Reavis High School
Physics Curriculum Snapshot

Unit 1: Scientific Skills and Practices

7-8 Days	Students will be able to: state definition for physics; measure length using a meter stick; measure time with a stopwatch and photogates; convert between metric and standard measurements; be able to calculate absolute and relative error; and, be able to differentiate between accuracy and precision.

Unit 2: Linear Motion

15 Days	Students will be able to: state the definitions and units of velocity, instantaneous and average velocity, speed, distance, displacement, and acceleration, free-fall, gravity; be able to differentiate between scalar and vector quantities; be able to create and analyze velocity and acceleration graphs of motion; be able to calculate the initial and final velocities, time, displacement, and acceleration for a body that is experiencing 1D motion and uniform acceleration; be able to measure displacement, time, and velocity of a body experiencing 1D motion; be able to calculate acceleration based on measurements; memorize gravity's quantity; and, differentiate between free-fall and horizontal motion; calculate time and height for free-fall problems.

Unit 3: Vectors and Projectile Motion

15-20 Days	Students will be able to: draw vectors tip to tail; add vectors graphically and mathematically; be able to use trigonometry to solve vectors at angles other than at the horizontal and perpendicular; be able to use Pythagorean's Theorem to calculate the resultant of two vectors; be able to resolve vectors into their x and y components; and, be able to add and subtract more than two vectors each with different angle. Students will be able to: state the definiton of projectile motion, parabolic motion, and 2 dimensional motion; and calculate the variables.

Unit 4: Dynamics

15 Days	Students will be able to: state Newton's three laws, key physical quantities associated with each law, and any math sentences associated with the law; state definitions of normal force, applied force, friction force, tension force, air drag force; units for measure of force (Newton); state the difference between weight and mass and provide math sentences to describe the difference; be able to solve F = ma problems for each variable; be able to use trigonometry to solve forces at an angle problem; be able to draw a free-body diagram; and, calculate tension in two or more cables attached at different angles to a mass.

Unit 5: Momentum

10 Days	Students will be able to: define momentum, impulse, elastic collision and inelastic collision; state the Conservation of Momentum Theory and its mathematical sentence; be able to differentiate amongst the types of collisions and write their correspodning math sentences; be able to calculate the starting state or ending state of objects experiencing elastic or inelastic collisions; be able to differentiate among momentum, forces, and impulse using math sentences and mathematical relationships; be able to demonstrate different types of collisions in an experimental setting and that conservation of momentum is observed; and, be able to create a safety system that reduces the impulse of a body experiencing a change in momentum.

Unit 6: Rotational Motion

10 Days	Students will be able to: state the definition of rotational motion, angular motion, tangential velocity, centripetal acceleration and centripetal force, torque, center of mass, equilibrium; calculate centripetal force and tangential velocity given period of rotation, mass, or angle; write math sentences representing sums of torques involving at least four different masses; calculate sums of torques; create a system of at least four masses that is in equilibrium about a center of mass.

Unit 7: Universal Gravity

10 Days	Students will be able to: state definitions for aphelion and perihelion, state Newton's Law of Gravitation mathematically; state Inverse Square Law mathematically; solve for gravitational forces given two different masses and distance between them; create a system that demonstrates the Inverse Square Law in terms of a model of gravitational forces.

Unit 8: Work & Power

5 Days	Students will be able to: state definitions of work, power, joule, calorie; convert between joules and calories; represent work and power with math sentences; calculate work and power given force, distance, or time; evaluate the energy needed to sustain activity; evaluate caloric intake as it relates to work and power.

Unit 9: Energy and Machines

15 Days	Students will be able to: state definitions of energy, kinetic energy, gravitational potential energy, elastic potential energy, conservation of mechanical energy, Work Energy Theorem; be able to calculate velocity or height in conservation of energy problems; use Hook's Law to calculate energy of a spring or rubberband; be able to calculate velocity at any point along an object's path that traverses various displacements and heights. Students will be able to state the three laws of machines and calculate the variables for machines.

Unit 10: Capstone Project

15 Days	Students will be able to demonstrate a profieciency in physics and science-related skills. Students will conduct an investigation and research concerning a topic of their choosing. Students will develop a testable question, create an experiment to collect data, and analyze the data to form a conclusion based upon the evidence that they collected. Students will be able to: demonstrate their knowledge of physics in at least three different areas by creating an experiment, demonstration, device, or consulting service that requires research, speaking with professionals, and applying physics knowledge and the scientific process.

Unit 11: Electricity

10 Days	Students will be able to: state defintion of volt, electromotive force; current, amperes, resistance, ohms, capacitance, farads, inductance, battery; state Ohm's Law mathematically; calculate resistance, volts, or current using Ohm's Law; be able to add resistances, voltages, currents, and capacitances in series and parallel; describe the relationship between electricity and energy; be able to create an electrical circuit that has current, voltage, resistance, and capacitance and that does some kind of work.