

Name _____
 Physics Lab - Muscle Power

Date _____
 Period _____

Introduction - In this lab, you will determine how powerful different muscles in your body are. Each group member must do each activity.

Equipment - meter stick, mass attached to a meter stick, stopwatch or watch with a second hand.

Procedure

1. Calculate the weight of the mass on the stick. Measure the length of the string. Record them on the data table. Raise the mass by rotating the stick in your hands so the string winds around the stick. Record the time required to do this.
2. In a "push-up" position, measure the distance from your chin to the floor and **multiply by 10**.
3. When doing push-ups, you are raising about 2/3 of your weight. Record this data. Measure and record the time to do 10 push-ups.
4. Measure the height of 1 step and multiply by the number of steps. Record this and your weight on the table. Measure the time it takes to run up 1 flights of steps. Record this on the data table. You must step on each step!

Calculations

1. Calculate the work done for each activity. Record your answers.
2. Calculate the power in watts exerted for each activity. Record your answers.
3. Calculate the power in horsepower exerted for each activity. Record your answers.

Questions – Complete the questions on the back of this sheet

Data Table	Weight Raised (N)	Distance (m)	Time (s)	Work (J)	Power (W)	Power (hp)
Mass on rope						
Push-ups (use 2/3rds of weight)						
Run up stairs (use entire weight)						

CONVERSIONS
 1.00 lb = 4.45 N

1.00 hp = 746 watts

1. What are the primary "muscle group(s)" used in each activity? (i.e. legs, arms, back, etc.)

2. Which of the muscle groups exerted the MOST power in these activities?

3. Does there appear to be a relationship between the size of the muscles and the power they exert? EXPLAIN in 3 – 4 sentences in order to receive full credit!!

4. Compare your data with others in your group.
 - a. Who is the most powerful person in your group?

 - b. Is the most powerful person the one who was fastest up the steps?

 - c. *Must* the most powerful person be the fastest? **Why or Why not?**