

## Law of Conservation of Energy - Assignment

Purpose - to use computer simulations to analyze situations where the law of conservation of energy applies and to explain this law in terms of the simulations.

YOU WILL NEED YOUR NETWORK LOGIN!!

### Procedure -

- 1) Using Interactive Physics Player open Sim 16.
- 2) Record the initial velocity of the mass, use this to calculate and record its starting kinetic energy.
- 3) Run the experiment stopping it at the highest point of the objects path.
- 4) Calculate and record this height using trigonometry, from this determine and record the Ep of the mass.
- 5) Predict the velocity of the mass when it returns to the bottom of the ramp, run the experiment to verify this.
- 6) Prove that mass does not affect the velocity but does affect the energy by changing the simulation and recording appropriate data. Describe what your procedure was.
- 7) Close Sim 16 and open Sim 23.
- 8) Run the experiment and stop when paused.
- 9) Sketch the graphs of Ek, Ep, and Etotal.
- 10) Use the tape player to find and then record the maximum height.
- 11) Label on all three graphs the time at which the ball is at its maximum height.
- 12) Reset changing the speed to one half of its original value, run.
- 13) How does this change the maximum height?

### Discussion -

- 1) In Sim 23 where in its path is the ball when Ek is at a maximum, and what values does Ep have?
- 2) In procedure 13 was the new height  $\frac{1}{2}$  of the old height? Explain showing mathematically the relation between the velocity and the height.
- 3) In either simulation was mass a factor in finding the maximum height? What about in finding the energy?

### Conclusion -

Your conclusion must include a statement on how energy changed forms in these simulations, as well as how the law of conservation of energy applies to these changes. State how the law of conservation of energy was proven.