

MODEL NAME:

ENERGY STORAGE AND TRANSFER MODEL

DESCRIPTION:

This model describes how energy is stored and transferred between various forms.

PROPERTIES:

• Measured:

- See other models

• Calculated:

- Energy (J)

- Elastic  $\rightarrow E_{E1}$

- Kinetic  $\rightarrow E_K$

- Gravitational  $\rightarrow E_g$

- Work (J)

$N \cdot m \equiv J$

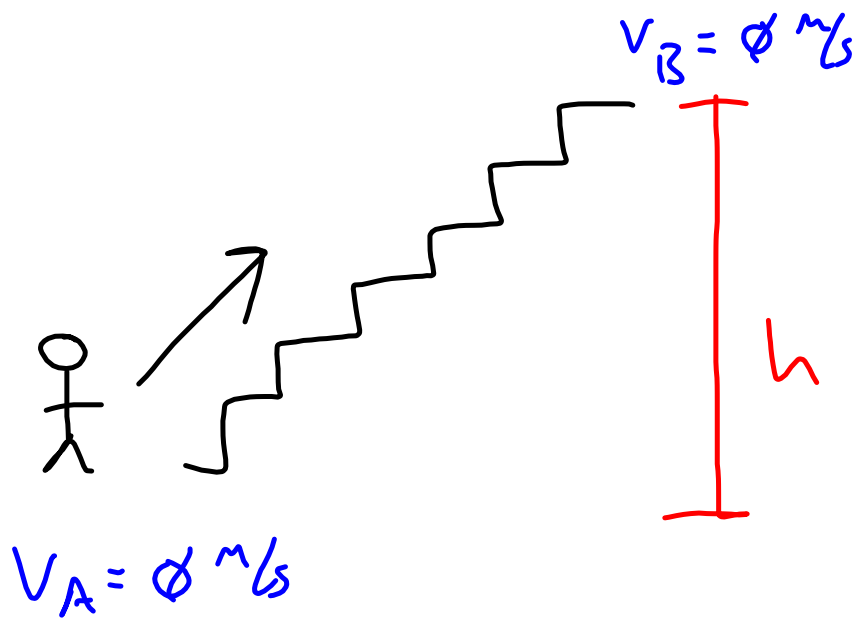
- Spring constant  $\left(\frac{N}{m}\right) \rightarrow k$

# REPRESENTATIONS

- Written/Verbal
- Diagrammatic
  - Pie charts
  - LOL Diagrams
- Graphical
  - Force - displacement  $\rightarrow$  slope =  $k$   
 $\rightarrow$  area = Work
  - Energy - (velocity)<sup>2</sup>  $\rightarrow$  slope =  $\frac{1}{2}m$
  - Energy - height  $\rightarrow$  slope =  $mg$
- Mathematical
  - $E_{E1} = \frac{1}{2}kx^2$
  - $F = -kx$
  - $E_k = \frac{1}{2}mv^2$
  - $E_g = mgh$

## RULES OF BEHAVIOR

- Energy can neither be created nor destroyed (conservation of energy).
- Energy is transferred between forms.
- Energy can also be used, and we typically call this work.



$$E_{ch} = \cancel{E_{Th}}^{\text{ignore}} + E_g$$

$$E_g = mgh$$

$$\text{Power} = \frac{\text{Energy or Work}}{\text{time}}$$

$$[W] = \left[ \frac{J}{s} \right]$$

<u>Power</u>		
<u>Group</u>	<u>Highest</u>	<u>Lowest</u>
1	514.53 W	104.85 W
2	280.78 W	184.32 W
3	987.83 W	229.32 W
4	968.6 W	591 W