Lesson Plan

Course: Physics
Subject: Simple Machines
Grade: 7
Date taught: 2/28/2004
Time taught: 8:00 a.m.
Length of period: 120 min
Group size: 20
Methods: Explanation, Interpretation, Experiment, Use of Internet

Science Education Standards:

- Students should organize materials and other resources, plan their work, make good use of group collaboration where appropriate, choose suitable tools and techniques, and work with appropriate measurement methods to ensure adequate accuracy.
- Technology influences society through its products and processes. Technology influences the quality of life and the ways people act and interact.

I. Goal Statements:

1. Students will be able to determine the types and the use of the simple machines in their life.

2. Students will be able to determine the relation of daily used tools and their relation to the simple machines.

3. Students will realize the main physical ideas behind the simple machines.

II. Behavioral Objectives:

This lesson should enable students to;

1. Identify the types of simple machines and their use in their daily life
2. Explain how simple machines work
3. Match some sample tools with main types of simple machines

III. Materials: Textbook, handouts, computer (with internet connection). For Pulley experiment: board and pulley, small bucket, large bucket, 15 weights, clamp, pulley, rope, load, hooks.

IV. Concepts, skills and content: Lever, inclined plane, wheel and axle, screw, wedge, pulley.
V. Procedures:

A. Introduction

1. Students will be asked to list some items that they use in their lives and make their works easier. They will also be asked to write how these machines make their lives easier. Results will be discussed.

B. Sequence of activities

- Students will list simple machines that they know, and discuss how do they work and why are they useful
- The main idea behind the simple machines will be introduced to the classroom. After that the types of simple machines will be introduced.
- Each kind of simple machine will be displayed and discussed in the class
- Pulley Experiment
- Students will log on to the following address and do the simple machine activities in groups [http://edheads.org/activities/simple-machines/index.htm](http://edheads.org/activities/simple-machines/index.htm)
- Computer lab activity will be discussed

VI. Students assessments and evaluations

Students’ assessments and evaluations will be based on the activities done on the classroom discussion, pulley laboratory activity, and computer activity. Students will report their records from the laboratory for evaluation. Students will be asked to go to one of the store near their apartments and list the items that are sold in the store which are related to the simple machines. Their list will be evaluated based on the correct matches of the simple machines and the number of correct listed items.

Essential Question:

1. How would our life look like without simple machines?

Unit Question:

1. What are the main advantages of the simple machines?
The Pulley Experiment

Name: ________________________________ Date: ___________

PULLEYS

HYPOTHESIS

If we had to lift a heavy load, pulleys can make the job easier.

MATERIALS

1 board and pulley  15 weights  1 rope
1 small bucket  1 pulley  1 load
1 large bucket  1 clamp  2 hooks

PROCEDURE

1. Clamp the board to your desk.

2. Hook the rope to the small bucket.

3. Put the load in the small bucket.
4. Put the rope over the top of the board. See Figure 1.

5. Tie the loose end of the rope to the large bucket. Make the rope short enough so that the large bucket is near the board.

6. GENTLY put the weights into the large bucket one at a time until the load just lifts off the ground. If you can slide a piece of paper under the edge of the small bucket, you have added enough weights.

7. Record the number of weights you needed.

8. Take the weights out of the large bucket and take the buckets off the rope.

9. Repeat this experiment two more times: first use the setup in Figure 2 and then the one in Figure 3.

<table>
<thead>
<tr>
<th>SETUP</th>
<th>WEIGHTS NEEDED</th>
</tr>
</thead>
<tbody>
<tr>
<td>No pulleys</td>
<td></td>
</tr>
<tr>
<td>1 pulley</td>
<td></td>
</tr>
<tr>
<td>2 pulleys</td>
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</table>

**CONCLUSION**

How can pulleys help us?

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**References**

1. [http://www.galaxy.net/~k12/machines/pulley1.shtml](http://www.galaxy.net/~k12/machines/pulley1.shtml)