

Energy of a Pendulum

A pendulum clock is a compound machine that uses stored energy to do work. A spring stores energy, and with each swing of the pendulum, some of that stored energy is used to move the hands of the clock. In this lab, you will take a close look at the energy conversions that occur as a pendulum swings.

MATERIALS

- marker
- mass, hooked, 100 g
- meterstick
- string, 1 m

SAFETY INFORMATION



PROCEDURE

1. Make a pendulum by tying the string around the hook of the mass. Use the marker and the meterstick to mark points on the string that are 50 cm, 70 cm, and 90 cm away from the mass.
2. Hold the string at the 50 cm mark. Gently pull the mass to the side, and release it without pushing it. Observe at least 10 swings of the pendulum.
3. Record your observations. Be sure to note how fast and how high the pendulum swings.

4. Repeat steps 2 and 3 while holding the string at the 70 cm mark and again while holding the string at the 90 cm mark.

ANALYZE THE RESULTS

1. List similarities and differences in the motion of the pendulum during all three trials.

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2. At which point (or points) of the swing was the pendulum moving the slowest? the fastest?

DRAW CONCLUSIONS

3. In each trial, at which point (or points) of the swing did the pendulum have the greatest potential energy? the least potential energy? (Hint: Think about your answers to question 2.)

4. At which point (or points) of the swing did the pendulum have the greatest kinetic energy? the least kinetic energy? Explain your answers.

5. Describe the relationship between the pendulum's potential energy and its kinetic energy on its way down. Explain.

6. What improvements might reduce the amount of energy used to overcome friction so that the pendulum would swing for a longer period of time?
