

**PROGRAM CONCENTRATION:** Architecture, Construction, Communications and Transportation  
**COURSE TITLE:** Introduction to Ground, Air and Maritime Technology – Sixth Grade

**COURSE DESCRIPTION:**

The Sixth Grade Aerospace and Transportation Technology Program is the beginning course for the Middle School Aerospace, Transportation Logistical Operations/Support (Ground/Marine) program. The course will help students build a strong knowledge base and develop skills related to logistics in the transportation sector. Tasks to be taught include knowledge of local and federal safety issues, careers, transportation components, tools and equipment, current and alternative fuel sources, oral and written communication and related physical science principles. Mastery of these standards will help prepare students to have a competitive edge for the transportation industry.

**CRITICAL COMPONENTS:**

**MSACCT- AST6-1: The students will research the history of the transportation industry.**

- a. Trace the development of transportation in the United States from a historical perspective.
- b. Explain the economic impact of the transportation industry at the local and national levels.
- c. Describe the impact of transportation on a global scale.
- d. Describe the differences and similarities between ground, air, and maritime travels.

**ACADEMIC STANDARDS:**

*S6CS8: Students will investigate the characteristics of scientific knowledge and how it is achieved.*

**SAMPLE TASKS:**

- Create a timeline of significant transportation developments.
- Investigate the impact of individuals and industry related to transportation at the local and regional levels.
- Research the contribution of transportation technology and its impact on the United States as a super power.

**MSACCT- AST6-2: Students will demonstrate their knowledge of major components of ground, air and maritime transportation vehicles.**

- a. Identify and locate the most important parts of ground, air, and maritime transportation vehicles.
- b. Describe the purpose of the fundamental transportation systems.
- c. Explain how each transportation system works dependent and independently of each other.
- d. Describe the Merchant Marine and Marine Transportation System.

**ACADEMIC STANDARDS:**

*ELA6RC3: The student acquires new vocabulary in each content area and uses it correctly.*

**NATIONAL ACADEMIC STANDARDS (NATEF):**

*LA283: The technician uses computerized and other databases to obtain system information.*

**SAMPLE TASKS:**

- Arrange a field trip to an aerospace/transportation factory or a local dealership where students can see vehicles being built or repaired.
- Use actual vehicles to have students identify systems.
- Use applicable demonstration aids to identify different vehicle systems.
- Use models to identify major components of an airplane or other transportation vehicle.

**MSACCT- AST6-3: Students will research careers in the ground, air and maritime transportation industry.**

- a. List the most common ground, air and maritime transportation careers.
- b. Describe the type of skills necessary for an aerospace/transportation technician, pilot, air traffic controller or airport manager.
- c. Describe the type of skills necessary for an auto and diesel technician, long-haul driver, transportation logistics operator or maintenance supervisor or manager.
- d. Describe the type of skills necessary for a cargo ship captain, passenger vessel, fishing vessel, tanker, and maritime transportation logistic manager.
- e. Compare and contrast the National Certification processes involving ground, air or maritime careers.

**ACADEMIC STANDARDS:**

*ELA6LSV2: The student listens to and views various forms of text and media in order to gather and share information, persuade others, and express and understand ideas. The student will select and critically analyze messages using rubrics as assessment tools.*

**NATIONAL ACADEMIC STANDARDS (NATEF):**

*LA283: The technician uses computerized and other databases to obtain system information.*

**SAMPLE TASKS:**

- Assign students to do research on an aerospace/transportation occupation and have them report on their findings.
- Invite an industry professional to speak to the class about a transportation career.
- Create a journal that represents a week in the life of a transportation professional.
- Shadow a transportation professional and create a report on the prerequisites, skills, duties and promotional opportunities related to that job.

**MSACCT- AST6-4: Students will identify and select the right tool for a given fastener or job.**

- a. Identify common ground, air and maritime transportation hand and power tools and proper uses.
- b. List safety rules for common ground, air and maritime transportation hand and power tools.
- c. Explain how to maintain and store tools properly.

