WEST JEFFERSON HILLS SCHOOL DISTRICT
ACADEMIC PHYSICS CURRICULUM

GRADE 11/12

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						
A. Apply knowledge and understanding about the nature of scientific and technological knowledge.	•Compare and contrast scientific theories and beliefs. • Know that science uses both direct and indirect observation means to study the world and universe	• 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	• Textbook/ Supplements • Transparencies • Lab Manual Diagrams • Periodic Table • Calculators • Handouts Lab Equipment • Measuring Devices • Computer (classroom) • Computer (lab) • Excel • Testing Kits/materials • Internet • Magazines and Journals	• Teacher Observation • Tests • Quizzes • Problem Solving • In-Class Work • Homework • Lab write-ups • Midterms • Final • Notebook check • Independent Projects • Critical Thinking • Essays • Rubric • Peer Evaluation	• Review and Re-teach • Small Group Instructions • Access to Learning Support Teachers • Adapted Lessons • Extended Time • Tutoring • Technology	• Additional Reading • Science Competition • Science Fairs • Independent Projects • Field Trips • Science Clubs • Summer Assignments • Internships • Science Honors Institute • Shadowing Programs

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3.2 Inquiry and Design						
B. Apply process knowledge and organize scientific and technological phenomena in varied ways. Evaluate experimental information for appropriateness and adherence to relevant science processes.	• Develop appropriate scientific experiments: raising questions, formulating hypotheses, testing, controlled experiments, recognizing variables, manipulating variables, interpreting data, and producing solutions. • Use process skills to make inferences and predictions using collected information and to communicate, using space/time relationships, defining operationally.	• 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	• Textbook/ Supplements • Transparencies • Lab Manual Diagrams • Periodic Table • Calculators • Handouts Lab Equipment • Measuring Devices • Computer (classroom) • Computer (lab) • Excel • Testing Kits/materials • Internet • Magazines and Journals	• Teacher Observation • Tests • Quizzes • Problem Solving • In-Class Work • Homework • Lab write-ups • Midterms • Final • Notebook check • Independent Projects • Critical Thinking • Case Studies • Essays • Rubric • Peer Evaluation	• Review and Re-teach • Small Group Instructions • Access to Learning Support Teachers • Adapted Lessons • Extended Time • Tutoring • Technology • Extended Time	• Additional Reading • Science Competition • Science Fairs • Independent Projects • Field Trips • Science Clubs • Summer Assignments • Internships • Science Honors Institute • Shadowing Programs

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3.2 Inquiry and Design						
	• 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.					

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3.2 Inquiry and Design						
C. Apply the elements of scientific inquiry to solve multi-step problems.	• Evaluate the significance of experimental information in answering the question.	• 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	• Textbook/ Supplements • Transparencies • Lab Manual Diagrams • Periodic Table • Calculators • Handouts Lab Equipment • Measuring Devices • Computer (classroom) • Computer (lab) • Excel • Testing Kits/materials • Internet • Magazines and Journals	• Teacher Observation • Tests • Quizzes • Problem Solving • In-Class Work • Homework • Lab write-ups • Midterms • Final • Notebook check • Independent Projects • Critical Thinking • Case Studies • Essays • Rubric • Peer Evaluation	• Review and Re-teach • Small Group Instructions • Access to Learning Support Teachers • Adapted Lessons • Extended Time • Tutoring • Technology • Extended Time	• Additional Reading • Science Competition • Science Fairs • Independent Projects • Field Trips • Science Clubs • Summer Assignments • Internships • Science Honors Institute • Shadowing Programs

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3.2 Inquiry and Design						
D. Identify and apply the technological design process to solve problems.	• Propose and analyze a solution. • Implement the solution. • Evaluate the solution, test, redesign, and improve as necessary.	• 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	• Textbook/ Supplements • Transparencies • Lab Manual Diagrams • Periodic Table • Calculators • Handouts Lab Equipment • Measuring Devices • Computer (classroom) • Computer (lab) • Excel • Testing Kits/materials • Internet • Magazines and Journals	• Teacher Observation • Tests • Quizzes • Problem Solving • In-Class Work • Homework • Lab write-ups • Midterms • Final • Notebook check • Independent Projects • Critical Thinking • Case Studies • Essays • Rubric • Peer Evaluation	• Review and Re-teach • Small Group Instructions • Access to Learning Support Teachers • Adapted Lessons • Extended Time • Tutoring • Technology • Extended Time	• Additional Reading • Science Competition • Science Fairs • Independent Projects • Field Trips • Science Clubs • Summer Assignments • Internships • Science Honors Institute • Shadowing Programs

