

Implementation date  
Fall 2010

**PROGRAM CONCENTRATION:**  
**CAREER PATHWAY:**  
**COURSE TITLE:**

**Government & Public Safety**  
**JROTC – Air Force**  
**Aerospace Science: Science of Flight**

### **Air Force Junior ROTC Curriculum**

The Georgia Performance Standards for the Air Force Junior ROTC curriculum are designed to provide students with the knowledge and skills necessary to “develop citizens of character dedicated to serving their community and nation.” **McREL** Standards and Benchmarks were used for all AFJROTC courses except Astronomy, Survival, and Global and Cultural Studies. Supported by contracts with the U.S. Education Department, Office of Educational Research and Improvement, **McREL** is one of ten Regional Educational Laboratories at the forefront of research, practice, and evaluation related to standards-based education and it has been awarded standards-based classroom instruction as its national leadership area within the regional educational laboratory network. Global and Cultural Studies used the **National Council on Social Studies** (NCSS) correlation, a nationally recognized source for social studies standards. Astronomy and Survival were correlated to the Georgia Performance Standards. All AFJROTC courses were compared to the **Georgia Performance Standards** for Social Studies, Math, Language Arts, and Science, and specific correlations were listed following each AFJROTC standard where applicable. Technology is infused into all AFJROTC curriculum.

All McREL Standards and Benchmarks are available for AFJROTC instructors and authorized users at [https://owa.afjrotc.net/cybercampus\\_prod/default.aspx](https://owa.afjrotc.net/cybercampus_prod/default.aspx) in the Library under Curriculum, McRel Standards and Benchmarks. Additional national education standards are referenced in this copyrighted cybercampus information. Georgia AFJROTC instructors should reference both the Georgia and McREL standards to meet both AFJROTC and Georgia student education requirements.

*Aerospace Science: The Science of Flight* content and process skills on the AFJROTC Cybercampus have been correlated to National Center for History in the Schools (NCHS): U.S. History, Expanded Edition; National Council on Social Studies (NCSS): Curriculum Standards for Social Studies; *National Research Council (NRC)*: National Science Education Standards; National Science Teachers Association (NSTA): The Content Core; Project 2061: Benchmarks for Science Literacy; *National Assessment of Educational Progress (NAEP)*: NAEP: 1996 Science Framework, and Science Assessment and Exercise Specifications; Trends in International Mathematics and Science Study (TIMSS): Final Year; International Society for Technology in Education (ISTE) National Educational Technology Standards for Students; International Technology in Education Association (ITEA): Standards for Technological Literacy; AEC Australian Technology Standards; as well as educational standards from Texas, North Carolina, and California.

### **Course Description: Aerospace Science: The Science of Flight**

The second year is a science course designed to acquaint the student with the aerospace

Implementation date  
Fall 2010

environment, the human requirements of flight, principles of aircraft flight, and principles of navigation. The course begins with a discussion of the atmosphere and weather. After developing an understanding of the environment, how that environment affects flight is introduced. Discussions include the forces of lift, drag, thrust, and weight. Students also learn basic navigation including map reading, course plotting, and the effects of wind. The portion on the Human Requirements of Flight is a survey course on human physiology. Discussed here are the human circulatory system, the effects of acceleration and deceleration, and protective equipment. Basic concepts of aircraft flight, high school math, physics, and science are brought to life as students study *The Science of Flight*.

**PS-AFSF-1. Students will demonstrate understanding of basic facts and general principles of the atmosphere.**

- a. Define a list of terms related to the atmosphere.
- b. Describe the roles of water and particulate matter.
- c. Identify the primary causes of atmospheric motion.

***Academic Standard(s):***

*SM1. Students will relate the formation, structure and composition of Earth's atmosphere to the processes that cause weather.*

*SES5 Students will investigate the interaction of insolation and Earth systems to produce weather and climate.*

*SES6 Students will explain how life on Earth responds to and shapes Earth systems.*

**PS-AFSF-2. Students will demonstrate knowledge of basic facts about the weather elements.**

- a. Identify types of clouds.
- b. Identify types of air masses and fronts.
- c. Describe terrain factors that affect weather.
- d. Describe types of turbulence.
- e. Identify normal weather patterns.

***Academic Standard(s):***

*SM2. Students will investigate energy transfer to types of clouds formed, precipitation, and air masses.*

*SES5 Students will investigate the interaction of insolation and Earth systems to produce weather and climate.*

*SES6 Students will explain how life on Earth responds to and shapes Earth systems.*

*SEV2 Students will demonstrate an understanding that the Earth is one interconnected system.*

Implementation date  
Fall 2010

**PS-AFSF-3. Students will demonstrate knowledge of instruments and communications used in weather forecasting.**

- a. Describe the instruments used for predicting weather forecasts.
- b. State the role of weather satellites in predicting weather.
- c. Describe the communication methods used to provide weather information.

