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PROGRAM CONCENTRATION:

Government & Public Safety

CAREER PATHWAY:

JROTC – Air Force

COURSE TITLE:

Aerospace Science: Astronomy

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 curriculums.

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Course Description:

Explorations: An Introduction to Astronomy guides students through the history of astronomy starting with the Chinese and ending with today’s scientific discoveries. Students learn about the scientific reasons for the composition of celestial objects in the Milky Way using the laws of physics. They review the discoveries various astronomers and scientists have made, concluding with recent efforts to learn more about objects in our universe. Basic concepts of space, high school math, and science are brought to life as students study this introduction to astronomy.

PS-AFA-1. Students will explain the scientific view of the origin of the universe, the evolution of scientific view of the universe, the identification of celestial objects, and individuals who contributed to historic and current knowledge of astronomy.

- a. Outline the main arguments and evidence in support of the standard cosmological model. (e.g. elements, solar systems, and universe)
- b. Compare and contrast the major properties of the components of our solar system.
- c. Describe the cyclical motions people saw through the ages and how they used that motion to form opinions about the universe.

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- d. Evaluate the contributions early astronomers made to our understanding of space and the solar system.
- e. Identify celestial objects that are visible in the night sky and use those objects to explain how we measure distances and the location of celestial bodies.

Academic Standard(s):

SAST2. Students will describe the scientific view of the origin of the universe, the evolution of matter, and the development of resulting celestial objects.

SAST4. Students will analyze the dynamic nature of astronomy by comparing and contrasting evidence supporting current views of the universe with historical views.

PS-AFA-2. Students will explain the composition of Earth including the size, density, atmosphere, and magnetic field.

- a. Explain the scientific principles that interact to create the Earth's shape.
- b. Identify materials that compose Earth, determine their density, and use that information to explain the overall weight of Earth.
- c. Describe the various actions associated with earthquakes and how each of these actions affects the Earth's surface.
- d. Evaluate the overall location, structure and purpose of Earth's magnetic field.

Academic Standard(s):

SAST1. Students will explain the tools used by astronomers to study electromagnetic radiation to determine composition, motions, and other physical attributes of astronomical objects.

PS-AFA-3. Students will describe and explain the composition of the Moon including the size, density, atmosphere, and magnetic field.

- a. Explain the scientific principles and celestial activity that creates the Moon's surface and shape.
- b. Describe the orbital phases of the Moon and the effect those orbits have on Earth.
- c. Evaluate the contributions early mankind made to our understanding of the moon and explain how early beliefs have changed with advances in scientific knowledge about the Moon.

Academic Standard(s):

SAST3. Students will describe and explain the celestial sphere and astronomical observations made from the point of reference of the Earth.

PS-AFA-4. Students will describe and explain the solar system including both main and minor players.

- a. Evaluate the importance of the Sun to the existence of Earth, highlighting both the negative and positive benefits Earth receives from the Sun.
- b. Compare and contrast the scientific theories concerning the origin of the solar system.
- c. Diagram the evolution of solar nebula into the solar system.

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- d. Describe recent scientific findings including planets, celestial objects, and other universes and explain how these discoveries might affect life on Earth in the future.

Academic Standard(s):

SAST5: Students will evaluate the significance of energy transfers and energy transformations in understanding the universe.

PS-AFA-5. Students will evaluate the significance of the composition, location, and orbits of the terrestrial planets and Jovian planets.

- a. Compare and contrast the atmosphere, rotation, and planetary construction (interior and exterior) of the terrestrial planets.
- b. Explain the greenhouse effect and how it affects various life forms.
- c. Describe current and planned missions to Mars, including the justification for making these journeys and the hazards involved.
- d. Compare and contrast the atmosphere, rotation, and planetary construction (interior and exterior) of the Jovian planets.
- e. Diagram the orbits, moons, and rings of the Jovian planets.
- f. Describe current and planned missions to the Jovian planets, including the justification for these missions and the hazards involved.

Academic Standard(s):

SAST5: Students will evaluate the significance of energy transfers and energy transformations in understanding the universe.

Co-Requisite – Characteristics of Science

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.

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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.

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- 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

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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 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.

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- 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.

