

Phoenix Christian High School SCI410H Honors Physics Course Scope & Sequence (2010)

COURSE DESCRIPTION

Physics is an honors lab course that seeks to integrate theory with practice, and examines the fact and process in seeking to understand the nature of the physical world.

The grading for each quarter of physics is as follows: 60% - average of all tests, 20% - average of all homework and quizzes, 20% - average of all labs.

REQUIRED TEXTS AND *KEY SUPPLEMENTAL MATERIALS

Conceptual Physics, Prentice Hall

Concept Development, Prentice Hall

Practice Book for Conceptual Physics, Prentice Hall

Laboratory Manual for Conceptual Physics, Prentice Hall

COURSE SCOPE AND SEQUENCE

First Semester

Creation-Evolution Perspective In Physics, Linear Motion 2 Weeks

Key Concepts: Motion Is Relative, Speed, Velocity, Free Fall-How Fast, How Far, Air Resistance and Falling Objects.

Assessments: Unit Test, Homework, Quizzes, Labs.

Biblical Integration: Christianity is not science. Evolution is not science. Science appears to support the biblical view of origins.

Projectile Motion 2 Weeks

Key Concepts: Vector and Scalar Quantities, Velocity Vectors, Components of Vectors, Seemingly complex Projectile Motion can be separated into simpler motions indicating an ultimate Designer of laws of motion, Upwardly Launched Projectiles, Fast-Moving Projectiles, Satellites.

Assessments: Unit Test, Homework, Quizzes, Labs.

Newton's First Law- Inertia 2 Weeks

Key Concepts: Mass, Net Force, Equilibrium, Vector Addition of Forces.

Assessments: Unit Test, Homework, Quizzes, Labs.

Biblical Integration: Aristotle's, Copernicus's, and Galileo's View of Motion, Copernicus, Galileo, Newton pursued development of basic motion laws because they knew there was a natural order from a Creator.

Newton's Second Law 2 Weeks

Key Concepts: Force Causes Acceleration, Mass Resists Acceleration, Second Law, Friction, Applying Force-Pressure, Free Fall Explained Falling and Air Resistance.

Assessments: Unit Test, Homework, Quizzes, Labs.

Newton's 3rd Law-Action-Reaction 1 Week
Key Concepts: Forces And Interactions, 3rd Law, Identifying Action-Reaction, A-R on Different Masses, Canceling A-R?, Horse-Cart Problem.
Assessments: Unit Test, Homework, Quizzes, Labs.

Momentum 2 Weeks
Key Concepts: Impulse Changes Momentum, Bouncing, Conservation of Momentum, Collisions, Momentum Vectors.
Assessments: Unit Test, Homework, Quizzes, Labs.

Energy 2 Weeks
Key Concepts: Work, Power, Mechanical Energy, Potential Energy, Kinetic Energy, Conservation of Energy, Machines, Efficiency, Energy For Life.
Assessments: Unit Test, Homework, Quizzes, Labs.
Biblical Integration: Man must work by the sweat of his brow,(Genesis 2) but always seeking more efficiency.

Circular Motion 2 Weeks
Key Concepts: Rotation And Revolution, Rotational Speed, Centripetal Force And Centrifugal Force, Simulated Gravity
Assessments: Unit Test, Homework, Quizzes, Labs.
Biblical Integration: The author of text is an evolutionist who emphasizes space stations to flee earth in the distant future when it becomes uninhabitable. This is contrasted with the Lord's coming.

Rotational Mechanics 1 Week
Key Concepts: Torque, Balanced Torques, Torque And Cg, Rotational Inertia, Conservation Of Angular Momentum.
Assessments: Unit Test, Homework, Quizzes, Labs.

Universal Gravitation 2 Weeks
Key Concepts: Falling Apple, Falling Moon, Falling Earth, Universal Law, Inverse Square Law, Universal Gravitation
Assessments: Unit Test, Homework, Quizzes, Labs.

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Second Semester

Special Relativity 2 Weeks
Key Concepts: Space Time, Relativity Of Motion, C as A Constant, 1st and 2nd Postulates Time Dilation, Twin Trip, Length Contraction, Momentum and Inertia in Relativity, KE in Relativity, The Correspondence Principle.
Assessments: Unit Test, Homework, Quizzes, Labs.
Biblical Integration: Einstein, like Newton, knew there was a Creator of Time, Space and Matter and the origin of order.

Temperature, Heat And Expansion 2 Weeks
Key Concepts: Thermal Equilibrium, Internal Energy, Specific Heat Capacity, High Specific Heat of Water, Thermal Expansion, Expansion of Water.
Assessments: Unit Test, Homework, Quizzes, Labs.

Thermodynamics 2 Weeks
Key Concepts: Absolute Zero, 1st Law of Thermo, Adiabatic Processes, 2nd Law, Heat Engines and the 2nd Law, Entropy.
Assessments: Unit Test, Homework, Quizzes, Labs.
Biblical Integration: The first and second Laws of Thermodynamics are perhaps the two fundamental scientific laws-and both biblically based-invalidating fundamental naturalistic evolutionary dogma.

Vibrations And Waves 3 Weeks
Key Concepts: Pendulum, Wave Description, Wave Speed and Motion, Transverse Waves, Longitudinal Waves, Interference, Standing Waves, Doppler Effect, Bow Waves, Shock Waves.
Assessments: Unit Test, Homework, Quizzes, Labs.

Light 2 Weeks

Key Concepts: Early Concepts of Light, Speed of Light, EM Waves, Transparent Materials, Opaque Materials, Shadows, Polarization, Polarized Light and 3-D Viewing.

Assessments: Unit Test, Homework, Quizzes, Labs.

Biblical Integration: Genesis 1 –‘Let there be light’, the wonder of the EM spectrum. Einstein’s view of light.

Electrostatics 2 Weeks

Key Concepts: Electrical Forces and Charges, Conservation of Charge, Coulomb’s Law. Conductors and Insulators, Charging by Friction and Contact, Charging by Induction, Charge Polarization.

Assessments: Unit Test, Homework, Quizzes, Labs.

Biblical Integration: Strength of electrical forces compared to other fundamental forces speaks of an omnipotent Source of the fundamental forces.

Electric Fields And Potential 2 Weeks

Key Concepts: Electric Fields, Lines, And Shielding, Electric Potential Energy, Potential, Electrical Energy Storage, Van De Graff Generator

Assessments: Unit Test, Homework, Quizzes, Labs.

Electric Current 2 Weeks

Key Concepts: Flow of Charge, Electric Current, Voltage Sources, Electric Resistance, Ohm’s Law, Electric Shock, Dc and Ac, Speed of Electrons in a Circuit, Electric Power, Series and Parallel Circuits.

Assessments: Unit Test, Homework, Quizzes, Labs.