		• Note guides				

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3.4 Physical Science, Chemistry and Physics						
A. Explain concepts about the structure and properties of matter. Apply concepts about the structure and properties of matter.	• Predict the behavior of gases through the use of Boyle's, Charles, or the ideal gas law, in everyday situations. • Apply rules of systematic nomenclature and formula writing to chemical substances. • Explain how the forces that bind solids, liquids and gases affect their properties. • Quantify the properties of matter (e.g., density, solubility coefficients) by applying mathematical formulas.	• 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	• Textbook/ Supplements • Transparencies • Lab Manual Diagrams • Periodic Table • Calculators • Handouts Lab Equipment • Measuring Devices • Computer (classroom) • Computer (lab) • Excel • Testing Kits/materials • Internet • Magazines and Journals	• Teacher Observation • Tests • Quizzes • Problem Solving • In-Class Work • Homework • Lab write-ups • Midterms • Final • Notebook check • Independent Projects • Critical Thinking • Case Studies • Essays • Rubric • Peer Evaluation	• Review and Re-teach • Small Group Instructions • Access to Learning Support Teachers • Adapted Lessons • Extended Time • Tutoring • Technology • Extended Time	• Additional Reading • Science Competition • Science Fairs • Independent Projects • Field Trips • Science Clubs • Summer Assignments • Internships • Science Honors Institute • Shadowing Programs

		• Class discussions • Note guides				

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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.	• 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.	• Direct Instruction • Partner Work • Group Work • Lab Work • Study Skills • Demonstrations (chemical) • Movie Clips • Graphing/ Analysis • Computer Projects • Cooperative Learning • Guided/Paired/ independent Reading	• Textbook/ Supplements • Transparencies • Lab Manual Diagrams • Periodic Table • Calculators • Handouts Lab Equipment • Measuring Devices • Computer (classroom) • Computer (lab) • Excel • Testing Kits/materials • Internet • Magazines and Journals	• 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	• Review and Re-teach • Small Group Instructions • Access to Learning Support Teachers • Adapted Lessons • Extended Time • Tutoring • Technology • Extended Time	• Additional Reading • Science Competition • Science Fairs • Independent Projects • Field Trips • Science Clubs • Summer Assignments • Internships • Science Honors Institute • Shadowing Programs

	• Apply appropriate thermodynamic concepts (e.g., conservation, entropy to solve problems relating to energy and heat.	• Brainstorming • Class discussions • Note guides		• Rubric • Peer Evaluation		

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3.4 Physical Science, Chemistry and Physics						
C. Distinguish among the principles of force and motion. Apply the principles of motion and 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. • Analyze the principles of translational motion, velocity, and acceleration as they relate to free fall	• Direct Instruction • Partner Work • Group Work • Lab Work • Study Skills • Demonstrations (chemical) • Movie Clips • Graphing/ Analysis • Computer Projects • Cooperative Learning • Guided/Paired/ independent	• Textbook/ Supplements • Transparencies • Lab Manual Diagrams • Periodic Table • Calculators • Handouts Lab Equipment • Measuring Devices • Computer (classroom) • Computer (lab) • Excel • Testing Kits/materials • Internet • Magazines and Journals	• 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	• Review and Re-teach • Small Group Instructions • Access to Learning Support Teachers • Adapted Lessons • Extended Time • Tutoring • Technology • Extended Time	• Additional Reading • Science Competition • Science Fairs • Independent Projects • Field Trips • Science Clubs • Summer Assignments • Internships • Science Honors Institute • Shadowing Programs

	and projectile motion. • Describe light effects (e.g., Doppler effect, dispersion, absorption, emission spectra, polarization, inference).	Reading • Brainstorming • Class discussions • Note guides		• Essays • Rubric • Peer Evaluation		

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3.4 Physical Science, Chemistry and Physics						
	• 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 forces and mass. • Determine the efficiency of mechanical systems by applying mathematical formulas. • Interpret a model that illustrates circular motion and acceleration.					

	• Describe inertia, motion, equilibrium and action/reaction concepts through words, models, and mathematical symbols.					