Physics Syllabus

Instructor: Ms. Hampsch
Email: alyson_hampsch@wrsd.net
Workroom: C122

Room: D105
Extra Help: Before/after school by appointment

Course Overview

Freshman Physics is a physical science course specifically for 9th grade students beginning their high school science curriculum. The course will expand the students' understanding of motion, properties of matter, sound, light, electricity and magnetism, all presented without requiring extensive mathematical background. All topics will incorporate basic scientific practices and methods. Projects, both individual and group, laboratory experiments, research, and other group activities will be an integral part of the program. The program will provide a good foundation for future science courses.

Course Goals

In this course, students will:

1. Develop a general understanding and appreciation of physics
2. Observe how science works in the world around us and learn to make sense of what they see through observation, questioning, hypotheses, and experimentation
3. Use basic physical principles to interpret the patterns in our universe
4. Develop the foundations for the scientific language they will use through their high school years and beyond
5. Exercise reasoning skills based on information collected from data
6. Prepare and present scientific reports
7. Prepare for the Physics MCAS, future science courses, and a successful academic career

Course Materials

Students are expected to bring the following materials to class:

- 3 ring binder (1" – 1 1/2")
- 5 Dividers (labeled - packets/notes/labs/tests/equation)
- Clear plastic ruler (smaller is less likely to break)
- Scientific calculator (I prefer the TI-30XA or TI-30IIS)
- Writing utensils
- White lined paper
- Earphones compatible with your chromebook.
- Access to online materials (or a plan to use the internet at school)
- Mind, body and spirit ready to learn

The following materials are recommended, but not required:

- Highlighter or thin markers

Course Topics

Semester 1

Unit 1: Math and Science Skills

- Measurement
- Accuracy and precision
- Percent error
- *Significant figures
- *Scientific notation
- Dimensional analysis and unit conversion
- Solving algebraic equations
- Graphing
- Equation of a line
- Problem solving strategies
- *Scientific method

Unit 2: Motion

- Frame of reference
- Distance
- Speed and velocity
- Acceleration
- Kinematic equations
- Free fall
- Motion graphs

Unit 3: Forces and Universal Gravitation

- Mass and inertia
- Newton's 1st law
- Force
- Net force
- Newton's 2nd law
- Mass vs. weight
- Friction
- *Air resistance
- Newton's 3rd law
- Universal gravitation
- *Circular motion
- *Centripetal force
- *Center of mass

Unit 4: Momentum and Impulse

- Momentum
- Impulse
- Conservation of Momentum
- Elastic and inelastic collisions

****Unit 5: Energy and Work**

- Work
- Work-energy theorem
- Potential energy
- Kinetic energy
- Conservation of energy
- Energy transformation
- Efficiency

Semester 2

Unit 6: Thermal Energy and Nuclear Energy

- Temperature
- Thermal equilibrium
- Heat and kinetic energy
- Specific heat and heat capacity
- Phase changes
- Fission, fusion, and decay
- *Thermal expansion
- *Heat transfer
- *Greenhouse effect

Unit 7: Electrostatics

- Electrical forces and charges
- Van der Graaff effects
- Coulomb's law
- Electric fields
- Ohm's law
- Circuits
- *Electrical potential energy
- *AC and DC circuits

Unit 8: Electromagnetism

- Fields (electric and magnetic)
- Transformers
- Faraday's Law

Unit 9: Waves

- Properties of waves
- Parts of a wave: period, amplitude, frequency, wavelength
- Simple harmonic motion
- *Transverse and longitudinal waves
- Sound waves
- Pitch and volume
- Wave speed in different media
- Reflection and refraction
- Wave interactions
- Constructive and destructive interference
- Resonance
- *Standing waves
- Speed of light in a vacuum
- *Electromagnetic spectrum
- *Color and light
- Wave-particle duality
- Photoelectric effect

*These units are optional. They are not tested on the Physics MCAS state assessment.

**May be split across semesters 1 and 2.

Grading

Your overall grade for this course will be determined as follows.

Overall Grade (100%)					
Semester 1 (50%)			Semester 2 (50%)		
Quarter 1 (20%)	Quarter 2 (20%)	Midterm (10%)	Quarter 3 (20%)	Quarter 4 (20%)	Final (10%)

Your grade will be based on my professional judgment of your work. Each assignment will carry a total point value. Those points will be added and the total points the student has earned will be divided by the total points available for each quarter grade.

There will be multiple types of assignments in this class:

HOMEWORK

There is a strong correlation between the steady effort needed to successfully complete practice problems and high performance on examinations. Assignments will be given regularly.

CLASS WORK

During class and lab sessions your willingness to discuss ideas with classmates, devise ways to measure and observe things and make brief presentations using the board and other media in the front of the room are important aspects of your class participation in the course. You are expected to be participating actively in class and lab sessions at all times.

QUIZZES

Quizzes may be given at any time and are given all the time. They will cover material in homework, lab, or lecture. These quizzes will vary in points and are a portion of the classwork grade. Your best assurance for doing well on quizzes is to come to class prepared.

TESTS

There will be several announced full period tests during each quarter and a two-hour comprehensive exam is given every semester. Questions on these exams will be based primarily on course assignments. Emphasis will be based on the demonstration of the ability to apply concepts and techniques to new situations. The instructor will also draw material for the exams from assigned problems, lab activities and presentations. Students are required to take exams at the appointed time. If you are absent on the day of a test, you will be expected to make it up on the day of your return.

