INTRODUCTION TO CAREERS IN AVIATION

This session introduces Explorers to the variety of careers in the aviation industry.

CATEGORY
- Exploring, Aviation
- US DOE, Transportation
- US DOE, STEM

OBJECTIVES
By the end of this session, participants will be able to:
- Understand the variety of careers in the aviation industry.
- Identify a career that sounds interesting and find out the education, training, and experience required for this profession.
- Explain the recreational pilot, sport pilot, and private pilot certificates.
- Explain the instrument rating.
- Discuss the privileges and limitations of certification and rating.
- Explain the main difference between a commercial pilot certificate and a private pilot certificate.
- Discuss different ways to obtain pilot training and certification.

SUPPLIES
- **Aviation Certifications** activity sheet (one per participant)
- **Careers in Aviation** activity sheet (one per participant)
- **Career Wrap-Up** activity sheet (one per participant)
- Optional: Invite an aviation professional to speak to participants about his or her career. The guest could bring photos, props (i.e., helmets, uniforms, flight gear), or other materials that will help in the discussion.

ADVISOR NOTE: Text in italics should be read aloud to participants. As you engage your post in activities each week, please include comments, discussions, and feedback to the group relating to **Character, Leadership,** and **Ethics.** These are important attributes that make a difference in the success of youth in the workplace and in life.

ACTIVITIES
Activity 1
Aviation Certifications
Pass out the **Aviation Certifications** activity sheet. Begin by discussing the different certifications a pilot can earn, including sport pilot, recreational pilot, private pilot, and instrument pilot rating. Have Explorers explain the similarities and differences of various certifications. Examine the importance of instrument ratings.

Activity 2
Careers in Aviation
Say: *Those are the certifications that pilots can earn, but there are many other careers in aviation that don't require flying. Let's discuss other careers too.*

Pass out the **Careers in Aviation** activity sheet. Review a few categories with the Explorers and discuss the educational requirements and duties of each. Let participant interest guide the discussion.

If you know enough about a specific career, an engaging discussion tactic is to pick a work scenario and ask students to problem solve.

If available, use online resources to supplement the discussion by finding universities that offer relevant degrees, learning more about a specific field, or finding people who might act as mentors. Let the discussion guide your searches.

Be sure to discuss how science, technology, engineering, and mathematics are all essential to aviation. There are many STEM fields listed on the **Careers in Aviation** activity sheet. Education and qualifications of these STEM careers should be highlighted during this discussion.

Activity 3
Guest Speaker
If possible, have a guest who is an aviation professional join you. He or she can discuss the path to his or her specific career, including education, training, the selection process for various employers, monthly schedules, potential job prospects, and any other topics of interest. Guests should be encouraged to bring any relevant hands-on props to make the discussion more interesting. Props can be anything, such as a flight bag, equipment used during flight, charts and maps, etc.

A good question for the guest to begin with might be "What do you think it takes to become a professional xxxx?" (substituting his or her profession for "xxxx.")

Activity 4
Wrap-Up
Pass out the **Career Wrap-Up** activity sheet and have participants complete it. Allow participants to search the internet for information if computers or smartphones are available. After everyone has completed the activity sheet, engage in a discussion about the various careers in which Explorers expressed an interest.

ADVISOR NOTE
Some sample questions are below. They are designed to help the participants apply what they have learned to their own interests. You are welcome to use these questions or develop your own questions that relate to your post or specific focus area.

REFLECTION
- *What does a commercial certificate allow you to do that an instructor might need?* (Ability to get paid for their instruction. Without a commercial certificate, the only money that a passenger can contribute is for their fair share of the operating costs of the plane.)
- *A pilot was contacted by the Federal Aviation Administration for a small infraction of airspace. The pilot flew into a "Temporary Flight Restriction" zone while the U.S. president was visiting a city. Why might an aviation lawyer be helpful in a situation like this? Can you think of some consequences for the pilot if he or she does not obtain adequate legal advice?* (Aviation lawyers specialize in rules and regulations of flight. Not consulting a specialist might result in loss of flying privileges, either temporarily or permanently.)

- *Choose one of the careers you decided to explore in depth and discuss with a fellow Explorer. What sorts of specialized knowledge are relevant only to aviation?* (For example, how is general medicine different from aviation medicine; general engineering different from aerospace engineering, etc.)

ADVISOR AND OFFICER REVIEW

After the meeting, address the following:

- Identify what was successful about the meeting.
- Identify what needed improvement.
- Schedule an officer and Advisor planning meeting to prepare for the next post meeting or activity.

Content for this session provided by Youth Aviation Adventure (http://www.youthaviationadventure.org/).

