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AP Physics 1 Assignment List 2024-2025

How to read this document:
This file lists all of the assignments for AP Physics 1. It also provides links
Point values are subject to change

Color Coding:

Handout
Optional Video/Assignment
AP Physics C Content - These are Calculus-based videos
“Just For Fun” Videos

AP Exam Date: Friday, May 16, 2025, 8 AM

Flipping Physics Video Runtime Breakdown (Hours: Minutes)

Level	Mandatory Videos	Optional Videos	AP C Videos
0		1:16	
1	2:09	1:32	0:32
2	1:02	0:22	
3	1:48	1:38	0:33
4	2:40	2:44	1:47
5	1:43	1:43	2:22
6	1:09	1:20	1:54
7	1:16	1:07	0:42
8	1:36	3:28	1:15
9	0:58	0:32	0:45
10	1:01	0:18	0:56
11	1:23		
TOTAL	**16:49**	**16:06**	**10:47**

Level 0 - Introductory Concepts/Getting Started

#	Assignment Name	Points	Done
	Force Concept Inventory Pre-Test - Questions / Answer Form	5	
	Register on AP Classroom Join Codes: 1A: N6LDG3 1B: 3PMVAV 2A: ZQ92GR 4A: E3M3JG	5	
1	[1] (6:14) Introduction to Significant Figures with Examples		
2	[1] (7:20) Rounding and Working with Significant Figures in Physics		
3	[1] (5:32) Introduction to Base Dimensions and Your Friends		
4	[2] (12:26) Introduction to Conversions in Physics		
5	[1] (13:25) Introduction to Accuracy and Precision (with Relative Error)		
6	[3] (13:08) A Problem to Review SOH CAH TOA & Pythagorean Theorem		
7	[1] (18:00) Why “Show All Your Work”?		

Level 1 - One-Dimensional Motion

	Information to Memorize for the AP Exam		

Displacement, Speed, and Velocity

#	Assignment Name	Points	Done

1	[1] (11:43) Introduction to Displacement and the Differences Between Displacement and Distance		
2	[2] (11:45) Introduction to Velocity and Speed and the differences between the two		
3	[2] (12:53) Average Velocity Example Problem with Three Velocities		
4	[2] (5:36) Example Problem: Velocity and Speed are Different		
5	[2] (12:39) Understanding and Walking Position as a function of Time Graphs		
6	[2] (15:11) Example Problem: Finding Average Speed for Pole Position – Not as easy as you may think		

Acceleration

#	Assignment Name	Points	Done
7	[2] (10:53) Introduction to Acceleration with Prius Brake Slamming Example Problem		
8	[2] (9:53) A Basic Acceleration Example Problem and Understanding Acceleration Direction		
9	[2] (24:53) Walking Position, Velocity and Acceleration as a Function of Time Graphs		
10	[2] (6:42) Introduction to Uniformly Accelerated Motion with Examples of Objects in UAM		
11	[3] (11:41) Introductory Uniformly Accelerated Motion Problem – A Braking Bicycle		
12	[3] (17:02) Toy Car UAM Problem with Two Different Accelerations		
13	[2] (5:58) Understanding Uniformly Acceleration Motion		
14	[1] (3:09) The Humility Soapbox – Uniformly vs. Uniformally		
15	[2] (12:51) Understanding Instantaneous and Average Velocity using a Graph		
16	[2] (7:59) A Graphical UAM Example Problem		
17	[2] (3:53) Experimentally Graphing Uniformly Accelerated Motion		
18	[2] (5:17) Reviewing One Dimensional Motion with the Table of Friends		
19	[2] (25:12) Harnessing the Power of Spreadsheets in Physics		

20	[1] (6:53) How to Solve Any Proportional Reasoning Problem (You won't recognize the physics equations in this video. That's ok!)		
	APC [3] (13:17) Derivative Introduction		
	APC [3] (7:24) The Derivative and Uniformly Accelerated Motion Equations		
	APC [3] (11:14) The Derivative and a Demonstration of Position, Velocity and Acceleration		
	Level 1 Practice Problems (For practice only!)		
	Level 1 Worksheet 1	30	
	Level 1 Worksheet 2	30	
	Level 1 Practice Quiz		

Level 2 - Free Fall

#	Assignment Name	Points	Done
1	[1] (12:12) Introduction to Free-Fall and the Acceleration due to Gravity		
2	[2] (6:01) Analyzing the Apollo 15 Feather and Hammer Drop – A Basic, Introductory Free-Fall Problem		
3	[3] (12:11) Dropping a Ball from 2.0 Meters - An Introductory Free-Fall Acceleration Problem		
4	[2] (4:56) Graphing the Drop of a Ball from 2.0 Meters - An Introductory Free-Fall Acceleration Problem		
5	[2] (10:46) Throwing a Ball up to 2.0 Meters & Proving the Velocity at the Top is Zero		
6	[1] (1:58) The Drop and Upward Throw of a Ball are Very Similar		
7	[1] (3:24) Creating a Position vs. Time Graph using Stop Motion Photography		
	(Choose One) Option 1 (12:05) Linearizing Graphs to Establish Relationships Between Variables Option 2 (11:43) Linearizing Graphs in Physics		
	Handout: Linearization Reference Sheet		

