Aviation

Career Cluster	STEM
Course Code	20053
Prerequisite(s)	None
Credit	.5
Program of Study and Sequence	Foundation Courses, Cluster Courses, Pathway Courses, Capstone Experiences
Student Organization	Skills USA
Coordinating Work-Based Learning	local airports
Industry Certifications	None
Dual Credit or Dual Enrollment	TBD
Teacher Certification	STEM Cluster Endorsement; Aviation Pathway Endorsement; 7-12 Technology Education Endorsement
Resources	https://www.faa.gov/education/ https://www.faa.gov/education/educator_resources/curriculum/high_school/ https://www.osha.gov/SLTC/airline_industry/

Course Description: This course provides students with an understanding of the science of flight and the history, regulations, and possible career paths within the aviation industry. It also covers the relationships of weight and balance, principles of navigation and flight control, ground and airport operations and services, and Federal Aviation Agency regulations.

Program of Study Application

Aviation is a pathway course in the aviation pathway. Students in this pathway would generally complete foundation courses and one of the STEM cluster courses prior to participating in aviation.

Career Cluster: STEM

Course: Aviation

Course Standards

Indicator # AV 1: Identify events in the history of flight.

Webb Level	*Sub-indicator*	*Integrated Content*
Two Skill/ Concept	AV 1.1 Identify flight in the ancient world *Examples:* • Identify the history of flight in Greek Myths. • Identify the importance of Kites and Balloons in China during the third century.	
Two Skill/ Concept	AV 1.2 Identify the development of flight in the early 1900s. *Examples:* • Distinguish the difference between lighter-than-air and heavier than-air vehicles. • Identify the importance of blimps. • Identify the importance of the Wright brothers.	
Two Skill/ Concept	AV 1.3 Identify the development of flight during the Golden Age of Flight (1918 to 1939) *Examples:* • Identify the importance of Charles Lindbergh. • Identify the importance of the Airmail Act (Kelly Act of 1925).	
Two Skill/ Concept	AV 1.4 Identify the development of flight innovation during World War II (1939 to 1945) *Examples:* • Identify the importance of the V-2 rocket. • Identify the importance of early jets.	

Two Skill/ Concept	AV 1.5 Identify the development of flight innovation during the Cold War (1945 to 1991) *Examples:* • Identify the importance of commercial aviation. • Identify the importance of space flight.	
Two Skill/ Concept	AV 1.6 Identify the development of flight innovation (1991 to present) *Examples:* • Identify the importance of military aviation. • Identify the importance of the space shuttle program.	
Three Strategic Thinking	AV 1.7 Analyze current trends in flight. *Examples:* • Investigate the importance of unmanned flight. • Evaluate challenges that arise with emerging flight technologies.	Code of Conduct for unmanned flight: http://www.auvsi.org/conduct

Notes:

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Indicator # AV 2 Investigate the principles of flight.

Webb Level	*Sub-indicator*	*Integrated Content*
Three Strategic Thinking	AV 2.1 Investigate the basic parts and control surfaces on aircraft. *Examples:* • Examine the utilization of the airfoil. • Examine the utilization of the wings. • Examine the utilization of the tail. • Examine the utilization of the propeller.	
Three Strategic Thinking	AV 2.2 Investigate the four forces of flight. *Examples:* • Explore the concept of lift versus weight. • Explore the concept of thrust versus drag.	Physical Science
Four Extended Thinking	AV 2.3 Investigate basic aerodynamics. *Examples:* • Apply Newton's Three Laws of Motion to flight. • Understand the impact of the Bernoulli Effect on airfoil. • Understand the impact of the Venturi Effect on propulsion. • Compare Static versus Dynamic Pressure.	Physical Science & Physics
Three Strategic Thinking	AV 2.4 Investigate airplane stability. *Examples:* • Explore the concept of pitch. • Explore the concept of roll. • Explore the concept of yaw.	Physics

Notes:

Indicator # AV 3 Understand the flight environment.

Webb Level	*Sub-indicator*	*Integrated Content*
Two Skill/ Concept	AV 3.1 Comprehend air safety. *Examples:* • List air safety concerns. • Demonstrate an understanding of the Federal Aeronautics Administration (FAA) regulations.	
Two Skill/ Concept	AV 3.2 Comprehend the airport layout, inclusive of safety elements. *Examples:* • List types of airports. • Identify causes of runway accidents. • Design a safe and effective airport layout.	
Three Strategic Thinking	AV 3.3 Comprehend airspace control. *Examples:* • Complete a flight plan. • Comprehend air-traffic control procedures.	
Two Skill/ Concept	AV 3.4 Comprehend radio communications. *Examples:* • Demonstrate procedures of radio communications during conduct of a flight. • Demonstrate cockpit management of radio systems.	Soft skills: communication

Notes:

Indicator # AV 4 Understand aircraft systems and performance

Webb Level	*Sub-indicator*	*Integrated Content*
Two Skill/ Concept	AV 4.1 Know the basic aircraft instruments. *Examples:* • Identify the six basic aircraft instruments (airspeed indicator, attitude indicator, altimeter, turn coordinator, heading indicator, and vertical speed indicator). • Interpret the reading of each instrument to confirm an accurate 'instrument scan'.	
Two Skill/ Concept	AV 4.2 Know aircraft systems. *Examples:* • List the basic flight control systems (mechanical, hydromechanical and fly-by-wire). • Describe the latest innovations in fly-by-wire flight control systems.	
Three Strategic Thinking	AV 4.3 Predict aircraft performance. *Examples:* • Solve percentage problems (percent of power for turbine engines, flap position percent indicators) • Solve ratio and proportion problems (compression ratios of an aircraft, glide ratios)	Algebra 1
Three Strategic Thinking	AV 4.4 Calculate weight and balance. *Examples:* • Compute empty weight center of gravity on an aircraft. • Compute loaded weight and loaded weight center of gravity of an aircraft.	Physical Science, Algebra 1

Notes:

Indicator # AV 5 Understand the relationships between weather and flight

Webb Level	*Sub-indicator*	*Integrated Content*
Two Skill/ Concept	AV 5.1 Explain basic weather theory. *Examples:* • Explain the composition of the Earth's atmosphere. • Explain how temperature variation influences flight performance.	Physical Geography, Earth Science
Two Skill/ Concept	AV 5.2 Describe weather patterns and clouds. *Examples:* • Analyze pressure systems at different attitudes on a surface map. • Identify the types of clouds (stratus, cumulonimbus, and cirrus) at different elevations and the potential hazards that may exist.	Physical Geography, Earth Science
Two Skill/ Concept	AV 5.3 Explain weather hazards. *Examples:* • Compare and contrast the common weather hazards when flying • Identify safe and corrective actions for common weather hazards as suggested by the Federal Aeronautics Administration (FAA)	
Three Strategic Thinking	AV 5.4 Interpret weather data. *Examples:* • Interpret current weather conditions using a weather map. • Collect and analyze local weather data.	Physical Geography, Earth Science
Two Skill/ Concept	AV 5.5 Identify sources of weather information. *Examples:* • Understand Significant Meteorological Information Service (SIGMET) • Define the role of the Aviation Data Service (ADDS)	

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Indicator # AV 6 Understand navigation in aviation

Webb Level	*Sub-indicator*	*Integrated Content*
One Recall	AV 6.1. Understand basic navigation. *Examples:* • List and describe the essential navigational information a pilot needs to know (starting point, ending point, direction, distance, speed, fuel capacity, and weight and balance) • List the advantages and disadvantages of Visual Flight Rules (VFR) flying.	
One Recall	AV 6.2 Understand dead-reckoning and pilotage. *Examples:* • Define dead-reckoning and pilotage. • Calculate a flight course using the elements of course line, airspeed, course heading and elapsed time.	Geometry, Physics
Two Skill/ Concept	AV 6.3 Utilize a flight computer. *Examples:* • Understand the basic concepts of a flight computer. • Use a flight computer to file a flight plan.	
Three Strategic Thinking	AV 6.4 Utilize aeronautical charts. *Examples:* • Plot a course using an aeronautical chart. • Evaluate flight plans for improved efficiency.	Geometry

Two Skill/ Concept	AV 6.5 Comprehend radio navigation. *Examples:* • Distinguish between the types of Radio Navigation: Very High Frequency Omnidirectional Range (VOR), Distance Measuring Equipment (DME), Instrument Landing System (ILS), Global Positioning System (GPS), Inertial Navigations Systems (INS)	

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Indicator # AV 7 Understand aviation physiology

Webb Level	*Sub-indicator*	*Integrated Content*
One Recall	AV 7.1 Know the effect on the body in the flight environment. *Examples:* • Identify the potential hazards on the body during flight. • List and describe the safety procedures to prevent aviation accidents due to physical distress.	Biology

Notes:

Indicator # AV 8 Understand aerospace science and technology

Webb Level	*Sub-indicator*	*Integrated Content*
Two Skill/ Concept	AV 8.1 Understand key concepts affecting exploration of space. *Examples:* • Identify the effect of zero gravity on flight. • Identify the effect of lack of atmosphere on flight. • Identify the effect of friction on flight.	Physical Science, Physics
Two Skill/ Concept	AV 8.2 Understand basic rocket theory and space flight. *Examples:* • Understand the history of rocketry. • Identify the major developments in space flight.	Physical Science, Physics
One Recall	AV 8.3 Analyze existing space platforms. *Examples:* • Analyze the stages of development and importance of the International Space Station. • Summarize the development and impact of the Hubble Space Telescope. • List the scientific purposes of unmanned space explorations. • Compare and contrast the privatization of the space program and the space shuttle program.	

Notes:

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Indicator # AV 9 Explore the multiple careers in aviation.

Webb Level	*Sub-indicator*	*Integrated Content*
Two Skill/ Concept	AV 9.1 Investigate aviation career fields and occupations. *Examples:* • Interview a professional working in an occupation that is of interest to them. • Research aerospace career opportunities of interest by participating in career exploration activities. • Explore the requirements, skills, wages, education, and geographic opportunities in one career associated with aerospace. • Present the results of your career exploration and resources. • Identify employability skills preferred by different aviation occupations.	Code of Ethics: http://www.alpa.org/about-alpa/what-we-do/code-of-ethics Soft Skills: Communication, Group Work, time-management, personal and professional responsibility

Notes: