

Energy & Running

①

Energy : Capacity to do work

Chemical, electrical,
mechanical, ...

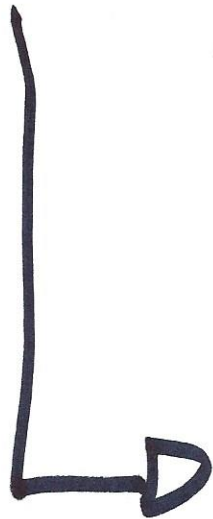
Joules

Work : Fd

Power : Rate of work done

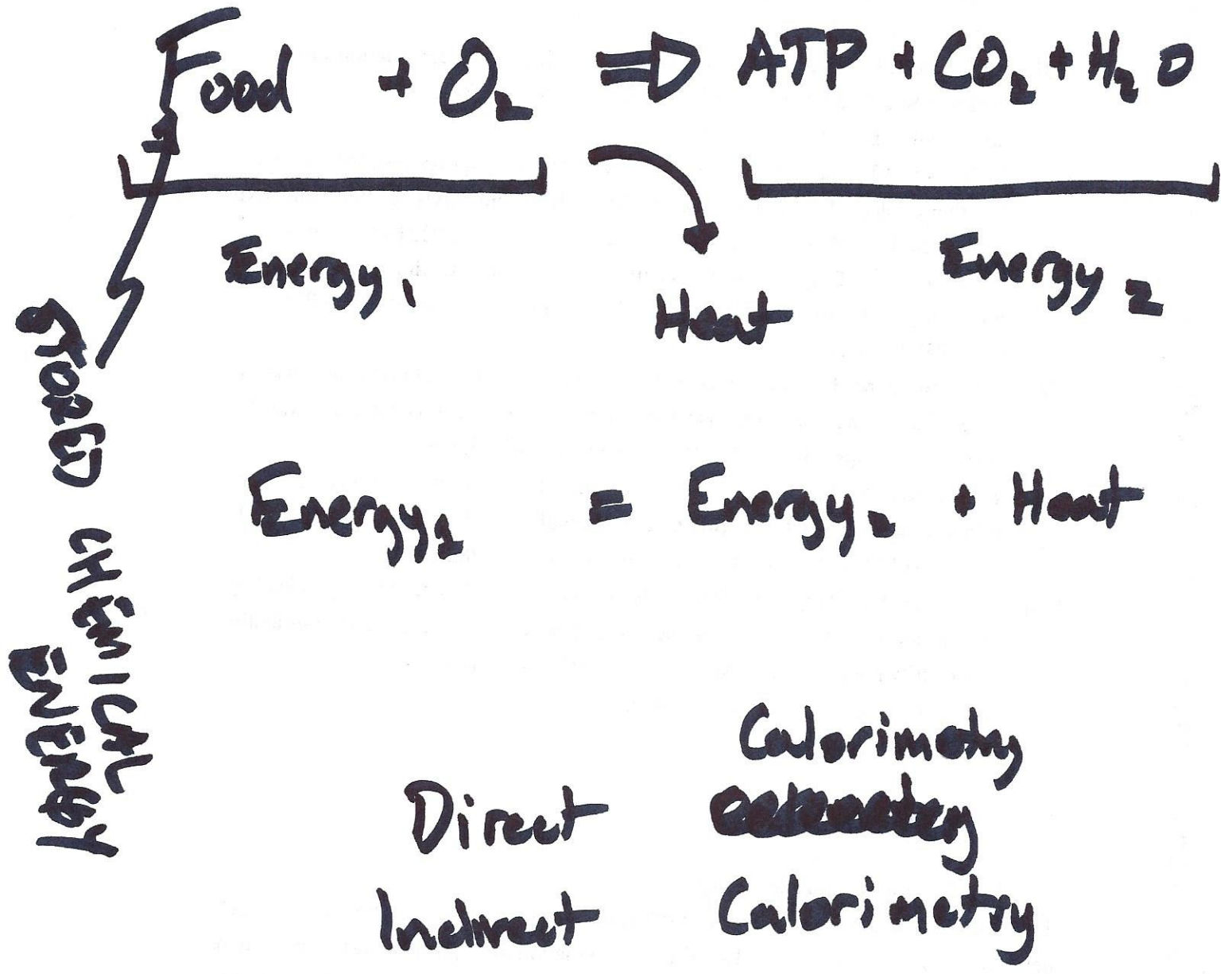
$$\boxed{\frac{W}{t}} = \frac{Fd}{t} = \boxed{Fv}$$