8	[2] (7:19) Common Free-Fall Pitfalls		
9	[3] (10:22) A Free-Fall Problem That You Must Split Into Two Parts		
10	[3] (4:08) Dropping Dictionaries Doesn't Defy Gravity, Duh!		
11	[3] (12:00) Don't Drop Your Camera 5.0 Seconds After Liftoff - An advanced free-fall acceleration problem		
	(4:41) Brian Cox Visits the World's Biggest Vacuum		
	Level 2 Practice Problems (For practice only!)		
	Level 2 Worksheet 1	30	
	Level 2 Worksheet 2	30	
	In-Class Activity - Motion Escape Room (3-4 people) (Must do one)	10	
	In-Class Activity - Kinematics Crime Scene (Must do one)	10	
	Level 2 Practice Quiz		

Level 3 - Two Dimensional Motion

Vectors and Scalars

#	Assignment Name	Points	Done
1	[2] (10:26) Introduction to Tip-to-Tail Vector Addition, Vectors and Scalars		
2	[3] (11:34) Introductory Tip-to-Tail Vector Addition Problem		
3	[1] (5:59) How to use Cardinal Directions with Vectors		
4	[3] (8:22) Introduction to Vector Components		
5	[3] (10:52) Introductory Vector Addition Problem using Component Vectors		
6	[2] (4:25) Using a Data Table to Make Vector Addition Problems Easier		
7	[3] (7:57) A Visually Complicated Vector Addition Problem using Component Vectors		
	APC [3] (12:31) Component, Unit, and R Position Vectors		
	APC [3] (4:46) Using the R Position Vector to find Velocity and		

	Acceleration		

Projectile Motion

#	Assignment Name	Points	Done
8	[2] (6:58) Introduction to Projectile Motion		
9	[3] (9:42) An Introductory Projectile Motion Problem with an Initial Horizontal Velocity - Part 1 of 2		
10	[3] (7:57) An Introductory Projectile Motion Problem with an Initial Horizontal Velocity - Part 2 of 2		
11	[3] (9:33) Nerd-A-Pult – An Introductory Projectile Motion Problem		
12	[3] (7:57) Nerd-A-Pult – Measuring Initial Velocity		
	APC [3] (5:52) Nerd-A-Pult using Unit Vectors		
13	[4] (10:30) Nerd-A-Pult #2 – Another Projectile Motion Problem		
	APC [3] (9:32) Nerd-A-Pult #2 using Unit Vectors		
14	[3] (8:53) Understanding the Range Equation of Projectile Motion		
15	[4] (7:31) Deriving the Range Equation of Projectile Motion		
16	In-Class Lecture [1] (1:46) A Physics Song - I'm A Little g Known (g is positive)		
17	[3] (7:23) A Range Equation Problem with Two Parts		
18	[3] (4:14) The Classic Bullet Projectile Motion Experiment		
19	[1] (1:58) The Classic Bullet Projectile Motion Experiment with X & Y Axis Scales		
20	[2] (6:37) Demonstrating the Components of Projectile Motion		

Relative Motion

#	Assignment Name	Points	Done
21	[1] (2:31) Skateboarding Frame of Reference Demonstration		
22	[1] (9:58) Introduction to Relative Motion using a Quadcopter Drone		
22b	[1] (2:48) Introduction to Relative Motion using a Quadcopter Drone		

	(Visuals Only)		
23	[2] (11:58) An Introductory Relative Motion Problem		
24	[3] (9:34) An Introductory Relative Motion Problem with Vector Components		
25	[3] (8:45) Relative Motion Problem: Solving for the angle of the moving object		
26	[1] (4:34) Memorizing vs. Understanding in Physics	1	
27	Solo mr.p: [3] (5:41) A Basic Relative Motion Problem	1	
	Lab - Marble Launcher		
	In-Class Activity - Projectile Murder Mystery	10	
	Handout - Kinematics Review Sheets		
	Level 3 Practice Problems (For practice only!)		
	Level 3 Worksheet 1	30	
	Level 3 Worksheet 2	30	
	Level 3 Practice Quiz		
	Level 1-3 Quiz		

AP Physics 1 Free Response Exam Questions you should be able to solve at this point in the curriculum:

	(7:56) 2015 #1 - Short Answer		
	(4:55) 2015 #4 - Paragraph Argument Short Answer		
	(10:30) 2016 #3 - Quantitative/Qualitative Translation		

