

name: _____

date: _____



**Centre of
Excellence**
ENERGY

Horsepower Inquiry Activity Challenge

Energy is only useful for our every day needs is when it can be put to work. **Work** is defined as the energy transfer when an object moves from one position to another by an external force. The general formula for work is:

$$W = F \Delta d$$

Where :

W = Work (J)

Δd = displacement (m)

Anything that does work over a period of time will also have **power**. Power is defined as the energy transfer over a unit of time. The general formula for power is

$$P = \frac{W}{\Delta t}$$

Where :

P = Power (W)

W = Work (J)

Δt = displacement (s)

Typically, power is measured in the SI unit of **watts** (W) which is just a J/s. A more common type of unit for power is **horsepower** (hp) which is often used to describe the power output of vehicles. Since these units measure the same thing, they can be converted by the following:

$$746 W = 1 hp$$

In this experiment, you will determine the horsepower output by running or walking up a few flights of stairs. Your goal in groups of four is to determine, but before that try the following practice problem. Keep in mind you will have to determine the relevant force(s) involved.

Practice Problem: Beth is running up the stairs to determine her horsepower. Her mass is 60kg and it takes her 4 seconds to run up the stairs to a height of 4.5m.

A) Find her power in watts

B) Find her hp

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Your task for this activity is to use the following materials to devise an experiment where you can determine the horse-power generated by each person running /walking up a few flights of stairs. The only materials you have access to are a stopwatch, bathroom scale, and a meter stick.

Data Table

You will want to collect applicable data to determine the winner of the challenge Use the template below to collect your data. Make sure to label and collect the date appropriately.

Calculations

You will use this section to calculate the horsepower generated by all four group members

name: _____

date: _____

Analysis Questions

1. Which member of your group generated the most horsepower? Why do you think this was the case?

2. What was your procedure? Please put it in bullet points below

3. Do you expect that there was any work done that could not be measured? If so, what was it?

4. How could you improve this experiment to have more accurate results?