Work-Energy (WE) Equation for Particles

An overview of problems that are easy using the Work-Energy equation compared to the $F = ma$ method.

And, problems that are hard with either method.

First: Problems that are easy using the Work-Energy equation.

1. Smooth rod.

If friction ($\mu$) present, difficult with both WE and $F=ma$. 

Slider FBD
Cont’d: Problems that are easy using the Work-Energy equation.

2. Crate released from rest.

Spring Constant: $k = 2000 \text{ N/m}$

If friction ($\mu$) present, difficult with both WE and F=ma.
Cont’d: Problems that are **easy** using the Work-Energy equation.

3. If friction ($\mu$) present, manageable with WE.

Block FBD:

- $F_{\text{spring}} = ks$
- $mg$
- $N$

**Easy**
Cont’d: Problems that are easy using the Work-Energy equation.

4. \( v_2 = ? \)

Smooth rod

If friction (\( \mu \)) present, difficult with both WE and F=ma.

Spring constant: \( k \)
Unstretched length = \( L_0 \)
Neglect the mass of the spring.

Slider FBD

\[ F_{spring} = ks \]