

Lab 2 Mechanical Energy Conservation

Objectives

In this lab, students will analyze the mechanical energy transformation in a dynamic process and reinforce their understanding of Mechanical Energy Conservation.

Supplies

[Mechanical Energy Conservation video](#) on YouTube.

URL <https://www.youtube.com/watch?v=mhIOylZMg6Q>

Theory

As discussed in the lecture, mechanical energy (ME) includes kinetic energy and potential energy (both gravitational potential energy and elastic potential energy). In this lab, there are only gravitational potential energy (PE) and kinetic energy (KE) involved. We are going to observe the transformation between them and study whether or not the total mechanical energy is conserved if friction (heat) is ignored.

The definitions of these energies are listed as follows:

$$KE = \frac{1}{2}mv^2$$

$$PE = mgh$$

$$ME = KE + PE$$

Procedure

Watch the [Mechanical Energy Conservation video](#) (multiple times if necessary) and answer the questions listed below.

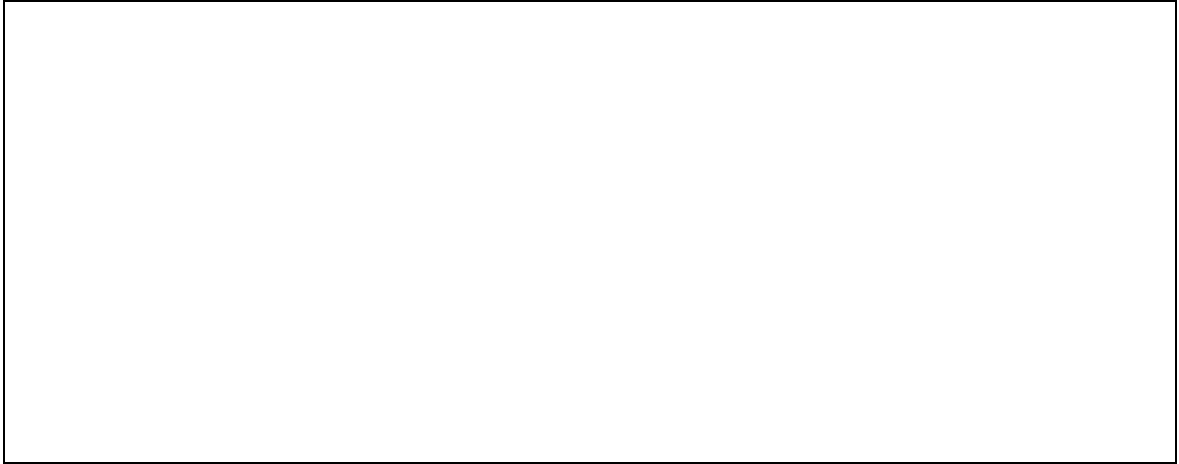
Questions and Problems

1. Describe the energy transformation process as the ball swings from one side to the other. (For example, when does the ball have maximum KE/PE and when does the ball have minimum KE/PE?)

2. Why does the professor in the video say, “I trust the law of conservation of mechanical energy 100 percent, but I may not trust myself”? What does he really mean?

3. Why does the professor say, “Please be very quiet” and “I hope I will be able to do it [release from his chin] at zero speed”? What will happen if he gives a non-zero (bigger than 0) speed to the ball when releasing it? Explain why.

4. When the ball swings back, does it come back exactly to the same height as it was released? Explain why or why not.



5. At the very beginning of the video, the professor calculated the work he did to the ball when lifting it up from the floor. Please show how he did the calculation and what physics concept/formula he used to do the calculation?



First and last name:

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