



Mechanical Physics Syllabus
CHS Science Department

Contact Information: Parents may contact me by phone, email, or visiting the school.

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Teacher Contact Websites:

- Google Classroom

CCSD Vision Statement: The Chillicothe City School District will provide tomorrow's leaders with a high quality education by developing high expectations and positive personal relationships among students, staff, and community members.

CCSD Mission Statement: The Chillicothe City School District empowers students to learn, to lead, and to serve.

Course Description and Prerequisite(s) from Course Handbook:

Mechanical Physics - 330

State Course #: 130302

Prerequisite: Algebra II completed or in progress; Chemistry recommended or can be taken concurrently. Waves & Electromagnetism is not a prerequisite for this class.

Elective

Grade: 10-12

Graded Conventionally

Credit: ½

Course Description:

This Physics course will elaborate on the study of the key concepts of motion, forces and mechanical energy as they relate to increasingly complex systems and applications that will provide a foundation for further study in science and scientific literacy. Students engage in investigations to understand and explain motion, forces and mechanical energy in a variety of inquiry and design scenarios that incorporate scientific reasoning, analysis, communication skills and real-world applications. **There is a \$15 lab fee.**

Learning Targets: Defined below for clarity are the Unit Titles, Big Ideas of every Unit taught during this course, and the Essential Questions to be answered to better understand the Big Ideas. A student's ability to grasp and answer the Essential Questions will define whether or not he or she adequately learns and can apply the skills found in Big Ideas. This will ultimately define whether or not a student scores well on assessments administered for this course.

- **1st or 3rd Quarter**
 - **Unit I Title: Motion in One Dimension**
 - **Big Idea #1:** I can summarize how motion can be documented by calculating velocity.
 - *Essential Question #1: How do I determine the displacement of an object as it travels between two points?*
 - *Essential Question #2: How do I calculate the velocity of an object using a given equation or a position vs time graph?*
 - **Big Idea #2:** I can cite evidence to illustrate how acceleration shows changes in motion.
 - *Essential Question #1: How do I document the changes of an object's motion over a given time with equations or velocity vs time graphs?*
 - *Essential Question #2: How do I analyze the effects of gravity on falling objects?*
 - *Essential Question #3: How do I combine the horizontal and vertical components of motion to determine the path of a projectile?*
 - **Unit II Title: Forces in One Dimension**
 - **Big Idea #1:** I can analyze how Newton's laws dictate the forces that influence motion.
 - *Essential Question #1: How do I describe the property of inertia in objects to predict their change in motion?*
 - *Essential Question #2: How do I calculate the force on an object using Newton's Second Law?*
 - **Big Idea #2:** I can use vectors and force diagrams to represent the different forces on an object.
 - *Essential Question #1: How do I draw all the forces that act upon an object?*
 - *Essential Question #2: How do I add and subtract vectors to determine the net force on an object?*
 - **Big Idea #3:** I can explain how gravity and friction affect all objects on Earth.
 - *Essential Question #1: How do I determine the force of gravity that exists between any two objects?*
 - *Essential Question #2: How do I calculate the different types of frictional forces and their effects on moving objects?*
- **2nd or 4th Quarter**
 - **Unit III Title: Forces in 2 dimensions**
 - **Big Idea #1:** I can demonstrate and calculate how force vectors in 2 dimensions can be added together or broken apart.
 - *Essential Question #1: How do I illustrate the net force acting on an object in 2 dimensions?*
 - *Essential Question #2: How do I use trigonometric functions to determine the net force or component forces acting on an object?*
 - **Big Idea #2:** I can assess how circular motion happens and can calculate the needed to create that circular motion.

