Warren County School District

PLANNED INSTRUCTION

COURSE DESCRIPTION

Course Title: Academic Physics

Course Number: 00350

Course Prerequisites: Functions or Functions Honors or Trigonometry with Integrated Algebra, or Probability and Statistics or taken concurrently or permission of principal.

Special Requirements: One additional lab period per week; calculator and computer based laboratory investigations

Course Description: (Include "no final exam" or "final exam required")
Physics, as a scientific discipline, is a study of the relationship between matter and energy. This course deals with the physical laws that describe the behavior of nature. Topics include force, motion, energy, momentum, wave mechanics, and electricity. An emphasis is placed on mathematical description of natural phenomena and on problem solving. Prerequisite: Functions or Functions Honors or Trigonometry with Integrated Algebra or Probability and Statistics or taken concurrently or permission of principal.

Suggested Grade Level: 12

Length of Course: _____ One Semester __X__ Two Semesters _____Other (Describe)

Units of Credit: 1 (Insert ***NONE*** if appropriate.)

PDE *Certification and Staffing Policies and Guidelines (CSPG)* Required Teacher Certification(s)
(Insert certificate title and CSPG#) Physics

Certification verified by WCSD Human Resources Department:
__X__ Yes _____ No

Board Approved Textbooks, Software, Materials:
Title:
Publisher:
ISBN #:
Copyright Date:
Date of WCSD Board Approval:

BOARD APPROVAL:

Date Written: September 2009

Date Approved: _____

Implementation Year: _____

Suggested Supplemental Materials: (List or insert **None**)
None

Course Standards

PA Academic Standards: (List by Number and Description)

3.1.12 Unifying Themes
- A. Apply concepts of systems, subsystems, feed back and control to solve complex technological problems.
- B. Apply concepts of models as a method to predict and understand science and technology.
- C. Assess and apply patterns in science and technology.
- D. Analyze scale as a way of relating concepts and ideas to one another by some measure.
- E. Evaluate change in nature, physical systems and man made systems.

3.2.12 Inquiry and Design
- A. Evaluate the nature of scientific and technological knowledge.
- B. Evaluate experimental information for appropriateness and adherence to relevant science processes.
- C. Apply the elements of scientific inquiry to solve multi-step problems.
- D. Analyze and use the technological design process to solve problems.

3.4.12 Physical Science, Chemistry and Physics
- C. Apply the principals of motion and force.

3.7.12 Technological Devices
- A. Apply advanced tools, materials and techniques to answer complex questions.
- B. Evaluate appropriate instruments and apparatus to accurately measure materials and processes.

WCSD Academic Standards: (List or **None**)
None

Industry or Other Standards: (List, Identify Source or **None**)
None

WCSD EXPECTATIONS

WCSD K-12 Expectations for instruction in writing, reading, mathematics and, technology have been developed and revised annually. The teacher will integrate all WCSD Expectations into this planned instruction.

SPECIAL EDUCATION AND GIFTED REQUIREMENTS

The teacher shall make appropriate modifications to instruction and assessment based on a student's Individual Education Plan (IEP) or Gifted Individual Education Plan (GIEP).

SPECIFIC EDUCATIONAL OBJECTIVES/CORRESPONDING STANDARDS AND ELIGIBLE CONTENT WHERE APPLICABLE

(List Objectives, PA Standards #'s, Other Standards (see samples at end))

ASSESSMENTS

PSSA Assessment Anchors Addressed: This course is written to the 12th grade standards. No assessment anchors have been written for this level.

Suggested Formative Assessments: The teacher will develop and use standards-based assessments throughout the course.

- Pre-Assessments of prior knowledge (e.g. entrance cards or KWL chart)
- Labs/lab reports
- Bell ringers/Problems of the Day(PODs)
- Discussions
- Teacher observation/Questioning
- Graphic organizers (e.g. Venn diagrams, word mapping, webbing, KWL chart, etc.)
- Summarizing
- Retelling
- Note taking
- Problem-based learning modules
- Authentic assessment
- Oral presentations
- Outlining
- Journaling
- Student presentations/projects
- Open-ended response
- Quizzes/tests
- Activities
- Classroom Performance System (CPS)
- White boards

Suggested Summative Assessments:

- Essays
- Open-Ended Responses
- Projects
- Quizzes/tests
- Student presentations
- Portfolios
- Lab Practical
- Lab Report

District Approved Assessment Instruments

- PSSA Tests-Grades 4, 8 and 11 only

Differentiated Instructional Assessment Strategies

Portfolio Assessment: _____ Yes __X__ No

District-wide Final Examination Required: _____ Yes __X__ No

Course Challenge Assessment (Describe):

REQUIRED COURSE SEQUENCE AND TIMELINE

(Content must be tied to objectives)

Content Sequence	Dates
A. Conventions of Measurement	**2 Weeks**
B. Kinematics	**8 Weeks**
1. Motion in One Dimension	
a. Displacement	
b Time.	
c. Velocity	
d. acceleration	
2. Motion in Two Dimensions	
a. Vectors	
(1). Motion	
(2). Force	
b. Projectiles	
C. Dynamics	**7 Weeks**
1. Newton's Laws of Motion	
a. First Law—Inertia	

b. Second Law F=ma
(1). Static (Net F = 0)
(2). Dynamic (Net = 0)
c. Third Law--Action/reaction
(1). Momentum
(2). Impulse
(3). Conservation of momentum

D. Energy **5 Weeks**
1. Work and Power
2. Kinetic and Potential Energy
3. Conservation of Energy

E. Circular motion **5 Weeks**
1. Rotational motion
a. Static
(1). Torque
b. Dynamics
2. Gravitational Forces and Field
a. Newton's Law of Universal Gravitation
b. Kepler's Three Laws of Motion
c. Special Theory

F. Periodic Motion **5 Weeks**
1. SHM
2. Wave Mechanics
a. Properties
b. Types
c. Interactions
3. Light
a. Optics
4. EM

G. Direct Current **3 Weeks**

H. Laboratory – **Once per Week**

Objectives:

A. Plan and conduct investigations, analyze and interpret data, and demonstrate scientific reasoning and logic as well as the use of models.
B. Apply physics to real world scenarios.
C. Investigate and understand the interrelationships among mass, distance, force and time.
D. Investigate and understand that quantities including, mass, energy, momentum, and charge are conserved.
E. Interpret wave phenomena and wave characteristics.
F. Diagram and construct basic electrical circuits and explain the functions of various circuit components.
G. Investigate and understand how to use the field concept to describe the effects of gravitational, electric, and magnetic forces.
I. Compare and contrast Newtonian physics and modern physics.

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WCSD STUDENT DATA SYSTEM INFORMATION

1. Is there a required final examination? __X__ Yes _____ No
2. Does this course issue a mark/grade for the report card?

   __X__ Yes _____ No
3. Does this course issue a Pass/Fail mark? _____ Yes __X__ No
4. Is the course mark/grade part of the GPA calculation?

   __X__ Yes _____ No
5. Is the course eligible for Honor Roll calculation? __X__ Yes _____ No
6. What is the academic weight of the course?

   _____ No weight/Non credit __X__ Standard weight

   _____ Enhanced weight (Describe)