**STUDENT POWER LAB**

In this investigation, you will explore your own personal power using your legs and your arms. To calculate your power, you will first determine how much work you have done while performing two different exercises.

You must measure your own work and power while performing exercises for short and long periods of time. The short activities will last for 10 s and the long activities will last for 1 minute.

**Keep safety in mind!** Make sure you are wearing the appropriate footwear. Perform exercises at a comfortable level rather than pushing yourself to find your maximum power. Notify your teacher of any health problems that may prevent you from completing this activity safely. Be careful when lifting weights and avoid fast movements. If you are not feeling well during an activity, stop.

**Question:** How does the power of your legs compare to the power of your arms? How does the amount of work change as the time of an exercise increases?

**Materials:**

* Stairs
* Stopwatch
* Metre Stick
* Newton Scale
* Free weights

**Procedure:**

1. Choose a weight that can be used to exercise your arms (curls). Measure the weight using the Newton scale. Record this weight in your table.
2. Measure the vertical distance for the motion of your arms when lifting the mass. Multiply it by 2. Record this here: \_\_\_\_\_\_\_\_\_\_
3. Complete the exercise for 10 seconds. Have one group member count the repetitions and another group member time the exercise using a stopwatch. Record the time in the table.
4. Multiply the distance from Step # 2 by the number of repetitions. Record this distance in the table.
5. After a rest period, repeat Steps # 3 and 4, this time completing the exercise for 1 minute.
6. Measure your body weight using the Newton scale. Record this in the table.
7. Using a ruler, measure the height of one stair step. Record this here: \_\_\_\_\_\_\_\_\_\_.
8. Run up and down the stairs for 10 seconds. Have one group member count the number of stairs and another group member time the exercise using a stopwatch. Record this time in the table.
9. Multiply the height of one stair step in Step # 8 by the number of stairs. Record this distance in the table.
10. After a rest period, repeat Steps # 8 and 9, this time completing the exercise for 1 minute.

**Calculations:**

1. Sample Distance calculation
2. Sample Work calculation
3. Sample Power calculation

**Error Analysis: None!**

**Discussion:**

1. How does the amount of work done by your arms in the brief exercises compare with the work done by your arms in the long exercises?
2. Compare the power in your arms for the brief exercises and the long exercises. Explain why they are different.
3. How does the amount of work done by your legs in the brief exercises compare with the work done by your legs in the long exercises?
4. Compare the power in your legs for the brief exercises and the long exercises. Explain why they are different.
5. How does the power of your legs compare to the power of your arms? Explain why they are different.
6. People often find that a workout gets easier over time. Describe two changes that can be made to increase the work done and power required for the arm exercise and the leg exercise to make it more challenging.
7. Many strength-training exercises are brief, while cardio exercises take much longer. Use what you have learned in this activity to explain why this is true.
8. Explain why both the work done and the power are important things to consider when designing a new workout routine.

**Conclusion: Write one!**