

**WEST JEFFERSON HILLS SCHOOL DISTRICT
AP PHYSICS CURRICULUM**

GRADE 12

<p style="text-align: center;">PA Academic Standards Student must be able to do</p>	<p style="text-align: center;">Objective Content or process student will be able to know and do</p>	<p style="text-align: center;">Instructional Methods</p>	<p style="text-align: center;">Materials/ Resources Textbooks, trade books, workbooks, software, hardware, etc.</p>	<p style="text-align: center;">*Assessment Procedures *Additional adaptations, modifications, accommodations, and enrichment/ acceleration will be provided per IEP</p>	<p style="text-align: center;">*Additional Learning Opportunities for students who do not meet basic standards *Additional adaptations, modifications, and accommodations will be provided per IEP</p>	<p style="text-align: center;">*Extended Learning Opportunities for students who can go beyond the basic standards. *Additional enrichment/acceleration will be provided per IEP</p>
<p>3.2 Inquiry and Design</p>						
<p>A. Evaluate the nature of scientific and technological knowledge.</p>	<ul style="list-style-type: none"> •Critically evaluate the status of existing theories. 	<ul style="list-style-type: none"> • Direct Instruction • Partner Work • Group Work • Lab Work • Study Skills • Demonstrations (chemical) • Movie Clips • Graphing/ Analysis • Computer Projects • Cooperative Learning • Guided/ Paired/ independent Reading • Brainstorming • Class discussions • Note guides 	<ul style="list-style-type: none"> •Textbook/ Supplements •Transparencies •PowerPoint •Lab Manual Diagrams •Periodic Table •Calculators •Handouts Lab Equipment •Measuring Devices •Computer (classroom) •Computer (lab) •Excel •Chemicals •Videos •Testing Kits/materials •Internet •Magazines and Journals 	<ul style="list-style-type: none"> •Teacher Observation •Tests •Quizzes •Problem Solving •In-Class Work •Homework •Lab write-ups •Midterms •Final •Critical Thinking •AP Problems •Essays •Rubric •Peer Evaluation 	<ul style="list-style-type: none"> • Review and Re-teach • Small Group Instructions • Access to Learning Support Teachers • Adapted Lessons • Extended Time • Tutoring • Technology • Extended Time 	<ul style="list-style-type: none"> • Additional Reading • Science Competition • Science Fairs • Independent Projects • Field Trips • Science Clubs • Summer Assignments • Internships • Science Honors Institute • Shadowing Programs

**WEST JEFFERSON HILLS SCHOOL DISTRICT
AP PHYSICS CURRICULUM**

GRADE 12

PA Academic Standards Student must be able to do	Objective Content or process student will be able to know and do	Instructional Methods	Materials/ Resources Textbooks, trade books, workbooks, software, hardware, etc.	*Assessment Procedures *Additional adaptations, modifications, accommodations, and enrichment/ acceleration will be provided per IEP	*Additional Learning Opportunities for students who do not meet basic standards *Additional adaptations, modifications, and accommodations will be provided per IEP	*Extended Learning Opportunities for students who can go beyond the basic standards. *Additional enrichment/acceleration will be provided per IEP
3.2 Inquiry and Design						
B. Evaluate experimental information for appropriateness and adherence to relevant science processes.	<ul style="list-style-type: none"> • Evaluate experimental data correctly within experimental limits. • Judge that conclusions are consistent and logical with experimental conditions. 	<ul style="list-style-type: none"> • Direct Instruction • Partner Work • Group Work • Lab Work • Study Skills • Demonstrations (chemical) • Movie Clips • Graphing/ Analysis • Computer Projects • Cooperative Learning • Guided/ Paired/ independent Reading • Brainstorming • Class discussions Note guides 	<ul style="list-style-type: none"> • Textbook/ Supplements • Transparencies • PowerPoint • Lab Manual Diagrams • Periodic Table • Calculators • Handouts Lab Equipment • Measuring Devices • Computer (classroom) • Computer (lab) • Excel • Chemicals • Videos • Testing Kits/materials • Internet • Magazines and Journals 	<ul style="list-style-type: none"> • Teacher Observation • Tests • Quizzes • Problem Solving • In-Class Work • Homework • Lab write-ups • Midterms • Final • Critical Thinking • AP Problems • Essays • Rubric • Peer Evaluation 	<ul style="list-style-type: none"> • Review and Re-teach • Small Group Instructions • Access to Learning Support Teachers • Adapted Lessons • Extended Time • Tutoring • Technology • Extended Time 	<ul style="list-style-type: none"> • Additional Reading • Science Competition • Science Fairs • Independent Projects • Field Trips • Science Clubs • Summer Assignments • Internships • Science Honors Institute • Shadowing Programs

