Virtual Courses 2023-2024
Writing Assessment Items in Physics

WORLD'S PHINEST PHYSICS

Overview: Participants learn how to write various multiple-choice and free-response assessment items for physics courses, including AP Physics and other college-level physics programs.

Earning Credit: Participants may earn up to 12 clock hours of professional development credit. Credit is earned by completing modules. Each module is worth a number of clock hours. A certificate is granted on June 1, 2024, OR once 12 hours are completed, OR upon request by the participant. Participants who do not earn 12 hours will still receive a certificate for the number of hours completed. There are more than 12 hours worth of modules available, so participants need not complete every module in order to complete the course. Participants continue to have access to the course even after they complete the 12 clock hours, until the course ends on June 1, 2024.

Course Objectives:

- Understand the spectrum of assessment from fully formative to fully summative.
- Understand the structure of a multiple choice item for a physics assessment.
- Create a variety of multiple choice items for physics assessments that address various learning objectives, knowledge pieces, and scientific skills.
- Identify features of good and poor multiple choice items.
- Be able to articulate good distractors for multiple choice items, and why they are good.
- Understand the structure of a free response item for a physics assessment.
- Create a variety of free response items for physics assessments that have multiple parts address various learning objectives, knowledge pieces, and scientific skills.
- Create a scoring rubric for a free response item that can be easily used by another teacher.
- Create other resources that can be used as formative assessments, and be able to articulate how they could best be used by other teachers.

Module	Description	Hours
Create a Calculation Multiple Choice Question	Participants learn how to craft a multiple choice question that aligns with skill 2.2 of the new AP Physics framework, where students must calculate a numerical quantity given a scenario and other known numerical quantities.	1
Create a Symbolic Answer Multiple Choice Question	Participants learn how to craft a multiple choice question that aligns with skill 2.1 of the new AP Physics framework, where students must derive a symbolic expression given a scenario and other known symbolic quantities.	1
Create a Proportionality Multiple Choice Question	Participants learn how to craft a multiple choice question that aligns with skill 2.4 of the new AP Physics framework, where students must apply proportional reasoning to a situation to determine what value a quantity is multiplied or divided by.	1
Create a Comparison Multiple Choice Question	Participants learn how to craft a multiple choice question that aligns with skill 2.3 of the new AP Physics framework, where students must make a comparison between two or more situations, places, or times.	1

Module	Description	Hours
Create a Justification Multiple Choice Question	Participants learn how to craft a multiple choice question that aligns with skill 3.3 of the new AP Physics framework, where students must select the correct justification for a given claim.	1
Create a Make-A-Claim Multiple Choice Question	Participants learn how to craft a multiple choice question that aligns with skill 3.2 of the new AP Physics framework, where students must select the correct claim or answer given a situation.	1
Create a Lab-Based Multiple Choice Question	Participants learn how to craft a multiple choice question that involves selecting the correct equipment, procedure, or data analysis for an experiment.	1
Create an Experimental Design Free-Response Question	Participants learn how to craft a free response question of the "Experimental Design" type (according to the new AP Physics exam specifications), where students design an experiment, describe the data analysis, engage in error analysis, and/or analyze given data from a proposed experiment. Participants also learn how to create a scoring rubric for such a question.	2
Create a Qualitative-Quantitative Translation Free-Response Question	Participants learn how to craft a free response question of the "Qualitative-Quantitative Translation" type (according to the new AP Physics exam specifications), where students analyze a situation qualitatively (using words like increase or decrease), then quantitatively (generally by deriving a symbolic equation), then showing that the qualitative and quantitative communicate the same ideas. Participants also learn how to create a scoring rubric for such a question.	2
Create a Mathematical Routines Free-Response Question	Participants learn how to craft a free response question of the "Mathematical Routines" type (according to the new AP Physics exam specifications), where students perform a long derivation, create a representation, and write a brief explanation related to a given scenario. Participants also learn how to create a scoring rubric for such a question.	2
Create a Translating Between Representations Free-Response Question	Participants learn how to craft a free response question of the "Translating Between Representations" type (according to the new AP Physics exam specifications), where students create a representation, derive an equation, draw graphs, and show that all these representations are expressing the same ideas. Participants also learn how to create a scoring rubric for such a question.	2
Create a Warm-Up	Participants learn how to craft a warm-up question that can involve doing math, creating representations, and/or engaging in scientific argumentation.	1
Create an Exit Ticket	Participants learn how to craft an exit ticket question that can involve doing math, creating representations, and/or engaging in scientific argumentation.	1
Create an Next-Time Question	Participants learn how to craft a next-time question of the style of Paul Hewitt's Next-Time Questions.	1
Create a Writing Task	Participants learn how to craft a short writing task, as well as a scoring rubric for such a task.	1
Create a TIPERs-Style Question	Participants learn how to craft a task of the type that appears in the Tasks Inspired by Physics Education Research books, as well as a scoring rubric for such a task.	1

