UTC Project Information	
Project Title	Inspiring Transportation Careers with K–12 Curriculum Activities
University	Washington State University
Principal Investigator	Michelle Akin
PI Contact Information	michelle.akin@wsu.edu
Funding Source(s) and Amounts Provided (by each agency or organization)	University of Washington PacTrans $43,000 Washington State University $43,000
Total Project Cost	$86,000
Agency ID or Contract Number	69A3551747110
Start and End Dates	September 1, 2018-August 31, 2020
Brief Description of Research Project	The objectives of this small PacTrans project are to 1) produce outreach curriculum for K–12 students that teach multi-modal transportation engineering concepts, and 2) conduct at least seven outreach sessions with elementary, middle and high schools in Pullman, WA, Moscow, ID, and Coeur d'Alene Indian Reservation. This scope is directly relevant to the PacTrans special topic areas of Access for All and Improved Reliability Across Modes because the specific activities will include multimodal transportation and isolated communities, and will include diverse communities. Workforce shortages in the transportation industry will put increased stress on transportation employees as they struggle to meet the demands of the nation's large transportation network. Newcomers with a diverse background in multi-modal transportation options will be critical as sustainable transportation alternatives are given increased priority during maintenance, operations, and expansion decisions. The Federal Highway Administration (FHWA) has two programs focused on K–12 Education and Training, one focuses on curriculum development and the other providing summer camps for middle and high school students focused on transportation.

Describe Implementation of Research Outcomes (or why not implemented) Place Any Photos Here	Outreach events were conducted by either hosting a table at a large science event where kids would walk around and stop at each table for various amounts of time to complete the different activities or by working with a large group of kids for a two-hour block at a day camp. Hands on and interactive activities that were conducted at tabling events include toothpick and gumdrop bridges, clothespin cars, and wind up cars. The toothpick and gumdrop bridges were made by giving the children a diagram of different bridge designs and a surplus of toothpicks and gumdrops (Figure 1). The children would then either follow a design on provided diagram (Figure 3) or create a design of their own to build a bridge. The bridge's strength was then tested by placing rolls of pennies on the center of the bridge while each end was sitting on a stack of books. The clothespin cars were created by putting a gumdrop on either side of two toothpicks and placing the toothpicks inside the clothespin at the spring and taped into the clamp part. The windup cars were created by pulling a rubber band through a foam cup, through lids (paper plates were used in this program) on either end of the cup, attaching a stick to one end of the rubber bad with the help of a bead, and a paperclip to the other end of the rubber band (Figure 4). Demonstrations were also conducted at some of the events including a gears demonstration, a pull-back rubber band car (Figure 2), and a gyroscope. The gears demonstration consisted of 3D printed gears of different sizes that the kids could twist and see which fit together best. The kids were instructed to count the rotations of the different gears to see how gear size influenced the necessary number of rotations. The gyroscope was used to demonstrate gravity and peak kids' interest in general as well as draw them to the table. The pull-back rubber band car consisted of a large hollow tube with wheels made of CDs and a rubber band twisted around a bar connecting the back wheels of the car and attached to another bar in the center of the car. When the rod attached to the back wheels was twisted, it created tension in the rubber band and caused the back wheels to spin. This was used to show potential energy and how friction causes a car to slow down at different rates on different surfaces.

	 A researcher helping a child make a gumdrop and toothpick bridge.  A researcher conducting the wind-up car demonstration.
Impacts/Benefits of Implementation (actual, or anticipated)	Anticipated benefits included inspiring students to pursue careers in transportation through outreach efforts. These benefits cannot be assessed as the students are not yet at an age to choose a career. Actual impacts included teaching students about engineering topics and growing interest in STEM.
Web Links • Reports Project Website	

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