**WEST JEFFERSON HILLS SCHOOL DISTRICT
AP PHYSICS CURRICULUM**

GRADE 12

PA Academic Standards Student must be able to do	Objective Content or process student will be able to know and do	Instructional Methods	Materials/ Resources Textbooks, trade books, workbooks, software, hardware, etc.	*Assessment Procedures *Additional adaptations, modifications, accommodations, and enrichment/ acceleration will be provided per IEP	*Additional Learning Opportunities for students who do not meet basic standards *Additional adaptations, modifications, and accommodations will be provided per IEP	*Extended Learning Opportunities for students who can go beyond the basic standards. *Additional enrichment/acceleration will be provided per IEP
3.2 Inquiry and Design						
C. Apply the elements of scientific inquiry to solve multi-step problems.	<ul style="list-style-type: none"> •Generate questions about objects, organisms, and/or events that can be answered through scientific investigations. •Organize experimental information using analytic and descriptive techniques. •Evaluate the significance of experimental information in answering the question. 	<ul style="list-style-type: none"> • Direct Instruction • Partner Work • Group Work • Lab Work • Study Skills • Demonstrations (chemical) • Movie Clips • Graphing/ Analysis • Computer Projects • Cooperative Learning • Guided/ Paired/ independent Reading • Brainstorming • Class discussions Note guides 	<ul style="list-style-type: none"> • Textbook/ Supplements • Transparencies • PowerPoint • Lab Manual Diagrams • Periodic Table • Calculators • Handouts Lab Equipment • Measuring Devices • Computer (classroom) • Computer (lab) • Excel • Chemicals • Videos • Testing Kits/materials • Internet • Magazines and Journals 	<ul style="list-style-type: none"> • Teacher Observation • Tests • Quizzes • Problem Solving • In-Class Work • Homework • Lab write-ups • Midterms • Final • Critical Thinking • AP Problems • Essays • Rubric • Peer Evaluation 	<ul style="list-style-type: none"> • Review and Re-teach • Small Group Instructions • Access to Learning Support Teachers • Adapted Lessons • Extended Time • Tutoring • Technology • Extended Time 	<ul style="list-style-type: none"> • Additional Reading • Science Competition • Science Fairs • Independent Projects • Field Trips • Science Clubs • Summer Assignments • Internships • Science Honors Institute • Shadowing Programs

