Xavier High School Micronesia
Physics Curriculum

UBD Quarters 1-4

Major Topics Covered/ Guiding Questions:

- Notation, Units and Measurements
- Motion in 1D
- Gravity and Mechanical Energy
- 2D Motion.
- Forces, Momentum and Impulses
- Rotational Kinematics
- Work, Energy, and Power
- Thermodynamics
- Charges, Electric Fields and Electrostatics
- Basic Electronics
- Oscillations and Waves
- Sound
- Light

Materials/Resources (Please specify if these are distributed to each individual student, given to groups of students, posted online for all students, or just to be used by teacher):

- Access to textbook, either physical copy or online PDF (each student)
- Access to graphing calculator, either through physical calculator or Desmos app (each student)
- Projector
- Notebook and Folder exclusively for Physics

Skills students will develop:

- Properly use a scientific calculator
- Set up kinematic equations and explain their variables for motion in 1D, 2D, and rotational motion
- Define and conceptualize motions, forces, and general mechanics spatially.
- Compound or rearrange formulas to solve for an unknown
- Converting units
- Understanding Newton's first three Laws of Motion
- Define and conceptualize Work, Energy, and Power
- Define and conceptualize the relationship between Heat, Energy, and Force
- Define and conceptualize how Electricity and basic circuitry works.
- Define and conceptualize waves, particularly in regards to Sound and Light

By the end of the year students will be able to _____ (must be measurable by assessments)

- Know the three fundamental units of physics (time, mass, and distance) and be able to convert those units to multiple other forms, whether they be metric or imperial.
- Define and conceptualize motions, forces, and general mechanics spatially.
- Verbally, visually, and through written means, explain the actions and mechanics of an object or force.
- Define and apply some of the laws that govern nature (gravity, inertia, electromagnetism, forces, constants, thermodynamics, temperature, phases of materials, vibrations and frequencies, sound, color, light, atomic laws, etc.)
- Be able to find unknowns in kinematic equations with no less than three variables.
- Conduct lab research, write a report including a hypothesis

Major Assessments/Projects: Tests, Quizzes, Homework, Projects, Notebook Checks, Labs and Lab Reports

UBD Quarter 1

Major Topics Covered/Guiding Questions: ● Notation, Units and Measurements ● Motion in 1D ● Gravity and Mechanical Energy	**Materials/Resources (Please specify if these are distributed to each individual student, given to groups of students, posted online for all students, or just to be used by teacher):** ● Access to textbook, either physical copy or online PDF (each student) ● Access to graphing calculator, either through physical calculator or Desmos app (each student) ● Projector ● Notebook and Folder exclusively for Physics
Skills students will develop: ● Properly use a scientific calculator ● Set up kinematic equations and explain their variables for motion in 1D ● Define and conceptualize motions, forces, and general mechanics spatially. ● Compound or rearrange formulas to solve for an unknown ● Converting units	**By the end of the quarter students will be able to _____ (must be measurable by assessments):** ● Convert between imperial and metric units to properly solve equations ● Use the five kinematic equations to solve for acceleration, velocity, time, and displacement ● Describe the difference between scalar and vector quantities ● Define hypothesis and be able to construct them ● Be able to relate information between Displacement/Time Graphs and Velocity/Time Graphs
Major Assessments/Projects: Tests, Quizzes, Homework, Projects, Notebook Checks, Labs and Lab Reports	

