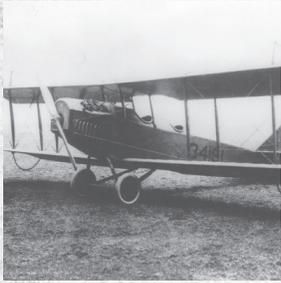


Texas Aviation: Adventure and Agriculture





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INTRODUCTION

THE FORD TRIMOTOR 5-A (NICKNAMED "THE TIN GOOSE") ON DISPLAY at the Smithsonian Air and Space Museum in Washington, D.C. Courtesy of Tim Evanson <https://www.flickr.com/photos/23165290@N00/7276904172>

THIS INTERPRETIVE PLAN ARTICULATES THE VISION of the Texas Department of Transportation (TxDOT) Environmental Affairs Division in an effort to interpret and articulate the growth and use of commercial and agricultural flight in Texas. This interpretive plan:

- provides initial research and program planning for information-based institutions;
- identifies applicable resources for classroom engagement and further research;
- presents a wide array of educational tools, including adaptive lesson plans that correspond to the Texas Essential Knowledge and Skills (TEKS) standards; outlines the goals and objectives of the Environmental Affairs Division in their efforts to expand museum outreach;
- and, highlights selected themes and narratives regarding commercial and agricultural flight development in Texas.



Who is TxDOT and the Environmental Affairs Division?

TxDOT began in 1917 as the Texas Highway Department. TxDOT maintains the federal and state road systems in Texas—interstate highways, US highways, state highways, farm-to-market roads, and other state types of roads, such as loops.

The Environmental Affairs Division (ENV) includes historians and archeologists that conduct outreach on programs across the state. ENV provides policy, procedures, training, guidance and technical assistance to other sections of TxDOT. It also manages environmental programs, works to streamline the environmental process, and monitors changing law and regulations.

The scope of this interpretive plan also caters to the mission of TxDOT's Aviation Division, which aims to aid general aviation airports in Texas. The Aviation Division seeks to help cities obtain both state and federal funds for improvements to general aviation airports.

Mission and Purpose Statement

The Environmental Affairs Division integrates environmental considerations into all TxDOT activities to achieve environmental compliance. As part of that, TxDOT engages in cultural resource management. In an effort to cultivate and manage archeological and historic resources, the division seeks to create tools that will provide museum specialists and educators with information about the cultural resources related to transportation topics in Texas.

This plan will provide a framework of educational and interpretive experiences that increase an understanding of commercial and agricultural aviation in Texas.

Interpretive Plan Goals and Objectives

- Educate the public about the rise of commercial aviation in Texas following the Air Mail Act.
- Inform the public about the development of innovative crop dusting and aerial seeding in Texas.
- Highlight the connections between commercial and agricultural flight to the development and construction of select communities and airports in Texas.
- Provide and interpretive structure and framework that allows museum staff to add information to, or use interpretive themes for activities and/or museum exhibits.



CENTRAL THEME

LOADING AIR MAIL ON FIRST MAIL PLANE TO LEAVE Robert Mueller Municipal Airport after dedication ceremonies.
Courtesy of Austin History Center, Austin Public Library <https://texashistory.unt.edu/ark:/67531/metaph124057/>

LEGEND HOLDS THAT TEXAN JACOB F. BRODBECK FLEW A PLANE IN 1865, nearly 38 years prior to the Wright brothers' first successful airplane flight, though sources are skeptical. While an image of his plane does exist, historians often argue its validity. Historians do agree, however, that in 1910, Louis Paulhan flew the first documented flight in Texas. As aviation interest in Texas developed and political tensions with Mexico increased, President William Taft ordered the First Aero Squadron in 1913 to defend Texas City and Galveston, Texas. This squadron supported nine airplanes and officially began the development of military aviation in Texas.

Due to its temperate climate year round, Texas established a number of military aviation schools across the state. Expansive military bases at Kelly Field and Brooks Air Force Base brought hundreds of aviators to Texas for training. When World War I ended, however, many pilots needed a job. They turned to commercial flying, a new niche in the industry.

Aviation in Texas soared to new heights with help from the Air Mail Act, stunt flying, crop dusting and the radical development of aerial seeding. The incorporation of commercial and agricultural flight directly impacted Texas community economies throughout the twentieth century.



