Physics 2022-2023 Syllabus

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My name is Roderick Jones. I consider it my distinct privilege to teach you physics, this year. I love physics. I must admit that I am a bit fonder of chemistry, but both, including biology and the other sciences have a distinct interplay that connects all of us as one being in this universe.

Like you, I started off in elementary school, Katherine Smith. I later attended Clifton Middle and graduated from Scarborough High, in 1991. Back then, Scarborough and Waltrip were constant rivals in sports.

In 1997, I graduated from Prairie View A&M University with a bachelor's degree in Biology, minoring in Chemistry. I was headed to medical school but had a change of heart. I worked in the Oil & Gas industry for a few years, then in August 2000, I began my career as an educator for the Houston Independent School District. I've taught at James Madison High School, Sharpstown High School, Young Women's College Prep, and now, I am a proud ram.

The Physics course includes topics in both classical and modern physics. Knowledge of algebra and basic trigonometry are required for the course. Understanding of basic principles and the application of these principles in the solution of problems are the major goals of the course.

You will be asked to construct physical models and manipulate variables to investigate and prove various hypotheses. You will, also, be asked to extrapolate data to predict outcomes. You will be asked to verify these outcomes graphically, mathematically and in writing.

Textbook:

Giancoli, Douglas C. 2005. *Physics: Principles with Applications*. 6th ed. Upper Saddle River, N.J.: Prentice Hall.

Course Website: Outlines of class notes, in-class and homework assignments and their solutions, as well as other important course documents will be posted on the class website on the HUB.

Materials: You will need to bring to class each day the following: laptop, pen/pencil, notebook paper, and a scientific/graphing calculator (*yes, you must purchase your own*.)

Conduct: I expect you to observe proper classroom conduct, as described in the *Student Code of Conduct*. I expect you to abide by Houston Independent School District guidelines and Waltrip High School school-wide rules. I expect you to observe all classroom rules and lab safety rules.

Failure to do so will result in a warning, followed by a student-teacher conference and/or removal from the classroom, either of which will be accompanied by a call home. Failure to observe lab safety rules, and thereby endanger the safety of the instructor and classmates, will result in a zero on the lab being performed, and referral to the Principal.

Classroom Affirmations:

- 1. I will honor my family by giving my best effort, daily.
- 2. I will arrive, with homework and supplies, prepared to work the entire class.
- 3. I will submit all assignments at the time they are due.
- 4. I will not participate in academic dishonesty.
- 5. I will study, in addition to completing my assignments.
- 6. I will pay attention and fully participate in all class activities.

Grading: Grading for the class will be determined by the following weighting system:

35%	Tests and Projects
30%	Labs and Quizzes
25%	Classwork
15%	Participation

Tests: Unit tests will mimic the format AP exam. They will consist of a multiple-choice section and a free response section. Unless specified otherwise, you will be allowed to use the same formula chart provided during the AP exam on the **free response section only**. On the multiple-choice section, you will not be allowed to use a formula chart.

Partial credit will be given for work shown on the free response section. Your grade will correspond to the percentage correct. <u>No curve is guaranteed!</u>

All tests will be administered in the presence of the teacher of record. Notes will never be allowed on a test. Any student attempting to use notes or any other form of outside assistance will be deemed academically dishonest. A grade of zero will be given for the exam. There will be no opportunity to retake the exam, and the infraction will be reported to the principal and the student's assistant principal, dean, counselor and parent.

Test Corrections: Following each test students will have the opportunity to complete test corrections. In order to receive this credit, the student must provide correct answers for each problem graded incorrect and must provide evidence proving each answer. Point values for test corrections will be based on the test score prior to extra credit, and are as follows:

95 and above:	1 point
90 – 94:	2 points
85 - 89	3 points
80 - 84	4 points
75 - 79	5 points
70 - 74	6 points
63 - 69	7 points
62	8 points
61	9 points
60 and below	10 points

Projects: Projects may take a number of forms. The primary project will be a long-term investigation, using the scientific method. Other projects might include video productions, annotated research papers with bibliographies and/or, but not limited to, art productions.

