Academic Physics 2

Physics 2 is a course designed for those students who would like to investigate topics in physics beyond those covered in their eleventh grade physics course. The course covers four main areas of study including engineering, astrophysics, vibrations and waves and electricity and magnetism. Students will gain a better understanding and appreciation for common physical phenomena that they experience in their everyday lives, as well as the nature of the cosmos. Mathematics is the language of physics; therefore, a strong mathematical background is needed for the course.

Class Website - https://sites.google.com/site/daysphysicsclass/
Email - mday@efsd.net
Phone - 412-896-2349 ext. 7902
Twitter - @MDayEF

BE SAFE	Listen to staff and Maintain personal space
RESPECT OTHERS	Be on time, Be polite, and Use appropriate language and tone
ACCOUNTABLE	Be prepared, Be honest, Do your own work, and Use electronic devices only when permitted
VICTORIOUS	Do your best work and Celebrate academic success
ENTHUSIASTIC	Have a positive attitude and Take ownership of learning

ACADEMIC INTEGRITY - SCIENCE

- Try! Listen! Think!
- Use your iPad and phone for educational purposes
- Be prepared for your class
- Follow directions
- Be safe in the lab
- Do not cheat
- Do not get off task or give up
- Do not damage school property

Grading Procedures

1. Grades are based on tests, quizzes, labs, projects, and homework.
    - Assignments will be given and collected daily.
    - Laboratory write-ups will be due the day after the lab is completed in class.
    - Quizzes will be given at various times during a chapter.
        - Make-up quiz will be different than the quiz given on the scheduled quiz date.
    - Tests will be given at the end of a chapter and will consist of problems and concepts.
        - Make-up test will be different than the test given on the scheduled test date.
    - Bonus points will be offered at various times during the year.
2. **As per school policy:** No assignments will be taken late. Any assignment that is not turned in on the due date will be given an automatic zero.
3. **As per school policy:** Students will be given one day to make up assignments for every day they are absent. Any assignments not turned in by this make-up date will be given a zero.
4. **As per school policy:** No credit will be given for assignments that are partially or completely copied from someone else's work.

Classroom Rules and Procedures

1. Be in your seat and ready to work when the bell rings.
2. Students will only be allowed to leave class with permission.
3. Answer bell ringer questions as soon as you enter class and prepare for class to begin. Bell ringers are timed (4 minutes after bell rings) and reviewed every day.
4. Your iPad is all you will be required to bring to class daily.
    a. Your iPad is a school issued resource; I expect it to only be used as such during my class.
    b. If you choose to use your phone it may only be used for educational proposes as well.
    c. All electronics must be placed flat on the table at all times.
5. All students will be paired with another student.
    - Your partner is the person sharing your table.
    - You will be expected to help each other understand class material.
    - Groups will be split and students will work individually if both students are not actively working.
    - Students will only be permitted to talk to their partner.
6. Students are responsible for all of their own make-up work.
    - The daily list of topics covered and assignments given will be listed on the calendar on the classroom website, on Canvas, and in the weekly email.
7. Closers will be given with 3 minutes remaining in each class.

Actions for breaking classroom rules

1. Warning
2. Student conference / Parent email
3. Teacher detention / Parent phone call
4. Office referral – An office referral will be issued for all following offences

❖ **I have reviewed and understand all of the information presented on this page.**

Student: Name _____

Signature _____

Email Address: _____

Parent / Guardian: Name _____

Signature _____

Email Address: _____

Syllabus – Academic Physics 2

Introduction to classroom rules and class website
Chapter 1 – The Cosmic Landscape
- Notes – The Earth to The Universe
- Notes – Gravity to The Scientific Method
- WS - Review - The Cosmic Landscape
- Test – The Cosmic Landscape

Chapter 2 – History of Astronomy
- Notes – Prehistoric Astronomy (through constellations)
  - WS – Star Finding and Constellations
- Notes – Prehistoric Astronomy (through retrograde motion)
- WS – Horoscope Activity
- Notes – The Moon through The Shadows of Alexadria
  - WS – A More Rounded View of the Earth (.5 period)
- Notes – Distance and Size of the Sun and Moon through Brahe
  - WS – The Motion of Mars
- Notes – Kepler to The Growth of Astrophysics
  - WS – The Heliocentric Model
- Lab – Ellipse Creation
- WS – Review – The History of Astronomy (date sensitive) - Equinox Activity
- Test – The History of Astronomy

Chapter 3 – Gravity and Motion
- Notes – Intro through Circular Motion
- Problem Session – Centripetal Acceleration
- Notes – Inertia through Centripetal Force
- Problem Session – Centripetal Force
- Simulation Lab – Gravity and Orbits
- Notes – Orbital Motion and Gravity through Universal Gravitational Force
- Problem Session – Universal Gravitational Force
- Simulation Lab – Gravity Force
- WS – Our Home: Planet Earth
- Notes – Kepler's Laws
- Problem Session – Kepler's Laws
- Simulation Lab – My Solar System
- Notes – Surface Gravity
- Problem Session – Surface Gravity
- Notes – Escape Velocity
- Problem Session – Escape Velocity
- Simulation Lab – Lunar Landing
- WS – Test Review – Gravity and Motion
- Test – Gravity and Motion

Chapter 4 – Survey of the Solar System
- Notes - Introduction through Condensation in the Solar Nebula
- Notes - Accretion and Planetesimals through The Sun
- Through the Wormhole – What happened before the Beginning
- Notes – The Planets
- Problem Session – Density
- Notes – Bode's Law
  - Problems Session – Bode's Law
  - Draw a scale diagram of the Solar System
- Notes – Satellites through Comets
  - Essay – Why do we have an asteroid belt and not another planet?
- Notes – Meteors through Giant Impacts
- Movie Armageddon – Worksheet and Essay
- WS – Test review – Survey of the Solar System
- Test – Survey of the Solar System