**Academic Standard(s):**

*SM3. Students will explore the science of weather forecasting.*

*SES. Students will explore the actions of water, wind, ice, and gravity that create landforms and systems of landforms (landscapes).*

*SES5. Students will investigate the interaction of insolation and Earth systems to produce weather and climate.*

**PS-AFSF-3. Students will demonstrate an understanding of the difference between regular weather and aviation weather.**

- a. Explain the weather hazards associated with aviation.
- b. List the types of severe weather that affect aviation.
- c. Describe arctic and tropic weather characteristics.

**Academic Standard(s):**

*SES3 Students will explore the actions of water, wind, ice, and gravity that create landforms and systems of landforms (landscapes).*

*SES5 Students will investigate the interaction of insolation and Earth systems to produce weather and climate.*

*SM4. Students will analyze the relationship of weather and society.*

**PS-AFSF-4. Students will demonstrate knowledge of the physiology of flight.**

- a. State the layers of the atmosphere and the composition of each.
- b. Describe the physiological divisions of the flight environment.
- c. Define the physical laws of gases according to Boyle's Law, Dalton's Law, and Henry's Law.
- d. Describe the processes for respiration and circulation.
- e. State the effects of reduced pressure at altitude.
- f. Define spatial disorientation and motion sickness.
- g. Describe individual stresses imposed upon a pilot during flight.

**Academic Standard(s):**

*SES1 Students will investigate the composition and formation of Earth systems, including the Earth's relationship to the solar system.*

*SES6 Students will explain how life on Earth responds to and shapes Earth systems.*

Implementation date  
Fall 2010

*SP4 Students will analyze the properties and applications of waves.*

*SP3 Students will evaluate the forms and transformations of energy.*

**PS-AFSF-5. Students will demonstrate an understanding of the history of aerospace medicine and human engineering.**

- a. Describe the early balloon flights.
- b. Describe the role of a flight surgeon in taking care of a flyer's medical needs.
- c. List examples of machines being adapted to man's needs for flight productivity.
- d. Describe the evolving of research within the fringes of space regarding space exploration.

***Academic Standard(s):***

*SP6 The student will describe the corrections to Newtonian physics given by quantum mechanics and relativity when matter is very small, moving fast compared to the speed of light, or very large.*

*SP4 Students will analyze the properties and applications of waves.*

**PS-AFSF-6. Students will demonstrate understanding of the protective equipment used for actual and simulated flight.**

- a. Describe the protective equipment used by pilots and astronauts.
- b. State the purpose and function of flight simulators.

***Academic Standard(s):***

*SP6. The student will describe the corrections to Newtonian physics given by quantum mechanics and relativity when matter is very small, moving fast compared to the speed of light, or very large.*

*SP3. Students will evaluate the forms and transformations of energy.*

**PS-AFSF-7. Students will distinguish between the principles of basic aeronautics.**

- a. Describe the theory of flight.
- b. Describe airfoils and flight.
- c. Describe the effects of relative wind.
- d. Describe the effects of angle of attack.
- e. Identify the four forces of flight.

***Academic Standard(s):***

*SP6. The student will describe the corrections to Newtonian physics given by quantum mechanics and relativity when matter is very small, moving fast compared to the speed of light, or very large.*

*MA1G3. Students will discover, prove, and apply properties of triangles, quadrilaterals, and other polygons.*

Implementation date  
Fall 2010

*SP4. Students will analyze the properties and applications of waves.*

*SP3. Students will evaluate the forms and transformations of energy.*

**PS-AFSF-8. Students will demonstrate understanding of aircraft motion and how it is controlled.**

- a. Identify the axes of rotation.
- b. Identify the effects of flaps on flight.
- c. Identify the effect of slats on flight.
- d. Identify the effects of spoilers on flight.
- e. Identify the effects of drag on flight.
- f. Describe the elements of controlled flight.

**Academic Standard(s):**

*MA1A1. Students will explore and interpret the characteristics of functions, using graphs, tables, and simple algebraic techniques.*

*MA2A3. Students will analyze graphs of polynomial functions of higher degree.*

*MM1A3. Students will solve simple equations.*

*SP6 The student will describe the corrections to Newtonian physics given by quantum mechanics and relativity when matter is very small, moving fast compared to the speed of light, or very large.*

*SP3. Students will evaluate the forms and transformations of energy.*

*SP4. Students will analyze the properties and applications of waves.*

**PS-AFSF-9. Students will demonstrate knowledge of basic engine principles.**

- a. Define a list of terms related to basic engine principles.
- b. Define *Boyle's Law* and *Charles and Gay-Luccas's Law*.
- c. Describe how engines evolved from the earliest version to present day.
- d. Describe the mechanical, cooling, and ignition system of the reciprocating engines.
- e. Describe the role of reversers and suppressors used in jet aircraft.
- f. Given real causes of pollution, state the method to eliminate the stated cause.

