Aviation Weather - UAS

Level: 2
Career Cluster: Advanced Manufacturing
Program: Engineering
Pathway(s): Engineering Applications UAS

Course Catalog Description

Introduces students to aviation weather and how atmospheric conditions affect flight safety, planning, and performance for both crewed aircraft and small unmanned aircraft systems (sUAS). Students learn to interpret weather reports, forecasts, and hazards while applying meteorological concepts to real-world aviation and drone operations, including remote pilot decision-making.

Summary

This course introduces students to the science of aviation weather by exploring how Earth's atmosphere, heat transfer, moisture, pressure, wind, fronts, clouds, visibility, and hazardous weather affect flight conditions and operational safety. Students learn to interpret aviation weather reports, forecasts, charts, and decision-making tools while applying meteorological concepts to flight planning, aircraft performance, and go/no-go decisions for both traditional aviation and small unmanned aircraft systems (sUAS). The course also connects aviation weather to engineering and drone-related career pathways by emphasizing professionalism, FAA regulations, ethics, postsecondary opportunities, and the practical use of weather data in real-world UAS mission planning and remote pilot operations.

Notes

Compared with the older course, which primarily emphasized basic meteorological concepts and preparation for the weather portion of the FAA Private Pilot Knowledge examination, this revised Aviation Weather - UAS course is more intentionally structured around modern aviation applications, remote pilot decision-making, and career-connected learning. While the previous version focused on traditional topics such as Earth's atmosphere, heat and temperature, water vapor, pressure, winds, fronts, clouds, and weather reports, the updated document expands those foundations into a more comprehensive and student-centered sequence that explicitly connects weather science to both crewed aviation and small unmanned aircraft systems (sUAS) operations. New updates include stronger alignment to engineering and drone pathway expectations, an expanded emphasis on aviation weather products, flight readiness, and go/no-go decision-making, and the addition of dedicated sections for final project assessment, leadership, and work-based learning. The revised course also strengthens professionalism, ethics, postsecondary and career exploration, and real-world application through authentic scenarios, workplace readiness skills, and clearer performance-based student outcomes. Overall, the new version shifts the course from a more traditional aviation weather outline to a broader, more current CTE course that better reflects UAS industry practices, applied learning, and college- and career-readiness priorities.

Student Learning Outcomes

1. Career Exploration and Postsecondary Opportunities

Objective: *Students will analyze career pathways in engineering and drones by exploring industry roles, workplace expectations, required education, certifications, professional organizations, and postsecondary opportunities available in Colorado in order to make informed academic and career decisions.*

1) Identify employment opportunities in various fields with a focus in the area of engineering and drones
    a. Recognize the work typically performed, tools and technology used, and nature of work environments
    b. Identify potential certifications within the careers
    c. Find membership organizations associated with the careers
    d. Understand the necessary education associated within the careers
2) Define professionalism within the context of engineering and drones
    a. Criticism and evaluation
    b. Presentation
    c. Assessment
3) Recognize laws, regulations, and ethics significant to the fields of engineering and drones
4) Identify postsecondary opportunities offered in the state of Colorado
    a. Technical college, community college, 4-year institutions
    b. Certificates, associates, bachelor, and advanced degree opportunities

2. Earth's Atmosphere and the Science of Aviation Weather

Objective: *Students will explain the composition, structure, and behavior of Earth's atmosphere and relate atmospheric processes to aviation conditions and small unmanned aircraft systems (sUAS) operations.*

5) Identify the major layers and components of Earth's atmosphere.
6) Describe how the Sun, land, water, and atmosphere interact to produce weather.
7) Differentiate between weather and climate in aviation contexts.
8) Explain how atmospheric composition affects aircraft operations and flight conditions.
9) Summarize the role of pressure, density, moisture, circulation, and temperature in weather formation.
10) Interpret how atmospheric conditions influence aviation safety and performance.
11) Construct a labeled model of the atmosphere showing where common aviation weather phenomena occur.
12) Relate atmospheric science concepts to engineering design considerations in aviation systems.