Virtual Courses 2023-2024 Projects and Performance Tasks in Physics

Overview: Participants learn about performance-based assessments (performance tasks) and then explore resources related to over 40 projects and performance tasks for various levels of physics, from conceptual through calculus-based college-level physics. Participants are encouraged to try some of the projects and performance tasks with their students.

Earning Credit: Participants may earn up to 12 clock hours of professional development credit. Credit is earned by completing modules. Each module is worth a number of clock hours. A certificate is granted on June 1, 2024, OR once 12 hours are completed, OR upon request by the participant. Participants who do not earn 12 hours will still receive a certificate for the number of hours completed. There are more than 12 hours worth of modules available, so participants need not complete every module in order to complete the course. Participants continue to have access to the course even after they complete the 12 clock hours, until the course ends on June 1, 2024.

Course Objectives:

- Understand the features of a performance-based assessment and how they compare and differ from projects, project-based learning, and traditional assessments.
- Perform a variety of performance-based assessments, acting in the role of the student.
- Plan and implement a variety of performance-based assessments with actual students.
- Create a rubric for scoring projects and performance tasks in physics.
- Score a variety of performance-based assessment submission from actual students and give students meaningful feedback.

Module	Recommended Courses	Description	Hours
Speed of Sound	Regular Honors AP Physics 1	Students design and conduct an experiment to measure the speed of sound using constant-velocity physics and linear regression data analysis.	3
Trip To School	Regular Honors AP Physics 1	Students take data related to their trip from home to school on a normal day, and use that data to create quantitative graphs of distance vs. time and speed vs. time, assuming all segments of motion are rest or constant velocity.	3
Acceleration of an Object	Regular Honors AP Physics 1	Students make basic measurements and use kinematics equations to calculate the acceleration and final velocity of an object.	2
Motion Storybook (Qualitative)	Regular Honors	Students create a story about a character undergoing seven different motions (rest, constant velocity forward or backward, accelerating forward or backward while gaining or losing speed), and represent that motion using qualitative sketched graphs of *x* vs. *t* and *v* vs. *t*.	2

Module	Recommended Courses	Description	Hours
Motion Storybook (Quantitative)	Honors AP Physics 1	Students create a story as described above, but assign actual values of distance, time, initial and final speed, and acceleration to the character. These values must be consistent with kinematics equations, and the student draws quantitative graphs and free-body diagrams representing the motion.	3
Green-Light-Red-Light	Honors AP Physics 1	Students take data for a car accelerating from rest, traveling with constant velocity, then braking to rest, and calculate distance and acceleration values from this data. They then represent the car's motion with quantitative position, velocity, and acceleration graphs.	3
Car Speeding Up	AP Physics C	Students take several data points of velocity vs. time for a car speeding up from rest to the speed limit. The student then models the velocity vs. time as a polynomial and use calculus to support claims about the car's acceleration and distance.	3
Trip To Kindergarten	Honors AP Physics 1 AP Physics C	Students create a map of a path from their home to the nearest elementary school such that the path is made of straight-line vectors. Students must then represent the vectors as components and magnitude-and-direction.	3
Projectile Motion Challenge	Regular Honors AP Physics 1 AP Physics C	Students perform an experiment using horizontal-launch projectile motion to determine the launch speed of a dart from a dart launcher, and then use that speed to predict the landing point of the projectile launched at an angle.	2
Ball Toss	Regular Honors AP Physics 1 AP Physics C	Students cause a ball or other object to become a projectile and directly measure height, horizontal distance, and time information. From this, they calculate all of the projectile motion parameters for the projectile and create every possible quantitative graph for the object's motion.	3
Falling Yo-Yo	Honors AP Physics 1 AP Physics C	Students use kinematics to determine the acceleration of a falling yo-yo, then use Newton's Second Law to make a claim about the amount of tension in the yo-yo string. No rotation concepts are required to perform this task.	2
Friction of a Yo-Yo	Honors AP Physics 1 AP Physics C	Students use a modified Atwood machine and make direct measurements in order to calculate the coefficient of kinetic friction between a yo-yo and a tabletop.	2
Newton's Third Law	Regular Honors	Students analyze ordinary situations, identifying an action/reaction pair of forces and showing that they understand the difference between Newton's Third Law and cause-and-effect.	2
Force on a Magnet	Honors AP Physics 1 AP Physics C	Students use a free-body diagram, vector components, and equilibrium principles to measure the force a magnet exerts on a metal surface. No magnetism concepts are required to do this activity.	2
Friction of a Coin	Honors AP Physics 1 AP Physics C	Students cause a coin to slide down an inclined plane and make measurements needed to calculate the coefficient of kinetic friction between the coin and the incline.	2
Weight of My Keys	Honors AP Physics 1 AP Physics C	Students use free-body diagrams, vector components, and equilibrium principles to measure the weight of their keys without having a scale available.	2

