Unit Map 2011-2012
Hampshire Regional School District
Heffernan, John / *Technology 4* / *Grade 4 (District Elementary School)*
Friday, October 21, 2011, 9:59AM

Unit: Open Ended Engineering Challenge - Burglar Alarm (Week 34, 7 Weeks) 🔲

Enduring Understandings	Essential Questions
The students will understand that sensors allow robots to interact with the world. The students will understand that engineering design is a iterative process with a defined cycle of steps. The students will understand that failure is an important and valuable part of the engineering process. The students will understand that engineers work cooperatively in teams to accomplish a task.	How does adding a sensor change what your robot can and cannot do? How can using the engineering design process help you build a better burglar alarm. How do failures help you create a better robot? What techniques can you use to work cooperatively to accomplish an engineering task?

Curriculum Frameworks and Learning Standards

MA: Science and Technology/Engineering, MA: Grades 3 - 5 , Technology/Engineering
1. Materials and Tools

- 1.1 Identify materials used to accomplish a design task based on a specific property, i.e., weight, strength, hardness, and flexibility.

2. Engineering Design

- 2.1 Identify a problem that reflects the need for shelter, storage, or convenience.
- 2.2 Describe different ways in which a problem can be represented, e.g., sketches, diagrams, graphic organizers, and lists.
- 2.3 Identify relevant design features (e.g., size, shape, weight) for building a prototype of a solution to a given problem.

MA: Science and Technology/Engineering, MA: Grades 3 - 5 , Science Inquiry Skills
Skills of Inquiry

- Ask questions and make predictions that can be tested.
- Keep accurate records while conducting simple investigations or experiments.
- Conduct multiple trials to test a prediction. Compare the result of an investigation or experiment with the prediction.
- Recognize simple patterns in data and use data to create a reasonable explanation for the results of an investigation or experiment.
- Record data and communicate findings to others using graphs, charts, maps, models, and oral and written reports.

MA: Technology Literacy, MA: Grades 3 - 5 , Computer Proficiency
Standard 1. Demonstrate proficiency in the use of computers and applications, as well as an understanding of the concepts underlying hardware, software, and connectivity.

Basic Operations

- G3-5: 1.1 Demonstrate basic steps in using available hardware and applications (e.g., log into a computer, connect/disconnect peripherals, upload files from peripherals).
- G3-5: 1.3 Use various operating system features (e.g., open more than one application/program, work with menus, use the taskbar/dock).
- G3-5: 1.4 Demonstrate intermediate keyboarding skills and proper keyboarding techniques.

Content	Skills
Students will know that sensors can be used to detect changes in the environment. Robots can use data from sensors to respond to changes in the environment. There are different kinds of sensors: motion sensors and tilt sensors. Understand what engineers do in their jobs.	- Program a robot car to alter its behavior when it senses motion or tilt - Test and refine an engineering design - Make an ad for a product they design

Assessments

Observational Checklist
Formative: Performance: Authentic Task
   Did the burglar alarm meet the requirements and work? Did the team work together well? Did the students come up with multiple, possible designs? Did the poster show understanding of their design and the design features? Did the alarm use multiple sensors? Did the students represents their possible solutions in multiple ways? The above can be written and a checklist for the project. Did both students program and use the computer?

  Define robot, define engineering, indicate interest in technology and engineering
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Learning Activities	Resources
The teacher introduces and motivates the students to use their WeDo kits to design and build a burglar alarm. They will also build a small house (can be just some walls) to contain the alarm. In teams of 2, students will: _____ Research the parts available _____ Write down 3 ideas for the alarm.	LEGO Education WeDo Robotics Construction Set LEGO Education WeDo Robotics Software v.1.2 and Activity Pack LEGO Education WeDo Resource Sets

| _____ Build the alarm | 🔵 Kids Engineer Web Site |

_____ Build the alarm
_____ Program the alarm
_____ Test the alarm
_____ Redesign alarm as needed
_____ Make poster draft
_____ Make final poster
_____ Reflect on their design individually

See attached links for a student checklist and reflection worksheet.

📎 Checklist
📎 Reflection Worksheet

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