## 1. Mini-Sized Mini-Golf

Subject: STEAM, Science	Topic or Unit of Study: Energy, Energy Transfer
Grade/Level: Grades 3-5	Time Allotment: 1.5 hours
<ul> <li>Objectives: <ul> <li>We will explore the basic principles of energy and their connection to an object's speed.</li> <li>We will identify and describe the relationship between speed and energy.</li> <li>We will engage effectively in a range of collaborative discussions.</li> </ul> </li> </ul>	<ul> <li>Standards:</li> <li>3-PS2-3: Ask questions to determine cause and effect relationships of electric or magnetic interactions between two objects not in contact with each other.</li> <li>4-PS3-3: Ask questions and predict outcomes about the changes in energy that occur when objects collide.</li> <li>4-PS3-4: Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.</li> <li>ISTE 1.3d: Students build knowledge by actively exploring real-world issues and problems, developing ideas and theories, and pursuing answers and solutions.</li> <li>MS-PS2-1: Apply Newton's Third Law to design a solution to a problem involving the motion of two colliding objects.</li> </ul>
<b>Synopsis:</b> This unit will develop your students' understanding of energy, energy transfer, and collision. They'll explore ways of using observation skills as they anticipate the outcomes of changes in energy during a collision, describe the relationship between energy and speed, and predict how energy moves from place to place. They'll also broaden their understanding of energy conversion (potential and kinetic) by investigating a solution that converts energy from one form to another, testing the solution to improve and refine its function.	<ul> <li>Materials: <ul> <li>Teacher/instructor lesson plan</li> <li>Teacher/instructor Google Slides presentation</li> <li>Teacher computer with access to internet and teacher presentation</li> <li>Student computers with LEGO Education SPIKE App</li> <li>LEGO Spike Essential kit (one per two students)</li> <li>Printed building instructions (optional)</li> </ul> </li> </ul>

# 2. Edge Evasion Carnival Chaos

Subject: STEAM, Science	Topic or Unit of Study: Energy, Energy Transfer
Grade/Level: Grades 3-5	Time Allotment: 1.5 hours
<ul> <li>Objectives: <ul> <li>We will explore and describe energy conversion (potential and kinetic energy).</li> <li>We will apply and test existing scientific knowledge of energy conversion.</li> <li>We will engage effectively in a range of collaborative discussions.</li> </ul> </li> </ul>	<ul> <li>Standards:</li> <li>4-PS3-4: Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.</li> <li>ISTE 1.3d: Students build knowledge by actively exploring real-world issues and problems, developing ideas and theories, and pursuing answers and solutions.</li> <li>5.AP.A.01: Develop, compare, and refine multiple algorithms for the same task and determine which algorithm is the most appropriate.</li> <li>ELA-LITERACY.SL.4.1: Engage effectively in a range of collaborative discussions (one-on-one, in groups, teacher-lef) with diverse partners on grade 4 topics and texts, building on others' ideas and expressing their own clearly.</li> </ul>
Synopsis: This unit will develop your students' understanding of energy, energy transfer, and collision. They'll explore ways of using observation skills as they anticipate the outcomes of changes in energy during a collision, describe the relationship between energy and speed, and predict how energy moves from place to place. They'll also broaden their understanding of energy conversion (potential and kinetic) by investigating a solution that converts energy from one form to another, testing the solution to improve and refine its function.	<ul> <li>Materials: <ul> <li>Teacher/instructor lesson plan</li> <li>Teacher/instructor Google Slides presentation</li> <li>Teacher computer with access to internet and teacher presentation</li> <li>Student computers with LEGO Education SPIKE App</li> <li>LEGO Spike Essential kit (one per two students)</li> <li>Printed building instructions (optional)</li> </ul> </li> </ul>