ACADEMIC STANDARDS:

*M6M1: Students will convert from one unit to another within one system of measurement (customary or metric) by using proportional relationships.*

NATIONAL ACADEMIC STANDARDS (NATEF):

*LA285: The technician can comprehend and apply information in operator's manuals to operate and maintain appropriate tools and equipment.*

*MA176: The technician interprets symbols to determine compliance with the manufacturer's specifications.*

SAMPLE TASKS:

- Lay out a number of hand and power tools and have students write down the name of each tool and explain its use.
- Lay out any number of fasteners and have students identify the type and size of tool to use on each.
- Use the proper tools to complete a sample hands-on example.

**MSACCT- AST6-5: Students will demonstrate knowledge of safety, OSHA, EPA issues and procedures.**

- a. Define OSHA and how it oversees and provides safety guidelines to the transportation industry.
- b. Describe the typical layout and sections of a ground, air and maritime transportation lab.
- c. List the types of accidents that can occur in a ground, air and maritime transportation lab.
- d. Explain how to prevent ground, air and maritime transportation lab accidents.
- e. Describe the general rules for the ground, air and maritime transportation lab.
- f. Explain federal, state, and local rules and regulations regarding environmental issues related to the work of the ground, air and maritime transportation industry.

ACADEMIC STANDARDS:

*S6CS2: Students will use standard safety practices for all classroom laboratory and field investigations.*

NATIONAL ACADEMIC STANDARDS (NATEF):

*LA038: The technician collects and organizes oral and written information based on discussions, notes, observations, personal experiences, and data collection that will assist in the problem analysis and solution process.*

*SC207: The technician develops and maintains an understanding of all federal, state, and local rules and regulations regarding environmental issues related to the work of the automobile technician. The technician uses such things as government impact statements, media information, and general knowledge of pollution and waste management to correctly use and dispose of products that result from the performance of a repair task.*

SAMPLE TASKS:

- Research LEAN technologies and report on their application to the transportation industry.
- Have students draw up a chart of the different types of fire extinguishers and their uses.
- Have students walk around the lab to identify safety hazards.
- Visit a manufacturing or repair facility. Report on the application of safety procedures.

**MSACCT- AST6-6: Students will demonstrate appropriate oral and written communication on personal and professional levels.**

- a. Explain the importance of clear concise communication between service technicians and customers,
- b. Describe the importance of professional communications between pilots with air traffic control, ship captains with port managers, and long-haul drivers with distribution managers.
- c. Contrast case studies of recent transportation events where good and poor communication had an impact.
- d. Create technical summaries of transportation stories and articles.

ACADEMIC STANDARDS:

*ELA6W4: The student consistently uses the writing process to develop, revise, and evaluate writing.*

NATIONAL ACADEMIC STANDARDS (NATEF):

*LA267: The technician supplies clarifying information to customers, associates, the parts suppliers, and the supervisor.*

SAMPLE TASKS:

- Have students complete a written report over a magazine article dealing with related information.
- Have students present an oral report over the article review.
- Use aeronautical charts to simulate and plan a cross-country flight.
- Translate and apply the ICAO alphabet as used in aviation communications.
- Role-play air traffic communications between a pilot and air traffic controller.
- Use a flight simulator to depart from one airport and land at another.

**MSACCT- AST6-7: Students will demonstrate knowledge of science principles related to force.**

- a. Explain and demonstrate physical science principles of tools and equipment.
- b. Use Newton's Laws and Bernoulli's Principle to explain basic principles of lift.
- c. Demonstrate the forces acting on an airplane, automobile, tractor-trailer, tug boat, and cargo ship.

