Energy Notes Planner

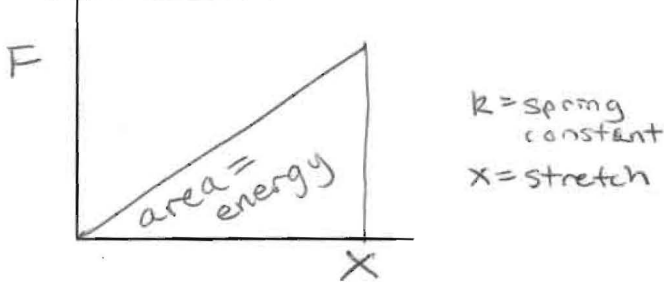## Elastically Stored Energy

Symbol: E_{el}

Comes from energy stored via:
a compressed or stretched spring

Question to ask to know this E is present:
Is the object attached to a compressed or stretched spring

Sketch graph of relationship:

F (vertical axis), X (horizontal axis), line increasing, area = energy

k = spring constant
x = stretch

This leads us to the equation(s):
$$F = kx \qquad E_{el} = \tfrac{1}{2}kx^2 = \tfrac{1}{2}F_{el} \cdot x$$

Gravitationally Stored Energy
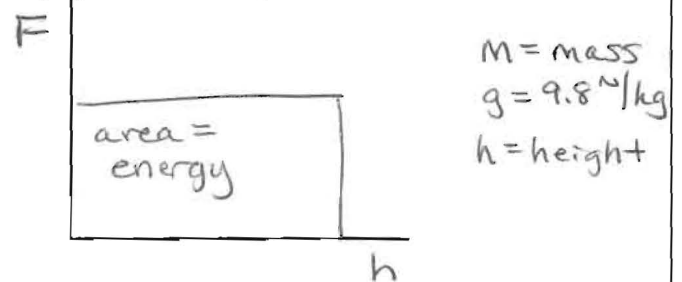
Symbol: E_g

Comes from energy stored via:
position above elevation zero

Question to ask to know this E is present:
Is the object above elevation zero?

Sketch graph of relationship:

F (vertical axis), h (horizontal axis), horizontal line, area = energy

M = mass
$g = 9.8 \, N/kg$
h = height

This leads us to the equation(s):
$$E_g = m \cdot g \cdot h$$

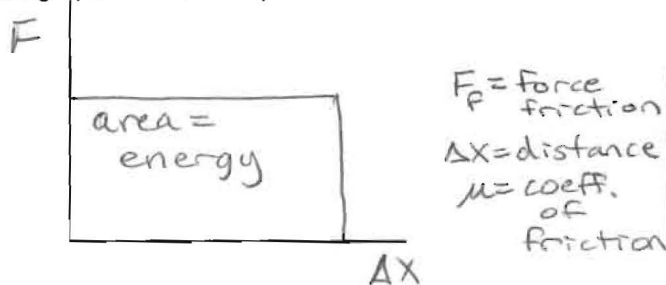## Thermally Stored Energy

Symbol: E_{Th}

Comes from energy stored via:
heat due to friction

Question to ask to know this E is present:
Was there friction over a distance?

Sketch graph of relationship:

F (vertical axis), ΔX (horizontal axis), horizontal line, area = energy

F_P = force friction
ΔX = distance
μ = coeff. of friction

This leads us to the equation(s):
$$E_{Th} = F_P \cdot \Delta X = \mu \cdot F_N \cdot \Delta X$$
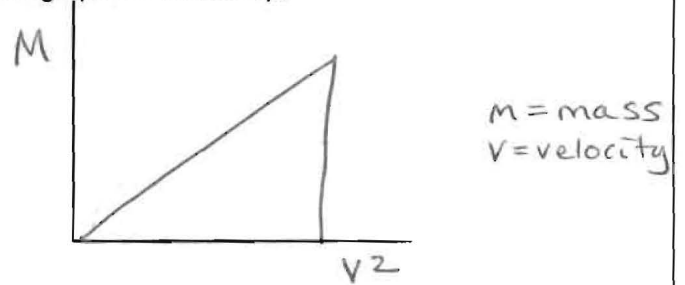
Kinetically Stored Energy

Symbol: E_K

Comes from energy stored via:
a moving object

Question to ask to know this E is present:
Is it moving?

Sketch graph of relationship:

M (vertical axis), v^2 (horizontal axis), line increasing

M = mass
v = velocity

This leads us to the equation(s):
$$E_K = \tfrac{1}{2}mv^2$$

Work
Displacement caused by a force

Radiate
Emit energy

Heat
Transfer of energy from a hot to cold object.

Law of Conservation of Energy
Total energy of a system stays constant.
Energy can't be created or destroyed.