Level 4 - Dynamics

Newton's Laws of Motion

#	Assignment Name	Points	Done
	Handout - Forces and Free Body Diagrams		
1	[1] (4:26) Introduction to Inertia and Inertial Mass		
2	[1] (6:63) Introduction to Force		
3	[1] (5:24) Introduction to the Force of Gravity and Gravitational Mass		
4	[1] (5:46) Weight and Mass are Not the Same		
5	[1] (6:57) Introduction to Free Body Diagrams or Force Diagrams		
6	[1] (2:58) The Reality of our First Free Body Diagram		
7	[1] (5:30) Introduction to Newton's First Law of Motion		
8	[2] (9:42) Introduction to Newton's Second Law of Motion with Example Problem		
9	[3] (8:29) Introductory Newton's 2nd Law Example Problem and Demonstration		
10	[1] (7:36) A "Show All Your Work" Example		
11	Solo mr.p: [2] (5:42) A Basic Newton's Second Law Problem		
12	[3] (10:45) Force vs. Time on a Dynamics Cart		
13	In-Class Lecture [1] (15:50) A Review of Inertia, Mass, Force and Newton's 1st Two Laws - No Lecture notes		
14	[3] (9:27) A Three Force Example of Newton's 2nd Law with Components		
15	[2] (3:35) Summing the Forces is Vector Addition		
	APC [3] (9:28) Using Unit Vectors to find Acceleration, Mass, and Velocity of 3 Forces		
16	Solo mr.p: [3] (6:31) A Basic Force Vector Addition Problem		
17	[3] (5:59) Using Newton's Second Law to find the Force of Friction		
18	[1] (5:58) Introduction to Newton's Third Law of Motion		

19	[2] (2:37) A Common Misconception about Newton's Third Law Force Pairs (or Action-Reaction Pairs)		
20	In-Class Lecture [3] (22:34) We Moved The Earth!! But How Far? An application of Newton's 3rd Law		
21	In-Class Lecture [3] (14:40) A Slightly More Complicated Friction and Newton's 2nd Law Problem - Lecture Notes		

Forces, Tension, Equilibrium, and Friction

#	Assignment Name	Points	Done
22	[1] (3:52) Understanding the Tension Force		
23	[1] (3:46) Introduction to Equilibrium		
24	[2] (6:11) Do You Feel Your Weight? A lesson on Apparent Weight		
25	[3] (3:59) 5 Steps to Solve any Free Body Diagram Problem		
26	[3] (8:59) An Introductory Tension Force Problem		
27	[1] (4:04) Introduction to Static and Kinetic Friction by Bobby		
28	[2] (4:59) Introduction to the Coefficient of Friction		
29	[2] (6:58) Understanding the Force of Friction Equation		
30	[2] (2:57) Experimentally Graphing the Force of Friction		
31	[3] (7:59) Does the Book Move? An Introductory Friction Problem		
32	[1] (4:39) Do Anti-lock Brakes use Static or Kinetic Friction? by Billy		
33	[3] (9:19) A Friction Review Problem - The Original Billy Bobby and Bo		
34	[2] (2:57) Everybody Brought Mass to the Party!		
35	[3] (8:59) Determining the Static Coefficient of Friction between Tires and Snow		
36	[3] (6:35) Breaking the Force of Gravity into its Components on an Incline		
37	[3] (9:22) Physics "Magic Trick" on an Incline		
38	[1] (3:32) A Free Body Diagram showing a Common Mistake		
39	[3] (6:41) Introductory Static Friction on an Incline Problem		

40	[2] (2:34) Calculating the Uncertainty of the Coefficient of Friction		
41	[3] (6:59) Introductory Kinetic Friction on an Incline Problem		
	APC [4] (20:28) An incline, 2 masses, and a pulley. What could be more fun?		
42	[2] (6:59) Do Your Feet Affect How Far You Slide on a Water Slide?		
	APC [4] (15:59) What is Terminal Velocity? How Do We Find It?		
43	[5] (22:00) A Brief Look at the Force of Drag using Numerical Modeling (or The Euler Method)		
44	(14:32) Letting Go Of Your Numbers Dependency		
	APC [3] (8:42) Demonstrating and Solving for Drag Coefficient		
	APC [3] (12:34) Effects of Drag Force on Free Fall		
	APC [5] (22:20) Deriving Motion Equations with Drag Force		
	APC [5] (17:55) Time Constant and the Drag Force		
	Level 4 Practice Problems (For practice only!)		
	Level 4 Worksheet 1	30	
	Level 4 Worksheet 2	30	
	Level 4 Worksheet 3	30	
	Level 4 Practice Quiz		
	Level 4 Quiz		

AP Physics 1 Free Response Exam Questions you should be able to solve at this point in the curriculum:

	(12:36) 2017 #2 - Experimental Design Question		
	(11:19) 2019 #2 - Quantitative/Qualitative Translation		

