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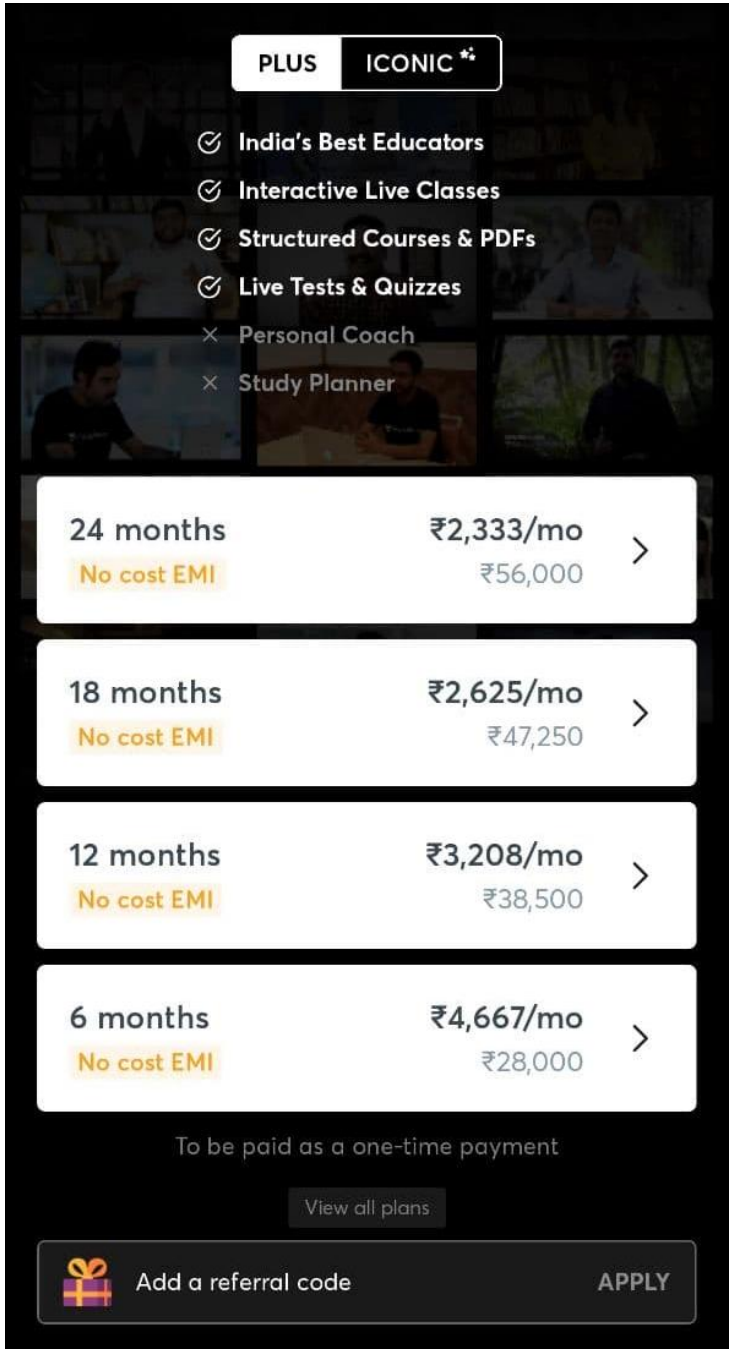

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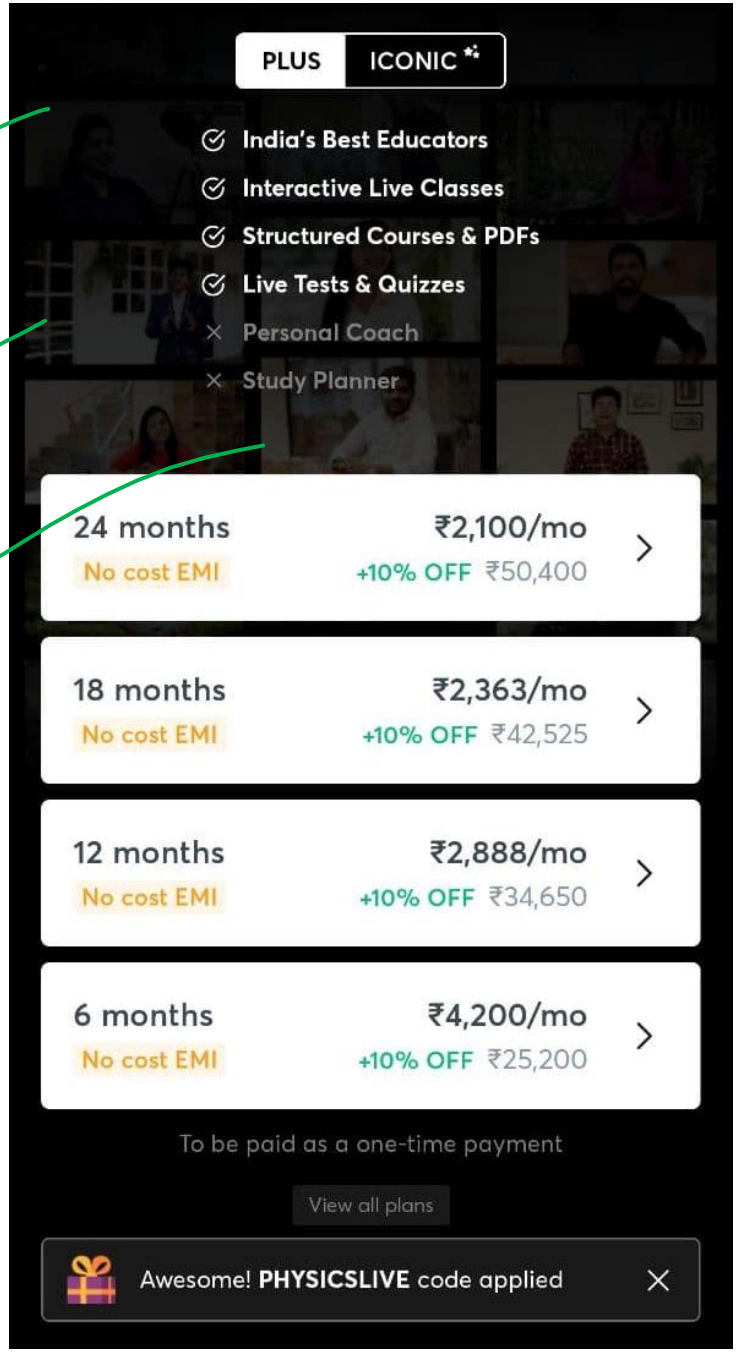

