CONCEPTUAL Physics

SHELTON HIGH SCHOOL
COURSE OUTLINE CONCEPTUAL PHYSICS

YEAR
2023 - 2024

INSTRUCTOR
MR. GODDARD

Dear Student & Parent/Guardian:

I will be your child's Conceptual Physics Science teacher for the 2023-2024 school year and thus I would like to briefly introduce myself. My name is Mr. James Goddard, 30-year veteran teacher of Physics, Chemistry, and Physical Science. I spent the majority of my high school teaching career in Michigan, preparing students to enter college. I graduated Michigan State University with a Bachelors Degree in Science education, majoring in Biology, Physics and minoring in Chemistry. In 1999, I completed my Masters Degree in Education. I am very active with the school and its programs and encourage my students to become active as well. I previously coached tennis, wrestling, and directed ski clubs for 15 years. I love teaching science to high school students, as they are open to the exciting world of science. This is an impressionable age for many students and I feel a tremendous responsibility to help them become successful with science, as science is a gateway to many fabulous careers and professions; something we will discuss throughout the year.

Please feel free to contact me with any questions, comments, compliments and/or concerns. The easiest way to reach me is via e-mail, jgoddard@sheltonpublicschools.org.

Please read the information on the coming pages about our class and objectives.

I look forward to a wonderful year.

Sincerely,

James Goddard

Mr. James Goddard
jgoddard@sheltonpublicschools.org

Conceptual Physics syllabus

Vision

All SHS students will participate in a standards-based science inquiry and there preparation will be a stepping stone for college-level science coursework and competition in the global marketplace. Students will collaborate through systematic investigations to foster scientific habits of the mind. Student learning will put emphasis on group work to establish learning communities through rich, engaging, and relevant science experiences.

Goals

Students will:

Achieve at or above "goal" as measured by the State of Connecticut science assessments.

- Learn through investigation, exploration, and questioning.
- Experience relevant and real-world science phenomena.
- Practice common scientific language.
- Become self-directed learners.
- Develop critical thinking skills.
- Utilize technology for learning.

Teachers will:

- Be knowledgeable about their science content standards and expectations.
- Use common scientific language.
- Understand and incorporate inquiry-based and student-centered instructional practices.
- Include research-based instructional practices that reflect a changing 21st century global community.
- Identify and emphasize interdisciplinary connections.
- Continually assess student learning using a variety of strategies.
- Integrate technology to enhance instruction.

Parents will:

- Provide a supportive learning environment at home.
- Be actively involved with student learning and achievement.
- Establish early and open communication with teacher.
- Review student assignments for daily completion.
- Support and encourage extra help when necessary.
- Encourage good organizational skills and positive in-class behavior.

Grading Policies **Component Grade%**

Assessments
* Tests 50%
* Labs 25%
* Quizzes 15%
* Classwork / Homework 10%

Topic Outline

- Describing Motion: Kinematics in One Dimension

  - Position and Frame of Reference
  - Displacement
  - Average Speed
  - Average Velocity
  - Instantaneous Speed
  - Instantaneous Velocity
  - Acceleration
  - Kinematic Equations

- Motion and Force: Dynamics

  - Vectors and Scalars
  - Vectors Addition
  - Vectors Subtraction
  - Multiplying Vector by a Number
  - Newton's First Law
  - Newton's Second Law
  - Newton's Third Law
  - Units and SI System
  - Important Forces
  - Friction

- Momentum and Impulse

  - Momentum
  - Impulse
  - Elastic Collisions
  - Inelastic Collisions
  - Two Dimensional Collisions
  - Center of Mass

- Work and Energy

  - Work and Energy
  - Kinetic Energy
  - Potential Energy
  - Mechanical and Other Forms of Energy
  - Conservation of Energy
  - Power

- Circular Motion; Gravitation

  - Circular Motion
  - Centripetal Acceleration
  - Universal Gravity
  - Satellites
  - Weightlessness

- Vibrations and Waves

  - Simple Harmonic Motion
  - Period and Frequency
  - Waves Transverse and Longitudinal
  - Principle of Superposition

- Electric Charge and Electric Field

  - Electric Charge
  - Static Electricity
  - Conductors, Insulators, Semiconductors
  - Electric Force (Coulomb Law)
  - Electric Field Lines
  - Electric Potential

- Electric Currents

  - Electric Current
  - Resistance
  - Ohm's Law
  - Electric Circuits
  - Resistors in Series and Parallel

- Magnetism

  - Magnetic Force on a Current
  - Magnetic Force on a Moving Charge
  - Magnetic Field around a Current
  - Ampere's Law
  - Faraday's Law of Induction

- Electromagnetic Waves

  - Changing Electric Fields Produce Magnetic Fields
  - Maxwell's Equations
  - Electromagnetic Waves
  - Electromagnetic Spectrum
  - Radio Waves, Microwaves, Infrared Radiation, UV, X-rays, Gamma Rays
  - Electromagnetic Waves Carry Energy

- Light: Geometric Optics

  - Light Rays
  - Mirrors
  - Index of Refraction and Speed of Lights
  - Snell's Law

Science Requirements and Grading

General:

Science is an important subject to master for any student. Students should expect to spend between 20-60 minutes daily outside of class to help master the concepts covered in class. Our textbook has been sent or will be sent home with every student and they need to use this to help complete their homework. Many times I will try to complete work in class to ensure understanding the concepts, but I will often require work at home as well.

Supplies:
The only supply not needed daily is the textbook.

1. Textbook: Issued and should remain at home
2. Notebook: Preferably a 3-ring binder so that papers can be easily stored and organized.
3. Pens and pencils:

Grading:

I will be following the SHS outline for grading, listed on the subsequent pages. One of the items not listed in the outline is my belief that students learn from their mistakes, therefore I will often times allow students to redo a quiz, test and/or lab. The catch is that they must do this within 1 week of the assessment and it must be done outside of class, i.e. before school, lunch and/or after school (by 3:00 p.m.). Because I allow students to "redo" most assessments, I will not round up grades. Therefore a 89.9% is not an 90% and therefore would be considered a B+, not an A-. Likewise is true for 79.9% (C+), 69.9%(D+) and 64.9% (F).

Students who qualify under 504 or Special Education provisions will be granted the accommodations and/or modifications as outlined in their educational plan.

Absences:

Preplanned absences are those considered to be due to doctor appointments, extra-curricular activities or co-curricular activities. All absences must be cleared through the office and must be entered into the student data base as excused for the student to be allowed to make up the work missed. Please check with the high school attendance office if you are uncertain what constitutes an unexcused vs. excused absence.

Students who miss class work and/or assessments due to an "excused" absence will be allowed equal time to make up the work. The exception is if a student misses the day of the assessment, they should plan on making up this assessment the day they return. The rationale is that they did not miss instructional time and should be ready when they return.

Students who miss class work due to co-curricular activities and/or extra-curricular activities are responsible for the work that they miss. They should arrange in advance of these absences to either meet with me or have another student tutor them on what they missed.

Late Work:

Homework that is late, (turned in after collected in class), may still be turned-in but will be reduced 10% per day up to 3 days. After this, the homework not turned in will receive a failing grade, per SHS science department policy.