

## TEACHERS AS FACILITATORS

The teacher acts as a facilitator for the students as they explore the problems presented in the TRAC™ PAC. The teacher's fund of knowledge becomes a resource as the students investigate ways to approach the problem.

TRAC™ activities are designed around a number of disciplines. Math teachers use the TRAC™ PAC at every level from basic algebra to advanced calculus, with activities that illustrate computer spreadsheets, geometry, graphing data, probabilities distribution, and queuing. Physical science classes address friction, gravity, magnetism, motion, and structures. Social science teachers explore the environment, urban planning, history, local government, technology's relationship to society, politics, and government regulations.

TRAC™ serves a resource for teachers to teach required science, technology, engineering, and math standards. Teachers use the TRAC modules to strengthen skills and introduce students to transportation careers. All modules teach one or more transportation principles.

## VOLUNTEERS AS GUIDES

Volunteers are usually engineers from state departments of transportation, though they could be persons from other transportation related fields. Their typical role is to be a mentor to the students and to assist the teacher in presenting the TRAC™ material. Then, for as long as the TRAC™ PAC remains in the school, volunteers remain

on call to provide technical assistance and to answer students' college and career questions.

The volunteers serve as role models; in some high schools, they may be the first engineers the students have ever met.

## TRAINING

AASHTO provides training for teachers and staff members of the state departments of transportation. Each member state receives two trainings annually.

*TRAC™ is the hands-on program that lets students use math and science skills to solve real-world problems in transportation and civil engineering.*



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TRAC™ is a program of the American Association of State Highway and Transportation Officials.

[tracrides.transportation.org](http://tracrides.transportation.org)



**Introducing**

**TRAC™**

**"The ride of**

**a lifetime"**

By engaging students in solving real-world problems such as magnetic-levitation train transportation, TRAC™ connects students to the work world of transportation and inspires them to consider careers in transportation and civil engineering.

**LEADING BY EXAMPLE**

## TRAC™ —TRANSPORTATION AND CIVIL ENGINEERING

TRAC™, is designed to teach Science, Technology, Engineering, and Math (STEM) standards. The hands-on activities introduce students in grades 7–12 to the work world of transportation and civil engineering and inspire them to consider careers in those fields. State departments of transportation work with schools in their state by providing the curricula and resources for the schools and make provisions for engineers to visit the classrooms to serve as speakers, teach a hands-on activity, and/or talk to students about the importance of math and science in preparing for their future.

### THE CHALLENGE

With the growth of the economy in the United States, more career opportunities will become available in the transportation industry. According to a recent report by the U.S. Departments of Transportation “Strengthening Skills Training and Career Pathways across the Transportation Industry,” employers will need to hire and



“Bridge It” from Portage Middle School, MI, placed third in the 2018, AASHTO Bridge Challenge.

train a total of 4.6 million new workers—1.2 times the current transportation workforce—due to expected growth, retirements, and turnover in the transportation industry from 2012 to 2022. Projections suggest that 417,000 of these positions will be created as a direct result to increased demand on our transportation systems.

Job opportunities in the transportation field are changing rapidly. Not so long ago, most transportation professionals were civil engineers; in the near future, with the advent of Intelligent Transportation Systems (ITS) and other new technologies, transportation will need to attract large numbers of computer systems engineers, telecommunications people, environmentalists, technologists from a wide number of disciplines, and others. Civil engineering will remain a core discipline. The transportation industry recognizes the need to recruit the best and the brightest young people, male and female, from every background and ethnic group.

### THE TRAC™ PAC

At the heart of the program is TRAC™ PAC 2; seven self-contained education modules featuring professionally developed curricula that meet national standards of learning. Each module contains the equipment, software, and supplies needed to perform hands-on activities related to:

- ◆ Bridge Design
- ◆ Design and Construction
- ◆ Environmental Engineering
- ◆ Highway Safety
- ◆ Magnetic Levitation
- ◆ Motion
- ◆ Traffic Technology



MS students build magnetic levitation cars.

The modules include a teacher reference guide, on-line links to activities, and the resources to complete the hands-on activities. Teachers can use the units relevant to their curriculum.

### STUDENTS AS INVESTIGATORS

All TRAC™ activities are structured to allow students to teach themselves what they need to know in order to solve the problems. The students are given inspiration, guidance, and the proper tools, and they work in teams, just as transportation professionals and engineers routinely do.

Instead of sitting passively while listening to lectures, students become explorers and investigators. They can build a magnetic levitation train that actually works, measure the impact of collisions, and design and test bridges for strength-to-weight ratio. They seek out and absorb information, formulate new ways of solving problems, and learn that working in transportation is fun, exciting, stimulating, challenging, and doable.