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H.C. Verma Physics

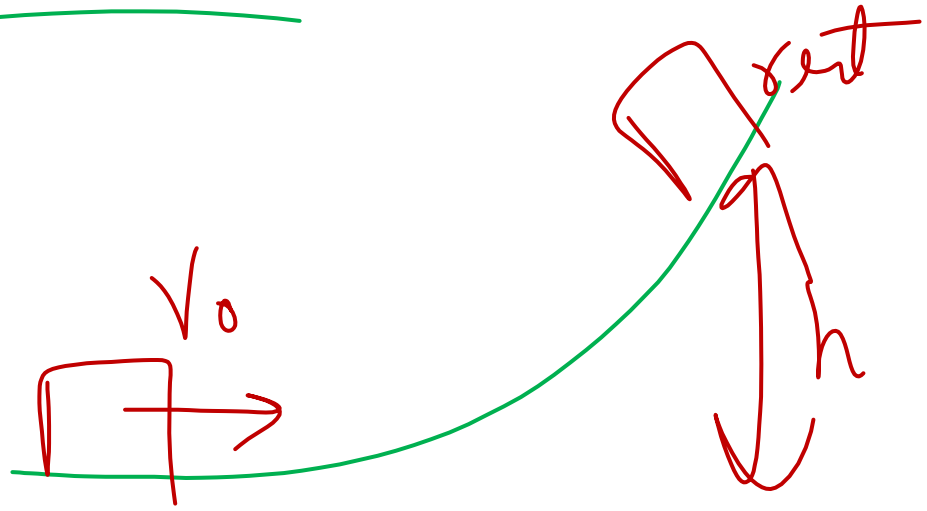
Questions for Short Answers

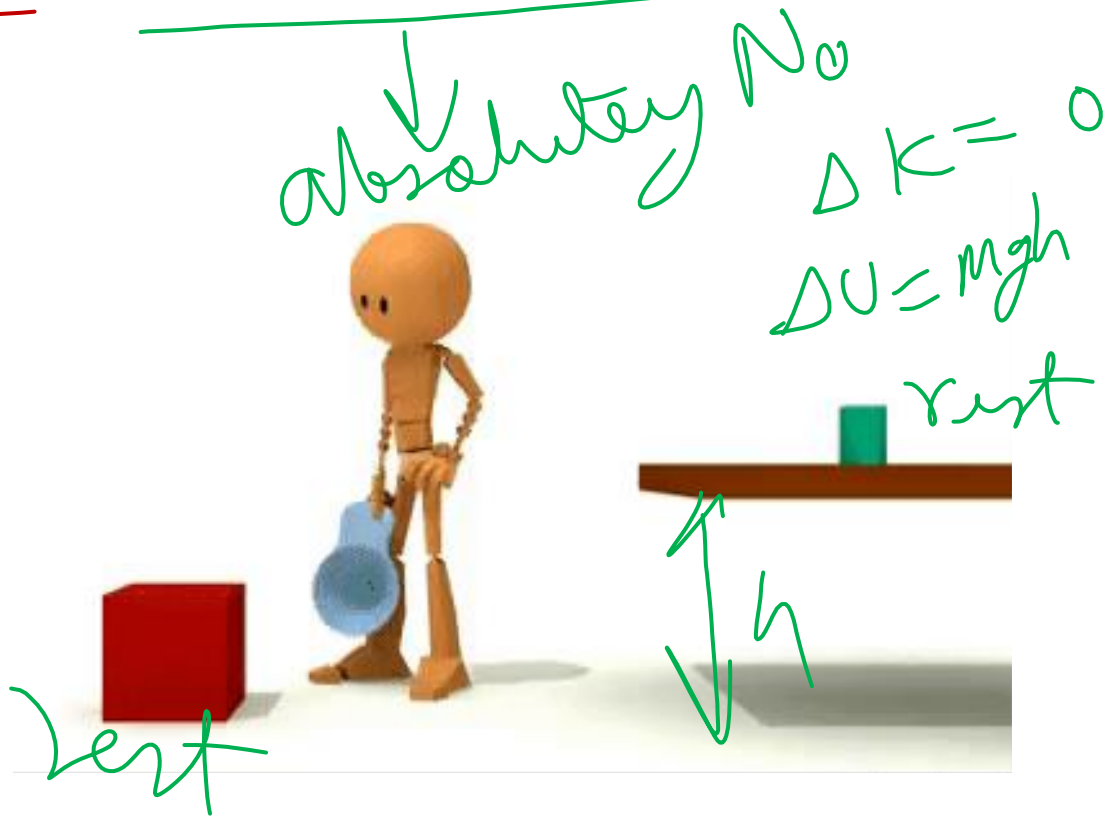
C-8 Work Energy & Power

By PRATEEK JAIN SIR

$W_{ext} = \Delta K + \Delta U$

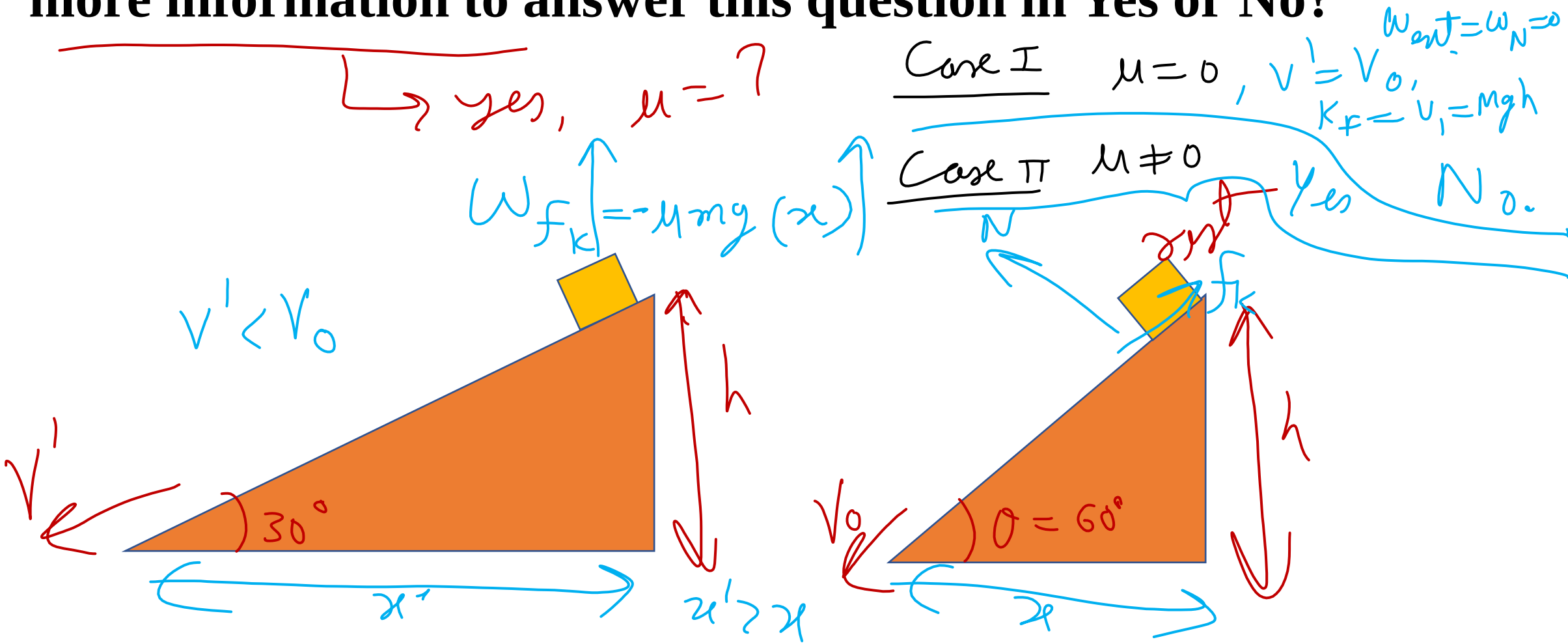
Q) When you lift a box from the floor and put it on an almirah the potential energy of the box increases, but there is no change in its kinetic energy. Is it a violation of conservation of energy?



