Lesson Plan 5: Airports

Title: Gateway to the World

Aerospace Workforce Educator Program lessons are designed to help students build the foundational skills needed for aviation careers while gaining early awareness of the many professions that support our aviation system. Each lesson introduces core concepts—such as navigation, communication, safety, design, or problem-solving—and connects them directly to the real work of pilots, air traffic controllers, drone operators, maintenance technicians, airport specialists, and other aviation professionals. By making these connections visible and age-appropriate, educators can help students see how classroom learning links to real careers and inspires interest in fields they may not yet know exist.

Grade Level: Varies
Primary STEM Skill Focus Area: Math & Science Skills
NextGen Science Standards: 3-5-ETS1 Engineering Design

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1. Lesson Objectives

Students will be able to:

- Identify elements of airport design (airport buildings, parts, environment)
- Describe how airports benefit local communities
- Identify how airport employees use technologies to keep travelers safe

2. Overview

This lesson introduces students to the role of airports and the various elements of airport design. Students will review different parts of an airport, such as runways and terminals, discuss their functions, and understand the technologies airport employees use to keep travelers safe.

The presenter, an Educator, will engage students in a two-way discussion on the topics listed above and explain how airports (and aviation) benefit local communities.

3. Resources

This section includes resources for the Educator to review before delivering the lesson. These tables are intended to provide pertinent background information. Table 1 lists basic terms to know. Table 2 lists possible resources to share with students as part of the lesson.

ORs and the school officials should review the resources and links in advance of the lessons to ensure the content is consistent with school policies and security protocols before presenting to students.

Table 1. Terms to Know

Term	Definition
Airport	A place where aircraft land, take off, and stay when they are not flying. Airport designs include multiple buildings, each serving a specific purpose.
Runway	A strip of smooth ground where aircraft can take off and land.
Taxiway	The paths that connect the runways with the airport terminal, aprons, hangars, etc.
Airport Apron	The area of an airport where loading and unloading passengers or cargo, refueling, parking, or maintenance take place.
Airport Traffic Control Tower	A tall building where the movements of aircraft and runway traffic are monitored and controlled.
Hangar	A building, usually at or near an airport, used to store aircraft.

Term	Definition
Airport Terminal	A building within an airport where passengers arrive or depart on a flight.
Spaceport	A site for launching and receiving spacecraft.

Table 2. Potential Materials for Use During the Lesson

Title	Length	Source	Platform	Description
1. FAA from the Flight Deck	Varies	FAA	YouTube	Video includes footage of runway approaches, airport taxiways, as well as diagrams and visual graphics that identify hot spots and other safety items.
2. Asheville Airport Diagram	N/A	FAA	Faa.gov	Diagrams outlining key parts of an airport.
3. FAA TV, Lake Hood, Alaska	1:13	FAA	Faa.gov	A quick look at air traffic operations at Lake Hood, Alaska – the busiest seaplane base in the United States.
4. FAA Commercial Space Transportation	2:51	FAA	Faa.gov	Video on spaceports and FAA role in commercial space transportation
5. FAA Airport Design Challenge	2:54	FAA	YouTube	Learn about ADC, the fully immersive, interactive, learning and collaboration opportunity.
6. Kids' First Flight	2:26	FAA	YouTube	Help your little ones prepare for their first flight on an airplane.
7. Airport Categories	N/A	FAA	Faa.gov	Airport Categories featuring some of the terms used in this lesson
8. FAA TV: NextGen Flight 101: The Passenger Experience	6:34	FAA	Faa.gov	FAA NextGen video, explaining how the FAA optimized technologies to benefit the airlines, airports, and travelers. Shows different parts of an airport.
9. Map of U.S. Spaceports	N/A	FAA	Faa.gov	Map of U.S. Spaceports, active as of Feb 2021
10. Spaceports by State	N/A	FAA	Faa.gov	List of U.S. Spaceports by state with detailed information

4. Activate Prior Knowledge (5 minutes)

The questions below are suggested prompts to introduce the lesson. Educators should modify these questions to align with the audience, their community, and their own experience.