**DALLAS MUNICIPAL AIRPORT
AT LOVE FIELD.**
Courtesy of postcardpost.com

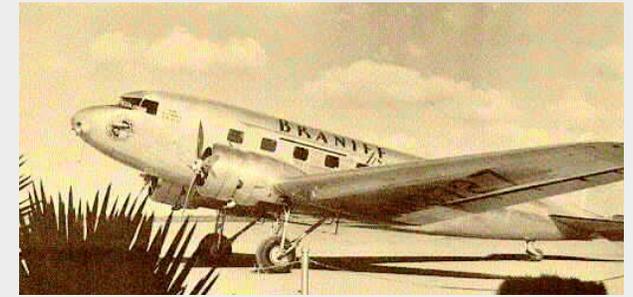


INTERPRETIVE THEMES

ONE-HALF RIGHT FRONT VIEW OF CURTISS JN-4D JENNY in flight over grass airfield; barnstorming wingwalker Ormer Locklear is seen hanging by his knees from the right wing bow; circa 1919-1920. Courtesy of the Smithsonian Institution
<https://airandspace.si.edu/collection-objects/curtiss-jn-4d-jenny-locklear-ormer-leslie-general-aviation-uses-aircraft>

Theme I

IN 1918, THE UNITED STATES POST OFFICE LAUNCHED AIRMAIL SERVICE to improve mail delivery times and to reach rural portions of the nation. Congress sought a new direction with the passage of the Contract Air Mail Act of 1925, called the Kelly Act, in honor of its sponsor Representative Clyde Kelly. This Act became the first major law Congress created that directly impacted the aviation industry. It aimed to encourage a growing aviation industry by eliminating control by the United States Post Office and shifting emphasis to private corporations and commercial airlines. As more airlines and airports joined the mail industry, passenger flight and barnstorming took to the skies.



BRANIFF AIRWAYS IN BROWNSVILLE, courtesy of postcardpost.com

Sub Topic 1: The Air Mail Act spurred the development of commercial aviation in Texas.

- After World War I, many pilots needed a job. They turned to transporting air mail throughout the United States.
- National Air Transport (NAT) became the first airline to fly cross-country and was awarded the one of the first private airmail contracts in 1925.
 - This airline flew out of two major airports, Love Field in Dallas, Texas, and the Fort Worth Municipal Airport.
- The first airmail flight in Texas began in 1926. It departed from the Fort Worth Municipal Airport, traveled through Oklahoma City, and delivered mail at its final destination in Chicago.
- Three airlines connected cities throughout the state and the nation: NAT, flying from Dallas to Chicago, Texas Air Transport (TAT), providing services between Dallas-Fort Worth and San Antonio, and Tammany Gulf Coast, flying from Houston to New Orleans.
- Thomas Braniff's airline, the Oklahoma City-Tulsa Airline, took over the NAT's airmail route between Dallas and Chicago.
 - Braniff moved his company to Love Field and expanded routes to Brownsville and the panhandle.

- The establishment of stable airports in Austin and Brownsville allowed Braniff Airways to foster a sense of international adventure and limitless boundaries. The incorporation of more routes through multiple airports allowed Braniff Airways to fly to more locations both nationally and internationally.
- Braniff Airways also incorporated passenger travel to make their services more marketable.

Sub Topic 2: Barnstorming and aerial advertising emerged as a driving force in commercial aviation development after the Air Mail Act.

- Barnstormers emerged in the early 1920s as a new entertainment industry.
 - Barnstorming got its name because most spacious areas of land that could hold large crowds for spectating were often found on farms.
 - These aviators performed loops, spins, and even wing walking, where the passenger or copilot walked along the wing of the plane and waved to the crowds below.
- Pilots performed stunts in planes, and even sold rides to spectators for about \$1.50, which is equal to roughly \$20 today.
- As barnstorming lost popularity, aerial advertising rose.