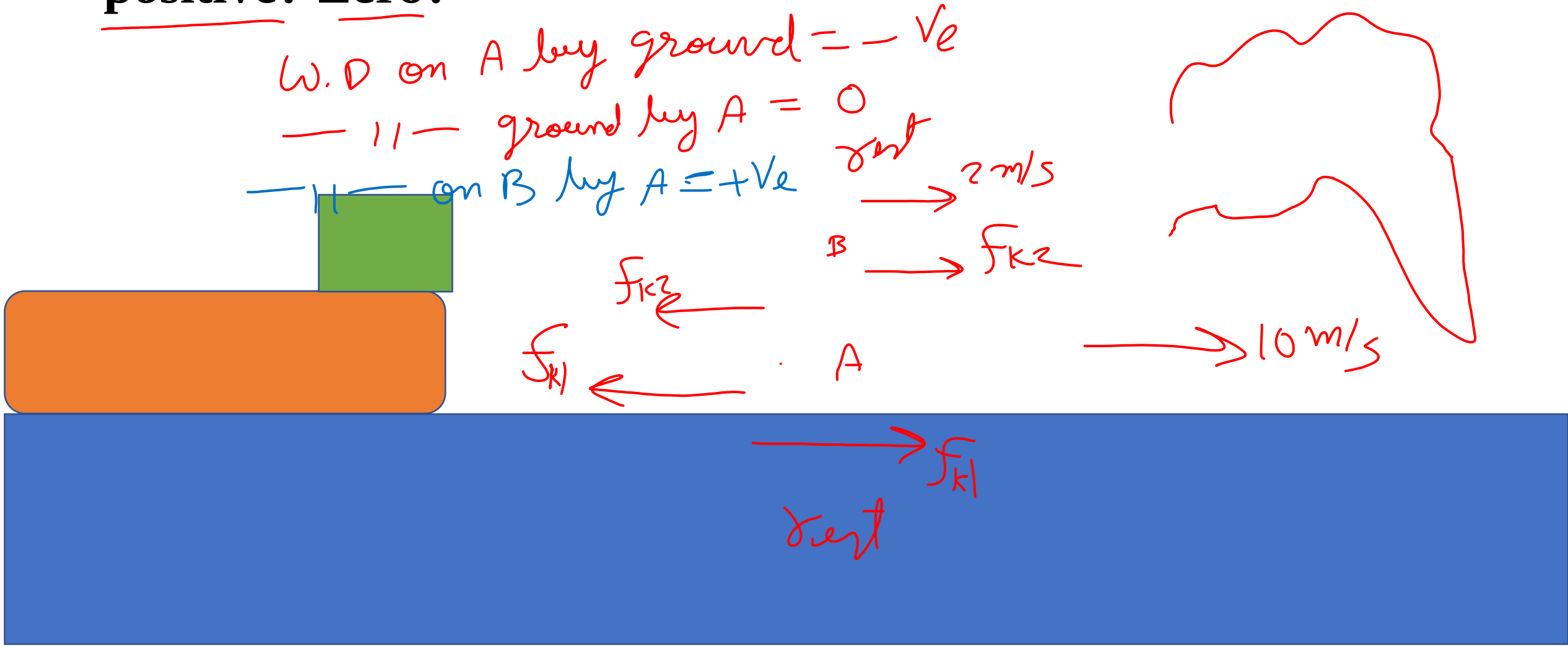


Credit: gwpixel.net

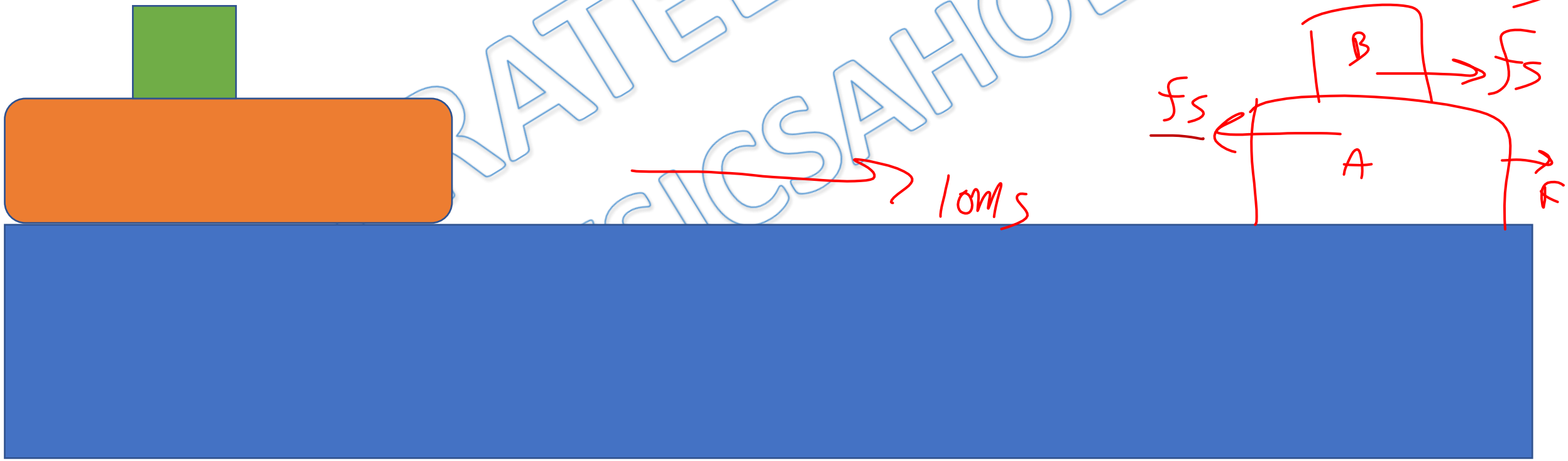
Q) A particle is released from the top of an incline of height h. Does the kinetic energy of the particle at the bottom of the incline depend on the angle of incline? Do you need any more information to answer this question in Yes or No?



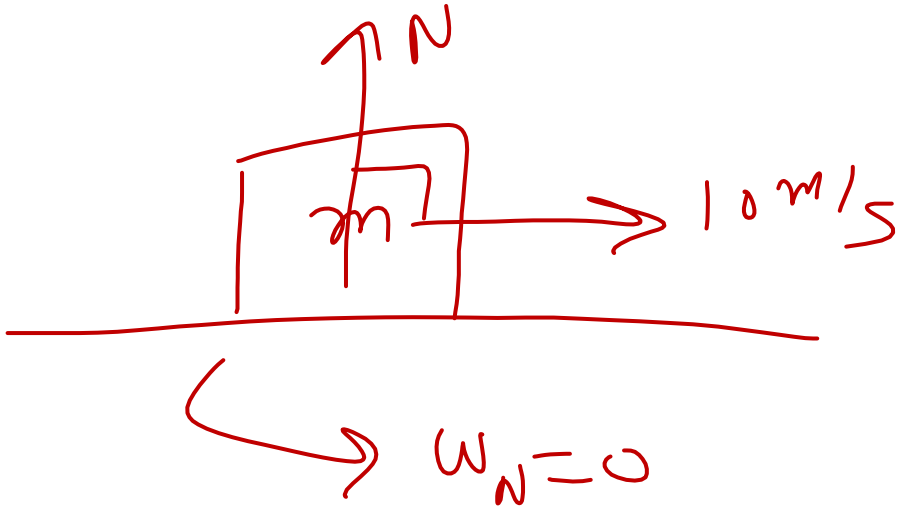
Q) Can the work by kinetic friction on an object be positive? Zero?



Q) Can static friction do nonzero work on an object? If yes, give an example. If no, give reason.



Q) Can normal force do a nonzero work on an object. If yes, give an example. If no, give reason.



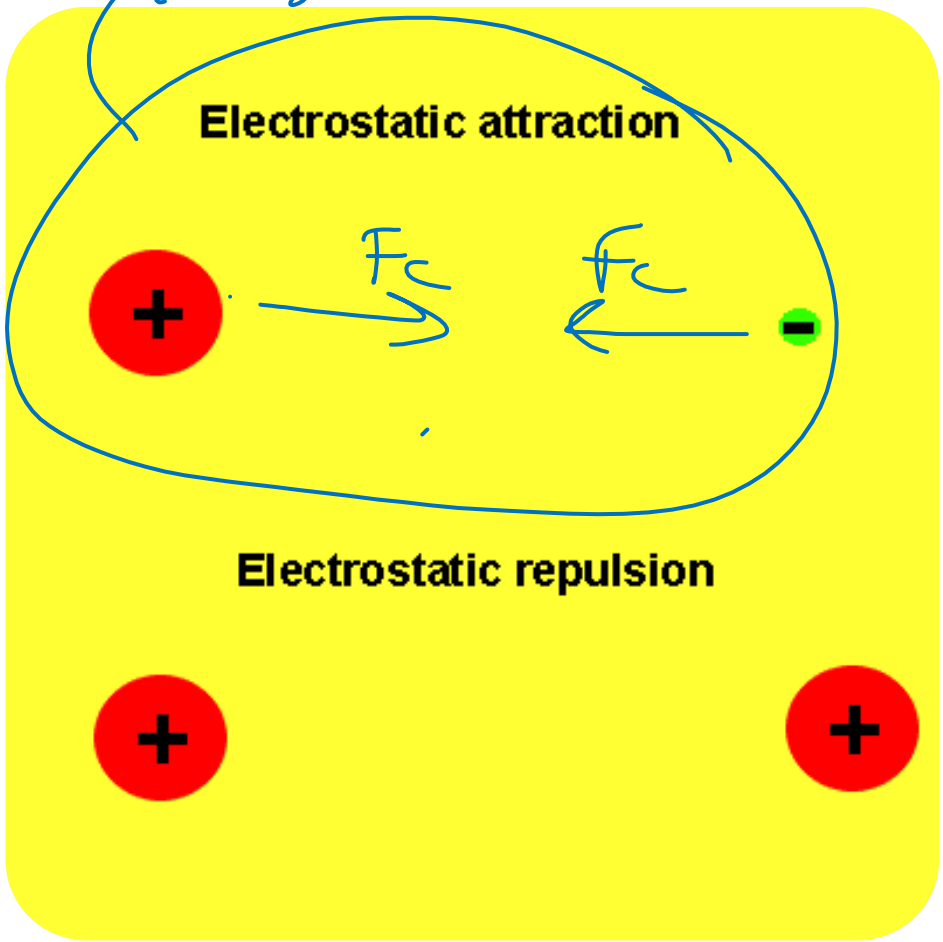
Q) Can kinetic energy of a system be increased without applying any external force on the system?