RESOURCES

Activity 1

Aviation Certifications

Certificate	**Requirements**	**Privileges**
Student Pilot	Read, write, speak, and understand English. 16 years old to solo. Medical certificate. Must pass written test for solo.	Fly with an instructor until solo. After solo, fly solo only with instructor permission in clear skies with no passengers.
Sport Pilot	Read, write, speak, and understand English. At least 17 years old. Medical certificate *or* driver's license. Minimum of 20 hours flying time including 15 hours of instruction and five hours of solo flying.	Only one passenger at a time. Passenger may not pay you. VFR flying only. Daytime flying only. Fly only "light sport aircraft," which have a maximum number of seats, maximum weight, and maximum speed.
Recreational Pilot	Read, write, speak, and understand English. At least 17 years old. Medical certificate. Pass written and practical tests. 30 hours flight time including some solo flying.	Fly no farther than 50 nautical miles from home airport. Daytime flying only. VFR flying only. Only one passenger at a time. Passenger may not pay you.
Private Pilot	Read, write, speak, and understand English. At least 17 years old. Medical certificate. Pass written and practical tests. 40 hours total flight time including 20 with an instructor and 10 as a solo pilot. Also requires three hours instrument time, three hours night flying, and three hours cross-country flying.	Fly with passengers, in VFR weather (clear skies), day or night, for any distance. Passengers may not pay you.

IFR Certification	Private pilot certificate. Pass written and practical tests. 50 hours cross-country as pilot in command. 40 hours instrument experience, 15 hours with an instructor, and a long cross-country flight.	Fly with passengers in instrument conditions (clouds), day or night, for any distance. Passengers may not pay you.
Commercial Pilot	At least 18 years old. Private pilot certificate. Medical certificate. Pass written and practical tests. At least 250 hours total flight time including 20 hours with an instructor, 50 hours cross-country as pilot in command, 10 hours of instrument training, 10 hours training in a plane with retractable landing gear, and a long cross-country flight.	Fly with paying passengers in the type of weather certified for. (It is possible to earn a commercial pilot certificate without having an instrument rating. When this is the case, pilot may fly only in VFR weather.)
Certified Flight Instructor (CFI)	At least 18 years old. Hold either commercial pilot certificate or airline transport pilot certificate. Pass two written tests and a practical test and demonstrate proficiency flying from the right seat.	Teach student pilots.
Certified Flight Instructor, Instruments (CFII)	Same requirements as a CFI but including the instrument rating.	Teach student pilots to fly by instruments.
Airline Transport Pilot	At least 23 years old. Commercial pilot certificate and an instrument rating. Pass written and practical tests. 1,500 hours total flight time, 1,000 of which need to be in two different types of aircraft.	Work for most commercial airlines and most parcel carriers (FedEx, UPS, USPS, etc.).

Source: Federal Aviation Regulations, part 61.

Other certifications are required for multiple-engine airplanes, float planes, and high-performance planes.

Activity 2
Careers in Aviation

There are many careers in aviation in addition to being a pilot. Some people design and build aircraft, and some people test and inspect them. There are people who fly planes and people who fix planes. And there are people who work at airports. Below is just a sampling of the different types of careers available in aviation. Some require college degrees, and some do not. But usually all of them require a solid background in math and science or some years of technical training, either on the job or through technical schools.

Career Title	Education Requirements	Responsibilities
Pilot Careers		
Agricultural pilot	High school diploma, special training, and license	Crop dusting.
Air traffic reporting pilot	College preferred	Report on street traffic.
Major/national airline pilot	College preferred; most require four-year degree	Fly commercial airplanes long distances.
Regional airline pilot	College preferred; most require four-year degree	Fly commercial airplanes shorter distances.
Helicopter pilot	College preferred; most require four-year degree	Police work, traffic reporting, hospital work, military work.
Corporate pilot	College preferred; most require four-year degree	Fly corporate-owned aircraft.
Air taxi pilot	College preferred	Fly private customers short distances.
Flight instructor	High school diploma	Teach flying.
Military pilot	College degree	Fly military aircraft.
Astronaut	Engineering, physical science, physics, or similar advanced degree	Participate in space missions.
Airline and Airport Operations		

Airport manager	College degree in airport management or business administration	Oversee all operations of the airport, contract with airlines and vendors, and act as “landlord” to the many people who work there.
Fixed base operator manager	High school diploma; college degree sometimes preferred	Manage services (such as refueling) and sell general aviation products at an airport.
Station manager	High school diploma; experience preferred	Coordinate flight crew, cargo crew, baggage crew, ground crew, and the information that must be communicated among all these teams.
Scheduling coordinator	College degree preferred; experience helpful	Coordinate schedule of planes into and out of airport.
Flight dispatcher	Dispatcher’s license; college degree and experience preferred	In cooperation with the pilot, furnish a flight plan that enables the plane to arrive at its destination on schedule with the maximum payload and least cost.
Air traffic controller	FAA training; college preferred	Direct all flight activities, give advice and information by radio to pilots, and monitor planes in and around the airport.
Safety inspector	Engineering degree and/or experience as a pilot or mechanic.	Inspect airplane and airport for safety.
Concession worker	High school diploma	Work in restaurants in the airport and prepare in-flight meals.
Fire and crash rescue personnel	Special training; college preferred	Conduct rescue and firefighting operations when a plane crashes.
Ramp service personnel	High school diploma	Work on the actual airfields such as loading and unloading baggage or driving vehicles.
Cabin maintenance mechanic	High school diploma, technical training	Maintain interior of plane.
Airline and Airport Services		
Customer services representative	High school diploma, business experience	Manage customer satisfaction and assist airline customers in any way.

