Principle of Technology TEKS/LINKS – Student Objectives One Credit	**Suggested Time Ranges**
First Six Weeks	
Professional & Employability Skills PT 1(A) The student will demonstrate knowledge of how to dress appropriately, speak politely, and conduct oneself in a manner appropriate for the profession. PT 1(B) The student will show the ability to cooperate, contribute, and collaborate as a member of a group in an effort to achieve a positive collective outcome. PT 1(C) The student will present written and oral communication in a clear, concise, and effective manner. PT 1(D) The student will demonstrate time-management skills in prioritizing tasks, following schedules, and performing goal-relevant activities in a way that produces efficient results. PT 1(E) The student will demonstrate punctuality, dependability, reliability, and responsibility in performing assigned tasks as directed.	1 day ongoing
Lab Safety & Equipment – Ongoing 40% PT 2(A) The student will demonstrate safe practices during laboratory and field investigations. PT 2(B) The student will demonstrate an understanding of the use and conservation of resources and the proper disposal or recycling of materials. PT 5(D) The student will demonstrate the appropriate use and care of laboratory equipment. PT 6(A) The student will master relevant safety procedures. PT 6(B) The student will comply with safety guidelines as described in various manuals, instructions, and regulations. PT 6(C) The student will identify and classify hazardous materials and wastes. PT 6(D) The student will make prudent choices in the conservation and use of resources and the appropriate disposal of hazardous materials and wastes. PT 3(F) The student will collect and organize qualitative and quantitative data and make measurements with accuracy and precision using tools such as multimeters (current, voltage, resistance), triple 9 beam balances, batteries, clamps, dynamics demonstration equipment, collision apparatus, data acquisition probes, discharge tubes with power supply (H, He, Ne, Ar), hand-held visual spectroscopes, hot plates, slotted and hooked lab masses, bar magnets, horseshoe magnets, plane mirrors, convex lenses, pendulum support, power supply, ring clamps, ring stands, stopwatches, trajectory apparatus, tuning forks, carbon paper, graph paper, magnetic compasses, polarized film, prisms, protractors, resistors, friction blocks, mini lamps (bulbs) and sockets, electrostatics kits, 90-degree rod clamps, metric rulers,	5 days ongoing

Principle of Technology TEKS/LINKS – Student Objectives One Credit	**Suggested Time Ranges**
spring scales, knife blade switches, Celsius thermometers, meter sticks, scientific calculators, graphing technology, computers, cathode ray tubes with horseshoe magnets, ballistic carts or equivalent, resonance tubes, spools of nylon thread or string, containers of iron filings, rolls of white craft paper, copper wire, Periodic Table, electromagnetic spectrum charts, slinky springs, wave motion ropes, and laser pointers. PT 3(G) The student will use a wide variety of additional course equipment as appropriate such as ripple tank with wave generator, wave motion rope, micrometer, caliper, radiation monitor, computer, ballistic pendulum, electroscope, inclined plane, optics bench, optics kit, pulley with table clamp, resonance tube, ring stand screen, four-inch ring, stroboscope, graduated cylinders, and ticker timer.	
Labs Research, Analysis & Reports - Ongoing PT 3(A) The student will know the definition of science and understand that it has limitations, as specified in subsection (b)(4) of this section. PT 3(B) The student will know that scientific hypotheses are tentative and testable statements that must be capable of being supported or not supported by observational evidence. Hypotheses of durable explanatory power, which have been tested over a wide variety of conditions, are incorporated into theories. PT 3(C) The student will know that scientific theories are based on natural and physical phenomena and are capable of being tested by multiple independent researchers. Unlike hypotheses, scientific theories are well-established and highly-reliable explanations, but may be subject to change as new areas of science and new technologies are developed. PT 3(D) The student will distinguish between scientific hypotheses and scientific theories. PT 3(E) The student will design and implement investigative procedures, including making observations, asking well-defined questions, formulating testable hypotheses, identifying variables, selecting appropriate equipment and technology, and evaluating numerical answers for reasonableness. PT 3(I) The student will identify and quantify causes and effects of uncertainties in measured data. PT 3(J) The student will organize, evaluate, and make inferences from data, including the use of tables, charts, and graphs. PT 3(K) The student will communicate valid conclusions supported by the data through various methods such as lab reports, labeled drawings, graphic organizers, journals, summaries, oral reports, and technology-based reports. PT 3(L) The student will express and manipulate relationships among physical variables quantitatively, including the use of graphs, charts, and equations.	1 day ongoing