Chapter 5 – The Planets
- Notes – Through Earth
- Notes – Through Jupiter
- Notes – Through Neptune
- Test Review – The Planets
- Test – The Planets

Chapter 6 – Vibrations and Waves
- Notes – SHM and Hooke's Law
- Problem Session – Hooke's Law
- LQ Lab – Period of a Pendulum
- Concept Review - SHM
- Quiz – Simple Harmonic Motion
- Notes – Finding SHM
- Problem Session – SHM of a Pendulum
- Problem Session – SHM of a Mass-Spring System
- LQ Lab – Simple Harmonic Motion
- Math Skills – Measuring SHM
- Quiz – Measuring SHM
- Notes – Wave Motion through wave Speed
- Problem Session – Wave Speed
- Concept Review – Properties of Waves
- Quiz – Properties of Waves
- Notes – Wave Interactions
- Graph Skills – Wave Interactions
- Quiz – Wave Interactions
- Lab – Waves in a Slinky
- Mixed Test Review – Vibrations and Waves
- Test – Vibrations and Waves

Chapter 7 – Sound
- Notes – Speed of Sound
- Concept Review – Sound Waves
- Section Quiz – Sound Waves
- LQ Lab – Speed of Sound
- Notes – Sound Intensity and Resonance
- Problem Session – Intensity of Sound Waves
- Concept Review – Sound Intensity and Resonance
- Section Quiz – Sound Intensity and Resonance
- LQ Lab – Sound Waves and Beats
- Notes – Harmonics
- Problem Session – Harmonics
- Diagram Skills – Harmonics
- Section Quiz – Harmonics
- LQ Lab – Mathematics of Music
- Mixed Test Review – Sound
- Test – Sound

Chapter 8 – Light and Reflection
- Notes – Electromagnetic Waves
- Problem Session – Electromagnetic Waves
- Concept Review – Characteristics of Light
- Section Quiz – Characteristics of Light
- LQ Lab – Light, Brightness and Distance
- Notes – Reflection (Flat Mirrors)
- Diagram Skills – Flat Mirrors
- Section Quiz – Flat Mirrors
- Notes – Reflection (Concave Mirrors)
- Problem Session – Imaging with Concave Mirrors
- Notes – Reflection (Convex Mirrors)
- Problem Session – Convex Mirrors
- Diagram Skills – Curved Mirrors
- Section Quiz – Curved Mirrors
- Notes – Color and Polarization
- Concept Review – Color and Polarization
- Section Quiz – Color and Polarization
- Simulation Lab – Color Vision
- LQ Lab – Polarization of Light
- Mixed Review – Light and Reflection
- Test – Light and Reflection

Chapter 9 – Refraction
- Notes – Refraction
- Problem Session – Refraction
- Simulation Lab – Bending Light
- Concept Review – Refraction
- Section Quiz - Refraction
- Notes - Lenses
- Problem Session – Thin Lenses
- Diagram Skills – Thin Lenses
- Section Quiz – Thin Lenses
- Notes – Total Internal Reflection
- Problem Session –Critical Angle

- Concept Review – Optical Phenomena
- Section Quiz – Optical Phenomena
- Mixed Review – Refraction
- Test – Refraction

Chapter 10 – Electric Forces and Fields
- Notes – Electric Charge
- Problem Session – Coulomb's Law
- Concept Review –Electric Charge
- Section Quiz – Electric Charge
- Notes – Superposition Principle
- Problem Session – Superposition Principle
- Notes – Equilibrium
- Problem Session – Equilibrium
- Math Skills – Electric Force
- Section Quiz – Electric Force
- Notes – Electric Field
- Concept Review – The Electric Field
- Section Quiz – The Electric Field
- WS – How stuff works – "electricity"
- Mixed Review – Electric Forces and Fields
- Test – Electric Forces and Fields

Chapter 11 – Electrical Energy and Current
- Notes – Electric Potential Energy
- Concept Review – Electric Potential
- Problem Session – Potential Energy and Potential Difference
- Section Quiz – Electric Potential
- Simulation Lab – Voltage
- Notes – Capacitance
- Concept Review – Capacitance
- Problem Session – Capacitance
- Section Quiz – Capacitance
- Simulation Lab – Capacitors
- Notes – Current and Drift Velocity
  - Problem Session – Current
- Notes – Resistance
  - Problem Session – Resistance
- Concept Review – Current and Resistance
- Section Quiz – Current and resistance
- Simulation Lab – Batteries, Resistors, and Current
- Notes – Energy Transfer and Electric Energy
  - Problem Session – Electric Power
- Notes – Cost of Electrical Energy
  - Problem Session – Cost of Electrical Energy
- Concept Review – Electric Power
- Section Quiz – Electric Power
- Mixed Review – Electric Energy and Current
- Test – Electric Energy and Current

Chapter 12 – Circuits and Circuit Elements
- Notes – Electric Circuits
- Diagram Skills – Schematic Diagrams and Circuits
- Section Quiz – Schematic Diagrams and Circuits
- Notes – Resistors in Series
- Problem Session – Resistors in Series
- Notes – Resistors in Parallel
- Concept Review – Resistors in Series or in Parallel
- Section Quiz – Resistors in Series or in Parallel
- Problem Session – Resistors in Parallel
- Notes – Resistors Combined Both in Parallel and Series
- Problem Session – Equivalent Resistance
- Concept Review – Complex Resistor Combinations
- Section Quiz – Complex Resistor Combinations
- Mixed Review – Circuits and Circuit Elements
- Test – Circuit and Circuit Elements