The Federal Aviation Administration

Session Time: Two, 50-minute sessions

DESIRED RESULTS

ESSENTIAL UNDERSTANDINGS

Develop interest in one or more aviation/aerospace career pathways and learn what is required to pursue future employment in the industry. (EU3)

Understand the importance of professionalism, ethics, and dedication as they relate to all aviation/aerospace operations. (EU4)

Develop an uncompromising safety mindset, understanding that growth and development in the aviation/aerospace industry must always be accompanied by responsive safety initiatives. (EU6)

ESSENTIAL QUESTIONS

1. How involved should the government be in aviation?
2. What would it be like to work for the FAA?

LEARNING GOALS

Students Will Know

- The various responsibilities of the FAA in maintaining civil aviation safety
- How the FAA contributes to the capacity, safety and efficiency of the national airspace system
- Various career opportunities available at the FAA, each related to one or more of the FAA's functions and responsibilities

Students Will Be Able To

- *Explain* the FAA's responsibilities and functions against its mandate to keep aviation safe and make it more efficient. (DOK-L2)
- *Identify and summarize* career opportunities available with the FAA. (DOK-L2)

ASSESSMENT EVIDENCE

Warm-up
After watching a video, students will write several sentences about how the regulation of certain activities can help achieve safety and efficiency.

Formative Assessment

In groups, students will research a specific responsibility of the FAA and create posters which illustrate and explain the specific role assigned.

Summative Assessment
Students will explain how certain FAA responsibilities make aviation safer and more efficient. Students also will identify FAA careers associated with each responsibility.

LESSON PREPARATION

MATERIALS/RESOURCES

- The Federal Aviation Administration Presentation
- The Federal Aviation Administration Student Activity
- The Federal Aviation Administration Teacher Notes

FAA Poster Session

- Rolled paper or poster board
- Markers

LESSON SUMMARY

Lesson 1: Fundamentals of Aviation Safety

Lesson 2: The Federal Aviation Administration

This two-session lesson will begin by having students watch a video of street traffic before laws and lights were put in place. This warm-up will help students understand how the regulation of certain activities can help achieve safety and efficiency. This will be followed by an overview of the FAA's mission and responsibilities.

As a formative assessment, students will map out and explain different FAA roles in order to create an overall image of the agency and all its responsibilities. Each student team will be given an area of responsibility and will research the area and create a poster to illustrate and explain the specific role assigned. Taken together, the posters will help illustrate the entire role of the FAA.

After reviewing the diverse career options available within the FAA, students will complete a summative assessment where they will explain how certain FAA responsibilities make aviation safer and more efficient. Students also will identify FAA careers associated with each responsibility.

BACKGROUND

The FAA's mission is to provide the safest, most efficient aerospace system in the world. It should be underscored that the FAA's primary mission is safety. However, it is also responsible for ensuring that the U.S. civil aviation system runs as efficiently as possible.

Often, something that increases safety also increases efficiency. Consider the early automobile traffic system. In the early days there were essentially no rules. The situation became dangerous, but it was also very inefficient. When a traffic regulation system was put in place, it was not only safer, but it also became more efficient. This concept also applies to air traffic management and many of the other responsibilities assigned to the FAA.

The FAA certifies pilots and aircraft, develops and manages air traffic and navigation facilities, constructs and manages airports and airspace, regulates U.S. commercial space transportation, researches and develops programs to control the environmental impact of civil aviation, and more.

These varied responsibilities generate a variety of career opportunities within the FAA. From engineers of all types, to safety inspectors who enforce federal aviation regulations, to air traffic controllers, the FAA relies on a diverse group of employees to manage the largest and safest civil aviation system in the world.

DIFFERENTIATION

To support student motivation in the **EXPLORE** section of the lesson plan, allow students the option to create a presentation or other visual representation to present the same information.

LEARNING PLAN

ENGAGE

Teacher Material: The Federal Aviation Administration Presentation

Slides 1-3: Introduce the topic and learning objectives for the lesson.

Slide 4: Conduct the **Warm-Up**.

Show students a video shot from the streets of San Francisco before traffic lights and laws were put in place. Start the video and allow it to play while students write about how traffic regulations increased both safety and efficiency. Students will also apply this concept to safety and efficiency in aviation. Ask students to share their answers with the class.

- "San Francisco - No Traffic Lights" (Length 7:09)
  http://video.link/w/EXfe

[DOK 3; formulate, hypothesize]

Warm-Up

After watching a video shot from the streets of San Francisco before traffic lights and laws were put in place, students will write several sentences about how regulation of certain activities can help achieve safety and efficiency.

Questions

Ensure students understand that often, something that increases safety also increases efficiency. Before traffic lights and laws were instituted, driving was not only dangerous, but it was also very inefficient. Establishing rules for street traffic increased efficiency and safety. This concept also applies to air traffic management and many of the FAA's other responsibilities. Students will learn in this lesson how the FAA ensures safety and efficiency in aviation.