**Academic Standard(s):**

*SEV4 Students will understand and describe availability, allocation and conservation of energy and other resources.*

*SC2. Students will relate how the Law of Conservation of Matter is used to determine chemical composition in compounds and chemical reactions.*

Implementation date  
Fall 2010

*SP6. The student will describe the corrections to Newtonian physics given by quantum mechanics and relativity when matter is very small, moving fast compared to the speed of light, or very large.*

*MA1D1. Students will determine the number of outcomes related to a given event.*

*SCSh7. Students will analyze how scientific knowledge is developed.*

*SP3. Students will evaluate the forms and transformations of energy.*

*SP4. Students will analyze the properties and applications of waves.*

**PS-AFSF-10. Students will demonstrate knowledge of the basic facts and general operating principle of rocket engines.**

- a. Outline the history of rocket engines.
- b. Describe how rocket engines operate.
- c. List the types of rocket engines.
- d. Describe advanced propulsion systems.

***Academic Standard(s):***

*SC2. Students will relate how the Law of Conservation of Matter is used to determine chemical composition in compounds and chemical reactions.*

*SP6. The student will describe the corrections to Newtonian physics given by quantum mechanics and relativity when matter is very small, moving fast compared to the speed of light, or very large.*

*SCSh7. Students will analyze how scientific knowledge is developed.*

*SP3. Students will evaluate the forms and transformations of energy.*

**PS-AFSF-11. Students will demonstrate knowledge of the types of civilian and military aerospace vehicles.**

- a. Identify the types of civilian aircraft.
- b. Identify the types of military aircraft.
- c. Identify the types of rockets and missiles.

***Academic Standard(s):***

*SC2. Students will relate how the Law of Conservation of Matter is used to determine chemical composition in compounds and chemical reactions.*

*SP6. The student will describe the corrections to Newtonian physics given by quantum mechanics and relativity when matter is very small, moving fast compared to the speed of light, or very large.*

Implementation date  
Fall 2010

*SCSh7. Students will analyze how scientific knowledge is developed.*

*SP3. Students will evaluate the forms and transformations of energy.*

**PS-AFSF-12. Students will use navigational aids.**

- a. State the elements of a map.
- b. Describe how to use air navigation charts.
- c. State the importance of flight planning.
- d. State how to perform a preflight plan.
- e. List the elements of flight.
- f. State the procedures to perform when lost.

***Academic Standard(s):***

*SCSh3. Students will identify and investigate problems scientifically.*

*SCSh4. Students use tools and instruments for observing, measuring, and manipulating scientific equipment and materials.*

*SCSh5. Students will demonstrate the computation and estimation skills necessary for analyzing data and developing reasonable scientific explanations*

*SCSh7. Students analyze how scientific knowledge is developed.*

*SCSh8. Students will understand important features of the process of scientific inquiry.*

*SES5. Students will investigate the interaction of insolation and Earth systems to produce weather and climate.*

**PS-AFSF-13. Students will demonstrate understanding of the four elements of navigation.**

- a. State how the Earth's size and shape affect navigation.
- b. State how to determine position.
- c. State how to determine direction.
- d. State how to determine distance.
- e. State how to determine time.

***Academic Standard(s):***

*SP3 Students will evaluate the forms and transformations of energy.*

*SCSh3. Students will identify and investigate problems scientifically.*

*SCSh4. Students use tools and instruments for observing, measuring, and manipulating scientific equipment and materials.*

*SCSh5. Students will demonstrate the computation and estimation skills necessary for analyzing data and developing reasonable scientific explanations*

Implementation date  
Fall 2010

*SCSh7. Students analyze how scientific knowledge is developed.*

*SCSh8. Students will understand important features of the process of scientific inquiry.*

*SES6. Students will explain how life on Earth responds to and shapes Earth systems.*

*SES5. Students will investigate the interaction of insolation and Earth systems to produce weather and climate.*

**PS-AFSF-14. Students will chart projections are used in navigation.**

- a. Identify the problems associated with projections.
- b. State the projection classifications.
- c. Describe the chart projection characteristics.

