Email: Jason.Mumm@crookcounty.k12.or.us Phone: 541-416-6900

Physics

Instructor: Mr. Mumm

Description

Physics is a two trimester, 1 credit, science course. The course covers scientific and laboratory protocol and subject matter covered will include but is not limited to: light and color, principles of mechanics, forces, friction, motion, forces and motion, work and energy, power, impulse and momentum, simple harmonic motion and Waves. The class is a non-calculus approach; we will focus much of our time on the fundamentals of physics and include mathematical equations when necessary.

Grading Procedure

Trimester will be assigned based on the following scale:
90-100%-A
80-89%-B
70-79%-C
60-69%-D
00-59%-F

Grade Determination: An overall grade in this course will be based off of total points and determined using the following guidelines and criteria. Assesments are worth 90% of the total grade and Homework is worth 10%.

1. **Tests**

A test will be given after each unit of study, and be worth a total amount of points from all assignments of that unit added together. The tests will be composed of several parts that test different levels of understanding and
comprehension. A final exam for the semester will be comprehensive (include everything studied thus far).

2. **Homework:**

Throughout each unit, homework will be assigned and usually discussed in class. Each homework assignment will be graded on a three point scale at the beginning of class. It is your responsibility to find out what assignments you missed and complete them. **If you do not do the homework this class will be extremely hard.**

3. **Laboratory work**

When a lab is performed, the write-up is due the day after the lab and worth 20 to 50 points each. Even though lab work is usually done in groups, *lab write-ups are to be written independently.* If you miss a lab, then you must come see me to set up a time to make the lab up. ***Lab safety violations will result in a zero score at least, possible removal from the class.***

4. Extra Credit: Extra credit is occasionally offered to the entire class.

Make-up Procedures and Late Work

1. **Late Work:**
   - Students have two days from time of **excused** absence to get work in for credit if it was collected in class. After two days, work is considered late. **Deductions will be made for all late work that is received.**
   - It is the students' responsibility to request assignments for the missed day(s) and to turn in completed assignments on time. Extensions on assignments are given only in extreme cases. **Again, deductions will be made for all late work that is received.**

2. **Make-Up**:
   - Retakes will be offered for each assessment taken, giving students the chance to show proficiency or mastery of material covered. Students will need to complete an Assessment Retake Form PRIOR to retaking any assessments. If the retake form is not turned in student will NOT be allowed to retake the assessment, until the form is received..

Classroom Policies

Tardy Policy:	1st & 2nd tardy: Verbal warning and angry scowl 3rd & 4th tardy: 30 minutes detention or 20 minute classroom cleanup 5th tardy: Administrative Referral Please Beware! If getting to school on time is problematic in your home, start planning now on how to overcome your situation, for regardless of who is at fault, if you are late to class it will be a recorded tardy. (FYI: The only accepted excuse for a tardy is a note from a teacher or doctor.)
Behavior:	Courtesy towards ***all***. This includes listening when others are speaking, whether it is your classmates or the teacher
Hall Pass:	You will receive 3 hall passes every 9 weeks. You have th opportunity to turn in unused hall passes at the end of the semester for extra credit. Hall passes should be used for emergancies only. Once you are out you will not be able to leave.
Food/Drink:	No food and drink in the lab (this includes gum and candy).
Extra Help:	If you need extra help with anything involving science, please feel free to see me anytime I am not in class. I will arrange a time before school, after school, or at lunch time to work with you.
Cell Phones:	No Cell Phones are allowed in Mr. Mumm's room!!

Disciplinary Plan

Any disciplinary issues that arise will be delt with according to the Crook County High School Handbook.

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Students: In order to have a productive and educational year in science, you are required to read and sign-off on the following list of class rules. Please read the list carefully, and initial each line indicating that you have read and understand the rule and/or consequence. Also, you are required to sign and date the bottom of the form.

Parents/Guardians: Please read this form with your student, and ensure that he/she **understands** each item. When complete, sign and date in the space provided. This form will be kept on file as long as your child is in high school

READ THE FOLLOWING ITEMS CAREFULLY.

1. I Have read the lab safety rules and will follow the lab "Safety Regulations" at all times while in the science class room. If I do not, I will have my lab privileges temporarily or permanently revoked. I understand that it will be virtually impossible to pass science without labs.
2. I have read the Syllabus and I know what to expect from Mr. Mumm and what Mr. Mumm expects from me during my time in science class.
3. I have read the tardy policy set forth by Mr. Mumm and I understand the rules that the policy intails.
4. I am aware that I will be using computers often in science and I will follow the "acceptable use" policy at all times while on the computer.

Any disciplinary issues that arise will be delt with according to the Crook County High School Handbook.

