Moon Middle School Technology Curriculum

BIG IDEAS

● Project Based Learning opportunities through STEAM fields / career based projects.

● Leadership and followership experiences setup by and presented for students

● Planning and documenting project through writing, graphic organizers, multimedia sources, CAD, graphic production

● Safe tools and equipment use, material and time management

● 4D Design Process to work through a process

ESSENTIAL QUESTIONS

● Project Based Learning opportunities through STEAM fields / career based projects.

● Leadership and followership experiences setup by and presented for students

● Planning and documenting project through writing, graphic organizers, multimedia sources, CAD, graphic production

● Safe tools and equipment use, material and time management

● 4D Design Process to work through a process, project, service.

● How might students expand their knowledge and understanding of various STEAM fields and career areas?
● How might students approach self leadership/followership along with small/large group leadership/followership? ● How might students plan and document comprehensive projects?

● How might students safely learn to work with tools, equipment, and materials while gaining valuable time management experience?

● How might a student plan an approach to create a process, complete a project, and or perform a service?

Key skills

Reading Comprehension

○ Analyzing Text
○ Draw Conclusions

○ Compare / Contrast

● Technical Writing

○ Counterclaim text

○ Informative text

○ Use tech to publish

○ Gather relevant info ○ Varied time frame

● Illustrate, Interpret, Examine the Scope of Technology

● Recognize, Demonstrate, Compare the +/- use of Tech in Society

● Analyze & Apply the Design Process

● Refine, Diagnose, Synthesis the results of Tech

● Field and Career areas of:

○ Medical Tech ○ Agricultural Tech

○ Energy Tech ○ Info & Communication

○ Transportation Tech ○ Manufacturing Tech

○ Structural Engineering

Vocabulary

● TSA - Technology Student Association is a national, state, and regional organization that provides enrichment opportunities in the areas of STEAM and leadership.

● Resources - Available tools, equipment, materials, and people that can help a person or group to accomplish a task (Each person has unique resources, while in class, students have similar resources)
● Project Based Learning - PBL, real life scenario problems that can be presented and solved with any path. Cannot be solved with yes or no answers and solutions cannot be looked up for a specific solution. ● LEAP - Leadership, Educate, Achieve, Personal Growth. The leadership program established by TSA includes a written summary for each project.

● Event Folder - The folder of comprehensive project provided by TSA

● Worklog - Documentation of work and progress.

● MLA format - Modern Language Association citation formatting for research sources.

● Work cited - Providing resources of research, images, video, audio, etc.

● Rubric - Scoring outline for each project
● Portfolio - Collection of text/graphic documentation to submit as or with a project
● Cover Letter - Introductory letter to a resume stating objectives toward attaining a position or acceptance

● Resume - Outline or list of contact information, background, and experience.

● PDF file - Portable document format files are easy to share, open, print, but are not able to be modified.

● Vector Image - An image made up of points and lines that can be sized without pixelation.

● Toolkit - Specific tools, equipment, and resources needed to perform a specific project/event.
● Chapter - A school's affiliation to TSA. A school may have one chapter at each level.

Differentiations

Enrichments

● Increase individual student project allowances or assigning.

● Project enhancing critiques to provide scaffolding growth opportunities
● Work with GIEP students / teacher to meet goals

● Assign project teams and group leaders for building, district, and or community service projects to enhance leading skills. Adaptations
● Decrease individual student project allowances or assigning.

● Project student specific critiques to provide scaffolding growth opportunities

● Work with students of need and special education teachers to meet goals

● Assign project teams and group leaders for building, district, and or community service projects to enhance leading skills.

● SAFETY CERT ADAPTATIONS ARE LIMITED TO READING ASSISTANCE. General adaptations will present false acceptance of safety and rules. If academic adaptations are made, students will not be permitted to use tools / equipment, but will be able to participate with constructing and assembling prefabricated part.