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.

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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.

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PROGRAM CONCENTRATION:

Government & Public Safety

CAREER PATHWAY:

JROTC – Air Force

COURSE TITLE:

Leadership Education III

Air Force Junior ROTC Curriculum

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Leadership III, Life Skills and Career Opportunities 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, Self-Regulation, Behavioral Studies, Health, Mathematics, and Economics.

Course Description:

Leadership Education II: Life Skills and Career Opportunities focuses on the AFJROTC mission to “develop citizens of character dedicated to serving their nation and community” by providing life skills training students will need. The curriculum covers educational and career opportunities, concepts for building wealth, college applications and course study, as well as the job-search process. The skills and knowledge students learn should make them happier, more productive citizens.

PS-AFLEIII-1. Students will examine the multiple career paths that are available and identify key aspects they should consider when choosing a career path.

- a. Research several career paths and identify steps required to attain those careers.
- b. Identify resources available for career planning.

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- c. List key factors to consider when choosing a career path.
- d. Research career options in the military and the steps required to enter both the enlisted and the officer corps.
- e. Identify the types of career opportunities available in the aerospace industry and the major agencies in the aerospace industry.
- f. Describe the work of one career in the civilian workforce, military workforce, and aerospace workforce.
- g. List four major subjects to study in preparing for a career in the civilian workforce, military workforce, and aerospace workforce.

Academic Standard(s):

ELA9W2. The student produces technical writing that reports technical information and/or conveys ideas clearly, logically, and purposefully to a particular audience.

ELA9W3, ELA10W3, ELA11W3, ELA12W3. The student uses research and technology to support writing.

PS-AFLEIII-2. Students will examine the multiple educational and career paths that are available to them along with the aptitude requirements in those career paths.

- a. Identify the 16 personality types and methods used to identify those personality types.
- b. Match the types of civilian, military, and aerospace jobs with work style preferences.
- c. List the advantages and disadvantages of a technically oriented career path.
- d. Compare and contrast technical training programs, apprenticeship programs, and intern programs.
- e. Outline the advantages of pursuing a higher education and the job classifications associated with educational tracks.
- f. Identify the earning potential for different types of education-based careers.

Academic Standard(s):

SSEMI4 The student will explain the organization and role of business, and analyze the four types of market structures in the U.S. economy.

ELA9RL, ELA10RL1 The student demonstrates comprehension by identifying evidence (e.g., diction, imagery, point of view, figurative language, symbolism, plot events and main ideas) in a variety of texts representative of different genres (e.g., poetry, prose [short story, novel, essay, editorial, biography], and drama) and using this evidence as the basis for interpretation.

ELA9LSV2, 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.

ELA9W2, ELA10W2 The student demonstrates competence in a variety of genres.

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PS-AFLEIII-3. Students will learn to create financial plans for their future that include budgeting, savings and bank accounts, and purchasing power.

- a. Identify the components of a personal financial plan and the steps followed to develop a financial plan.
- b. Name sources of income and spending requirements.
- c. Explain the various bank services and procedures required for each service.
- d. Demonstrate balancing a checking account.
- e. Identify advantages and disadvantages of credit and debit cards.
- f. Compare and contrast checking and savings accounts.
- g. Identify buying and selling issues that occur daily.
- h. List the issues that must be considered when buying or leasing apartments/homes.
- i. Outline the issues to consider in buying or leasing cars
- j. Explain the factors and issues to consider in determining a monthly budget.

Academic Standard(s):

SSEPF5 The student will describe how insurance and other risk-management strategies protect against financial loss.

SSEF4 The student will compare and contrast different economic systems, and explain how they answer the three basic economic questions of what to produce, how to produce and for whom to produce.

SSEPF1 The student will apply rational decision to the making of personal spending and savings choices.

SSEPF2 The student will explain that banks and other financial institutions are businesses which channel funds from savers to investors.

PS-AFLEI-4. Students will learn how to manage their finances and various problem areas.

- a. List the positive and negative aspects of using credit.
- b. Describe differing credit and credit card options along with the positive and negative aspects of both.
- c. State the costs associated with attending a community, two-year, or four-year college
- d. List possible sources of funds for financing a college education
- e. Describe the major types of insurance available to protect personal resources
- f. Explain the activities that constitute identity theft and describe actions that could prevent identity theft.