units : watts



How fast Energy is
transformed from one
form to another

Metaboliz Processes

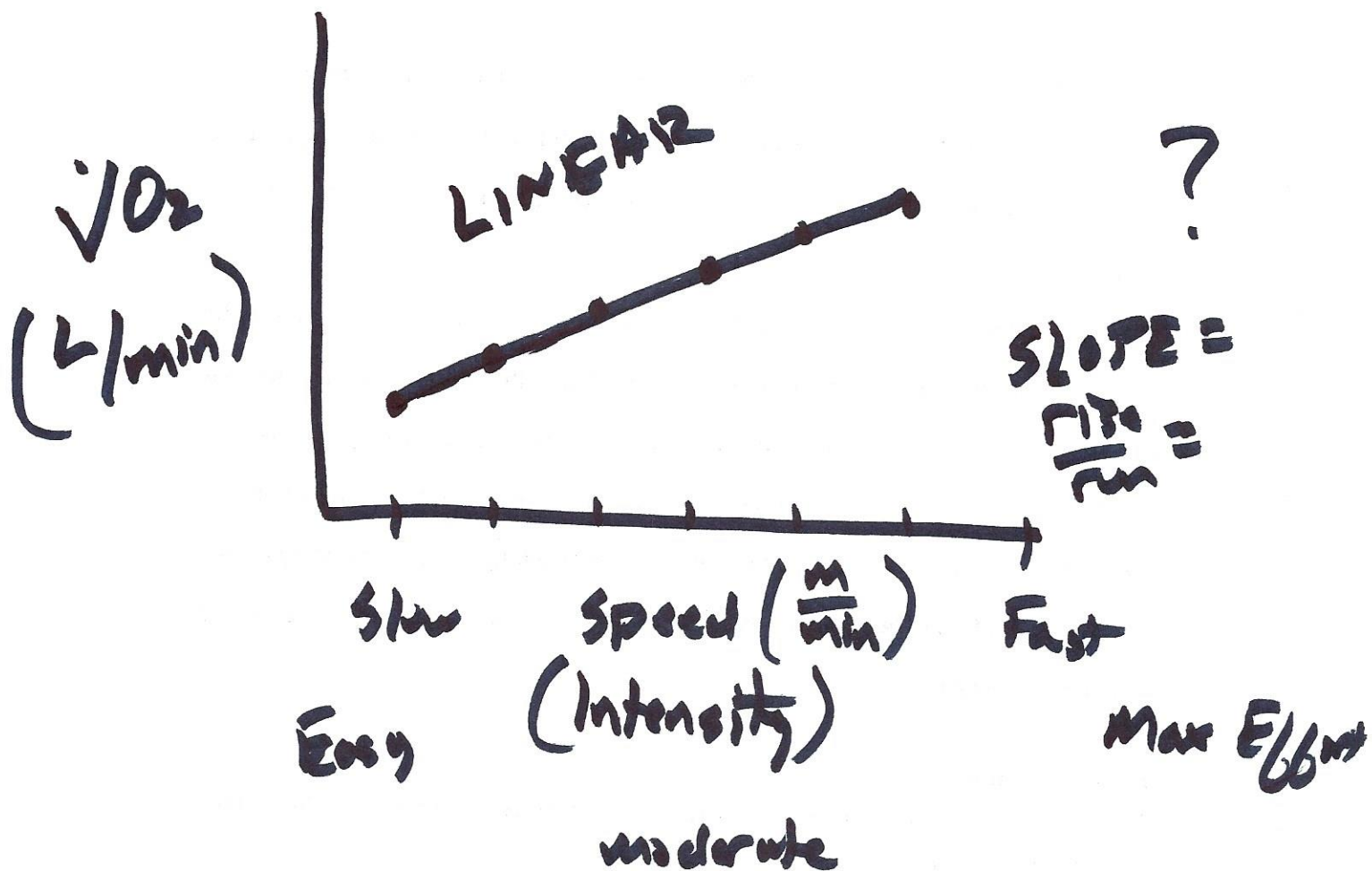


Calorie : A measure of heat

1 Calorie : The amount of heat need to raise 1g of water 1°C

GXT