Module	Recommended Courses	Description	Hours
Mu of My Shoe	Honors AP Physics 1 AP Physics C	Students perform various experiments to measure the coefficient of static friction between their shoe and a metal track.	3
Amusement Park Injury	Regular Honors AP Physics 1	Students are given information about an amusement park ride that caused a rider injury, and must show why the ride would be certain to cause injury and is not safe. Students must suggest changes that could be made to make the ride safe.	2
Measuring G of the My Solar System Applet	Honors AP Physics 1 AP Physics C	Students access the “My Solar System” applet and create various circular orbits. Using measurements made about the objects in the simulation, students calculate the value of G used within the applet’s code according to the applet’s (non-SI) units.	2
Finding Gravity with Conical Pendulum	Regular Honors AP Physics 1 AP Physics C	Students make measurements of the motion of a conical pendulum and then use either similar triangle ratios or trigonometry to calculate an experimental value for *g*.	2
Energy of an Activity	Regular Honors AP Physics 1	Students analyze a series of energy transformations for an ordinary activity and represent those transformations using qualitative bar charts, force diagrams, and qualitative statements about the work done on or by systems.	3
Mouse Trap Car Project	Regular Honors AP Physics 1	Students build a mousetrap-powered car and make measurements of the car’s motion in order to quantitatively analyze energy transfers that take place as the car travels.	4
Roller Coaster Design	Regular Honors AP Physics 1 AP Physics C	Students specify heights and radii of curvature of a given roller coaster design and then use conservation of energy and circular motion principles to show that the entire roller coaster is safe.	3
Egg Bungee	Honors AP Physics 1 AP Physics C	Students design a bungee cord using basic rubber bands, and attach a small holder for an egg. Students attach the cord to the ceiling and release the egg at ceiling level. The goal is for the egg to get as close to the floor as possible without touching. Students use video analysis to analyze the motion and energy transformations that take place for the egg bungee.	3
Car Crash	Regular Honors AP Physics 1	Students create a bumper for a Pasco Cart out of copy paper and tape. They then roll the cart down a Pasco track elevated by a single book so that the cart collides with a can. If the can is not dented, the procedure is repeated with a higher incline until the can is dented. The student then analyzes energy transformations, momentum, impulse, and force.	2
Slow-Yo	AP Physics 1 AP Physics C	Students design a yo-yo device to unroll from two strings. The goal is to take the longest possible time to unroll. Students make measurements of the motion to calculate the rotational inertia of the slow-yo using both forces/torques and energy.	3
Measuring Rotational Inertia	AP Physics 1 AP Physics C	Students use energy principles to calculate the rotational inertia of an ordinary household object after making measurements of the object’s rotational motion.	3

