Blackhawk School District

CURRICULUM

Course Title:	**TSA I**
Course Number:	**1038**
Grade Level(s):	**9-12**
Length of Course:	**Semester (1st)**
Credits:	**.5**
Faculty Author(s):	**Tim Linkenheimer**
Date:	**January 2010**

COURSE DESCRIPTION:

Technology Student Association (TSA) I is a capstone course in the technology education program. This course is designed for students that have completed at least two courses in Blackhawk's Technology Education Program which they earned a C or better as a final grade **AND HAVE RECEIVED TEACHER APPROVAL** . Students can also be admitted to this course if: **they have been a Blackhawk TSA member for at least one year, AND THEY HAVE RECEIVED TEACHER APPROVAL**. Finally, students can be admitted to enroll in this course if they have taken the TSA 9 course and have earned a grade of a C or better. Students will participate in TSA competitive event activities designed to prepare them for regional, state and possibly national TSA competitions. Activities that students will prepare for, but are not limited to, during this course are: Career Comparisons, Prepared Presentation, PA Biomedical Essay, PA Safety Illustration, Structural Engineering, Promotional Graphics etc… It is strongly recommended that any student aspiring to become a Blackhawk TSA officer should take this course due to the leadership activities that will be covered during this course as well. Students that enroll in this course will be strongly encouraged to run for a Blackhawk TSA chapter office.

COURSE OUTLINE	PROPOSED TIME / ACTUAL TIME	RESOURCES	OBJECTIVES (PA standard)	LESSON REFLECTION (for future revisions)
1. Class Orientation	2 days	Syllabus	3.4.10.A1. Illustrate how the development of technologies is often driven by profit and an economic market.	
2. Introduction to Technology	3 days	Instructor Designed Power Point	3.4.10.A2. Interpret how systems thinking applies logic and creativity with appropriate comprises in complex real-life problems.	
3. Teamwork Activities	17 days	Competitive Events Guide, Instructor Designed Activities	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 comprises in complex real-life problems.	
4. TSA Organizational Structure, Chapter Bylaws & TSA Officers	5 days	Competitive Events Guide, Instructor Designed Activities	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.	
5. PA Safety Illustration (Computer Graphics)	5 days	Competitive Events Guide, Computer Lab Facility, Microsoft Office (School Fusion)	3.4.12.A1. Compare and contrast the rate of technological development over time.	
6. PA Biomedical Essay	7 days	Competitive Events Guide, Computer Lab Facility, Microsoft Office (School Fusion)	3.4.12.A2. Describe how management is the process of planning, organizing, and controlling work. 3.4.12.A3. Demonstrate how technological progress promotes the advancement of science, technology, engineering and mathematics (STEM).	
7. Structural Engineering	18 days	Competitive Events Guide, Computer Lab Facility, CADD Software, Event	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.	

