

The Engineering Design Process

Engineers solve problems by following a series of steps. These steps help them think creatively, test ideas, and improve their designs. Through this activity, you will use the Engineering Design Process to design a water wheel.



Identify the Problem

State the challenge to solve in your own words. What are the constraints that may limit your designs?

Build Understanding

What do you know about the problem? What has been done in the past? Asking questions or researching the problem may help you find a starting point.



Design is never perfect the first time – engineers learn by testing and improving!



Plan

Brainstorm possible solutions. The more ideas the better! Work in teams to choose a couple solutions you think have the best possibility of working and sketch them out.



Prototype + Test

Build working models and test them. Collect data, when possible, to compare how well different designs meet the challenge.



Adjust

Make changes to your designs and test again. You may decide to try something completely new – that is fine!

How Does This Connect to Manufacturing?

Manufacturing is how designs become real products. Once engineers create a working design, manufacturers figure out how to build it efficiently and consistently.

Engineering & Manufacturing Work Together

Engineering

Designs the solution
Focuses on creativity & function
Uses sketches, models, and tests

Manufacturing

Builds the solution
Focuses on efficiency & quality
Uses tools, machines, and workflows



Reflect + Share

At the end of the design time, think about the process you and your group followed to get to your final design. As a class, share what you learned.

Example: Designing a Toy Car

Engineering: Design a car that rolls 2 meters using rubber bands.

Manufacturing: Build 5 identical cars using the same materials and process, and check each one for quality.

Manufacturing teams often give feedback to engineers to improve the design for easier building.