

Keeping Time with Big Ben



Some Ideas You Can Use: The Components of a Pendulum

The picture at right shows the components of a pendulum. The three main parts of a pendulum that might affect the period of the pendulum are the pivot point, the pendulum bob, and the massless rod or string connected to the pendulum bob and anchored at the pivot point. We assume the rod or string is massless when the mass of the pendulum bob is much larger than the mass of the rod or string.

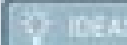
When the pendulum is hanging straight down, we say the bob is at the **equilibrium position**. When we pull the pendulum back from the equilibrium position, the angle the pendulum makes is called the **amplitude**. When the pendulum bob is released, the pendulum will swing back and forth around the equilibrium position.



Some things I know from what I read...



Keeping Time with Big Ben



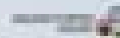
Some Ideas You Can Use: Simple Harmonic Motion

Pendulums, such as the one found within Big Ben, are part of a class of objects that undergo **simple harmonic motion**. An object in simple harmonic motion moves back and forth about the equilibrium position. When a pendulum is not moving, the bob will rest (or hang motionless) at the equilibrium position. When an outside force moves the bob from its equilibrium position, a restoring force causes the object to move back toward its equilibrium position. This process is then repeated multiple times as the bob swings back and forth. This motion is referred to as simple, because after the initial force to move the bob from equilibrium, the only forces acting on the bob are the restoring force and the tension in the string.

There are several ways to describe the motion of the pendulum. One of the most common is to measure the **period (T)** of the pendulum, which is the time (measured in seconds) it takes to make one complete swing from the starting position and back. The picture at right shows a pendulum making a complete swing.



Some things I know from what I read...



Argument Driven Inquiry

Shasha Hu



Argument Driven Inquiry:

Argument-driven Inquiry in Physics Todd Hutner, Victor Sampson, Daniel FitzPatrick (Clinical assistant professor of mathematics), 2020 Are you interested in a three dimensional approach to helping your high school physics students learn the practices of science including constructing explanations and engaging in argument from evidence By using argument driven inquiry ADI for high school physics lab instruction you can do just that Argument Driven Inquiry in Physics Volume 2 provides the information and instructional materials you need to start using this method right away for electricity and magnetism investigations The book is a one stop source of expertise advice and lessons to help physics students work the way scientists do The book is divided into three parts An introduction to argument driven inquiry and how to use the labs You ll learn about the stages of ADI from question identification data analysis and argument development and evaluation to double blind peer review and report revision A well organized series of 17 field tested labs designed to be much more authentic for instruction than traditional laboratory activities The labs cover a variety of topics including electrostatics electric current capacitors resistors and circuits and magnetic fields and electromagnetism Introduction labs acquaint students with new content Application labs encourage deeper exploration of the use of a theory law or unifying concept Helpful appendixes These range from timeline options to peer review guides and teacher scoring rubrics including ones for AP physics ADI in Physics Volume 2 is a follow up to ADI in Physics Volume 1 Mechanics Lab Investigations for Grades 9 12 Both are part of the NSTA Press series for ADI in biology chemistry life science and physical science The authors understand your time constraints so they designed the books with easy to use lab handouts student pages teacher notes and checkout questions The labs also support three dimensional instruction helping students learn the science practices crosscutting concepts and core ideas found in the Next Generation Science Standards The labs also support student learning of standards in both algebra and calculus based AP Physics courses In addition they offer ways for students to develop the disciplinary skills outlined in the Common Core State Standards Many of today s high school teachers like you are seeking new ways to engage students in science practices and help students learn more from lab activities ADI in Physics Volume 2 does all of this while also giving your students the chance to practice reading writing speaking and using math in the context of science

Argument-driven Inquiry in Fifth-grade Science Victor Sampson, Todd Hutner, Jonathon Grooms, Carrie Burt, Jennifer Jordan-Kaszuba, 2020-08-05 Are you interested in helping your elementary students learn the practices of science including constructing explanations and engaging in argument from evidence Argument Driven Inquiry in Fifth Grade Science will provide you with both the information and instructional materials you need to get started right away The book is a one stop source of expertise advice and investigations It s designed to help your fifth graders work the way scientists do while integrating literacy and math at the same time Argument Driven Inquiry in Fifth Grade Science is divided into two basic parts 1 An introduction to the stages of ADI from question identification data analysis and argument development to evaluating and

