

Conservative Forces

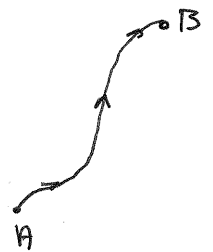
Def: "A force is conservative if the work done by the force between two points in space is independent of the path taken."

-OR-

Def: "A force is conservative if the work done by the force around a closed loop in space is zero."

POTENTIAL ENERGY AND Conservative forces

A POTENTIAL ENERGY CAN BE defined for a CONSERVATIVE FORCE. THE WORK DONE BY A CONSERVATIVE FORCE BETWEEN A & B



IS $-(PE_B - PE_A) = PE_A - PE_B$. The work done by

AN EXTERNAL FORCE AGAINST the conservative force

from A to B is $(PE_B - PE_A) = \Delta PE$

$$\Rightarrow \left\{ \begin{array}{l} W_{\text{conservative}} = -\Delta PE \\ \text{force} \end{array} \right.$$

WORK BY FRICTIONAL FORCES

Kinetic frictional forces always oppose the displacement

And ALWAYS do negative work

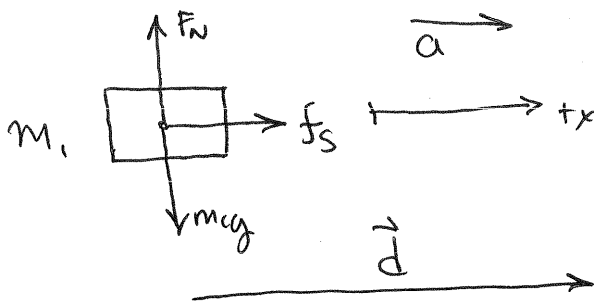
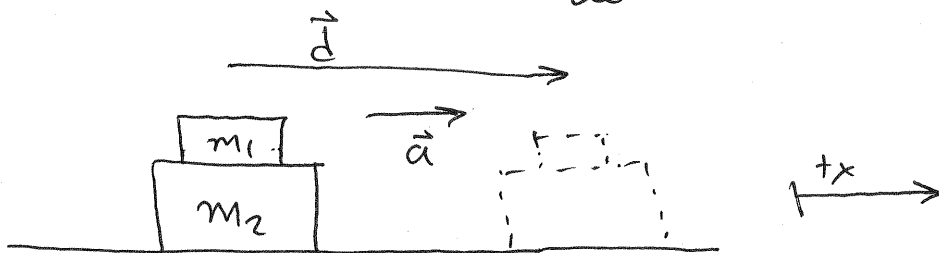


$$W_{fk} = -f_k d$$

↑
 $\cos 180^\circ$



STATIC Frictional forces can do work \Rightarrow



f_s does (+) work
in accelerating m_1
in contact w/ m_2

$$W_{fs} = +f_s d$$

↑
 $\cos 0^\circ = +1$

$f_s = m_1 a$

f_s accelerates m_1 by Newton's 2nd law