Educational Outreach:

*Everyone can do it!*

Presented by
Sarah Hernandez
and
Karla Corro Diaz
The Advocacy Committee is working with the STEM Subcommittee and members of LeadershipITE to develop resources for members wanting to go into schools or other community groups and get kids excited about a career in transportation engineering or planning. Here's what I'm talking about: I took part in "Introduce a Girl to Engineering Day" last year with a structural engineer. I think every girl who participated will be designing structures one day because they had so much fun "building bridges" out of sheets of notebook paper and seeing how many pennies they could stack on top of them.

My question to you all is, have you ever used a similar activity with kids that was transportation-related, and that the kids really seemed to have fun with?

Please share here!
Karen
Advocacy Committee Co-Chair
Why is this useful to you?

• “As a respected transportation professional, you have no doubt been asked at some point to participate in recruitment events and activities.
• In response to this request, you have likely either
  (1) spent significant time and energy outside of your workday researching available recruitment resources and independently developing transportation-related presentation materials and hands-on activities or exercises or
  (2) politely declined due to time and energy constraints.
• To make it easier for transportation professionals to participate in local recruitment events and activities, the ITE Transportation Education Council has compiled useful resources to aid in your efforts.”

http://www.ite.org/councils/Education/Recruitment/
Available Slide Decks

Supplemental Pre-College Recruitment Presentation Materials
As a complement to the toolbox, these presentation materials and templates may be used to precede active learning sessions. A professional doing career outreach may choose to provide a brief presentation introducing transportation engineering as a profession prior to or after performing one of the hands-on activities available in the toolbox.

These materials may also be used to as a stand-alone exchange when forums do not support active learning opportunities. You may use these presentations and update them to provide more local flavor.

Presentations/Templates

ITE Great Ideas Webshare: Student Activities - Recording (82MB)
Facilitated by Gary B. Thomas P.E., Ph.D., Research Engineer, Texas A&M Transportation Institute, College Station, TX, USA

Engineering
Dyan C. Damron, P.E., PTOE, MITE, Project Manager, Neel-Schaffer, Inc., Nashville, TN, USA

Engineering?
Alyssa Reynolds, P.E., PTOE, MITE, Project Engineer II, City of Henderson, Henderson, NV, USA

Careers in Transportation and Engineering
Monica Sulur, P.E., PTOE, MITE, Senior Civil Engineer, City of Santa Ana, Santa Ana, CA, USA

Careers in Transportation Planning
Brad Strader, AICP, PTOE, President, Royal Oak, MI, USA and Philip L. Winters, Director, CUTR, Tampa, FL, USA

Careers in Transportation Planning

Long Range Transportation Models
Assumes future land use & valid assumptions are made that the community will develop per its plan.

Expected deficiencies (or increased) and alternative analysis

Projected Enrollment Projections

Employment & Household Projections

Recommended Changes to the Plan
Available Lesson Plans

Recruitment Toolbox

Your search with:
Topic Area: All
Age Level: All
resulted in the following activities.

1. Advancements in Transportation

Topic Area: Multimodal
Age Level: 6th - 8th Grade
Activity: Click Here

2. Air Pollution

Topic Area: Environment/Energy
Age Level: 3rd - 5th Grade
Activity: Click Here

3. Air Pollution: What Can You Do?

Topic Area: Environment/Energy
Age Level: Kindergarten-2nd Grade
Activity: Click Here

http://www.ite.org/councils/Education/Recruitment/
STEM Outreach at the UofA

STEM Girls Day for High School Girls

GirlTREC Camp for Middle School Girls
Outreach Goals

• Increase awareness of careers in transportation and traffic engineering
• Introduce basics of traffic signal control
  – Queuing diagrams
  – Cycle length and phases
  – Etc.
• Use cheap (or free), readily accessible tools and technologies
Lesson Overview

- Mini lectures on traffic signal concepts
- Simulation using Gridlock Buster or Live-Role Play
- Student presentations
Mini Lecture Key Points

• What is gridlock?
• What are signal phases?
• How do we measure queues?
• What is the relationship between congestion and signal timing?
• Why do we use simulation?
Understanding Basics of Signal Control

• Gridlock Buster
• Developed under an NSF grant at the Univ. of Minnesota.
• Free, browser based, easy to use!

http://www.its.umn.edu/GridlockBuster/
Gather Simulation Data on Queues

- Compare fixed and manual control
- Produce queuing diagrams
- Analyze relationship between queue length and signal phasing

http://street.umn.edu/ROAD.html
Gather Data using Live-Role Play
Live-Role Play Details

- Assign roles
  - 1 Traffic Controller
  - 1 Police Officer
  - 8 Phase Monitor
  - 8 Queue Counter
  - Everyone Else
    - Cars
    - Trucks

- Need some type of traffic signal, stopwatches, clipboards, and colored tape.
Presentations by Participants
Lessons Learned

• *First, you can do it!*
• For a group of 30 students, recommend 5+ volunteers (get your local chapter members to help out)
• Importance of ‘debrief’ presentation
• Educate teachers too!
• Bring a cool prop!
Aligning Outreach with Transportation Challenges

• Transportation and traffic engineers find themselves working more and more with big data.
• Transportation field is interdisciplinary
  – Planners
  – Civil engineers
  – Computer scientists
  – Electrical engineers, etc.

• Need to educate and recruit young engineers who will be able to work in interdisciplinary teams and handle big data.
Outreach Goals

• Introduce students to transit planning concepts.
• Develop computer programming skills.
• Collect, analyze, and apply data to design better transit routes.
• (Teach students how to navigate transit.)
• Use cheap (or free), readily accessible tools and technologies.
Bluetooth and Wifi Detection

• **Methods:**
  - Phone/Tablet broadcast MAC-address while passenger’s Wi-Fi and BT are enabled.
  - Field sensors record MAC-Address.
  - MAC address is unique to a passenger’s phone and can be tracked between locations.

• **Application:**
  - Transit boarding/alighting data at bus stops.
  - Transit trip origin-destination locations and times.
  - Transit wait times.
Lesson Overview

- Transit system design game
  *Mini Metro*

- Sensor design and programming using off-the-shelf components

- Field data collection, analysis, and application
What would you need?

- Laptops with Bluetooth Antennas
- Open-source, python script
- A bus route with a couple stops
- Some clipboards
- Helpful volunteers!
Want more information?

Sarah Hernandez  
Assistant Professor  
sarahvh@uark.edu

Karla Diaz  
Research Assistant  
kjdiazco@uark.edu

you.uark.edu/sarahvh