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How (ME) is conserved iff FORCES are CONSERVATIVE.

but diminishes with time if NON-Conservative forces occur.

WORK ENERGY THEOREM:

(a) $W^{NET}_{TOTAL} = W^{NET}_{CONS} + W^{NET}_{NONCONS.} = \Delta(KE) = (KE)_f - (KE)_i$

& (b) $W^{NET}_{CONS} = -\Delta(PE) = (PE)_i - (PE)_f$ = WORK DONE by CONSERVATIVE FORCES.

Substitute (b) into (a) to get:

$$\Delta(KE) = -\Delta(PE) + W^{NET}_{NON-CONS.}$$

$$(KE)_f - (KE)_i = (PE)_i - (PE)_f + W^{NET}_{NONCONS.}$$

OR $$\{(KE)_f + (PE)_f\} - \{(KE)_i + (PE)_i\} = W^{NET}_{NON-CONS.}$$

$$(ME)_f - (ME)_i = W^{NET}_{NONCONS.}$$

THUS (ME) is a conserved constant only if $W^{NET}_{NON-CONS} = 0$.

Finally NOTE that $W_{NON-Conservative}$ is always NEGATIVE

... because drag forces always oppose the displacement.

THEREFORE, when $W_{NON-CONS} \neq 0$

$$(ME)_f < (ME)_i$$

so that (ME) is decreasing.