

Watch Youtube video "Time period of a pendulum depends on its length / Oscillation / Physics"

Group Member #1: _____ by KClassScienceChannel Group Member #2: _____

L13 - Lab - The Motion of Pendulums

124 marks

Students are going to experimentally verify the formula for the period of a pendulum, and confirm that the period is independent of the mass of the attached object.

T = Period (time to return to its original position)

$$T = 2\pi \sqrt{\frac{l}{g}}$$

L = length in meters.

g = 9.81 m/s² (kids should know this)

Part 1: Verifying the Formula for a Pendulum

Procedure	Equipment
<p>Students will create a pendulum with a known length and mass. They will measure the period to confirm the validity of the formula. They should repeat this for multiple lengths.</p>	<p>String Mass Stopwatch</p>

	Total	Multiplier	3	2	1	0
Evaluate and select appropriate procedures and instruments for collecting evidence and information, including appropriate sampling procedures.		X1	Student has included a detailed procedure and complete materials list.	Student has neglected minor steps or equipment, or has included an incorrect step in their procedure.	Student did not include important procedural steps or critical pieces of equipment necessary for the completion of the lab.	Not included in write-up.

Calculations

Conclusion

	Total	Multiplier	3	2	1	0
State a conclusion, based on experimental data; and explain how evidence gathered supports or refutes a hypothesis, prediction or theory.		x2	<i>Student is able to draw an educated conclusion that references both their hypothesis and their findings.</i>	<i>Student is able to draw a reasonable conclusion from their experiment.</i>	<i>Student's conclusion is vague or misses the main purpose of the experiment.</i>	<i>Not included in write-up.</i>

↓
Verified for multiple lengths.

↓
Verified for a single length.

Part 2: Verifying the Formula is Independent of Mass

Procedure	Equipment
<p>Keeping length constant, students will use multiple masses and check that the period stays the same.</p>	

	Total	Multiplier	3	2	1	0
<p>Evaluate and select appropriate procedures and instruments for collecting evidence and information, including appropriate sampling procedures.</p>		X1	<p><i>Student has included a detailed procedure and complete materials list.</i></p>	<p><i>Student has neglected minor steps or equipment, or has included an incorrect step in their procedure.</i></p>	<p><i>Student did not include important procedural steps or critical pieces of equipment necessary for the completion of the lab.</i></p>	<p><i>Not included in write-up.</i></p>

Calculations
Conclusion

	Total	Multiplier	3	2	1	0
State a conclusion, based on experimental data; and explain how evidence gathered supports or refutes a hypothesis, prediction or theory.		x2	<i>Student is able to draw an educated conclusion that references both their hypothesis and their findings.</i>	<i>Student is able to draw a reasonable conclusion from their experiment.</i>	<i>Student's conclusion is vague or misses the main purpose of the experiment.</i>	<i>Not included in write-up.</i>

Part 3: Identify Experimental Error

Sources of Error	Impact on Accuracy
<p><i>Major (Specify):</i></p> <p><i>Slack in string at extreme angles</i></p> <p><i>Flex in beam that pendulum is attached to</i></p> <p><i>Friction</i></p>	
<p><i>Minor (Specify):</i></p> <p><i>Measurement errors</i></p> <p><i>String not massless</i></p>	

	Total	Multiplier	3	2	1	0
Identify and explain sources of error; and evaluate the relevance, reliability and adequacy of data and data collection methods.		x2	<i>Student is able to identify and categorize sources of error as either major or minor sources, and state their impact on accuracy.</i>	<i>Student is able to identify major sources of error only, and state their impact on accuracy.</i>	<i>Student is not aware of any significant sources of error that are indeed present, or is unable to state the impact on accuracy.</i>	<i>Not included in write-up.</i>