



Centre Pointe Learning, Inc.
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Welcome to **PRISMS PLUS**, the comprehensive high school physics curriculum you have been waiting for.

PRISMS PLUS for students provides 44 complete learning cycles in four unit books. Each learning cycle includes original laboratory activities for exploration, concept development, and application plus the concept enhancer and conceptual practice support materials students need to complete their understanding.

The comprehensive **PRISMS PLUS** teacher resources assist you in providing the learning environment you want where students can fully develop and apply their understanding of physics concepts.

PHILOSOPHY AND OBJECTIVES

PRISMS, which stands for Physics Resources and Instructional Strategies for Motivating Students, began in 1987 as a collection of high-interest activities related to real-life experiences of high school physics students. **PRISMS PLUS** utilizes an enhanced learning cycle pedagogy in which students engage in explorations prior to introduction of abstract concepts. After the concepts have been introduced within the context of these explorations, students then are provided with additional activities that are opportunities to apply what they have learned to real-life experiences.

PRISMS PLUS includes activities and exercises that are designed to develop conceptual understanding of the major physics ideas being introduced, engage students in scientific inquiry, and cultivate scientific reasoning and problem-solving skills.

THE ORIGINAL PRISMS

The original PRISMS, made available to teachers through a variety of funding sources including the National Science Foundation and the Department of Education, consisted of a teacher's manual and a computer test bank. The PRISMS teacher manual contained approximately 130 student activities accompanied by corresponding teacher notes. The materials encompassed an entire year of high school physics instruction. The original PRISMS manual was not designed to

replace textbooks, but rather to provide teachers with resources ideas and instructional strategies. The PRISMS computer test bank, available in Macintosh and PC format, contained over 2,000 questions. These questions were keyed to common objectives found in most high school physics courses and were ranked by levels of reasoning according to Bloom's Taxonomy. The PRISMS manual and test bank were made available through the University of Northern Iowa Physics Department.

PRISMS PLUS ENHANCED VERSION OF THE ORIGINAL PRISMS

The focus of the new **PRISMS PLUS** is complete learning cycles. A complete learning cycle is one that provides fully integrated experiences that enable students to develop not only their problem-solving and inquiry skills but also a deep, long-lasting understanding of physics concepts.

PRISMS PLUS consists of 44 learning cycles that are divided into the following units:

Force and Motion (14 learning cycles)

Work and Energy (8 learning cycles)

Waves and Optics (12 learning cycles)

Electricity, Magnetism, and Modern Physics (10 learning cycles)

Both student and teacher materials for these units will be available in unit format by Centre Pointe Learning, Inc.

PRISMS PLUS, like the original PRISMS materials, utilizes inexpensive materials with an activity-based pedagogy to generate interest and enthusiasm among students and teachers for the study of physics. Materials also provide opportunities for students to use instructional technologies such as computer- and calculator-based laboratory tools. And, with **PRISMS PLUS**, students can extend their understanding of the physics concepts introduced in the learning cycles with additional activities that use Constructing Physics Understanding (CPU) computer simulation software. To complete the plus in **PRISMS PLUS**, the test bank is an expanded version of the original PRISMS test bank.

STUDENT MATERIALS

Multiple activities carefully ordered, targeted concept support materials, and software exercises make **PRISMS PLUS** the curriculum your students need.

Three Types of Activities

Exploration, concept development, and application, present students with problems that engage them in scientific inquiry and call them to apply their observations to the concepts being introduced and to real-life applications. In the exploration activities, students make predictions and observations and discover patterns and relationships. The concept development activities provide opportunities for students to develop concepts within the context of what they have observed. The application activities provide students with a means to apply their

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understanding of concepts to new situations and real-life problems.

Each activity includes questions that provide a focus for students to link their observations and data with physics ideas and concepts. These questions also provide an opportunity for students to reflect on what they have learned and observed. Each activity also includes an extension that provides students with suggestions to make further observations, collect data, and arrive at evidence-based conclusions about the concepts being addressed.

Concept Support Materials

Each learning cycle's *Concept Enhancer* is a one- to three-page student reading that contains references to observations and connections between concepts and phenomena that students should have shared in the exploration and concept development activities. Other relevant examples are also provided and discussed. The Concept Enhancer is carefully written to help facilitate the transition students must make from the observations they have made and the patterns and relationships they have discovered in the exploration activity to the development of the desired concept in the concept development activity.

Conceptual Practice exercises provide students with opportunities to use their newly acquired knowledge and skills to analyze additional situations. These exercises give students practice in answering questions and solving problems that are conceptual in nature.

The Concept Enhancer and Conceptual Practice immediately follow the exploration and concept development activities but come prior to the application activity.