③

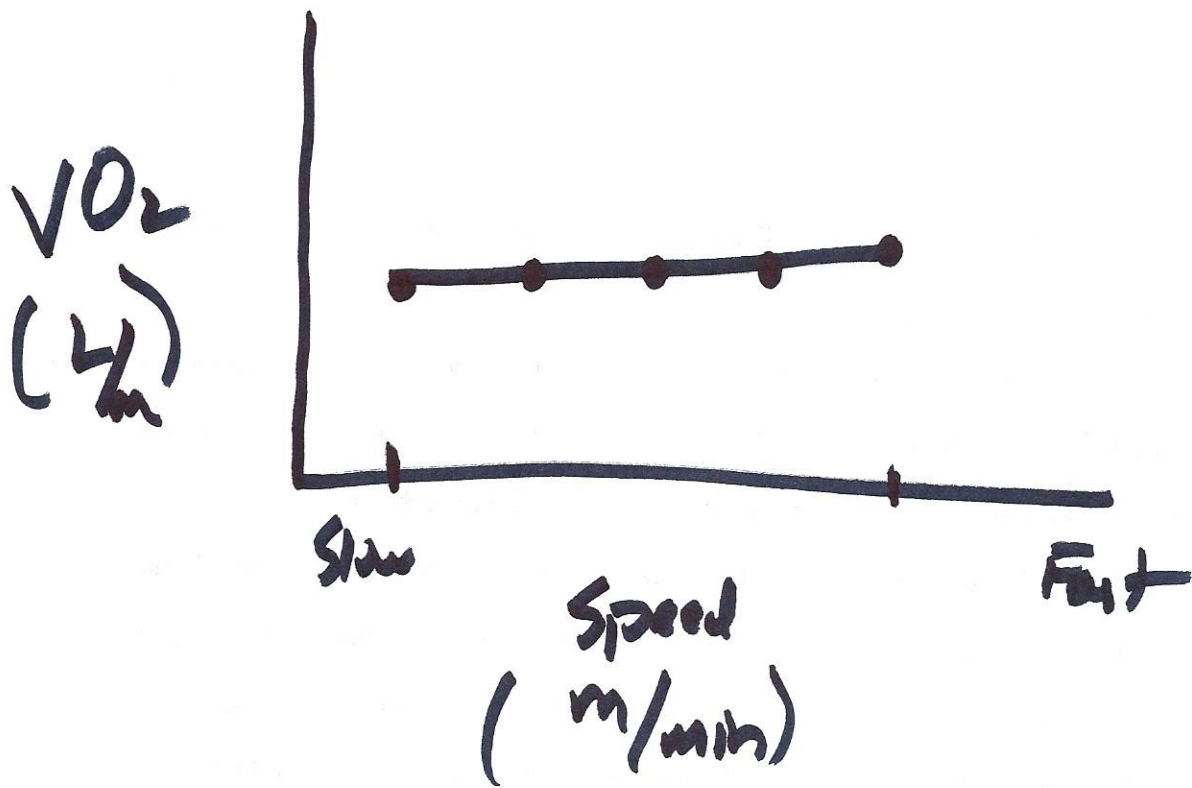


$$\text{SLOPE} = \frac{RISE}{RUN} = \frac{\Delta (L/min)}{\Delta (\frac{m}{min})} = \frac{L}{m}$$

$\Downarrow$
 $\frac{L}{min} \cdot \frac{min}{m}$

[Liters of Oxygen per distance.]

