

Paper Suspension Bridges: You want ME to go up THERE?

Grade Levels: 9-12

**Physics or Physical Science: Forces—
compression and tension**

**2003 NTTI Master Teacher
Abraham Phelps, Central
High School, Springfield, MA**

Overview:

Students investigate types of bridges online, through demonstrations, and through video and then construct their own bridges.

Time Allotment: Approximately four to five 52-minute class periods. Second half of bridge building project adds another 3-5 class periods, depending on how much you have students work on their bridges inside or outside of class.

Learning Objectives:

Students will be able to:

- Understand the difference between Tension and Compression
- Describe how both are used in bridge construction and design
- Construct bridges out of newspaper to support as much mass as possible
- Relate classroom learning to a “real world” application through the design process

Standards:

State Standards:

From MA Science and Technology/Engineering Curriculum Framework, May, 2001

Physics Learning Standards for a Full First-Year Course:

- 1.2 Illustrate how to represent vectors graphically and be able to add them graphically.
- 1.8 Use a free body force diagram with only co-linear forces to show forces acting on an object, and determine the net force on it.
- 1.10 Interpret and apply Newton’s third law of motion.

Construction Technologies Learning Standards:

- 5.2 Identify and describe three major types of bridges (e.g., arch, beam, and suspension) and their appropriate uses (e.g., site, span, resources, and load).
- 5.3 Explain how the forces of tension, compression, torsion, bending, and shear affect the performance of bridges.
- 5.4 Describe and explain the effects of loads and structural shapes on bridges.



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