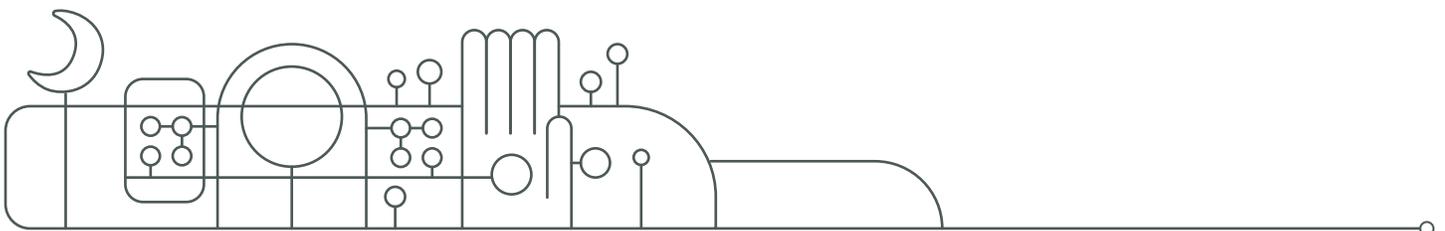


# FUTURE GOALS™ Science Edition

## Course Outline

Lesson	Game Description	Learning Objectives <i>Students will be able to...</i>	Key Terms
<b>Prepare the Surface</b>	Students explore the particle motion of different phases (solids, liquids and gases) and use that to set the air and ice temperature for the arena.	<ul style="list-style-type: none"> <li>○ Explain that matter is made up of particles that are too small to see (i.E. Molecules).</li> <li>○ Describe how changes in temperature affect molecular motion and kinetic energy.</li> <li>○ Describe and compare the phases of matter (solid, liquid, and gas) based on temperature and molecular motion.</li> </ul>	Molecules, atoms, H <sub>2</sub> O, O <sub>2</sub> , phases, solid, liquid, gas, volume, kinetic energy, Celsius, Fahrenheit, freezing, melting
<b>The Face-Off</b>	Students explore the relationship between potential and kinetic energy during a puck drop.	<ul style="list-style-type: none"> <li>○ Explain the difference between kinetic energy (ke) and potential energy (pe).</li> <li>○ Identify the relative amount of ke and pe in a system, based on an object's speed and position relative to the ground.</li> <li>○ Explain the relationship between ke and pe in a closed system (i.E. Energy is conserved).</li> </ul>	Kinetic energy, potential energy, energy transformation, conservation of energy
<b>Strength</b>	Students explore the effect of mass and speed on a player's kinetic energy by adding removing their equipment and adjusting their skating speed.	<ul style="list-style-type: none"> <li>○ Identify and define independent and dependent variables.</li> <li>○ Recognize patterns and correlations in data sets.</li> <li>○ Explain the positive relationships between mass, speed (velocity), and kinetic energy.</li> <li>○ Identify that changes in speed (velocity) have a greater impact on kinetic energy than changes in mass.</li> </ul>	Independent variable, dependent variable, kinetic energy, mass, speed
<b>Endurance</b>	Students train players in their target heart rate zone during an on-ice shift to see the effect of exercise on heart rate and breathing rate.	<ul style="list-style-type: none"> <li>○ Describe the components and function of the respiratory and circulatory system.</li> <li>○ Collect data to analyze the relationship between physical exercise and heart rate and breathing rate.</li> <li>○ Describe the relationship between cells, tissues, organs and organ systems.</li> </ul>	Specialized cells, tissue, rate, organ, organ system, circulatory system, respiratory system, red blood cell, capillaries, heart rate, breathing rate



Lesson	Game Description	Learning Objectives <i>"Students will be able to..."</i>	Key Terms
<b>The Stick</b>	Students make observations about player's stick design preferences based on their skating, shooting, and passing styles and use this observational data to design the best stick for a new player.	<ul style="list-style-type: none"> <li>○ Define and identify variables and criteria in an engineering design task.</li> <li>○ Analyze data tables to discover patterns and correlations.</li> <li>○ Select an optimal design solution to meet given criteria.</li> </ul>	Observation, criteria, variable, qualitative data, quantitative data
<b>The Goalie Pads</b>	Students isolate and control variables to see how different pad materials affect protection & maneuverability.	<ul style="list-style-type: none"> <li>○ To define and identify controls (or controlled variables) in an engineering design task.</li> <li>○ Perform controlled experiments by adjusting experimental variables.</li> <li>○ Analyze data tables to find patterns and correlations.</li> <li>○ Select an optimal design solution based on given requirements.</li> </ul>	Criteria, independent/dependent/controlled variables, optimization