

**OBJECTIVE:**

The object of this experiment is to determine the amount of horsepower that you, personally, can generate in performing a rather extreme task.

**PROCEDURE:**

The extreme task is for you to climb a set (or several sets) of stairs. You should make at least four trials, and you should work in pairs so that one can climb while the other does the timing. **NOTE: If you have a heart condition, have been physically inactive, or have a physical handicap DO NOT climb the stairs rapidly.** If not, it might prove interesting to see who can generate the highest horsepower. Climb no less than 20 steps each trial.

**DATA:**

You will need to know your weight. (This portion of the experiment will be kept confidential.) You will also need to know the height of each step, the number of steps you climbed, and the time that it takes for you to climb the stairs. Caution: The step heights may vary! Note: Be sure to use the correct precision in listing your measurements and use the rule for significant figures when *multiplying* or *dividing* your measurements.

**REPORT:**

1. Title Page: Title of Experiment. In lower right-hand corner include: Name, Physics 1110, Lab 2, Lab-Section. Date Lab Performed, and Lab Partner.
2. Objective of Experiment: A precise statement of what it is you wish to do.
3. Apparatus: List equipment used. Also, in this case, mention *where* the experiment took place and *describe* the set of stairs (Used hand rail? Landing? Turns?).
4. Theory: Define all terms and discuss (and occasionally derive) any equations or relations used. In this case you should begin where the *Objective* left off, and, *using good flow*, include a definition of gravitational potential energy, work, power, and horsepower (namely, the physical quantities that were measured in this laboratory). Be sure to include that a major assumption is that the work done by you *equals* the increase in the gravitational potential energy.
5. Procedure: You should describe what you did in order to obtain the data.
6. Graphs: Use Excel to provide a graph of your four trials. You may wish to do a bar graph
7. Data
8. A Sample Calculation: Choose *one* of the four trials, and present calculations (neatly) of each step that was done in order to obtain your personal horsepower.
9. Results: A precise statement of the result of this experiment. NOTE: You may wish to state an *average* horsepower for your four trials.
- 10 Sources of Error: What experimental errors could have entered into your measurements? Please include (a) Instrumental Error in which you state and then discuss the *precision* of your measurements for each physical quantity (weight, step height, time), and (b) Inherent Error in which you discuss error involved in the experiment itself.

**COMMENT ON YOUR WRITE-UP:**

Your report should be self-contained so that another person (who has not seen this page of laboratory discussion) will know what you are trying to measure, how you did it, and what results you obtained. Use paragraph form for all sections except the *data*, *graphs*, and *sample calculation* sections, maintain good flow; and carry the reader along. **GOOD LUCK!**