EXPLORE

Teacher Material: The Federal Aviation Administration Presentation

Slide 5: The FAA, or Federal Aviation Administration, is a federal agency within the U.S. Department of Transportation. It is led by an Administrator and is responsible for oversight of civil aviation in the United States.

Slide 6: As students learned in the first unit of semester one, aviation is divided into three distinct segments: commercial, military, and general aviation.

There are actually two other categories that are used to differentiate aviation: civil and military.

Civil aviation encompasses all commercial and general aviation flying. In the United States, the FAA is responsible for the safety and oversight of civil aviation.

Slide 7: The mission of the FAA is to provide the "safest and most efficient aerospace system in the world." While the FAA's primary mission is safety, it is also responsible for ensuring that the U.S. civil aviation system runs as efficiently as possible.

The FAA's responsibilities are very broad. In addition to managing the entire air traffic control system, the FAA certifies pilots and aircraft, constructs and manages airports, regulates U.S. commercial space transportation, researches and develops programs to control the environmental impact of civil aviation, and much, much more. Students will explore these roles throughout the course of this lesson.

EXPLAIN

Teacher Material: The Federal Aviation Administration Presentation

Slide 8: First, students will explore the FAA's role in the certification of aircraft and airmen.

The FAA builds and enforces standards to which aircraft must be built, tested and maintained. It also certifies pilots, mechanics, flight attendants and more.

Slide 9: Note that the FAA refers to all pilots as "airmen" and to the process of licensing pilots as "airmen certification."

The type of flying a pilot will do influences what type of pilot's certificate is required. The FAA is responsible for creating and enforcing the requirements for each type of pilot certificate. The Federal Aviation Regulations contain the aeronautical experience, certification requirements, responsibilities, privileges, and limitations for each grade of certificate: student pilot, sport pilot, recreational pilot, private pilot, commercial pilot, airline transport pilot (ATP), instrument rating, flight instructor, and ground instructor.

The FAA certifies more than just pilots. It also issues certificates for many different types of mechanics, flight attendants, air traffic controllers, dispatchers, drone pilots (also called remote pilots), and even parachute riggers.

Slide 10: Most aircraft flown in the United States must be certified by the FAA. The FAA divides aircraft into categories and classes so that it knows which set of certification rules to apply. Aircraft with very different characteristics, such as airplanes and helicopters, must be evaluated using rules and standards appropriate to the category and class of aircraft to which they belong.

Once certified, regular maintenance and inspections are required for the aircraft to continue to fly legally.. An aircraft is required to undergo an annual inspection. If the aircraft is flown for hire (to make money), the FAA requires more frequent inspections.

The FAA also issues Airworthiness Directives (ADs) when an unsafe condition exists in a product (aircraft, engine, propeller, etc.). ADs are similar to product recalls. They notify an aircraft owner or operator of an unsafe condition and require action to resolve the problem.

Slide 11: The FAA operates the busiest and safest air traffic control system in the world. The FAA safely handles more than 43,000 flights each day, carrying more than 2.5 million passengers.

Slide 12: Play just the first few minutes of a recording between an air traffic controller and a passenger whose pilot has fallen unconscious. Tell students to listen for the aircraft identifier "5-5-Niner" Delta Whiskey."

The airplane was a Super King Air—a multi-engine turboprop—and it was carrying four passengers. The passenger that took over the controls of the airplane was a long-time private pilot who had only flown small single-engine airplanes. He had never flown a King Air. He called air traffic control asking for help landing the airplane.

Three controllers worked together—all talking on the same frequency. One would advise the passenger of how to fly the airplane, another was rerouting other traffic from the area. A third controller was relaying specific information about how to fly the King Air.

The passenger-turned-pilot was able to safely land the aircraft on the first try.

- "Passenger Lands Plane After Pilot Dies" (Length (14:21)

  http://video.link/w/yyMd

Slide 13: The FAA has been working to modernize the air traffic control system for years. A new airspace system called the Next Generation Air Transportation System (dubbed NextGen) will convert our current radar-based air traffic system to a satellite-based one. GPS technology will be used to shorten flight routes, save time and fuel, reduce traffic delays, increase airspace capacity, and permit controllers to monitor and manage aircraft with greater safety margins.

Students will learn more about airspace capacity restraints and NextGen in Unit 8.

Slide 14: The FAA not only creates the regulations and standards for airmen, aircraft and operators, but it also enforces the rules.

The FAA may suspend or revoke a pilot's certificate or an operator's certificate (like an airline or flight school) if they violate FAA regulations. The FAA has more than 3,000 aviation safety inspectors located across the country who investigate, inspect, and enforce.

Slides 15-16: The FAA is responsible for for all programs related to airport safety and inspections and standards for the design, construction, and operation of more than 5,000 public use airports, heliports and seaplane bases in the United States. It is also responsible for determining environmental and social requirements and impacts of airports.

