Wyoming Department of Education Required Virtual Education Course Syllabus

Sheridan County School District # 1

Program Name	Sheridan County School District #1 Virtual School	Content Area	SC
Course ID	AC03151	Grade Level	11 - 12
Course Name	General Physics	# of Credits	1
SCED Code	03151	Curriculum Type	Acellus

COURSE DESCRIPTION

In the Acellus General Physics explores the nature of our physical environment and explains how natural phenomena occur in terms of mathematics. Students are led through an investigation of matter and its motion through time and space, along with related concepts such as energy and force. Acellus General Physics is A-G Approved through the University of California.

WYOMING CONTENT AND PERFORMANCE STANDARDS

STANDARD #	BENCHMARK (Standard/Indicator) Use the Standards and Benchmarks as Spreadsheets
HS-PS2-1	Analyze data to support the claim that Newton's second law of motion describes the mathematical relationship among the net force on a macroscopic object, its mass, and its acceleration.
HS-PS2-2	Use mathematical representations to support the claim that the total momentum of a system of objects is conserved when there is no net force on the system.
HS-PS2-3	Apply scientific and engineering ideas to design, evaluate, and refine a device that minimizes the force on a macroscopic object during a collision.
HS-PS2-4	Use mathematical representations to predict the gravitational and/or electrostatic forces between objects using Newton's Law of Gravitation and/or Coulomb's Law, respectively.
HS-PS2-5	Plan and conduct an investigation to provide evidence that an electric current can produce a magnetic field and that a changing magnetic field can produce an electric current.
HS-PS3-1	Create or apply a computational model to calculate the change in the energy of one component in a system when the change in energy of the other component(s) and energy flows in and out of the system are known.
HS-PS3-3	Design, build, and refine a device that works within given constraints to convert one form of energy into another form of energy.
HS-PS3-4	Plan and conduct an investigation to provide evidence that the transfer of thermal energy when two components of different temperature are combined within a closed system results in a more uniform energy distribution among the components in the system.
HS-PS4-1	Use mathematical representations to support a claim regarding relationships among the frequency, wavelength, and speed of waves traveling in various media.
HS-PS4-2	Evaluate the advantages and disadvantages of using digital transmission and storage of information.
HS-PS4-3	Evaluate evidence behind the idea that electromagnetic radiation can be described either by a wave model or a particle model, and that for some situations one model is more useful than the other.
HS-ETS1-2	Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.
HS-ETS1-3	Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts.

HS-ETS1-4	Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem.

SCOPE AND SEQUENCE

UNIT OUTLINE	STANDARD#	OUTCOMES OBJECTIVES/STUDENT CENTERED GOALS
Unit 1 – Introduction to Physics		In this unit students learn about what Physics is, measured numbers, using significant digits, scientific notation, and the metric system. Students also learn about math with units, and conversions.
Unit 2 – 1-D Kinematics	HS-PS2-2	In this unit students learn about position and displacement, average velocity, position graphs, velocity graphs and acceleration, and positive, minus, and zero acceleration. They also learn about 1-D kinematic equations, using motion equations, solving motion problems, and solving a
Unit 3 – Vectors and 2-D Kinematics	HS-PS2-2	In this unit students learn about vectors an 2-D motion, graphical addition of vectors, vector components, vector magnitude and direction, and analytical addition of vectors. They also learn about breaking down and solving 2-D motion, and projectile motion.
Unit 4 – Forces and Newton's Laws	HS-PS2-1; HS-PS2-2	In this unit students learn about dynamics and Newton's second law – single force, Newton's first law, multiple forces, weight, and Newton's third law and normal force. They also learn about kinetic and static friction, how to do 2-D force problems and examples of these problems, inclined
Unit 5 – Circular Motion and Gravity	HS-PS2-4; HS-ETS1-2; HS-ETS1-3	In this unit students learn about uniform circular motion, centripetal force and acceleration, period, centripetal versus centrifugal force, and the force and acceleration of gravity. They also learn about gravity and orbits.
Unit 6 – Energy	HS-PS3-1; HS-PS3-3	In this unit students learn about work, including positive and negative work, work and energy, and kinetic energy. They also learn about gravitational potential energy, mechanical energy, energy problems with and without work, and power.
Unit 7 – Momentum	HS-PS2-3; HS-ETS1-2; HS-ETS1-3; HS-ETS1-4	In this unit students learn about momentum, impulse, and conservation of momentum. They also learn about collisions, inelastic collisions, and recoil.
Unit 8 – Fluid Mechanics		In this unit students learn about fluids and pressure. They also learn about pressure and depth, buoyant force, and flow rate.
Unit 9 – Thermodynamics	HS-PS3-4	In this unit students learn about heat, temperature, thermal expansion, heat and temperature change. They also learn about calorimetry, phase change, measuring gases, behavior of gases, and the first law of thermodynamics.
Unit 10 – Oscillations and Waves	HS-PS4-1	In this unit students learn about oscillations, Hooke's Law, simple harmonic motion, period and frequency. They also learn about oscillation of pendulums, waves, wave properties, interference, standing waves, and the standing wave equation.
Unit 11 – Sound	HS-PS4-1	In this unit students learn about sound waves, sound properties, and the speed of sound. They also learn about string instruments, open pipes, and closed pipes.

Unit 12 – Light	HS-PS4-1	In this unit students learn about light waves, color, the electromagnetic spectrum, and reflection. They also learn about index of refraction, refraction, and internal refraction.
Unit 13 – Optics		In this unit students learn about lenses and images, and ray tracing. They also learn about a convex lens with a real image, magnification, and a convex lens with a virtual image.
Unit 14 – Electric Forces		In this unit students learn about electric charges, Coulob's Law, and force from multiple charges. They also learn about electric field, electric potential energy, electric potential, and potential difference.
Unit 15 – DC Electric Circuits	HS-PS4-2; HS-PS4-4	In this unit students learn about electric current and circuits, resistance and Ohm's Law, and simple circuits. They also learn about electric power, series and parallel, and series and parallel resistors.
Unit 16 – Magnetic Forces	HS-PS2-5; HS-PS3-3; HS PS4-3	In this unit students learn about magnetic forces and magnetic fields. They also learn about magnetic field from a current and from current loops, and magnetic force on moving charges.