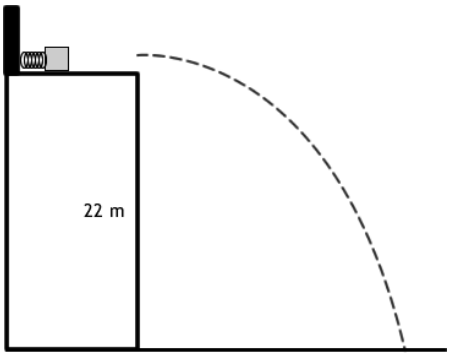
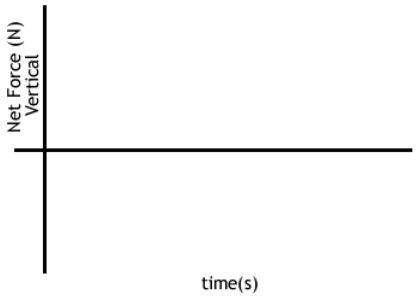
AP Physics Name:_____

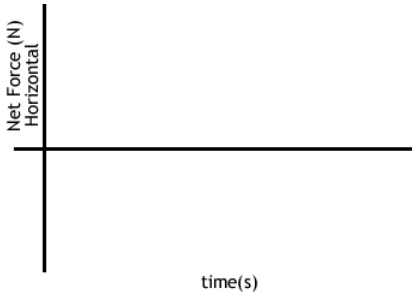
Work, Power, Energy



A 6kg block is held against a compressed spring and released from rest. The block slides across a frictionless surface and is launched off the 22m cliff.

a) Sketch the net force(vertical and horizontal) as a function of time from the time the block is released to the time the block hits the ground.





b) If the block was compressed 0.25m, and leaves the spring with a speed of 15m/s, determine the spring constant of the spring.

c) Determine the time it takes the block to hit the ground once it leaves the cliff.

d) Determine how far the ball lands from the base of the cliff.

e) Determine the speed at which the block strikes the ground.

f) Given the following changes, determine what would happen to the horizontal distance traveled by the block, once the block leaves the cliff. Consider each change separately.

i) The spring constant is doubled, but the compressed distance is halved. Increase decrease stay the same

ii) The cliff's height is cut in half. Increase decrease stay the same

iii) A larger mass is used. Increase decrease stay the same

The graph below shows a cyclist's pedaling power as a function of time for various different workouts.

a) Which workout does the cyclist have the most consistent power output? Justify your answer.

Circle one
Workout 1
Workout 2
Workout 3

b) Which workout best corresponds to a cyclist trying to toast a piece of bread? Justify your answer.

Circle one
Workout 1
Workout 2
Workout 3

c) Which workout does the cyclist burn the most calories? Justify your answer.

Circle one
Workout 1
Workout 2
Workout 3

d) Estimate the change in energy of the cyclist from 5 to 15 seconds.