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Physics Scope & Sequence

1st Six Weeks (25 Days) August 14th-September 19th	2nd Six Weeks (27 Days) September 24th-November 1st
Unit 0: Getting Started/ (5 days) Aug. 14th-20th ❖ **Safety: Establish Procedures and Routines** ➢ Science Safety Rules ➢ Lab rules and expectations/Equipment/Setup ➢ Interactive Notebooks **Unit 1: Linear Motion (20 Days) Aug. 21st-Sep. 19th** ❖ **Big Ideas:** Just as distance and displacement have distinctly different meanings (despite their similarities), so do speed and velocity. Speed and velocity are kinematic quantities that have distinctly different definitions. ➢ **Important Concepts**: ■ Generate and interpret graphs and charts describing different types of motion and motion in one dimension using equations and graphical vector addition ■ Differentiate between vector and scalar quantities. ■ Distinguish between distance and displacement. ■ Distinguish between speed and velocity. ■ Distinguish between average velocity and instantaneous velocity. ■ Describe the motion of an object in freefall. ■ Solve for any variable using kinematic equations ➢ **Readiness TEKS: P.4A, P.4B** ➢ **Supporting TEKS: None**	**Unit 2: Forces and Laws of Motion (13 Days) Sep. 24th-Oct. 10th** ❖ **Big Ideas**: Forces act in pairs, unbalanced forces cause acceleration which is the change in velocity of an object, these changes can be diagrammed on a Free-body diagram. ➢ **Important Concepts**: ■ Effect of forces on objects- law of inertia, the relationship between force and acceleration, and the nature of force pairs between objects, including free – body force diagrams ➢ **Readiness TEKS: P.4D** ➢ **Supporting TEKS: None** **Unit 3: Motion in 2 Dimensions (14 Days) Oct. 15th-Nov. 1st** ❖ **Big Ideas**: Two-dimensional motion is the study of movement in two directions, including the study of motion along a curved path, such as projectile and circular motion. ➢ **Important Concepts:** ■ Accelerated motion in two dimensions, including using equations, graphical vector addition. ■ Projectile and circular motion. ■ Velocity vectors are used to measure velocity along a curved path. ■ In order to study motion along a curved path, students must begin with an understanding of how to measure velocity along a curved path. ■ A vector is more than a number. It has both magnitude and direction. On a graph or diagram, it is represented by an arrow ➢ **Readiness TEKS: None** ➢ **Supporting TEKS: P.4C**

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3rd Six Weeks (26 Days) November 6th-December 19th	4th Six Weeks (31 Days) January 7th-February 21st
Unit 4: Fundamental (Gravitational) Force and Mechanical Energy, Momentum and Impulse (25 Days) Nov. 6th-Dec. 19th ❖ **Big Ideas:** The force of gravitational attraction between the Earth and other objects is inversely proportional to the distance separating the earth's center from the object's center. If the net force on a closed system is zero, the total momentum of the system is conserved. ➢ **Important Concepts:** ■ Gravitational, electromagnetic, weak nuclear, and strong nuclear forces. . ■ Magnitude of the gravitational force between two objects depends on their masses and the distance between their centers. ■ Mechanical energy of power generated within, impulse applied to, and momentum of a physical system. ➢ **Readiness TEKS: P.5B, P.6C** ➢ **Supporting TEKS: P.5A**	**Unit 0: Getting Started/ (5 days) Jan. 7th-13th** ❖ **Safety: Establish Procedures and Routines** **Unit 0: Getting Started/ (5 days)** ❖ **Safety: Establish Procedures and Routines** ➢ Science Safety Rules ➢ Lab rules and expectations/Equipment/Setup ➢ Interactive Notebooks **Unit 5: Work – Energy Theorem, Energy Transformations and Conservation (14 Days) Jan. 14th-31st** ❖ **Big Ideas**: Waves propagate energy through matter and space. Vibrating objects produce pressure variations known as soundwaves, and many can be detected by the human ear. Light is a form of energy and possesses both particle properties and wave properties. ➢ **Important Concepts**: ■ Work – energy theorem in various situations. ■ Kinetic and potential energy and their transformations. ■ The net work W net is the work done by the net force acting on an object. ■ Work done on an object transfers energy to the object. ■ The translational kinetic energy of an object of mass m moving at speed v is KE =$1/2mv^2$. ■ The work-energy theorem states that the network W_{net} on a system changes its kinetic energy, W_{net}.= $1/2mv_f^2$-$1/2mv_i^2$ ■ Laws of conservation of energy and conservation of momentum in one direction ➢ **Readiness TEKS: P.6A, P.6B, P.6D** ➢ **Supporting TEKS: None**

