

7.2 MATERIALS AND THEIR PROPERTIES

How could you design a test for a petrochemical product?

DIRECTIONS

1. Gather a variety of petrochemical products and testing supplies for each small group of researchers.
2. Each group will create a way to test a property and explain the results in a clear, structured way using the **Engineering Design Model**.
3. **Ask** what is our petrochemical product and how is it used?
What is the property that we will test?
4. **Imagine** some of the ways we can test this property using this product.
5. **Plan** an experiment.
6. **Create** a design for the test.
7. **Improve** your test and re-test.
8. Present the tests and results.



Petrochemical product	Properties	Uses
polyurethane fibers	stretchy thermal protection	swimsuits, leotards, gloves, mittens
polycarbonates	lightweight	helmets, safety goggles, aircraft windshields
PVC	flexible electrical insulation	coated wires used in consumer electronics; electrical components in lawnmowers; insulation tape
polyurethane foam	insulating, energy efficient lightweight	insulation in walls, roofs and refrigerators; furniture
HDPE, nylon	water resistance	shower curtains, umbrellas
artificial fibers (polyester, rayon)	resistance to bases/NaOH and acids/HCl solution	towels, bed sheets, clothing

Other potential properties: binding agents, crease resistance, food protection, impact resistance, solvent-resistance, shock absorbance, heat resistance, flexibility, cleaners.

Other potential materials: acetylene, epoxy resins, neoprene rubber, solvents, surfactants, urethane, vinyl resins.