

# Iona Prep Physics – Laboratory Exercise

**Title:** To measure the power production of several students

**Procedure:**

1. Choose a flight of stairs and measure the vertical height in feet. Express the height in feet (for example 10 feet 2 inches would be 10.17 feet)
2. One partner will run up the stairs and the other will use a stopwatch to time him. Record the time in seconds.
3. Weigh the runner, recording the weight in pounds. There is no restriction on the running. The runner may take one step at a time, or he may jump multiple steps. He may also use the handrail. He may run with or without shoes, but the weight should represent the weight when running.
4. Repeat the procedure at least once to check for consistency. The best (shortest) time should be used in calculations.
5. The partners may exchange roles, the timer becoming the runner and vice-versa.
6. Collect results for at least 7 students.
7. In your write-up show in detail how the calculations (conversions) were done for one student.

**Data:**

Name	Weight	Distance (ft)	Time (s)	Power Generated By student		
	(lb)			Ft lb/s	Horsepower	Watts

Calculations:  
 Work = force \* distance  
 Power = work/time

- Conversions:
- 1 inch = 2.54 cm
  - 1 pound = 4.45 N
  - 1 foot = 0.305 meters
  - 1 horsepower = 550 ft lb/s
  - 1 Watt = 1 Joule/s = 0.738 ft lb/s = 1.341x10<sup>-3</sup> horsepower

- Your write-up should contain ALL of the following
- ✓ Your name
  - ✓ The date the experiment was performed
  - ✓ The procedure written in the past tense and a diagram
  - ✓ A data table – which also serves as the conclusion for this experiment
  - ✓ Detailed calculations for your own set of student data