revising ideas 2 A well organized series of 16 field tested investigations designed to be much more authentic for instruction than traditional activities The focus is on making sense of how the world works Investigations cover matter and its interactions motion and stability ecosystems and their interactions energy and dynamics Earth s place in the universe and Earth s systems Using the Student Workbook your students will explore important content and discover scientific practices They ll investigate questions such as What happens to a substance s weight when transforming from a solid to a liquid Where does the matter that plants need to grow come from Why do days change length in different locations on Earth And why do people use hot water instead of cold when making tea This book is part of NSTA s bestselling series about ADI in elementary middle and high school science Like its predecessors this collection is designed to be easy to use with teacher notes investigation handouts and checkout questions The lessons support the Next Generation Science Standards and the Common Core State Standards for English language arts and mathematics The book can also help emerging bilingual students meet the English Language Proficiency Standards with its tips for teaching English language learners Many of today s elementary school teachers like you want new ways to engage students in scientific practices and help students learn more from classroom activities Argument Driven Inquiry in Fifth Grade Science does all of this while giving students the chance to practice reading writing speaking and using mathematics in the context of science *Argument-Driven Inquiry*

Three-Dimensional Investigations for Biology Victor Sampson, 2024-12 This book includes eight ADI investigations for high school biology Each investigation is designed as a standalone lesson allowing you to decide which and when to use them during the academic year All of the investigations are aligned with at least one of the Texas Disciplinary Core Ideas TEKS one of the Texas Recurring Themes and Concepts TEKS and a majority of the Texas Science and Engineering Practices TEKS for high school biology

Argument-Driven Inquiry in Physical Science Jonathon Grooms, Patrick J. Enderle, Todd Hutner, Ashley Murphy, Victor Sampson , 2016-10-01 Are you interested in using argument driven inquiry for middle school lab instruction but just aren t sure how to do it Argument Driven Inquiry in Physical Science will provide you with both the information and instructional materials you need to start using this method right away The book is a one stop source of expertise advice and investigations to help physical science students work the way scientists do The book is divided into two basic parts 1 An introduction to the stages of argument driven inquiry from question identification data analysis and argument development and evaluation to double blind peer review and report revision 2 A well organized series of 22 field tested labs designed to be much more authentic for instruction than traditional laboratory activities The labs cover four core ideas in physical science matter motion and forces energy and waves Students dig into important content and learn scientific practices as they figure out everything from how thermal energy works to what could make an action figure jump higher The authors are veteran teachers who know your time constraints so they designed the book with easy to use reproducible student pages teacher notes and checkout questions The labs also support today s standards and will help your students

learn the core ideas crosscutting concepts and scientific practices found in the Next Generation Science Standards In addition the authors offer ways for students to develop the disciplinary skills outlined in the Common Core State Standards Many of today s middle school teachers like you want to find new ways to engage students in scientific practices and help students learn more from lab activities Argument Driven Inquiry in Physical Science does all of this while also giving students the chance to practice reading writing speaking and using math in the context of science **Student Lab Manual for Argument-Driven Inquiry in Earth and Space Science** Victor Sampson,Ashley Murphy,Todd L. Hutner,Kemper Lipscomb,2018-04 Are you interested in using argument driven inquiry for middle and high school lab instruction but just aren t sure how to do it Argument Driven Inquiry in Earth and Space Science is a one stop source of expertise advice and investigations to help Earth and space science students work the way scientists do Student Workbook for Argument-Driven Inquiry in Third-Grade Science Victor Sampson,Ashley Murphy,2019-05-10 These 14 field tested lessons cover motion and stability molecules and organisms heredity biological evolution and Earth s systems Your students will explore questions ranging from why wolves live in groups to how the climate changes as one moves from the equator toward the poles Student Lab Manual for Argument-Driven Inquiry in Physical Science Jonathon Grooms,Patrick J. Enderle,Todd Hutner,Victor Sampson ,2016-10-01 Are you interested in using argument driven inquiry for middle school lab instruction but just aren t sure how to do it Argument Driven Inquiry in Physical Science will provide you with both the information and instructional materials you need to start using this method right away The book is a one stop source of expertise advice and investigations to help physical science students work the way scientists do Student Lab Manual for Argument Driven Inquiry in Life Science provides the student materials you need to guide your students through these investigations With lab details student handouts and safety information your students will be ready to start investigating Argument-driven Inquiry in Fourth-grade Science Victor Sampson,Ashley Murphy,2019 Are you interested in helping your elementary students learn the practices of science including constructing explanations and engaging in argument from evidence Argument Driven Inquiry in Fourth Grade Science will provide you with both the information and instructional materials you need to get started right away The book is a one stop source of expertise advice and investigations It s designed to help your fourth graders work the way scientists do while integrating literacy and math at the same time Argument Driven Inquiry in Fourth Grade Science is divided into two basic parts 1 An introduction to the stages of ADI from question identification data analysis and argument development to evaluating and revising ideas 2 A well organized series of 15 field tested investigations designed to be much more authentic for instruction than traditional activities The investigations cover energy waves and their application in technologies for information transfer molecules and organisms and Earth s place in the universe and systems Using the Student Workbook your students will explore important content and discover scientific practices They can investigate questions such as these How does the energy of a moving object change after a collision How can you make an electric car