OBJECTIVES	PA TECH ED	PA CORE	INSTRUCTIONAL STRATEGIES & ACTIVITIES	ASSESSMENTS	OUTCOMES / PROJECTS
Project Based Learning opportunities through STEAM fields / career based projects. PA-TSA Specific Project / Rubric file National TSA Project / Rubric file	3.4.10.A1. 3.4.10.A2. 3.4.10.A3. 3.4.10.B1. 3.4.10.B2. 3.4.10.B3. 3.4.10.B4. 3.4.10.C1. 3.4.10.C2. 3.4.10.C3. 3.4.10.D1. 3.4.10.D2. 3.4.10.D3. 3.4.10.E1. 3.4.10.E2. 3.4.10.E3. 3.4.10.E4. 3.4.10.E5. 3.4.10.E6. 3.4.10.E7.	CC.3.5.9-10.B CC.3.5.9-10.C CC.3.5.9-10.D CC.3.5.9-10.E CC.3.5.9-10.F CC.3.5.9-10.G CC.3.5.9-10.H CC.3.5.9-10.I CC.3.5.9-10.J CC.3.6.9-10.A CC.3.6.9-10.B CC.3.6.9-10.C CC.3.6.9-10.D CC.3.6.9-10.E CC.3.6.9-10.F CC.3.6.9-10.G CC.3.6.9-10.H CC.3.6.9-10.I	● Teacher will provide instruction of TSA processes, TSA project event packets, and the TSA @ WH website portal. ● Teacher will provide assigned projects to demonstrate key technical skills that will enhance future project outcome productivity. ● Teacher will facilitate the overall project library to students for the purpose of personal and group selection. ● Students will gain knowledge, understanding, and logistical information of TSA processes, TSA project event packets, and TSA @ WH website navigation. ● Students will practice key technical skills with specifically assigned projects that will apply to future projects. ● Students will gain knowledge to understand the basis of projects from the comprehensive project library.	Specific project rubrics provided by TSA. PA-TSA Specific Project / Rubric file National TSA Project / Rubric file	Outcomes vary based on project event, theme, and topic selection. Outcomes may include: ● Portfolio ● Essays / Response ● Worklog ● Graphic Organizers ● Visual Documentations ● Blueprints ● Isometric Drawings ● Orthographic Projections ● CAD Designs ● Resume/Cover letter ● Speech Presentations ● Manufacturing products ● Inventions / Innovations ● Robotics ● Structural Engineering ● 3D modeling ● Authoring / Illustrating ● Web work ● Video game design ● Coding ● Sustainable Energy MS event list library PA-TSA Specific Project / Rubric file National TSA Project / Rubric file
Leadership and followership experiences setup by and presented for student	3.4.10.A2. 3.4.10.D3.	CC.3.5.9-10.C. CC.3.6.9-10.B	● Teacher will lead discussions and present materials through TSA's Leadership Challenge ● Students will learn through reading, writing and action through the	Student LEAP Reponse work in conjunction with specific project submissions. Individual & Group Response Form	Student project work will assist with populating the LEAP Response forms

			Leadership Challenge in preparation to the LEAP response required by projects		
Planning and documenting project through writing, graphic organizers, multimedia sources, CAD, graphic productio	3.4.10.C1.	CC.3.5.9-10.C. CC.3.6.9-10.E CC.3.6.9-10.I	● Teacher will demonstrate various types of documentation as they relate to specific student project choices. ● Students will follow specific project directions to interpret documentation means for worklog and visual representation of procedures	Student will follow rubric based project packets to generate the specific documentation needed to accurate completion	Student documentation will accurately match the rubric requirements for specific projects
Safe use of tools, equipment, materials, and managing time as per individual project	3.4.10.A3 3.4.10.C1. 3.4.10.D1. 3.4.10.E7.	CC.3.6.9-10.E.	● Teacher will present student/parent/guardian safety contracts, safety certification study guide, and demonstrations of tools, equipment, while outlining steps to build material management strategies and adjusting time v quality standards. ● Students will review and submit safety contracts and safety certification reviews. Observing teacher demonstrations or tools, equipment, and material management for modeling.	Students will pass the 30+ question safety contract with 100% accuracy. Students are permitted to retake the test as many times as they need. General adaptations are not permitted, but reading assistance can be provided.	Students will be permitted to utilize tools and equipment for TSA projects for successful and accurate completion of TSA project rubrics standards.
Students will be able to interpret each of the four 4D steps	3.4.10.C1.	CC.3.5.9-10.C.	● Teacher will lead the discussions for the design process in relatation to general concepts as well as project specific. ● Students will participate with discussion to generalize word meanings in relation to projects	Written/typed organizers that are student chosen or project provided.	Well documented project ideas, plans, troubleshooting, and presentations that meet rubric standards.