Yes

$W_{ext} + W_{int} = \Delta K$

$W_{ext} = \Delta K$

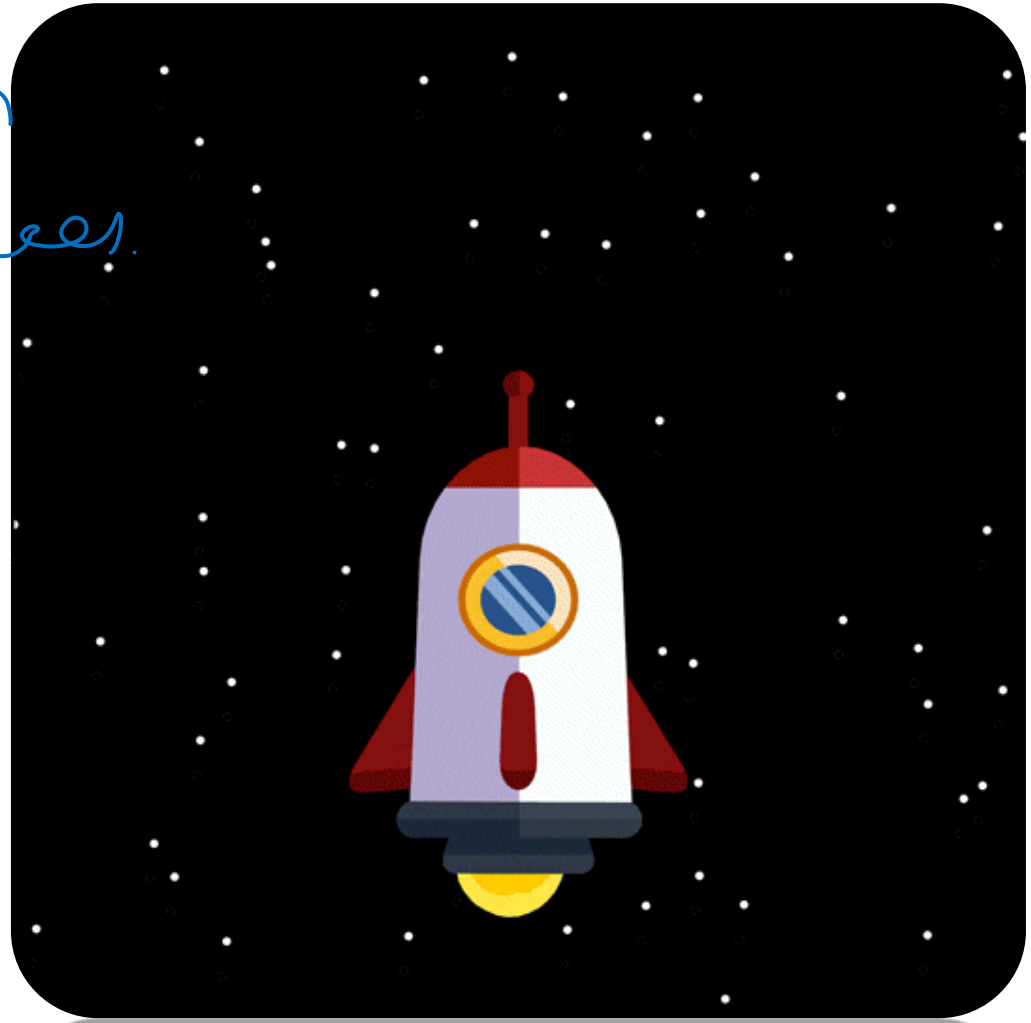
$W_{ext} = \Delta K + \Delta U$



Q) Is work-energy theorem valid in non-inertial frames?

Yes if we also consider the w.d by Pseudo forces.

$W_{all} = \Delta K$



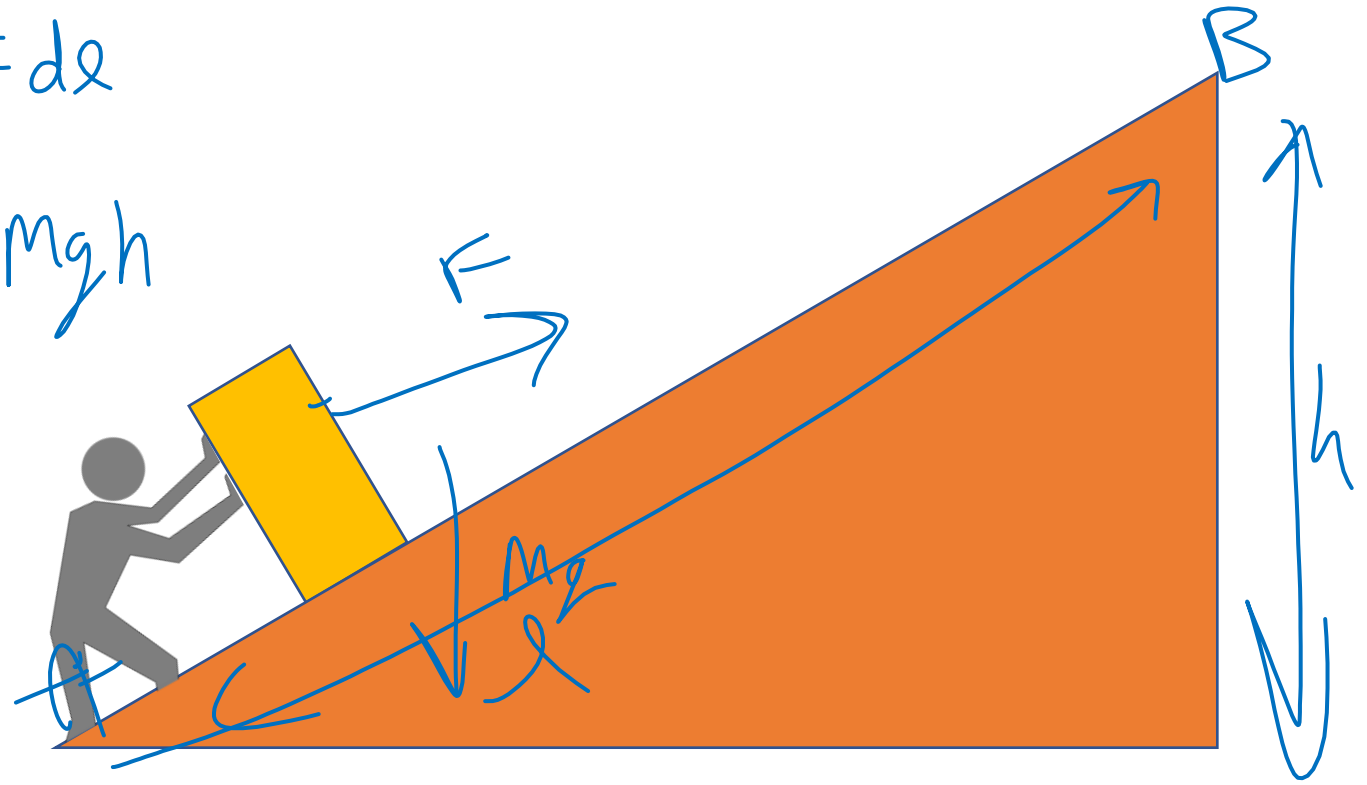
Credit: Pinterest

Q) A heavy box is kept on a smooth inclined plane and is pushed up by a force F acting parallel to the plane. Does the work done by the force F as the box goes from A to B depend on how fast the box was moving at A and B? Does the work by the force of gravity depend on this?