Principle of Technology TEKS/LINKS – Student Objectives One Credit	Suggested Time Ranges
Scientific/Research - Ongoing PT 4(A) The student will in all fields of science, analyze, evaluate, and critique scientific explanations by using empirical evidence, logical reasoning, and experimental and observational testing, including examining all sides of scientific evidence of those scientific explanations, so as to encourage critical thinking. PT 4(B) The student will communicate and apply scientific information extracted from various sources such as current events, news reports, published journal articles, and marketing materials. PT 4(C) The student will draw inferences based on data related to promotional materials for products and services. PT 4(D) The student will explain the impacts of the scientific contributions of a variety of historical and contemporary scientists on scientific thought and society. PT 4(E) The student will research and describe the connections between physics and future careers. PT 4(F) The student will express and interpret relationships symbolically to make predictions and solve problems mathematically, including problems requiring proportional reasoning and graphical vector addition. **Lab Documentation & Measurement - Ongoing** PT 5(A) The student will demonstrate the understanding that scientific hypotheses are tentative and testable statements that must be capable of being supported by observational evidence. PT 5(B) The student will demonstrate the understanding that scientific theories are based on physical phenomena and are capable of being tested by multiple independent researchers. PT 5(C) The student will design and implement investigative procedures. **Measurement** PT 5(E) The student will demonstrate accurate measurement techniques using precision instruments. PT 5(F) The student will record data using scientific notation and International System (SI) of units. PT 5(G) The student will identify and quantify causes and effects of uncertainties in measured data. **Organization/Display** PT 5(H) The student will organize and evaluate data, including the use of tables, charts, and graphs. PT 5(I) The student will communicate conclusions supported through various methods such as laboratory reports, labeled drawings, graphic organizers, journals, summaries, oral reports, or technology-based reports. PT 5(J) The student will record, express, and manipulate data using graphs, charts, and equations.	

Principle of Technology TEKS/LINKS – Student Objectives One Credit	Suggested Time Ranges
Prime Movers in Mechanical Systems **Vectors** PT 7(Aiii) and Phy 4[A] The student will generate and interpret relevant equations using graphs and charts for one- and two-dimensional motion using and describing vector forces and resolution. **Newton's Law of Motion** PT 7(B) and Phy 4[D] The student will describe and calculate the effects of forces on objects, including law of inertia and impulse and conservation of momentum. PT 7(C) and Phy 4[E] The student will develop and interpret free-body force diagrams. **Torque & Rotation** PT 7(Aii) and Phy 4[C] The student will use and describe two-dimensional equations for projectile and circular motion. PT 7(D) and Phy 4[F] The student will identify and describe motion relative to different frames of reference.	6 days
Fluid in Hydraulic System PT 10(A) and Phy 6[E] The student will describe how the macroscopic properties of a thermodynamic system such as temperature, specific heat, and pressure are related to the molecular level of matter, including kinetic or potential energy of atoms. PT 7(C) and Phy 4[E] The student will develop and interpret free-body force diagrams.	5 days
Newton's Law of Gravitation PT 7(B) and Phy 4[D] The student will describe and calculate the effects of forces on objects, including law of inertia and impulse and conservation of momentum. PT 7(C) and Phy 4[E] The student will develop and interpret free-body force diagrams. PT 7(D) and Phy 4[F] The student will identify and describe motion relative to different frames of reference. **Electrical Force** PT 8(G) The student will design and construct both series and parallel circuits and calculate current, potential difference, resistance, and power of various circuits. PT 8(C) and Phy 5[C] The student will describe and calculate the magnitude of electrical forces.	5 days
Temperature in Thermal Systems – Specific Heat PT 10(A) and Phy 6[E] The student will describe how the macroscopic properties of a thermodynamic system such as temperature, specific heat, and pressure are related to the molecular level of matter, including kinetic or potential energy of atoms.	5 days