ACADEMIC STANDARDS:

*M6P4: Students will make connections among mathematical ideas and to other disciplines.*

*S6CS4: Students will use tools and instruments for observing, measuring, and manipulating equipment and materials in scientific activities.*

*S8P2: Students will be familiar with the forms and transformations of energy.*

**NATIONAL ACADEMIC STANDARDS (NATEF):**

*SC198: The technician can demonstrate an understanding of the correct procedure to measure the electrical parameters of voltage, current, resistance, or power.*

*SC233: The technician can demonstrate an understanding of the kinetic and potential energy relationships that occur in valve systems, ignition systems, and other stored energy systems such as springs and fuels.*

**SAMPLE TASKS:**

- Use Newton's Laws of Motion to explain the motion of an airplane or rocket.
- Demonstrate Bernoulli's Principle as it relates to lift.
- Use a wind tunnel to relate the four forces acting on an airplane to flight performance
- Have students demonstrate understanding of leverage and force with different types of tools and equipment.
- Build and fly models that include flight controls for roll, pitch and yaw.

**MSACCT- AST6-7: Students will demonstrate knowledge of current and alternative fuel sources.**

- a. Summarize how crude oil is converted to gasoline and diesel fuels.
- b. Describe properties of gasoline and diesel fuels.
- c. Summarize properties of alternative fuels.
- d. Compare and contrast benefits of green fuels and energy production.

**ACADEMIC STANDARDS:**

*M6P4: Students will make connections among mathematical ideas and to other disciplines.*

*S6CS4: Students will use tools and instruments for observing, measuring, and manipulating equipment and materials in scientific activities.*

**SAMPLE TASKS:**

- Create diesel fuel from vegetable oil.
- Have students complete a graphic organizer of the potential energy from different types of fuels.
- Have students compare aerospace/transportation fuels using a graphic organizer.

**MSACCT- AST6-8: Students will understand the purpose of SkillsUSA.**

- a) Explain the history and purpose of SkillsUSA.
- b) Describe the SkillsUSA emblem.
- c) Establish a SkillsUSA chapter.

**ACADEMIC STANDARDS:**

*ELA6LSV2: The student listens to and views various forms of text and media in order to gather and share information, persuade others, and express and understand ideas. The student will select and critically analyze messages using rubrics as assessment tools.*

*ELA6R: The student understands and acquires new vocabulary and uses it correctly in reading and writing.*

*ELA6W3: The student uses research and technology to support writing.*

**NATIONAL ACADEMIC STANDARDS (NATEF):**

*LA283 - The technician uses computerized and other databases to obtain system information.*

**SAMPLE TASKS:**

- Draw and label the SkillsUSA emblem.
- Visit the SkillsUSA website: [www.skillusa.org](http://www.skillusa.org).
- Show a SkillsUSA video.
- Invite a guest speaker from a local SkillsUSA high school chapter.
- Conduct a SkillsUSA chapter meeting.

**CURRICULUM RESOURCES:**

- Modern Automotive Technology
- MAVCC Safety Program
- Mitchell On Demand Service Data
- CDX Videos
- Skills/USA PDP Level 1

**WEB SITES:**

[www.doe.k12.ga.us/](http://www.doe.k12.ga.us/)

[www.natef.org](http://www.natef.org)

[www.snapon.org](http://www.snapon.org)

[www.quest.nasa.gov](http://www.quest.nasa.gov)

[www.faa.gov/education\\_research/education](http://www.faa.gov/education_research/education)

[www.nasm.si.edu/](http://www.nasm.si.edu/)

[www.planemath.com/](http://www.planemath.com/)

[www.skillsusa.org](http://www.skillsusa.org)

[www.skillsusageorgia.org](http://www.skillsusageorgia.org)

**READING STANDARD COMMENT:**

After the elementary years, students are seriously engaged in reading for learning. This process sweeps across all disciplinary domains, extending even to the area of personal learning. Students encounter a variety of informational as well as fictional texts, and they experience text in all genres and modes of discourse. In the study of various disciplines of learning (language arts, mathematics, science, social studies), students must learn through reading the communities of discourse of each of those disciplines. Each subject has its own specific vocabulary, and for students to excel in all subjects, they must learn the specific vocabulary of those subject areas *in context*.