## 3. Mini Pinball Mania

Subject: STEAM, Science	Topic or Unit of Study: Energy, Energy Transfer
Grade/Level: Grades 3-5	Time Allotment: 1.5 hours
<ul> <li>Objectives:</li> <li>We will apply ideas to refine a solution that converts energy from one form to another.</li> <li>We will test the solution to improve and refine its function.</li> <li>We will engage effectively in a range of collaborative discussions.</li> </ul>	<ul> <li>Standards:</li> <li>4-PS3-4: Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.</li> <li>ISTE 1.3d: Students build knowledge by actively exploring real-world issues and problems, developing ideas and theories, and pursuing answers and solutions.</li> <li>5.AP.M.02: Modify, remix, or incorporate portions of an existing program into one's own work, to develop or add more advanced features (grade-level appropriate).</li> <li>ELA-LITERACY.SL.4.1: Engage effectively in a range of collaborative discussions (one-on-one, in groups, teacher-lef) with diverse partners on grade 4 topics and texts, building on others' ideas and expressing their own clearly.</li> </ul>
Synopsis: This unit will develop your students' understanding of energy, energy transfer, and collision. They'll explore ways of using observation skills as they anticipate the outcomes of changes in energy during a collision, describe the relationship between energy and speed, and predict how energy moves from place to place. They'll also broaden their understanding of energy conversion (potential and kinetic) by investigating a solution that converts energy from one form to another, testing the solution to improve and refine its function.	<ul> <li>Materials: <ul> <li>Teacher/instructor lesson plan</li> <li>Teacher/instructor Google Slides presentation</li> <li>Teacher computer with access to internet and teacher presentation</li> <li>Student computers with LEGO Education SPIKE App</li> <li>LEGO Spike Essential kit (one per two students)</li> <li>Printed building instructions (optional)</li> </ul> </li> </ul>

# 4. Carnival Chaos Challenge

Crazy Chaos

Subject: STEAM, Science	Topic or Unit of Study: Energy, Energy Transfer
Grade/Level: Grades 3-5	Time Allotment: 1.5 hours
<ul> <li>Objectives:</li> <li>We will develop ideas and theories to solve a real-world situation.</li> <li>We will apply ideas to refine a solution that converts energy from one form to another.</li> <li>We will test the solution to improve and refine its function.</li> </ul>	<ul> <li>Standards:</li> <li>4-PS3-4: Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.</li> <li>ISTE 1.3d: Students build knowledge by actively exploring real-world issues and problems, developing ideas and theories, and pursuing answers and solutions.</li> <li>5.AP.M.02: Modify, remix, or incorporate portions of an existing program into one's own work, to develop or add more advanced features (grade-level appropriate).</li> <li>MS-PS2-1: Apply Newton's Third Law to design a solution to a problem involving the motion of two colliding objects.</li> </ul>
<b>Synopsis:</b> This unit will develop your students' understanding of energy, energy transfer, and collision. They'll explore ways of using observation skills as they anticipate the outcomes of changes in energy during a collision, describe the relationship between energy and speed, and predict how energy moves from place to place. They'll also broaden their understanding of energy conversion (potential and kinetic) by investigating a solution that converts energy from one form to another, testing the solution to improve and refine its function.	<ul> <li>Materials: <ul> <li>Teacher/instructor lesson plan</li> <li>Teacher/instructor Google Slides presentation</li> <li>Teacher computer with access to internet and teacher presentation</li> <li>Student computers with LEGO Education SPIKE App</li> <li>LEGO Spike Essential kit (one per two students)</li> </ul> </li> </ul>

## Extra: Bowling Bonanza

Subject: STEAM, Science	Topic or Unit of Study: Energy, Energy Transfer
Grade/Level: Grades 3-5	Time Allotment: 1.5 hours
<ul> <li>Objectives:</li> <li>We will predict outcomes of the changes in energy that occur when objects collide.</li> <li>We will observe and describe the relationship between energy and force.</li> <li>We will engage effectively in a range of collaborative discussions.</li> </ul>	<ul> <li>Standards:</li> <li>3-PS2-3: Ask questions to determine cause and effect relationships of electric or magnetic interactions between two objects not in contact with each other.</li> <li>4-PS3-3: Ask questions and predict outcomes about the changes in energy that occur when objects collide.</li> <li>4-PS3-4: Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.</li> <li>ISTE 1.3d: Students build knowledge by actively exploring real-world issues and problems, developing ideas and theories, and pursuing answers and solutions.</li> <li>MS-PS2-1: Apply Newton's Third Law to design a solution to a problem involving the motion of two colliding objects.</li> </ul>
<b>Synopsis:</b> This unit will develop your students' understanding of energy, energy transfer, and collision. They'll explore ways of using observation skills as they anticipate the outcomes of changes in energy during a collision, describe the relationship between energy and speed, and predict how energy moves from place to place. They'll also broaden their understanding of energy conversion (potential and kinetic) by investigating a solution that converts energy from one form to another, testing the solution to improve and refine its function.	<ul> <li>Materials: <ul> <li>Teacher/instructor lesson plan</li> <li>Teacher/instructor Google Slides presentation</li> <li>Teacher computer with access to internet and teacher presentation</li> <li>Student computers</li> <li>LEGO Spike Essential kit (one kit per two students)</li> <li>Paper copies of building instructions (optional)</li> </ul> </li> </ul>