Constructing Physics Understanding (CPU) Student Workbook

The CPU activity workbook is a collection of activities that use CPU computer simulation software to provide additional learning opportunities for students that complement and extend the learning cycles. They offer students virtual opportunities to apply their understanding to investigations that are not possible in the actual classroom.

TEACHER'S GUIDE MATERIALS

Each unit Teacher Guide provides learning cycle teaching notes, activity teaching notes and answers, safety guidelines, blackline masters, and unit material lists and assessment resources are provided for teachers in the Teacher's Guides.

Learning Cycle Teacher Notes

These teacher notes provide you with information and strategies on how to begin and how to wrap up a learning cycle.

Getting Started teacher notes provide the following:

An overview of the concepts that will be introduced and the activities that make up the learning cycle.

National Science Education Standards (5-8 and 9-12) and Benchmarks for Science

Literacy (6-8 and 9-12) that are being addressed.

Prerequisite knowledge and skills needed by students to complete the learning cycle.

Suggestions for setting the stage for student learning that focus on problems, issues, or questions about phenomena that are interesting and/or familiar to students. These suggestions provide students with a sense of what they are about to do in the learning cycle.

Information for taking account of student ideas that are commonly held about physical phenomena related to the learning cycle. This information contains suggestions on how to help students confront inconsistencies in their previously held ideas and their observations.

Wrapping It Up teacher notes provide the following:

Suggestions on building the case and promoting student reflection. After completing the learning cycle, students can draw from their experiences to develop an evidence-based argument for the Standards or Benchmarks that have been addressed. This section also provides suggestions on how student understanding can be assessed. It contains suggestions on how the students can reflect on what they have learned, how their initial ideas have changed, and how they can use their understanding in new situations.

Thought-provoking questions and suggestions for extending student knowledge and promoting open inquiry. This section includes further investigations students might conduct that would allow them to apply their understanding to new observations and situations.

Activity Teaching Notes and Answers

Specific activity teaching notes and answers to student edition questions are provided. This section includes the following:

Information to help teachers to make informed decisions on how the activity could be

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implemented and adapted for their classrooms

Information about the ease of lab setup and calculations, the reliability and interest level, and the scientific process and reasoning skills being used

A list of materials used in the activity, how to set up the materials, teaching strategies, and sample data/calculations

Answers to questions asked in the activities and extensions as well as sample data

Answers to the questions and solutions to the problems posed in the Conceptual Practice

PRISMS PLUS Test Bank

The **PRISMS PLUS** computer test bank contains objectives as well as questions related to the concepts being introduced in each of the learning cycles. This enhanced version of the original PRISMS computer test bank has been made more user-friendly for both PC and Macintosh users.

Now some of the activities as well as activity extensions can be used as performance assessments to assess student understanding and proficiency in both scientific process and physics related skills.

FOR ADDITIONAL INFORMATION

More information may be obtained from the PRISMS web page at <http://www.prisms.uni.edu/>. For ordering information and additional product information contact Centre Pointe Learning, Inc. at 1.888.471.4545 or at Centre Pointe's website at <http://www.cplearning.com>.

Information about professional development opportunities involving **PRISMS PLUS** may be obtained by clicking on the appropriate link found on the web page.

Unit 1 FORCE AND MOTION

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1. Kinematics
2. Making tracks
3. Accelerating Tracks
4. Vector Vector, What's My Vector?
5. Relative Motion
6. Static Equilibrium
7. Inertia
8. Newton's Second Law
9. Using Graphs to Understand Newton's Second Law
10. Weight
11. Newton's Third Law
12. Impulse and Change in Linear Momentum
13. Conservation of Linear Momentum
14. Projectile Motion

UNIT 2 WORK AND ENERGY

1. Work
2. Power
3. Conservation of Energy
4. Heat and Temperature
5. Change of Phase
6. Mechanical Equivalent of Heat
7. Ideal Gas Laws
8. Solar Energy

UNIT 3 WAVES AND OPTICS

1. Incandescence or Luminescence?
2. Inverse Square
3. Velocity, Frequency and Wavelength
4. Speed of Sound
5. Factors Affecting Frequency
6. Reflection
7. Refraction
8. Lenses
9. Image Size and Location
10. Diffraction and Interference
11. Color
12. Polarized Light

UNIT 4 ELECTRICITY, MAGNETISM, AND MODERN PHYSICS

1. Electrostatics
2. Electric Fields
3. Magnetic Fields
4. Electric Circuits
5. Ohm's Law
6. Capacitors
7. Motors
8. Generator
9. Radioactive Decay
10. Spectra and Energy

For further information please contact:

***Centre Pointe Learning, Inc. at 1.888.471.4545,
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