

# CURRICULUM

## Innovation and Invention

Thomas Jefferson High School

*Curriculum Strand: Measurement*

<b>PA Academic Standards</b> Student must be able to do	<b>Objective</b> Content or process student will be able to know and do	<b>Instructional Methods</b>	<b>Materials/ Resources</b> Textbooks, workbooks, software, hardware, etc	<b>*Assessment Procedures</b> *Additional adaptations, modification, accommodations, and enrichment/ acceleration will be provided per IEP	<b>*Additional Learning</b> Opportunities for students who do not meet basic standards *Additional adaptations, modifications, and accommodations will be provided per IEP	<b>*Extended Learning</b> Opportunities for students who can go beyond the basic standards. *Additional enrichment/ acceleration will be provided per IEP
3.1.12 D Analyze scale as a way of relating concepts and ideas to one another by some measure.	<ul style="list-style-type: none"> <li>Demonstrate an understanding of the customary scale to the 1/16"</li> </ul>	<ul style="list-style-type: none"> <li>Direct Instruction</li> <li>Group Work</li> <li>Hands-on Work</li> <li>Demonstrations</li> <li>Note Taking</li> <li>Independent Design and Development</li> </ul>	<ul style="list-style-type: none"> <li>Materials</li> <li>Measuring Devices</li> <li>Worksheets</li> </ul>	<ul style="list-style-type: none"> <li>Teacher Observation</li> <li>Quizzes</li> <li>In-Class Work</li> <li>Projects</li> <li>Q/A</li> </ul>	<ul style="list-style-type: none"> <li>Extended Time</li> <li>Tutoring</li> <li>Technology</li> <li>Adapted Lessons</li> <li>Access to Learning Support</li> <li>Review and Re-teach</li> <li>Peer Interaction</li> <li>Group Instruction</li> </ul>	<ul style="list-style-type: none"> <li>Additional Work</li> <li>Measure to the 1/64"</li> <li>Peer Instruction</li> </ul>

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*Curriculum Strand: Multi-view Sketching*

<b>PA Academic Standards</b> Student must be able to do	<b>Objective</b> Content or process student will be able to know and do	<b>Instructional Methods</b>	<b>Materials/ Resources</b> Textbooks, workbooks, software, hardware, etc	<b>*Assessment Procedures</b> *Additional adaptations, modification, accommodations, and enrichment/ acceleration will be provided per IEP	<b>*Additional Learning</b> Opportunities for students who do not meet basic standards *Additional adaptations, modifications, and accommodations will be provided per IEP	<b>*Extended Learning</b> Opportunities for students who can go beyond the basic standards. *Additional enrichment/ acceleration will be provided per IEP
3.1.12.B Apply concepts of models as a method to predict and understand science and technology 3.1.12.D Analyze scale as a way of relating concepts and ideas to one another by some measure	<ul style="list-style-type: none"> <li>• Interpret concepts and ideas by sketching</li> <li>• Recognize and differentiate between the various views and projections of an object</li> <li>• Construct, organize and predict views and projections of an object</li> <li>• Develop a day to day journal complete with sketches and ideas</li> </ul>	<ul style="list-style-type: none"> <li>• Direct Instruction</li> <li>• Group Work</li> <li>• Hands-on Work</li> <li>• Demonstrations</li> <li>• Note Taking</li> <li>• Independent Design and Development</li> </ul>	<ul style="list-style-type: none"> <li>• Journals</li> <li>• Measuring Devices</li> </ul>	<ul style="list-style-type: none"> <li>• Teacher Observation</li> <li>• Problem Solving</li> <li>• In-Class Work</li> <li>• Write-ups</li> <li>• Journal Check</li> <li>• Projects</li> <li>• Critical Thinking</li> <li>• Q/A</li> </ul>	<ul style="list-style-type: none"> <li>• Extended Time</li> <li>• Tutoring</li> <li>• Technology</li> <li>• Adapted Lessons</li> <li>• Access to Learning Support</li> <li>• Review and Re-teach</li> <li>• Peer Interaction</li> <li>• Group Instruction</li> </ul>	<ul style="list-style-type: none"> <li>• More In-depth Projects</li> <li>• Peer Assistance</li> <li>• Independent Research Project</li> </ul>

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### *Curriculum Strand: Production Tools and Safety*

