Transportation Challenge | 2016 E-Day Competition
Herff College of Engineering | University of Memphis
Grades 4-12

Student teams will compete with K’NEX vehicles that they bring and submit to the judges on E-Day. Vehicles will be powered by a single “Micro Power Spring Motor” available in the K’NEX Forces, Energy & Motion set. See the Materials section below for more information.

- Teams will submit their vehicles during competition timeslots from 9:00 AM until 3:30 PM in the Engineering Administration Building (first floor) at the University of Memphis.
- Vehicles will be submitted unassembled with all parts contained in a zip-lock bag.
- The bag will be labeled with the submitting organization’s name and with the names of the team members.
- Each team will represent their organization and will consist of four or fewer team members. Organizations may have up to three teams entering the competition.

2016 Competition Description
The purpose of this competition is for your team to quickly construct a vehicle that can travel a ‘Mystery Distance’ at the time of competition. Your team should collect data to determine the distance that your vehicle will travel when released from various ‘pull-back’ distances (when using the spring motor, you must pull the vehicle back along the floor in order to wind the motor).

The design goals should be:
- the ability to construct the vehicle quickly and
- the ability to operate the vehicle with predictability so that it reaches a ‘Mystery’ destination.

Your team will be judged based upon the time it takes to construct your vehicle and the distance your car stops from the target. More rules, including allowed materials, are described below.

Materials
Vehicles must be constructed from materials contained in standard K’NEX kits. The motive force for the vehicles will be provided by a single micro power spring motor as shown above.

Please Contact Caitlin McGrath (cmcgrth1@memphis.edu) with any questions.
Total Score for Transportation Challenge

The total score for this competition is composed of two parts. The formula for computing the total score is as follows:

$$200 \times \frac{\text{shortest build time}}{\text{your build time}} + 200 - 10 \times (\text{distance between closest point of vehicle and mystery 'city' in inches})$$

Competition Rules

1. At registration, you will be given a start time for the beginning of the build phase of the competition. All the members of the team may participate in the building of the vehicle. Illustrations and drawings may be used during the construction phase but no photos or other instructions that were not drawn by team members may be used.

2. Each team will be assigned a judge to act as a time keeper for that team. The official time is the time as decided by the assigned judge. The longest build time will be 15 minutes. Any time beyond this will not be penalized.

3. Once a vehicle is declared completed, it may not be altered in any way. (If alterations need to be made then a 15 second penalty will be added to your build time).

4. The team will be allowed to test their vehicle in a designated testing area and collect additional data for their vehicle on the flooring surface for the competition. Each team will be allowed to test in the designated area for 3 minutes prior to their competition start time. Teams will not be given information on the mystery distance during testing.

5. Once a team enters the competition area, they will be told the mystery distance that their vehicle must reach (the distance will be a value between 10 and 20 feet). Teams will then be given 1 minute to discuss strategy prior to competing. Each team will have 2 tries to reach the mystery distance ‘city’. Teams may pull back the vehicle from any location, but the front wheels of the vehicle must be placed immediately behind the starting line prior to the vehicle being released.
6. The Mystery Distance ‘city’ will be a 1’ x 1’ square designated on the course, and some part of the vehicle MUST stop in the square for the team not to be assessed a penalty. If the car does not land in the mystery distance city on the second try then a penalty will be assessed using the shortest distance from any part of the car to the Mystery ‘city’ (for either the first or second trial - both penalties will be recorded in the event that the initial trial results in the best performance).

*Note – It is very important to test your vehicle design in advance to ensure it performs in a predictable manner when released from a starting line. You should also practice recording data so that you will have a process in place so that you may use your limited time most effectively in the testing arena on the day of the competition.