STEM CIP

Science/Technology/Engineering/Mathematics
Curriculum Integration Project

Riding on a Pendulum

Student Curriculum Module

CurrTech Integrations

Riding on a Pendulum

A Study of Force and Motion

Student Curriculum Module

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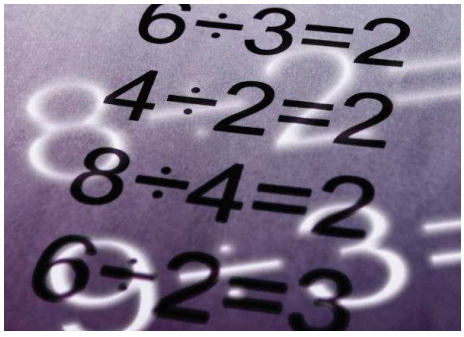
Science, Technology, Engineering, and Mathematics (STEM) Curriculum Integration Project (CIP) (STEM-CIP)

Welcome to the exciting world of STEM. STEM is a new way to learning **S**cience, **T**echnology, **E**ngineering, and **M**athematics (STEM). These four disciplines are taught together, as one, rather than being taught as separate as in the past. The natural connections among the four disciplines have always been there in scientific and engineering research labs and in professional work settings, but not always in your classroom.

The modules of the STEM-CIP Project have been designed to engage you in stimulating, real, and current problems and questions. These problems and questions involve the life, physical, environmental, and earth/space sciences, technology, engineering, and mathematics, in other words STEM.

As you learn about STEM you will be acting as an engineer using science, technology, and mathematics to solve problems through designing and creating products and processes. Many of these products you use in some form in everyday life. In the STEM-CIP modules you will design Alka-Seltzer rockets, develop models of amusement park rides, and engineer wind turbines and cars. As you do so, you will follow the same processes and thinking that engineers, scientists, and mathematicians use when they solve real world problems and questions.

So sit back, buckle up, and let's launch into the world of STEM.



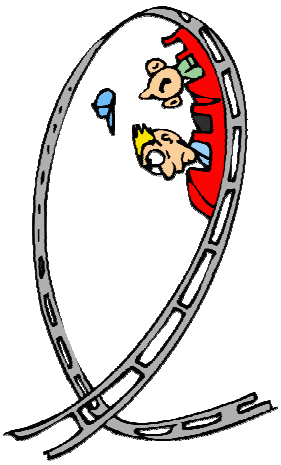


Table of Contents

Activity 4: How Does Amplitude Affect the Period of a Pendulum?

Activity Description

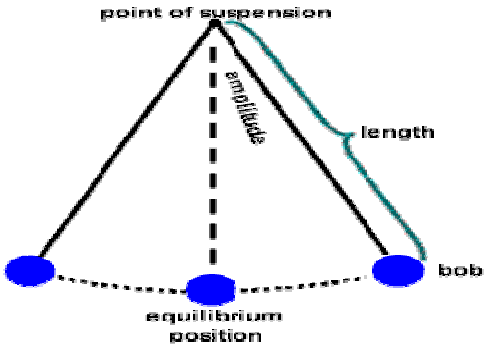
In this activity, you will use the pendulum you constructed to alter the **amplitude** of the pendulum to see how it affects its period.

Make a Hypothesis

4a. On page 16 of the SDRB, hypothesize how the period will be affected if the amplitude (displacement of the pendulum) is changed. You may want to review "Hypothesis Testing" located on page 47 of the SDRB, before completing this question.

Explore

4b. You and your team will now test your hypothesis. Use the following amplitudes: 30, 20, and 10 degrees**.** Let the pendulum swing back and forth ten (10) times for each trial. Perform 5 trials for each amplitude. Record your data in the table on page 16 of the SDRB.



Explain

4c. On page 16 of the SDRB, compute the average period for each amplitude. Show your math calculations. Then record your calculations in the chart provided.

4d. On the grid on page 17 of the SDRB, construct a graph of the amplitude on the horizontal (X) axis and the period of the pendulum on the vertical (Y) axis. Decide what type of graph is most appropriate for the data you collected. Be sure to properly label your axes and title your graph.

4e. On page 18 of the SDRB, answer the following questions: On which axis of the graph was the independent variable recorded? The dependent variable? What conclusions can you draw from your graph?

4f. Use the graph you constructed to interpolate and extrapolate what the periods would be for the amplitudes listed on page 18 of the SDRB. Note any patterns.

Continued on next page

Activity 4: How Does Amplitude Affect the Period of a Pendulum?, Continued

Check Your Understanding

On pages 19 and 20 of the SDRB, answer the four questions to Check Your Understanding of Activity 4.

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