Work

- Must be _____
- A _____ must be applied over a _____

This _____ must be _____ to the direction the object is moving

Ex: Is work being done in the following?

1. Lifting your book bag _____
2. Pushing a box across the floor _____
3. Carrying a book across the classroom _____

- Equation: Work = _____ x _____

  $W = Fd$

- Unit: N m = _____ (J)

- One joule of work is done when 1 N of force is exerted over 1 m. (Lifting a quarter-pounder with cheese up 1m requires about 1 J of work.)
- The unit for work, the joule, is named in honor of James Joule (1818 – 1889). He was an English brewer that did a lot of 'work' studying the idea of heat.

Power

- A 'force' that is applied over a 'distance' will take some amount of '_____'.
- _____ at which work is done
- The faster the work is done the _____ power is required

- Equation: Power = _____÷ _____

  $P = {}^{W}/_{t}$

- Unit = ${}^{J}/_{s}$ = _____ (W)

The unit for power, watt, is named in honor of James Watt (1736-1819), who developed the steam engine. He found by experiment that a good horse could work all day at an average rate of about 360 foot-pounds per second. So as not to be accused of exaggeration in the sale of his steam engines, he multiplied this by 1 ½ when he defined horsepower (hp). 1 hp = 746 W