**WEST JEFFERSON HILLS SCHOOL DISTRICT
AP PHYSICS CURRICULUM**

GRADE 12

PA Academic Standards Student must be able to do	Objective Content or process student will be able to know and do	Instructional Methods	Materials/ Resources Textbooks, trade books, workbooks, software, hardware, etc.	*Assessment Procedures *Additional adaptations, modifications, accommodations, and enrichment/ acceleration will be provided per IEP	*Additional Learning Opportunities for students who do not meet basic standards *Additional adaptations, modifications, and accommodations will be provided per IEP	*Extended Learning Opportunities for students who can go beyond the basic standards. *Additional enrichment/acceleration will be provided per IEP
3.2 Inquiry and Design						
D. Analyze and use the technological design process to solve problems.	<ul style="list-style-type: none"> • Implement and assess the solution. 	<ul style="list-style-type: none"> • Direct Instruction • Partner Work • Group Work • Lab Work • Study Skills • Demonstrations (chemical) • Movie Clips • Graphing/ Analysis • Computer Projects • Cooperative Learning • Guided/ Paired/ independent Reading • Brainstorming • Class discussions • Note guides 	<ul style="list-style-type: none"> • Textbook/ Supplements • Transparencies • PowerPoint • Lab Manual Diagrams • Periodic Table • Calculators • Handouts Lab Equipment • Measuring Devices • Computer (classroom) • Computer (lab) • Excel • Chemicals • Videos • Testing Kits/materials • Internet • Magazines and Journals 	<ul style="list-style-type: none"> • Teacher Observation • Tests • Quizzes • Problem Solving • In-Class Work • Homework • Lab write-ups • Midterms • Final • AP Problems • Critical Thinking • Essays • Rubric • Peer Evaluation 	<ul style="list-style-type: none"> • Review and Re-teach • Small Group Instructions • Access to Learning Support Teachers • Adapted Lessons • Extended Time • Tutoring • Technology • Extended Time 	<ul style="list-style-type: none"> • Additional Reading • Science Competition • Science Fairs • Independent Projects • Field Trips • Science Clubs • Summer Assignments • Internships • Science Honors Institute • Shadowing Programs

**WEST JEFFERSON HILLS SCHOOL DISTRICT
AP PHYSICS CURRICULUM**

GRADE 12

PA Academic Standards Student must be able to do	Objective Content or process student will be able to know and do	Instructional Methods	Materials/ Resources Textbooks, trade books, workbooks, software, hardware, etc.	*Assessment Procedures *Additional adaptations, modifications, accommodations, and enrichment/ acceleration will be provided per IEP	*Additional Learning Opportunities for students who do not meet basic standards *Additional adaptations, modifications, and accommodations will be provided per IEP	*Extended Learning Opportunities for students who can go beyond the basic standards. *Additional enrichment/acceleration will be provided per IEP
3.4 Physical Science, Chemistry and Physics						
A. Apply concepts about the structure and properties of matter.	<ul style="list-style-type: none"> •Apply rules of systematic nomenclature and formula writing to chemical substances. •Explain how radioactive isotopes that are subject to decay can be used to estimate the age of materials. •Explain how the forces that bind solids, liquids, and gases affect their properties. •Apply the conservation of energy concept to fields as diverse as mechanics, nuclear particles, and studies of the origin of the 	<ul style="list-style-type: none"> • Direct Instruction • Partner Work • Group Work • Lab Work • Study Skills • Demonstrations (chemical) • Movie Clips • Graphing/ Analysis • Computer Projects • Cooperative Learning • Guided/ Paired/ independent Reading • Brainstorming • Class discussions • Note guides 	<ul style="list-style-type: none"> • Textbook/ Supplements • Transparencies • PowerPoint • Lab Manual Diagrams • Periodic Table • Calculators • Handouts Lab Equipment • Measuring Devices • Computer (classroom) • Computer (lab) • Excel • Chemicals • Videos • Testing Kits/materials • Internet • Magazines and Journals 	<ul style="list-style-type: none"> • Teacher Observation • Tests • Quizzes • Problem Solving • In-Class Work • Homework • Lab write-ups • Midterms • Final • Critical Thinking • AP Problems • Essays • Rubric • Peer Evaluation 	<ul style="list-style-type: none"> • Review and Re-teach • Small Group Instructions • Access to Learning Support Teachers • Adapted Lessons • Extended Time • Tutoring • Technology • Extended Time 	<ul style="list-style-type: none"> • Additional Reading • Science Competition • Science Fairs • Independent Projects • Field Trips • Science Clubs • Summer Assignments • Internships • Science Honors Institute • Shadowing Programs

