Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Period: \_\_\_\_\_\_

**WORK AND POWER LAB**

**Objective:** Does work and power happen when walking up stairs?

Hypothesis (if……then):

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

* Compare work done in different situations.
* Explain why work has a more precise scientific meaning than the meaning of work in everyday language.
* Calculate the amount of work done on an object that is moved from one position to another

W = F x d P = W/t Weight = m x g

**Materials:** stopwatch, meter stick, calculator

**Procedure:**

1. Record your mass in pounds. Divide by 2.1 to get your mass in kilograms.

2. Find your weight in Newtons. (Hint: Use the above weight equation)

3. Count the number of stairs to the top of the stadium. Put it in your observation table. Divide the total number of stairs by 2 and record in your observation table.

4. Find the total height of the stairs by multiplying the height of each stair by thetotal number of stairs. Record in your observation table. Repeat for ½ of the stairs.

5. Take turns (in your group) timing each person as they walk and run up the stairs.

6. Repeat for ½ the number of total stairs.

7. Find the work done to walk and run up the entire flight of stairs and half the stairs.Then find the power exerted for walking and running up the entire flight of stairsand half the stairs. (Hint: Use the above equations.)

**Observations:**

Your mass = \_\_\_\_\_\_\_\_\_\_ pounds = \_\_\_\_\_\_\_\_\_\_\_ kilograms

Your weight = \_\_\_\_\_\_\_\_\_\_\_\_\_ Newtons

Height of each stair = \_\_\_\_\_\_\_\_\_ m

|  |  |  |
| --- | --- | --- |
|  | Total # of Stairs | ½ Total # of Stairs |
| Number of Stairs |  |  |
| Total height of  Stairs (meters) |  |  |
| Time to walk up  the Stairs (sec) |  |  |
| Time to run up the  Stairs (sec) |  |  |

**Calculations:**

|  |  |  |
| --- | --- | --- |
|  | Total # of Stairs | ½ Total # of Stairs |
| Work Done to walk up  the Stairs (J) |  |  |
| Power used to walk up  the Stairs (W) |  |  |
| Work Done to run up  the Stairs (J) |  |  |
| Power used to run up  the Stairs (W) |  |  |

**Questions/Conclusion:**

1. Which number of stairs needed more work? Why?
2. Which number of stairs needed the least amount of work? Why?
3. Why are the answers to #1 and #2 different? **(Because they’re different questions isn’t an appropriate response.)**
4. Which number of stairs required more power? Why?
5. Which number of stairs required the least amount of power? Why?

**6.** Why are the answers to #4 and #5 different? **(Because they’re different questions isn’t an appropriate response.)**