Principle of Technology TEKS/LINKS – Student Objectives One Credit	**Suggested Time Ranges**
PT 10(B) and Phy 6[F] The student will contrast and give examples of different processes of thermal energy transfer, including conduction, convection, and radiation. PT 10 (C) and Phy 6[G] The student will analyze and explain technological examples such as solar and wind energy that illustrate the laws of thermodynamics, including the law of conservation of energy and the law of entropy.	
Second Six Weeks	
Work by Force in Mechanical Systems PT 9(A) and Phy 6[A] The student will describe the transformational process between work, potential energy, and kinetic energy (work-energy theorem). PT 9(B) and Phy 6[B] The student will use examples to analyze and calculate the relationships among work, kinetic energy, and potential energy. PT 9(C) and Phy 6[C] The student will describe and calculate the mechanical energy of, the power generated within, the impulse applied to, and the momentum of a physical system. PT 9(D) and Phy 6[D] The student will describe and apply the laws of conservation of energy and conservation of momentum.	5 days
Work in Fluid Systems – Hydraulic System PT 10(A) and Phy 6[E] The student will describe how the macroscopic properties of a thermodynamic system such as temperature, specific heat, and pressure are related to the molecular level of matter, including kinetic or potential energy of atoms. PT 7(B) and Phy 4[D] The student will describe and calculate the effects of forces on objects, including law of inertia and impulse and conservation of momentum. PT 7(C) and Phy 4[E] The student will develop and interpret free-body force diagrams.	7 days
Work in Electrical Systems – Voltage PT 8(C) and Phy 5[C] The student will describe and calculate the magnitude of electrical forces. PT 8(G) The student will design and construct both series and parallel circuits and calculate current, potential difference, resistance, and power of various circuits. PT 7(C) and Phy 4[E] The student will develop and interpret free-body force diagrams.	3 days
Rate in Mechanical Systems PT 7(A) and Phy 4[A] The student will generate and interpret relevant equations using graphs and charts for one- and two-dimensional motion. PT 7(Ai) and Phy 4[B] The student will use and describe one-dimensional	5 days

Principle of Technology TEKS/LINKS – Student Objectives One Credit	**Suggested Time Ranges**
equations for displacement, distance, speed, velocity, average velocity, acceleration, and average acceleration. PT 7(D) and Phy 4[F] The student will identify and describe motion relative to different frames of reference.	
Rate in Fluid Systems PT 7(A) and Phy 4[A] The student will generate and interpret relevant equations using graphs and charts for one- and two-dimensional motion. PT 7(Ai) and Phy 4[B] The student will use and describe one-dimensional equations for displacement, distance, speed, velocity, average velocity, acceleration, and average acceleration.	5 days
Third Six Weeks	
Rate in Electrical Systems PT 7(A) and Phy 4[A] The student will generate and interpret relevant equations using graphs and charts for one- and two-dimensional motion. PT 7(Ai) and Phy 4[B] The student will use and describe one-dimensional equations for displacement, distance, speed, velocity, average velocity, acceleration, and average acceleration. PT 11(B) and Phy 7[B] The student will investigate and analyze characteristics of waves, including period, velocity, frequency, amplitude, and wavelength. PT 11(C) and Phy 7[B] The student will investigate and calculate the relationship between wave speed, frequency, and wavelength. PT 8(F) and Phy 5[E] The student will characterize materials as conductors or insulators based on their electrical properties. PT 8(G) The student will design and construct both series and parallel circuits and calculate current, potential difference, resistance, and power of various circuits.	4 days
Rate in Thermal Systems - Conductors PT 8(F) and Phy 5[E] The student will characterize materials as conductors or insulators based on their electrical properties. PT 10(B) and Phy 6[F] The student will contrast and give examples of different processes of thermal energy transfer, including conduction, convection, and radiation.	6 days
Resistance in Mechanical Systems **Newton's Law** PT 7(B) and Phy 4[D] The student will describe and calculate the effects of forces on objects, including law of inertia and impulse and conservation of momentum. PT 7(C) and Phy 4[E] The student will develop and interpret free-body force diagrams.	6 days

