# K-12 Transportation Activities: Roads, Rails, Ships & Planes  
(as of 01-08-13)

<table>
<thead>
<tr>
<th>Title</th>
<th>Target Grade</th>
<th>Topic</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>In the Driver’s seat (PLT)</td>
<td>K-2 X 3-4 X 5-6 X</td>
<td>General X Cars &amp; Roads X Rail X Maritime Shipping X Planes X Freight Cargo X Bike X</td>
<td>Center</td>
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<tr>
<td>Science that Saves: Crash (NSTA SciTchr)</td>
<td>K-2 X 3-4 X</td>
<td>Cars &amp; Roads X Rail X Maritime Shipping X Planes X Freight Cargo X Bike X</td>
<td>Center</td>
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<tr>
<td>MDOT TRAC: Motion &amp; Transp. Engineer</td>
<td>K-2 X 3-4 X</td>
<td>General X Cars &amp; Roads X Rail X Maritime Shipping X Planes X Freight Cargo X Bike X</td>
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<td>Shipping &amp; Receiving Ports</td>
<td>K-2 X 3-4 X</td>
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<td>MDOT TRAC: Bridge Builder</td>
<td>K-2 X 3-4 X</td>
<td>General X Cars &amp; Roads X Rail X Maritime Shipping X Planes X Freight Cargo X Bike X</td>
<td>Online</td>
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<tr>
<td>MDOT TRAC: City Planning</td>
<td>K-2 X 3-4 X</td>
<td>General X Cars &amp; Roads X Rail X Maritime Shipping X Planes X Freight Cargo X Bike X</td>
<td>Online</td>
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<td>Travel Math (worksheets-Paddle to Sea)</td>
<td>K-2 X 3-4 X</td>
<td>General X Cars &amp; Roads X Rail X Maritime Shipping X Planes X Freight Cargo X Bike X</td>
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<td>Brain Saver</td>
<td>K-2 X 3-4 X</td>
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<td>Five Points Traffic Jam</td>
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<td>Road Construction (NE After School Club)</td>
<td>K-2 X 3-4 X</td>
<td>General X Cars &amp; Roads X Rail X Maritime Shipping X Planes X Freight Cargo X Bike X</td>
<td>Center</td>
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<tr>
<td>It’s a Drag: Designing Aerodynamic Cars</td>
<td>K-2 X 3-4 X</td>
<td>General X Cars &amp; Roads X Rail X Maritime Shipping X Planes X Freight Cargo X Bike X</td>
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<td>MDOT TRAC: Physics of HWY Safety</td>
<td>K-2 X 3-4 X</td>
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<td>MDOT TRAC: Magnetic Levitation</td>
<td>K-2 X 3-4 X</td>
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<td>MDOT TRAC: Roadway Design &amp; Construction</td>
<td>K-2 X 3-4 X</td>
<td>General X Cars &amp; Roads X Rail X Maritime Shipping X Planes X Freight Cargo X Bike X</td>
<td>Online</td>
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<td>EiE Designing Maglev Systems</td>
<td>K-2 X 3-4 X</td>
<td>General X Cars &amp; Roads X Rail X Maritime Shipping X Planes X Freight Cargo X Bike X</td>
<td>Online</td>
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<td>Shipping Lingo</td>
<td>K-2 X 3-4 X</td>
<td>General X Cars &amp; Roads X Rail X Maritime Shipping X Planes X Freight Cargo X Bike X</td>
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<td>What Happened to Edmund Fitzgerald?</td>
<td>K-2 X 3-4 X</td>
<td>General X Cars &amp; Roads X Rail X Maritime Shipping X Planes X Freight Cargo X Bike X</td>
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<td>What Floats Your Boat?</td>
<td>K-2 X 3-4 X</td>
<td>General X Cars &amp; Roads X Rail X Maritime Shipping X Planes X Freight Cargo X Bike X</td>
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<td>How Locks Work</td>
<td>K-2 X 3-4 X</td>
<td>General X Cars &amp; Roads X Rail X Maritime Shipping X Planes X Freight Cargo X Bike X</td>
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<td>Plot the Path into the Harbor</td>
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Transportation Lesson Plans & Activities

Family Engineering Book Long Activities (40 min activities)
- Brain Saver (K-6) – design a helmet to prevent brain injury in crashes---from biking, motorcycles, hockey, skiing, etc.
- Five Points Traffic Jam (Gr. 4-6) – design an intersection that is safe for pedestrians, bicyclists, and vehicles
- It’s a Drag (Gr. 4-6) – design a car that is aerodynamic
- Second Skins (Gr. 4-6) – design a package that protects item and uses resources efficiently
- Blast Off (Gr. 3-6) – design a rocket to go to outer space

Family Science Activities (Joan has lesson)
- Building Paper Airplanes and Hoop Gliders (Gr. 4-6)
- Glider K-2 – design a glider that goes furthest
- Candy Puffer (Gr. 3-6) – design a car that goes furthest with a big blow from the student
- Design the best sail (Gr. 4-6) – design effective sails for wind-powered vehicles

National Science Teachers’ Association (NSTA) Journals
- A Science that Saves Lives: Crash Science addresses the leading cause of death of teens in the U.S. (Jan 2013 Science Teacher p. 32) (Gr. 5-6)