Each project will be graded according to a rubric, presented at the onset of the project. Students are expected to adhere to the guidelines of the rubric and simulate an exemplar, if presented. As always, students will be held to the highest standard of academic honesty. Any attempt to plagiarize, purchase and/or present material as yours which is not your intellectual property will result in a grade of zero being awarded for the project, and the highest punishment allowed by Waltrip High School and the Houston Independent School District.

Classwork: Classwork is the foundation of learning. Classwork, in Physics, will primarily deal with practicing a skill necessary to finding the solution to a problem. Students are expected to attend to the teacher and any student presenting.

Any student, fully present in the class, who does not complete the day's assignment will receive the grade of zero. The student's parents will be contacted and informed. No make-up work will be assigned. **Homework:** The purpose of homework is to allow you an opportunity to practice on your own. If you are incapable of completing your homework, find your instructor before the homework is due and request assistance.

Under any circumstances, do not...

- 1. Consult homework apps or websites, online.
- 2. Copy or allow another student to copy your homework.
- 3. Allow someone other than you to complete your homework for you.
- 4. Share answers with other students on social media.

Homework is to be submitted at the beginning of the class period on its due date. No excuses will be accepted on the due date for failure to submit the homework. Extensions to submission time must be requested, in advance.

Late Work: Late assignments will be accepted with a ten-point penalty for each class day the assignment is late. The only assignments that will be considered late are homework assignments that were not submitted on time. After five school days, the assignment will be considered void.

Make-Up Work: If you are absent on the day a classwork assignment, you are expected to schedule time with the teacher to receive that day's instruction and complete that day's assignment. Within five school days of the absence, the maximum score that may be attributed to the assignment is fifty points. *Hint: The earlier the better*.

Make up tests/quizzes will only be given if you are absent on the day of the test. You will be required to take the test immediately upon your return unless. After five school days, a grade of zero will be assigned.

Homework assignments may not be made up after five consecutive school days after the absence.

Absences for school functions: If you are absent due to a school related event (game, tournament, field trip, etc.), projects must be turned in on their due date because you have had extended time to complete the project. If the project requires you to present on the day it is due, you may present to your instructor on the day of your return to class.

If you will miss a test, a quiz or a lab, you must arrange to complete the assignment in the presence of your instructor.

Extra Credit: Up to three article reviews may be done each six-week cycle, to add 3 percentage points on to your cycle exam grade. The articles must be about a physical science topic, and you must show how they relate to one of our TEKS Objectives. The article may come from a newspaper, a scientific journal or magazine. It must be 1000 words long, typed, submitted electronically via email, Times New Roman, 12 pt font, one-inch margins, double-spaced. Any information directly copied from the article must be in quotation marks or it must be paraphrased. The article must be sourced in a bibliographic index using APA style. The article must be submitted with a cover page, including your name, the title of the article, the title of your paper, date, course and class period. *Note: The words on your cover page and bibliography must not count toward your overall 1000 words*.

Tutorials: If you feel that you need extra help in this class, I will accommodate you after school. I am usually in my classroom after school until 4:30. If you need to come for extra help before school, you must get a pass from me.

Content Outline:

		I will create a distance vs. time graph and use it to calculate velocity.		
l in Unit 1 rej	Phys 4A. Generate and interpret graphs and charts representing different types	I will create a velocity vs. time graph and calculate acceleration		
		I will interpret distance v time, velocity v time, and acceleration v time graphs.		
		I will analyze and describe, in writing, the motion of an object based on a graph, chart or data table.		
		I will investigate the role of mass on momentum and change in momentum.		
		I will calculate accelerated motion in the x direction and diagram it.		
	Phys 4B. Describe and analyze motion in one	I will calculate accelerated motion in the y direction and diagram it.		
Unit 2	dimension using equations and graphical vector addition.	I will compare vector and scalar measurements		
		I will add vector components using Pythagoras' Theorem or Trig functions to predict the Resultant Vector.		
		I will trig functions to find the components of a vector.		
		Describe the motion of projectile launched at an angle and horizontally launched and explain motion along the x and y axes. Calculate the time to fall of an object dropped from height = Δy .		
	PHYS.4C Analyze and describe accelerated motion in two dimensions, including using equations, graphical vector addition, and projectile and circular examples.	Calculate the maximum height and initial velocity of a projectile launched at an angle.		
		Calculate the range of a projectile launched horizontally and at an angle.		
Unit 3		Calculate the centripetal acceleration of an object spinning around a center point.		
		Calculate the centripetal force of an object spinning around a center point		
		Calculate rotational velocity, acceleration, momentum and torque		
		Perform rotational kinematics		
PHYS.4D Calculate the effect of forces on object: including the law of		I will demonstrate that forces cause a change in motion, using pulleys and inclined planes.		
Unit 4	inertia, the relationship between force and acceleration, and the nature of force pairs between objects using methods including free-body force diagrams.	I will demonstrate the relationship between force and mass.		
		I will demonstrate and identify action-reaction force pairs.		
		I will draw linear, free-body diagrams and calculate overall net force.		
		I will use Pythagoras and trig function to calculate vector sums of objects at an angle.		
		I will calculate the acceleration on a connected group of objects.		

Unit 5	 (B) describe and calculate how the magnitude of the gravitational force between two objects depends on their masses and the distance between their centers; (C) describe and calculate how the magnitude of the electric force between two objects depends on their charges and the distance between their centers; (E) characterize materials as conductors or insulators based on their electric properties; and (F) investigate and calculate current through, potential difference across, resistance of, and power used by electric circuit elements connected in both series and parallel combinations. 	Determine the magnitude of gravitational force Determine the magnitude of electromagnetic force Calculate the current, power, voltage and resistance in parallel and series circuits and elements of the circuit. Predict the resistance of materials based on resistivity, length and cross-sectional area.
Unit 6	PHYS.6C Calculate the mechanical energy of, power generated within, impulse applied to, and momentum of a physical system PHYS.6A Investigate and calculate quantities using the work-energy theorem in various situations PHYS.6D Demonstrate and apply the laws of conservation of energy and conservation of momentum in one dimension	Calculate the mechanical energy, potential and kinetic. Explain the conservation of energy. Calculate work and power I will identify a change in kinetic energy as work Since the mass of the object does not change, I will identify work as a change in the velocity of an object. Calculate momentum and impulse Demonstrate and Calculate the Conservation of Momentum. Relate the conservation of momentum to the conservation of energy. I will compare elastic and inelastic collisions for conservation of energy and conservation of momentum. I will demonstrate inelastic collisions and the conservation of momentum. I will investigate applications of elastic collisions and the conservation of momentum and kinetic energy I will master conservation of energy and momentum practice problems.



The focus, this month, is to represent an object in space and time in relation to its environment.

MOM	TUE	WED	THU	FR
1	2	3	4	5
8	9	10	11	12
15	16	17	18	19
22	23 (5A, 1E, 1F)	24	25	26
Read Chapter 2, Section 3	Analyze position/ time graphs Hand- graphing	How does angle of incline affect the velocity of a ballistic cart?	Analyze velocity/time graphs Photogates/ Apps	$v = \frac{x_f - x_0}{t_f - t_0}$
29	30	31		
Read Chapter 2, Section 4 Chapter 3, Section 1	Analyze accn/time graph Interpret graphs	$v = \frac{v_f - v_0}{t_f - t_0}$		

Sep ²⁰²²

The focus at this time is to identify the position of an object in 1-D and 2-D space and determine its rate ate and direction of motion,

MOM	TUE	WED	Ε	R
			1	2
			<i>Interpret</i> motion graphs	
5 (Labor Day)	6 (5B , 2 C)	7	8	9
Read Chapter 5, Section 1	<i>Define</i> scalars and vectors Relative motion		Combine vectors in 1-D and 2-D. Pythagorean Theorem	$r = \sqrt{a^2 + b^2}$
12	13 (5C, 3A)	14	15	16
Common Assessment 1 Read Chapter 3, Section 2	Analyze 1-D motion Frames of Reference	$v = v_0 + at$	<i>Analyze</i> 1-D motion Calculate	$v^2 = v_0^2 + 2a(d)$
19	20	21	22	23
	Analyze 1-D motion Calculate	$d = v_0(t) + \frac{1}{2} a(t)^2$	Analyze 1-D motion Calculate	$d = \frac{v + v_0}{2}(t)$
26	27	28	29 (5D)	30
Read	Analyze 1-D motion Calculate		Describe circular acceleration Analyze circular acceleration	Cycle 1 Ends $a_c = \frac{v}{r} = \frac{4\pi^2 r}{T^2}$ How does radius affect the period of rotation?