- In 1926, Webb Ruff established University Airport in Austin. Ruff taught flight lessons, offered passenger services, and even "provided airplane trips to all out-of-town University of Texas football games."
- *The Austin Statesman* reported that in 1926, a plane dropped approximately ten thousand samples of Orbit chewing gum in downtown. E.F. Brownleo and William F. Easterwood Jr., Orbit gum distributors, cleverly used this stunt as an advertising tactic.
 - The owner of a nearby vaudeville house, the Majestic Theater, noticed how pedestrians scrambled to collect the free samples.
 - The Majestic Theater then hired a pilot to drop thirty tickets over downtown Austin to advertise a new show. The pilot even painted the name of the theater on the bottom of its wings for maximum aerial promotion.
- The Austin Air Service ran an advertisement in the *Statesman* stating that they would release a number of live chickens for a "Free Airplane Ride and a Chicken Dinner." Anyone who caught the bird could keep the chicken and take a free plane ride over Austin.

Theme II

FERTILE LAND, FAVORABLE WEATHER, AND ACCESS TO WATER FOR IRRIGATION have always been important factors for the agricultural industry. Advances in farming equipment improved their capabilities and their success became integral to the stability of the state. Crop dusters became a necessity for Texan farmers to help improve their operations and increase their production.

Sub Topic 1: Crop dusting was essential to agricultural profits in Texas.

- In 1919, the United States Department of Agriculture sent an army aviator, Lieutenant William H. Tillisch, and an additional observer, E.L. Diven, to inspect southern Texas for crop-control violations. These men used an airplane to search for outlawed cotton fields.
 - As they investigated, aviators delighted at the opportunity to fly low and slow over large agricultural and rural land.
 - This hunt for banned cotton fields arguably planted the seed for agricultural flight.
- Crop dusting involved dropping poisonous dust over a plot of farmland to eradicate harmful insects and pests.
- In 1943, the Austin American Statesman reported that farmers in Travis County depended on aerial crop dusting to turn a profit on their crops. Without the rapid poisoning of insects by planes, farmers struggled to eliminate the pests by hand before they took over an entire field.
- A few World War II training airplanes were available to purchase for farming. Unfortunately, most were not suited for agricultural use and required many modifications.
- Schools like Texas A&M University established programs to design airplanes for agricultural needs.



AERIAL SEEDING, courtesy of TxDOT.

- In 1955, the Austin Statesman explained that Texas A&M, in association with the Civil Aeronautics Association and the State Aerial Applicators Association, would train pilots at their university for crop dusting, aerial seeding, and fertilizer spreading.
- Leland Snow created the Air Tractor in 1958.
 - Snow's aircraft revolutionized crop dusting for its precision, safety, and easy maneuverability.

Sub Topic 2: Aerial seeding provided another boost for agricultural aviation.

- The advanced production of rice provided another outlet for agricultural flight in Texas.
- In 1946, a group of men augmented a standard biplane from World War II to aerial seed a rice field.
 - Veterans K.W. Kinky Shane and Gilbert Mapes secured an outdated plane and became the first in the world to use an airplane for agriculture in this way.
- An aerial seeding of rice fields proved much faster than seeding by hand.
- Aerial seeding required a spotter to be on the ground.
 - This person directed planes where they should go. Because the planes had to fly so low, accidents often occurred and resulted in fatalities when pilots lost sight of their spotters.
- Fields and Poley Mitchell founded M&M Air Services of Beaumont Inc. in response to a growing demand for agricultural aviation.
 - According to George Mitchell, current owner of M&M Air Services, the brothers "pioneered water-seeded rice".
 - M&M Air Services acquired an old military plane and modified it to meet their needs. Seventy-two years later, the company is still family owned.

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Websites

The following websites provide information regarding the history of aviation in Texas. Some include online exhibits and additional resources.

Disciples of Flight:
<https://disciplesofflight.com/>

How Things Fly—Interactive Website through the Smithsonian:
<http://howthingsfly.si.edu/activities>

Smithsonian National Air and Space Museum:
<https://airandspace.si.edu/>

Smithsonian National Postal Museum:
<https://postalmuseum.si.edu/index.html>

Texas Agriculture Magazine—Texas Farm Bureau:
<http://texasfarmbureau.org/publications/>

Texas Agricultural Aviation Association:
<http://taaa.org/site/>

Texas Co-op Power Magazine:
<https://www.texascooppower.com/>

Texas Department of Transportation—Aviation:
<https://www.txdot.gov/inside-txdot/division/aviation.html>

