AP DAILY VIDEOS

AP Physics C: Mechanics

AP Daily is a series of on-demand, short videos—created by expert AP teachers and faculty—that can be used for in-person, online, and blended/hybrid instruction. These videos cover every topic and skill outlined in the AP Course and Exam Description and are available in AP Classroom for students to watch anytime, anywhere.

Unit 1

Video Title	Topic	Video Focus	Instructor
1.1: Daily Video 1	Kinematics—Motion in One Dimension	Calculating unknown variables of motion such as acceleration, velocity, or position for an object undergoing uniformly accelerated motion in one dimension.	Julie Hood
1.1: Daily Video 2	Kinematics—Motion in One Dimension	Free-fall acceleration due to gravity for objects falling from rest.	Julie Hood
1.1: Daily Video 3	Kinematics—Motion in One Dimension	Free-fall acceleration due to gravity for objects given initial velocity.	Julie Hood
1.2: Daily Video 1	Kinematics—Motion in Two Dimensions	There are multiple simultaneous relationships among the quantities of position, velocity, and acceleration for the motion of a particle moving in more than one dimension with or without net forces.	Angela Benjamin
1.2: Daily Video 2	Kinematics—Motion in Two Dimensions	Calculating kinematic quantities in projectile motion, such as speed, displacement, velocity, acceleration, and time, given initial conditions of various launch angles, including horizontal.	Angela Benjamin
1.2: Daily Video 3	Kinematics—Motion in Two Dimensions	The position, velocity, and acceleration versus time for a moving object are related to each other and depend on understanding of slope, intercepts, asymptotes, and area, or upon calculus concepts.	Angela Benjamin

Unit 2

Video Title	Topic	Video Focus	Instructor
2.1: Daily Video 1	Newton's Laws of Motion—First and Second Law	We will look at a representation of Newton's laws and explain what a force is and how that force can change the translational motion of an object.	Angela Benjamin
2.1: Daily Video 2	Newton's Laws of Motion—First and Second Law	We will explain Newton's first law in qualitative terms and apply the law to different physical situations, and calculate a force acting on an object in equilibrium.	Angela Benjamin
2.1: Daily Video 3	Newton's Laws of Motion—First and Second Law	We will calculate the acceleration and the average force acting on an object with a single constant force and a velocity vector changing over a known interval of time.	Angela Benjamin
2.1: Daily Video 4	Newton's Laws of Motion—First and Second Law	We will explore the relationship for all the frictional forces acting on an object on a rough surface. We will look at relative motion of kinetic friction, and the maximum value of static friction.	Angela Benjamin
2.1: Daily Video 5	Newton's Laws of Motion—First and Second Law	We will use relationships derived from a Newton's second law analysis of how unknown forces (or accelerations) can be determined from the given unknown physical characteristics.	Angela Benjamin
2.2: Daily Video 1	Circular Motion	We will define the quantities that describe circular motion and develop relationships among these quantities.	John Frensley
2.2: Daily Video 2	Circular Motion	We will solve example problems related to vertical circular motion, such as determining the maximum or minimum safe speed a roller coaster can travel on a curved track.	John Frensley
2.2: Daily Video 3	Circular Motion	We will solve example problems related to horizontal circular motion, such as determining the fastest safe speed to take a turn and the banked curve problem.	John Frensley
2.2: Daily Video 4	Circular Motion	We will investigate curved motion with changing speed, and relate tangential, centripetal, and net accelerations.	John Frensley
2.3: Daily Video 1	Newton's Laws of Motion—Third Law	We will state Newton's third law and identify action-reaction pairs of forces. We will also show the relationship between Newton's third law and the law of "cause and effect."	John Frensley
2.3: Daily Video 2	Newton's Laws of Motion—Third Law	We will investigate situations and solve problems involving several objects connected by the tension force, such as the "train of blocks."	John Frensley
2.3: Daily Video 3	Newton's Laws of Motion—Third Law	We will solve problems related to blocks hanging from a pulley, also known as the Atwood machine.	John Frensley
2.3: Daily Video 4	Newton's Laws of Motion—Third Law	We will solve problems wherein an Atwood machine has been modified, such as one block sliding on a table or on an incline.	John Frensley