Oct ²⁰²²

The focus of this is on motion in a straight line and motion around a fixed point, where the acceleration is constant.

MOM	TUE	WED	THU	FR
3	4 (Inservice)	5 (Fall Holiday)	6	7
Common Assessment 2 Read Chapter 6, Section 2	Analyze uniform circular motion Homework assignment for holiday		Analyze projectile horizontal motion	How does the initial velocity of a horizontal projectile affect range?
10	11	12	13	14
Read Chapter 6, Section 1	<i>Analyze</i> projectile motion at an angle	How does the incline angle affect range?	<i>Analyze</i> projectile motion at an angle	
17	18	19	20 (5E)	21
Read Chapter 4, Section 1	<i>Analyze</i> projectile motion at an angle		<i>Explain</i> equilibrium and inertia,	How does mass relate to resistance to change in motion?
24	25	26	27	28
Read Chapter 4, Section 2	<i>Calculate</i> forces using Newton's 2 nd Law	How does the mass of the cart affect the acceleration of the cart under constant force?	<i>Calculate</i> forces using Newton's 2 nd Law	

Nov ²⁰²²

The focus is on forces, including gravitational and electrostatic. Field forces, including the electric field.

MOM	TUE	WED	ΒE	FR
31	1	2	3	4
Common Assessment 3 Read Chapter 5, Section 3	<i>Use</i> Free-Body Diagrams	How does the angle of incline affect the frictional force of an object on an incline plane?	<i>Use</i> Free-Body Diagrams	Cycle 2 Ends $a = \frac{Force}{mass}$
7	8 (5G)	9	10 (5H)	11
Read Chapter 4, Section 3	Illustrate/Anal yze Force Pairs using Newton's 3 rd Law		<i>Calculate</i> the magnitude of force between two objects, using Universal Gravitation	Confirm the gravitational acceleration between earth and an object of mass, <i>m</i> . $F_g = \frac{GMm}{r^2}$
14	15	16	17	18
Read Chapter 7, Section 1 Chapter 7, Section 2	Predict changes in force brought about by changes in mass or distance Scientific Notation		<i>Predict</i> changes in force brought about by changes in mass or distance	
21	22	23	24	25
Thanks- giving	Thanks- giving	Thanks- giving	Thanks -giving	Thanks- giving

Dec ²⁰²²

The focus of this month is to discuss how electrical fields affect particles and review for the semester exams

NOM	TUE	WED	THU	FRI
28	29 (6A)	30	1	2
Read Chapter 20, Sect 1 Chapter 20, Sect 2	<i>Predict</i> the magnitude of electrical force between 2 objects.	$F_e = \frac{kQq}{r^2}$	<i>Predict</i> the magnitude of electrical force between 2 objects.	
5	6 (6B)	7	8	9
Common Assessment 4 Read Chapter 21, Sect 1 Chapter 24, Sect 1	Identify/ Describe electric, E, and magnetic field, B, forces Scientific Notation	$E = \frac{Force}{charge}$ $B = \frac{\mu I}{2\pi r}$ $F = ILBsin\theta$ $F = qvBsin\theta$ $\mu = permeability$ of the medium	<i>Investigate</i> <i>Describe</i> the Conservation of Charge	
12	13	14	15	16
Final Review	Final Review	Final Review	Final Review	Final Exams
19	20	21	22	23
Final Exams	Final Exams	Final Exams Cycle 3 Ends	Holiday	Holiday
26	27	28	29	30
Holiday	Holiday	Holiday	Holiday	Holiday