8. Promotional Graphics	6 days	tools & Supplies Competitive Events Guide, Computer Lab Facility, Microsoft Office (School Fusion)	Demonstrate how humans devise 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 various technologies. 3.4.10.B4. Recognize that Technological development has been evolutionary, the result of a series of refinements to a basic invention. 3.4.12.B1. Analyze ethical, social, economic, and cultural considerations as related to the development, selection, and use of technologies.	
9. Prepared Presentation	4 days	Competitive Events Guide, Computer Lab Facility, Microsoft Office	3.4.12.B2. Illustrate how, with the aid of technology, various aspects of the environment can be monitored to provide information for decision making.	
10. Essays on Technology	5 days	Competitive Events Guide	3.4.10.C1. Apply the components of the technological design process.	
11. Regional Conference Preparation	6 days	Competitive Events Guide, Materials & Equipment required for specific student selected events.	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. 3.4.12.C2.	
12. TSA I Final	2 days	Instructor Designed Study Guide & Final	Apply the concept that engineering design is influenced by personal characteristics, such as creativity, resourcefulness, and the ability to visualize and think abstractly. 3.4.12.C3. Apply the concept that many technological problems require a multi-disciplinary approach. 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. 3.4.12.D2. Verify that engineering design is influenced by personal characteristics, such as creativity, resourcefulness, and the ability to visualize and think abstractly. 3.4.10.D3. Synthesize data, analyze trends, and draw conclusions regarding the effect of technology on the individual, society, and the environment. 3.4.12.E1.Compare and contrast the emerging technologies of telemedicine, nanotechnology, prosthetics, and biochemistry as they relate to improving human health. 3.4.12.E2. Compare and contrast the technologies of biotechnology, conservation, bio-fuels, and ecosystems as they relate to managing Earth's resources effectively. 3.4.12.E3. Compare and contrast energy and power systems as they relate to pollution, renewable and non-renewable resources, and conservation. 3.4.12.E4 Synthesize the effects of information and communication systems and subsystems as an integral part of the development of the Information Age. 3.4.12.E5. Explain how the design of intelligent and non-intelligent transportation systems depends on many processes and innovative techniques. 3.4.12.E6. Compare and contrast the importance of science, technology, engineering and math (STEM) as it pertains to the manufactured world. 3.4.12.E7. Analyze the technologies of prefabrication and new structural materials and processes as they pertain to constructing the modern 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 the effects of technological 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. **M11.A.2.1.1 Solve problems using operations with rational numbers including rates (single and multi-step and multiple procedure operations) (e.g., distance, work and mixture problems, etc.).** **M11.A.2.1.1 Solve problems using operations with rational numbers including percents (single and multi-step and multiple procedure operations) (e.g., distance, work and mixture problems, etc.).** **M11.A.2.1.2 Solve problems using direct proportions** **M11.A.2.1.2 Solve problems using inverse proportions** **M11.A.2.1.3 Use proportional relationships in problem**	

			solving settings. **M11.A.2.1.3 Identify proportional relationships in problem solving settings.** **M11.A.3.1.1 Simplify expressions using the order of operations to solve problems (any rational numbers may be used).** **M11.A.3.1.1 Evaluate expressions using the order of operations to solve problems (any rational numbers may be used).** **M11.A.3.2.1 Use estimation to solve problems.** **M11.B.2.1.1 Measure angles in degrees (up to 360°) (protractor must be provided or drawn).** **M11.B.2.1.1 Compare angles in degrees (up to 360°) (protractor must be provided or drawn).** **M11.C.1.1.1 Identify and/or use the properties of a radius of a circle (given numbers should be whole.)** **M11.C.1.1.1 Identify and/or use the properties of a diameter of a circle (given numbers should be whole.)** **M11.C.1.1.1 Identify and/or use the properties of a tangent of a circle (given numbers should be whole.)** **M11.C.1.3.1 Identify properties of congruent polygons.** **M11.C.1.3.1 Use properties of congruent polygons.** **M11.C.1.3.1 Identify properties of similar polygons.** **M11.C.1.3.1 Use properties of similar polygons.** **M11.C.1.3.1 Identify properties of solids.** **M11.C.1.3.1 Use properties of solids.** **M11.C.1.4.1 Find the measure of a side of a right triangle using the Pythagorean Theorem (Pythagorean Theorem included on the reference sheet).** **M11.C.3.1.1 Calculate the distance between 2 points on a**	