<b>PA Academic Standards</b> Student must be able to do	<b>Objective</b> Content or process student will be able to know and do	<b>Instructional Methods</b>	<b>Materials/ Resources</b> Textbooks, workbooks, software, hardware, etc	<b>*Assessment Procedures</b> *Additional adaptations, modification, accommodations, and enrichment/ acceleration will be provided per IEP	<b>*Additional Learning</b> Opportunities for students who do not meet basic standards *Additional adaptations, modifications, and accommodations will be provided per IEP	<b>*Extended Learning</b> Opportunities for students who can go beyond the basic standards. *Additional enrichment/ acceleration will be provided per IEP
3.7.12.A Apply advanced tools, materials and techniques to answer complex questions	<ul style="list-style-type: none"> <li>• Identify and recall safety issues on a variety of hand tools</li> <li>• Identify and recall safety issues on a variety of machines</li> <li>• Memorize proper production techniques</li> <li>• Recognize and classify various production materials</li> </ul>	<ul style="list-style-type: none"> <li>• Direct Instruction</li> <li>• Group Work</li> <li>• Hands-on Work</li> <li>• Demonstrations</li> <li>• Note Taking</li> <li>• Cooperative Learning</li> </ul>	<ul style="list-style-type: none"> <li>• Production Machines</li> <li>• Materials</li> <li>• Journal</li> <li>• Hand Tool</li> <li>• Measuring Devices</li> <li>• Worksheets</li> </ul>	<ul style="list-style-type: none"> <li>• Teacher Observation</li> <li>• Quiz</li> <li>• Problem Solving</li> <li>• In-Class Work</li> <li>• Critical Thinking</li> <li>• Peer Evaluation</li> <li>• Q/A</li> </ul>	<ul style="list-style-type: none"> <li>• Extended Time</li> <li>• Tutoring</li> <li>• Technology</li> <li>• Adapted Lessons</li> <li>• Access to Learning Support</li> <li>• Review and Re-teach</li> <li>• Peer Interaction</li> <li>• Group Instruction</li> </ul>	<ul style="list-style-type: none"> <li>• Peer Assistance</li> </ul>

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## Innovation and Invention

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### Curriculum Strand: Computer Aided Drafting

<b>PA Academic Standards</b> Student must be able to do	<b>Objective</b> Content or process student will be able to know and do	<b>Instructional Methods</b>	<b>Materials/ Resources</b> Textbooks, workbooks, software, hardware, etc	<b>*Assessment Procedures</b> *Additional adaptations, modification, accommodations, and enrichment/ acceleration will be provided per IEP	<b>*Additional Learning</b> Opportunities for students who do not meet basic standards *Additional adaptations, modifications, and accommodations will be provided per IEP	<b>*Extended Learning</b> Opportunities for students who can go beyond the basic standards. *Additional enrichment/ acceleration will be provided per IEP
3.1.12 D Analyze scale as a way of relating concepts and ideas to one another by some measure 3.6.12.B Analyze knowledge of information technologies of process encoding, transmitting, receiving, storing and decoding 3.7.10.C Apply basic computer operations and concepts 3.7.10.D Utilize computer software to solve specific problems 3.7.10.E Apply basic computer communications systems	<ul style="list-style-type: none"> <li>Recall, draw and distinguish between orthographic, isometric, layout and assembly views</li> <li>Prepare organized drawing using AutoCAD software to convey ideas</li> <li>Develop a set of drawings for production</li> </ul>	<ul style="list-style-type: none"> <li>Direct Instruction</li> <li>Group Work</li> <li>Hands-on Work</li> <li>Demonstrations</li> <li>Internet Research</li> <li>Cooperative Learning</li> <li>Brainstorming</li> <li>Class Discussions</li> <li>Note Taking</li> <li>Independent Design and Development</li> </ul>	<ul style="list-style-type: none"> <li>Production Machines</li> <li>Materials</li> <li>Journal</li> <li>Hand Tool</li> <li>Measuring Devices</li> <li>Worksheets</li> <li>Computer</li> <li>AutoCAD Software</li> </ul>	<ul style="list-style-type: none"> <li>Teacher Observation</li> <li>Quiz</li> <li>Problem Solving</li> <li>In-Class Work</li> <li>Critical Thinking</li> <li>Peer Evaluation</li> <li>Q/A</li> </ul>	<ul style="list-style-type: none"> <li>Extended Time</li> <li>Tutoring</li> <li>Technology</li> <li>Adapted Lessons</li> <li>Access to Learning Support</li> <li>Review and Re-teach</li> <li>Peer Interaction</li> <li>Group Instruction</li> </ul>	<ul style="list-style-type: none"> <li>Peer Assistance</li> <li>More In-depth Projects</li> </ul>

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### Curriculum Strand: Design Process