**Academic Standard(s):**

*SCSh3. Students will identify and investigate problems scientifically.*

*SCSh4. Students use tools and instruments for observing, measuring, and manipulating scientific equipment and materials.*

*SCSh5. Students will demonstrate the computation and estimation skills necessary for analyzing data and developing reasonable scientific explanations.*

*SCSh7. Students analyze how scientific knowledge is developed.*

*SCSh8. Students will understand important features of the process of scientific inquiry.*

*SES6. Students will explain how life on Earth responds to and shapes Earth systems.*

*SES5. Students will investigate the interaction of insulation and Earth systems to produce weather and climate.*

**PS-AFSF-15. Students will explain the types and functions of navigation instruments.**

- a. Describe the functions of the clock.
- b. Describe the functions of airspeed indicators.
- c. Describe the functions of the altimeter.
- d. Describe the types of altitude.
- e. Describe the functions of a compass.
- f. Describe the functions of turn-and-slip indicators.
- g. Describe the functions of attitude indicators.

**Academic Standard(s):**

*SCSh3. Students will identify and investigate problems scientifically.*

Implementation date

Fall 2010

*SCSh4. Students use tools and instruments for observing, measuring, and manipulating scientific equipment and materials.*

*SCSh5. Students will demonstrate the computation and estimation skills necessary for analyzing data and developing reasonable scientific explanations.*

*SCSh7. Students analyze how scientific knowledge is developed.*

*SCSh8. Students will understand important features of the process of scientific inquiry.*

**PS-AFSF-16. Students will use dead reckoning techniques.**

- a. List basic facts and general principles of dead reckoning.
- b. Describe the wind triangle and its applications.

***Academic Standard(s):***

*SCSh3. Students will identify and investigate problems scientifically.*

*SCSh4. Students use tools and instruments for observing, measuring, and manipulating scientific equipment and materials.*

*SCSh5. Students will demonstrate the computation and estimation skills necessary for analyzing data and developing reasonable scientific explanations.*

*SCSh7. Students analyze how scientific knowledge is developed.*

**PS-AFSF-17. Students will demonstrate understanding of the types of navigational Aids.**

- a. Describe the uses of the ADF, VOR, TACAN VORTAC, and ILS.
- b. Describe the uses of Celestial navigation.
- c. Describe the uses of radar, LORAN, and Doppler.
- d. Describe the uses of the Inertial Navigation System.
- e. Describe the uses of the plotter.
- f. Describe the uses of the dead reckoning computer.

***Academic Standard(s)***

*SCSh3. Students will identify and investigate problems scientifically.*

*SCSh4. Students use tools and instruments for observing, measuring, and manipulating scientific equipment and materials.*

*SCSh5. Students will demonstrate the computation and estimation skills necessary for analyzing data and developing reasonable scientific explanations.*

*SCSh7. Students analyze how scientific knowledge is developed.*

## **Co-Requisite – Characteristics of Science**

Implementation date  
Fall 2010

## Habits of Mind

### **SCSh1. Students will evaluate the importance of curiosity, honesty, openness, and skepticism in science.**

- a. Exhibit the above traits in their own scientific activities.
- b. Recognize that different explanations often can be given for the same evidence.
- c. Explain that further understanding of scientific problems relies on the design and execution of new experiments which may reinforce or weaken opposing explanations.

### **SCSh2. Students will use standard safety practices for all classroom laboratory and field investigations.**

- a. Follow correct procedures for use of scientific apparatus.
- b. Demonstrate appropriate technique in all laboratory situations.
- c. Follow correct protocol for identifying and reporting safety problems and violations.

### **SCSh3. Students will identify and investigate problems scientifically.**

- a. Suggest reasonable hypotheses for identified problems.
- b. Develop procedures for solving scientific problems.
- c. Collect, organize and record appropriate data.
- d. Graphically compare and analyze data points and/or summary statistics.
- e. Develop reasonable conclusions based on data collected.
- f. Evaluate whether conclusions are reasonable by reviewing the process and checking against other available information.

### **SCSh4. Students use tools and instruments for observing, measuring, and manipulating scientific equipment and materials.**

- a. Develop and use systematic procedures for recording and organizing information.
- b. Use technology to produce tables and graphs.
- c. Use technology to develop, test, and revise experimental or mathematical models.

### **SCSh5. Students will demonstrate the computation and estimation skills necessary for analyzing data and developing reasonable scientific explanations.**

- a. Trace the source on any large disparity between estimated and calculated answers to problems.
- b. Consider possible effects of measurement errors on calculations.
- c. Recognize the relationship between accuracy and precision.
- d. Express appropriate numbers of significant figures for calculated data, using scientific notation where appropriate.
- e. Solve scientific problems by substituting quantitative values, using dimensional analysis and/or simple algebraic formulas as appropriate.

### **SCSh6. Students will communicate scientific investigations and information clearly.**

- a. Write clear, coherent laboratory reports related to scientific investigations.
- b. Write clear, coherent accounts of current scientific issues, including possible alternative interpretations of the data.

