PENDULUM PERIOD

NAME

CLASS / DATE

01 QUESTION

How does the length of a pendulum's string change the time it takes to complete one swing?

02 PREDICT BEFORE YOU MEASURE

AS LENGTH INCREASES, PERIOD WILL…

○ increase ○ decrease ○ stay about the same

Predict before timing. Explain what you think will happen as the measured length increases.

03 VARIABLES

I CHANGE (INDEPENDENT)

I MEASURE (DEPENDENT)

I KEEP THE SAME (CONTROLLED) · NAME THE FACTOR CHANGED AND AT LEAST TWO CONDITIONS HELD CONSTANT.

04 MATERIALS

- ☐ Secure stand and clamp
- ☐ One light bob and adjustable string
- ☐ Ruler (cm)
- ☐ Stopwatch
- ☐ Calculator
- ☐ Clear swing path

05 PROCEDURE

SAFETY Clamp or hold the support securely and use a light bob. Keep faces, fingers, and other people outside the swing path; do not wrap the string around a hand or neck. Have an adult help with any elevated support, and stop if the stand shifts or the bob becomes loose.

1 **MEASURE LENGTH** Measure from the pivot to the bob's center at 20, 40, 60 and 80 cm. ☐

2 **SET A SMALL ANGLE** Pull back under 15°. Use the same bob and release without pushing. ☐

3 **TIME CYCLES** Time ten complete cycles three times at each length; start and stop at the same crossing and direction. ☐

4 **FIND THE PERIOD** Average the three total times. Divide each mean by ten to find T in seconds. ☐

5 **SQUARE AND GRAPH** Calculate T^2 in s^2 and plot it against length in cm. ☐

DATA AND EXPLANATION

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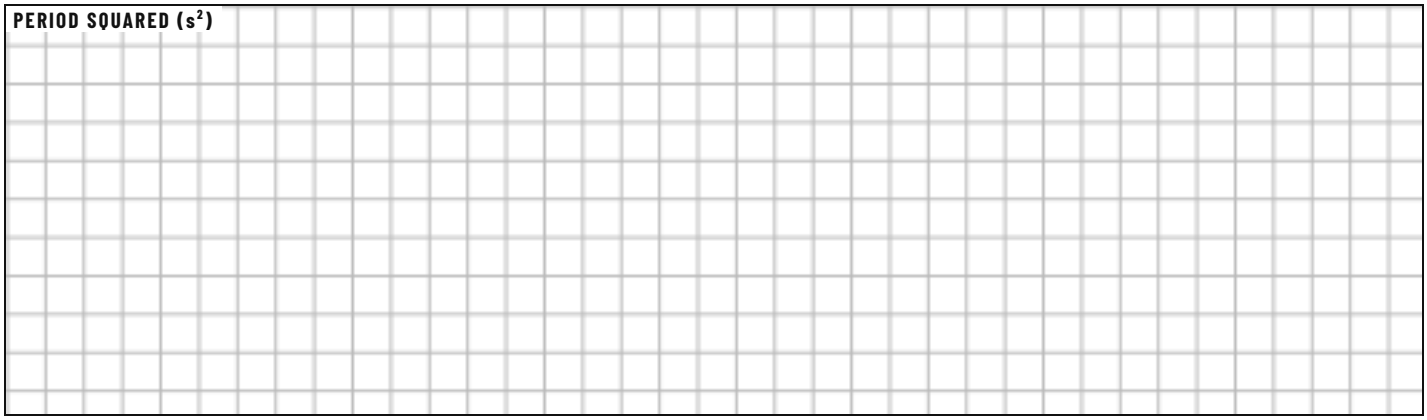
06 RECORD YOUR OBSERVATIONS

LENGTH (CM)	TRIAL 1 (S)	TRIAL 2 (S)	TRIAL 3 (S)	MEAN (S)	T (S)	T^2 (S^2)
20						
40						
60						
80						

Each trial = time for 10 cycles · Mean = (trial 1 + trial 2 + trial 3) ÷ 3 · T = mean ÷ 10 · T^2 = T × T

SHOW ONE CALCULATION

07 GRAPH PERIOD SQUARED



Plot one point per length and draw a best-fit trend. Label the scale and units. X: STRING LENGTH (cm)

08 EXPLAIN IT WITH EVIDENCE

CLAIM

EVIDENCE

REASONING

Reasoning must use: pivot · length · period · cycle · pattern

09 THINK FURTHER

How could you test whether bob mass affects period while keeping the string length and release angle fixed?