Module	Recommended Courses	Description	Hours
Beat-Down	Regular Honors AP Physics 1 AP Physics C	Students select a song and look up its tempo (beats per minute). Knowing the BPM, students must create a pendulum that oscillates in time with the song. Repeat for a spring-mass oscillator. Students then represent the motion of the spring-mass oscillator using a variety of quantitative graphs.	3
SHM At Home	AP Physics C	Students create an oscillating system in their home using household materials and then make measurements necessary to calculate every possible parameter for the oscillation. They then use Desmos to create every possible quantitative graph of the object's oscillation.	3
Density of an Object	AP Physics 2 (next year AP Physics 1)	Students use basic buoyancy principles to calculate the density of an irregularly shaped object.	2
Thermodynamic Letters	AP Physics 2	Students formulate a series of thermodynamic processes (quantitatively) such that one of the diagrams *PV*, *PT*, or *VT* looks like a recognizable capital or lower-case letter.	3
Electroscope P-Task	Regular Honors	Students build an electroscope out of ordinary materials, and then create a Flipgrid video in which they show the electroscope, explain how it works, show it working with a charged object, and show a diagram of the charge separation.	2
Electric Field and Potential	AP Physics C	Each student is assigned a continuous charge distribution and must use integral calculus to find the electric field and electric potential at a given point.	2
Gauss's Law and Electric Potential	AP Physics C	Each student is assigned a symmetrical but non-uniform charge distribution of radius R so that they can use Gauss's Law to calculate the electric field as a function of r, then use integral calculus to calculate the electric potential as a function of r. The use of integral calculus to obtain charge enclosed as a function of r is required.	2
Circuits Puzzle P-Task	Regular Honors AP Physics 2	Students create a circuits puzzle of the type found in the Crack the Circuit game on the website The Universe and More. Students then solve each other's puzzles.	3
House Wiring Project	Regular Honors AP Physics 2	Students turn a cardboard box into a model house (three rooms), each room of which is lit by Christmas lights that are series, parallel, or in a mixed configuration.	4
Electric Sign P-Task	Honors AP Physics 2 AP Physics C	Students create a sign showing a word or phrase out of resistors that are connected in such a way as to appear like recognizable capital or lower case letters.	3
Build a Capacitor	AP Physics 2 AP Physics C	Students build a capacitor using ordinary materials, then perform an experiment to find the capacitor's capacitance.	3
Particle Paths	AP Physics 2 AP Physics C	Students draw a region of space filled with electric and magnetic fields so that a particle released from rest will trace out a path that is a recognizable letter. Students must trace out their own initials.	3
Build an Electric Motor	Regular Honors AP Physics 2	Students build a crude electric motor out of inexpensive materials that can be found at Dollar Tree and Harbor Freight Tools, or other such discount stores.	3

Module	Recommended Courses	Description	Hours
Build an Electromagnet	Regular Honors	Students build a series of simple electromagnets from wire, nails, and other materials and make claims about what makes the electromagnet the strongest.	2
Measuring the Width of a Hair	AP Physics 2	Students use a laser to measure the width of a human hair as well as the width of data tracks on a CD or DVD. This activity involves interference and diffraction-grating concepts.	2
Finding Focal Length	AP Physics 2	Students perform an experiment to find the focal length of a given thin lens.	2
Measure the Speed of Sound with Straws	Regular Honors AP Physics 2	Students perform an experiment in order to calculate the speed of sound given only a straw, scissors, a ruler, and an app on the phone that detects sound frequency.	2
Roller Coaster Design (with Rotation)	AP Physics 1 AP Physics C	Students design a roller coaster, including specifying features (dips, hills, loops), specifying their heights and radii of curvature. Students then use rotational motion, circular motion, and energy principles in order to show that the ride is safe at all points.	4
Rube Goldberg Machine	Regular Honors AP Physics 1 AP Physics C	Students design a Rube Goldberg Machine such that the various actions demonstrate basic mechanics principles. For each principle, the student must explain how that action shows the principle and show a qualitative representation associated with that principle (free-body diagram, energy bar chart, etc.)	4
Physics Magic Trick	Regular Honors AP Physics 2	Each student formulates (or finds on the Internet) a physics demonstration that can be fashioned as a magic trick. Students perform the trick, then show how it works with correct physics principles and at least one representation.	3
Physics of a Movie Scene	Regular Honors AP Physics 1 AP Physics 2 AP Physics C	Each student finds a scene in a movie where one or more laws of physics are clearly violated. Students write a review of the scene in the style of the reviews found on the Intuitor Insultingly Stupid Movie Physics website.	3

WORLD'S PHINEST PHYSICS

Virtual Courses 2023-2024 Revving Up For Rotation

Overview: Participants learn rotational motion concepts so that they can better deliver instruction on the topics related to rotational motion to their college-level physics courses. Participants also learn about hands-on activities that can help students understand and practice rotational principles. This course is intended for OnRamps and Advanced Placement Physics teachers.

