Simple Machines Lesson Plan

Background. Are chop sticks a machine? What about an egg beater? In this project, students will be challenged to identify and study simple machines in everyday life—from a seesaw to a treadmill. They must investigate how these simple yet fascinating "machines" work and their efficiency, effort and resistance forces. The students then work in groups to combine everyday parts to invent and make their own imaginative but useful two-dimensional machine. The students are instructed to compose an informative essay in Microsoft Word and create a dynamic presentation in Microsoft PowerPoint to present their machine project. Finally, students create a newsletter designed to tell the story of how their simple machines work and create a Web page to display their machine projects. In the end, students discover they have gone on a delightful mystery adventure into the world of how things work.

Standards.

Science and Technology:	NS 9-12.5 (Science and Technology)
Language Arts:	NL-Eng K-12.5 (Communication Strategies)
Mathematics:	NM-Num 9-12.1-3 (Number and Operations); NM-Meas 9-12.1-2 (Measurement); NM-Data 9-12.1-2 (Data Analysis and Probability); NM-PROB. PK-12.1-4 (Problem Solving); NM-COMM PK-12.-4 (Communication); NM-CONN.PK-12.1-3 (Connections)
Science:	NS.9-12.1(Science as Inquiry); NS.9-12.2 (Physical Science); NS.9-12.5 (Science and Technology)

Required Software. Microsoft Excel, Microsoft PowerPoint, Microsoft Internet Explorer 6, Microsoft Publisher, Microsoft FrontPage, Microsoft Word, and Microsoft Encarta Encyclopedia Online

Time Allotted. Approximately 14 days (not including the presentation time).

Objectives

A. Technology. Students will:

- Use the Internet for research.
- Use Microsoft Publisher to create a newsletter.
- Create a PowerPoint presentation.
- Create a Web page to display machine projects.
- Use Microsoft Word to create an informative essay.

B. Science. Students will:

- Identify the simple machines and their movements.
- Identify and calculate resistance and effort force.
- Create a two-dimensional machine using everyday parts.
- Identify simple machines in everyday objects.
- Define a machine's efficiency.
- Name and give examples of the six simple machines.

- Calculate a machine's mechanical advantage.
- Describe factors that affect a machine's efficiency.

C. Language Arts. Students will:

- Use the six traits to create a newsletter publication.
- Use the six traits to create an informative essay.

D. Math. Students will:

- Calculate force.
- Calculate efficiency.

Prerequisite Skills.

- Students must have prerequisite knowledge of the six traits of writing.
- Students must have prerequisite skills of multiplication and division.
- Students must have prerequisite skills of one- and two-step problems.
- Students should have familiarity with Microsoft Publisher, PowerPoint, Word and Internet Explorer.

Procedure

Days One and Two.

- Students brainstorm to come up with a list of possible machines and write a paragraph describing the machine (for example, what it does, who would use it).
- Define simple machines.
- Identify the movements of the simple machines.
- Classify everyday objects as a simple machine.
- Define efficiency.
- Calculate efficiency.
- Define mechanical advantage.
- Calculate mechanical advantage.
- Introduce the project with PowerPoint presentation about Simple Machines
- Work with the group on the machine project.
- Brainstorm, see examples, and identify needed supplies.
- Students will create PowerPoint Presentations, Student Newsletters and WebPages

Days Three through Five. Students work on their PowerPoint presentations.

- Students view examples of PowerPoint presentations.
- Hand out the rubric and expectations.
- Students determine what resources will be in the presentation (see PowerPoint Planner)
- Students develop a storyboard that includes the required elements.
- Students create a blank outline.
- Presentation should be enhanced with a background design, graphics, music/sounds, and transitions.

Days Six through Nine. Students work on their Newsletter.

- Students view examples of newsletters.
- Hand out the rubric and expectations.

- Students plan the content, including the overall goal, the title of the publication, topics and reference materials, and resources to use (see Newsletter Planner).
- Students create a newsletter storyboard.
- Students use the Newsletter Wizard in Publisher.
- Newsletter should be enhanced using graphics and captions.

Days Ten and Eleven. Students work on their Web Pages.

- Students view examples of Web pages.
- Hand out the rubric and expectations.
- Students create a Web page to display the machine projects (see Web Page Planner).

Days Twelve through Fourteen. Student presentations.

Accommodations for Different Learners

Resource Student. Pair resource students with other students when they are working on the multimedia projects and other tasks. Or have the resource students work as a group on the projects with their aide, if applicable.

Gifted Students

- Have gifted students help you find and bookmark appropriate simple machine Web sites.
- Allow them to design their own publications without using the templates.
- Encourage them to act as technology assistants throughout the projects, as they complete their own projects.
- Allow gifted students to make more in-depth brochures, add more pages to their newsletter, or include more slides in their PowerPoint presentation.
- Pair up your gifted students with your resource room students.
- Challenge students to create a compound machine that incorporates all six simple machines.

ESL Students. A student who speaks and understands minimal English can be paired with a student who speaks the ESL student's language as well as English.

Assessment. Students will be assessed traditionally for the written assignments and activities. For the computer application projects and machine project, the teacher will use scoring guides and rubrics to assess students. In addition, the Web pages include a response form for feedback from the Internet community.

Rubrics. Web Page; Newsletter; PowerPoint

Handouts. Newsletter Planner; PowerPoint Planner; Website Planner