Level 5 - Work, Energy, Power, and Spring Force

Work and Energy

#	Assignment Name	Points	Done
1	[3] (7:10) Introduction to Work with Examples		
2	[3] (5:57) Introductory Work Problem		
	APC [3] (15:11) Work as the Dot Product		
	APC [3] (18:30) Integral Introduction via Work		
3	[2] (9:35) Hooke's Law Introduction - Force of a Spring		
4	[2] (5:46) Determining the Spring Constant, k, with a Vertically Hanging Mass		
5	[2] (5:51) The Human Spine acts like a Compression Spring		
	(14:59) LOL Diagrams		
	Handout - LOL Diagrams		
6	[3] (5:25) Introduction to Kinetic Energy with Example Problem		
7	[1] (5:48) Introduction to Gravitational Potential Energy with Zero Line Examples		
8	[1] (7:17) Introduction to Elastic Potential Energy with Examples		
	APC [3] (9:27) Work done by a Spring - Deriving Elastic Potential Energy		
	APC [4] (7:54) Deriving the Work-Energy Theorem using Calculus		
	APC [3] (6:11) Work-Energy Theorem Example Problem		
9	[2] (8:26) Introduction to Conservation of Mechanical Energy with Demonstrations		
10	[2] (8:49) Introductory Conservation of Mechanical Energy Problem using a Trebuchet		
11	In-Class Lecture [3] (7:41) A Pendulum Conservation of Energy Problem		
12	In-Class Lecture [1] (6:59) Adding Work and Energy to the Table of Friends - The Table of Friends		

13	[3] (8:49) Conservation of Energy Problem with Friction, an Incline and a Spring by Billy		
14	[3] (3:14) Work due to the Force of Gravity on an Incline by Billy		
15	[1] (3:24) The Energy Song by Bo		
	APC [3] (10:24) Finding the Force on a Ball from a Dent		
16	In-Class Lecture [1] (6:26) Spacewarp: A Review of Mechanical Energies		
17	In-Class Lecture [2] (9:49) A Basic Conservation of Energy Problem including a Spring		
18	[2] (4:58) Introduction to Mechanical Energy with Friction		
19	[3] (8:58) Introductory Work due to Friction equals Change in Mechanical Energy Problem		
20	[4] (5:37) Work due to Friction equals Change in Mechanical Energy Problem by Billy		
21	[5] (12:45) Net Work equals Change in Kinetic Energy Problem by Billy		
	APC [3] (15:13) Conservative and Nonconservative Forces		
	APC [3] (8:14) Conservative Force and Potential Energy		
	APC [2] (7:15) Energy Transferred Into and Out of a System		
22	[2] (13:38) Energy Systems Clarified		
	APC [3] (14:52) Example of Energy Transferred Into and Out of a System		
	APC [1] (1:04) Stable, Unstable and Neutral Equilibrium		

Power

#	Assignment Name	Points	Done
23	[3] (5:52) Introduction to Power		
24	[3] (11:24) Average and Instantaneous Power Example		
25	[3] (9:45) Graphing Instantaneous Power		

26	[3] (11:25) Average Power Delivered by a Car Engine - Example Problem		
	APC [5] (6:59) Calculating Average Drag Force on an Accelerating Car using an Integral		
27	[3] (5:17) Instantaneous Power Delivered by a Car Engine - Example Problem		
	APC [3] (5:23) Power and Calculus		
	APC [3] (10:27) Power using Derivative and Unit Vectors - Example		
	APC [3] (4:54) From Power to Work using an Integral - Example		
	Level 5 Practice Problems (For practice only!)		
	In-Class Activity: Energy Scavenger Hunt	10	
	In-Class Activity: Energy Scramble	10	
	Level 5 Worksheet 1	30	
	Level 5 Worksheet 2	30	
	Level 5 Worksheet 3	30	
	Level 5 Practice Quiz		
	Level 5 Quiz		

AP Physics 1 Free Response Exam Questions you should be able to solve at this point in the curriculum:

	(12:44) 2015 #3 - Quantitative/Qualitative Translation		
	(6:55) 2017 #4 - Short Answer		
	(11:38) 2019 #3 - Experimental Design Question		

Level 6 - Impulse and Momentum

Center of Mass

#	Assignment Name	Points	Done
1	[1] (7:06) Center of Mass Introduction		

2	[2] (6:41) Calculating the Center of Mass of a System of Particles		
3	[2] (7:42) Center of Mass of an Irregular Object		
4	[2] (6:13) Center of Mass of an Object with a Hole		
5	[2] (8:45) Throwing a Ball in a Boat - Demonstrating Center of Mass		
	APC [4] (14:47) Center of Mass by Integration (Rigid Objects with Shape)		
	APC [4] (10:26) Nonuniform Density Center of Mass		
	APC [3] (12:12) System of Particles Translational Motion		