## Extra: High Stick Hockey

Subject: STEAM, Science	Topic or Unit of Study: Energy, Energy Transfer
Grade/Level: Grades 3-5	Time Allotment: 1.5 hours
<ul> <li>Objectives:</li> <li>We will observe and describe how energy can be transferred.</li> <li>We will predict how energy moves from place to place.</li> <li>We will engage effectively in a range of collaborative discussions.</li> </ul>	<ul> <li>Standards:</li> <li>4-PS3-2: Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.</li> <li>CSTA.1B.AP.10: Create programs that include sequences, events, logos, and conditionals.</li> <li>ISTE 1.3d: Students build knowledge by actively exploring real-world issues and problems, developing ideas and theories, and pursuing answers and solutions.</li> <li>CCSS.ELA-LITERACY.SL.4.1: Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led), building on others' ideas and expressing their own clearly.</li> </ul>
<b>Synopsis:</b> This unit will develop your students' understanding of energy, energy transfer, and collision. They'll explore ways of using observation skills as they anticipate the outcomes of changes in energy during a collision, describe the relationship between energy and speed, and predict how energy moves from place to place. They'll also broaden their understanding of energy conversion (potential and kinetic) by investigating a solution that converts energy from one form to another, testing the solution to improve and refine its function.	<ul> <li>Materials: <ul> <li>Teacher/instructor lesson plan</li> <li>Teacher/instructor Google Slides presentation</li> <li>Teacher computer with access to internet and teacher presentation</li> <li>Student computers</li> <li>LEGO Spike Essential kit (one per two students)</li> <li>Building instructions (optional)</li> </ul> </li> </ul>

#### Extra: Maze Craze

Subject: STEAM, Science	Topic or Unit of Study: Energy, Energy Transfer
Grade/Level: Grades 3-5	Time Allotment: 1.5 hours
<ul> <li>Objectives:</li> <li>We will observe and explain how interactions between two objects can impact the energy of an object.</li> <li>We will compare and iterate to improve the design of the solution.</li> <li>We will engage effectively in a range of collaborative discussions.</li> </ul>	<ul> <li>Standards:</li> <li>4-PS3-2: Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.</li> <li>CSTA.1B.AP.10: Create programs that include sequences, events, logos, and conditionals.</li> <li>ISTE 1.3d: Students build knowledge by actively exploring real-world issues and problems, developing ideas and theories, and pursuing answers and solutions.</li> <li>CCSS.ELA-LITERACY.SL.4.1: Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led), building on others' ideas and expressing their own clearly.</li> </ul>
<b>Synopsis:</b> This unit will develop your students' understanding of energy, energy transfer, and collision. They'll explore ways of using observation skills as they anticipate the outcomes of changes in energy during a collision, describe the relationship between energy and speed, and predict how energy moves from place to place. They'll also broaden their understanding of energy conversion (potential and kinetic) by investigating a solution that converts energy from one form to another, testing the solution to improve and refine its function.	<ul> <li>Materials: <ul> <li>Teacher/instructor lesson plan</li> <li>Teacher/instructor Google Slides presentation</li> <li>Teacher computer with access to internet and teacher presentation</li> <li>Student computers</li> <li>LEGO Spike Essential kit (one per two students)</li> <li>Building instructions (optional)</li> </ul> </li> </ul>