Please sign in the appropriate space below to indicate you have read and understand each item above. This contract will be presented to you and/or your parents/guardians as needed. If you would like a copy of this form, contact Mr. Mumm at the High school. If you have any questions concerning this, please contact Mr. Mumm via email. Jason.mumm@crookcounty.k12.or.us

Student Name (PRINT)	Student Signature	Date

Parent/Guardian Name (PRINT)	Parent/Guardian Signature	Date

Course_____ Period _____

NGSS State Standards

HS-PS2 Motion and Stability: Forces and Interactions

Students who demonstrate understanding can:

HS-PS2-1. **Analyze data to support the claim that Newton's second law of motion describes the mathematical relationship among the net force on a macroscopic object, its mass, and its acceleration.** [Clarification Statement: Examples of data could include tables or graphs of position or velocity as a function of time for objects subject to a net unbalanced force, such as a falling object, an object rolling down a ramp, or a moving object being pulled by a constant force.] [Assessment Boundary: Assessment is limited to one-dimensional motion and to macroscopic objects moving at non-relativistic speeds.]

HS-PS2-2. **Use mathematical representations to support the claim that the total momentum of a system of objects is conserved when there is no net force on the system.** [Clarification Statement: Emphasis is on the quantitative conservation of momentum in interactions and the qualitative meaning of this principle.] [Assessment Boundary: Assessment is limited to systems of two macroscopic bodies moving in one dimension.]

HS-PS2-3. **Apply scientific and engineering ideas to design, evaluate, and refine a device that minimizes the force on a macroscopic object during a collision.*** [Clarification Statement: Examples of evaluation and refinement could include determining the success of the device at protecting an object from damage and modifying the design to improve it. Examples of a device could include a football helmet or a parachute.] [Assessment Boundary: Assessment is limited to qualitative evaluations and/or algebraic manipulations.]

HS-PS2-4. **Use mathematical representations of Newton's Law of Gravitation and Coulomb's Law to describe and predict the gravitational and electrostatic forces between objects.** [Clarification Statement: Emphasis is on both quantitative and conceptual descriptions of gravitational and electric fields.] [Assessment Boundary: Assessment is limited to systems with two objects.]

HS-PS2-5. **Plan and conduct an investigation to provide evidence that an electric current can produce a magnetic field and that a changing magnetic field can produce an electric current.** [Assessment Boundary: Assessment is limited to designing and conducting investigations with provided materials and tools.]

HS-PS2-6. **Communicate scientific and technical information about why the molecular-level structure is important in the functioning of designed materials.*** [Clarification Statement: Emphasis is on the attractive and repulsive forces that determine the functioning of the material. Examples could include why electrically conductive materials are often made of metal, flexible but durable materials are made up of long chained molecules, and pharmaceuticals are designed to interact with specific receptors.] [Assessment Boundary: Assessment is limited to provided molecular structures of specific designed materials.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education:*

Science and Engineering Practices

Planning and Carrying Out Investigations

Planning and carrying out investigations to answer questions or test solutions to problems in 9–12 builds on K–8 experiences and progresses to include investigations that provide evidence for and test conceptual, mathematical, physical and empirical models.

- Plan and conduct an investigation individually and collaboratively to produce data to serve as the basis for evidence, and in the design: decide on types, how much, and accuracy of data needed to produce reliable measurements and consider limitations on the precision of the data (e.g., number of trials, cost, risk, time), and refine the design accordingly. (HS-PS2-5)

Analyzing and Interpreting Data

Analyzing data in 9–12 builds on K–8 and progresses to introducing more detailed statistical analysis, the comparison of data sets for consistency, and the use of models to generate and analyze data.

- Analyze data using tools, technologies, and/or models (e.g., computational, mathematical) in order to make valid and reliable scientific claims or determine an optimal design solution. (HS-PS2-1)

Using Mathematics and Computational Thinking

Mathematical and computational thinking at the 9–12 level builds on K–8 and progresses to using algebraic thinking and analysis, a range of linear and nonlinear functions including trigonometric functions, exponentials and logarithms, and computational tools for statistical analysis to analyze, represent, and model data. Simple computational simulations are created and used based on mathematical models of basic assumptions.

- Use mathematical representations of phenomena to describe explanations. (HS-PS2-2),(HS-PS2-4)

Constructing Explanations and Designing Solutions

Disciplinary Core Ideas

PS2.A: Forces and Motion

- Newton's second law accurately predicts changes in the motion of macroscopic objects. (HS-PS2-1)
- Momentum is defined for a particular frame of reference; it is the mass times the velocity of the object. In any system, total momentum is always conserved. (HS-PS2-2)
- If a system interacts with objects outside itself, the total momentum of the system can change; however, any such change is balanced by changes in the momentum of objects outside the system. (HS-PS2-2),(HS-PS2-3)

PS2.B: Types of Interactions

- Newton's law of universal gravitation and Coulomb's law provide the mathematical models to describe and predict the effects of gravitational and electrostatic forces between distant objects. (HS-PS2-4)
- Forces at a distance are explained by fields (gravitational, electric, and magnetic) permeating space that can transfer energy through space. Magnets or electric currents cause magnetic fields; electric charges or changing magnetic fields cause electric fields. (HS-PS2-4),(HS-PS2-5)
- Attraction and repulsion between electric charges at the atomic scale

Crosscutting Concepts

Patterns

- Different patterns may be observed at each of the scales at which a system is studied and can provide evidence for causality in explanations of phenomena. (HS-PS2-4)

