



Name _____

Date _____ Period _____

Horsepower Activity

QUESTION: How much horsepower can you generate by going up the stairs?

MATERIALS: Bathroom scale, meter stick, stopwatch, flight of stairs

PROCEDURE: Write the Formulas, Plug in Values, and Show All Work Including Units

1. Using the bathroom scale, find your mass in pounds (lbs).
2. Using the conversion factor below, convert your mass in pounds (lbs) into kilograms (kg).
write the fraction, multiply and cancel units
3. Write the acceleration due to gravity and include the units?
4. Using the formula below, find the force in Newtons (N) that gravity is pulling you down.
write the formula, plug w/units & chug w/units
5. Using a meter stick, measure the height of one step in centimeters (cm).
We will assume that all the steps are the same height.
6. Count the total steps and find the total height in centimeters (cm).
show your work
7. Convert the total height of the stairs from centimeters (cm) into meters (m).
write the fraction, multiply and cancel units

$$\frac{.4536 \text{ kg}}{1 \text{ lb}}$$

$$\frac{1 \text{ m}}{100 \text{ cm}}$$

$$\text{Force(N)} = \text{Mass(kg)} \times \text{Acceleration(m/s}^2\text{)}$$

8. Using the formula below, find the work in Joules (J) done as you went up the stairs.
write the formula, plug w/units & chug w/units
9. Using a stopwatch, find the time, in seconds (s), it takes you to get up all the stairs.
10. Using the formula below, find the power in Watts (W) done as you went up the stairs.
write the formula, plug w/units & chug w/units
11. Using the conversion factor below, convert your power in Watts (W) into horsepower (HP).
write the fraction, multiply and cancel units

$$\frac{1 \text{ horsepower(HP)}}{746 \text{ Watts}}$$

$$\text{Power(W)} = \frac{\text{Work(J)}}{\text{Time(s)}}$$

$$\text{Work(J)} = \text{Force(N)} \times \text{Distance(m)}$$