Work and Power Lab Activity
SPH4C

Purpose: To calculate the work and power required to move a brick along a wooden board.

Materials: Brick   Horizontal Wooden Board
                      Spring Scale   Metre Stick
                      String or Fishing Line   Stopwatch
                      Chalk

Procedure:

1. Tie the string or fishing line to the brick. To the other end of the string or fishing line, attach the spring scale.
2. Place the brick on the wooden board. Mark the starting position of the brick using a piece of chalk.
3. Start the stopwatch. Holding the spring scale, pull the brick **at a constant speed** along the board. Record the reading on the scale while the brick is in motion. (Make sure the pull is completely horizontal.) This is your applied force F. Stop the stopwatch when you stop the brick. Record the time on the stopwatch. This is your time Δt.
4. Mark the stopping position of the brick using a piece of chalk. Measure the distance between your starting and stopping positions. This is your distance Δd.
5. Repeat Steps 2 – 5 for four more trials.

Data:

Table 1: _____

Trial	Force (N) F	Distance (m) Δd	Time (s) Δt	Work (J) $W = F\,\Delta d$	Power (W) $P = \dfrac{W}{\Delta t}$
1					
2					
3					
4					
5					

Analysis: Calculate the work (in Joules) you did and the power (in Watts) you exerted for each trial. Show your work for Trial 1 in the space below:

Work: Power:

Was your force similar for each trial? _____

Would you expect it to be? Explain why or why not: _____

_____

Was your work similar for each trial? _____

Would you expect it to be? Explain why or why not: _____

_____

During which trial was the highest power generated? _____

Explain why: _____

_____

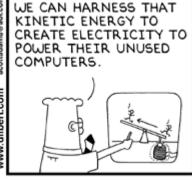For Trial 1, convert the work done to calories (1 cal = 4.186 J):

$$W = \underline{\quad} J \times \left(\frac{1\,cal}{4.186\,J} \right) = \underline{\quad} cal$$

How many food Calories (kilocalories) does this equal? _____

For Trial 1, convert the power generated to horsepower (1 hp = 745.7 W):

$$P = \underline{\quad} W \times \left(\frac{1\,hp}{745.7\,W} \right) = \underline{\quad} hp$$

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