

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

GRADE 11

<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"> • Know and use the ongoing scientific processes to continually improve and better understand how things work. • Critically evaluate the status of existing theories (e.g., wave theory of light, classification of subatomic particles, theory of evolution). 	<ul style="list-style-type: none"> • Molecular Models • Direct Instruction • Partner Work • Group Work • Lab Work • Study Skills • Demonstrations (chemical) • Movie Clips • Graphing/ Analysis • Computer Projects • Cooperative Learning • Journal Writing • Guided/ Paired/ independent Reading • Brainstorming • Class discussions • Note guides • Dissections 	<ul style="list-style-type: none"> • Textbook/ Supplements • Transparencies • PowerPoint • Lab Manual Diagrams • Periodic Table • Calculators • Handouts Lab Equipment • Model Kits • Spectrophotometer • Microscopes • CBL-Vernier Probes • Measuring Devices • Computer (classroom) • Computer (lab) • Excel • Preserved and Living Specimens • 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 • Notebook check • Independent • Projects • Research Papers • Critical Thinking • Case Studies • 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

•Instructional CD's

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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. •Interpret results of experimental research to predict new information or improve a solution. 	<ul style="list-style-type: none"> •Molecular Models •Direct Instruction •Partner Work •Group Work •Lab Work •Study Skills •Demonstrations (chemical) •Movie Clips •Graphing/ Analysis •Computer Projects •Cooperative Learning •Journal Writing •Guided/Paired/ independent Reading •Brainstorming •Class discussions 	<ul style="list-style-type: none"> •Textbook/ Supplements •Transparencies •PowerPoint •Lab Manual Diagrams •Periodic Table •Calculators •Handouts Lab Equipment •Model Kits •Spectrophotometer •Microscopes •CBL-Vernier Probes •Measuring Devices •Computer (classroom) •Computer (lab) •Excel •Preserved and Living Specimens •Chemicals •Videos •Testing Kits/materials •Internet •Magazines and Journals •Instructional CD's 	<ul style="list-style-type: none"> •Teacher Observation •Tests •Quizzes •Problem Solving •In-Class Work •Homework •Lab write-ups •Midterms •Final •Notebook check •Independent •Projects •Research Papers •Critical Thinking •Case Studies •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

- Note guides
- Dissections

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3.2 Inquiry and Design						
C. Apply the elements of scientific inquiry to solve multi-step problems. <ul style="list-style-type: none"> • Evaluate experimental data with known information. • Apply inquiry to problem solving 	<ul style="list-style-type: none"> •Generate questions about objects or events that can be answered through scientific investigations. •Evaluate the appropriateness of questions. •Organize experimental information using analytic and descriptive techniques. •Evaluate the significance of experimental information in answering the question. •Project additional questions from a research study that could be studied. 	<ul style="list-style-type: none"> •Molecular Models •Direct Instruction •Partner Work •Group Work •Lab Work •Study Skills •Demonstrations (chemical) •Movie Clips •Graphing/ Analysis •Computer Projects •Cooperative Learning •Journal Writing •Guided/ Paired/ independent Reading •Brainstorming 	<ul style="list-style-type: none"> •Textbook/ Supplements •Transparencies •PowerPoint •Lab Manual Diagrams •Periodic Table •Calculators •Handouts Lab Equipment •Model Kits •Spectrophotometer •Microscopes •CBL- Vernier Probes •Measuring Devices •Computer (classroom) •Computer (lab) •Excel •Preserved and Living Specimens •Chemicals •Videos •Testing Kits/materials •Internet 	<ul style="list-style-type: none"> •Teacher Observation •Tests •Quizzes •Problem Solving •In-Class Work •Homework •Lab write-ups •Midterms •Final •Notebook check •Independent •Projects •Research Papers •Critical Thinking •Case Studies •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 • Dissections 	<ul style="list-style-type: none"> • Magazines and Journals • Instructional CD's 			
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3.2 Inquiry and Design						
D. Analyze and use the technological design process to solve problems. <ul style="list-style-type: none"> • Propose & analyze a solution • Implement the solution • Evaluate the solution 	<ul style="list-style-type: none"> • Assess all aspects of the problem, prioritize the necessary information, and formulate questions that must be answered. • Propose, develop, and appraise the best solution and develop alternative solutions. • Implement and assess the solution. • Evaluate and assess the solution, redesign and improve as necessary. • Communicate and assess the process and evaluate and present the impacts of the 	<ul style="list-style-type: none"> • Molecular Models • Direct Instruction • Partner Work • Group Work • Lab Work • Study Skills • Demonstrations (chemical) • Movie Clips • Graphing/ Analysis • Computer Projects • Cooperative Learning • Journal Writing • Guided/ Paired/ independent Reading • Brainstorming 	<ul style="list-style-type: none"> • Textbook/ Supplements • Transparencies • PowerPoint • Lab Manual Diagrams • Periodic Table • Calculators • Handouts Lab Equipment • Model Kits • Spectrophotometer • Microscopes • CBL- Vernier Probes • Measuring Devices • Computer (classroom) • Computer (lab) • Excel • Preserved and Living Specimens • Chemicals • Videos • Testing Kits/materials • Internet 	<ul style="list-style-type: none"> • Teacher Observation • Tests • Quizzes • Problem Solving • In-Class Work • Homework • Lab write-ups • Midterms • Final • Notebook check • Independent Projects • Research Papers • Critical Thinking • Case Studies • 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

