



**Unit Map 2011-2012**  
**Hampshire Regional School District**  
**Heffernan, John / Technology 2 / Grade 2 (District Elementary School)**

Friday, October 21, 2011, 9:56AM



**Unit: Smart Spinner and Drumming Monkey Robots (Week 4, 7 Weeks)**  

Enduring Understandings	Essential Questions
<p>Gears transfer mechanical energy.</p> <p>Using different sized gears changes the speed of the gears.</p> <p>Cams cause an up and down movement of a beam.</p>	<p>Can you make a Drumming Monkey robot that makes different rhythms using cams?</p> <p>How does using different sized gears change the speed of the gears?</p>
<p><b>Curriculum Frameworks and Learning Standards</b></p>	
<p><b>MA: Mathematics (2011), MA: Grade 2 , Measurement &amp; Data</b>  2.MD Work with time and money.</p> <ul style="list-style-type: none"> <li>• MA.7.a. Know the relationships of time, including seconds in a minute, minutes in an hour, hours in a day, days in a week, a month, and a year; and weeks in a month and a year.</li> </ul> <p><b>MA: Science and Technology/Engineering, MA: PreK - 2 , Technology/Engineering</b>  2. Engineering Design</p> <ul style="list-style-type: none"> <li>• 2.1 Identify tools and simple machines used for a specific purpose, e.g., ramp, wheel, pulley, lever.</li> <li>• 2.2 Describe how human beings use parts of the body as tools (e.g., teeth for cutting, hands for grasping and catching), and compare their use with the ways in which animals use those parts of their bodies.</li> </ul> <p><b>MA: Science and Technology/Engineering, MA: PreK - 2 , Science Inquiry Skills</b>  Skills of Inquiry</p> <ul style="list-style-type: none"> <li>• Ask questions about objects, organisms, and events in the environment.</li> <li>• Tell about why and what would happen if?</li> <li>• Make predictions based on observed patterns.</li> <li>• Name and use simple equipment and tools (e.g., rulers, meter sticks, thermometers, hand lenses, and balances) to gather data and extend the senses.</li> <li>• Record observations and data with pictures, numbers, or written statements.</li> <li>• Discuss observations with others.</li> </ul>	
Content	Skills
<p>Understand how the number of teeth and diameter of the gears affect the speed of the movement.</p>	<p><b>SMART SPINNER</b></p> <p><b>Science</b></p>

Understand how the number and position of the cams affects the frequency and timing of the beat pattern (rhythm).

Trace the transmission of motion and transfer of energy through the machine.  
Identify the gear mechanism and the effect of the gears on the length of time the top can spin.

**Technology**

Create a programmable model to demonstrate the knowledge and operation of digital tools and technological systems.

**Engineering**

Build and test the spinner movement.  
Modify the spinning behavior by changing the gears to affect the speed of the top and the length of time it spins.

**Mathematics**

Compare the ratio of the smaller and larger gears.

**DRUMMING MONKEY**

**Science**

Trace the transmission of motion and transfer of energy through the machine.  
Identify the lever mechanism and the effect of the cams on the rhythm or timing of the lever arm movement.

**Technology**

Create a programmable model to demonstrate the knowledge and operation of digital tools and technological systems.

**Engineering**

Build and test the drumming monkey movement.  
Modify the drumming behavior by changing the cams to affect the pattern of tapping and program sound effects to make the patterns more interesting.

**Mathematics**

Use numbers to represent the type of sounds played and the amount of time the motor turns on.

**Assessments**

**Observation**

**Formative: Performance: Authentic Task**

Teachers observe teams at work looking for understanding and skills. Teachers monitor and check completed Activity Data Tables for understanding. Teachers monitor the final discussions for understanding of the 2 key concepts on cams and gear ratios. [Note: this could be assessed more formally.]

<b>Learning Activities</b>	<b>Resources</b>
<p>Students build the Smart Spinner according to the Lego directions using either the book or the onscreen Activity Guide.</p> <p>Students program the Smart Spinner to spin and the stop when the motion sensor detects that the handle is raised.</p> <p>Students time the spinner for each of the 3 different gear configurations.</p> <p>The class discusses gear ratios and why the first configuration resulted in the longest spin times.</p> <p>Students build the Drumming Monkey according to the Lego directions using either the book or the onscreen Activity Guide.</p> <p>Students program the Drumming Monkey to drum for a specified time.</p> <p>Students fill in their Activity Data Table for each of the 4 different cam configurations.</p> <p>Students can add sound to their Drumming Monkey, including record and using their own sounds, if they finish early.</p> <p>The class discusses cam gears and why the different configurations produced different rhythms.</p>	<p>Stopwatches - helpful but not required</p> <p>Wall clock with a second hand</p> <p>Activity Sheets for Drumming Monkeys</p> <p>Activity Sheets for Smart Spinner</p> <p>Yogurt cups or other cups to make a drum for the Drumming Monkey</p> <p>Lego Education WeDo Teacher's Guide</p> <p>Lego Education WeDo Robotics Kits</p> <p>Laptops with WeDo software installed</p> <p> <a href="#">Kids</a></p>

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