

**Lesson Aims:**

*All learners:*

1. Definition of power and its unit.

*Most learners:*

1. Estimate human power.
2. Able to use the formula for power and rearrange it in calculations.

*Some learners:*

1. Be able to use standard form in calculations and be able to use prefixes for mega, kilo.

## Starter !!

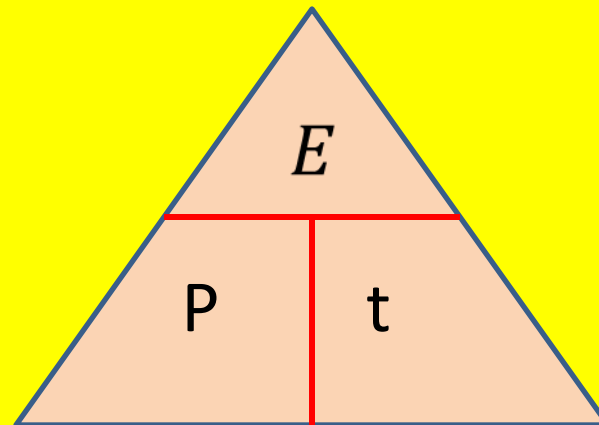
1. A football of mass  $0.5\text{kg}$  is kicked vertically up with kinetic energy of  $80\text{J}$ .
  - a. Calculate the speed the ball was kicked up with.
  - b. Calculate the maximum height the ball can reach.
2. What does conservation of energy state ?

# Power

Power is defined as the amount of energy used every one second.

$$Power(W) = \frac{Energy\ used(J)}{time(s)}$$

The unit of Power is the Watt(W).





Energy used = Weight(N) × height(m)

Imagine lifting a  
ball up

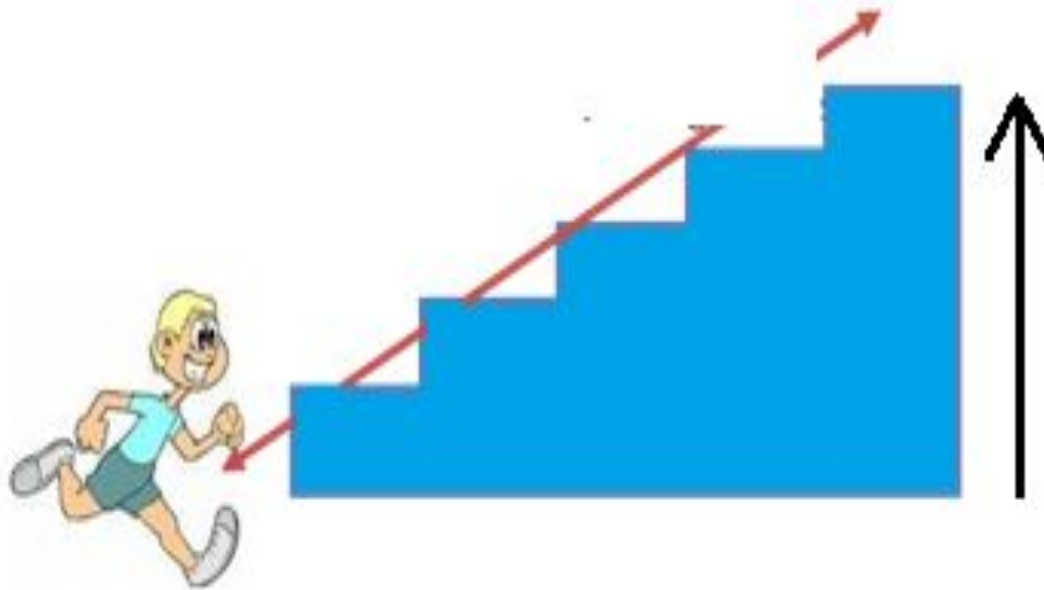
Height of  
step = \_\_\_\_m



Body Weight  
 $W = m \times g$



My Power =  $\frac{\text{Weight(N)} \times \text{Height of one step(m)} \times \text{Number of Steps}}{\text{Time(s)}}$



Height  
climbed up

My Power =  $\frac{\text{Weight(N)} \times \text{Height of one step(m)} \times \text{Number of Steps}}{\text{Time(s)}}$

# Examples !!

A person has a weight of 750 N. She needs to go to the top floor of a skyscraper. The top floor is 200 m above the ground.

- a** Calculate the work that must be done for the person to go from the ground to the top floor.
- b** It takes a person 20 minutes to climb the stairs to reach the top floor. Calculate the person's power.
- c** The lifts in the building have a power of 5 kW. Calculate the time it takes the person to reach the top floor using a lift.