

Powering Progress: The Water Wheel Challenge



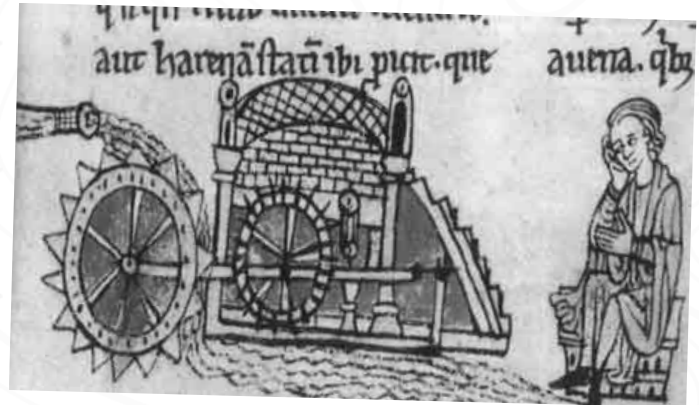
For thousands of years, humans have harnessed the energy of moving water to make work easier. Ancient Greeks used water wheels to grind grain into flour, and by the 1700s, communities across Europe and America relied on water-powered mills to pump water and process materials. In early Vermont towns, having a mill wasn't just convenient—it was considered essential for civilized life.

Millwrights, the engineers of their time, combined skills in carpentry, masonry, blacksmithing, and surveying to design and build these powerful machines. They chose wheel types, calculated speeds, and crafted gear systems—all without modern computers or motors. These water-powered buildings evolved into factories, laying the foundation for modern engineering.



Today, you'll step into the shoes of those early innovators. **Your challenge: design and build a working water wheel that can lift a load as high as possible.**

As you experiment, you'll explore the same questions millwrights once faced: *How do you capture water's energy? What wheel design works best? And how can you make your system efficient and reliable?*



Let's dive in—and let the water do the work!

Part 1: Understand the Problem

In your own words, what is the goal of this challenge?

*What constraints do you have?
What factors may limit your design?*

Handwritten notes on a lined notepad:

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Part 2: Brainstorm + Sketch

*Think about paddle shape, number, and placement.
Sketch a couple ideas for designs below:*

A large, empty rectangular box with a thin black border, intended for sketching ideas for paddle designs.

Part 3: Plan + Build + Reflect

For your initial design it is important to test often! That will provide the best feedback on your design. Don't worry about building it perfectly the first time!

What worked with your design? And what can you improve? (Think about the variable - what you can change - like size of the paddles, the number of paddles, their angles, depth, etc.)

How are you going to change your design for the next test?

A template for a piece of lined paper with a scalloped bottom edge and punch holes on the left side. It contains five horizontal lines for writing.A template for a piece of lined paper with a scalloped bottom edge and punch holes on the left side. It contains five horizontal lines for writing.

Test #	Lift Height (cm)	What did you change?
1		
2		
3		
4		
5		

What needs improvement?

This is a graphic of a single sheet of white, lined notebook paper. It features a silver-colored metal spiral binding along the top edge. The paper has five horizontal blue lines spaced evenly down its length. The bottom edge of the paper is decorated with a wavy, torn-paper effect. The entire sheet is set against a solid black background.