Implementation date  
Fall 2010

- c. Use data as evidence to support scientific arguments and claims in written or oral presentations.
- d. Participate in group discussions of scientific investigation and current scientific issues.

## The Nature of Science

### **SCSh7. Students analyze how scientific knowledge is developed.**

Students recognize that:

- a. The universe is a vast single system in which the basic principles are the same everywhere.
- b. Universal principles are discovered through observation and experimental verification.
- c. From time to time, major shifts occur in the scientific view of how the world works. More often, however, the changes that take place in the body of scientific knowledge are small modifications of prior knowledge. Major shifts in scientific views typically occur after the observation of a new phenomenon or an insightful interpretation of existing data by an individual or research group.
- d. Hypotheses often cause scientists to develop new experiments that produce additional data.
- e. Testing, revising, and occasionally rejecting new and old theories never ends.

### **SCSh8. Students will understand important features of the process of scientific inquiry.**

Students will apply the following to inquiry learning practices:

- a. Scientific investigators control the conditions of their experiments in order to produce valuable data.
- b. Scientific researchers are expected to critically assess the quality of data including possible sources of bias in their investigations' hypotheses, observations, data analyses, and interpretations.
- c. Scientists use practices such as peer review and publication to reinforce the integrity of scientific activity and reporting.
- d. The merit of a new theory is judged by how well scientific data are explained by the new theory.
- e. The ultimate goal of science is to develop an understanding of the natural universe which is free of biases.
- f. Science disciplines and traditions differ from one another in what is studied, techniques used, and outcomes sought.

## Reading Across the Curriculum

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 in the middle grades, students start to self-select reading materials based on personal interests established through classroom learning. Students become curious about

Implementation date  
Fall 2010

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.

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.

### **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.

Implementation date  
Fall 2010

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.

**Social Studies Skills Matrices**  
MAP AND GLOBE SKILLS GOAL:

Implementation date  
Fall 2010

The student will use maps to retrieve social studies information. I: indicates when a skill is introduced in the standards and elements as part of the content D: indicates grade levels where the teacher must develop that skill using the appropriate content M: indicates grade level by which student should achieve mastery, the ability to use the skill in all situations A: indicates grade levels where students will continue to apply and improve mastered skills.

Map and Globe Skills	K	1	2	3	4	5	6	7	8	9-12
1. Use cardinal directions	I	M	A	A	A	A	A	A	A	A
2. Use intermediate directions		I	M	A	A	A	A	A	A	A
3. Use a letter/number grid system to determine location			I	M	A	A	A	A	A	A
4. Compare and contrast the categories of natural, cultural, and political features found on maps			I	M	A	A	A	A	A	A
5. Use inch to inch map scale to determine distance on maps			I	M	A	A	A	A	A	A
6. Use map key/legend to acquire information from historical, physical, political, resource, product, and economic maps			I	D	M	A	A	A	A	A
7. Use map to explain impact of geography on historical and political events			I	D	M	A	A	A	A	A
8. Draw conclusions and make generalizations based on maps				I	M	A	A	A	A	A
9. Use latitude and longitude to determine location				I	D	D	D	M	A	A
10. Use graphic scales to determine distances on maps					I	M	A	A	A	A
11. Compare maps of the same place at different points in time and from different perspectives to determine changes, identify trends, and generalize about human activities					I	M	A	A	A	A

Implementation date  
Fall 2010

## INFORMATION PROCESSING SKILLS

**GOAL:** The student will be able to locate, analyze, and synthesize information related to social studies topics and apply this information to solve problems/make decisions.

**I:** indicates when a skill is introduced in the standards and elements as part of the content

**D:** indicates grade levels where the teacher must develop that skill using the appropriate content

**M:** indicates grade level by which student should achieve mastery, the ability to use the skill in all situations

**A:** indicates grade levels where students will continue to apply and improve mastered skills

Information Processing Skills	K	1	2	3	4	5	6	7	8	9-12
1. Compare similarities and differences	I	D	M	A	A	A	A	A	A	A
2. Organize items chronologically	I	D	D	M	A	A	A	A	A	A
3. Identify issues and/or problems and alternative solutions	I	D	D	D	D	M	A	A	A	A
4. Distinguish between fact and opinion		I	D	M	A	A	A	A	A	A
5. Identify main idea, detail, sequence of events, and cause and effect in a social studies context		I	D	D	M	A	A	A	A	A
6. Identify and use primary and secondary sources		I	D	D	M	A	A	A	A	A
7. Interpret timelines		I	D	D	M	A	A	A	A	A
8. Identify social studies reference resources for a specific purpose			I	M	A	A	A	A	A	A
9. Construct charts and tables			I	M	A	A	A	A	A	A
10. Analyze artifacts			I	D	D	M	A	A	A	A
11. Draw conclusions and make generalizations				I	M	A	A	A	A	A
12. Analyze graphs and diagrams				I	D	M	A	A	A	A
13. Translate dates into centuries, eras, or ages				I	D	M	A	A	A	A
14. Formulate appropriate research questions					I	M	A	A	A	A
15. Determine adequacy and/or relevancy of information					I	M	A	A	A	A
16. Check for consistency of information					I	M	A	A	A	A
17. Interpret political cartoons					I	D	D	D	M	A

