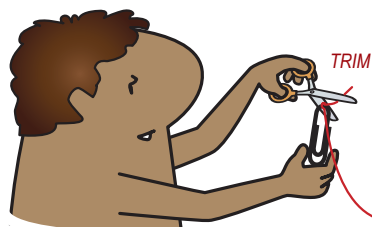


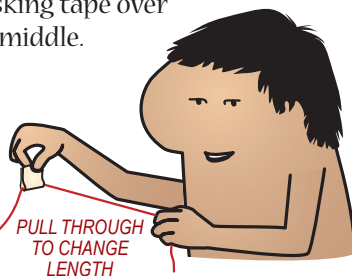
clock pendulum

...adapted from **GLOBAL TOPS #91**
by TOPS Learning Systems

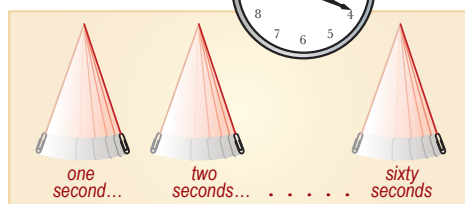
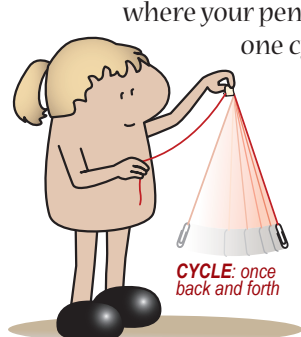
1. Tie an arm's length of thread to a paper clip.



2. Lightly fold a small piece of masking tape over the middle.



3. Slide the thread through the tape until you find the length where your pendulum swings exactly one cycle each second.



4. Measured to the center of the bob (the paper clip), how long is your pendulum clock? Can you accurately time one minute with it?

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OBJECTIVE

To make a pendulum that ticks like a clock, at 60 cycles per minute.

SET-UP

Cover wall clocks. Ask students to be seated and put away all timepieces (you will be the only timekeeper). Announce a contest: students should stand up when they guess that one minute has passed from the moment you say "GO!" Note who stands closest to the mark, but don't announce the winner until all are standing. Then hand out copies of the lab above. Students might repeat this contest at the end of this lab (see wrap-up).

LAB NOTES

Copy the lab for each student or lab team.

Notes 2-3. Tape folded over thread makes an ideal pendulum pivot: hold it while the pendulum swings beneath. The thread stays put until you slide it to a new pendulum length. By trial and error, students find the length that counts 60 seconds with 60 swings.

ANSWERS

4. A one-second pendulum measures 24.8 cm from the edge of the tape tab to the middle of the clip.

WRAP-UP

Have students sit again, then ask them to stand at precisely one minute by counting their pendulum cycles. They will likely all stand together.

EVALUATION

Q. A grandfather clock runs too slow. How would you adjust its pendulum bob to improve its timing?

A. Shorten the pendulum to speed up the clock. *An adjustable nut on the bob generally allows this.*

EXTENSION

Develop a pendulum that makes 1 *swing* (half a cycle) each second. How many times longer is this than your 1-cycle-per-second pendulum? *Ideal pendulums 4 times longer swing at half the frequency.*

MATERIALS

- Thread, scissors, a paper clip, masking tape, and a centimeter ruler.
- A clock or timepiece that shows seconds.

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