Principle of Technology TEKS/LINKS – Student Objectives One Credit	**Suggested Time Ranges**
PT 7(D) and Phy 4[F] The student will identify and describe motion relative to different frames of reference. PT 7(Ai) and Phy 4[B] The student will use and describe one-dimensional equations for displacement, distance, speed, velocity, average velocity, acceleration, and average acceleration. PT 10(A) and Phy 6[E] The student will describe how the macroscopic properties of a thermodynamic system such as temperature, specific heat, and pressure are related to the molecular level of matter, including kinetic or potential energy of atoms.	
Resistance in Fluid Systems PT 7(D) and Phy 4[F] The student will identify and describe motion relative to different frames of reference.	5 days
Resistance in Electrical Systems **Conductors, Insulators & Semiconductors** PT 8(F) and Phy 5[E] The student will characterize materials as conductors or insulators based on their electrical properties. PT 10(B) and Phy 6[F] The student will contrast and give examples of different processes of thermal energy transfer, including conduction, convection, and radiation. **Electrical Circuits** PT 8(G) The student will design and construct both series and parallel circuits and calculate current, potential difference, resistance, and power of various circuits.	3 days
Semester Review & Testing	1 day
Fourth Six Weeks	
Resistance in Thermal Systems PT 10(A) and Phy 6[E] The student will describe how the macroscopic properties of a thermodynamic system such as temperature, specific heat, and pressure are related to the molecular level of matter, including kinetic or potential energy of atoms. PT 10(B) and Phy 6[F] The student will contrast and give examples of different processes of thermal energy transfer, including conduction, convection, and radiation. PT 10(C) and Phy 6[G] The student will analyze and explain technological examples such as solar and wind energy that illustrate the laws of thermodynamics, including the law of conservation of energy and the law of entropy.	4 days
Energy in Mechanical & Fluid Systems **Kinetic Energy & Rotational Motion** PT 9(A) and Phy 6[A] The student will describe the transformational process	3 days

Principle of Technology TEKS/LINKS – Student Objectives One Credit	Suggested Time Ranges
between work, potential energy, and kinetic energy (work-energy theorem). PT 9(B) and Phy 6[B] The student will use examples to analyze and calculate the relationships among work, kinetic energy, and potential energy. PT 10(A) and Phy 6[E] The student will describe how the macroscopic properties of a thermodynamic system such as temperature, specific heat, and pressure are related to the molecular level of matter, including kinetic or potential energy of atoms. PT 7(Aii) and Phy 4[C] The student will use and describe two-dimensional equations for projectile and circular motion.	
Energy in Mechanical & Fluid Systems II PT 8(A) and Phy 5[A] The student will research and describe the historical development of the concepts of gravitational, electromagnetic, weak nuclear, and strong nuclear forces. PT 8(B) and Phy 5[B] The student will describe and calculate the magnitude of gravitational forces between two objects. PT 12(C) and Phy 8[C] The student will describe the significance of mass-energy equivalence.	7 days
Energy in Electrical Systems PT 9(A) and Phy 6[A] The student will describe the transformational process between work, potential energy, and kinetic energy (work-energy theorem). PT 9(B) and Phy 6[B] The student will use examples to analyze and calculate the relationships among work, kinetic energy, and potential energy. PT 10(A) and Phy 6[E] The student will describe how the macroscopic properties of a thermodynamic system such as temperature, specific heat, and pressure are related to the molecular level of matter, including kinetic or potential energy of atoms. PT 8(D) and Phy 5[D] The student will describe the nature and identify everyday examples of magnetic forces and fields. PT 8(E) The student will describe the nature and identify everyday examples of electromagnetic forces and fields. PT 8(F) and Phy 5[E] The student will characterize materials as conductors or insulators based on their electrical properties. PT 8(H) and Phy 5[G] The student will investigate and describe the relationship between electric and magnetic fields in applications such as generators, motors, and transformers.	3 days
Energy in Thermal Systems PT 10(A) and Phy 6[E] The student will describe how the macroscopic properties of a thermodynamic system such as temperature, specific heat, and pressure are related to the molecular level of matter, including kinetic or potential energy of atoms. PT 10(B) and Phy 6[F] The student will contrast and give examples of different processes of thermal energy transfer, including conduction,	7 days