	universe.					
--	-----------	--	--	--	--	--

**WEST JEFFERSON HILLS SCHOOL DISTRICT
AP PHYSICS CURRICULUM**

GRADE 12

PA Academic Standards Student must be able to do	Objective Content or process student will be able to know and do	Instructional Methods	Materials/ Resources Textbooks, trade books, workbooks, software, hardware, etc.	*Assessment Procedures *Additional adaptations, modifications, accommodations, and enrichment/ acceleration will be provided per IEP	*Additional Learning Opportunities for students who do not meet basic standards *Additional adaptations, modifications, and accommodations will be provided per IEP	*Extended Learning Opportunities for students who can go beyond the basic standards. *Additional enrichment/acceleration will be provided per IEP
3.4 Physical Science, Chemistry and Physics						
A. Apply concepts about the structure and properties of matter.	<ul style="list-style-type: none"> •Apply the predictability of nuclear decay to estimate the age of material that contains radioactive isotopes. •Quantify the properties of matter (e.g., density, solubility coefficients) by applying mathematical formulas. 	<ul style="list-style-type: none"> • Direct Instruction • Partner Work • Group Work • Lab Work • Study Skills • Demonstrations (chemical) • Movie Clips • Graphing/ Analysis • Computer Projects • Cooperative Learning • Guided/ Paired/ independent Reading • Brainstorming 	<ul style="list-style-type: none"> • Textbook/ Supplements • Transparencies • PowerPoint • Lab Manual Diagrams • Periodic Table • Calculators • Handouts Lab Equipment • Measuring Devices • Computer (classroom) • Computer (lab) • Excel • Chemicals • Videos • Testing Kits/materials • Internet • Magazines and Journals 	<ul style="list-style-type: none"> • Teacher Observation • Tests • Quizzes • Problem Solving • In-Class Work • Homework • Lab write-ups • Midterms • Final • Critical Thinking • AP Problems • Essays • Rubric • Peer Evaluation 	<ul style="list-style-type: none"> • Review and Re-teach • Small Group Instructions • Access to Learning Support Teachers • Adapted Lessons • Extended Time • Tutoring • Technology • Extended Time 	<ul style="list-style-type: none"> • Additional Reading • Science Competition • Science Fairs • Independent Projects • Field Trips • Science Clubs • Summer Assignments • Internships • Science Honors Institute • Shadowing Programs

		<ul style="list-style-type: none"> • Class discussions • Note guides 				
--	--	--	--	--	--	--