Unit 3

Video Title	Topic	Video Focus	Instructor
3.1: Daily Video 1	Work-Energy Theorem	In this video, we will introduce the concept of work and its relationship with kinetic energy.	John Frensley
3.1: Daily Video 2	Work-Energy Theorem	In this video, we will calculate the work done by a force that is not directed parallel to displacement, and we will discuss the work done by the force of gravity.	John Frensley
3.1: Daily Video 3	Work-Energy Theorem	In this video, we will calculate the work done by a force that varies with displacement, and we will discuss the work done by a spring.	John Frensley
3.1: Daily Video 4	Work-Energy Theorem	In this video, we will discuss sample problems involving work and kinetic energy.	John Frensley
3.2: Daily Video 1	Forces and Potential Energy	In this video, we will discuss conservative and dissipative forces and define the relationship between a conservative force and potential energy.	John Frensley
3.2: Daily Video 2	Forces and Potential Energy	In this video, we will discuss the force and potential energy relationships for Hooke's-Law – obeying springs and nonlinear springs.	John Frensley
3.2: Daily Video 3	Forces and Potential Energy	In this video, we will discuss potential energy functions and graphs of potential energy curves.	John Frensley
3.2: Daily Video 4	Forces and Potential Energy	In this video, we will change potential energy graphs into velocity vs. time graphs and vice versa.	John Frensley
3.3: Daily Video 1	Conservation of Energy	In this video, we will discuss the definition of an isolated system and introduce mechanical energy and the law of conservation of energy.	Boris Korsunsky
3.3: Daily Video 2	Conservation of Energy	In this video, we will begin solving a problem that involves the potential energy of a non-linear spring. You will be non-Hooked!	Boris Korsunsky
3.3: Daily Video 3	Conservation of Energy	In this video, we will finish solving a problem that involves the potential energy of a non-linear spring.	Boris Korsunsky
3.3: Daily Video 4	Conservation of Energy	In this video, we will find the force of tension in a pendulum at the bottom point of its swing.	Boris Korsunsky
3.4: Daily Video 1	Power	In this video, we will introduce the concept of power.	Boris Korsunsky
3.4: Daily Video 2	Power	In this video, we will solve two basic problems that incorporate the concept of power.	Boris Korsunsky

Unit 4

Video Title	Topic	Video Focus	Instructor
4.1: Daily Video 1	Center of Mass	In this video, we will introduce the concept and the properties of the center of mass. The center of gravity will also be discussed.	Boris Korsunsky
4.1: Daily Video 2	Center of Mass	In this video, we will explain how to find the location of the center of mass for non-symmetrical collections of particles as well as the extended objects.	Boris Korsunsky
4.1: Daily Video 3	Center of Mass	In this video, we will locate the center of mass of a bar with a non-uniform density. If you think that integrals are fun, this video is for you!	Boris Korsunsky
4.2: Daily Video 1	Impulse and Momentum	In this video, we will define momentum and impulse and derive the relationship between the impulse and the change in momentum.	Boris Korsunsky
4.2: Daily Video 2	Impulse and Momentum	In this video, we will solve a problem about the change in momentum due to a time-dependent force. Still think that integrals are fun? Good.	Boris Korsunsky
4.3: Daily Video 1	Conservation of Linear Momentum, Collisions	In this video, we will analyze data during an inelastic collision and calculate changes in linear momentum and kinetic energy.	Dee Dee Messer
4.3: Daily Video 2	Conservation of Linear Momentum, Collisions	In this video, we will analyze data during an explosion and elastic collision and calculate changes in linear momentum and kinetic energy.	Dee Dee Messer
4.3: Daily Video 3	Conservation of Linear Momentum, Collisions	In this video, we will use conservation laws to analyze situations that involve a ballistic pendulum.	Dee Dee Messer
4.3: Daily Video 4	Conservation of Linear Momentum, Collisions	In this video, we will analyze 2D collisions.	Dee Dee Messer

