

## MS Physical Science: Forces-Collision Safety

The following learning activities were backwards planned to facilitate the development of students' knowledge and skills for mastery of this NGSS Performance Expectation. Not all of the dimensions and CCSS are covered in the following activities and teachers are encouraged to address them where possible.

<b>MS-PS2-1 Motion and Stability: Forces and Interactions</b>		
<p>Students who demonstrate understanding can:</p> <p><b>MS-PS2-1. Apply Newton's Third Law to design a solution to a problem involving the motion of two colliding objects.</b>*[Clarification Statement: Examples of practical problems could include the impact of collisions between two cars, between a car and stationary objects, and between a meteor and a space vehicle.] [Assessment Boundary: Assessment is limited to vertical or horizontal interactions in one dimension.]</p>		
<p>The performance expectation above was developed using <a href="#">the following elements from the NRC document <i>A Framework for K-12 Science Education</i></a>:</p>		
<p><b>Constructing Explanations and Designing Solutions</b> Constructing explanations and designing solutions in 6–8 builds on K–5 experiences and progresses to include constructing explanations and designing solutions supported by multiple sources of evidence consistent with scientific ideas, principles, and theories.</p> <ul style="list-style-type: none"> <li>Apply scientific ideas or principles to design an object, tool, process or system.</li> </ul>	<p><b>PS2.A: Forces and Motion</b></p> <ul style="list-style-type: none"> <li>For any pair of interacting objects, the force exerted by the first object on the second object is equal in strength to the force that the second object exerts on the first, but in the opposite direction (Newton's third law).</li> </ul>	<p><b>Systems and System Models</b></p> <ul style="list-style-type: none"> <li>Models can be used to represent systems and their interactions—such as inputs, processes and outputs—and energy and matter flows within systems.</li> </ul> <p style="text-align: center;">-----</p> <p style="text-align: center;">---</p> <p style="text-align: center;"><b>Connections to Engineering, Technology, and Applications of Science</b></p> <p><b>Influence of Science, Engineering, and Technology on Society and the Natural World</b></p> <ul style="list-style-type: none"> <li>The uses of technologies and any limitations on their use are driven by individual or societal needs, desires, and values; by the findings of scientific research; and by differences in such factors as climate, natural resources, and economic conditions.</li> </ul>
<p>Connections to other DCIs in this grade-band: <b>MS.PS3.C</b></p>		
<p>Articulation of DCIs across grade-bands: <b>3.PS2.A ; HS.PS2.A</b></p>		
<p>Common Core State Standards Connections:</p> <p><i>ELA/Literacy -</i></p> <p><b>RST.6-8.1</b> Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. (MS-PS2-1)</p> <p><b>RST.6-8.3</b> Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks. (MS-PS2-1)</p> <p><b>WHST.6-8.7</b> Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration. (MS-PS2-1)</p> <p><i>Mathematics -</i></p> <p><b>MP.2</b> Reason abstractly and quantitatively. (MS-PS2-1)</p> <p><b>6.NS.C.5</b> Understand that positive and negative numbers are used together to describe quantities having opposite directions or values;</p>		