Impulse and Momentum

#	Assignment Name	Points	Done
6	[1] (3:18) You Can't Run From Momentum! (a momentum introduction)		
7	[2] (3:57) Force of Impact Equation Derivation		
8	[2] (7:59) Calculating the Force of Impact when Stepping off a Wall		
9	[2] (7:55) Impulse Introduction or If You Don't Bend Your Knees When Stepping off a Wall		
10	[2] (4:46) Proving and Explaining Impulse Approximation		
11	[3] (9:57) How to Wear a Helmet: a PSA from Flipping Physics		
12	[2] (3:58) Introduction to Conservation of Momentum with Demonstrations		
	[1] (4:00) Slow Motion Rocket Demonstration (Conservation of Momentum)		
	APC [2] (8:35) Conservation of Momentum Derivation and Rocket Demonstration		
13	[2] (5:39) Introductory Conservation of Momentum Explosion Problem Demonstration		
	APC [2] (5:29) Conservation of Momentum using Unit Vectors		
14	[2] (6:46) Introduction to Elastic and Inelastic Collisions		
15	[2] (5:33) Introductory Perfectly Inelastic Collision Problem Demonstration		

16	[2] (7:53) Introductory Elastic Collision Problem Demonstration		
17	[3] (4:18) Demonstrating Impulse is Area Under the Curve		
	APC [3] (6:36) Impulse Derivation and Demonstration		
	APC [4] (13:20) Indefinite Integral Introduction and 4 Kinematic Equation (UAM) Derivations		
	APC [5] (22:26) Demonstrating Calculus with a Ball and Force Platform		
18	[2] (4:21) Demonstrating How Helmets Affect Impulse and Impact Force		
19	[2] (3:59) Review of Momentum, Impact Force, and Impulse		
20	[2] (6:54) Using Impulse to Calculate Initial Height		
21	[2] (8:23) Impulse Comparison of Three Different Demonstrations		
22	[1] (4:32) Review of Mechanical Energy and Momentum Equations and When To Use Them!		
23	[4] (13:27) 2D Conservation of Momentum Example using Air Hockey Discs		
	APC [2] (5:08) 2D Conservation of Momentum Example using Air Hockey Discs and Unit Vectors		
	APC [3] (15:21) Ballistic Pendulum		
	Level 6 Practice Problems (For practice only!)		
	Level 6 Worksheet 1	30	
	Level 6 Worksheet 2	30	
	Level 6 Practice Quiz		
	Level 6 Practice Quiz #2		
	Level 6 Quiz		

	Force Concept Inventory Post-Test - Questions / Answer Form	5	

AP Physics 1 Free Response Exam Questions you should be able to solve at this point in the curriculum:

	(8:30) 2016 #2 - Experimental Design Question		

Level 7 - Rotational Kinematics

#	Assignment Name	Points	Done
1	[1] (5:03) Introduction to Circular Motion and Arc Length		
2	[1] (4:16) Defining Pi for Physics		
3	[1] (3:44) Introductory Arc Length Problem - Gum on a Bike Tire		
4	[1] (2:59) Angular Velocity Introduction		
5	[1] (5:40) Introductory Angular Velocity Problem - A Turning Bike Tire		
6	[1] (2:27) Angular Acceleration Introduction		
7	[1] (5:26) Angular Accelerations of a Record Player		
8	[1] (6:34) Uniformly Angularly Accelerated Motion Introduction		
9	[2] (3:43) Introductory Uniformly Angularly Accelerated Motion Problem - A CD Player		
10	[1] (3:57) Human Tangential Velocity Demonstration		
11	[2] (3:39) Introductory Tangential Velocity Problem - Mints on a Turntable		
12	[2] (6:50) Tangential Acceleration Introduction with Example Problem - Mints on a Turntable		
13	[1] (5:57) Demonstrating the Directions of Tangential Velocity and Acceleration		
14	[2] (6:20) Centripetal Acceleration Introduction		
15	[2] (5:59) Introductory Centripetal Acceleration Problem - Cylindrical Space Station		
16	[1] (5:25) Centripetal Force Introduction and Demonstration		
17	[3] (7:31) Introductory Centripetal Force Problem - Car over a Hill		
18	[3] (3:49) What is the Maximum Speed of a Car at the Top of a Hill?		
19	[2] (4:57) The Scalar Nature of Variables in Rotational Motion Equations		
	APC [3] (11:17) Centripetal Acceleration Derivation		
20	[3] (6:47) Mints on a Rotating Turntable - Determining the Static Coefficient of Friction		

21	[3] (5:06) Determining the Force Normal on a Toy Car moving up a Curved Hill		
22	[1] (3:58) Demonstrating Why Water Stays in a Bucket Revolving in a Vertical Circle		
23	[1] (6:13) Analyzing Water in a Bucket a Bucket Revolving in a Vertical Circle		
24	[3] (5:57) Minimum Speed for Water in a Bucket Revolving in a Vertical Circle		
	[1] (2:58) Human Loop the Loop with Damien Walters		
	[1] (22:20) Laws and Causes (VSauce)		
25	[1] (6:23) The Right Hand Rule for Angular Velocity and Angular Displacement		
26	[1] (5:20) A Tale of 3 Accelerations or The Differences between Angular, Tangential, and Centripetal Accelerations		
27	[4] (9:23) Conical Pendulum Demonstration and Problem		
	[5+] (18:02) The Real Physics of Roller Coaster Loops (Art of Engineering)		
	APC [2] (12:50) Nonuniform Circular Motion - Ball in a Vertical Circle		
	APC [3] (9:50) Nonuniform Circular Motion - Force of Tension in a Rope		
	APC [2] (7:46) Nonuniform Circular Motion - Accelerating Car		
	Level 7 Practice Problems (For practice only!)		
	Level 7 Worksheet 1	30	
	Level 7 Worksheet 2	30	
	Level 7 Practice Quiz		