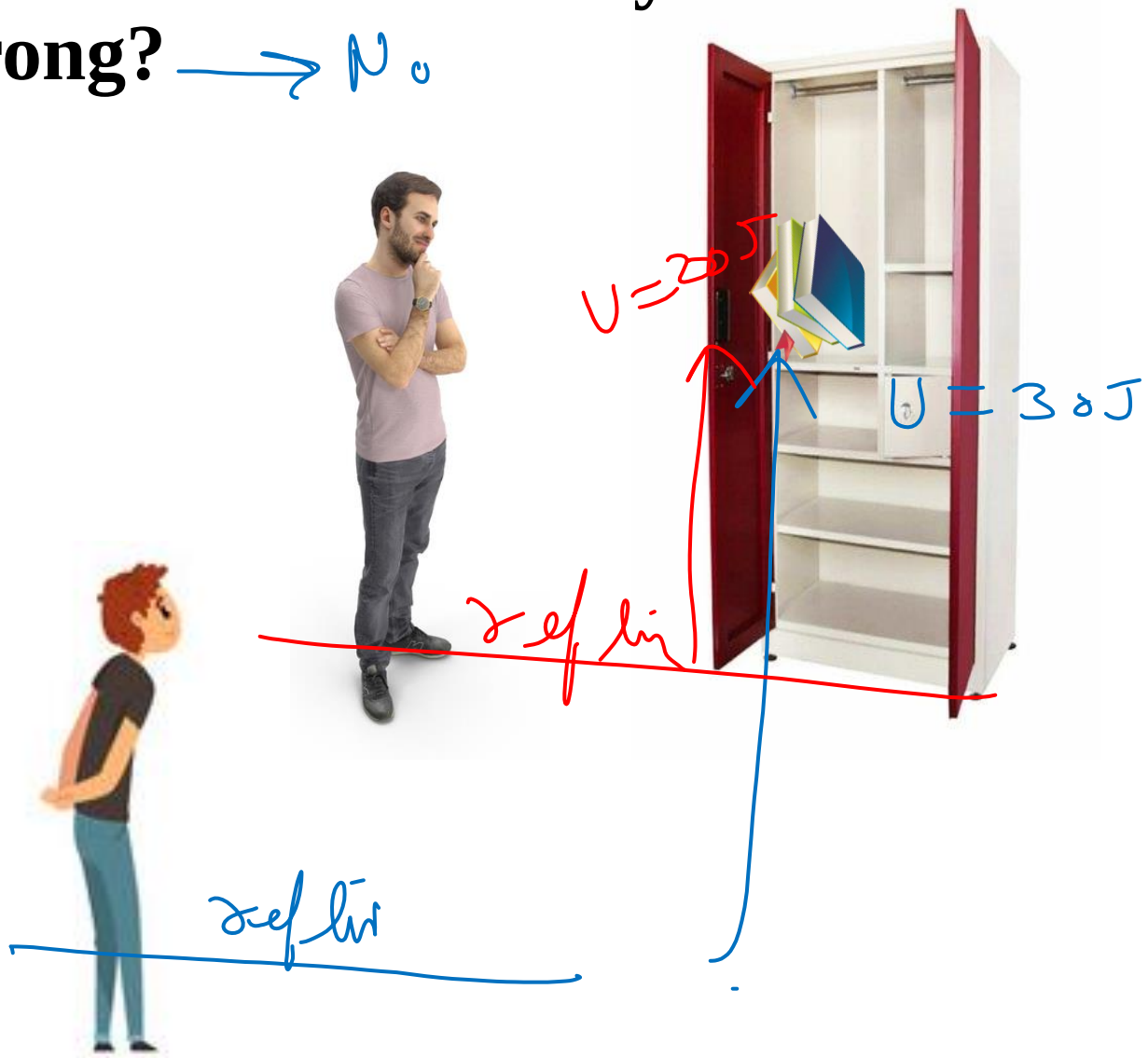
No

$W = \int F\,dx$

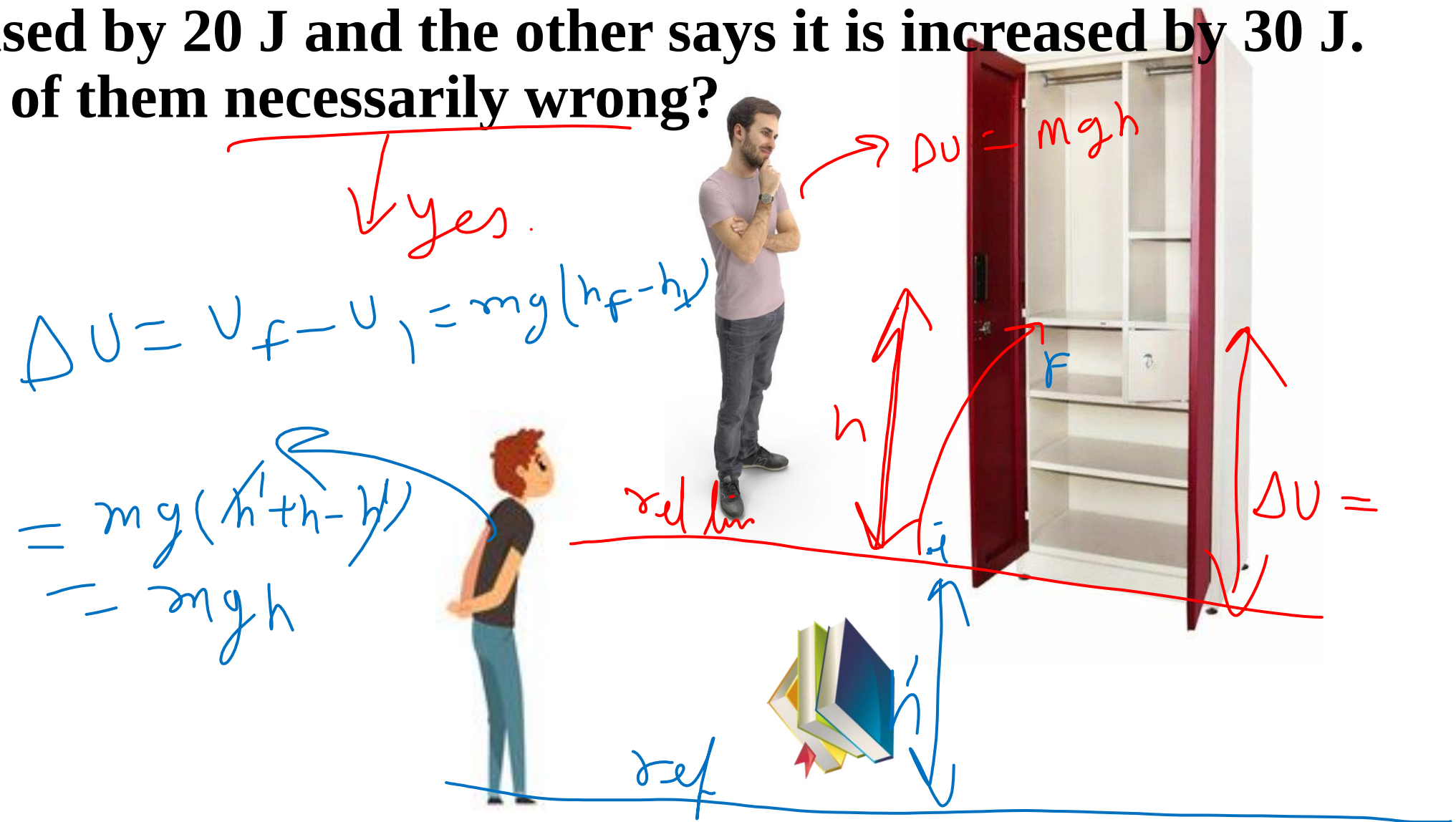
$W_g = -mgh$



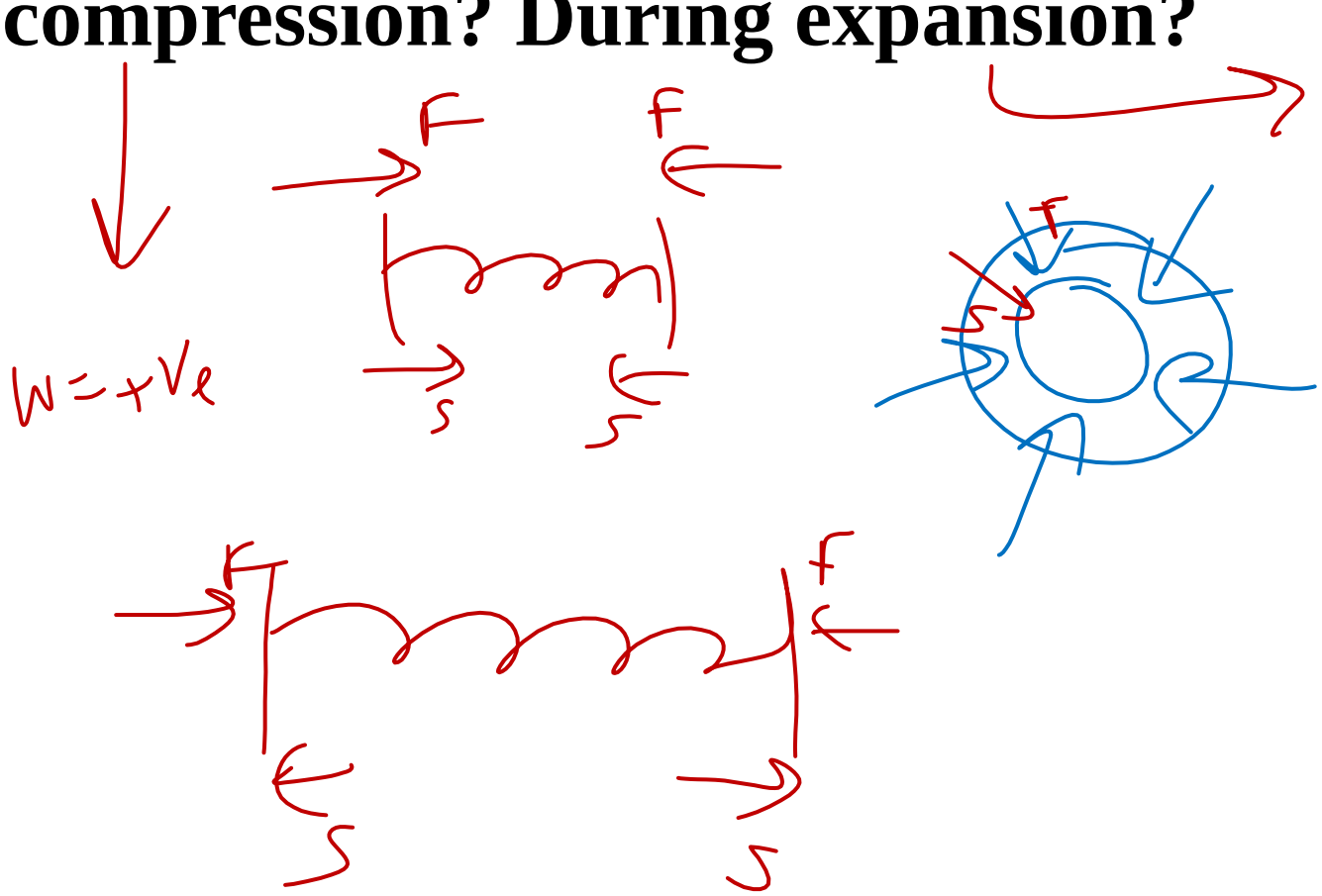
Q) One person says that the potential energy of a particular book kept in an almirah is 20 J and the other says it is 30 J. Is one of them necessarily wrong?



Q) A book is lifted from the floor and is kept in an almirah. One person says that the potential energy of the book is increased by 20 J and the other says it is increased by 30 J. Is one of them necessarily wrong?