Principle of Technology TEKS/LINKS – Student Objectives One Credit	**Suggested Time Ranges**
convection, and radiation. PT 10(C) and Phy 6[G] The student will analyze and explain technological examples such as solar and wind energy that illustrate the laws of thermodynamics, including the law of conservation of energy and the law of entropy.	
Power in Mechanical Systems PT 9(A) and Phy 6[A] The student will describe the transformational process between work, potential energy, and kinetic energy (work-energy theorem). PT 9(B) and Phy 6[B] The student will use examples to analyze and calculate the relationships among work, kinetic energy, and potential energy. PT 9(C) and Phy 6[C] The student will describe the concept of power. PT 9(D) and Phy 6[D] The student will describe the concepts of conservation of energy and conservation of momentum. PT 8(G) The student will design and construct both series and parallel circuits and calculate current, potential difference, resistance, and power of various circuits.	4 days
Power in Fluid Systems PT 10(A) and Phy 6[E] The student will describe how the macroscopic properties of a thermodynamic system such as temperature, specific heat, and pressure are related to the molecular level of matter, including kinetic or potential energy of atoms.	4 days
Fifth Six Weeks	
Power in Electrical Systems **Current & Circuits** PT 8(C) and Phy 5[C] The student will describe and calculate the magnitude of electrical forces. PT 8(G) The student will design and construct both series and parallel circuits and calculate current, potential difference, resistance, and power of various circuits.	5 days
Linear Momentum PT 9(C) The student will describe the concept of power. Phy 6[C] The student will calculate the mechanical energy of, power generated within, impulse applied to, and momentum of a physical system. PT 9(D) and Phy 6[D] The student will describe the concepts of conservation of energy and conservation of momentum. PT 7(B) and Phy 4[D] The student will describe and calculate the effects of forces on objects, including law of inertia and impulse and conservation of momentum. PT 10(C) and Phy 6[G] The student will analyze and explain technological examples such as solar and wind energy that illustrate the laws of	2 days

Principle of Technology TEKS/LINKS – Student Objectives One Credit	Suggested Time Ranges
thermodynamics, including the law of conservation of energy and the law of entropy.	
Angular Momentum PT 9(C) The student will describe the concept of power. Phy 6[C] The student will calculate the mechanical energy of, power generated within, impulse applied to, and momentum of a physical system. PT 9(D) and Phy 6[D] The student will describe the concepts of conservation of energy and conservation of momentum. PT 7(B) and Phy 4[D] The student will describe and calculate the effects of forces on objects, including law of inertia and impulse and conservation of momentum.	6 days
Properties of Waves **Wave Characteristics & Sound** PT 11(A) and Phy 7[A] The student will examine and describe oscillatory motion and wave propagation in various types of media. PT 11(B) and Phy 7[B] The student will investigate and analyze characteristics of waves, including velocity, frequency, amplitude, and wavelength. PT 11(C) and Phy 7[B] The student will describe the relationship between wave speed, frequency, and wavelength. PT 11(D) and Phy 7[C] The student will compare and contrast the characteristics and behaviors of transverse and longitudinal waves.	8 days
Wave Interactions PT 11(B) and Phy 7[B] The student will investigate and analyze characteristics of waves, including velocity, frequency, amplitude, and wavelength. PT 11(E) and Phy 7[D] The student will investigate behaviors of waves, including reflection, refraction, diffraction, interference, resonance, and the Doppler effect.	6 days
Electromagnet Radiation PT 8(A) and Phy 5[A] The student will research and describe the historical development of the concepts of gravitational, electromagnetic, weak nuclear, and strong nuclear forces. PT 8(E) The student will describe the nature and identify everyday examples of electromagnetic forces and fields. PT 10(B) and Phy 6[F] The student will contrast and give examples of different processes of thermal energy transfer, including conduction, convection, and radiation. PT 11(B) and Phy 7[B] The student will investigate and analyze characteristics of waves, including velocity, frequency, amplitude, and wavelength. PT 11(C) and Phy 7[B] The student will describe the relationship between	4 days