Level 8 - Rotational Dynamics

#	Assignment Name	Points	Done
	Activity - Rotational Inertia Stations	10	
1	[2] (8:40) Moment of Inertia Introduction and Rotational Kinetic Energy Derivation		

2	[2] (7:57) Introductory Moment of Inertia and Rotational Kinetic Energy Problem		
3	[2] (3:58) Eggs in a Carton Moment of Inertia Problem		
4	[1] (11:22) Moment of Inertia of Rigid Objects with Shape		
5	[2] (9:59) Torque Introduction		
6	[2] (6:58) An Introductory Torque Wrench Problem		
7	[2] (5:53) The Right Hand Rule for Torque		
8	[2] (4:58) Net Torque on a Door Problem		
9	[1] (3:41) Rotational form of Newton's Second Law - Introduction		
10	[1] (6:54) Demonstrating Rotational Inertia (or Moment of Inertia)		
11	[3] (4:42) Introductory Rotational Form of Newton's Second Law Problem		
12	[3] (9:23) - (1 of 2) Measuring the Rotational Inertia of a Bike Wheel		
13	[3] (9:52) - (2 of 2) Measuring the Rotational Inertia of a Bike Wheel		
14	[2] (5:43) Rotational Equilibrium Introduction (and Static Equilibrium too!!)		
15	[3] (10:24) Introductory Rotational Equilibrium Problem		
16	[3] (8:58) Placing the Fulcrum on a Seesaw		
17	[3] (6:59) Painter on a Scaffold - Don't Fall Off!		
18	[3] (7:18) Graphing Rotational Inertia of an Irregular Shape		
19	[2] (4:35) How the Force of Tension on a Pulley Changes with Acceleration		
	APC [3] (7:46) Uniform Thin Hoop Rotational Inertia Derivation		
20	[5+] (9:22) Using Integrals to Derive Rotational Inertia of a Long, Thin Rod with Demonstration		
	APC [4] (12:10) Uniform Solid Cylinder Moment of Inertia Derivation		
	APC [3] (9:15) Parallel Axis Theorem Derivation		
21	[2] (3:17) Parallel Axis Theorem Example		
22	[5] (13:48) 2 Masses on a Pulley - Torque Demonstration		

23	[4] (7:59) 2 Masses on a Pulley - Conservation of Energy Demonstration		
24	[3] (8:58) Torque - Mass on Plank with String		
25	[2] (5:38) Rolling Without Slipping Introduction and Demonstrations		
26	[3] (7:28) Rolling Acceleration Down an Incline		
27	[2] (5:52) Which Will Be First? (Rolling Down an Incline)		
28	[2] (2:49) Which Direction will the Wheel Accelerate?		
29	[4] (8:51) Acceleration of a Wheel descending on a Rope (Torque Solution)		
30	[4] (6:59) Acceleration of a Wheel descending on a Rope (Energy Solution)		
31	[2] (5:59) Angular Momentum of a Rigid Object with Shape Introduction		
32	[2] (9:21) Conservation of Angular Momentum Introduction and Demonstrations		
33	[2] (5:20) Wheel Conservation of Angular Momentum Demonstration and Solution		
34	[3] (10:31) Merry-Go-Round - Conservation of Angular Momentum Problem		
35	[2] (9:51) Angular Momentum of Particles Introduction		
36	[3] (4:24) Common Point Particle Angular Momentum Triangle		
37	[2] (5:53) What are the Equations for Kinetic Energy and Angular Momentum of a Point Particle Moving in a Circle?		
38	[3] (4:44) Are Linear and Angular Momentum Conserved for a Satellite?		
39	[3] (9:51) Are Linear and Angular Momentum Conserved during this Collision?		
40	[4] (7:57) Point Particle with Rigid Object Collision - Conservation of Angular Momentum Demonstration and Problem		
41	[5] (12:28) Dart with Thin Rod Collision - Conservation of Angular Momentum Demonstration and Problem		
	[2] (8:37) Physics for Martial Arts: Intro to Rotational Dynamics (Tigon Karate)		

	[1] (4:16) The Physics of the “Hardest Move” in Ballet - Arleen Sugano		
	APC [3] (15:04) Cross Product Torque (with a Cross Product Review)		
	APC [3] (7:24) Cross Product Angular Momentum Derivation		
	APC [3] (5:34) Angular Momentum of a Rigid Body Derivation		
	APC [4] (18:12) Angular Momentum and a Pulley Mass System		
	Level 8 Practice Problems (For practice only!)		
	Level 8 Worksheet 1	30	
	Level 8 Worksheet 2	30	
	Level 8 Practice Quiz		
	Level 7-8 Quiz		