Academic Standard(s):

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SSEPF5 The student will describe how insurance and other risk-management strategies protect against financial loss.

SSEF4 The student will compare and contrast different economic systems, and explain how they answer the three basic economic questions of what to produce, how to produce and for whom to produce.

SSEPF2 The student will explain that banks and other financial institutions are businesses which channel funds from savers to investors.

SSEMA3 The student will explain how the government uses fiscal policy to promote price stability, full employment and economic growth.

PS-AFLEIII-5. Students will identify steps necessary for being accepted to and entering college.

- a. Describe the various methods of college entrance testing and possible test questions that will go with each test.
- b. Explain the college applications process including entrance essays, interviews, and campus visits.

Academic Standard(s):

ELA9LSV2 d, ELA10LSV2 d, ELA11LSV2 d, ELA12LSV2 d. Applies appropriate interviewing techniques (e.g., demonstrates knowledge of the subject and organization, compiles and reports responses, evaluates the effectiveness of the interview).

ELA9W3, ELA19W3, ELA11W3, ELA12W3. The student uses research and technology to support writing.

ELAALRL4 The student employs a variety of writing genres to demonstrate a comprehensive grasp of significant ideas in selected literary works. The student composes essays, narratives, poems, or technical documents.

ELA10W3, ELA11W3, ELA12W3. The student uses research and technology to support writing.

ELA10W2, ELA11W2, ELA12W2. The student demonstrates competence in a variety of genres.

PS-AFLEIII-6. Students will identify aspects of campus life that are different from high school. They will learn how to manage their time and make healthy life choices in their academic and personal lives.

- a. Identify aspects of campus life that are different from high school, including campus organizations, extracurricular activities, living arrangements, and campus resources.
- b. Compare and contrast college and high school academic policies.
- c. Explain the points that need to be considered to make healthy lifestyle choices in order to maintain your physical and mental health.
- d. List signs of burnout, depression, stress, and anxiety.

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- e. Examine the different areas of college study and the different careers associated with specific majors.
- f. List personal interests and desires and explain how they affect the decision-making process when selecting a major.
- g. Outline the importance of time management in both your academic and personal life.

Academic Standard(s):

SSEPF1 The student will apply rational decision to the making of personal spending and savings choices.

SSEF2 The student will give examples of how rational decision making entails comparing the marginal benefits and the marginal costs of an action.

ELA10LSV1, ELA11LSV1, ELA12LSV1. The student participates in student-to-teacher, student-to-student, and group verbal interactions.

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

PS-AFLEIII-7. Students will identify steps in the job search and interview process.

- a. List personal job skills and methods to help sell your skills to a potential employer.
- b. Explain how to organize and prepare for a job search.
- c. Prepare a personal résumé.
- d. Outline the interview process.
- e. Explain qualities employers use in evaluation including character, commitment, and competence.
- f. Complete a practice interview.

Academic Standard(s):

ELA9LSV2 d, ELA10LSV2 d, ELA11LSV2 d, ELA12LSV2 d. Applies appropriate interviewing techniques (e.g., demonstrates knowledge of the subject and organization, compiles and reports responses, evaluates the effectiveness of the interview).

PS-AFLEIII-8. Students will develop career skills including planning professional development, learning teamwork, and dealing with feedback.

- a. Explain how to plan for professional development.
- b. Compare and contrast personal and organizational values.
- c. Describe the dimensions of communication.
- d. Give examples of the dimensions of collaboration.
- e. Demonstrate how to seek and receive feedback.
- f. Outline effective and appropriate ways to seek promotions.

Academic Standard(s):

ELA9LSV2, ELA10LSV2, ELA11LSV2, ELA12LSV2. The student formulates reasoned judgments about written and oral communication in various media genres. The student delivers focused,

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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.

MA1P3, MA2P3, MA3P3, MM1P3, MM2P3, MM3P3, MM4P3. Students will communicate mathematically.

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 - Read technical texts related to various subject areas.
- b. Discussing books
 - Discuss messages and themes from books 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.

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- 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.
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