3. Heat, Temperature, and Energy Transfer in Flight Environments

Objective: *Students will analyze how heat transfer and temperature variation influence weather patterns and performance in crewed aircraft and drone flight environments.*

13) Define radiation, conduction, and convection.

14) Explain how unequal heating of Earth contributes to circulation patterns and weather.
15) Compare warm and cold air masses and their effects on the atmosphere.
16) Analyze how temperature changes influence air density and flight performance.
17) Interpret the relationship between temperature and lift, engine performance, and navigation conditions.
18) Create a graphic or diagram that models energy transfer in the atmosphere.
19) Evaluate how temperature differences contribute to local and regional weather patterns.
20) Apply temperature data to aviation scenarios involving performance and planning.

4. Water Vapor, Moisture, and Precipitation

Objective: *Students will examine the role of water vapor in atmospheric processes and apply moisture concepts to aviation weather interpretation and safe drone mission planning.*

21) Define water vapor, humidity, dew point, dew, frost, and condensation.
22) Explain the relationship between dew point and weather conditions.
23) Calculate dew point using basic scenarios and data sets.
24) Differentiate among common forms of precipitation and atmospheric moisture.
25) Analyze how moisture content affects visibility, cloud formation, and weather development.
26) Interpret the significance of dew point spread for aviation operations.
27) Predict how moisture conditions may affect takeoff, landing, and navigation.
28) Justify aviation weather decisions using moisture-related data.

5. Atmospheric Pressure, Density, and Altimetry

Objective: *Students will interpret the relationship between atmospheric pressure, density, and altitude and apply these concepts to flight planning, aircraft performance, and drone operational limits.*

29) Define atmospheric pressure, density altitude, and altimetry.
30) Explain how pressure systems affect weather and flight conditions.
31) Analyze the relationship between altitude, pressure, and aircraft performance.
32) Interpret surface maps and pressure patterns for aviation use.
33) Calculate basic altitude or pressure-related scenarios used in aviation weather study.
34) Compare high- and low-pressure systems and their associated weather conditions.
35) Apply pressure and density information to flight planning decisions.
36) Evaluate why altimetry and pressure awareness are critical to safe aviation operations.

6. Aviation Weather Reports, Forecasts, and Decision Tools

Objective: *Students will interpret aviation weather products and use official reports and forecasts to support flight planning and weather-based decisions for pilots and remote pilots.*

37) Identify major sources of aviation weather information used by pilots.
38) Explain the purpose of aviation weather services and how weather data is updated and communicated.
39) Differentiate among METARs, PIREPs, TAFs, AIRMETs, SIGMETs, and related reports.
40) Interpret common aviation weather reports and forecast products.
41) Compare standard, abbreviated, and outlook weather briefings.

42) Evaluate the usefulness of different weather products for specific aviation scenarios.
43) Retrieve relevant weather information from a provided flight-planning scenario.
44) Defend a go/no-go decision using evidence from aviation weather reports and forecasts.

7. Global Winds, Jet Stream, and Atmospheric Circulation

Objective: *Students will analyze how global wind systems and upper-level circulation influence weather patterns, aviation navigation, and UAS mission routing.*

45) Describe the major global wind patterns and circulation systems.
46) Explain the Coriolis Effect and its role in atmospheric motion.
47) Identify the characteristics and influence of the jet stream.
48) Analyze how high and low pressure interact with wind patterns.
49) Interpret how winds aloft affect aircraft routing and travel conditions.
50) Predict the aviation impacts of changing wind systems and jet stream position.
51) Design a simple flight-planning response to a weather scenario involving wind and pressure changes.
52) Relate broad atmospheric circulation patterns to aviation efficiency and safety.