Earning Credit: Participants may earn up to 12 clock hours of professional development credit. Credit is earned by completing modules. Each module is worth a number of clock hours. A certificate is granted on June 1, 2024, OR once 12 hours are completed, OR upon request by the participant. Participants who do not earn 12 hours will still receive a certificate for the number of hours completed. There are more than 12 hours worth of modules available, so participants need not complete every module in order to complete the course. Participants continue to have access to the course even after they complete the 12 clock hours, until the course ends on June 1, 2024.

Course Objectives:

- Understand concepts related to rotational motion, forces and torque, energy, and angular momentum.
- Evaluate instructional resources for rotation as to their effectiveness with one's own student population.
- Plan, implement, and assess hands-on activities with students for rotation topics and principles.
- Evaluate student work products and give meaningful feedback.

Module	Description	Hours
Notes - Angle and Angular Velocity	Teaching notes on angular displacement and angular speed concepts, including the difference between angular speed and linear speed.	0.6
Activity - Pivoting Ruler	A basic activity to show students why radians are the best way to measure angular displacement (not degrees)	0.5
Notes - Tangential and Centripetal Acceleration	Notes on the difference between the tangential component and the centripetal component of acceleration.	0.5
Notes - Angular Kinematics	Notes on angular kinematics equations, as well as calculus-based kinematics.	0.3
Activity - Fidget Spinner	A basic activity where students make measurements to figure out the angular acceleration of a fidget spinner as it slows down in its rotation.	1.0
Activity - Twirling Ruler	A basic activity where students make measurements to figure out the angular acceleration of a ruler twirling on the end of a pencil as it slows down in its rotation.	1.0
Notes - Kinematics Graphs and Segmented Motion	Notes on the graphs of angular kinematic quantities, and also engaging in segmented motion with angular quantities.	0.4
Notes - Torque	Notes on calculating torque and rotational equilibrium.	0.6
Activity - Torque on a Meterstick	An activity where students take data to show the relationships among torque, radius, force, and angle.	1.0

Module	Description	Hours
Activity - Walk the Plank	A rotational equilibrium activity where students predict how far an object can be placed over the edge of a table without tipping the plank over.	0.5
Activity - Bridge Support	A rotational equilibrium activity where students calculate the force applied by the supports of a bridge that carries a load.	0.5
Activity - Tipping Block	A rotational equilibrium activity where students calculate the coefficient of static friction between a block and a table by tipping the block over slowly.	0.5
Activity - Leaning Ruler	A rotational equilibrium activity where students calculate coefficients of friction of a meterstick leaning against a wall.	1.0
Notes - Rotational Inertia	Notes on the basic principles of rotational inertia and how it relates to mass and its distribution.	0.3
Notes - Parallel Axis Theorem	Notes on the Parallel Axis Theorem and example questions. Note that the Parallel Axis Theorem appears in AP Physics 1 starting in Fall 2024.	0.2
Notes - Integrating to Get Rotational Inertia	Notes on setting up and evaluating integrals to obtain the rotational inertia of an object.	0.3
Activity - Whirlygig Labs	Labs involving the PVC whirligigs where students show the relationship between torque and angular acceleration, and also how mass and its distance from the center of mass determine the amount of rotational inertia.	2.0
Notes - Rotational Dynamics	Notes on Rotational Dynamics (when torques and forces on an object are not balanced and Newton’s Second Law must be used).	0.2
Notes - Rotational Dynamics Examples	Example problems related to Rotational Dynamics.	0.3
Activity - Yo-Yo Rotational Inertia (Unrolling)	A basic activity where students make measurements of a falling, unrolling yo-yo to calculate its rotational inertia.	0.5
Activity - Stationary Yo-Yo	A more advanced activity where the yo-yo unrolls, but does not fall. The goal again is to find the rotational inertia of the yo-yo.	1.0
Notes - Rotational Energy	Notes on rotational energy principles.	0.3
Notes - Rolling	Examples of applying rotational energy and rotational dynamics to objects either rolling with slipping or without slipping.	0.4
Activity - Ball Rolls Off a Table	An advanced version of a projectile motion activity where students must use rotational energy to find the projectile’s launch speed before predicting where the projectile will land.	1.0
Activity - Yo-Yo Rotational Inertia (Rolling)	A lab where students make several trials of measurements for a yo-yo rolling down an incline in order to calculate the yo-yo’s rotational inertia.	1.0
Notes - Angular Momentum Basics	Definition of angular momentum and how a translating object also has angular momentum.	0.3
Notes - Conservation of Angular Momentum	Rotational collisions and other interactions where Conservation of Angular Momentum must be applied.	0.6

