Toys for the Future

Grade 8

Topic: Energy
Grade: 8
Duration: 3 x 45 minutes

Students will create a play area for the school that meets specific criteria. Within the area, there will be a variety of technology toys to teach specific concepts. The area will be self-contained and all of the toys must use some form of renewable energy or alternate source to create movement. The toys be aesthetically pleasing and be suitable for a specific age group. This area will be part of a larger school improvement plan.

Curriculum Expectations

- 8s87: Demonstrate an understanding of the factors that contribute to the efficient operation of mechanisms and systems
- 8s88: Design and make systems of structures and mechanisms, and investigate the efficiency of the mechanical devices within them
- 8s89: Demonstrate understanding of the factors that can affect the manufacturing of a product, including the needs of the consumer
- 8s104: Design and make a mechanical system that is operated by hydraulic or pneumatic power
- 8s105: Select and use appropriate materials and strategies to make a product
- 8s106: Produce technical drawings and layout diagrams of a structure or a mechanical system that they are designing, using a variety of resources
- 8s110: Identify the kinds of information that assist consumers in making a decision about buying a product
- 8s111: Identify consumer expectations regarding the function and effectiveness of a product, using information collected in a survey they made, and recognize that expectations may change
- 8s113: Identify the personal and societal factors that determine whether a product is used
- 8e3: Organize information and ideas creatively as well as logically, using paragraph structures appropriate for their purpose (e.g., paragraphs structured to develop a comparison or establish a cause-and-effect relationship)
- 8e23: Use spreadsheets, computer-generated charts, and graphs for specific purposes (e.g., to convey data) and in appropriate contexts (e.g., research reports)
- 8e62: Contribute collaboratively in group situations by asking questions and building on the ideas of others
- 8e63: Work with members of their group to establish clear purposes and procedures for solving problems and completing projects
- 8m61: Recognize three-dimensional figures from their top, side, and front views
- 8m62: Sketch and build representations of three-dimensional figures (e.g., nets, skeletons) from front, top, and side views
- 8m91: Systematically collect, organize, and analyse primary data
- 8m94: Evaluate data and draw conclusions from the analysis of data
- 8m97: collect primary data using both a whole population (census) and a sample of classmates, organize the data on tally charts and stem-and-leaf plots, and display the data on frequency tables

- 8m100: Manipulate and present data using spreadsheets, and use the quantitative data to solve problems

Background Information
New products are always coming on the market. Large corporations spend millions of dollars in research and development before a product comes on the market. They conduct surveys to determine what is needed. They do focus groups with experimental products. They test their products extensively before they mass-produce the item. More and more informed companies are looking at products that are not harmful to the environment and do not use excessive energy in their production.

Accountability
Students will appreciate what is required to produce a new product that looks at the wise use of energy.

Teacher Notes
1. Use this scenario approach:

   > Your school is designing a new play area for the younger children. The parents and teachers want this area to take the environment into account. They want to use recycled materials wherever possible. They want to include new toys that are unusual and that will demonstrate a variety of scientific and technological principles. The design of these toys should be aesthetically pleasing and also be enjoyable for the children. The design must take into account that only renewable forms of energy can be used in any objects that are in the area. The area should include a variety of toys and equipment for children of different ages.

2. Create design companies within the class. Each company will create a proposal to be presented to the EC Team for the contract to create this new play area and all the toys that will go in the area.
3. Students can assume different roles within their organization in order to accomplish the task.
4. The students should create a survey that can be used to determine what types of toys are needed in the school. Have them look at how younger children play, what kinds of toys they like and how long they spend on any one task.
5. Have the teams create a prototype of a new toy that demonstrates a technological principle – it can use gears, pulleys, hydraulics, pneumatics, etc., but it cannot use electricity or batteries to make it operate.
6. Create a spreadsheet to show the cost of creating the new toys. Labour, material and promotion costs should be calculated into the final plan.
7. Students should consider what materials to use in the toys – parents want recycled material used. Their toys cannot have a negative effect on the environment.
8. Create the original design and market it to the School Council or EC Team. It can be used at the Rummage Sale or donated to the younger classes.

Home Extension
Bring in toys from home to examine.

Lesson Comments
Teachers, feel free to add in your own comments for this lesson.