PA STANDARDS FOR TECHNOLOGY EDUCATION

SCOPE OF TECHNOLOGY

3.4.10.A1. Illustrate how the development of technologies is often driven by profit and an economic market 3.4.10.A2. Interpret how systems thinking applies logic and creativity with appropriate compromise of complex real-life problems. 3.4.10.A3. Examine how technology transfer occurs when a new user applies an existing innovation developed for one purpose in a different function.

TECH & SOCIETY

3.4.10.B1. Compare and contrast how the use of technology involves weighing the trade-offs between the positive and negative effects. 3.4.10.B2. Demonstrate how humans device technologies to reduce the negative consequences of other technologies. 3.4.10.B3. Compare and contrast how a number of different factors, such as advertising, the strength of the economy, the goals of a company and the latest fads, contribute to shaping the design of and demand for. 3.4.10.B4. Recognize that technological development has been evolutionary, the result of a series of refinements to a basic invention.

TECH & ENGINEERING DESIGN

3.4.10.C1. Apply the components of the technological design process. 3.4.10.C2. Analyze a prototype and/or create a working model to test a design concept by making actual observations and necessary adjustments. 3.4.10.C3. Illustrate the concept that not all problems are technological and not every problem can be solved using technology.

ABILITIES FOR A TECH WORLD

3.4.10.D1. Refine a design by using prototypes and modeling to ensure quality, efficiency, and productivity of a final product. 3.4.10.D2. Diagnose a malfunctioning system and use tools, materials, and knowledge to repair it. 3.4.10.D3. Synthesize data, analyze trends, and draw conclusions regarding the effect of technology on the individual, society, and the environment.

THE DESIGNED WORLD

3.4.10.E1. Assess how medical technologies over time have impacted prevention and rehabilitation, vaccines and pharmaceuticals, medical and surgical procedures, and genetic engineering. 3.4.10.E2. Compare and contrast how the engineering design and management of agricultural systems require knowledge of artificial ecosystems and effects of technical development on flora and fauna. 3.4.10.E3. Compare and contrast the major forms of energy: thermal, radiant, electrical, mechanical, chemical, nuclear and others. 3.4.10.E4. Evaluate the purpose and effectiveness of information and communication systems. 3.4.10.E5. Analyze the development of transportation services and methods and their impact on society. 3.4.10.E6. Illustrate how manufacturing systems may be classified into types such as customized production, batch production, and continuous production. 3.4.10.E7. Evaluate structure design as related to function, considering such factors as style, convenience, safety, and efficiency.

PA CORE FOR TECHNOLOGY EDUCATION

READING

CC.3.5.9-10.A. Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. CC.3.5.9-10.B. Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. CC.3.5.9-10.C. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. CC.3.5.9-10.C. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. CC.3.5.9-10.D. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. CC.3.5.9-10.D. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. CC.3.5.9-10.E. Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). CC.3.5.9-10.F. Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address. CC.3.5.9-10.G. Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. CC.3.5.9-10.H. Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. CC.3.5.9-10.I. Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. CC.3.5.9-10.J. By the end of grade 10, read and comprehend science/technical texts in the grades 9–10 text complexity band independently and proficiently.

WRITING

CC.3.6.9-10.A. Write arguments focused on discipline-specific content. Introduce precise claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that establishes clear relationships among claim(s), counterclaims, reasons, and evidence. Develop claim(s) and counterclaims fairly, supplying data and evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline-appropriate form and in a manner that anticipates the audience's knowledge level and concerns. Use words, phrases, and clauses to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing. Provide a concluding statement or section that follows from or supports the argument presented.

CC.3.6.9-10.B. * Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. Introduce a topic and organize ideas, concepts, and information to make important connections and distinctions; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension. Develop the topic with well-chosen, relevant, and sufficient facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic. Use varied transitions and sentence structures to link the major sections of the text, create cohesion, and clarify the relationships among ideas and concepts. Use precise language and domain-specific vocabulary to manage the complexity of the topic and convey a style appropriate to the discipline and context as well as to the expertise of likely readers. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing. Provide a concluding statement or section that follows from and supports the information or explanation presented (e.g., articulating implications or the significance of the topic).

CC.3.6.9-10.C. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

CC.3.6.9-10.D. Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.

CC.3.6.9-10.E. Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.

CC.3.6.9-10.F. Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating an understanding of the subject under investigation.

CC.3.6.9-10.G. Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.

CC.3.6.9-10.H. Draw evidence from informational texts to support analysis, reflection, and research.

CC.3.6.9-10.I. Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.