Beginning with the middle grade years, students begin to self-select reading materials based on personal interests established through classroom learning. Students become curious about science, mathematics, history, and literature as they form contexts for those subjects related to their personal and classroom

experiences. As students explore academic areas through reading, they develop favorite subjects and become confident in their verbal discourse about those subjects.

Reading across curriculum content develops both academic and personal interests in students. As students read, they develop both content and contextual vocabulary. They also build good habits for reading, researching, and learning. The Reading Across the Curriculum standard focuses on the academic and personal skills students acquire as they read in all areas of learning.

**CTAEMRC-1: Students will enhance reading in all curriculum areas by:**

- a. Reading in all curriculum areas.
  - Read a minimum of 25 grade-level appropriate books per year from a variety of subject disciplines and participate in discussions related to curricular learning in all areas.
  - Read both informational and fictional texts in a variety of genres and modes of discourse.
  - Read technical texts related to various subject areas.
- b. Discussing books.
  - Discuss messages and themes from books in all subject areas.
  - Respond to a variety of texts in multiple modes of discourse.
  - Relate messages and themes from one subject area to messages and themes in another area.
  - Evaluate the merit of texts in every subject discipline.
  - Examine author's purpose in writing.
  - Recognize the features of disciplinary texts.
- c. Building vocabulary knowledge.
  - Demonstrate an understanding of contextual vocabulary in various subjects.
  - Use content vocabulary in writing and speaking.
  - Explore understanding of new words found in subject area texts.
- d. Establishing context.
  - Explore life experiences related to subject area content.
  - Discuss in both writing and speaking how certain words are subject area related.
  - Determine strategies for finding content and contextual meaning for unknown words.

**WRITING:**

The student writes clear, coherent text. The writing shows consideration of the audience and purpose. The student progresses through the stages of the writing process (e.g., prewriting, drafting, revising, and editing successive versions).

**CTAEW-1: The student demonstrates competence in a variety of genres.**

The student produces technical writing (business correspondence: memoranda, emails, letters of inquiry, letters of complaint, instructions and procedures, lab reports, slide presentations) that:

- a) Creates or follows an organizing structure appropriate to purpose, audience, and context.
- b) Excludes extraneous and inappropriate information.
- c) Follows an organizational pattern appropriate to the type of composition.
- d) Applies rules of Standard English.

**CTAEW-2: The student uses research and technology to support writing.**

The student:

- a) Identifies topics, asks and evaluates questions, and develops ideas leading to inquiry, investigation, and research.

- b) Uses organizational features of electronic text (e.g., bulletin boards, databases, keyword searches, e-mail addresses) to locate relevant information.
- c) Includes researched information in different types of products (e.g., compositions, multimedia presentations, graphic organizers, projects, etc.).
- d) Uses appropriate structures to ensure coherence (e.g., transition elements).
- e) Supports statements and claims with anecdotes, descriptions, facts and statistics, and specific examples.
- f) Gives credit for both quoted and paraphrased information in a bibliography by using a consistent and sanctioned format and methodology for citations.

**CTAEW-3: The student consistently uses the writing process to develop, revise, and evaluate writing.**

The student:

- a) Plans and drafts independently and resourcefully.
- b) Uses strategies of note taking, outlining, and summarizing to impose structure on composition drafts.
- c) Edits writing to improve word choice after checking the precision of the vocabulary.

**ENTREPRENEURSHIP:**

**MKT-EN-1: Understands concepts and processes associated with successful entrepreneurial performance.**

- a) Define entrepreneurship.
- b) Identify and analyze characteristics of a successful entrepreneur.
- c) Identify the reasons for planning in entrepreneurial businesses.
- d) Discuss the entrepreneurial discovery processes.
- e) Assess global trends and opportunities.
- f) Determine opportunities for business creation.
- g) Generate ideas for business.
- h) Determine feasibility of ideas.
- i) Determine the major reasons for business failure.