Q) In one of the exercises to strengthen the wrist and fingers, a person squeezes and releases a soft rubber ball. Is the work done on the ball positive, negative or zero during compression? During expansion?



Credit: Tenor

Q) In tug of war, the team that exerts a larger tangential force on the ground wins. Consider the period in which a team is dragging the opposite team by applying a larger tangential force on the ground. List which of the following works are positive, which are negative and which are zero?

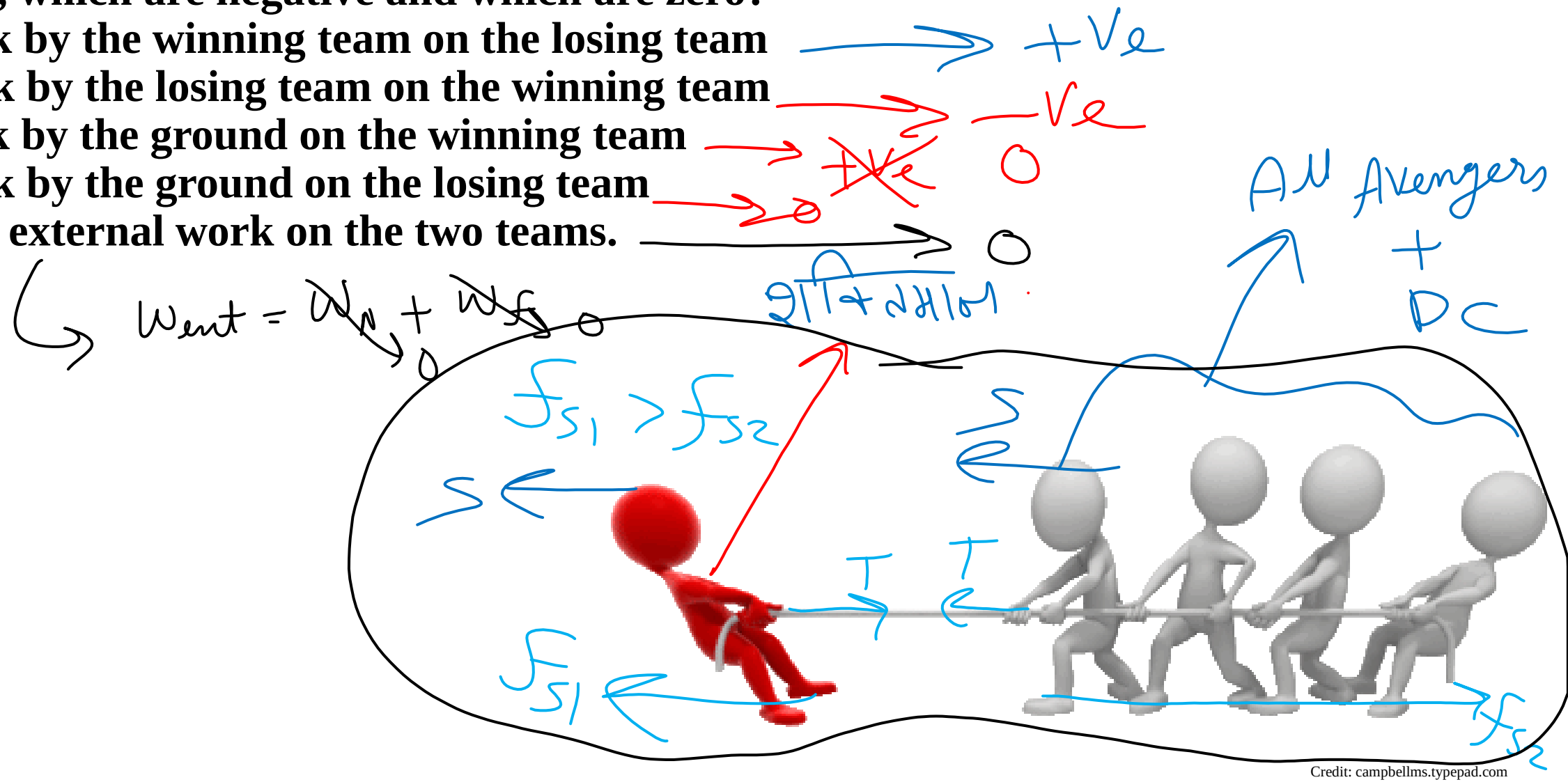
(a) work by the winning team on the losing team