move faster And why do big waves block the entrance to some New Zealand harbors This book is part of NSTA s best selling series about ADI in middle school and high school science Like its predecessors this collection is designed to be easy to use with teacher notes investigation handouts and checkout questions The lessons also support the Next Generation Science Standards and the Common Core State Standards for English language arts and mathematics The book can also help emerging bilingual students meet the English Language Proficiency Standards Many of today s elementary school teachers like you want new ways to engage students in scientific practices and help students learn more from classroom activities Argument Driven Inquiry in Fourth Grade Science does all of this while giving students the chance to practice reading writing speaking and using mathematics in the context of science

Student Workbook for Argument-Driven Inquiry in Fourth-Grade Science Victor Sampson,Ashley Murphy,2019-07-02

Are you interested in helping your elementary students learn the practices of science including constructing explanations and engaging in argument from evidence Argument Driven Inquiry in Fourth Grade Science will provide you with both the information and instructional materials you need to start right away The book is a one stop source of expertise advice and investigations It s designed to help your third graders work the way scientists do while integrating literacy and math at the same time With the Student Workbook for Argument Driven Inquiry in Fourth Grade Science you ll have all the student materials you need to guide your students through these investigations It provides lab details safety information and handouts to get your students ready to start investigating It presents a well organized series of 15 field tested investigations designed to be much more authentic for instruction than traditional activities The investigations cover energy waves and their application in technologies for information transfer molecules and organisms and Earth s place in the universe and systems Students can investigate questions such as these How does the kinetic energy of a moving object change after a collision How can you make an electrical car move faster And why do big waves block the entrance to some New Zealand harbors The Student Workbook book is part of NSTA s best selling series about ADI in middle school and high school science Like its predecessors this collection is designed to be easy to use The lessons also support the Next Generation Science Standards and the Common Core State Standards for English language arts and mathematics The book can also help emerging bilingual students meet the English Language Proficiency Standards Many of today s elementary school teachers like you want new ways to engage students in scientific practices and help students learn more from classroom activities Argument Driven Inquiry in Fourth Grade Science with its accompanying Student Workbook does all of this while giving students the chance to practice reading writing speaking and using mathematics in the context of science

Argument-driven Inquiry in Earth and Space Science Victor Sampson,Ashley Murphy,Kemper Lipscomb,Todd Hutner,2018 If you re looking for labs that cover Earth and space science appeal to middle and high school students and use Argument Driven Inquiry ADI your search is over Argument Driven Inquiry in Earth and Space Science provides 23 field tested labs that cover the universe Earth and weather It also

helps you make the instructional shift to ADI This innovative approach to inquiry prompts students to use argument to construct support and evaluate scientific claims The book starts with guidance on how to use ADI Then it provides labs that cover five disciplinary core ideas in Earth and space science Earth s place in the universe the history of Earth Earth s systems weather and climate and Earth and human activity Your students will explore important content and discover scientific practices They can investigate everything from how the seasons work to what causes geological formations and even consider where NASA should send a space probe next to look for signs of life This volume is the latest in NSTA s teacher friendly ADI series The authors are veteran teachers who know the importance of connecting all investigations to today s standards and of providing the information and instructional materials you need in one useful resource that combines literacy math and science Use these new investigations to help students develop science proficiency by figuring out how and why things work not just learning theories and laws

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In a time characterized by interconnectedness and an insatiable thirst for knowledge, the captivating potential of verbal expression has emerged as a formidable force. Its capability to evoke sentiments, stimulate introspection, and incite profound transformations is genuinely awe-inspiring. Within the pages of "**Argument Driven Inquiry**," a mesmerizing literary creation penned with a celebrated wordsmith, readers set about an enlightening odyssey, unraveling the intricate significance of language and its enduring impact on our lives. In this appraisal, we shall explore the book's central themes, evaluate its distinctive writing style, and gauge its pervasive influence on the hearts and minds of its readership.

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