8. Local Winds and Regional Weather Patterns

Objective: *Students will investigate local wind systems and evaluate their effects on aviation navigation, small-scale weather, and low-altitude drone operations.*

53) Define local wind patterns such as sea breeze, land breeze, valley breeze, and mountain breeze.
54) Explain how terrain and surface heating influence local wind development.
55) Collect and analyze local weather data to identify patterns.
56) Interpret local weather maps and observations relevant to aviation.
57) Assess how regional wind conditions influence navigation, takeoff, landing, and aircraft handling.
58) Examine how local winds contribute to convection and other localized weather phenomena.
59) Graph weather observations and draw conclusions about regional trends.
60) Report how local wind conditions may affect aviation safety in a selected scenario.

9. Air Masses, Fronts, and Weather Systems

Objective: *Students will explain the formation and movement of air masses and fronts and analyze their effects on aviation weather, drone safety, and mission timing.*

61) Define air masses, fronts, and cyclonic systems.
62) Identify the major categories of air masses and their characteristics.
63) Describe the development of cold fronts, warm fronts, stationary fronts, and occluded fronts.
64) Analyze how fronts affect wind, temperature, pressure, precipitation, and storms.
65) Interpret frontal weather information in aviation weather reports and maps.
66) Predict weather changes associated with advancing air masses and frontal systems.
67) Evaluate the aviation risks associated with frontal passage and unstable weather.
68) Construct an explanation of how large-scale weather systems impact flight operations.

10. Cloud Formation, Stability, and Hazardous Weather

Objective: *Students will analyze cloud formation and atmospheric stability and evaluate weather hazards that affect aviation safety and small UAS operations.*

69) Describe the lifting processes that contribute to cloud formation.
70) Identify major cloud types and the hazards associated with each.
71) Differentiate stable and unstable atmospheric conditions.
72) Explain how stability influences turbulence, storms, and cloud development.
73) Analyze hazardous weather conditions such as icing, wind shear, thunderstorms, and turbulence.
74) Interpret current weather maps to identify potential hazards to flight.
75) Compare common aviation weather hazards and their operational impact.
76) Recommend safe or corrective actions in response to hazardous weather conditions.

11. Visibility, Flight Conditions, and Aviation Weather Decisions

Objective: *Students will apply aviation weather concepts to visibility, ceiling, and real-world flight decision-making for pilots and remote drone operators.*

77) Define visibility, ceiling, and basic visual flight weather minimums.
78) Explain how visual observations are used to assess flight conditions.
79) Interpret atmospheric phenomena such as haze, smoke, halos, and cloud cover in relation to flight.
80) Analyze multiple weather products to determine flight readiness.
81) Synthesize weather data from reports, charts, and briefings into a flight recommendation.
82) Evaluate a scenario and make an evidence-based go/no-go decision.
83) Justify operational decisions using weather reports, forecast products, and observed conditions.
84) Develop a structured weather briefing or decision summary for a aviation mission.

12. Final Project Assessment

Objective: *Students will synthesize aviation weather knowledge and operational decision-making skills in a culminating project that demonstrates technical understanding, communication, safety awareness, and professional presentation.*

85) Develop a final project that applies aviation weather concepts to a realistic aviation or sUAS operational scenario.
86) Collect, interpret, and integrate relevant weather data, reports, charts, and forecasts into the project solution.
87) Justify operational recommendations, flight decisions, or mission plans using evidence-based reasoning and safety criteria.
88) Produce a polished project deliverable that communicates findings clearly through writing, visuals, data displays, or oral presentation.
89) Evaluate project outcomes, reflect on strengths and areas for improvement, and revise work based on feedback when appropriate.

13. Leadership

Objective: *Students will demonstrate leadership skills that support collaboration, ethical decision-making, responsibility, and effective communication in aviation, engineering, and drone-related learning environments.*

90) Demonstrate responsibility, accountability, and initiative when completing individual and group tasks.
91) Practice effective communication skills when sharing ideas, giving feedback, and contributing to team goals.
92) Apply ethical and professional behaviors in classroom, laboratory, and workplace settings.
93) Use problem-solving and conflict-resolution strategies to support productive collaboration and safe decision-making.
94) Participate in leadership development opportunities such as CTSO activities, presentations, service, or project management roles.