<b>PA Academic Standards</b> Student must be able to do	<b>Objective</b> Content or process student will be able to know and do	<b>Instructional Methods</b>	<b>Materials/ Resources</b> Textbooks, workbooks, software, hardware, etc	<b>*Assessment Procedures</b> *Additional adaptations, modification, accommodations, and enrichment/ acceleration will be provided per IEP	<b>*Additional Learning</b> Opportunities for students who do not meet basic standards *Additional adaptations, modifications, and accommodations will be provided per IEP	<b>*Extended Learning</b> Opportunities for students who can go beyond the basic standards. *Additional enrichment/ acceleration will be provided per IEP
3.1.12.A Apply concepts of system, subsystems, feedback and control to solve complex technological problems 3.1.12.B Apply concepts of models as a method to predict and understand science and technology 3.1.12.C Assess and apply patterns in science and technology 3.2.12.D Analyze and use the technological design process to solve problems	<ul style="list-style-type: none"> <li>• Recognize and predict possible environmental factors associated with design or development</li> <li>• Discuss and formulate problem solving strategies for specific design</li> <li>• Develop a problem statement</li> <li>• Research and investigate the history and possible solution</li> <li>• Construct a model or prototype of a real-world design</li> </ul>	<ul style="list-style-type: none"> <li>• Direct Instruction</li> <li>• Group Work</li> <li>• Hands-on Work</li> <li>• Demonstrations</li> <li>• Internet Research</li> <li>• Cooperative Learning</li> <li>• Brainstorming</li> <li>• Class Discussions</li> <li>• Note Taking</li> <li>• Independent Design and Development</li> </ul>	<ul style="list-style-type: none"> <li>• Production Machines</li> <li>• Materials</li> <li>• Journal</li> <li>• Hand Tool</li> <li>• Measuring Devices</li> <li>• Worksheets</li> <li>• Computer</li> <li>• AutoCAD Software</li> </ul>	<ul style="list-style-type: none"> <li>• Teacher Observation</li> <li>• Problem Solving</li> <li>• In-Class Work</li> <li>• Write-ups</li> <li>• Portfolio Check</li> <li>• Projects</li> <li>• Critical Thinking</li> <li>• Q/A</li> <li>• Essays</li> <li>• Peer Evaluation</li> </ul>	<ul style="list-style-type: none"> <li>• Extended Time</li> <li>• Tutoring</li> <li>• Technology</li> <li>• Adapted Lessons</li> <li>• Access to Learning Support</li> <li>• Review and Re-teach</li> <li>• Peer Interaction</li> <li>• Group Instruction</li> </ul>	<ul style="list-style-type: none"> <li>• More In-depth Projects</li> <li>• Peer Assistance</li> <li>• Independent Research Project</li> </ul>

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### Curriculum Strand: Design Process

<b>PA Academic Standards</b> Student must be able to do	<b>Objective</b> Content or process student will be able to know and do	<b>Instructional Methods</b>	<b>Materials/ Resources</b> Textbooks, workbooks, software, hardware, etc	<b>*Assessment Procedures</b> *Additional adaptations, modification, accommodations, and enrichment/ acceleration will be provided per IEP	<b>*Additional Learning</b> Opportunities for students who do not meet basic standards *Additional adaptations, modifications, and accommodations will be provided per IEP	<b>*Extended Learning</b> Opportunities for students who can go beyond the basic standards. *Additional enrichment/ acceleration will be provided per IEP
3.6.10.C Apply physical technologies of structural design, analysis and engineering, personnel relations, financial affairs, structural production, marketing, research and design to real world problems 3.7.12.A Apply advanced tools, materials and techniques to answer complex questions 3.8.12.B Apply the use of ingenuity and technological resources to solve specific societal needs and improve the quality of life	<ul style="list-style-type: none"> <li>Formulate a set of tests to evaluate a model or prototype</li> <li>Propose modifications that will support and improve a design</li> </ul>	<ul style="list-style-type: none"> <li>Direct Instruction</li> <li>Group Work</li> <li>Hands-on Work</li> <li>Demonstrations</li> <li>Internet Research</li> <li>Cooperative Learning</li> <li>Brainstorming</li> <li>Class Discussions</li> <li>Note Taking</li> <li>Independent Design and Development</li> </ul>	<ul style="list-style-type: none"> <li>Production Machines</li> <li>Materials</li> <li>Journal</li> <li>Hand Tool</li> <li>Measuring Devices</li> <li>Worksheets</li> <li>Computer</li> <li>AutoCAD Software</li> </ul>	<ul style="list-style-type: none"> <li>Teacher Observation</li> <li>Problem Solving</li> <li>In-Class Work</li> <li>Write-ups</li> <li>Portfolio Check</li> <li>Projects</li> <li>Critical Thinking</li> <li>Q/A</li> <li>Essays</li> <li>Peer Evaluation</li> </ul>	<ul style="list-style-type: none"> <li>Extended Time</li> <li>Tutoring</li> <li>Technology</li> <li>Adapted Lessons</li> <li>Access to Learning Support</li> <li>Review and Re-teach</li> <li>Peer Interaction</li> <li>Group Instruction</li> </ul>	<ul style="list-style-type: none"> <li>More In-depth Projects</li> <li>Peer Assistance</li> <li>Independent Research Project</li> </ul>