Maritime Lessons (Whitefish Pt Activity Guide and Paddle to the Sea)
- How Locks Work (Paddle to Sea p.103) (Gr. 4-6) – design a lock system
- Plot the Path (Whitefish Lesson Notebook) (Gr. 3-6) – Aids to navigation, best route into the harbor
- What Floats Your Boat (Maritime Lessons p.55) – Students learn principles of Buoyancy and use them to create a boat that hold the most cargo
- Great Lakes Shipping & Receiving Ports (Maritime Lessons p.45) (Gr. 3-6) – students move the natural resources from their shipping port to receiving port and determine what it is made into.
- Harbor Navigation Game & What Does A Ship Captain Need? & Shipping Lingo & Parts of a Ship (K-4) (Maritime Lessons p.29, 34, 50, 52)
- What Happened to the Edmund Fitzgerald? (Maritime Lessons p.21) (Gr. 4-6) – Aids to Navigation, ship routes, cargoes

General
- Travel Math – Scale, perimeter, distance, rate, time (these are worksheets, so would need to be combined with an activity)

Roads & Highways
- Road Construction (Gr. 2-6) – build a road with the least environmental impact, cost efficient, takes you to the places you need to go

Family Engineering Openers (short 3 min activities) – These are set up in lunch room for all participants to do
- Against the Wind – compare aerodynamic cars characteristics of cars
- Boxing Beans – compare packaging shapes for transport and shelving and consumer attractiveness
- School Bus Puzzle – choose best order to pick up students on bus route

**Project Learning Tree Activities**

- **In the Driver's Seat** - Gr. 5-8 (Project Learning Tree Activity #85; p.325)
  Students learn about gasoline, then explore fuel conservation and energy efficiency by simulating the distance they can travel on a set amount of gas using different vehicles with different fuel efficiencies.

- **On the Move** - Gr. 4-8; variation for K-2 (Project Learning Tree Activity #53; p.185)
  Student will examine transportation systems which are vital to their community

**Activities on the Web**

1. **WHEELS AND THINGS: TRANSPORTING GOODS**
   Students examine the role of transportation in getting goods to market by designing suitable packaging and preparing an export report. Students should understand that transport is a service that is an essential component in the exchange of goods and services.

2. **Chair Lift Challenge Lesson** focuses on unique challenges in transportation engineering, such as devising a method for skiers or hikers to get to the top of a mountain. Students work in teams to design a "chair lift" out of everyday items that can transport a ping pong ball in a chair of their own design from the bottom of a "valley" to the top of a "mountain" along a clothes line or wire without the ball falling out. Students design their chairlift and chair on paper, execute their design, test it, reflect on the challenge, and share their experiences with the class.

3. **Ship the Chip Lesson** focuses on engineering package designs that meet the needs of safely shipping a product. Students work in teams of "engineers" to design a package using standard materials that will safely ship a single chip through the mail to the school address.

4. **Critical Load Students** learn about how to test structures for maximum load by designing prototypes of buildings out of cards. Topics examined include problem solving, teamwork, and the engineering design process. Students work first individually to build a structure, then combine materials in student teams to design the strongest structure, evaluate the load capacity and critical load, and discuss why the strongest design worked best. Students also learn about famous failed and successful building structures.

5. **The Attraction is Obvious: Designing Maglev Systems** (Transportation Engineering & Magnetism) EiE (Gr. 3-6) - In this unit, student understanding will rise to new heights as they explore transportation engineering, magnetism, and the technological innovation of the Magnetic Levitation train. Following the lead of the storybook characters—who need to attract customers to a family-owned toy store before the business fails—students engineer a way to design a levitating vehicle system that will carry packages without them touching the ground.

6. **Forces Of Flight: Let’s Make A Flying Wing Glider – Gr. 3-4**
   Students will identify forces of flight, and how a wing develops lift. Students will make a glider from foam core, adjust it for best flight, and so that it will turn. (Family Science Lesson Fall 2012)
7. **ON THE ROAD AGAIN: MOVING PEOPLE, PRODUCTS, IDEAS**
   In this lesson students learn to identify modes of transportation and communication for moving people, products, and ideas from place to place. Students also learn the advantages and disadvantages of different modes of transportation. This lesson investigates ways in which global interdependence is altering traditional trade patterns, and encourages students to speculate on future world economic development. 
   [http://www.ite.org/councils/education/recruitment/activities/TFS03.pdf](http://www.ite.org/councils/education/recruitment/activities/TFS03.pdf)

8. **MDOT TRAC** (Transportation and Civil Engineering Modules (these would need to be adapted for this program format) **(Gr. 7-12)**
   [http://www.michigan.gov/mdot/0,1607,7-151-9623_38029_38059_41397---,00.html](http://www.michigan.gov/mdot/0,1607,7-151-9623_38029_38059_41397---,00.html)

   - **Bridge Builder - Building Math Skills**
     Algebra, geometry and physics are applied to the design and construction of bridges.
   - **City Planning - Building Fun in Social Studies**
     Use SIMCITY to show concepts of design, problem solving, critical thinking and group decision making.
   - **Highway Development and the Environment**
     Social studies and the sciences come together as students consider the environmental issues an science involved with highway planning.
   - **The Physics of Highway Safety**
   - **Magnetic Levitation**
     Students put magnetic levitation cars through their paces while learning Newton's First and Second Laws of Motion.
   - **Motion and the Transportation Engineer - Physics**
     Momentum and impulse are brought to life for high school or middle school science classes.
   - **Roadway Design and Construction**
     Showcases the wide range of disciplines (including math, social studies and technology) involved in taking a road from design to construction.
   - **Traffic Technology - Physics and Computers**
     Linear motion, basic circuits and Boolean logic for high school students.