The FAA also manages the nation's top transportation laboratory in the United States called the William J. Hughes Technical Center in Atlantic City, NJ. The Center's highly skilled workforce conducts tests and research to develop solutions to aviation's challenges. Students will learn more about aviation's environmental impact in Unit 8.

The FAA also investigates accidents, compiles accident and incident data, performs risk analysis and disseminates safety information. In addition, it performs regular forecasts for future demand and emerging industry trends (like the proliferation of unmanned aircraft (drones).

Slide 17: The FAA provides oversight of the integration of drones into the national airspace system. In early 2018, there were more than 800,000 hobbyist drones and more than 120,000 registered Part 107 (commercial) drones registered with the FAA.

Slide 18: The FAA also provides oversight for commercial space transportation. It issues licenses and permits that ensure equipment tests, launch or reentry plans, and other commercial space operations protect the public health, security, and foreign policy interests of the United States.

EXTEND

Teacher Material: The Federal Aviation Administration Presentation

Slide 19: Conduct the **Formative Assessment**. This assessment will begin at the end of the first session and extend into the second session.

Students will map out and explain different FAA roles in order to create an overall image of the agency and all its responsibilities. Each student team will be given an area of responsibility and will research the area and create a poster

to illustrate and explain the specific role assigned. Taken together, the posters will help illustrate the entire role of the FAA.

Upon completion, hang the posters around the classroom and perform a gallery walk so that student teams explain and present their posters to classmates.

Areas for research include:

- Pilot certification
- Aircraft certification
- Air traffic control
- NextGen
- Airports
- Commercial space transportation
- Unmanned aircraft systems (UAS)
- Policy, international affairs, and environment
- Security and hazardous materials safety
- Data and research

[DOK 4; create, DOK 2; summarize]

Formative Assessment

Divide students into groups of 2 or 3 and provide poster board, newsprint, markers and other supplies. Assign each group an area of responsibility. Groups will research their assigned area and create informational posters which must include the following:

- The purpose of the division
- Stakeholders affected by the division
- Current projects
- Alignment of the division with FAA's mission "to provide the safest and most efficient aerospace system in the world"
- Jobs available and specialized education or training required

Teaching Tips

If multiple groups are conducting research on the same topic, give them time to compare results before making their gallery walk presentations.

Slides 20-21: Discuss a few possible careers in the FAA, including types of jobs and the duties they involve. FAA employees work around the world in very diverse areas.

Show students a video that points out many of the career opportunities available at the FAA.

- "FAA 101" (Length 6:40)

  http://video.link/w/Itge

EVALUATE

Teacher Materials: The Federal Aviation Administration Presentation, The Federal Aviation Administration Teacher Notes

Student Material: The Federal Aviation Administration Student Activity

Slide 22: Conduct the **Summative Assessment**.

About 5-10 minutes before the end of class, provide students **The Federal Aviation Administration Student Activity**. Students will be asked to explain how certain FAA responsibilities contribute to safety and efficiency. They will also identify FAA careers associated with each responsibility. Allow students to use the Internet to search for more information on FAA career options. Find possible answers in **The Federal Aviation Administration Teacher Notes**.

Summative Assessment Scoring Rubric

Follows assignment instructions
Provides clear and concise explanations for how the FAA role specified contributes to safety and efficiency
Identifies 2 or more sample FAA careers for each responsibility

Points	Performance Levels
9-10	Consistently demonstrates criteria
7-8	Usually demonstrates criteria
5-6	Sometimes demonstrates criteria
0-4	Rarely to never demonstrates criteria

[DOK 3; categorize, identify]

Summative Assessment

Students will explain how certain FAA responsibilities make aviation safer and more efficient. Students also will identify FAA careers associated with each responsibility.

STANDARDS ALIGNMENT

NGSS STANDARDS

Three-dimensional Learning

HS-ETS1-4 - Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem.

- Science and Engineering Practices
    - Using Mathematics and Computational Thinking
- Disciplinary Core Ideas
    - **ETS1.B**: Developing Possible Solutions
- Crosscutting Concepts
    - Systems and System Models

COMMON CORE STATE STANDARDS

- **RST.9-10.2** - Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.
- **WHST.9-10.2** - Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
- **WHST.9-10.6** - Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.
- **WHST.9-10.8** - Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.

REFERENCES

https://www.faa.gov
https://www.faa.gov/about/office_org/headquarters_offices/ang/offices/tc/
https://www.faa.gov/jobs/career_fields/aviation_careers/media/ASI_Fact_Sheet.pdf https://www.faa.gov/pilots/become/
https://www.faa.gov/news/fact_sheets/news_story.cfm?newsId=19375
https://www.faa.gov/pilots/safety/pilotsafetybrochures/media/alcohol.pdf
https://www.faa.gov/air_traffic/by_the_numbers/
www.gama.aero