Connecting to the *Next Generation Science Standards* (NGSS Lead States 2013)

• The chart below makes one set of connections between the instruction outlined in this article and the *NGSS*. Other valid connections are likely; however, space restrictions prevent us from listing all possibilities.

• The materials, lessons, and activities outlined in the article are just one step toward reaching the performance expectations listed below.

<table>
<tr><td colspan="2">Standard

MS-PS2: Motion and Stability: Forces and Interactions
https://www.nextgenscience.org/dci-arrangement/ms-ps2-motion-and-stability-forces-and-interactions</td></tr>
<tr><td colspan="2">Performance Expectation

MS-PS2-2: Plan an investigation to provide evidence that the change in an object’s motion depends on the sum of the forces on the object and the mass of the object.</td></tr>
<tr><td>Dimensions</td><td>Classroom Connections</td></tr>
<tr><td>Science and Engineering Practice

Planning and Carrying Out Investigations</td><td>Students collaboratively plan, create, and test vehicles to answer the driving question: Can you construct two different vehicles that will travel the farthest distance?</td></tr>
<tr><td>Disciplinary Core Idea

PS2.A: Forces and Motion
The motion of an object is determined by the sum of the forces acting on it; if the total force on the object is not zero, its motion will change. The greater the mass of the object, the greater the force needed to achieve the same change in motion. For any given</td><td>Students use their designs to articulate why their vehicle traveled the distance it did by analyzing the forces exerted and mass of the object.</td></tr>
</table>

object, a larger force causes a larger change in motion. • All positions of objects and the directions of forces and motions must be described in an arbitrarily chosen reference frame and arbitrarily chosen units of size. To share information with other people, these choices must also be shared.	
Crosscutting Concept Patterns	Students observe patterns in the performance of various models to formulate relationships and causes to solidify their understanding of Newton's Second Law of Motion.

Connections to the *Common Core State Standards* (NGAC and CCSSO 2010)

ELA CCSS.ELA-LITERACY.SL.8.1 Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 8 topics, texts, and issues, building on others' ideas and expressing their own clearly.
Mathematics CCSS.MATH.CONTENT.5.G.A.2 Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.