BRIDGE BUILDER *Building Math Skills*

TRAC™
Leading by Example

This module meets the following National Standards of Learning

National Science Education Standards: Physical Science

Grades 6–12

Science as Inquiry

- Identify questions that can be answered through scientific investigations.
- Use appropriate tools and techniques to gather, analyze, and interpret data.
- Use technology and mathematics to improve investigations and communications.
- Think critically and logically to make the relationships between evidence and explanations.

Abilities of Technological Design

- Identify appropriate problems for technological design.
- Design a product.
- Implement a proposed design.
- Evaluate completed technological designs or products.

Activities

Activity 1: Structural Concepts

Activity 1 is an interactive computer-based introduction to the basic concepts employed by a structural engineer when designing and building bridges.

Activity 2: Beam Me Up

Activity 2 involves three in-class demonstrations that illustrate some of the key structural concepts that are essential to understanding how basic bridges behave.

Activity 3: Bridge Analysis

Activity 3 consists of two parts. The first part serves as an introduction to the theory behind how engineers determine how much force is transferred to each member of a truss from the force applied to the structure. The second part of Activity 3 gives the students an introduction to computer-based design.

Activity 4: Draft it Up!

Activity 4 is a drafting activity utilizing Bentley Microstation PowerDraft v8i software. This activity will provide students with a basic introduction to CAD software.

Activities 5 and 6: Basic & Improved Box Bridge Structures

Activities 5 and 6 allow the students to take part in hands-on activities that guide them through the process of building their own bridges, which they will test in class as part of a design competition.

TRAC™ (TRAnsportation and Civil engineering) is a hands-on education outreach program designed for use in science, math, technology, and social science classes. By engaging students in solving real-world problems, sending volunteer mentors in the classroom, and supplying teachers with the needed materials. TRAC connects K-12 students to the working world of transportation professionals and civil engineers, and inspires them to consider careers in these fields. TRAC PAC 2 is designed for students in middle school and high school. Rides K–8 introduces elementary school students to basic transportation concepts.

Visit **www.tracrides.transportation.org** to learn more about the TRAC program.

AASHTO

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