

Sci 265 - Energy and Power

Conversion of Mechanical Energy: Energy flow between potential and kinetic energy

Experiment 1: Click on the "Galileo Pendulum I" on your desktop

1. Observe the experiment, describe your observations and explain them using your knowledge of energy.
2. What changes occur to the pendulum motion during the experiment?
3. What aspects of motion do not change?
4. What is the initial and final height of the pendulum in each sub experiment?
5. How can you explain your observations using the ideas of energy?

Experiment 2: Choose Galileo Pendulum 2

It is important that you only watch this video one bit at a time. You should draw a prediction before you watch the result for each step. This will make it easier to remember what happens and sort out why it happens. Luis will release the pendulum bob at a specific height and let it swing freely. Then he will place an obstacle in the way of the bob and repeat the experiment releasing the bob at the same height as before. There are 6 levels of the experiment.

1. Watch from **00:00:00 to 00:00:13** of the “Galileo Pendulum II” on your desktop. Stop before he swings the pendulum again. Predict how high the bob will rise this time. Draw a picture of the pendulum when it’s closest to Luis and when it’s furthest from Luis, the highest point it reaches on each side.
2. Watch from **00:00:13 – 00:00:25**. How high did it rise? Draw a diagram showing maximum height on each side.
3. Watch the next (2nd) setting from **00:00:25 – 00:00:33**. Make a prediction for the new height of the obstacle. Include a drawing.
4. Watch from **00:00:33 – 00:00:41**. How high did it rise? Draw a diagram showing maximum height on each side.

5. Now watch the placement of the 3rd position (**stop at 00:00:51**) and predict how high the pendulum will go. Include a diagram showing final height on each side.
6. Watch the experiment and draw a diagram showing maximum height on each side.
7. Now watch the placement of the 4th position (**stop at 00:01:14**) and predict how high the pendulum will go. Include a diagram showing final height on each side.
8. Watch the experiment and draw a diagram showing the maximum height on each side.
9. Now watch the placement of the 5th position (**stop at 00:01:25**) and predict how high the pendulum will go. Include a diagram showing final height on each side.

10. Watch the experiment and draw a diagram showing the maximum height on each side.

11. Now watch the placement of the 6th position (**stop at 00:01:38**) and predict how high the pendulum will go. Include a diagram showing final height on each side.

12. Watch the experiment and draw a diagram showing the maximum height on each side.

13. What are the key points that cause a different result for the pendulum? Explain why the behavior changes at these key points.

14. How does the final height on each side compare for each experiment?

15. How is this experiment different from the first observational experiment with the pendulum?

16. What were the unexpected features of the experiment that made you rethink your model?

How powerful are you?

Materials and Equipment: stopwatch, 2 meter stick or ruler, human

Predict

Which person in your group is capable of the largest burst of power over a short distance?

Plan

Create an experiment that will allow you to determine the power output of each person in your group as you run up a flight of stairs.

Investigate

Collect data for each member of your group and then convert the power output to horsepower and post the largest value on the white board. *Hint: Your reading for this week contains all the equations and examples to help you complete the necessary calculations.*

Analyze

Discuss the accuracy of this experiment. What factors were not accounted for in your calculations? Which of these would cause you to overestimate the person's power output and which would cause you to underestimate?