(b) work by the losing team on the winning team

(c) work by the ground on the winning team

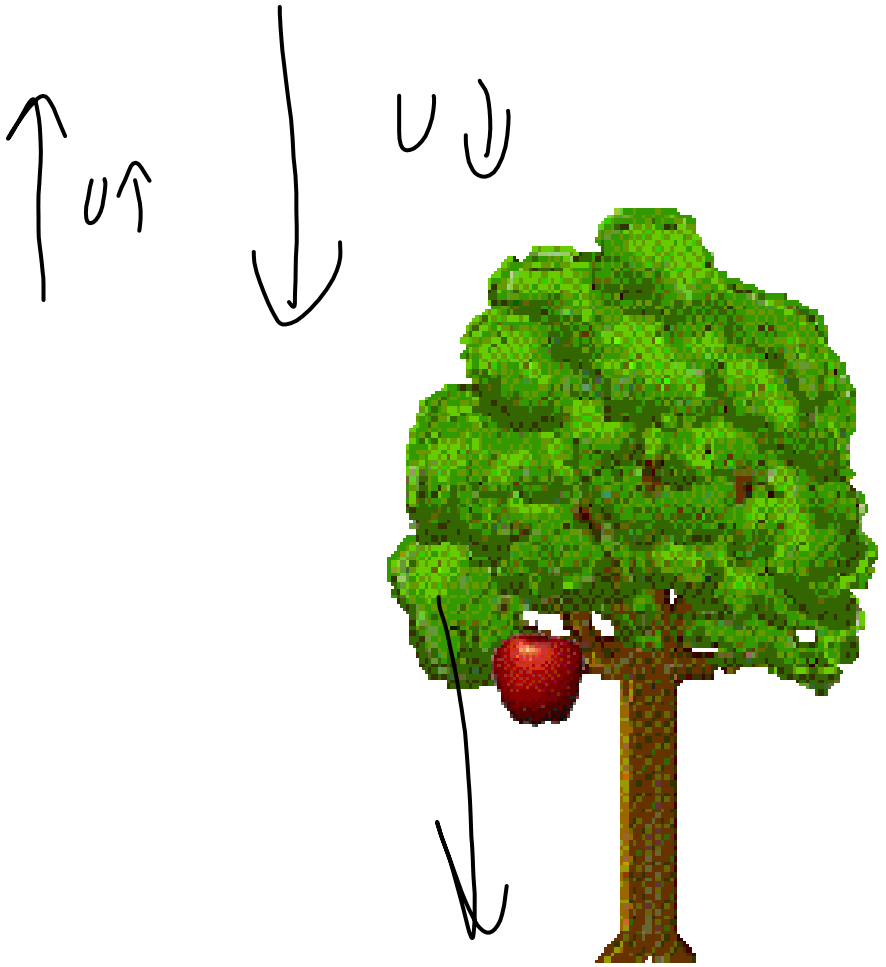
(d) work by the ground on the losing team

(e) total external work on the two teams.



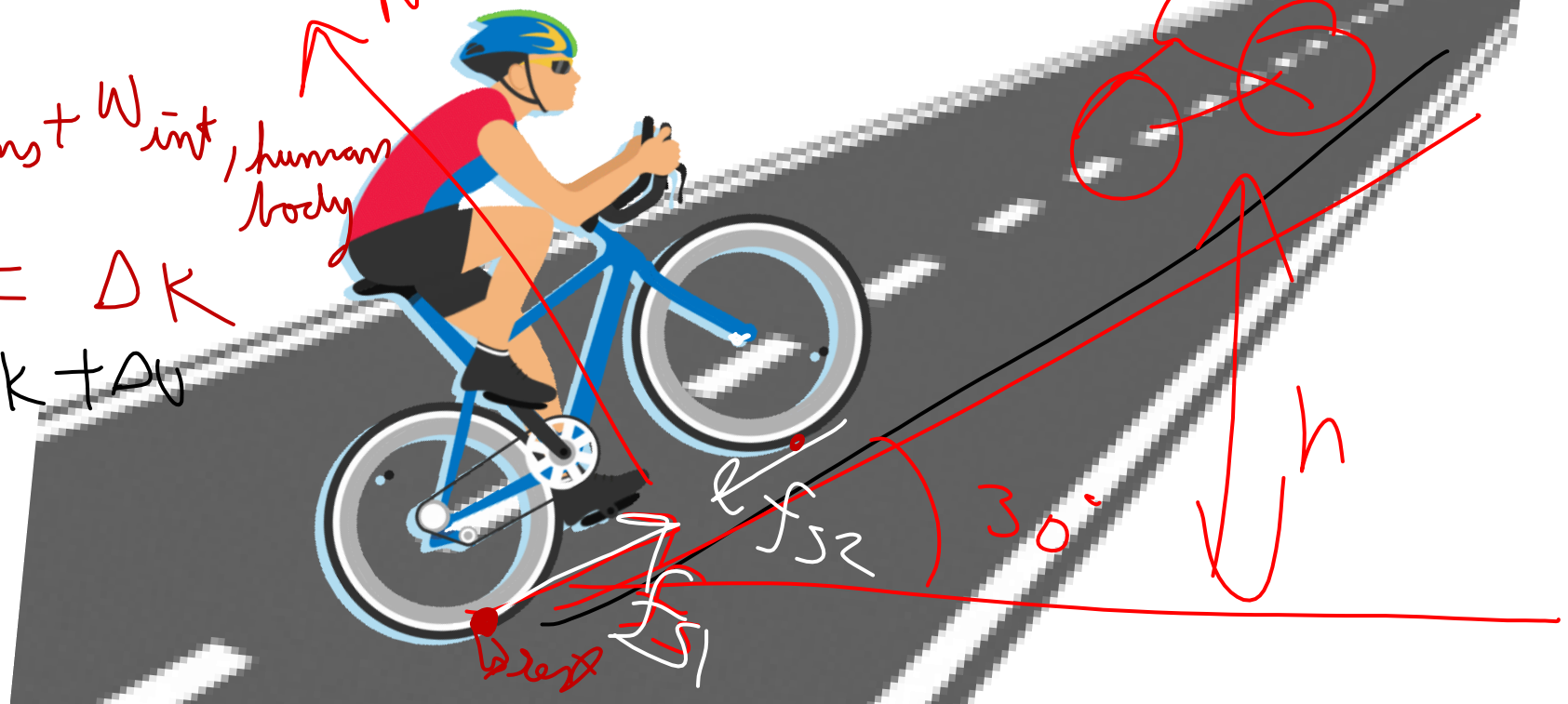
Credit: campbellms.typepad.com

Q) When an apple falls from a tree what happens to its gravitational potential energy just as it reaches the ground? After it strikes the ground?

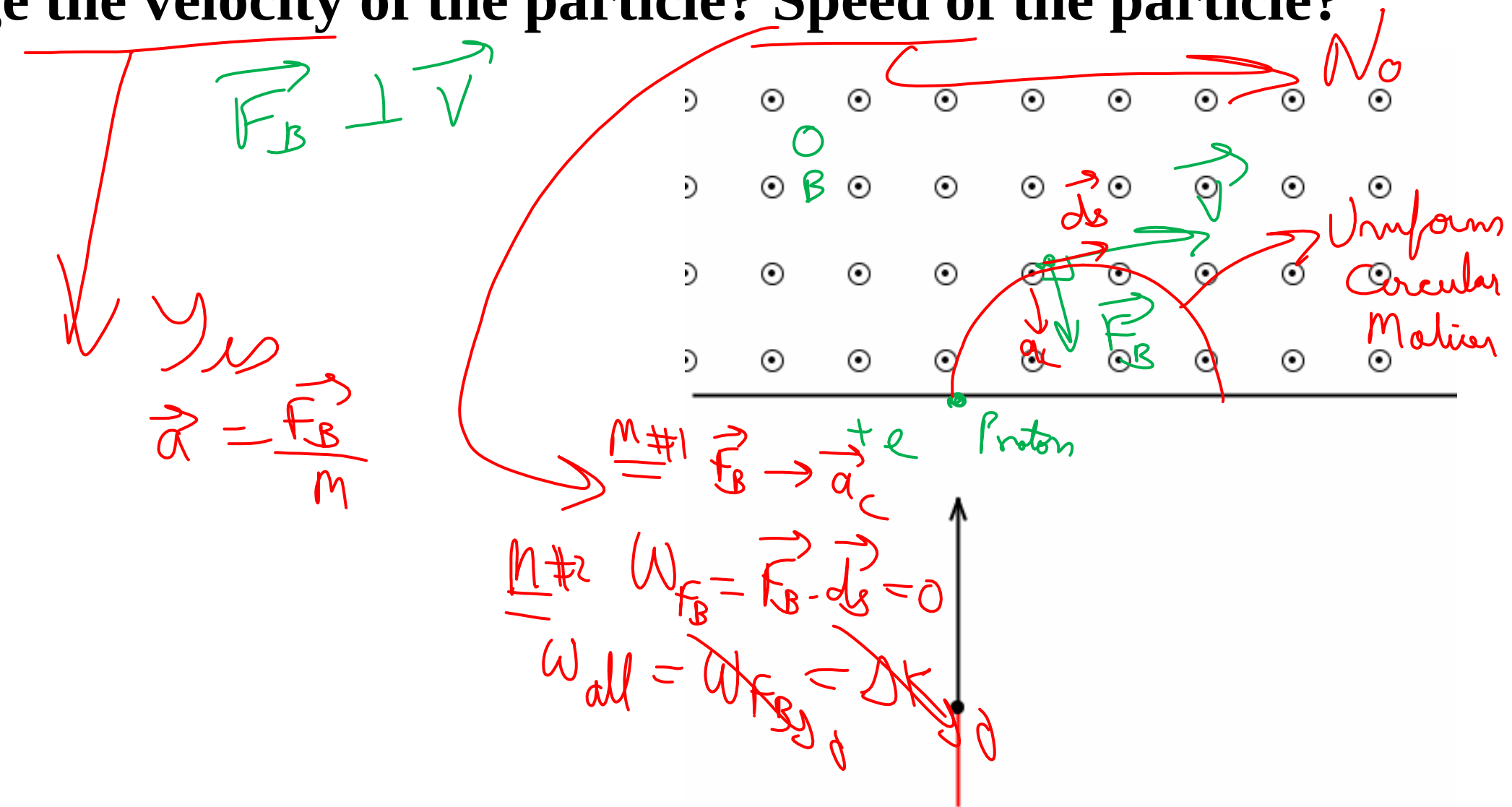


Credit: kawaiiyuri.com

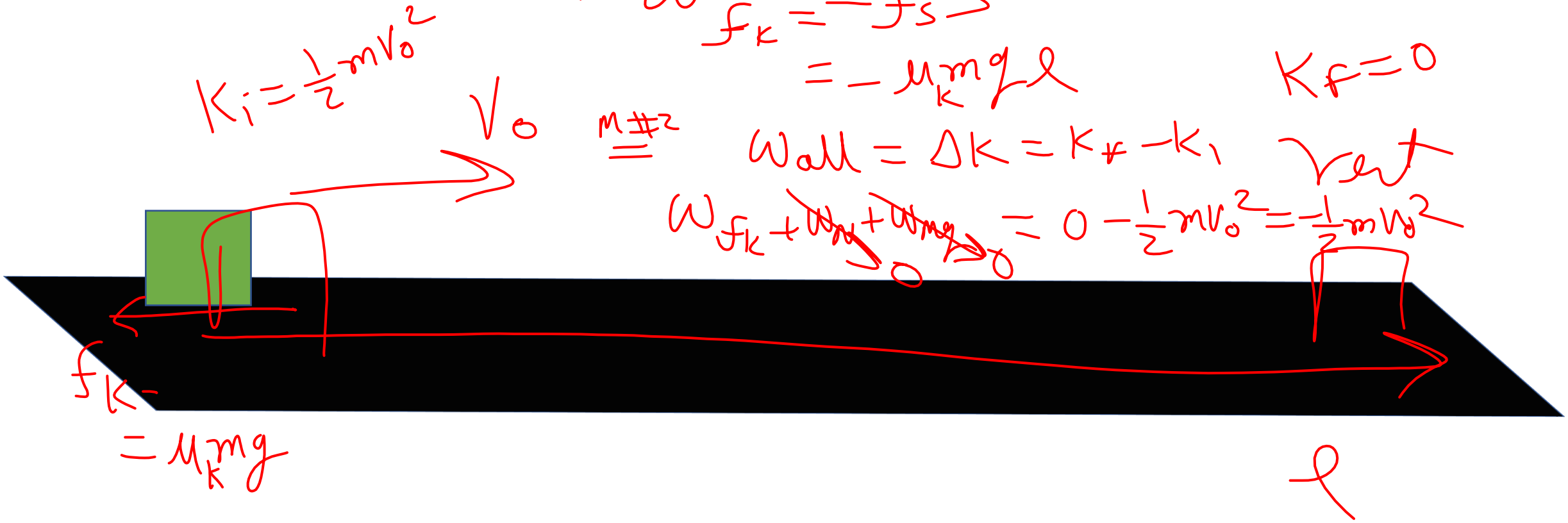
Q) When you push your bicycle up on an incline the potential energy of the bicycle and yourself increases. Where does this energy come from?



Q) The magnetic force on a charged particle is always perpendicular to its velocity. Can the magnetic force change the velocity of the particle? Speed of the particle?

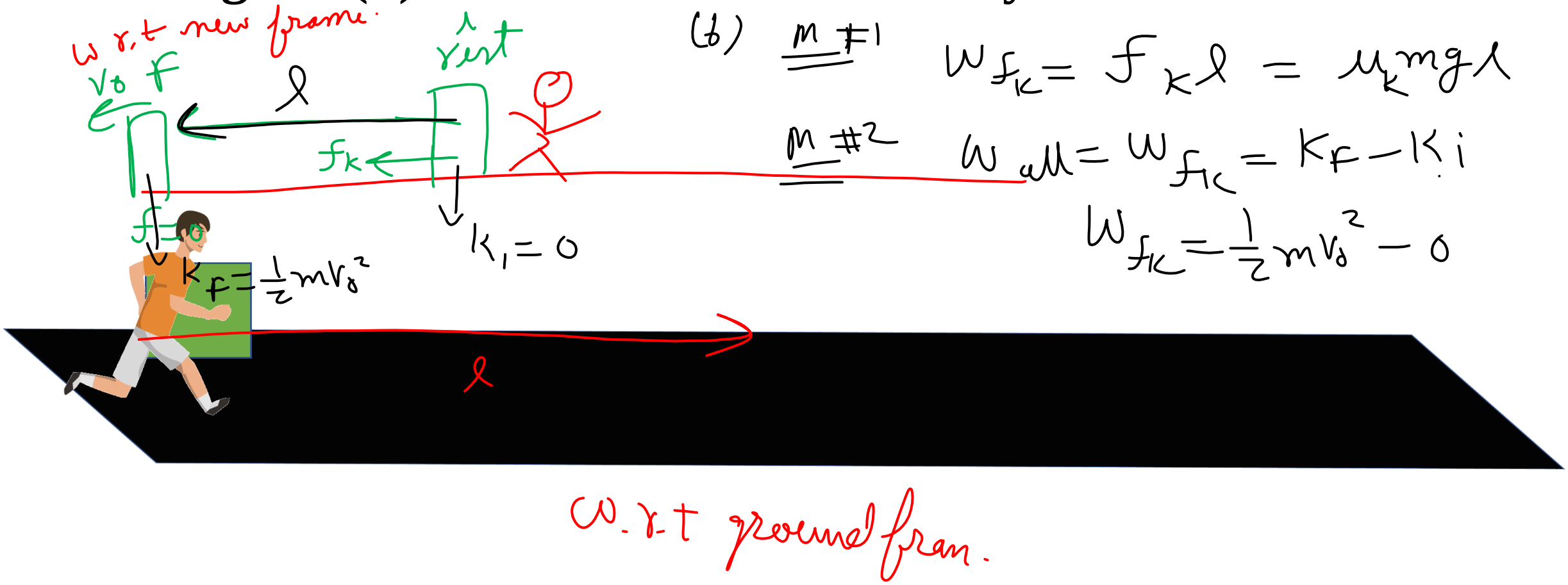


Q) A ~~ball~~ block is given a speed V_0 on a rough horizontal surface. The ~~ball~~ block travels through a distance l on the surface and stops. (a) What are the initial and final kinetic energies of the ball? '(b) What is the work done by the kinetic friction?



$W = \vec{F} \cdot \vec{ds}$

Q) Consider the situation of the previous question from a frame moving with a speed V_0 parallel to the initial velocity of the block. (a) What are the initial and final kinetic energies? (b) What is the work done by the kinetic friction?



(b) $m \neq 1$

$W_{f_k} = f_k \ell = \mu_k mg\ell$

$m \neq 2$

$W_{all} = W_{f_k} = K_f - K_i$

$W_{f_k} = \frac{1}{2}mv_0^2 - 0$

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Chalo Niklo