

**Grade Levels:** 6<sup>th</sup> Grade

**Time:** 6 – 1 Hour sessions

**Brief Description of Lesson:** In this activity, students will be able to gain hands on experience, collaborating with one another to build their own vehicle using Infento Kits.  
*FIU-EOW offers ways to **differentiate or provide accommodations** to provide opportunities for all students to access the curriculum or standards. These are being provided as suggestions.*

SCIENCE	TECHNOLOGY	ENGINEERING	MATHEMATICS
<p><b>Standard:</b> <b>SC.6.P.13.1:</b> Investigate and describe types of forces including contact forces and forces acting at a distance, such as electrical, magnetic, and gravitational.</p> <p><b>SC.6.P.13.3:</b> Investigate and describe that an unbalanced force acting on an object changes its speed, or direction of motion, or both.</p>	<p><b>Standard:</b> <b>SC.68.CS-CC.1.2:</b> Apply productivity and/or multimedia tools for local and global group collaboration.</p> <p><b>SC.68.CS-CP.3.1:</b> Select appropriate tools and technology resources to accomplish a variety of tasks and solve problems.</p>	<p><b>Standard:</b> <b>MS-ETS1-4:</b> Develop a model to generate data to test ideas about designed systems, including those representing inputs and outputs.</p> <p><b>STEL-7Q:</b> Apply the technology and engineering design process.</p>	<p><b>Standard:</b> <b>MA.K12.MTR.5.1:</b> Use patterns and structure to help understand and connect mathematical concepts.</p> <p><b>MA.6.NSO.4.1:</b> Apply and extend previous understandings of operations with whole numbers to add and subtract integers with procedural fluency.</p>
<p><b>Activity:</b> The concepts of these forces can be introduced before the kit using the link below.</p> <p><a href="#">Contact and Noncontact Forces</a></p> <p>As the students build, they can take note of what components correspond and affect each force involved in the movement of the vehicle.</p> <p><b>VOCABULARY</b> <b>Contact force:</b> force that occurs as a result of two objects making contact with each other. (Friction, push, pull, etc.) <b>Non-contact Force:</b> force which acts on an object without coming physically in contact with it. (Gravity, electric, magnetic)</p>	<p><b>Activity:</b> Each kit has its manual accessible on the infento website, available in different languages.</p> <p>The media can be displayed on classroom tablets or smart boards for the students to use as they build.</p> <p>During planning, the specific manual to be used will be chosen and then continued to be used for the rest of the visits. The choice of manuals will be consistent for the whole project.</p> <p><b>Supporting Resources:</b> <a href="#">Infento Manuals</a> <a href="#">Infento Manuals in Spanish</a></p>	<p><b>Activity:</b> <b>Student Practice:</b> Students will:</p> <ol style="list-style-type: none"> <li>1. <b>Ask:</b> Define the problem</li> <li>2. <b>Imagine:</b> Brainstorm possible solutions</li> <li>3. <b>Plan:</b> Choose a kit to build and divide the work evenly among each student.</li> <li>4. <b>Create:</b> Make it and Test it!</li> <li>5. <b>Improve:</b> Based on their tests, how can students reflect and improve their infento creation.</li> </ol> <p><b>Hook:</b> Roary has noticed that there is a lot of foot traffic while getting around campus. He decides that he needs a new form of transportation to get around.</p> <p><b>Problem:</b> How can we build and modify an Infento Kits design to better suit Roary's needs?</p> <p><b>Measurable Goal:</b></p>	<p><b>Activity:</b> As the students build the vehicle they will need to discern between different parts, ensuring that they are a proper fit.</p> <p>Using the visual aids, students can see the patterns built into their chosen ride. Units, measurements, angles, addition, and subtraction are all used.</p> <p>During the Improve portion, students will be able to make modifications. They will be able to add or subtract parts to improve the vehicle for themselves and for Roary. They will need to keep tolerances and lengths in mind, as they implement these changes.</p>

<p><b>Friction:</b> Force resisting the relative motion of surfaces sliding against each other.</p> <p><b>Speed:</b> The rate of change in the position of an object in any direction.</p> <p><b>Velocity:</b> A quantity designating how fast and in what direction an object is moving.</p> <p><b>Acceleration:</b> Rate of change of velocity, speeding up, down, or constant.</p>		<p>Students will determine if they were successful during the session or project if:</p> <ul style="list-style-type: none"> <li>• The designated section for the session is completed within the time limit.</li> <li>• No necessary building materials are remaining or missing by the end of the session.</li> </ul>	
<p><b>Differentiation:</b> The supplemental video is available for students who would like to learn more on the topic.</p> <p>Diagrams and pictures of the vocabulary words can also be created and provided for students who need help visualizing the concepts.</p>	<p><b>Accommodations:</b> Students can have the option to access the Infento kit manual on their personal devices, in turn offering them a more convenient way to access the instructions.</p>	<p><b>Accommodations:</b> We recommend grouping students based on their respective skill levels to ensure optimal learning outcomes for all students. This should be done by the teacher in advance of the FIU EoW visit.</p> <p>During the design and creation process, provide noise-cancelling headphones or an alternate location, i.e., the hallway.</p>	<p><b>Differentiation:</b> Develop a textual guide to complement the visual instructions, assisting students in having a deeper understanding with each step.</p>

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**Brief Description of Document:** This document is paired with the EoW Infento Kit lesson plan. Certain words may be difficult for students to visualize and understand. Thus, these pictures and diagrams may be of use.

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**Contact force:** force that occurs as a result of two objects making contact with each other.  
(Friction, push, pull, etc.)