(4)

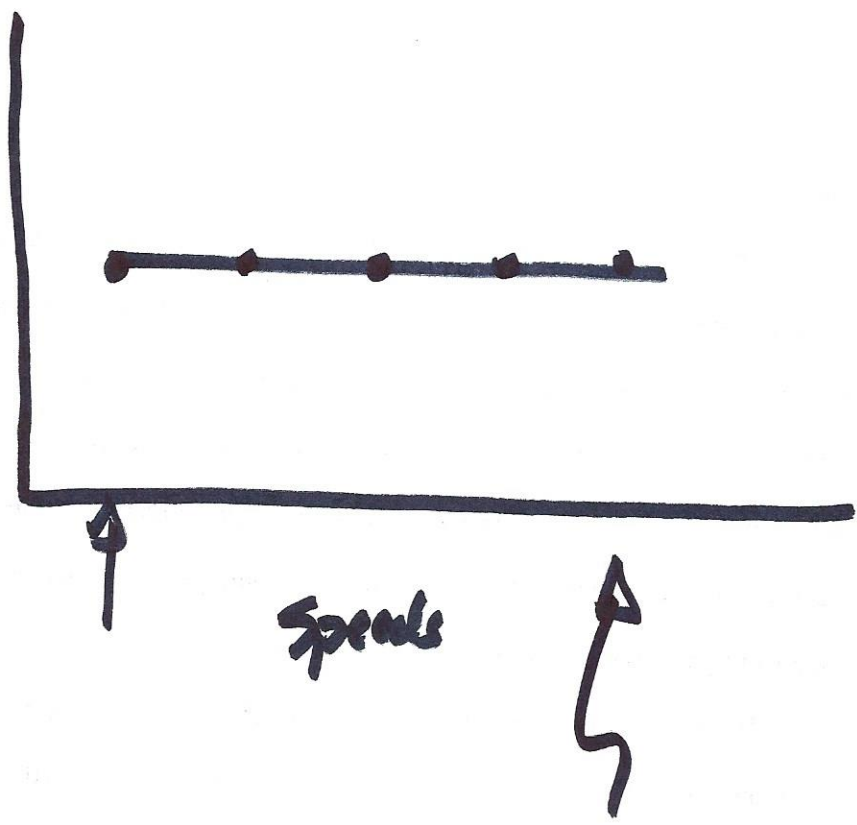


The Amount of oxygen consumed (L)
 is the same ~~for~~ distance.
 For a given

Energetic cost of locomotion

$$\frac{\text{L of Oxygen}}{\text{distance}}$$

$\frac{\text{Calories}}{\text{m}}$

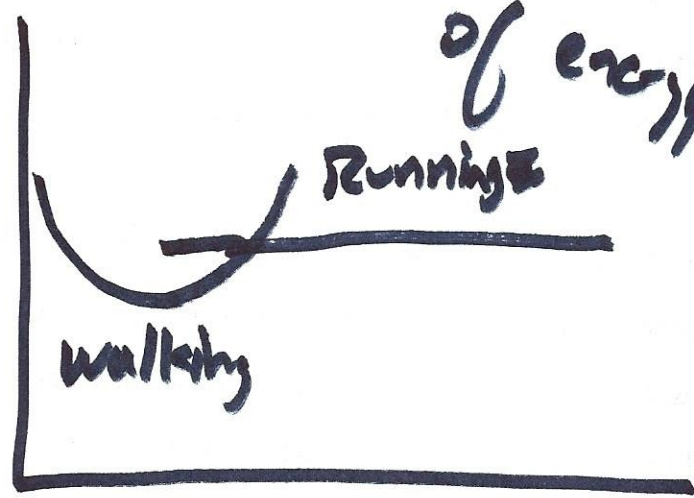


Speeds

Energy transformed
at faster rate
But same amount
of energy transformed.

Energetic
cost of
locomotion

$(\frac{\text{J}}{\text{m}})$



speed (m/min)