Implementation date  
Fall 2010

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**JROTC – Air Force**  
**Leadership Education II**

**Air Force Junior ROTC Curriculum**

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*Leadership Education II, Communication, Awareness, and Leadership* content and process skills on the AFJROTC Cybercampus have been correlated to McRel standards for Thinking and Reasoning, Working With Others, Language Arts, Life Work, Arts and Communication, Civics, Historical Understanding, Health and Technology, Self-Regulation, Behavioral Studies, United States History, and Health.

**Course Description:**

*Leadership Education II: Communication, Awareness, and Leadership* focuses on the Air Force Junior Reserve Officer Training Corp (AFJROTC) mission to “develop citizens of character dedicated to serving their nation and community.” This is accomplished through better communication, increased awareness of self and others, and improved leadership. Woven throughout the course is the underlying theme of developing personal integrity while emphasizing leadership and other values, such as service and excellence.

**PS-AFLEII-1. Students will identify the parts of the communication process and explain how the process works. Explain and summarize encoding and decoding, verbal and nonverbal communication cues, the importance of feedback, and barriers to effective communication.**

- a. Diagram the communication process.
- b. Describe encoding and decoding.
- c. Select and list communication cues
- d. Name and give examples of three barriers to effective communication
- e. Explain the importance of feedback

**PS-AFLEII-2. Students will recognize and explain the difference between listening and hearing, the types of listening, and the importance of listening.**

- a. Distinguish the difference between listening and hearing.
- b. Select the three types of listening and give examples of each.
- c. Describe one of the three types of listening.
- d. Demonstrate examples of problems resulting from poor listening.

Implementation date

Fall 2010

**PS-AFLEII-3. Students will identify the component parts of the thinking process, recognize the standards of critical thinking, and explain the importance of learning to think and how to ask good questions.**

- a. Diagram the thinking process
- b. Distinguish between thinking and reflection.
- c. Describe the impact of thinking on decision making and on problem solving.
- d. Name and evaluate three standards for critical thinking.

*Academic Standard(s):*

*MA3P1. Students will solve problems (using appropriate technology).*

**PS-AFLEII-4. Students will identify the six steps in the basic checklist for communication and organizational patterns.**

- a. Diagram the six steps in the basic checklist.
- b. Explain purpose and audience.
- c. Compare and contrast various ways of conducting research.
- d. Show how to support ideas
- e. Justify the benefits of getting organized.
- f. Select the six organizational patterns.
- g. Describe the benefits of writing a draft.
- h. Describe the benefits of feedback.

*Academic Standard(s):*

*MA3P1. Students will solve problems (using appropriate technology).*

*ELA11W2. The student demonstrates competence in a variety of genres.*

**PS-AFLEII-5. Students will recognize the elements of effective writing, and active voice in writing. They will summarize the three-part structure of a draft paper, the rules for the use of personal pronouns, the rules of subject-verb agreement, and the basics of e-mail protocol. The students will apply the elements of effective writing.**

- a. Describe tone, clarity, and continuity.
- b. Distinguish between the three parts of a paper.
- c. Describe ways to structure paragraphs and write transitions.
- d. Label a topic sentence, sentences written in active and passive voice, and sentences with appropriate subject-verb agreement.
- e. Describe style and substance guidelines.
- f. Label the six rules of e-mail protocol.
- g. Construct a letter or article using the effective writing style.

*Academic Standard(s):*

*ELA11W1. 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. The student*

*MA3P1. Students will solve problems (using appropriate technology).*

*ELA11W2. The student demonstrates competence in a variety of genres.*

**PS-AFLEII-6. Students will summarize the steps for preparing to speak, for organizing a presentation, and the techniques for presenting a talk. They will apply the elements of effective speaking.**

- a. Distinguish between the six steps for effective communication.
- b. Explain the importance of knowing the situation and audience.
- c. Diagram the three types of speaking and the three purposes of a speech.
- d. Distinguish between the four common methods of presentation.
- e. Outline a presentation and include an introduction, body, conclusion, transitions, and illustrations.

Implementation date  
Fall 2010

- f. Explain presentation skills and the importance of practicing your speech.
- g. Present a speech using the effective speaking format.

