

Name: _____

Lab #2
HNRS 227 Laboratory with Ms. Clark
Week of 10 September 2007

Heat Energy and Thermodynamics
 A Maxwellian Potpourri

Open the software for this laboratory experiment by running the program called Exploration of Physics from your desktop.

You will find this experiment under the "heat" tab of the program's menu.

Please remember to answer all questions in complete sentences with necessary graphics or calculations as requested.

The 1st Law of Thermodynamics and Energy Conversion

This experiment allows you to explore the relationship between mechanical energy and heat. The falling weight drives a paddle which stirs the water in a thermally insulated bucket. The stirring raises the temperature of the water by a measurable amount, converting gravitational potential energy into heat.

You will be performing the experiment several times, varying the parameters each time. Be sure to record the water mass, initial water temperature, hanging mass height and gravity each time.

Energy Varying Height and Mass

Perform the experiment first starting with 2 kilograms for the hanging mass. Then change only the hanging mass, 2 kilograms greater each time, until you get to 10 kilograms. Fill in your data table below:

Water Mass	Initial Temp.	Hanging Mass	Height	Gravity	Final Temp.

1. As the hanging block mass increases how is the final temperature of the water changing? Explain what is happening.

2. As you increase block mass, what is happening to the potential energy of the block? Explain.

Now explore the changes that occur due to changes in the height. Changing only the height, fill in the data table for this experiment.

Water Mass	Initial Temp.	Hanging Mass	Height	Gravity	Final Temp.

3. As the block height increases how is the final temperature of the water changing? Explain what is happening.

4. As you increase block height, what is happening to the potential energy of the block? Explain.

Now explore the changes that occur due to changes in the water mass. Changing only the water mass, fill in the data table for this experiment.

Water Mass	Initial Temp.	Hanging Mass	Height	Gravity	Final Temp.

5. As you increase water mass, does it take more or less energy to raise the water to a given temperature? Explain what is happening.

Now explore the changes that occur due to changes in the initial water temperature. Changing only the initial water temperature, fill in the data table for this experiment.

Water Mass	Initial Temp.	Hanging Mass	Height	Gravity	Final Temp.

6. As you increase the initial water temperature, what happens to the energy in the system? Explain.

7. How does the increasing initial water temperature affect the final temperature? Explain.

8. What conclusions can you draw from the experiments conducted in this laboratory exercise, regarding heat, conversion of energy and the conditions of the experiment?