- Have you been to an airport?
- What parts do you remember the most?

- Have you ever wondered why airports look the way they do?
- Who do you think is responsible for keeping all of those flights that leave and come to the airports safe?
- How do you think the people who work at the airport keep everyone safe?
- What are some of the benefits of having an airport in your community?

5. Instructional Sections

The lesson sections listed below provide talking points to help Educators deliver a consistent message about airports, the major elements of airport design, and the significance of airports in local communities.

Educators should modify these sections and adjust the suggested timing to align content to their audience, community, and their personal experience.

5.1 Introduction to Airport Design (10 minutes)

- There are many different parts of an airport
- But first, what's an airport?
- An airport is where all types of aircraft (planes, helicopters, even blimps) take off, land, and stay when they are not flying
- Every airport is unique, but airport design has some essential elements that keep operations, people, and aircraft safe
- Airports include several parts: Runways, Taxiways, Terminals, Aprons, Hangars, and Towers
    - Does anyone know what these parts look like?
    - **Runways are** strips of ground where aircraft can take off and land
        - As much as possible, runways are aligned with the wind to help aircraft during takeoff and landing
        - Some airports have several runways, which might be parallel, next to each other, or may cross over
        - Do you think every **runway** needs to be paved?
          [No, some runways are leveled strips of grass, not attached to an airport terminal; smaller aircraft, like the ones used in farming, are able to take off from an unpaved surface]
    - **Taxiways** are the paths that connect the runways with the airport terminal, aprons, hangars, etc.
    - What are Terminals, Aprons, and Hangars?
        - **Terminals** are buildings where passengers arrive or depart on a flight
        - **An Apron** is the area of an airport where loading and unloading passengers or cargo, refueling, parking, or maintenance takes place
        - **A Hangar** is a building used to store and repair aircraft when they are not flying

- What about Towers?
  - A **Control Tower** is a tall building used by air traffic controllers to monitor and direct aircraft on the runways, taking off or landing at an airport
  - **Air traffic controllers** talk to the aircraft from the control tower, and tell the pilots which runways they can use, usually after checking weather and wind direction

– All of these different parts must work together to ensure the safety of all passengers, employees, pilots, and aircraft crews, and aircraft

Suggested Visual and Videos:
Show websites/photos of the different parts of an airport:
- *FAA from the Flight Deck*
- *Ashville, NC, Airport Diagram*

5.2 Airport Safety (5 minutes)

– Now let's talk about safety – how do you think airport professionals make sure travelers are safe?
  - They get special training to handle safety issues
  - They use specially designed and engineered tools to monitor safety
  - Airport terminals are built to withstand bad weather and storms
  - Parts of the airport, like the runways, taxiways, and aprons are off-limits to the public
  - Airports also have cameras, fire-safety equipment, and alarms

– People working at the airports also focus on protecting the environment near the airport:
  - They have procedures to make sure aircraft do not damage the wildlife and the environment
  - They use systems to make sure that wildlife, such as birds, don't interfere with the aircraft

– The FAA develops flight paths to decrease aircraft noise, minimize impacts to communities, and reduce aircraft exhaust

5.3 What Roles Do Airports Play in Our Communities? (5 minutes)

– Airports are important to local communities because they give local businesses and people access to locations and products from all over the world

– Airports create important connections to other parts of our country; they allow you to visit family who are far away or to travel to other countries for vacation

– Aircraft fly into airports to deliver goods, like medicine, clothes, and food
  - They make it easier to get fruits and vegetables that may not grow nearby

- Airports also create many jobs for people in their communities
- For some parts of the country, especially those not easily accessible by roads, airports are even the main way to connect to the rest of the world

Suggested Visual and Videos:

- *FAA TV Lake Hood, Alaska [1 min 13 sec]*

5.4 Airports Today and in the Future (15 minutes)

- Airports differ by size, purpose, and the type of travelers they serve
- There are many different types of airports:
    - International:
        - These airports have both local, regional, national, and international flights
        - They must have customs, a place where travelers' passports are checked by a government official
        - These airports have some of the biggest aircraft called jumbo jets
    - National and regional:
        - These airports give communities access to places in the U.S.
        - Regional airports have fewer flights, and the airlines serving these airports usually do not fly outside of the U.S.
        - You will typically see both big and small aircraft
    - Local:
        - Local airports may not have commercial airlines flying into them
        - They are normally used for flight training and personal or business use
        - Local airports tend to have smaller aircraft
    - Spaceports:
        - Spaceports are places where spacecraft take off and sometimes land
        - Spaceports are used for science, exploration, and research
        - The United States has 12 spaceports that launch spacecraft

Suggested Visual and Videos:
Show websites/photos that display the different types of airports:

- Airport Categories

- In the future, some airports may be combined with spaceports, especially with the development of new technologies
- Airports will also become easier for passengers, for example, they may not have long lines for

checking bags or to get through security

- The transportation industry predicts that air travel will become more popular in the future, which means airports will become bigger and better
- Control towers may become virtual, meaning that the controllers will be able to track the aircraft from another location by using cameras installed at the airport
- Artificial Intelligence or AI may help airports be more secure, safe, and adaptable. AI can help in many ways, for example, it can help us:
    - Predict when each aircraft is arriving and when to schedule other departures
    - Monitor and decide when to schedule aircraft maintenance
    - Improve weather forecasts
    - Estimate the impacts of weather delays
    - More precisely decide the amount of fuel the aircraft needs for each destination
- With better technologies and more people traveling, airports will grow and change, making these places more convenient and more welcoming for all of us

Suggested Visual and Videos:
Show websites/photos with different functions and types of airports:

- FAA TV: NextGen Flight 101: The Passenger Experience [6 min 34 sec]
- FAA TV: Spaceport Licenses [1 min 56 sec]

5.5 Activity (15 minutes)

The table below includes sample activities that can be used as part of the lesson.

Table 3. Sample Activities

Activity	Objectives	Educator Actions	Student Actions	Closing
Draw Your Own Airport	Identify the critical parts of an airport	Highlight some key elements for the students before they draw their airport: ○ Control Tower ○ Runway ○ Taxiway ○ Terminal	Draw a custom airport including some or all of these elements	Ask the students to describe their airport, which parts of the airport they included, and why
Airport Matching	Match the type of airport with its use and the aircraft that can land there	Present different types of airports, their uses, and the types of aircraft they use and ask the students to match them correctly: ○ Which airport can be used for international travel? ○ What kinds of aircraft can you find there?	Match the corresponding airport with its use and types of aircraft that may land and takeoff there	Ask the students to explain which type of airport they would prefer to have in their community and why

6. What Did You Learn? (5 minutes)

For closing and wrap up, Educators can ask the students the following questions:

- Describe the two important things that airports do for the communities around them?
- Name three different types of airports
- Which technologies do airport employees use to keep the aircraft and travelers safe?

Suggested Game:
10 question knowledge check game

7. Extension Activities

- If you were to design an airport for your neighborhood, which kind of airport would it be and why?
- Think about the airports in your communities. What kinds of aircraft do they fly?
- Discuss the types of jobs at airports.
- Discuss what makes spaceports different from typical airports.

8. Supplies

- Access to the Internet to view and share videos and slides on screen
- 3 or 4 small model aircraft
- Pictures or charts featuring different types of airports
- 8.5 x 11 white paper (enough for the whole class)
- 20 – 30 different colored markers (enough for the whole class)
- Spark sheet (PDF) (virtual) for students to have as a reference