			number line. (formula provided on the reference sheet). **M11.C.3.1.1 Calculate the midpoint between 2 points on a number line. (formula provided on the reference sheet).** **M11.C.3.1.1 Calculate the distance between 2 points on a coordinate plane (formula provided on the reference sheet).** **M11.C.3.1.1 Calculate the midpoint between 2 points on a coordinate plane (formula provided on the reference sheet).** **S11.A.1.2.1 Explain and apply scientific concepts to societal issues using case studies (e.g., spread of HIV, deforestation, environmental health, energy).** **S11.A.1.2.2 Use case studies (e.g., Wright brothers' flying machine, Tacoma Narrows Bridge, Henry Petroski's Design Paradigms) to propose possible solutions and analyze economic and environmental implications of solutions for real-world problems.** **S11.A.1.3.4 Compare the rate of use of natural resources and their impact on sustainability.** **S11.A.2.1.3 Use data to make inferences and predictions, or to draw conclusions, demonstrating understanding of experimental limits.** **S11.A.2.2.2 Explain how technology (e.g., GPS, spectroscope, scanning electron microscope, pH meter, probe, interface, imaging technology, telescope) is used to extend human abilities and precision.** **S11.A.3.1.1 Apply systems analysis, showing relationships (e.g., flowcharts, concept maps), input and output, and measurements to explain a system and its parts.** **S11.A.3.1.4 Apply the universal systems model of inputs, processes, outputs, and feedback to a working system (e.g., heating, motor, food production) and identify the resources necessary for operation of the system.** **S11.A.3.2.1 Compare the accuracy of predictions represented in a model to actual observations and behavior.**	

			S11.A.3.2.2 Describe advantages and disadvantages of using models to simulate processes and outcomes. **S11.A.3.2.3 Describe how relationships represented in models are used to explain scientific or technological concepts (e.g., dimensions of objects within the solar system, life spans, size of atomic particles, topographic maps).** **S11.B.3.3.2 Compare the impact of management practices (e.g., production, processing, research, development, marketing, distribution, consumption, by-products) in meeting the need for commodities locally and globally.** **S11.C.3.1.6 Identify elements of simple machines in compound machines.** **R11.A.2.3.1 Make inferences and/or draw conclusions based on information from text.** **R11.A.2.3.2 Cite evidence from text to support generalizations.** **R11.A.2.4.1 Identify and/or explain stated or implied main ideas and relevant supporting details from text.** **R11.A.2.5.1 Summarize the major points, processes, and/or events of a nonfictional text as a whole.** **R11.B.1.2.1 Explain, interpret, compare, describe, analyze, and/or evaluate connections between texts.** 1.11.12.A Apply appropriate strategies to construct meaning through interpretation and to analyze and evaluate author's use of techniques and elements of fiction and non-fiction for rhetorical and aesthetic purposes 1.1.12.B Use context clues, knowledge of root words and word origins as well as reference courses to decode and understand new words. 1.1.12.D Demonstrate / comprehension understanding before reading, during reading, and after reading on a variety of grade level texts to support understanding of a variety of literary works from different cultures and literary movements. 1.2.12.E Identify, analyze, and evaluate the structure and the format	

			of a variety of complex informational texts for clarity, simplicity, and coherence, as well as appropriateness of graphics and visual appeal. 1.4.12.A Demonstrate a sophisticated control of grammar, mechanics, spelling, usage, and sentence formation. 1.4.12 B Write complex informational pieces (e.g. research, papers, literary analytical essays, evaluations). 1.5.12.A Write with a clear focus, identifying topic, task, and audience. 1.5.12.B Gather content appropriate for topic. 1.5.12.F Use grade appropriate conventions of language when writing and editing. 1.8.12.B Conduct inquiry and research on self-selected or assigned topics, issues, or problems, using a variety of appropriate media sources and strategies; Demonstrate the sources have been evaluated for accuracy, bias, and credibility; Synthesize information gathered from a variety of sources, including technology and one's own research, and evaluate information for its relevance to the research question, 1.9.12.A Use media and technology resources for research, information, analysis, problem solving, and decision making in content learning; Identify complexities and inconsistencies in the information and the different perspectives found in each medium. 1.4.12 C Write persuasive pieces. 1.4.12 C Clarify and defend positions with precise and relevant evidence including facts, expert options, quotations, expressions of commonly accepted beliefs, and logical reasoning.	