Module	Description	Hours
Activity - Angular Momentum Lab	A lab that uses the same materials as the old Circular Motion Lab (the spinning stopper lab), but this time to show whether angular momentum is conserved.	1.0
Activity - Rod Rotational Inertia Lab	A lab where students cause a translating cart to collide with a rotating rod, and then make the necessary measurements to calculate the rotational inertia of the rod using Conservation of Angular Momentum.	1.0
Notes - Elliptical Orbits	Notes on elliptical orbits, particularly how Conservation of Energy and Conservation of Angular Momentum apply.	0.7

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Virtual Courses 2023-2024 Flowing Into Fluids

Overview: Participants learn fluid dynamics concepts so that they can better deliver instruction on the topics related to fluid dynamics to their college-level physics courses. Participants also learn about hands-on activities that can help students understand and practice fluid dynamics principles. This course is intended for OnRamps and Advanced Placement Physics teachers.

Earning Credit: Participants may earn up to 12 clock hours of professional development credit. Credit is earned by completing modules. Each module is worth a number of clock hours. A certificate is granted on June 1, 2024, OR once 12 hours are completed, OR upon request by the participant. Participants who do not earn 12 hours will still receive a certificate for the number of hours completed. There are more than 12 hours worth of modules available, so participants need not complete every module in order to complete the course. Participants continue to have access to the course even after they complete the 12 clock hours, until the course ends on June 1, 2024.

Course Objectives:

- Understand concepts related to density, pressure, buoyancy, and fluid dynamics.
- Evaluate instructional resources for fluid dynamics as to their effectiveness with one's own student population.
- Plan, implement, and assess hands-on activities with students for fluid dynamics topics and principles.
- Evaluate student work products and give meaningful feedback.

Module	Description	Hours
Notes - Geometric Scaling and Density	Notes on how the area and volume of similar objects scale with length parameters, and also the basics of density.	0.3
Activity - Density of Water	A basic activity where students create a graph, the slope of which is the density of water.	0.5
Lab - Density	A lab where students use a graduated cylinder and glass marbles to calculate the density of the glass marbles.	1.0
Activity - Floating Bowl	An activity where students predict how much mass can be set in a floating bowl before the bowl sinks.	0.5
Activity - Floating Block	An activity where students predict how much mass can be set on a floating block before the block sinks.	0.5
Notes - Pressure	Notes on the definition of pressure, hydrostatic pressure at depth, and Pascal’s Principle.	0.5
Lab - Pressure	A lab where students show the relationship between pressure and depth in water, and calculate the density of water with a straight-line graph.	1.0
Notes - Buoyancy	Notes on the buoyant force and the difference between floating and sinking objects.	0.5
Lab - Buoyancy	A lab where students use a floating cup with mass in it to show the relationship between buoyancy and volume and also to calculate the density of water.	1.0

Module	Description	Hours
Activity - Density of an Object	An activity where students use basic buoyancy principles to calculate the density of an irregularly shaped object.	0.5
Notes - Flow Rate and Bernoulli's Law	Notes on the principles related to fluids in motion, along with basic examples worked out.	0.7
Activity - Bernoulli Cut and Paste	A cut-and-paste matching activity where students match Bernoulli bar charts to different given fluid dynamics situations.	0.5
Lab - Bernoullis Law Height	A lab where students investigate the relationship between the height of a fluid and the speed the fluid emerges from a hole in the container.	1.0
Lab - Bernoullis Law Force	A lab where students investigate the relationship between the force applied to a fluid and the speed the fluid emerges from the container.	1.0
Activity - Squirt Gun	An activity where students use projectile motion and fluid dynamics laws in order to calculate the pressure applied to the water in a squirt gun when the trigger is pulled.	0.5
Activity - H2O Blaster	An activity where students apply continuity and Bernoulli equations, along with projectile motion, to the water in an H2O Blaster as it is pushed out.	1.0
Activity - Soda Bottle	An activity where students apply continuity and Bernoulli equations, along with projectile motion, to the water in a soda bottle as it leaks out a hole in the side.	1.0
Example Multiple Choice and Free Response Questions	This is a set of example questions for fluid dynamics.	4.0
Student Workbook Pages	This is a set of worksheets that are meant to mimic the AP Physics 1 Student Workbook, but for fluid dynamics. Each page includes a scoring rubric in lieu of teacher solutions.	3.6
Unit Test	A unit test for fluid dynamics, which includes multiple choice and free response questions.	2.4