Cause and Effect

- Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects. (HS-PS2-1),(HS-PS2-5)
- Systems can be designed to cause a desired effect. (HS-PS2-3)

Systems and System Models

- When investigating or describing a system, the boundaries and initial conditions of the system need to be defined. (HS-PS2-2)

Structure and Function

- Investigating or designing new systems or structures requires a detailed examination of the properties of different materials, the structures of different

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Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles, and theories. ▪ Apply scientific ideas to solve a design problem, taking into account possible unanticipated effects. (HS-PS2-3) **Obtaining, Evaluating, and Communicating Information** Obtaining, evaluating, and communicating information in 9–12 builds on K–8 and progresses to evaluating the validity and reliability of the claims, methods, and designs. ▪ Communicate scientific and technical information (e.g. about the process of development and the design and performance of a proposed process or system) in multiple formats (including orally, graphically, textually, and mathematically). (HS-PS2-6) ---------- ***Connections to Nature of Science*** **Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena** ▪ Theories and laws provide explanations in science. (HS-PS2-1),(HS-PS2-4) ▪ Laws are statements or descriptions of the relationships among observable phenomena. (HS-PS2-1),(HS-PS2-4)	explain the structure, properties, and transformations of matter, as well as the contact forces between material objects. (HS-PS2-6),*(secondary to HS-PS1-1),(secondary to HS-PS1-3)* **PS3.A: Definitions of Energy** ▪ …and "electrical energy" may mean energy stored in a battery or energy transmitted by electric currents. *(secondary to HS-PS2-5)* **ETS1.A: Defining and Delimiting Engineering Problems** ▪ Criteria and constraints also include satisfying any requirements set by society, such as taking issues of risk mitigation into account, and they should be quantified to the extent possible and stated in such a way that one can tell if a given design meets them. *(secondary to HS-PS2-3)* **ETS1.C: Optimizing the Design Solution** ▪ Criteria may need to be broken down into simpler ones that can be approached systematically, and decisions about the priority of certain criteria over others (trade-offs) may be needed. *(secondary to HS-PS2-3)*	components, and connections of components to reveal its function and/or solve a problem. (HS-PS2-6)

Connections to other DCIs in this grade-band: **HS.PS3.A** (HS-PS2-4),(HS-PS2-5); **HS.PS3.C** (HS-PS2-1); **HS.PS4.B** (HS-PS2-5); **HS.ESS1.B** (HS-PS2-4); **HS.ESS2.A** (HS-PS2-5)

Articulation to DCIs across grade-bands: **MS.PS1.A** (HS-PS2-5); **MS.PS2.A** (HS-PS2-1),(HS-PS2-2),(HS-PS2-3); **MS.PS2.B** (HS-PS2-4),(HS-PS2-5),(HS-PS2-6); **MS.PS3.C** (HS-PS2-1),(HS-PS2-2),(HS-PS2-3); **MS.ESS1.B** (HS-PS2-4),(HS-PS2-5)

Common Core State Standards Connections:

ELA/Literacy –

RST.11-12.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. *(HS-PS2-1),(HS-PS2-6)*
RST.11-12.7	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. (HS-PS2-1)
WHST.9-12.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. *(HS-PS2-6)*
WHST.9-12.7	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. (HS-PS2-3),(HS-PS2-5)
WHST.11-12.8	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation. *(HS-PS2-5)*
WHST.9-12.9	Draw evidence from informational texts to support analysis, reflection, and research. *(HS-PS2-1),(HS-PS2-5)*

Mathematics –

MP.2	Reason abstractly and quantitatively. (HS-PS2-1),(HS-PS2-2),(HS-PS2-4)
MP.4	Model with mathematics. (HS-PS2-1),(HS-PS2-2),(HS-PS2-4)
HSN-Q.A.1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. (HS-PS2-1),(HS-PS2-2),(HS-PS2-4),*(HS-PS2-5),(HS-PS2-6)*
HSN-Q.A.2	Define appropriate quantities for the purpose of descriptive modeling. *(HS-PS2-1),(HS-PS2-2),(HS-PS2-4),(HS-PS2-5),(HS-PS2-6)*
HSN-Q.A.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. (HS-PS2-1),(HS-PS2-2),(HS-PS2-4),*(HS-PS2-5),(HS-PS2-6)*
HSA-SSE.A.1	Interpret expressions that represent a quantity in terms of its context. (HS-PS2-1),(HS-PS2-4)
HSA-SSE.B.3	Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. (HS-PS2-1),(HS-PS2-4)
HSA-CED.A.1	Create equations and inequalities in one variable and use them to solve problems. (HS-PS2-1),(HS-PS2-2)
HSA-CED.A.2	Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. *(HS-PS2-1),(HS-PS2-2)*
HSA-CED.A.4	Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. *(HS-PS2-1),(HS-PS2-2)*
HSF-IF.C.7	Graph functions expressed symbolically and show key features of the graph, by in hand in simple cases and using technology for more complicated cases. *(HS-PS2-1)*
HSS-ID.A.1	Represent data with plots on the real number line (dot plots, histograms, and box plots). *(HS-PS2-1)*