**WEST JEFFERSON HILLS SCHOOL DISTRICT
AP PHYSICS CURRICULUM**

GRADE 12

PA Academic Standards Student must be able to do	Objective Content or process student will be able to know and do	Instructional Methods	Materials/ Resources Textbooks, trade books, workbooks, software, hardware, etc.	*Assessment Procedures *Additional adaptations, modifications, accommodations, and enrichment/ acceleration will be provided per IEP	*Additional Learning Opportunities for students who do not meet basic standards *Additional adaptations, modifications, and accommodations will be provided per IEP	*Extended Learning Opportunities for students who can go beyond the basic standards. *Additional enrichment/acceleration will be provided per IEP
3.4 Physical Science, Chemistry and Physics						
B. Analyze energy sources and transfers of heat. Apply and analyze energy sources and conversions and their relationship to heat and temperature.	<ul style="list-style-type: none"> • Use knowledge of conservation of energy and momentum to explain common phenomena (e.g., refrigeration system, rocket propulsion). • Explain resistance, current and electro-motive force (Ohm's Law). • Evaluate mathematical formulas that calculate the efficiency of specific chemical and mechanical systems. • Apply appropriate thermodynamic 	<ul style="list-style-type: none"> • Direct Instruction • Partner Work • Group Work • Lab Work • Study Skills • Demonstrations (chemical) • Movie Clips • Graphing/ Analysis • Computer Projects • Cooperative Learning • Guided/ Paired/ independent Reading • Brainstorming 	<ul style="list-style-type: none"> • Textbook/ Supplements • Transparencies • PowerPoint • Lab Manual Diagrams • Periodic Table • Calculators • Handouts Lab Equipment • Measuring Devices • Computer (classroom) • Computer (lab) • Excel • Chemicals • Videos • Testing Kits/materials • Internet • Magazines and Journals 	<ul style="list-style-type: none"> • Teacher Observation • Tests • Quizzes • Problem Solving • In-Class Work • Homework • Lab write-ups • Midterms • Final • Critical Thinking • AP Problems • Essays • Rubric • Peer Evaluation 	<ul style="list-style-type: none"> • Review and Re-teach • Small Group Instructions • Access to Learning Support Teachers • Adapted Lessons • Extended Time • Tutoring • Technology • Extended Time 	<ul style="list-style-type: none"> • Additional Reading • Science Competition • Science Fairs • Independent Projects • Field Trips • Science Clubs • Summer Assignments • Internships • Science Honors Institute • Shadowing Programs

	concepts (e.g., conservation, entropy to solve problems relating to energy and heat.	<ul style="list-style-type: none"> • Class discussions • Note guides 				
--	--	--	--	--	--	--

**WEST JEFFERSON HILLS SCHOOL DISTRICT
AP PHYSICS CURRICULUM**

GRADE 12

PA Academic Standards Student must be able to do	Objective Content or process student will be able to know and do	Instructional Methods	Materials/ Resources Textbooks, trade books, workbooks, software, hardware, etc.	*Assessment Procedures *Additional adaptations, modifications, accommodations, and enrichment/ acceleration will be provided per IEP	*Additional Learning Opportunities for students who do not meet basic standards *Additional adaptations, modifications, and accommodations will be provided per IEP	*Extended Learning Opportunities for students who can go beyond the basic standards. *Additional enrichment/acceleration will be provided per IEP
3.4 Physical Science, Chemistry and Physics						
C. Distinguish among the principles of force and motion. Apply the principles of motion and force.	<ul style="list-style-type: none"> • Identify the relationship of electricity and magnetism as two aspects of a single electromagnetic force. • Identify elements of simple machines in compound machines. • Describe sound effects (e.g., Doppler effect, amplitude, frequency, reflection, refraction, absorption, sonar, seismic). • Evaluate wave properties of frequency, wavelength, and speed as applied to sound and light through different media. 	<ul style="list-style-type: none"> • Direct Instruction • Partner Work • Group Work • Lab Work • Study Skills • Demonstrations (chemical) • Movie Clips • Graphing/ Analysis • Computer Projects • Cooperative Learning • Guided/ Paired/ independent 	<ul style="list-style-type: none"> • Textbook/ Supplements • Transparencies • PowerPoint • Lab Manual Diagrams • Periodic Table • Calculators • Handouts Lab Equipment • Measuring Devices • Computer (classroom) • Computer (lab) • Excel • Chemicals • Videos • Testing Kits/materials • Internet • Magazines and 	<ul style="list-style-type: none"> • Teacher Observation • Tests • Quizzes • Problem Solving • In-Class Work • Homework • Lab write-ups • Midterms • Final • Notebook check • AP Problems • Critical Thinking • Essays • Rubric • Peer Evaluation 	<ul style="list-style-type: none"> • Review and Re-teach • Small Group Instructions • Access to Learning Support Teachers • Adapted Lessons • Extended Time • Tutoring • Technology • Extended Time 	<ul style="list-style-type: none"> • Additional Reading • Science Competition • Science Fairs • Independent Projects • Field Trips • Science Clubs • Summer Assignments • Internships • Science Honors Institute • Shadowing Programs