**ACADEMIC STANDARDS:**

*ELA8W1: The student produces writing that establishes an appropriate organizational structure, sets a context and engages the reader, maintains a coherent focus throughout, and signals a satisfying closure.*

*ELA8W3: The student uses research and technology to support writing.*

*SSEF6: The student will explain how productivity, economic growth and future standards of living are influenced by investment in factories, machinery, new technology and the health, education and training of people.*

*SSEIN1: The student will explain why individuals, businesses and governments trade goods and services.*

**MKT-EN-2: Explain the fundamental concepts of business ownership.**

- a) Determine the relationship of competition to our private, free enterprise system.
- b) Explain the effects of competition on buyers and sellers.



- c) Identify the common types of business ownership.
- d) Compare and contrast the advantages and disadvantages of each type of ownership.
- e) Explain relevant government regulations relating to the operation of a business.
- f) Discuss the types of risks that businesses encounter.
- g) Explain how businesses deal with the various types of risks.
- h) Identify the market segment for the business.
- i) Formulate a marketing mix designed to reach a specific market segment.
- j) Utilize the marketing functions to determine the competitive advantage of the proposed business.

### ACADEMIC STANDARDS:

*ELA8W1: The student produces writing that establishes an appropriate organizational structure, sets a context and engages the reader, maintains a coherent focus throughout, and signals a satisfying closure.*

*ELA8W3: The student uses research and technology to support writing.*

*SSEF5: The student will describe the roles of government in a market economy.*

### CTAE Foundation Skills

The Foundation Skills for Career, Technical and Agricultural Education (CTAE) are critical competencies that students pursuing any career pathway should exhibit to be successful. As core standards for all career pathways in all program concentrations, these skills link career, technical and agricultural education to the state's academic performance standards.

The CTAE Foundation Skills are aligned to the foundation of the U. S. Department of Education's 16 Career Clusters. Endorsed by the National Career Technical Education Foundation (NCTEF) and the National Association of State Directors of Career Technical Education Consortium (NASDCTEc), the foundation skills were developed from an analysis of all pathways in the sixteen occupational areas. These standards were identified and validated by a national advisory group of employers, secondary and postsecondary educators, labor associations, and other stakeholders. The Knowledge and Skills provide learners a broad foundation for managing lifelong learning and career transitions in a rapidly changing economy.

**CTAE-FS-1 Technical Skills:** Learners achieve technical content skills necessary to pursue the full range of careers for all pathways in the program concentration.

**CTAE-FS-2 Academic Foundations:** Learners achieve state academic standards at or above grade level.

**CTAE-FS-3 Communications:** Learners use various communication skills in expressing and interpreting information.

**CTAE-FS-4 Problem Solving and Critical Thinking:** Learners define and solve problems, and use problem-solving and improvement methods and tools.

**CTAE-FS-5 Information Technology Applications:** Learners use multiple information technology devices to access, organize, process, transmit, and communicate information.

**CTAE-FS-6 Systems:** Learners understand a variety of organizational structures and functions.

**CTAE-FS-7 Safety, Health and Environment:** Learners employ safety, health and environmental management systems in corporations and comprehend their importance to organizational performance and regulatory compliance.

**CTAE-FS-8 Leadership and Teamwork:** Learners apply leadership and teamwork skills in collaborating with others to accomplish organizational goals and objectives.

**CTAE-FS-9 Ethics and Legal Responsibilities:** Learners commit to work ethics, behavior, and legal responsibilities in the workplace.

**CTAE-FS-10 Career Development:** Learners plan and manage academic-career plans and employment relations.

**CTAE-FS-11 Entrepreneurship:** Learners demonstrate understanding of concepts, processes, and behaviors associated with successful entrepreneurial performance.