Berrien Springs High School
Physics
Course Syllabus
Fall 2013 – Spring 2014

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Course Textbook:	Holt Physics

COURSE DESCRIPTION:

- The purpose of this course is to introduce physics to students with a wide range of backgrounds and abilities.
- This course shows how physics is related to the world around us.
- Conceptual development and quantitative applications are made, covering mechanics, properties of matter, energy, conservation laws, thermodynamics, waves, electricity and magnetism, optics, and modern physics.
- This course helps to prepare students for college or technical career paths by introducing them to logical problem solving, mathematical applications, and physical phenomena. Whatever their career pathway, students will gain a greater appreciation for the order and beauty of the universe.

COURSE OBJECTIVES:

- Motion and Stability: Forces and Interactions (Content Standard HS-PS2)
  Students should be able to answer the question, "How can one explain and predict interactions between objects and within systems of objects?" The disciplinary core idea is broken down into the sub ideas of Forces and Motion and Types of Interactions. The performance expectations focus on students building understanding of forces and interactions and Newton's Second Law. Students also develop understanding that the total momentum of a system of objects is conserved when there is no net force on the system. Students are able to use Newton's Law of Gravitation and Coulomb's Law to describe and predict the gravitational and electrostatic forces between objects. Students are able to apply scientific and engineering ideas to design, evaluate, and refine a device that minimizes the force on a macroscopic object during a collision. The crosscutting concepts of patterns, cause and effect, systems and system models, and structure and function are called out as organizing concepts for these disciplinary core ideas. Students are expected to demonstrate proficiency in planning and conducting investigations, analyzing data and using math to support claims, applying scientific ideas to solve design problems, and communicating scientific and technical information; and to use these practices to demonstrate understanding of the core ideas.

- Energy (Content Standard HS-PS3)
  Students formulate an answer to the question, "How is energy transferred and conserved?" The Core Idea is broken down into four sub-core ideas: Definitions of Energy, Conservation of Energy and Energy Transfer, the Relationship between Energy and Forces, and Energy in Chemical Process and Everyday Life. Energy is understood as quantitative property of a system that depends on the motion and interactions of matter and radiation within that system, and the total change of energy in any system is always equal to the total energy transferred into or out of the system. Students develop an understanding that energy at both the macroscopic and the atomic scale can be accounted for as either motions of particles or energy associated with the configuration (relative positions) of particles. In some cases, the energy associated with the configuration of particles can be thought of as stored in fields. Students also demonstrate their understanding of engineering principles when they design, build, and refine devices associated with the conversion of energy. The crosscutting concepts of cause and effect; systems and system models; energy and matter; and the influence of science, engineering, and technology on society and the natural world are further developed in the performance expectations. In these performance expectations, students are expected to demonstrate proficiency in developing and using models, planning and carry out investigations, using computational thinking and designing solutions; and to use these practices to demonstrate understanding of the core ideas.

- Waves and Their Applications (Content Standard HS-PS4)
  This core idea helps students answer the question, "How are waves used to transfer energy and send and store information?" The disciplinary core idea is broken down into Wave Properties, Electromagnetic Radiation, and Information Technologies and Instrumentation. Students are able to apply understanding of how wave properties and the interactions of electromagnetic radiation with matter can transfer information across long distances, store information, and investigate nature on many scales. Models of electromagnetic radiation as either a wave of changing electric and magnetic fields or as particles are developed and used. Students understand that combining waves of different frequencies can make a wide variety of patterns and thereby encode and transmit information. Students also demonstrate their understanding of engineering ideas by presenting information about how technological devices use the principles of wave behavior and wave interactions with matter to transmit and capture information and energy. The crosscutting concepts of cause and effect; systems and system models; stability and change; interdependence of science, engineering, and technology; and the influence of engineering, technology, and science on society and the natural world are highlighted as organizing concepts for these disciplinary core ideas. In the performance expectations, students are expected to demonstrate proficiency in asking questions, using mathematical thinking, engaging in argument from evidence and obtaining, evaluating and communicating information; and to use these practices to demonstrate understanding of the core ideas.

INSTRUCTIONAL PHILOSOPHY:

- Physics concepts will be presented by means of various methods, including classroom lectures, demonstrations, worksheets and laboratories. Students will be expected to demonstrate an understanding of material presented in class through both written and verbal means. Physics is learned by practice, therefore, students can expect daily assignments and weekly hands-on laboratory activities.
- Course work will be completed utilizing a combination of methods. Some course work will be completed independently in class and at home, other work will be done

in small cooperative groups. Students are encouraged to assist each other in their understanding of the subject matter. By discussion, debate, and teaching others the students will increase their knowledge of the subject.

STUDENT ASSESSMENT:
Student will be evaluated through a combination of Unit Exams, Quizzes, Homework, Worksheets and Laboratories.

Marking period grades will be apportioned as follows:

- Homework 20 %
- Group worksheets and laboratories 20 %
- Quizzes 20 %
- Unit Exams 40 %

The semester grade will be weighted as 80% regular marking period grades and 20% Final Exam grade.

COURSE SCHEDULE:

Marking Period One Topics:
- Chapter 1: Introduction to Physics and Mathematical Background
- Chapter 2: One-dimensional Motion
- Chapter 3: Two-dimensional Motion
- Chapter 4: Forces
- Chapter 5: Work and Energy

Marking Period Two Topics:
- Chapter 6: Impulse and Momentum
- Chapter 7: Circular Motion
- Chapter 11: Harmonic Motion and Waves
- Chapter 12: Sound Waves

CLASSROOM EXPECTATIONS:
Students are expected to:
- Complete all assignments in a timely manner, showing all work
- Be in class daily, on time!
- Bring books, notes, assignments and pencils everyday
- Keep all notes and graded assignments organized in a three-ring binder
- Take care of school materials such as calculators and protractors, and return them to their correct places at the end of each class period
- Ask questions if needed
- Be considerate of others