### PA Academic Standards
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### Objective
Content or process student will be able to know and do

### Instructional Methods

### Materials/Resources
Textbooks, trade books, workbooks, software, hardware, etc.

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#### 3.6. Technology Education

##### 3.6.12.

A. Analyze biotechnologies that relate to propagating, growing, maintaining, adapting, treating and converting.

- Analyze and solve a complex production process problem using biotechnologies (e.g., hydroponics, fish farming, crop propagation).
- Analyze specific examples where engineering has impacted society in protection, personal health application or physical enhancement.
- Appraise and evaluate the cause and effect and subsequent environmental, economic and societal impacts that result from biomass and biochemical conversion.

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### 3.6. Technology Education

#### 3.6.12.

- Evaluate and apply biotechnical processes to complex plant and animal production methods.
- Apply knowledge of biochemical-related technologies to propose alternatives to hazardous waste treatment.
- Apply knowledge of agricultural science to solve or improve a biochemical related problem.
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3.6. Technology Education

3.6.12.

B. Analyze knowledge of information technologies of processes encoding, transmitting, receiving, storing, retrieving and decoding.

• Apply and analyze advanced information techniques to produce a complex image that effectively conveys a message (e.g., desktop publishing, audio and/or video production).

• Analyze and evaluate a message designed and produced using still, motion and animated communication techniques.

• Describe the operation of fiber optic, microwave and satellite informational systems.
### TECHNOLOGY CURRICULUM

#### GRADE 12

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3.6. Technology Education

3.6.12.

- Apply various graphic and electronic information techniques to solve real world problems (e.g., data organization and analysis, forecasting, interpolation).
### PA Academic Standards

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Textbooks, trade books, workbooks, software, hardware, etc.

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#### 3.6. Technology Education

#### 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.

- Apply knowledge of construction technology by designing, planning and applying all the necessary resources to successfully solve a construction problem.

- Compare resource options in solving a specific manufacturing problem.

- Analyze and apply complex skills needed to process materials in complex manufacturing enterprises.
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3.6. Technology Education
3.6.12.

- Apply advanced information collection and communication techniques to successfully convey solutions to specific construction problems.
- Assess the importance of capital on specific construction applications.
- Analyze the positive and negative qualities of several different types of materials as they would relate to specific construction applications.
- Analyze transportation technologies of propelling, structuring, suspending, guiding, controlling and supporting.
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### 3.6. Technology Education

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- Analyze the concepts of vehicular propulsion, guidance, control, suspension and structural systems while designing and producing specific complex transportation systems.
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#### 3.7 Technological Devices

3.7.12

A. Apply advanced tools, materials and techniques to answer complex questions.
- Demonstrate the safe use of complex tools and machines within their specifications.
- Select and safely apply appropriate tools, materials and processes necessary to solve complex problems that could result in more than one solution.
- Evaluate and use technological resources to solve complex multi-step problems.
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3.7 Technological Devices

3.7.12

B. Evaluate appropriate instruments and apparatus to accurately measure materials and processes.

- Apply and evaluate the use of appropriate instruments to accurately measure scientific and technologic phenomena within the error limits of the equipment.
- Evaluate the appropriate use of different measurement scales (macro and micro).
- Evaluate the utility and advantages of a variety of absolute and relative measurement scales for their appropriate application.
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3.7 Technological Devices

3.7.12

C. Evaluate computer operations and concepts as to their effectiveness to solve specific problems.
   - Describe and demonstrate atypical software installation.
   - Analyze and solve hardware and advanced software problems.
   - Assess and apply multiple input and output devices to solve specific problems.
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#### 3.7 Technological Devices

3.7.12

D. Evaluate the effectiveness of computer software to solve specific problems.
- Evaluate the effectiveness of software to produce an output and demonstrate the process.
- Design and apply advanced multimedia techniques.
- Analyze, select and apply the appropriate software to solve complex problems.
- Evaluate the effectiveness of the computer as a presentation tool.
- Analyze the legal responsibilities of computer users.
## 3.7 Technological Devices

### 3.7.12

**E. Assess the effectiveness of computer communications systems.**
- Assess the effectiveness of a computer based communications system.
- Transfer files among different computer platforms.
- Analyze the effectiveness of on-line information resources to meet the needs for collaboration, research, publications, communications and productivity.
- Apply knowledge of protocol standards to solve connectivity problems.

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TECHNOLOGY CURRICULUM  

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### 3.8 Science, Technology and Human Endeavors

#### 3.8.12

A. Synthesize and evaluate the interactions and constraints of science and technology on society.

- Compare and contrast how scientific and technological knowledge is both shared and protected.
- Evaluate technological developments that have changed the way humans do work and discuss their impacts (e.g., genetically engineered crops).
- Evaluate socially proposed limitations of scientific research and technological application.
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#### 3.8 Science, Technology and Human Endeavors

3.8.12

B. Apply the use of ingenuity and technological resources to solve specific societal needs and improve the quality of life.
- Apply appropriate tools, materials and processes to solve complex problems.
- Use knowledge of human abilities to design or modify technologies that extend and enhance human abilities.
- Apply appropriate tools, materials and processes to physical, informational or biotechnological systems to identify and recommend solutions to international problems.
- Apply knowledge of agricultural science to develop a solution that will improve on a human need or want.
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<td>• Analyze and communicate the positive or negative impacts that a recent technological invention had on society.</td>
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### 3.8 Science, Technology and Human Endeavors

**3.8.12**

- Evaluate and describe potential impacts from emerging technologies and the consequences of not keeping abreast of technological advancements (e.g., assessment alternatives, risks, benefits, costs, economic impacts, constraints).

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