**Academic Standard(s):**

*ELA9LSV2 The student formulates reasoned judgments about written and oral communication in various media genres. The student delivers focused, coherent, and polished presentations that convey a clear and distinct perspective, demonstrate solid reasoning, and combine traditional rhetorical strategies of narration, exposition, persuasion, and description.*

*ELA10LSV2 The student formulates reasoned judgments about written and oral communication in various media genres. The student delivers focused, coherent, and polished presentations that convey a clear and distinct perspective, demonstrate solid reasoning, and combine traditional rhetorical strategies of narration, exposition, persuasion, and description.*

**PS-AFLEII-7. Students will apply the rules associated with Maslow’s hierarchy of needs and recognize the elements of attitude and how goals influence actions.**

- a. Diagram the five levels of human needs.
- b. Describe how different needs motivate behavior.
- c. Describe a belief (perspective, outlook on life) many people have about the world.
- d. Explain the value of a positive attitude.
- e. Describe a desire that is common among students.
- f. Explain an event in which goals led to actions.

**Academic Standard(s):**

*MA3P1. Students will solve problems (using appropriate technology).*

**PS-AFLEII-8. Students will predict the ways that attitudes affect actions, remember and name the common defense mechanisms, the key elements of a positive attitude, and the priority of task completion and people.**

- a. Define attitude.
- b. Select defense mechanisms from a list.
- c. Explain actions that demonstrate positive and negative attitudes.
- d. Select task completion and people as priorities from a list of options.

**Academic Standard(s):**

*MA3P1. Students will solve problems (using appropriate technology).*

**PS-AFLEII-9. Students will recognize the qualities of perseverance, courage, and patience in a leader.**

- a. Explain the definition of a leader.
- b. Define perseverance, courage, and patience.
- c. Describe actions associated with perseverance, courage, and patience.
- d. In a story that illustrates leadership, identify examples of perseverance, courage, and patience.

**PS-AFLEII-10. Students will recognize integrity in good citizens, explain what it means to be a positive role model and the impact of character on behavior.**

- a. Define integrity.
- b. Label personal standards of conduct that reflect excellence.
- c. Describe the actions of personal role models and actions that demonstrate loyalty.
- d. Select examples of integrity in action in citizens.
- e. Describe how actions speak louder than words.
- f. Explain the way in which character influences action and the relationship between commitment and responsibility.

**PS-AFLEII-11. Students will explain the eight basic elements of personality types described in the Myers-Briggs Type Indicator® (MBTI)® and the ways in which personality influences actions and the strengths and**

Implementation date  
Fall 2010

**weaknesses of different personality types and styles.**

- a. Define personality.
- b. Devise four questions to ask about personality preferences.
- c. Distinguish between characteristics of extraversion, introversion, sensing, intuition, thinking, feeling, judging, and perceiving.
- d. Describe the ways in which extraverts and introverts are energized to act.
- e. Select your personality type.
- f. Describe the strengths and weaknesses of your personality type.

**Academic Standard(s):**

*MA3P1. Students will solve problems (using appropriate technology).*

**PS-AFLEII-12. Students will explain the consequences of taking or avoiding responsibility and the consequences of actions and decisions. The student will explain common ways in which people use defense mechanisms to avoid responsibility.**

- a. Define consequences.
- b. Select the advantages of personal accountability.
- c. Describe the effects of defense mechanisms.
- d. Label examples of denial.
- e. Give examples of shifting blame.
- f. Describe patterns of rationalism and the effects of acting without thinking.
- g. Predict the possible consequences of making bad decisions.
- h. Explain some of the possible results of failing to think and act carefully when solving a problem.

**Academic Standard(s):**

*MA3P1. Students will solve problems (using appropriate technology).*

**PS-AFLEII-13. Students will work as a team while explaining the characteristics of effective teams. They will explain the four stages of team development and how to plan for and run an effective meeting.**

- a. Describe the purpose of team goals.
- b. Explain the importance of team roles.
- c. Select three common concerns of team members.
- d. Describe the advantages of defined goals.
- e. Describe the assignment of clear roles.
- f. Select examples of team rules.
- g. Explain the need for clear and constructive communication.
- h. Describe the benefits of balanced participation.
- i. Diagram the four stages of team growth.
- j. Describe the feelings and behaviors associated with the four stages of team growth.
- k. Explain some important points to consider in planning and running meetings.

**PS-AFLEII-14. Students will explain the dimensions of respect, the values of tolerance and understanding, and how to improve group effectiveness.**

- a. Define mutual respect, personal dignity, prejudice, discrimination, and stereotyping.
- b. Describe ways to demonstrate mutual respect, and ways to work toward common goals.
- c. Distinguish between how people show tolerance and understanding toward one another.
- d. Explain reasons for prejudice, discrimination, and gender stereotypes.
- e. Explain the benefits of accepting differences.
- f. Name ways to evaluate and measure group effectiveness.