AP Physics 1 Free Response Exam Questions you should be able to solve at this point in the curriculum:

	(10:10) 2016 #1 - Short Answer		
	(10:54) 2017 #3 - Quantitative/Qualitative Translation		
	(10:19) 2018 #3 - Quantitative/Qualitative Translation		
	(10:29) 2019 #1 - Short Answer		

Level 9 - Universal Gravitation

#	Assignment Name	Points	Done
1	[1] (7:19) Newton's Universal Law of Gravitation Introduction - The Big G Equation		
2	[2] (6:20) How Much is a Mermaid Attracted to a Doughnut?		
3	[3] (6:38) The The Force of Gravitational Attraction between the Earth and the Moon		
4	[3] (4:20) Deriving the Acceleration due to Gravity on any Planet and specifically Mt. Everest		

	APC [2] (8:11) Kepler's First Law of Planetary Motion		
	APC [1] (2:03) Kepler's Second Law of Planetary Motion		
	APC [3] (4:51) Kepler's Second Law Derivation		
	APC [2] (4:42) Kepler's Third Law of Planetary Motion		
	APC [2] (5:12) Kepler's Third Law Derivation		
5	[4] (7:09) Altitude of Geostationary Orbit, a special case of Geosynchronous Orbit		
6	[1] (3:47) Dropping a Bucket of Water - Demonstration		
7	[2] (6:59) Apparent Weightlessness Introduction		
8	[2] (8:11) Number of g's or g-Forces Introduction		
9	[2] (8:12) Gravitational Field Introduction		
10	[2] (8:47) Universal Gravitational Potential Energy Introduction		
	APC [3] (7:35) Universal Gravitational Potential Energy Derivation		
11	[3] (5:59) Deriving the Binding Energy of a Planet		
12	[3] (7:06) Deriving Escape Velocity of Planet Earth		
13	[3] (4:23) Mechanical Energy of a Satellite in Circular Orbit		
14	[4] (6:09) Impulse for Two Objects being Attracted to One Another		
	APC [5+] (12:34) Force of Gravity and Gravitational Potential Energy Functions from Zero to Infinity (but not beyond)		
	Level 9 Practice Problems (For practice only!)		
	In-Class Activity: Circular Motion Escape Room	10	
	Level 9 Worksheet 1	30	
	Level 9 Worksheet 2	30	
	Level 9 Practice Quiz		

AP Physics 1 Free Response Exam Questions you should be able to solve at this point in the curriculum:

	(11:06) 2018 #1 - Short Answer		

Level 10 - Simple Harmonic Motion

#	Assignment Name	Points	Done
1	[1] (3:59) Simple Harmonic Motion Introduction via a Horizontal Mass-Spring System		
2	[1] (4:59) Simple Harmonic Motion - Force, Acceleration, and Velocity at 3 Positions		
3	[1] (2:26) Horizontal vs. Vertical Mass-Spring System		
4	[2] (6:32) When is a Pendulum in Simple Harmonic Motion?		
5	[2] (8:22) Demonstrating What Changes the Period of Simple Harmonic Motion		
6	[3] (2:59) Triple the Mass in a Mass-Spring System. How does Period Change?		
7	[3] (4:10) Frequency vs. Period in Simple Harmonic Motion		
8	[1] (2:28) Comparing Simple Harmonic Motion to Circular Motion - Demonstration		
9	[3] (8:14) Simple Harmonic Motion Position Equation Derivation		
10	[5+] (5:48) Simple Harmonic Motion Velocity and Acceleration Equation Derivations		
11	[3] (8:51) Simple Harmonic Motion Position, Velocity, and Acceleration Graphs		
12	[3] (6:59) Simple Harmonic Motion Graphs of Mechanical Energies		
13	[2] (9:43) Simple Harmonic Motion Demonstrating Position, Velocity, and Acceleration of a Mass-Spring System		
14	[1] (2:48) Simple Harmonic Motion Creating Circular Motion from Sine and Cosine Curves		
	APC [4] (12:48) Simple Harmonic Motion Derivations using Calculus (Mass-Spring System)		
	[3] (1:22) Phase Constant		
	APC [3] (13:29) Simple Pendulum - Simple Harmonic Motion Derivation using Calculus		
	APC [4] (14:52) Physical Pendulum - Period Derivation using Calculus		

	APC [4] (7:11) Total Mechanical Energy in Simple Harmonic Motion		
	APC [4] (8:04) Velocity as a function of Position in Simple Harmonic Motion		
	Level 10 Practice Problems (For practice only!)		
	Level 10 Worksheet 1	30	
	Level 10 Worksheet 2	30	
	Level 10 Practice Quiz		
	Level 9-10 Quiz		

AP Physics 1 Free Response Exam Questions you should be able to solve at this point in the curriculum:

	(9:42) 2018 #5 - Paragraph Argument Short Answer		

Level 11 Fluids

#	Assignment Name	Points	Done
1	(7:31) 3 States of Matter - Solid, Liquid, Gas		
2	(6:26) Density		
3	(6:59) Billy's Pressure Dream		
4	(9:00) Fluid Pressure - Billy's Still Dreaming about Physics		
5	(11:03) Buoyant Force Equation: Step-by-Step Derivation		
6	(13:12) Buoyant Force Explained: Submerged Objects in Fluids		
7	(9:01) Buoyant Force Calculation: A Submerged Wood Cylinder		
8	(8:58) Buoyant Force in Action: Weight of Displaced Water!		
9	(7:17) Buoyant Force Explained: Objects Floating on Fluids!		
10	(4:08) Ice Melting in Water: Does the Water Level Change?		
11	(13:16) Calculating Buoyant Force on a Submerged Sphere		
12	(11:53) Buoyant Force Demonstration with Steel and Oak Spheres		
13	(8:00) Calculating Tension Force on a Submerged Oak Sphere		
14	(6:16) Ideal Fluid Flow		
15	(10:15) Continuity Equation for Ideal Fluid Flow- Derivation		
16	(4:01) Volume Flow Rate Example		
17	(14:52) Bernoulli's Principle Derivation		
18	(7:00) 7 Fun Demos of Bernoulli's Principle Explained		
19	(7:11) Solving Fluid Flow with Bernoulli's Equation		
20	(5:11) Deriving Torricelli's Theorem Using Bernoulli's Equation		
21	(9:06) Demonstrating Torricelli's Theorem with a Rain Barrel		
	Level 11 Worksheet 1	30	
	Level 11 Worksheet 2	30	
	Level 11 Quiz		

Level 12 AP Review Exercises

#	Assignment Name	Points	Done
	AP Physics 1 Fundamentals Check		
	2022 Practice Exam 1 - Multiple Choice with Test Corrections	50	
	2022 Practice Exam 1 - Free Response	50	
	2022 Practice Exam 1 - Scoring Sheet Completed		
	2022 Practice Exam 2 - Multiple Choice with Test Corrections	50	
	2022 Practice Exam 2 - Free Response	50	
	2022 Practice Exam 2 - Scoring Sheet Completed		
	2022 Practice Exam 3 - Multiple Choice with Test Corrections	50	
	2022 Practice Exam 3 - Free Response	50	
	2022 Practice Exam 3 - Scoring Sheet Completed		

End of Year Project

#	Assignment Name	Points	Done
	End of Year Enrichment Project		

AP Review Videos

	(New - 2024) Topic Reviews
	(32:15) AP Physics 1 Exam Cram: Full Curriculum in 30 Minutes
	(11:57) Unit 1 - Kinematics
	(10:57) Unit 2 - Dynamics
	(11:36) Unit 2 Supplement - Newton's Second Law
	(21:07) Unit 2 Supplement - Friction
	(6:35) Unit 2 Supplement - Center of Mass

	(21:07) Unit 2a - Newton's Laws and Forces
	(13:37) Unit 2b - Universal Gravitation, Spring Force, and Circular Motion
	(18:39) Unit 3 - Work, Energy, and Power
	(15:13) Unit 4 - Linear Momentum
	(16:01) Unit 5a - Rotational Kinematics
	(12:34) Unit 5b - Torque and Rotational Inertia
	(7:45) Rotational Kinematics Demonstrated
	(19:42) Unit 6 - Energy and Momentum of Rotating Systems
	(14:15) Unit 7 - Oscillations
	(8:31) Unit 8 - Fluids

	Topic Reviews
	Kinematics Review
	Kinematics Review Supplement - Projectile Motion
	Kinematics Review Supplement - Motion Graphs
	Kinematics Review Supplement - Center of Mass
	Dynamics Review
	Dynamics Review Supplement - Newton's Second Law
	Dynamics Review Supplement - Friction
	Work, Energy, and Power Review
	Linear Momentum & Impulse Review
	Rotational Kinematics Review
	Rotational Dynamics Review
	Universal Gravitation Review
	Simple Harmonic Motion Review
	Equations to Memorize

	Free Response Section
	Free Response - Qualitative/Quantitative Translation (QQT) and Paragraph Argument Short Answer (PASA) Explained
	Free Response - Experimental Design Questions (EDQ) Explained
	Free Response - Short Answer (SA) Explained
	8 General Suggestions for the Free Response Questions of any AP Physics Exam

	Free Response Solutions
	2015 FRQ #1 - SA
	2015 FRQ #3 - QQT
	2015 FRQ #4 - PASA
	2016 FRQ #1 - SA
	2016 FRQ #2 - EDQ
	2016 FRQ #3 - QQT
	2017 FRQ #2 - EDQ
	2017 FRQ #3 - QQT
	2017 FRQ #4 - SA
	2018 FRQ #1 - SA
	2018 FRQ #3 - QQT
	2018 FRQ #5 - PASA
	2019 FRQ #1 - SA
	2019 FRQ #2 - QQT
	2019 FRQ #3 - EDQ