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### Curriculum Strand: Engineering Principles

<b>PA Academic Standards</b> Student must be able to do	<b>Objective</b> Content or process student will be able to know and do	<b>Instructional Methods</b>	<b>Materials/ Resources</b> Textbooks, workbooks, software, hardware, etc	<b>*Assessment Procedures</b> *Additional adaptations, modification, accommodations, and enrichment/ acceleration will be provided per IEP	<b>*Additional Learning</b> Opportunities for students who do not meet basic standards *Additional adaptations, modifications, and accommodations will be provided per IEP	<b>*Extended Learning</b> Opportunities for students who can go beyond the basic standards. *Additional enrichment/ acceleration will be provided per IEP
3.1.12.A Apply concepts of system, subsystems, feedback and control to solve complex technological problems 3.1.12.B Apply concepts of models as a method to predict and understand science and technology 3.1.12.E Evaluate change in nature, physical systems and man made systems 3.6.12.C Analyze physical technologies of structural design, analysis and engineering, personnel relations, structural production, marketing, research and design to real world problems	<ul style="list-style-type: none"> <li>• Describe and test forces that apply to a model or prototype</li> <li>• Classify and describe the technological systems and subsystems of a designed model or prototype</li> <li>• Examine, design and construct various systems that may be included in a designed model or prototype:                             <ol style="list-style-type: none"> <li>1. Structural</li> <li>2. Mechanical</li> <li>3. Electrical</li> <li>4. Fluid</li> <li>5. Energy</li> </ol> </li> </ul>	<ul style="list-style-type: none"> <li>• Direct Instruction</li> <li>• Group Work</li> <li>• Hands-on Work</li> <li>• Demonstrations</li> <li>• Internet Research</li> <li>• Cooperative Learning</li> <li>• Brainstorming</li> <li>• Class Discussions</li> <li>• Note Taking</li> <li>• Independent Design and Development</li> </ul>	<ul style="list-style-type: none"> <li>• Production Machines</li> <li>• Materials</li> <li>• Journal</li> <li>• Hand Tool</li> <li>• Measuring Devices</li> <li>• Worksheets</li> <li>• Computer</li> <li>• AutoCAD Software</li> </ul>	<ul style="list-style-type: none"> <li>• Teacher Observation</li> <li>• Problem Solving</li> <li>• In-Class Work</li> <li>• Write-ups</li> <li>• Portfolio Check</li> <li>• Projects</li> <li>• Critical Thinking</li> <li>• Q/A</li> <li>• Essays</li> <li>• Peer Evaluation</li> </ul>	<ul style="list-style-type: none"> <li>• Extended Time</li> <li>• Tutoring</li> <li>• Technology</li> <li>• Adapted Lessons</li> <li>• Access to Learning Support</li> <li>• Review and Re-teach</li> <li>• Peer Interaction</li> <li>• Group Instruction</li> </ul>	<ul style="list-style-type: none"> <li>• More In-depth Projects</li> <li>• Peer Assistance</li> <li>• Independent Research Project</li> </ul>

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### Curriculum Strand: Technological Interactions