	<ul style="list-style-type: none"> Propose and produce modifications in specific mechanical power systems that will improve their efficiency. 	Reading <ul style="list-style-type: none"> Brainstorming Class discussions Note guides 	Journals			
--	--	--	----------	--	--	--

**WEST JEFFERSON HILLS SCHOOL DISTRICT
AP PHYSICS CURRICULUM**

GRADE 12

PA Academic Standards Student must be able to do	Objective Content or process student will be able to know and do	Instructional Methods	Materials/Resources Textbooks, trade books, workbooks, software, hardware, etc.	*Assessment Procedures *Additional adaptations, modifications, accommodations, and enrichment/ acceleration will be provided per IEP	*Additional Learning Opportunities for students who do not meet basic standards *Additional adaptations, modifications, and accommodations will be provided per IEP	*Extended Learning Opportunities for students who can go beyond the basic standards. *Additional enrichment/acceleration will be provided per IEP
3.4 Physical Science, Chemistry and Physics						
C. Distinguish among the principles of force and motion. Apply the principles of motion and force.	<ul style="list-style-type: none"> Analyze the principles of translational motion, velocity, and acceleration as they relate to free fall and projectile motion. Describe light effects (e.g., Doppler effect, dispersion, absorption, interference). Describe and measure the motion of sound, light, and other objects. Know Newton's laws of motion (including inertia, action and reaction) and gravity and apply them to solve problems related to 	<ul style="list-style-type: none"> Direct Instruction Partner Work Group Work Lab Work Study Skills Demonstrations (chemical) Movie Clips Graphing/ Analysis Computer Projects Cooperative Learning Guided/ Paired/ 	<ul style="list-style-type: none"> Textbook/ Supplements Transparencies PowerPoint Lab Manual Diagrams Periodic Table Calculators Handouts Lab Equipment Measuring Devices Computer (classroom) Computer (lab) Excel Chemicals Videos 	<ul style="list-style-type: none"> Teacher Observation Tests Quizzes Problem Solving In-Class Work Homework Lab write-ups Midterms Final AP Problems Essays Rubric Peer Evaluation 	<ul style="list-style-type: none"> Review and Re-teach Small Group Instructions Access to Learning Support Teachers Adapted Lessons Extended Time Tutoring Technology Extended Time 	<ul style="list-style-type: none"> Additional Reading Science Competition Science Fairs Independent Projects Field Trips Science Clubs Summer Assignments Internships Science Honors Institute

	forces and mass. <ul style="list-style-type: none"> Determine the efficiency of mechanical systems by applying mathematical formulas. 	independent Reading <ul style="list-style-type: none"> Brainstorming Class discussions Note guides 	<ul style="list-style-type: none"> Testing Kits/materials Internet Magazines and Journals 			<ul style="list-style-type: none"> Shadowing Programs
--	---	--	--	--	--	--

**WEST JEFFERSON HILLS SCHOOL DISTRICT
AP PHYSICS CURRICULUM**

GRADE 12

PA Academic Standards Student must be able to do	Objective Content or process student will be able to know and do	Instructional Methods	Materials/Resources Textbooks, trade books, workbooks, software, hardware, etc.	*Assessment Procedures *Additional adaptations, modifications, accommodations, and enrichment/ acceleration will be provided per IEP	*Additional Learning Opportunities for students who do not meet basic standards *Additional adaptations, modifications, and accommodations will be provided per IEP	*Extended Learning Opportunities for students who can go beyond the basic standards. *Additional enrichment/acceleration will be provided per IEP
3.4 Physical Science, Chemistry and Physics						
	<ul style="list-style-type: none"> Analyze the principles of rotational motion to solve problems relating to angular momentum, and torque. Interpret a model that illustrates circular motion and acceleration. Describe inertia, motion, equilibrium, and action/ reaction concepts through words, models, and mathematical symbols. 					

--	--	--	--	--	--	--