Unit 5

Video Title	Topic	Video Focus	Instructor
5.1: Daily Video 1	Torque and Rotational Statics	In this video, we will investigate the properties of torque and how it affects the rotation of objects.	Diana (Dee Dee) Messer
5.1: Daily Video 2	Torque and Rotational Statics	In this video, we will analyze systems where the net force and torques are zero.	Diana (Dee Dee) Messer
5.1: Daily Video 3	Torque and Rotational Statics	In this video, we will investigate inertia in rotational systems and the multiple ways to calculate rotational inertia.	Diana (Dee Dee) Messer
5.1: Daily Video 4	Torque and Rotational Statics	In this video, we will practice solving problems using the concepts of torque and rotational inertia.	Diana (Dee Dee) Messer
5.2: Daily Video 1	Rotational Kinematics	In this video, we will learn the variables and units used to accurately describe and analyze rotational motion.	Diana (Dee Dee) Messer
5.2: Daily Video 2	Rotational Kinematics	In this video, we will analyze rotational systems with uniform and non-uniform angular acceleration.	Diana (Dee Dee) Messer
5.2: Daily Video 3	Rotational Kinematics	In this video, we will learn the conditions for rolling without slipping and practice analyzing rotational systems.	Diana (Dee Dee) Messer
5.3: Daily Video 1	Rotational Dynamics and Energy	In this video, we will analyze the motion of a pulley using Newton's Second Law for Rotation.	Angela Jensvold
5.3: Daily Video 2	Rotational Dynamics and Energy	In this video, we will describe the sum of torques experienced by a rigid extended body.	Angela Jensvold
5.3: Daily Video 3	Rotational Dynamics and Energy	In this video, we will analyze motion of objects that are rolling without slipping.	Angela Jensvold
5.3: Daily Video 4	Rotational Dynamics and Energy	In this video, we will conserve energy for a rolling object.	Angela Jensvold
5.4: Daily Video 1	Angular Momentum and Its Conservation	In this video, we will calculate the angular momentum vector of a rotating rigid body.	Angela Jensvold
5.4: Daily Video 2	Angular Momentum and Its Conservation	In this video, we will calculate the angular momentum vector of a linear translating particle.	Angela Jensvold
5.4: Daily Video 3	Angular Momentum and Its Conservation	In this video, we will describe the conditions under which rotating systems' angular momentum is conserved.	Angela Jensvold
5.4: Daily Video 4	Angular Momentum and Its Conservation	In this video, we will calculate changes in angular velocity of a rotating object when the rotational inertia of the object changes.	Angela Jensvold

Unit 6

Video Title	Topic	Video Focus	Instructor
6.1: Daily Video 1	Simple Harmonic Motion, Springs, and Pendulums	In this video, we will learn the terms used to discuss and analyze simple harmonic motion and describe their use in position vs. time graphs and equations.	Judy Adler
6.1: Daily Video 2	Simple Harmonic Motion, Springs, and Pendulums	In this video, we will derive equations for velocity and acceleration vs. time from the position vs. time equation of an SHO and discuss where maxima, minima, and zeros occur.	Judy Adler
6.1: Daily Video 3	Simple Harmonic Motion, Springs, and Pendulums	In this video, we will derive the equation for the period of a mass on a spring.	Judy Adler
6.1: Daily Video 4	Simple Harmonic Motion, Springs, and Pendulums	In this video, we will analyze how changing an experimental setup changes the effective spring constant and the motion of a simple harmonic oscillator.	Judy Adler
6.1: Daily Video 5	Simple Harmonic Motion, Springs, and Pendulums	In this video, we will learn about a variety of pendula and about how various sources of experimental error will affect results.	Judy Adler
6.1: Daily Video 6	Simple Harmonic Motion, Springs, and Pendulums	In this video, we will analyze the motion of a simple harmonic oscillator in terms of its energy at various points in its motion.	Judy Adler
6.1: Daily Video 7	Simple Harmonic Motion, Springs, and Pendulums	In this video, we will practice using an energy approach to solve simple harmonic motion problems.	Judy Adler

Unit 7

Video Title	Topic	Video Focus	Instructor
7.1: Daily Video 1	Gravitational Forces	In this video, we will discuss Newton's universal law of gravitation and use it to calculate a variety of related quantities, including force and gravitational field strengths.	Judy Adler
7.1: Daily Video 2	Gravitational Forces	In this video, we create a graph of force vs. position and will qualitatively and quantitatively analyze the force both inside and outside of hollow and solid spheres.	Judy Adler
7.1: Daily Video 3	Gravitational Forces	In this video, we will practice solving previous AP Exam multiple-choice problems that relate to gravitational force, field, and acceleration calculations.	Judy Adler
7.2: Daily Video 1	Orbits of Planets and Satellites	In this video, we will describe the scientific laws governing the motion of planets around the Sun, which are called Kepler's laws.	Julie Hood
7.2: Daily Video 2	Orbits of Planets and Satellites	In this video, we will focus on Newton's law of gravitation and Kepler's third law by working through a free-response question from the 2005 AP Physics C Mechanics Exam.	Julie Hood
7.2: Daily Video 3	Orbits of Planets and Satellites	In this video, we will consider the total mechanical energy of a satellite-Earth system and derive an expression for the escape speed of a satellite using energy principles.	Julie Hood