14. Work-Based Learning

Objective: *Students will connect classroom learning to workplace expectations by exploring authentic applications of aviation weather knowledge, professional practices, and career readiness skills in aviation and sUAS industries.*

95) Identify how aviation weather knowledge is used in industry roles such as pilot, dispatcher, meteorologist, air traffic support, and remote pilot operations.
96) Demonstrate employability skills such as punctuality, communication, teamwork, adaptability, and attention to safety.
97) Analyze workplace scenarios or case studies involving weather-related operational decisions and industry standards.
98) Engage with industry-informed experiences such as guest speakers, job shadows, simulations, internships, or project-based partnerships when available.
99) Reflect on workplace expectations and personal career readiness to set goals for future education, training, and employment.

15. Career and Technical Student Organizations

Objective: *Using the CTSO Resource Document, chapter activities will provide some of the best opportunities CTSO members will have to learn by doing. A successful program of work creates a positive learning atmosphere in the classroom. CTSO members learn how to accept responsibility, work as a team, manage a budget, and handle success and failure. Per the CTE Admin Handbook, CTSOs are embedded into curriculum.*

Professional Development

Prepare each member for entry into the workforce and provide a foundation for success in a career. Becoming a professional does not stop with acquiring a skill, but involves an increased awareness of the meaning of good citizenship and the importance of labor and management in the world of work.

Community Service

Promote and improve goodwill and understanding among all segments of the community through services donated by CTSO chapters, and to instill in its members a lifetime commitment to community service.

Business and Industry Connections

Increase awareness of quality job practices and attitudes, and increase the opportunities for employer engagement and eventual employment.

Financial Leadership

Plan and participate in activities to allow all members to carry out the chapter's projects. Educate members on their own personal finance for current and future success.

Public Relations

Make the general public aware of the good work that students in career and technical education are doing to better themselves and their community, state, nation, and world.

Social Activities

To increase cooperation in the school and community through activities that allow CTSO members to get to know each other in something other than a business or classroom setting.

Academic Standards Alignment

Colorado CTE courses are required to integrate academic and essential skills into course content. The following academic standards have been identified as aligned to this course and should be integrated throughout instruction.

CO CTE Academic Standards Resources (Rubrics, integration strategies, etc)
CDE Colorado Academic Standards Online (Online standards lookup tool)

Note: Mathematics and Science standards will be added in the future. Visit the Colorado Academic Standards page for the most current version.

Reading, Writing and Communicating Crosswalk

Course: Aviation Weather
Colorado Academic Standards – Reading, Writing, and Communicating

Standard	Prepared Graduate Competency	Description	Course Evidence / Alignment
Standard 1: Oral Expression and Listening	Prepared Graduate 1 – Collaboration	Collaborate effectively as group members or leaders who listen actively and respectfully; pose thoughtful questions, acknowledge the ideas of others; and contribute ideas to further the group's attainment of an objective.	Students collaborate when evaluating weather scenarios and flight decisions for crewed aircraft and drones; discuss risks, safety implications, and appropriate responses based on weather data; contribute ideas during shared analysis of aviation and UAS weather situations.
Standard 1: Oral Expression and Listening	Prepared Graduate 2 – Oral Presentations	Deliver effective oral presentations for varied audiences and varied purposes.	Students verbally explain weather conditions and impacts on flight operations; communicate forecasts, hazards, and go/no-go decisions; present interpretations of meteorological data

			for aircraft and remote pilot drone missions to peers and instructors.
Standard 2: Reading for All Purposes	Prepared Graduate 4 – Informational Texts	Read a wide range of informational texts to build knowledge and to better understand the human experience.	Students read and interpret National Weather Service reports and forecasts; aviation weather charts, symbols, and coded reports; and FAA-aligned materials used in both aviation and small UAS weather planning.
Standard 2: Reading for All Purposes	Prepared Graduate 5 – Language in Context	Understand how language functions in different contexts, command a variety of word-learning strategies to assist comprehension, and make effective choices for meaning or style when writing and speaking.	The course requires precise use of meteorological, aviation, and remote pilot terminology; abbreviations and coded language used in aviation weather products; and context-dependent communication where clarity directly impacts safety.
Standard 3: Writing and Composition	Prepared Graduate 6 – Craft arguments	Craft arguments using techniques specific to the genre.	Students justify flight and mission decisions based on weather evidence; defend go/no-go, route, and launch timing decisions using meteorological data; and support conclusions with analyzed weather information and safety criteria.

