WORK-ENERGY + F_{NET} = ma

Units 10 & 11 + 6 & 7

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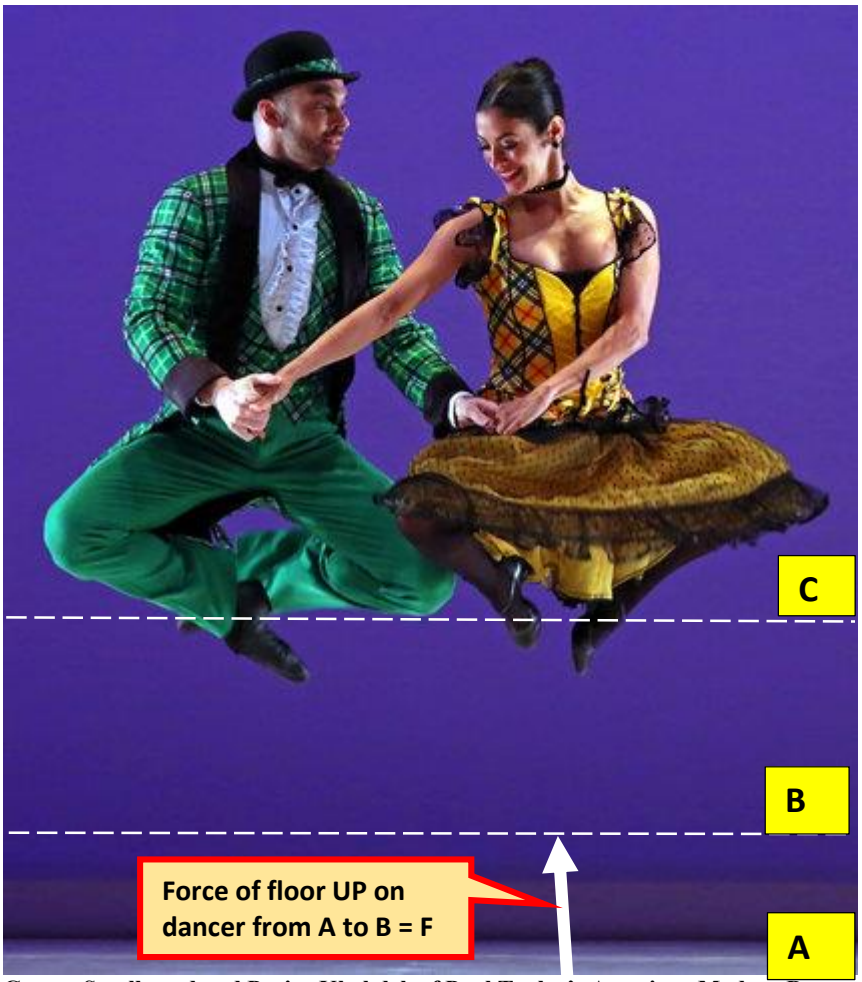
A Program of Premieres by Paul Taylor's American Modern Dance



George Smallwood and Parisa Khobdeh of Paul Taylor's American Modern Dance in "Sullivaniana," at the David H. Koch Theater.

Premieres have been popping forth from Paul Taylor's American Modern Dance this week — with variable results. Wednesday's gala began with a piece (new to New York) by Mr. Taylor, "Sullivaniana." Like many Taylor creations this century, it seemed like a skillful preliminary sketch of something this master didn't have the energy to turn into an interesting dance. It also looked neither American nor like modern dance.

INTRODUCTION: Dancers PUSH up from floor with a force F. A to B (1 ft.) they accelerate. At B they leave the floor with Velocity V_B and rise 2 ft. to C where they stop. Each dancer's weight is 160 lb.(mg).

QUESTIONS: WORK-ENERGY

(a)Find dancer's increase in gravitational potential energy A to C? (b)How much work did they each do A to B? (c)Find force F using work-energy concepts? (d) Using energy conservation concepts find V_B?

HINTS: $W = \Delta K + \Delta U$, $U = mgh$, $W = F X$ $K = ½ m v^2$, $V^2 = V_o^2 + 2 a X$, weight = mg
Note: W = Work, when F is in direction of motion W is positive.

NEWTON'S 2ND LAW

(e) Find acceleration A to B using kinematics concepts? (f) Find mass of one dancer? (g) Using $F_{NET} = ma$ find force of floor F up on dancers from A to B? NOTE: From A to B the NET force on dancer is made up of two forces:

$$F_{NET} = F - mg = m\,a$$

ANSWERS: (a) 480 ft. lb., (b) 480 ft. lb. (c) 480 lb., (d) V_B = 11.31 ft./s., (e) 64 ft./s.^{2}, (f) 5 slugs , (g) 480 lb.

EDITERS NOTE: It was possible to obtain Floor force two ways….by work-energy Or Newton's second law. Happyness!