**Non-contact Force:** force which acts on an object without coming physically in contact with it.  
(Gravity, electric, magnetic)

## Types of Forces

**Contact forces:** interactions between objects that touch



applied force



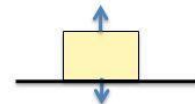
spring force



drag force



frictional force



normal force

**Non-contact forces:** attract or repel, even from a distance



magnetic force

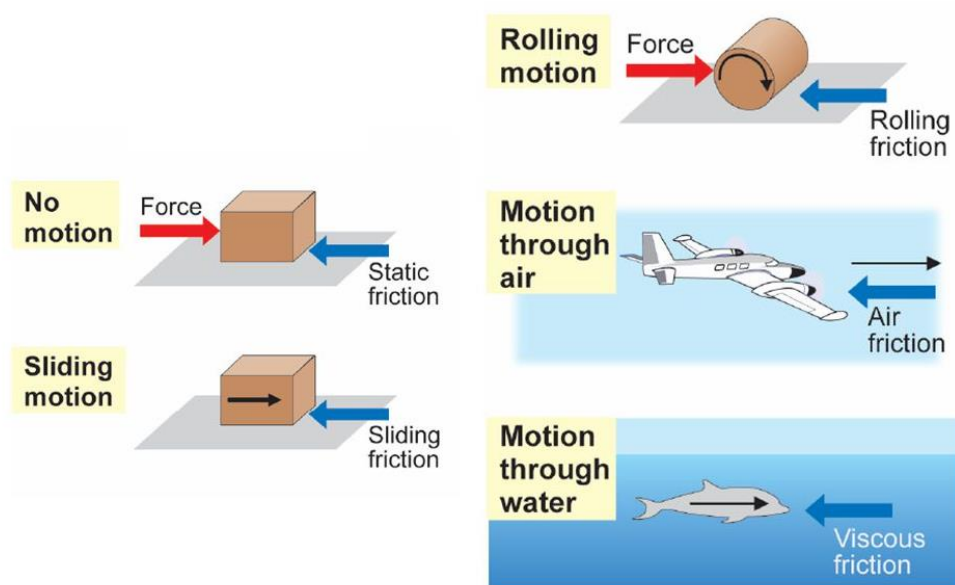


electric force



gravitational force

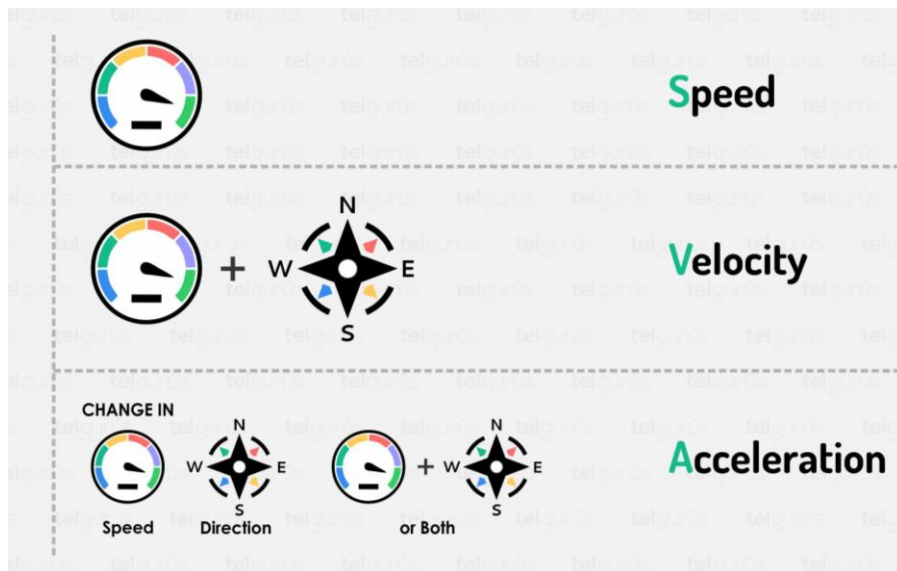
**Friction:** Force resisting the relative motion of surfaces sliding against each other.

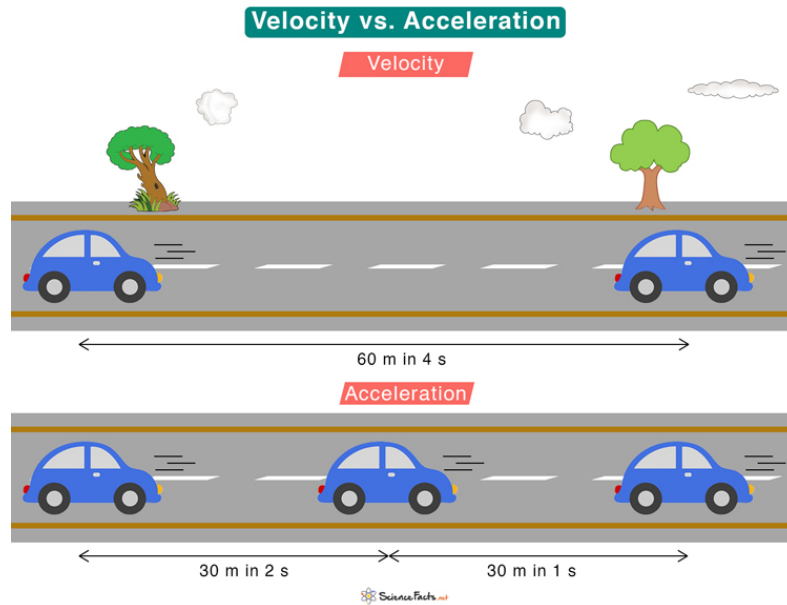


**Speed:** The rate of change in the position of an object in any direction.

**Velocity:** A quantity designating how fast and in what direction an object is moving.

**Acceleration:** Rate of change of velocity, speeding up, down, or constant.





## References:

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