

**WEST JEFFERSON HILLS SCHOOL DISTRICT
AP BIOLOGY 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 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., germ theory of disease, wave theory of light, classification of subatomic particles, theory of evolution, epidemiology of aids). • Integrate new information into existing theories and explain implied results. 	<ul style="list-style-type: none"> • Direct Instruction • Group Work • Lab Work • Demonstrations • Graphing/ Analysis • Cooperative Learning • 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 • Measuring Devices • Computer (classroom) • Computer (lab) • Preserved and Living Specimens • Chemicals • Videos • Testing Kits/materials • 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 • Independent Projects • Critical Thinking • Case Studies • Essays • Rubric 	<ul style="list-style-type: none"> • Small Group Instructions • Tutoring • Technology 	<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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<p>3.2 Inquiry and Design</p>						
<p>B. Evaluate experimental information for appropriateness and adherence to relevant science processes.</p>	<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 • Group Work • Lab Work • Demonstrations • Graphing/ Analysis • Cooperative Learning • 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 • Measuring Devices • Computer (classroom) • Computer (lab) • Preserved and Living Specimens • Chemicals • Videos • Testing Kits/materials • 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 • Critical Thinking • Case Studies • Essays • Rubric 	<ul style="list-style-type: none"> • Small Group Instructions • Tutoring Technology 	<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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3.2 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. • Evaluate the appropriateness of questions. • Design an investigation with adequate control and limited variables to investigate a question. • 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 • Demonstrations • Graphing/ Analysis • Cooperative Learning • 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 • Measuring Devices • Computer (classroom) • Computer (lab) • Preserved and Living Specimens • Chemicals • Videos • Testing Kits/materials • 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 • Independent Projects • Critical Thinking • Case Studies • Essays • Rubric 	<ul style="list-style-type: none"> • Small Group Instructions • Tutoring Technology 	<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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3.2 Inquiry and Design						
D. Identify and apply the technological design process to solve problems.	<ul style="list-style-type: none"> • Examine the problem rank all necessary information and all questions that must be answered. • Propose and analyze a solution. • Implement the solution. • Evaluate the solution, test, redesign, and improve as necessary. • Communicate the process and evaluate and present the impacts of the solution. 	<ul style="list-style-type: none"> • Direct Instruction • Group Work • Lab Work • Demonstrations • Graphing/ Analysis • Cooperative Learning • 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 • Measuring Devices • Computer (classroom) • Computer (lab) • Preserved and Living Specimens • Chemicals • Videos • Testing Kits/materials • 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 • Independent Projects • Critical Thinking • Case Studies • Essays Rubric 	<ul style="list-style-type: none"> • Small Group Instructions • Tutoring • Technology 	<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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<p>3.3 Biological Sciences</p>						
<p>A. Explain the relationship between structure and function at all levels of organization.</p>	<ul style="list-style-type: none"> • Identify and explain interactions among organisms (e.g., mutually beneficial, harmful relationships). • Explain and analyze the relationship between structure and function at the molecular, cellular, and organ-system level. • Describe and explain structural and functional relationships in each of the five (or six) kingdoms. • Explain significant biological diversity found in each of the biomes. 	<ul style="list-style-type: none"> • Molecular Models • Direct Instruction • Group Work • Lab Work • Demonstrations • Graphing/ Analysis • Cooperative Learning • 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 • Measuring Devices • Computer (classroom) • Computer (lab) • Preserved and Living Specimens • Chemicals • Videos • Testing Kits/materials • 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 • Independent Projects • Critical Thinking • Case Studies • Essays • Rubric 	<ul style="list-style-type: none"> • Small Group Instructions • Tutoring • Technology 	<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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<p>3.3 Biological Sciences</p>						
<p>B. Analyze the chemical and structural basis of living organisms.</p>	<ul style="list-style-type: none"> • Identify and describe factors affecting metabolic function (e.g., temperature, acidity, hormones). • Evaluate metabolic activities using experimental knowledge of enzyme. • Evaluate relationships between structure and functions of different anatomical parts given their structure. • Describe potential impact of genomic research on the biochemistry and physiology of life. 	<ul style="list-style-type: none"> • Molecular Models • Direct Instruction • Group Work • Lab Work • Demonstrations • Graphing/ Analysis • Cooperative Learning • 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 • Measuring Devices • Computer (classroom) • Computer (lab) • Preserved and Living Specimens • Chemicals • Videos • Testing Kits/materials • 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 • Independent Projects • Critical Thinking • Case Studies • Essays • Rubric 	<ul style="list-style-type: none"> • Small Group Instructions • Tutoring Technology 	<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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3.3 Biological Sciences						
C. Explain gene inheritance and expression at the molecular level.	<ul style="list-style-type: none"> • Analyze gene expression at the molecular level. • Describe the roles of nucleic acids in cellular reproduction and protein synthesis. • Describe genetic engineering techniques, applications, and impact. • Explain birth defects from the standpoint of embryological development and/or changes in genetic makeup. 	<ul style="list-style-type: none"> • Direct Instruction • Group Work • Lab Work • Demonstrations • Graphing/ Analysis • Cooperative Learning • 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 • Measuring Devices • Computer (classroom) • Computer (lab) • Preserved and Living Specimens • Chemicals • Videos • Testing Kits/materials • 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 • Independent Projects • Critical Thinking • Case Studies • Essays • Rubric 	<ul style="list-style-type: none"> • Small Group Instructions • Tutoring • Technology 	<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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<p>3.3 Biological Sciences</p>						
<p>D. Analyze the theory of evolution.</p>	<ul style="list-style-type: none"> • Examine human history by describing the progression from early hominid to modern humans. • Apply the concept of natural selection as a central concept in illustrating evolution theory. 	<ul style="list-style-type: none"> • Direct Instruction • Group Work • Lab Work • Demonstrations • Graphing/ Analysis • Cooperative Learning • 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 • Measuring Devices • Computer (classroom) • Computer (lab) • Preserved and Living Specimens • Chemicals • Videos • Testing Kits/materials • 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 • Independent Projects • Critical Thinking • Case Studies • Essays • Rubric 	<ul style="list-style-type: none"> • Small Group Instructions • Tutoring • Technology 	<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