Standard 3: Writing and Composition	Prepared Graduate 7 – Informational Writing	Craft informational/explanatory texts using techniques specific to the genre.	Students produce written explanations of weather phenomena and flight impact; document interpretations of forecasts and weather hazards; and create explanatory responses for aviation and drone operations demonstrating meteorological understanding.
Standard 3: Writing and Composition	Prepared Graduate 9 – Writing Process	Demonstrate mastery of their own writing process with clear, coherent, and error-free polished products.	Students draft, revise, and refine written weather analyses; produce clear, coherent, accurate technical explanations; and apply correct aviation, meteorological, and remote pilot conventions in final products.
Standard 4: Research Inquiry and Design	Prepared Graduate 10 – Research and Ethics	Gather information from a variety of sources; analyze and evaluate its quality and relevance; and use it ethically to answer complex questions.	Students gather weather data from multiple aviation and UAS sources; analyze and compare forecasts to assess flight conditions; and use information ethically to support safe and informed pilot and remote pilot decision-making.

Free Resource Links

1. Career Exploration and Postsecondary Opportunities

- Bureau of Labor Statistics Aviation Careers (aviation careers meteorology jobs education pathways)
  https://www.bls.gov/ooh
- FAA Aviation Careers (pilot meteorology aviation certifications career pathways)
  https://www.faa.gov/jobs
- NASA STEM Careers (STEM aviation engineering workforce skills)
  https://www.nasa.gov/stem
- CareerOneStop Aviation Careers (career exploration aviation training certifications)
  https://www.careeronestop.org

2. Earth's Atmosphere and the Science of Aviation Weather

- NASA Atmosphere Overview (atmospheric layers composition structure earth systems)
  https://climate.nasa.gov
- NOAA Earth System Research (atmospheric science weather systems climate processes)
  https://www.esrl.noaa.gov
- National Geographic Atmosphere Resource (atmosphere layers gases earth systems weather)
  https://www.nationalgeographic.org
- UCAR Atmospheric Basics (atmosphere structure weather science education)
  https://scied.ucar.edu

3. Heat, Temperature, and Energy Transfer in Flight Environments

- NOAA Heat Transfer Basics (radiation conduction convection atmospheric energy transfer)
  https://www.weather.gov
- Khan Academy Heat and Temperature (thermal energy transfer temperature relationships)
  https://www.khanacademy.org
- NASA Energy Budget (energy transfer earth systems weather impact)
  https://earthobservatory.nasa.gov
- CK12 Thermal Energy (heat transfer conduction convection radiation concepts)
  https://www.ck12.org

4. Water Vapor, Moisture, and Precipitation

- National Weather Service Moisture Basics (humidity dew point precipitation weather)
  https://www.weather.gov
- NASA Water Cycle Overview (water vapor precipitation atmospheric processes)
  https://gpm.nasa.gov
- UCAR Water Vapor Resource (humidity dew point moisture atmospheric science)
  https://scied.ucar.edu
- Khan Academy Humidity and Dew Point (moisture calculations weather conditions)
  https://www.khanacademy.org

5. Atmospheric Pressure, Density, and Altimetry

- NOAA Atmospheric Pressure (pressure systems altitude weather patterns) https://www.weather.gov
- FAA Pilot Handbook Weather Section (altimetry pressure aviation performance) https://www.faa.gov
- Khan Academy Air Pressure (pressure altitude density relationships) https://www.khanacademy.org
- NASA Air Density Explanation (density altitude aircraft performance effects) https://www.grc.nasa.gov