- *Essential Question #1: How do I explain what happens to an object during circular motion?*
- *Essential Question #2: How do I calculate centripetal acceleration and force for a given object?*
- **Big Idea #3:** I can analyze and calculate momentum and the vectors associated with it.
 - *Essential Question #1: How do I describe and calculate momentum?*
 - *Essential Question #2: How do I use the conservation of momentum to describe how it is conserved between moving objects?*
 - *Essential Question #3: How do I describe and calculate impulse for a given example?*
- **Unit IV Title: Work, Power, and Energy**
 - **Big Idea #1:** I can assess how gravitational potential energy, elastic potential energy, and nuclear energy are connected to the idea of stored energy.
 - *Essential Question #1: How do I describe how gravitational potential energy is transferred and interacts with other forms of energy?*
 - *Essential Question #2: How do I calculate elastic potential energy?*
 - *Essential Question #3: How do I predict the products of a nuclear reaction and calculate energy changes?*
 - **Big Idea #2:** I can I can investigate what is meant by the Law of Conservation of energy and show that it is correct through calculations.
 - *Essential Question #1: How do I explain the law of conservation of energy?*
 - *Essential Question #2: How do I describe and calculate the energy transformation in a given system?*
 - **Big Idea #3:** I can calculate work and power and differentiate between them.
 - *Essential Question #1: How do I calculate work?*
 - *Essential Question #2: How do I calculate power?*
- **END OF COURSE EXAM**

Course Materials:

- Google Chromebook
- Scientific Calculator
- Notebook

Textbook:

- Holt Physics (Classroom set)

Electronic Resources:

- Google classroom

Course Expectations:

- Welcome to the exploration of our physical world through scientific inquiry (question asking and answering). Our study of the physical world will revolve around

hands-on learning experiences that will put you in the role of discovering truths about the world in which we live. Such activities require an open and focused mind. Your performance in this class will be measured by how well you can solve problems and demonstrate your understanding of concepts, not by how well you can memorize facts. For this reason, your active participation and productivity in class are the most significant commitments you can make to yourself and me during this course. I look forward to our joint exploration of the physical world around us!

Grading:

Unit Exams	50%
Assessments (Including: Quizzes, Essays, Labs, and Projects)	30%
Class work/Homework	20%

- Each nine week's grade comprises 40% of a student's final grade.
- The End of Course Exam comprises 20% of a student's final grade.

Grading Scale:

The grading scale for Chillicothe High School can be found in the student handbook or online at <http://www.chillicothe.k12.oh.us/1/Content2/studenthandbook>.

Late Work: Late work will be subject to the Board-adopted policy on assignments that are submitted late (to be reviewed in class).

- Regardless of the absence type (excused, unexcused, OSS, etc.), students are expected to make up work and be held accountable for learning all material they missed.
- Any student who is absent from school will receive one (1) additional day for every day he/she missed to make up his/her work for full credit (100%).
- Any student who exceeds the allotted time to turn in an assignment for full credit may still submit work late for partial credit.
 - Any student who turns in work up to 1 week late must at least be given the opportunity to earn 75% on that assignment.
 - Any student who turns in work between 1 and 2 weeks late must at least be given the opportunity to earn 60% on that assignment.
- The end of the 9 weeks is the cut off point for teachers to accept late work from students for full or partial credit unless the teacher decides to give the student an incomplete for the 9 weeks due to extenuating circumstances.

Performance Based Section: Writing

Assignments/Exams/Presentations/Technology

One or more of the End of Unit Exams may be Performance Based. According to the Ohio Department of Education, "Performance Based Assessments (PBA) provides authentic ways for students to demonstrate and apply their understanding of the content and skills within the standards. The performance based assessments will provide formative and summative information to inform instructional decision-making and help students move forward on their trajectory of learning." Some examples of Performance Based Assessments include but are not limited to portfolios, experiments, group projects, demonstrations, essays, and presentations.

CHS Mechanical Physics Course Syllabus

After you have reviewed the preceding packet of information with your parent(s) or guardian(s), please sign this sheet and return it to me so that I can verify you understand what I expect out of each and every one of my students.

Student Name (please print): _____

Student Signature: _____

Parent/Guardian Name (please print): _____

Parent/Guardian Signature: _____

Date: _____