Year 8 Science Report Exemplar

Effect of the Length of a Pendulum on its Period

Introduction

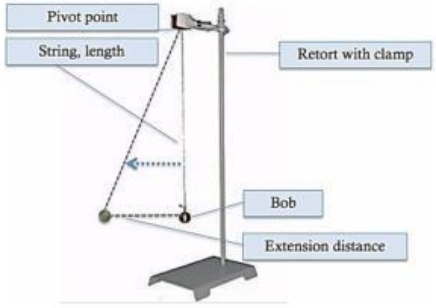
A 'Grandfather' clock transfers the energy from a swinging pendulum to the movement of the clock hands via cogs.

The "period of oscillation" is the time taken for a pendulum to complete one swing. The mass of the pendulum does not affect its swing. The period depends on various factors such as extension distance and the length of the string.

The aim of this experiment is to investigate how changing the length of the string affects the period of oscillation.

It is hypothesised that if the length of the string increases, then the period of the pendulum increases because the bob will have further to move.

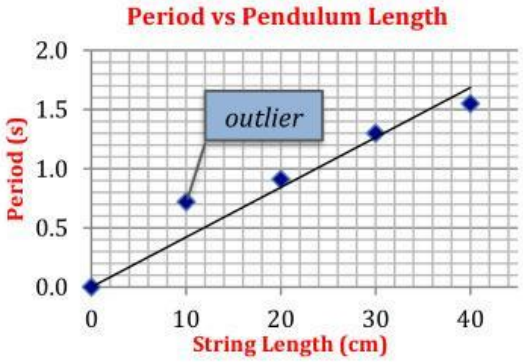
Method



The mass of the bob was kept constant at 5g and the extension distance maintained at 20cm. The length of the string was changed in 10cm increments from 10cm to 40cm. Ten swings were timed and averaged to determine the period more precisely.

Results

Length of Pendulum (cm)	Period of Oscillation (s)
0	0
10	0.7
20	0.9
30	1.3
40	1.6



Discussion

The graph shows that as the length of the pendulum increased, the period also increased. The trendline shows direct linear proportion relationship between period and string length. There is a close fit to most data points except for the period with a string length of 10cm.

It was difficult to accurately determine the period because of the unstable pivot point and the short intervals used to obtain the period.

A possible improvement could be to use a better set up for attaching the pendulum. Using more trials (eg. three sets of ten swings) could find the period with greater precision. Longer string lengths of 50cm or more could be tested.

Conclusion

The relationship between the length of a pendulum and its period is directly proportional. The hypothesis is supported as the period increased with increasing string length.

References

Science Quest 8 Textbook - pg. 53

Annotations

Title:
Relate the effect of the changing variable (independent) upon the measured variable (dependent)

Introduction
-Why is this an interesting topic to study? (link to real life examples)
-What do you already know that is related to this experiment (background)
-What quantities (variables)will you be changing, measuring and keeping the same (controlled)
- What is the purpose (aim) of this experiment?
-What prediction (hypothesis) do you make? (If ... then ... because)

Method
-Show a labelled scientific diagram of the apparatus or equipment used.
-Label all equipment and components
-Write a brief summary of what you did (method) in past tense and passive voice ie. do not use "I" or "we".

Results
-Draw a table of your results (data summary from logbook) including headings and units
-Show calculations (if/ when appropriate)
-Convert table into a graph (if/ when appropriate)
- Add a trendline (line or curve of best fit)
-Include graph title and label axes including units
-Note observations (if/ when appropriate)

Discussion
-Link your results to your introduction
- Use the graph to support your results
-Describe any shortcomings (limitations) in equipment and/or method
-Suggest improvements and a follow-up activity (extensions) if possible

Conclusion
-Summarise your results
-State whether your hypothesis was supported or not ie. refuted

References
-State what you used (resources) for research

Scientific Reports

Revise Q-Learn

Week 3 Lessons 1-3

Key Text Pages

- Topic: 1.5 p.12-18 Planning your own InvestigationLinks to an external site.
- Topic: 1.6 Writing an Aim and forming a Hypothesis (online only)Links to an external site.
- Topic: 1.7 p.19-23 Record-keeping and ResearchLinks to an external site.
- Topic 1.8 p.23-28 Controlling Variables

Refer to the exemplar above to fill in the blanks

Structure

A scientific report contains the following sections

Introduction

- **A statement detailing why this is an interesting investigation. Relate to a**
  .
- **Information**
- **Discuss the and .**
-
-

Method

- **Scientific Diagram**
- **Brief dot-point for completing the experiment.**

Results

Presentation of data.