6. Aviation Weather Reports, Forecasts, and Decision Tools

- Aviation Weather Center Tools (METAR TAF forecasts aviation weather data) https://aviationweather.gov
- FAA Weather Briefings Guide (weather reports flight planning briefings) https://www.faa.gov
- NOAA Weather Data Services (weather observations forecasts reports) https://www.noaa.gov
- SkyVector Flight Planning (weather charts aviation navigation planning) https://skyvector.com

7. Global Winds, Jet Stream, and Atmospheric Circulation

- NOAA Jet Stream Basics (jet stream wind patterns atmospheric circulation) https://www.weather.gov
- NASA Global Winds (wind circulation coriolis effect atmosphere) https://earthobservatory.nasa.gov
- Khan Academy Wind Patterns (global winds coriolis effect atmospheric movement) https://www.khanacademy.org
- UCAR Wind Systems (air circulation pressure patterns wind movement) https://scied.ucar.edu

8. Local Winds and Regional Weather Patterns

- NOAA Local Winds (sea breeze land breeze mountain winds) https://www.weather.gov
- National Geographic Wind Patterns (local winds environmental effects weather) https://www.nationalgeographic.org
- UCAR Local Weather Systems (local winds convection regional weather) https://scied.ucar.edu
- Weather Underground Local Weather Data (local weather data analysis patterns) https://www.wunderground.com

9. Air Masses, Fronts, and Weather Systems

- NOAA Air Masses and Fronts (cold fronts warm fronts weather systems) https://www.weather.gov
- National Weather Service Fronts Guide (air masses fronts weather changes) https://www.weather.gov

- Khan Academy Air Masses (fronts pressure systems storm development) https://www.khanacademy.org
- NASA Weather Systems Overview (cyclones fronts atmospheric movement) https://earthobservatory.nasa.gov

10. Cloud Formation, Stability, and Hazardous Weather

- NOAA Cloud Types and Formation (clouds stability convection weather hazards) https://www.weather.gov
- UCAR Cloud Identification (cloud types storm development aviation hazards) https://scied.ucar.edu
- NASA Cloud Formation (cloud physics weather patterns atmospheric processes) https://earthobservatory.nasa.gov
- FAA Weather Hazards Guide (icing turbulence thunderstorms aviation safety) https://www.faa.gov

11. Visibility, Flight Conditions, and Aviation Weather Decisions

- FAA Weather Decision Making (visibility ceiling flight safety decisions) https://www.faa.gov
- Aviation Weather Center Visibility Tools (visibility ceiling weather analysis flight planning) https://aviationweather.gov
- NOAA Visibility and Fog (fog haze visibility weather impacts) https://www.weather.gov
- Skybrary Aviation Safety (visibility decision making flight safety weather) https://www.skybrary.aero

12. Final Project Assessment

- FAA Aviation & Space Education (aviation education student projects aerospace career pathways) https://www.faa.gov/education
- NASA Smart Skies (aviation weather air traffic decision-making simulations student projects) https://www.nasa.gov/directorates/armd/smart-skies/
- National Weather Service Data Resources for the Classroom (weather data classroom projects forecasting analysis) https://www.weather.gov/education/data-resources
- AOPA Foundation High School Aviation STEM Curriculum (aviation capstone projects UAS curriculum assessments) https://youcanfly.aopa.org/high-school/high-school-curriculum

13. Leadership

- SkillsUSA Student Resources (leadership communication teamwork workplace readiness) https://www.skillsusa.org/students/

- NCC-CTSO Overview (CTSO leadership real-world skills career readiness) https://www.ctsos.org/
- U.S. Department of Labor Soft Skills: The Competitive Edge (professionalism communication teamwork problem solving) https://www.dol.gov/agencies/odep/publications/fact-sheets/soft-skills-the-competitive-edge