LABS
Both informal and formal written labs will be assigned. In the lab, you will be using activity sheets, which will be handed out at appropriate times. The entries on these handouts must be in your own words. Although you may use the same data and graphs as your partner(s) and discuss concepts with your classmates, all entries should reflect your understanding of the concepts and the meaning of the data and graphs you are presenting.

Late work
All work not turned in the day it was due will be entered into PowerSchool as a 0% and will be marked accordingly; "absent" if the student was absent or "missing" if the student was in class and did not complete the assignment. Homework can be turned in late any time before the end of the unit for half credit. 10% per day late will be deducted from the final grade of other assignments turned in late. Any student turning in work after the due date must inform me that they have turned in the work, either in person or by email.

Attendance
WRHS has an attendance policy. Make sure you are aware of the consequences of frequent absences. Any absence from class can give a student some difficulty in maintaining their average. **Making up missed work is the responsibility of the student. The student needs to make every effort to find out the homework assignment and what material was covered in class.** Class and homework assignments are often posted to Google classroom, which students can access from home. If an assignment or project is due on the day a student is absent, the student must make every effort to send the assignment (project) in with a friend or a sibling or at very least get it to me BEFORE school the next day. All other work missed during a day of excused absence including quizzes, homework, and labs must be made up within 2 days. I only keep lab equipment out for 1 week. Make-up work is **your** responsibility.

Academic Integrity
You are encouraged to discuss and debate the ideas in any assignment with your teacher, lab partners, team members and other classmates. If you work on assignments cooperatively, rather than independently, you may share ownership of a spreadsheet, graph and diagram files. However, all students' academic work must reflect their own honest efforts. Cheating and plagiarism in any form will not be tolerated. This includes, but is not limited to copying (even with modifications) homework, papers, lab reports, or quiz or test answers; acquiring or disseminating quizzes or tests before they are administered; or using information from the Internet or other outside sources without proper attribution.

Students who collaborate with others in cheating by allowing their papers to be copied or by other means will be subjected to penalties commensurate with their involvement, which may include the student receiving "0" for the work or suffering significant grade reduction.

If there is reasonable evidence of copying, it will be construed as an act of plagiarism. In such cases, the principal or the class administrator along with the department head and teacher will be informed about both the incident and the penalty imposed, and the parent(s) or guardian(s) will be notified. The administration reserves the right to impose other penalties up to and including removal from the course, removal from honor societies, and loss of eligibility for scholarships with "honor" as criteria. A 0% will be given for the assignment. This policy is also followed in regards to cheating or talking during (before and after) a test period.

While AI has been a fixture in modern life for many years, it has recently become imperative that the high school set expectations and parameters for its use. While traditional forms of AI can be used in a positive manner to increase efficiency, the aim of this new policy is to limit and control the use of generative AI. Generative AI, such as ChatGPT, is able to produce content (written, audio, visual) which bypasses the creative functions of its users. Similar to the school's policy on plagiarism, students at WRHS are responsible for submitting their own work, displaying their own understanding, knowledge and creativity. Like with plagiarism, teachers will be monitoring the use of AI within their classroom and student work. It is the responsibility of the student to prove that AI was not used by showing the evolution of their work through outlines, drafts, editing, proper citations, etc. If the student admits to using AI or cannot sufficiently defend the authenticity of their work, the consequence will be the same as plagiarism.

Technology Policies

CHROMEBOOKS

All incoming students will have a Google Chromebook that will be used in a multitude of ways during the school year. **Students are expected to bring their charged computer to school every day**. The Chrombook will act as the student's main access point for email, Google classroom, and computer based physics class work. During class, all computer use must be for physics class or with instructor permission.

GOOGLE CLASSROOM

Instead of a class website, students are asked to join Google Classroom. This is a virtual space where all class notes, classwork, homework, and announcements, will be posted.

EMAIL

Students receive a school email, which will be the main form for direct student-teacher communication. Students are expected to check their email.

CELL PHONES

Students are expected to have their cell phones away during class. Any cell phone use during class will result in disciplinary action as stated in the student handbook.

Classroom Procedures

What you can expect from me:

To be prepared and on time
To be respectful
To have a positive attitude
To teach to the best of my ability
To be available for extra help
To provide a learning environment for every student
No homework on holidays!

What I expect from you:

To be on time and in your seat when the bell rings
To be prepared for class (agenda, assignments, notebook, text, calculator, ruler, pencil)
To be respectful (each other, teachers, the room)
To have a positive attitude
To be on task and work to the best of your ability
To follow directions the first time given
To understand that you are part of a learning environment.

Classroom disruptions will be dealt with in a quick and consistent manner.
Warnings may be given as well as retentions both after class and after school.
A parent/ guardian may be contacted.
A member of administration may be contacted.

Textbooks: Conceptual Physics by Hewitt

Textbooks are distributed for use at home. Any student who receives a textbook is responsible for the proper care of the textbook and will not write on or mark any part of the book. Students will pay for damage or loss of issued textbooks.

Once you and your parents/guardians have read this syllabus please sign the form to indicate that you are aware of all of the information contained within it, and therefore also responsible for all information.

I have read, understand, and agree to abide by the classroom rules and policies.

Student's Name:

Student's Signature:

Date:

Parent/Guardian's Name:

Parent/Guardian's Signature:

Date: