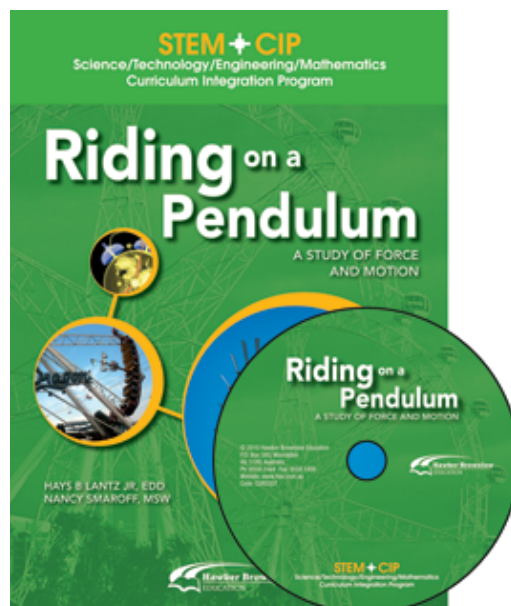


# STEM-CIP: Riding on a Pendulum (Complete Set)

Author(s): Hays B Lantz, Nancy Smaroff

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<b>ISBN:</b>	978 1 74239 529 6
<b>Code:</b>	CUR5263
<b>RRP:</b>	\$199.00
<b>Format:</b>	154-page A4 binder, CD-ROM
<b>Age Group:</b>	Years 5–10
<b>Learning Areas:</b>	Science; Maths; Technology
<b>Categories:</b>	Inquiry Learning; Activities and Exercises



## Summary:

The revolutionary new practice of STEM teaches the related disciplines of Science, Technology, Engineering and Mathematics as one unit, emphasising their close relationship, rather than separately as in the past. In this Forces and Motion module, students learn how to plan and conduct well-designed experiments through a study of periodic motion, gravitational attraction, kinetic and potential energy, and pendulum systems.

Students conduct experiments on a pendulum based upon three independent variables. Their task is to write an engineering report and construct a model of a pendulum ride for an amusement park. As an extension, they design and conduct investigations on pendulums on the moon and compare the results to the behaviour of pendulums on Earth.

This binder and CD-ROM set holds the complete *Riding on a Pendulum* unit – Teacher's Guide, containing background information, questions and answers, and classroom implementation instructions; Student Curriculum Module, the primary student text containing information, readings and instructions; and the Student Data and Response section, where students record and evaluate their work as they progress.

The CD-ROM contains PowerPoint presentations that serve as visual enhancements to the activities, and a complete copy of the contents of the binder in PDF form for ease of reproduction.

## Related Resources:

- *STEM CIP: Motoring with Magnets: Complete Set* (CUR5261)
- *STEM CIP: 3-2-1 Lift Off: Complete Set* (CUR5262)
- *STEM CIP: Chip Off the Old Block: Complete Set* (CUR5260)
- *STEM CIP: The Great Mixing Bowl: Complete Set* (CUR5264)

**Hawker Brownlow**  
EDUCATION  
PO Box 580  
Moorabbin VIC 3189  
Tel: +61 3 8558 2444  
Fax: +61 3 8558 2400  
Web: [www.hbe.com.au](http://www.hbe.com.au)  
Email: [orders@hbe.com.au](mailto:orders@hbe.com.au)

# Riding on a Pendulum – Module Overview

**Student challenge: Design a pendulum-type amusement park ride rated highly for its “thrill factor”.**

<p><b>Module Intent</b> Design and conduct well-defined scientific investigations</p>	<p><b>Module Science Concepts</b></p> <ul style="list-style-type: none"> <li>• Periodic force, harmonic motion</li> <li>• Gravity</li> </ul>	<p><b>Module Maths Concepts</b></p> <ul style="list-style-type: none"> <li>• Independent vs. Dependent variables</li> <li>• Types of graphs</li> <li>• Formula for period of a pendulum</li> <li>• Finding a variance</li> </ul>
<p><b>Module Engagement</b> Introduce module engagement.</p>	<p><b>Activity 4: How does Amplitude Affect Period?</b> <i>Structured Inquiry – Introduces the students to the influence of amplitudes on the period of a pendulum</i> <b>Concepts:</b> Well-structured investigation. Graphing.</p>	<p><b>Module Extension: Effects of Gravity</b></p> <p><b>Activity 8: Galileo and the Pendulum</b> <i>Guided Inquiry – Students compare their findings and confirm or refute Galileo’s findings</i> <b>Concepts:</b> Effects of the force of gravity</p>
<p><b>Scientific Investigation</b></p> <p><b>Activity 1: Components of a Pendulum</b> <i>Structured Inquiry – Design, construct and create scientific drawing of a pendulum</i> <b>Concepts:</b> Read to perform a task.</p>	<p><b>Activity 5: How does Mass Affect the Period of a Pendulum?</b> <i>Guided Inquiry – Students conduct repeated trials to validate their hypotheses about mass and the period of a pendulum.</i> <b>Concepts:</b> Well-structured investigation. Data table organisation.</p>	<p><b>Activity 9: Pendulum on the Moon</b> <i>Structured Inquiry – Students explore how a pendulum would behave on the moon</i> <b>Concepts:</b> Force of gravity</p>
<p><b>Activity 2: Amplitude of a Pendulum</b> <i>Structured Inquiry – Students discover the concept of amplitude through observing the motions of a pendulum they built in Activity 1</i> <b>Concepts:</b> Amplitude, Independent vs. Dependent variables</p>	<p><b>Activity 6: How does Length Affect the Period of a Pendulum?</b> <i>Guided Inquiry – Pendulums of varying lengths are investigated</i> <b>Concepts:</b> Well-structured investigation. Dependent vs. Independent variables. Formula for the period of a pendulum.</p>	<p><b>Activity 10: Riding on a Pendulum</b> <i>Guided Inquiry – Students explore what creates the “thrill factor” on amusement park rides</i> <b>Concepts:</b> Relate riding on a pendulum swing to microgravity</p>
<p><b>Activity 3: Period of a Pendulum</b> <i>Structured Inquiry: Data are collected on the period of the pendulum through individual and, then, repeated trials</i> <b>Concepts:</b> Calculated period of pendulum. What is variance and how do you calculate it?</p>	<p><b>Design and Engineering</b></p> <p><b>Activity 7: Engineering your Pendulum</b> <i>Guided Inquiry: Design a Pendulum Thrill Ride</i> <b>Concepts:</b> Engineering Process</p>	