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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 conservation of energy concept to fields as diverse as mechanics, nuclear particles and studies of the origin of the universe. • Quantify the properties of matter (e.g., density, solubility coefficients) by applying mathematical formulas. 	<ul style="list-style-type: none"> • Molecular Models • Direct Instruction • Partner Work • Group Work • Lab Work • Study Skills • Demonstrations (chemical) • Movie Clips • Graphing/ Analysis • Computer Projects • Cooperative Learning • Journal Writing • Guided/ Paired/ independent Reading 	<ul style="list-style-type: none"> • Textbook/ Supplements • Transparencies • PowerPoint • Lab Manual Diagrams • Periodic Table • Calculators • Handouts Lab Equipment • Model Kits • Spectrophotometer • Microscopes • CBL-Vernier Probes • Measuring Devices • Computer (classroom) • Computer (lab) • Excel • Preserved and Living Specimens • Chemicals • Videos • Testing Kits/materials 	<ul style="list-style-type: none"> • Teacher Observation • Tests • Quizzes • Problem Solving • In-Class Work • Homework • Lab write-ups • Midterms • Final • Notebook check • Independent Projects • Research Papers • Critical Thinking • Case Studies • 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

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3.4 Physical Science, Chemistry, and Physics						
B. Apply and analyze energy sources and conversions and their relationship to heat and temperature.	<ul style="list-style-type: none"> • Determine the heat involved in illustrative chemical reactions. • Evaluate mathematical formulas that calculate the efficiency of specific chemical and mechanical systems. • Apply appropriate thermodynamic concepts (e.g., conservation, entropy) to solve problems relating to energy and heat. 	<ul style="list-style-type: none"> • Molecular Models • Direct Instruction • Partner Work • Group Work • Lab Work • Study Skills • Demonstrations (chemical) • Movie Clips • Graphing/ Analysis • Computer Projects • Cooperative Learning • Journal Writing • Guided/ Paired/ independent 	<ul style="list-style-type: none"> • Textbook/ Supplements • Transparencies • PowerPoint • Lab Manual Diagrams • Periodic Table • Calculators • Handouts Lab Equipment • Model Kits • Spectrophotometer • Microscopes • CBL-Vernier Probes • Measuring Devices • Computer (classroom) • Computer (lab) • Excel • Preserved and Living Specimens • Chemicals 	<ul style="list-style-type: none"> • Teacher Observation • Tests • Quizzes • Problem Solving • In-Class Work • Homework • Lab write-ups • Midterms • Final • Notebook check • Independent • Projects • Research Papers • Critical Thinking • Case Studies • Essays 	<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

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3.4 Physical Science, Chemistry, and Physics						
C. Apply the principles of motion and force.	<ul style="list-style-type: none"> • Evaluate wave properties of frequency, wavelength and speed as applied to sound and light through different media. • Propose and produce modifications of specific mechanical power systems that will improve their efficiency. • Analyze the principles of translational motion, velocity and acceleration as they relate to free fall and projectile motion. • Analyze the principles of rotational motion to solve 	<ul style="list-style-type: none"> • Molecular Models • Direct Instruction • Partner Work • Group Work • Lab Work • Study Skills • Demonstrations (chemical) • Movie Clips • Graphing/ Analysis • Computer Projects • Cooperative Learning • Journal Writing • Guided/ Paired/ independent 	<ul style="list-style-type: none"> • Textbook/ Supplements • Transparencies • PowerPoint • Lab Manual Diagrams • Periodic Table • Calculators • Handouts Lab Equipment • Model Kits • Spectrophotometer • Microscopes • CBL-Vernier Probes • Measuring Devices • Computer (classroom) • Computer (lab) • Excel • Preserved and Living 	<ul style="list-style-type: none"> • Teacher Observation • Tests • Quizzes • Problem Solving • In-Class Work • Homework • Lab write-ups • Midterms • Final • Notebook check • Independent • Projects • Research Papers • Critical Thinking • Case Studies • Essays 	<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

	problems relating to angular momentum, and torque.	Reading <ul style="list-style-type: none"> • Brainstorming • Class discussions • Note guides • Dissections 	Specimens <ul style="list-style-type: none"> • Chemicals • Videos • Testing Kits/materials • Internet • Magazines and Journals • Instructional CD's 	<ul style="list-style-type: none"> • Rubric • Peer Evaluation 		
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3.4 Physical Science, Chemistry, and Physics						
	<ul style="list-style-type: none"> • Interpret a model that illustrates circular motion and acceleration. • Describe inertia, motion, equilibrium, and action/reaction concepts through words, models and mathematical symbols. 					

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3.4 Physical Science, Chemistry, and Physics						
D. Analyze the essential ideas about the composition and structure of the universe.	<ul style="list-style-type: none"> •Analyze the Big Bang Theory’s use of gravitation and nuclear reaction to explain a possible origin of the universe. •Compare the use of visual, radio, and x-ray telescopes to collect data regarding the structure and evolution of the universe. •Correlate the use of the special theory of relativity and the life of a star. 	<ul style="list-style-type: none"> •Molecular Models •Direct Instruction •Partner Work •Group Work •Lab Work •Study Skills •Demonstrations (chemical) •Movie Clips •Graphing/ Analysis •Computer Projects •Cooperative Learning •Journal Writing 	<ul style="list-style-type: none"> •Textbook/ Supplements •Transparencies •PowerPoint •Lab Manual Diagrams •Periodic Table •Calculators •Handouts Lab Equipment •Model Kits •Spectrophotometer •Microscopes •CBL-Vernier Probes •Measuring Devices •Computer (classroom) •Computer (lab) •Excel 	<ul style="list-style-type: none"> •Teacher Observation •Tests •Quizzes •Problem Solving •In-Class Work •Homework •Lab write-ups •Midterms •Final •Notebook check •Independent •Projects •Research Papers •Critical Thinking 	<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

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