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	Unit 6: Thermodynamics and Thermal Energy Transfer (13 Days) Feb. 3rd-21st ❖ **Big Ideas:** Thermodynamics deals with the study of energy and the conversion of energy. ➢ **Important Concepts**: ■ Four laws of thermodynamics and the processes of thermal energy transfer. ➢ **Readiness TEKS: None** ➢ **Supporting TEKS: P.6E**
5th Six Weeks (33 Days) **February 24th-April 17th**	**6th Six Weeks (31 Days)** **April 20th-June 2nd**
Unit 7: Wave Propagation and Characteristics and Characteristics, Behaviors of Electromagnetic and Sound Waves, and Image Formation and Photoelectric Effect (21 Days) Feb. 24th-Mar. 31st ❖ **Big Ideas**: Waves propagate energy through matter and space. Vibrating objects produce pressure variations known as soundwaves, and many can be detected by the human ear. Light is a form of energy and possesses both particle properties and wave properties. ➢ **Important Concepts:** ■ Define amplitude, frequency, period, wavelength, and velocity of a wave Relate wave frequency, period, wavelength, and velocity. ■ Solve problems involving wave properties Oscillatory motion and wave propagation in various types of media. ■ Relationship between wave speed, frequency, and wavelength. ■ Compare characteristics and behaviors of transverse waves, and characteristics and behaviors of longitudinal waves, ■ Behaviors of waves, including reflections, diffraction, interference, resonance, and the Doppler effect ■ Image formation due to reflection from a plane mirror and refraction through a thin convex lens. ■ Photoelectric Effect and dual nature of light. ■ Emission spectra produced by various atoms.	**Unit 9: Electric Circuits: (15 Days) Apr. 20th-May 8th** ❖ **Big Ideas**: Electrical currents carry electricity that can be transformed into other forms of energy and circuit components can be placed in series, in parallel or in a combination of series and parallel. ➢ **Important Concepts**: ■ Characterize materials as conductors or insulators based on their electric properties. ■ Calculate current, electric circuit in series and parallel combinations. ➢ **Readiness TEKS: P.5F** ➢ **Supporting TEKS: P.5E** **Unit 10: Application of Atomic and Nuclear Physics (10 Days) May 11th-22nd** ❖ **Big Ideas**: Nuclear Physics has a vast range of applications and that the transformation of one type of element into another is the basis of *nuclear reactions*, which cause one nucleus to change into a different nucleus. ➢ **Important Concepts**: ■ Compare and explain the emission spectra produced by various stars ■ Calculate and describe the applications of mass-energy equivalence ■ Applications of atomic and nuclear phenomena, nuclear stability, fission and fusion, radiation therapy, diagnostic

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- Applications of mass – energy equivalence

➢ **Readiness TEKS: P.7B, P.7D, P.8A**

➢ **Supporting TEKS: P.7A, P.7C, P.7E, P.8B, P.8C**

Unit 8: Electric and Magnetic Forces (12 Days)Apr. 1st-17th

❖ **Big Ideas**: Our world is governed by electromagnetic interactions. All chemical bonds, the strength and weakness of materials, light, the influences that form and control living things are all aspects of electromagnetism. Electromagnetic force is associated with a fundamental property of matter.

➢ **Important Concepts**:

- Magnitude of electric force between two objects depends on their charges and the distance between their centers.
- Use of Electric and Magnetic forces in daily life application such as in generators, motors, and transformers

➢ **Readiness TEKS: None**

➢ **Supporting TEKS: P.5A, P.5D, P.5E**

imaging, semiconductors, superconductors, solar cells, and nuclear power.

➢ **Readiness TEKS: None**

➢ **Supporting TEKS: P.8B, P.8C, P.8D**

Note: The process standards are embedded in concept standards so that the student, for at least 40% of instructional time, conducts laboratory and field investigations