- **Show . (if/when and if appropriate)**
- **Draw a table of . Include and units.**
- **Convert table into a (if/ when appropriate)**
  Add a (line or curve of best fit)
  Include graph and label including units
- **Note (if/ when appropriate)**

Discussion

- Link your to your
- Use the to support your results
- Describe any shortcomings ( ) in equipment and/or method
- Suggest and a follow-up activity (extensions) if possible

Conclusion

- your results
-State whether your was supported or not ie. refuted

References

-State what you used ( ) for research

Review Q-Learn Week 2 Lesson 1

Conventions/Rules for Drawing Scientific Diagrams.

Scientific diagrams are:

- drawn in
- cross-section
- about to a of a page,
- ruled and hand-drawn
- ruled horizontal straight lines ( ) for labels
- correct and
- no or
- equipment should be in
- items that should be drawn as

VARIABLES

In a science report, most sections continually reference 2 variables.

These are the independent variable and the dependent variable.

The variable is the variable we change or test.

The variable is the variable we measure or observe. It is the result of changing the independent variable.

In a fair test we only change variable. The variables that we keep the same are called the .

Experiment 1

Surface and Effect on Bounce

Introduction

The way in which a tennis ball rebounds after hitting different surfaces is an interesting phenomenon that can be explained by the principles of energy transfer. This experiment explores how the type of surface (such as carpet and vinyl) affects the height of the tennis ball's rebound, a scenario that can be observed in real-world situations like sports courts or recreational areas. For example, in tennis, the type of surface (hardcourt, grass, or clay) can influence the game's pace and how the ball behaves. Understanding the effect of different surfaces on bounce height can provide insights into how energy is absorbed and transferred between objects in real-life settings, from sports to engineering. The aim of this experiment is to investigate whether a tennis ball rebounds higher when dropped onto a carpet compared to when it is dropped onto vinyl.

Label the parts of the aim.

to investigate rebound height surface type

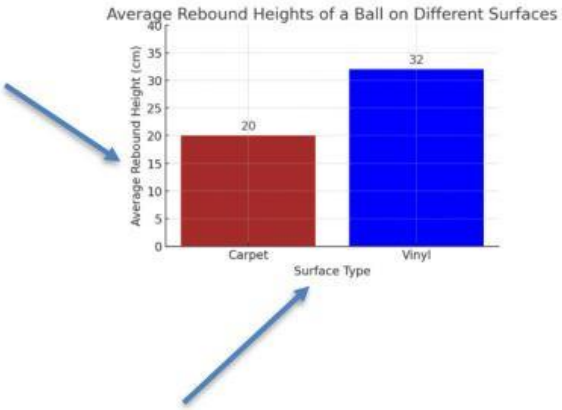
Complete the hypothesis

It is hypothesized that the tennis ball will when dropped onto the vinyl than onto the . This is because the vinyl is a surface that will absorb less energy, leaving more to propel the ball upwards. The carpet, being softer, will more of the ball's energy, resulting in a lower .

Results

The independent and dependent variables are used to label the columns in the table of results and the axis on the graph.

Surface Types on Rebound Heights			
Surface	**Rebound Heights (cm)**		
	Trial 1	Trial 2	Trial 3
Vinyl	32	33	31
Carpet	20	21	19



Discussion

The experiment aimed to measure how a ball after being on different —carpet and . The results show that the ball bounced higher on , with an average rebound height of cm, to cm on the carpet. These were expected, as vinyl is a harder, absorbent surface than carpet, which more of the ball's energy and reduces the rebound .

There was slight in the heights recorded across the three for each surface. On the carpet, rebound heights ranged from cm to cm, while on vinyl, they from cm to cm. These small variations could be due to error in observing the exact height of the bounce or slight inconsistencies in how . To improve the of the results, a fixed measuring set-up, a controlled ball release mechanism and a high-speed camera could be used to reduce

Conclusion

Overall, the support the expectation that a harder like vinyl allows for a greater height than a softer surface like carpet. Despite some limitations in measurement accuracy, the general trend remains clear. With improved methods, future could produce even more precise and results.

As you can clearly see, a scientific report restates the independent and dependent variable throughout. The scientific language is also repeated and restated.