Principle of Technology TEKS/LINKS – Student Objectives One Credit	**Suggested Time Ranges**
wave speed, frequency, and wavelength. PT 11(G) and Phy 7[F] The student will describe the role of wave characteristics and behaviors in medical and industrial technology applications. PT 12(A) and Phy 8[A] The student will describe the photoelectric effect and the dual nature of light. PT 12(E) and Phy 8[D] The student will explore technology applications of atomic, nuclear, and quantum phenomena such as nanotechnology, radiation therapy, diagnostic imaging, and nuclear power.	
Nuclear Radiation PT 8(A) and Phy 5[A] The student will research and describe the historical development of the concepts of gravitational, electromagnetic, weak nuclear, and strong nuclear forces. PT 8(I) and Phy 5[H] The student will describe technological applications of the strong and weak nuclear forces in nature. PT 12(D) and Phy 8[C] The student will describe the role of mass-energy equivalence for areas such as nuclear stability, fission, and fusion. PT 12(E) and Phy 8[D] The student will explore technology applications of atomic, nuclear, and quantum phenomena such as nanotechnology, radiation therapy, diagnostic imaging, and nuclear power.	2 days
Sixth Six Weeks	
Nuclear Radiation PT 8(A) and Phy 5[A] The student will research and describe the historical development of the concepts of gravitational, electromagnetic, weak nuclear, and strong nuclear forces. PT 8(I) and Phy 5[H] The student will describe technological applications of the strong and weak nuclear forces in nature. PT 12(D) and Phy 8[C] The student will describe the role of mass-energy equivalence for areas such as nuclear stability, fission, and fusion. PT 12(E) and Phy 8[D] The student will explore technology applications of atomic, nuclear, and quantum phenomena such as nanotechnology, radiation therapy, diagnostic imaging, and nuclear power.	12 days
Ray Optics: Reflection & Refraction PT 11(E) and Phy 7[D] The student will investigate behaviors of waves, including reflection, refraction, diffraction, interference, resonance, and the Doppler effect. PT 11(F) and Phy 7[E] describe and predict image formation as a consequence of reflection from a plane mirror and refraction through a thin convex lens. PT 12(A) and Phy 8[A] The student will describe the photoelectric effect and	5 days

Principle of Technology TEKS/LINKS – Student Objectives One Credit	**Suggested Time Ranges**
the dual nature of light.	
Wave Optics: Interference & Diffraction PT 11(E) and Phy 7[D] The student will investigate behaviors of waves, including reflection, refraction, diffraction, interference, resonance, and the Doppler effect. PT 11(B) and Phy 7[B] The student will investigate and analyze characteristics of waves, including velocity, frequency, amplitude, and wavelength. PT 11(C) and Phy 7[B] The student will describe the relationship between wave speed, frequency, and wavelength.	8 days
Laser Light PT 11(B) and Phy 7[B] The student will investigate and analyze characteristics of waves, including velocity, frequency, amplitude, and wavelength. PT 11(C) and Phy 7[B] The student will describe the relationship between wave speed, frequency, and wavelength. PT 12(B) and Phy 8[B] The student will compare and explain emission spectra produced by various atoms. PT 12(E) and Phy 8[D] The student will explore technology applications of atomic, nuclear, and quantum phenomena such as nanotechnology, radiation therapy, diagnostic imaging, and nuclear power.	5 days
Semester Review & Testing	3 days