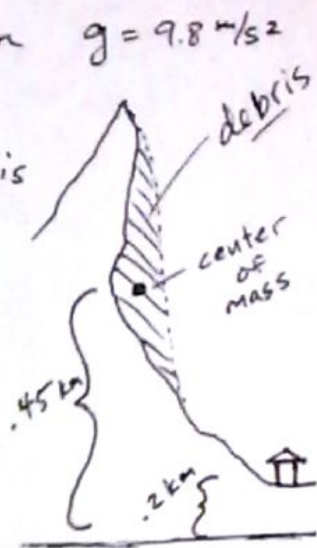


Scientists at the U.S. Geological Survey have been monitoring a potential landslide. They have estimated that the total mass of mud and debris is  $250,000 \text{ kg}$  that will fall during the event. The debris will fall from an average height of  $.45 \text{ km}$ . Scientist estimate that a total of  $2.5 \times 10^6 \text{ J}$  of heat will result as a consequence of friction from the landslide.



(A) How fast will the debris travel at  $.2 \text{ km}$  in height?

(B) How fast will the debris travel at  $0 \text{ km}$  in height?

(C) Answer parts A and B again given that  $1.0 \times 10^8 \text{ J}$  of energy is released as sound energy as the debris fall.