

Grade 8 Science

Unit 4: Systems in Action



Simple Machine Experiments

Starting next class we will take four periods to perform a series of experiments looking at simple machines. Specifically you will experiment with pulleys, levers, inclined planes, and you will also explore a variety of tools to look at the mechanical advantage they provide.

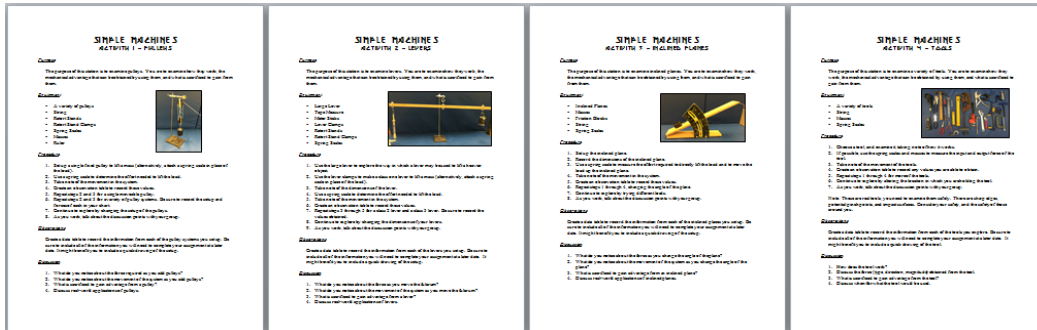
You will not be doing an in-depth project on this work, however, you will be submitting an assignment to document your findings. Be sure to be aware of the criteria, so you record the necessary information.

Today we will discuss each of the four stations, as well as the assignment you are to complete. I will not be reviewing these next period, so please be sure you pay attention today, so that you are prepared for next class.

You will note that the procedures for these experiments are much more vague than activities we have done in the past. This is by design, it allows you to explore more on your own. You should note, however, that you are expected to be working throughout.

Simple Machine Experiments

We will now take some time to look at the four stations.



Note: If you are taking pictures of your setups to use as reference later, I recommend you use a post-it note and label the setup, i.e., "Pulley System #1." You will not be using digital pictures on your assignments, these would only be for reference.

Note: The discussion questions on the experiment sheets are only there to prompt discussion with your peers, you do not need to record answers.

Simple Machine Experiments

The assignment you are to submit for this series of experiments is as follows:

For each station you are to choose one example you did and complete the following:

1. Hand draw the simple machine - you will be graded on the quality of these drawings, take your time.
2. Dimension your drawing - you need to include all of the dimensions necessary to define the system. Show these on the drawing.
3. Show all of the forces acting on your drawing - provide a label for each of your forces. Show these on the drawing.
4. Calculate the ideal mechanical advantage of the system - be sure to layout your solution properly.
5. Calculate the actual mechanical advantage - while you are performing the experiments, be sure to record the information you will need to do this.
6. Calculate the efficiency of the system.

Note: Each member should choose a different system.

Simple Machine Experiments

Here is the rubric that will be used to grade your assignment. Note that each row does not carry the same weight.

Simple Machine Documentation

Name: _____

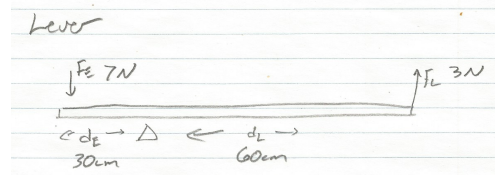
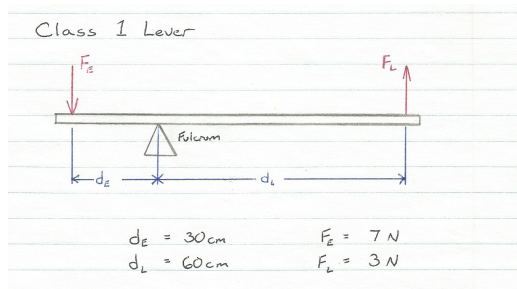
Criteria	Level			
	1	2	3	4
	Criteria is completed...			
Drawings Drawings of the system are to be neat, include the appropriate components, and clearly communicate the information about the system. From the drawing, one should clearly understand how the system was used.	...with limited effectiveness	...with some effectiveness	...with effectiveness	...with a high degree of effectiveness
Dimensions Dimensions required to understand the use of the system are to be included <u>on the drawings</u> , with necessary units. Dimensions should clearly indicate what has been measured, using dimension lines/arrows as is necessary.	...with limited effectiveness	...with some effectiveness	...with effectiveness	...with a high degree of effectiveness
Forces Forces applied to and obtained from the system are to be included <u>on the drawings</u> , clearly and appropriately labelled, with necessary units. A legend, defining the labels used for the forces, can be included to provide further clarity.	...with limited effectiveness	...with some effectiveness	...with effectiveness	...with a high degree of effectiveness
Calculations Proper calculations are to be performed, using the equations and variables taught in class. Each calculation is to be neatly organized, spaced appropriately, using the formatting and layout as is required in science class. All calculations are to be accurately reported and include the appropriate information and units.	...with limited effectiveness	...with some effectiveness	...with effectiveness	...with a high degree of effectiveness

* Note: The mark received for "Calculations" accounts for 50% of the assignment grade. The other 50% comes, equally, from the other three sections on the rubric.

Note: Choosing a system with an IMA of 1 is not level 4 work.

Simple Machine Experiments

The purpose of the drawings, included in this assignment, are to communicate information. Simply scribbling a quick sketch and random lines on a piece of paper will not earn the marks you would like. Let's compare the following two drawings:



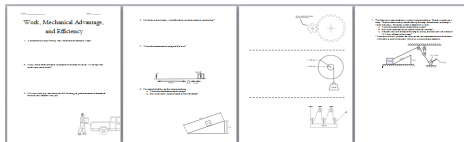
Calculation Practise

You may use the remaining time to work on your Work, Efficiency and Mechanical Advantage worksheet. This will be your last in-class opportunity to work on this.

Please recall that you will hand in this worksheet, and that I will be checking it to see how much of it you have completed. If you are unsure of anything, you should be asking for assistance.

We will not be taking this work up in class, instead I will be posting full solutions online for you to reference.

The worksheet is due: _____



Attachments

4-7 Experiment Sheets.pdf

4-6 Systems Calculations.pdf