<b>PA Academic Standards</b> Student must be able to do	<b>Objective</b> Content or process student will be able to know and do	<b>Instructional Methods</b>	<b>Materials/ Resources</b> Textbooks, workbooks, software, hardware, etc	<b>*Assessment Procedures</b> *Additional adaptations, modification, accommodations, and enrichment/ acceleration will be provided per IEP	<b>*Additional Learning</b> Opportunities for students who do not meet basic standards *Additional adaptations, modifications, and accommodations will be provided per IEP	<b>*Extended Learning</b> Opportunities for students who can go beyond the basic standards. *Additional enrichment/ acceleration will be provided per IEP
3.1.12.B Apply concepts of models as a method to predict and understand science and technology 3.1.12.C Assess and apply patterns in science and technology 3.6.12.C Analyze physical technologies of structural design, analysis and engineering, personnel relations, financial affairs, structural production, marketing, research and design to real world problems 3.8.12.A Synthesize and evaluate the interactions and constraints of science and technology on society 3.8.12.C Evaluate consequences and impacts of technology	<ul style="list-style-type: none"> <li>• Arrange a material cost list</li> <li>• Assess research and data to determine if the cost is worth the benefit</li> <li>• Examine and write a proposal for a patent</li> <li>• Assess any real-world impacts or consequences from the production or development of a designed invention or innovation</li> </ul>	<ul style="list-style-type: none"> <li>• Direct Instruction</li> <li>• Group Work</li> <li>• Hands-on Work</li> <li>• Demonstrations</li> <li>• Internet Research</li> <li>• Cooperative Learning</li> <li>• Brainstorming</li> <li>• Class Discussions</li> <li>• Note Taking</li> <li>• Independent Design and Development</li> </ul>	<ul style="list-style-type: none"> <li>• Production Machines</li> <li>• Materials</li> <li>• Journal</li> <li>• Hand Tool</li> <li>• Measuring Devices</li> <li>• Worksheets</li> <li>• Computer</li> <li>• AutoCAD Software</li> </ul>	<ul style="list-style-type: none"> <li>• Teacher Observation</li> <li>• Problem Solving</li> <li>• In-Class Work</li> <li>• Write-ups</li> <li>• Portfolio Check</li> <li>• Projects</li> <li>• Critical Thinking</li> <li>• Q/A</li> <li>• Essays</li> <li>• Peer Evaluation</li> </ul>	<ul style="list-style-type: none"> <li>• Extended Time</li> <li>• Tutoring</li> <li>• Technology</li> <li>• Adapted Lessons</li> <li>• Access to Learning Support</li> <li>• Review and Re-teach</li> <li>• Peer Interaction</li> <li>• Group Instruction</li> </ul>	<ul style="list-style-type: none"> <li>• More In-depth Projects</li> <li>• Peer Assistance</li> <li>• Independent Research Project</li> </ul>

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### Curriculum Strand: Presenting Information

<b>PA Academic Standards</b> Student must be able to do	<b>Objective</b> Content or process student will be able to know and do	<b>Instructional Methods</b>	<b>Materials/ Resources</b> Textbooks, workbooks, software, hardware, etc	<b>*Assessment Procedures</b> *Additional adaptations, modification, accommodations, and enrichment/ acceleration will be provided per IEP	<b>*Additional Learning</b> Opportunities for students who do not meet basic standards *Additional adaptations, modifications, and accommodations will be provided per IEP	<b>*Extended Learning</b> Opportunities for students who can go beyond the basic standards. *Additional enrichment/ acceleration will be provided per IEP
3.7.10.E Apply basic computer communications systems 3.8.10.A Analyze the relationship between societal demands and scientific and technological enterprises 3.8.19.B Analyze how human ingenuity and technological resources satisfy specific human needs and improve the quality of life 3.8.12.C Evaluate the consequences and impacts of scientific and technological solutions	<ul style="list-style-type: none"> <li>Conclude and defend the previously stated problem statement</li> <li>Evaluate any real-world impacts or consequences from the production or development of a designed invention or innovation</li> <li>Organize all information for a final presentation</li> <li>Professionally deliver a proposal supporting a design for a innovation or invention</li> </ul>	<ul style="list-style-type: none"> <li>Direct Instruction</li> <li>Group Work</li> <li>Hands-on Work</li> <li>Demonstrations</li> <li>Note Taking</li> <li>Independent Design and Development</li> <li>Class Discussion</li> </ul>	<ul style="list-style-type: none"> <li>Computer</li> <li>Journal</li> </ul>	<ul style="list-style-type: none"> <li>Teacher Observation</li> <li>In-Class Work</li> <li>Write-ups</li> <li>Portfolio Check</li> <li>Projects</li> <li>Critical Thinking</li> <li>Q/A</li> <li>Peer Evaluation</li> </ul>	<ul style="list-style-type: none"> <li>Extended Time</li> <li>Tutoring</li> <li>Technology</li> <li>Adapted Lessons</li> <li>Access to Learning Support</li> <li>Review and Re-teach</li> <li>Peer Interaction</li> <li>Group Instruction</li> </ul>	<ul style="list-style-type: none"> <li>More In-depth Projects</li> <li>Peer Assistance</li> <li>Independent Research Project</li> </ul>