14. Work-Based Learning

- CareerOneStop Skills Assessment (employability skills workplace readiness self-assessment) https://www.careeronestop.org/ExploreCareers/Assessments/skills.aspx
- Junior Achievement JA Career Success (workplace readiness communication teamwork problem solving) https://jausa.ja.org/programs/ja-career-success
- FAA Aviation Workforce and Education Programs (aviation careers workforce development student pathways) https://www.faa.gov/education/programs
- FAA Aviation Workforce Development Grants (aviation workforce internships apprenticeships UAS pathways) https://www.faa.gov/about/office_org/headquarters_offices/ang/grants/awd

Technology Student Association – National Competitive Events

Geospatial Technology

Objective: *Students will collect, analyze, map, synthesize, and defend geospatial data in response to the annual TSA Geospatial Technology challenge.*

- Research the annual TSA Geospatial Technology challenge and identify the geographic issue or prediction being investigated.
- Collect geospatial data such as imagery, boundaries, transportation data, earth observations, historical maps, or basemaps.
- Use an online mapping platform to represent and analyze geospatial data.
- Prepare a digital documentation portfolio explaining the challenge, collected data, analysis maps, prediction, resources, and work log.
- Create a visual infographic map that communicates the predicted outcome and clearly supports it with data.
- Present and defend the team's prediction during the semifinal presentation/interview.
- Evaluate the final entry using TSA criteria for data use, prediction quality, visual communication, analysis, creativity, and presentation.

Resources

- Technology Student Association – Geospatial Technology competition guidelines https://tsaweb.org/competitions-programs/tsa/themes-problems
- ArcGIS Online – Mapping and geospatial analysis tools https://www.arcgis.com/
- NASA Earthdata – Earth observation and geospatial data https://www.earthdata.nasa.gov/
- NOAA Aviation Weather Center – Aviation weather data and forecasts https://aviationweather.gov/

Technology Student Association – National Competitive Events

Data Science and Analytics

Objective: *Students will collect, analyze, visualize, document, and present a data set connected to the annual TSA Data Science and Analytics theme.*

- Research the annual TSA Data Science and Analytics theme and identify a focused topic for investigation.
- Collect or compile a data set of at least 500 rows from credible and relevant sources.
- Analyze data to identify trends, patterns, relationships, limitations, and possible predictions.
- Create a digital scientific poster that communicates the research question, data source, visualizations, analysis, and findings.
- Prepare a documentation portfolio explaining methods, data collection, analysis, conclusions, and resources.
- Present the digital scientific poster within the TSA time limit using clear, evidence-based communication.
- Complete an on-site semifinal challenge by creating a visual representation and brief synopsis from a provided data set.

Resources

- Technology Student Association – Data Science and Analytics competition guidelines https://tsaweb.org/competitions-programs/tsa/themes-problems
- NOAA Climate Data Online https://www.ncei.noaa.gov/cdo-web/
- NOAA Aviation Weather Center https://aviationweather.gov/
- Tableau Public – Data visualization tools https://public.tableau.com/

Technology Student Association – National Competitive Events

STEM Mass Media

Objective: *Students will research, write, produce, and revise STEM-focused news content that informs a public audience in alignment with TSA STEM Mass Media competition requirements.*

- Research the annual STEM Mass Media theme and identify the key information needed for an informative news story.
- Write clear, accurate, audience-centered news copy that summarizes technical information for a general audience.
- Produce a digital news broadcast that presents the annual topic in an original and professional manner.
- Organize information using journalistic structure, concise wording, appropriate tone, and effective transitions.
- Develop interview questions and gather relevant information from a briefing or press-conference format.
- Write a digital news article that synthesizes background information, interview details, and evidence.
- Evaluate the final media product using TSA criteria for accuracy, organization, creativity, communication, and technical quality.

Resources

- Technology Student Association – STEM Mass Media competition guidelines https://tsaweb.org/competitions-programs/tsa/themes-problems
- NOAA Aviation Weather Center https://aviationweather.gov/
- National Weather Service – Aviation Weather Services https://www.weather.gov/aviation/
- Canva – News graphics and presentation design tools https://www.canva.com/