Ticket agent	High school diploma; two years of college preferred	Check in passengers, assign seats if necessary, and tag bags.
Reservations sales agent	High school diploma; two years of college preferred	Assist passengers with reservations and sell tickets.
Flight attendant	High school diploma, special training; college preferred	Take care of in-flight needs such as security, compliance with regulations, and passenger comfort and safety.
Baggage handler	High school diploma	Load and unload cargo and baggage, drive baggage tractors, and operate conveyors, forklifts, and other air freight handling equipment
Skycap	High school diploma	Assist passengers before they board the plane and after they leave the plane.
Cargo handler	High school diploma	Load and unload cargo and baggage.
Air freight/cargo agent	High school diploma, shipping experience	Manage the movement of air freight and air cargo.
Aircraft and Systems Maintenance		
Airframe or powerplant mechanic	High school diploma, technical training; degree preferred	Make sure the plane is serviced and fit to fly.
Avionics specialist	High school diploma, technical training; degree preferred	Make sure plane's instruments, radios, GPS receivers, and other avionics are functional.
Aircraft Manufacturing		
Manufacturing engineer	Four-year degree	Design the processes of airplane manufacture.
Electrical installer and technician	High school diploma, associate degree	Install and maintain electronics in the airplane.
Tool, jig, and fixture maker; sheet metal fabricator; machine tool operator	High school diploma, vocational school	Make the parts that will go into the airplane.

CAD operator and illustrator	College degree preferred	Design the airplane using computer-aided design packages.
Assembler and installer	High school diploma	Assemble planes and install electronics, wiring, and other parts.
Quality technician	High school diploma, associate degree	Inspect airplane for quality assurance as it is being built.
Scientific and Technical Services		
Engineer (aeronautical, aerospace, civil, electrical, mechanical)	Engineering degree	Design the plane and its fuselage; the electronics; the heating, cooling, and oxygen systems; the engines; and the structure, and make sure the loads on a plane are coordinated with the structure of the plane. Engineers design the seats, headsets, and movie screens. Chemical engineers work with plastic compositions and fuel mixes, and aerodynamic engineers make sure the plane moves smoothly through the air. Materials engineers design the best metals and materials for strong, light airframes.
Meteorologist	Meteorology degree; experience preferred	Analyze weather data and make weather reports for the pilot.
Cartographer	Cartography degree	Create maps for use by the aviation industry.
Architect	Architecture degree	Design and build airports and airport facilities.
Technicians (electronics radar, navigation)	High school diploma, special training	Repair and maintain various electronic equipment on the plane and in the airport.
Law-Related Services		
Aviation attorney	Law degree	Defend and prosecute pilots when they are cited for breaking FAA rules.

Sky marshal	High school diploma, police academy, law enforcement experience	Ride airplanes incognito to preserve safety on the planes.
Drug enforcement agent	College degree, special training; experience preferred	Use helicopters to assist police in arrests and patrols.
Customs agent	College degree	Work at ports of entry to screen foreign travelers.
Security officer	High school diploma, special training	Patrol airports to maintain safety at the airport.
Accident investigator	College degree, industry experience	Investigate aviation accidents to determine causes.
Security specialist	High school diploma, law enforcement experience	Ensure the safety of all people in and around the airport. X-ray carry-on bags, search baggage, enforce airport regulations, and patrol the grounds.
Health Services		
Flight physician/aviation medical examiner	Medical degree	Perform aviation physicals on pilots.
Office Professionals		
Travel agent	High school diploma, special training	Assist in vacation travel, including airline tickets, ground transportation, hotel, and tours.
Information systems specialist	College degree	Maintain, program, and support all aspects of aviation, airports, flying, and communications computers.
Food preparer	High school diploma; health certificate required	Prepare in-flight meals.

Activity 4
Career Wrap-Up*

Complete the following.

1. What is involved in becoming a professional pilot?

2. After I get my pilot license, what steps must I take before I can start applying for a job with an airlines?

3. What other flying jobs are available other than working for an airline?

Choose three careers from the **Careers in Aviation** activity sheet that look interesting and then elaborate on one.

Career Opportunities in Aviation

1.

2.

3.

Elaborate on one of the careers listed above: _____

a) Educational requirements

b) Training requirements

c) Experience needed

*Activity sheet based on original work by Teresa Guillemot, owner of The Practical Aviator.