UBD Quarter 2

Major Topics Covered/Guiding Questions: ● 2D Motion ● Dynamics ● Forces, Momentum and Impulses ● Rotational Motion ● Torque, Angular Momentum and Rolling	**Materials/Resources (Please specify if these are distributed to each individual student, given to groups of students, posted online for all students, or just to be used by teacher):** ● Access to textbook, either physical copy or online PDF (each student) ● Access to graphing calculator, either through physical calculator or Desmos app (each student) ● Projector ● Notebook and Folder exclusively for Physics
Skills students will develop: ● Properly use a scientific calculator ● Set up kinematic equations and explain their variables for motion in 2D and rotational motion ● Define and conceptualize motions, forces, and general mechanics spatially. ● Compound or rearrange formulas to solve for an unknown ● Converting units ● Understanding Newton's first three Laws of Motion ● Understanding Linear Momentum ● Understanding Elastic and Inelastic Collisions	**By the end of the quarter students will be able to _____ (must be measurable by assessments):** ● List Newton's first three Laws of Motion ● Describe how Force relates to previously learned kinematic equations ● Be able to use force to solve questions relating to the five kinematic equations ● Solve Vector Addition problems ● Solve Inclined Planes problems ● Solve Projectile Motion problems ● Be able to use the 5 rotational kinematic equations to solve for angle of rotation, angular velocity, angular acceleration, and standard kinematic values
Major Assessments/Projects: Tests, Quizzes, Homework, Projects, Notebook Checks, Labs and Lab Reports	

UBD Quarter 3

Major Topics Covered/Guiding Questions: ● Work, Energy and Power ● Thermodynamics ● Oscillations and Waves ● Simple Harmonic Motion	**Materials/Resources (Please specify if these are distributed to each individual student, given to groups of students, posted online for all students, or just to be used by teacher):** ● Access to textbook, either physical copy or online PDF (each student) ● Access to graphing calculator, either through physical calculator or Desmos app (each student) ● Projector ● Notebook and Folder exclusively for Physics
Skills students will develop: ● Define and conceptualize Work, Energy, and Power ● Define and conceptualize the relationship between Heat, Energy, and Force ● Define and conceptualize waves ● Define Simple Harmonic Motion	**By the end of the quarter students will be able to _____ (must be measurable by assessments):** ● Be able to solve Ideal Mechanical Advantage problems ● Define efficiency for simple machines and what hinders that efficiency ● Describe and calculate Work and Power ● Apply the Work-Energy Theorem ● Explain the Law of Conservation of Energy ● Explain the Zeroth, First, and Second Laws of Thermodynamics ● Describe the workings of Heat Pumps, Heat Engines, and Refrigerators ● Distinguish between the types of waves (Pulse/Periodic, Transverse/Longitudinal) ● Distinguish between the period, frequency, wavelength, and amplitude, and velocity of waves ● Use Hooke's Law to solve Simple Harmonic Motion equations
Major Assessments/Projects: Tests, Quizzes, Homework, Projects, Notebook Checks, Labs and Lab Reports	

UBD Quarter 4

Major Topics Covered/Guiding Questions: ● Sound ● Light ● Charges, Electric Fields and Electrostatics ● Magnetism and Making Electricity ● Basic Electronics	**Materials/Resources (Please specify if these are distributed to each individual student, given to groups of students, posted online for all students, or just to be used by teacher):** ● Access to textbook, either physical copy or online PDF (each student) ● Access to graphing calculator, either through physical calculator or Desmos app (each student) ● Projector ● Notebook and Folder exclusively for Physics
Skills students will develop: ● Define and conceptualize how Electricity and basic circuitry works. ● Define and conceptualize waves, particularly in regards to Sound and Light	**By the end of the quarter students will be able to _____ (must be measurable by assessments):** ● Relate properties of waves to soundwaves ● Describe and explain sonic booms and the Doppler Effect ● Describe pitch and loudness ● Explain the Decibel Scale ● Explain natural frequencies and harmonics ● Relate properties of waves to lightwaves ● Define the electromagnetic spectrum and describe it in terms of frequencies and wavelengths ● Describe the behavior of electromagnetic radiation ● Describe positive and negative electric charges ● Characterize materials as conductors or insulators based on their electrical properties ● Describe electric polarization and charging by induction ● Describe Coulomb's Law ● Explain the properties of capacitors and dielectrics ● Describe Ohm's Law ● Interpret circuit diagrams and diagram basic circuit elements ● Interpret circuit diagrams with parallel resistors
Major Assessments/Projects: Tests, Quizzes, Homework, Projects, Notebook Checks, Labs and Lab Reports	