

PROGRAM CONCENTRATION: Architecture, Construction,
Communications & Transportation
CAREER PATHWAY: Flight Operations
COURSE TITLE: Aviation Meteorology

Atmospheric dynamics and concepts are addressed to build a meteorological foundation that will enable students to understand environmental variables that create and change the earth's weather. Meteorological techniques will be used in analyzing, charting, and forecasting weather patterns, and students will apply learned skills to the aeronautical needs and procedures of the air transportation industry.

DYNAMICS

ACT-AM-1. Students will identify the climate and seasonal changes of the earth's atmosphere.

- a. Identify the earth's tilt and its orbit around the sun and the seasonal relationship.
- b. Recognize the global atmospheric circulation and the effects of differential heating.
- c. Relate the global circulation of the atmosphere to that of ocean currents.
- d. Identify the structure of the earth's layers of the atmosphere, and become knowledgeable of the history of the study of meteorology.

ACADEMIC STANDARDS:

S4E4. Students will analyze weather charts/maps and collect weather data to predict weather events and infer patterns and seasonal changes.

ACT-AM-2. Students will understand the relationship between air pressure, temperature, and density.

- a. Identify vertical airflow and atmospheric stability.
- b. Recognize the effects of water in the atmosphere.
- c. Understand the relationship between cloud development and precipitation.

ACADEMIC STANDARDS:

S1E1. Students will observe, measure, and communicate weather data to see patterns in weather and climate.

ACT-AM-3. Students will operate and employ weather technology and terminology.

- a. Observe and record weather data using units of measurement (i.e., degrees, knots, miles per hour, etc.)
- b. Operate and employ weather tools (i.e. thermometer, barometer, and hygrometer, etc.)
- c. Understand weather symbols and weather coding.
- d. Communicate atmospheric conditions using appropriate terminology.

ACADEMIC STANDARDS:

S1E1. Students will observe, measure, and communicate weather data to see patterns in weather and climate.

ACT-AM-4. Students will demonstrate an understanding of mid latitude weather patterns and systems.

- a. Understand the horizontal and vertical circulation of low and high pressure systems.
- b. Identify air masses and monitor daily weather phenomena.
- c. Use weather tools and units of measurement.
- d. Employ meteorological terminology and coding procedures.
- e. Demonstrate an understanding of synoptic weather structure.

ACADEMIC STANDARDS:

MM2P(b). Solve problems that arise in mathematics and in other contexts (using appropriate technology).

ACT-AM-5. Students will apply techniques to analyze and forecast weather data.

- a. Analyze weather charts for surface and upper air data.
- b. Identify vorticity, divergence, and the jet stream.
- c. Employ methods of forecasting.
- d. Produce a forecast product.

ACADEMIC STANDARDS:

S4E4. Students will analyze weather charts/maps and collect weather data to predict weather events and infer patterns and seasonal changes.

S6CS5. Students will use the ideas of system, model, change, and scale in exploring scientific and technological matters.

AVIATION APPLICATIONS

ACT-AM-6. Students will demonstrate an understanding of aviation weather codes and terminology

- a. Understand the METAR coding for weather observations, terminal forecasts, and weather advisories (i.e., PIREPS, AIRMETS, SIGMETS, etc.)
- b. Interpret data from multiple weather data sources (commercial, government and military).
- c. Access available meteorological resources to obtain weather data.

ACADEMIC STANDARDS:

S4E4 Students will analyze weather charts/maps and collect weather data to predict weather events and infer patterns and seasonal changes.

S6CS5 Students will use the ideas of system, model, change, and scale in exploring scientific and technological matters.

ACT-AM-7. Students will apply atmospheric dynamics to aeronautical components.

- a. Detect VFR (Visual Flight Rules), MFR (Marginal Flight Rules) and IFR (Instrument Flight Rules) weather conditions.
- b. Interpret the relevance of pressure changes to indicated altimeter readings.
- c. Identify wind direction and speed as it applies to flight planning, crosswind components, and aircraft performance.
- d. Apply seasonal and geographical weather variations to flight characteristics and aircraft performance.

ACADEMIC STANDARDS:

MM2P(b). Solve problems that arise in mathematics and in other contexts (using appropriate technology).

S6CS5. Students will use the ideas of system, model, change, and scale in exploring scientific and technological matters.

ACT-AM-8. Students will identify aviation weather hazards.

- a. Identify convective weather activity threats such as wind shear, thunderstorms, and heavy rain.
- b. Recognize the danger of instability in atmospheric conditions such as freezing levels, turbulence, and significant precipitation.
- c. Understand the importance of VFR ceilings and minimum visibility requirements to avoid significant atmospheric threats.

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.