

Paper Power

STRUCTURAL ENGINEERING CHALLENGE

What Students Do

Students design, build, and test a freestanding paper structure at least 8 inches tall that can support a heavy book for 30 seconds without collapsing. Teams explore stability, compression, load distribution, material efficiency, and structural shape, then redesign their structure using evidence from testing.

24

STUDENTS

60-90

MINUTES

3-8

GRADES

8+ IN

HEIGHT GOAL



KNT Activity Pack Includes

- Teacher Guide with challenge setup, facilitation notes, and extension ideas
- Student Activity Book and Structural Design Planner
- Build, Test, and Redesign worksheets
- Engineering Challenge Cards and reflection prompts
- Measurement and load-test recording sheets
- Classroom provides paper/cardstock or light cardboard, tape, scissors, ruler, and a heavy book for testing

Students Learn To

- Explain how shape and structure affect strength and stability
- Identify compression and load distribution in a simple structure
- Use limited materials efficiently to meet design criteria
- Measure height and document test results
- Identify where and why a structure bends, buckles, or collapses
- Redesign using evidence from the first test

How It Works

1

PLAN

Sketch a freestanding structure that will reach at least 8 inches and support a heavy load.

2

BUILD

Construct the design using only the approved paper materials and classroom supplies.

3

TEST

Place the book on the structure and observe whether it remains standing for 30 seconds.

4

REDESIGN

Strengthen weak points, adjust the structure, and test again using evidence from the first trial.

Lightweight Materials. Serious Engineering.

The challenge is not simply to use more material. Students learn to strengthen a structure through smart geometry, support placement, folding, rolling, and load distribution, then prove the design through a timed load test.

Designed for flexible afterschool, summer, classroom, and expanded-learning implementation.