**PS-AFLEII-15. Students will identify the elements of a common vision, write a team charter, and explain how to enlist others to work toward a common vision.**

- a. Define vision and excellence.
- b. Explain how to write a team vision statement.

Implementation date  
Fall 2010

- c. Describe how to write team goals and actions that encourage team members to work together.
- d. Name different types of team assignments.
- e. Diagram a timeline for achieving results.

**PS-AFLEII-16. Students will explain about solving problems and conflicts and the patterns of reacting to conflict. Students will summarize the types of problems in groups and the levels of conflict in groups.**

- a. Define problem and conflict.
- b. Name several types of problems with relations.
- c. Describe problems with direction.
- d. Explain operational problems.
- e. Diagram levels of conflict in groups.
- f. Describe the patterns of reacting to conflict.

*Academic Standard(s):*

*MA3P1. Students will solve problems (using appropriate technology).*

**PS-AFLEII-17. Students will explain common group problems, common indicators of group problems, and the six steps of problem solving.**

- a. Name the types of groups that have problems.
- b. Define poor performance.
- c. Explain the common signs of troubled relationships.
- d. Explain the effects of low morale.
- e. Distinguish between the six steps of problem solving.
- f. Diagram ways to list and test possible solutions.

*Academic Standard(s):*

*MA3P1. Students will solve problems (using appropriate technology).*

**PS-AFLEII-18. Students will recognize, remember and explain the nature of consensus and methods of building consensus.**

- a. Define consensus and a unilateral decision.
- b. Describe the benefits of consensus and active listening.
- c. Explain the importance of negotiation and compromise.
- d. Name the characteristics of good questions.

*Academic Standard(s):*

*MA3P1. Students will solve problems (using appropriate technology).*

**PS-AFLEII-19. Students will recognize and explain the basic elements of leadership, the Air Force Core Values, and reasons for recognizing the Core Values.**

- a. Define leadership and name the two basic elements of leadership.
- b. Explain the three Air Force Core values.
- c. Define integrity and name three moral traits associated with integrity.
- d. Describe four behaviors that reflect the Core Values of service before self.
- e. Define excellence.
- f. Name five areas of excellence in performance.
- g. Describe four reasons for recognizing the Core Values.

**PS-AFLEII-20. Students will recognize and explain the traits of effective leaders, the importance of competence and commitment in a leader.**

- a. Name six leadership traits.
- b. Describe the six leadership traits.
- c. Define competence and commitment.
- d. Name two key components of competence in an effective leader.

Implementation date  
Fall 2010

- e. Distinguish between indicators of strong commitment.

**PS-AFLEII-21. Students will summarize the key principles of leadership, the importance of setting the example, of caring for your people, and of accepting responsibility.**

- a. Define leadership principles, setting the example, and caring for your people.
- b. Explain a situation in which a leader set the example for his or her followers, and demonstrates caring for his or her people.
- c. Explain the primary responsibility of a leader.
- d. Predict the effects on a team when a leader fails to accept responsibility.

**PS-AFLEII-22. Students will explain two orientations to leadership behavior and summarize the four leadership styles and the primary factors of the leadership situation.**

- a. Distinguish between orientation toward people and tasks.
- b. Label the components of the leadership grid.
- c. Explain the following leadership styles:
  - a. Telling
  - b. Selling
  - c. Participating
  - d. Delegating
- d. Explain environmental factors.

**PS-AFLEII-23. Students will recognize the readiness factors of followers and effective ways to relate to leaders.**

- a. Define followership.
- b. Describe:
  - a. The willingness of followers.
  - b. The ability of followers.
  - c. The confidence of followers.
- c. Name three actions to take in supporting leaders.

**PS-AFLEII-24. Students will explain ways to prepare for leadership, the key elements of effective coaching and mentoring, and apply ways to practice leadership.**

- a. Explain four actions to take in preparing to lead.
- b. Explain questions to ask in observing a leader.
- c. Explain coaching.
- d. Explain ways to build trust and opportunities to lead.
- e. Organize and execute a team project.
- f. Demonstrate ways to evaluate your experience.

## **Reading Across the Curriculum**

### **Reading Standard Comment**

After the elementary years, students engage 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 middle grades years, students begin to self-select reading materials based on personal interest 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

Implementation date

Fall 2010

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, research, 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.

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 nooks in all subject area.
  - 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 content
  - 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.

## **CTAE Foundation Skills**

The Foundation Skills for Career, Technical and Agricultural Education (CTAE) are critical competencies that student 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 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 post secondary 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 career 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.

Implementation date

Fall 2010

**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.