant conditions or life stages, which points to a design need for growing conditions.

Engineering Task

K-2 Challenge:

Build a cozy home for a sprouting seed! Using paper towels, water, and a cup or container, design a place where a seed can grow strong roots and leaves. Your seed house needs to let water in, keep the seed warm and safe, and let you peek inside to see what's happening. Can your seed grow new leaves in one week?

3-5 Challenge:

Design and build a germination chamber that promotes optimal seedling growth. Your chamber must (1) maintain consistent moisture without waterlogging roots, (2) allow observation of root and shoot development without opening the chamber repeatedly, (3) hold the seedling upright, and (4) fit within a 4" × 6" footprint. Test your design by growing a seed for 10 days and measuring root length, shoot height, and number of leaves. Compare results with at least one alternative design.

EDP Phase Targeted

Ask / Define Problem — This phase fits best because the visible mixed stages of plant development invite students to ask: "What conditions does a seed need to grow well?" and "How can we observe growth happening?" The photo doesn't show a solution yet; it shows a real-world need (plant growth) that requires investigation and problem-solving.

Suggested Materials

- Paper towels or coffee filters
- Small clear plastic cups or resealable plastic bags
- Seeds (bean, radish, or lentil seeds work quickly)

- Water in a spray bottle
- Ruler (for 3–5 measurement task)
- Optional: potting soil, perlite, or sand for comparison tests

Estimated Time

K-2: 15 minutes setup + 10 minutes daily observation over 7–10 days
3-5: 20 minutes planning + 15 minutes build + 10 minutes daily observation/measurement over 10 days + 20 minutes final analysis and comparison

Why This Works for Teachers

This task directly addresses NGSS 3-5-ETS1-1 (define a simple design problem) and K-2-ETS1-1 (ask questions and predict solutions to simple problems) by having students identify real constraints (moisture, light, air, stability) and test their design choices against measurable plant growth outcomes.