Texas State Historical Association:
<https://www.tshaonline.org/home/>

Texas Time Travel:
<http://texasmetravel.com/node/28710>

The Bullock Museum in Austin, TX, features changing exhibits. A few years ago, the Bullock celebrated Texas Aviation through Tango Alpha Charlie:
<https://www.thestoryoftexas.com/visit/exhibits/tango-alpha-charlie>

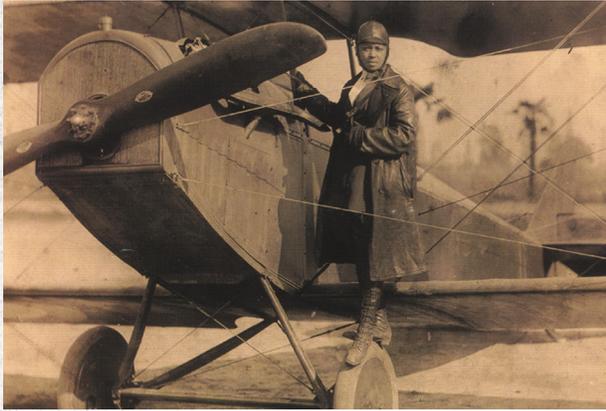
The Pan Am Historical Foundation:
<https://www.panam.org/enter>

The Portal to Texas History provides primary source materials about Texas. This site also offers many resources for educators:
<https://texashistory.unt.edu/>



SPOTLIGHTS

BESSIE COLEMAN IN TAILOR MADE OFFICER'S UNIFORM posed standing on the running board of a Ford Model T automobile with nose and right wing of her Curtiss JN-4 Jenny to her left. Courtesy of the Smithsonian Institution. <https://airandspace.si.edu/collection-objects/coleman-bessie-curtiss-jn-4-jenny-family-photograph>

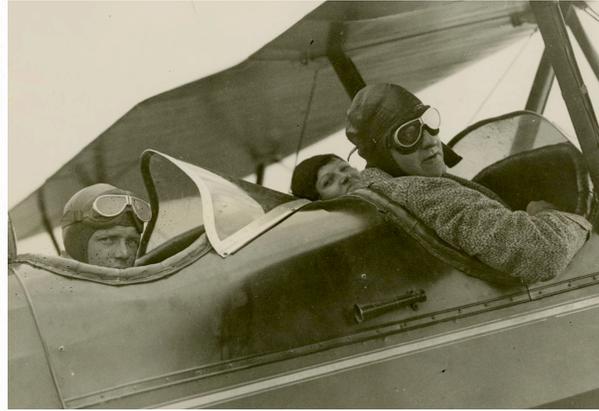


Barnstormin' Bessie

One famous barnstormer from Atlanta, Texas, was Elizabeth 'Bessie' Coleman. Born in 1892, Coleman grew up in a Cherokee sharecropping home. At three years old, Bessie's family moved to Waxahachie and her father left to find better employment; he never returned.

Disgusted with gender roles and race relations in America, Coleman was inspired to become the first black female pilot in history. Unfortunately, no American flight school accepted this ambitious African-American woman. Coleman worked hard to learn French so she could move to Paris in 1920 to attend the Caudron Brothers' School of Aviation. As the first minority woman to receive an international pilot's license, Coleman returned to America as a stunt pilot.

Nicknamed "Queen Bess," Coleman performed all over America and spoke at public events to encourage women and African-Americans to pursue a career in aviation. Despite her rough upbringing by illiterate parents - in a one-room home in Texas with twelve other siblings - Coleman overcame numerous obstacles relating to her gender and race. She changed the face of gendered aviation and encouraged women and minorities to follow their dreams through her advanced aviation acrobatics.



Charles Lindbergh

Charles Lindbergh, born in Detroit, Michigan, also flew for airmail. In 1929, Lindbergh flew the first successful airmail flight from Mexico City to a U.S. city, Brownsville, Texas. His five hour, thirty-eight minute flight proved that was significantly faster to deliver mail by aircraft, rather than railroad. Nearly 20,000 people gathered in Brownsville to witness this historic event.

Mail often dropped accidentally from the plane and it delayed the delivery process. At the time, delivering airmail was an unreliable process. Pilots placed mail in a rubber container and dropped it from the plane onto the airfield. At the same time, mail that needed to be picked up was attached to a contraption that the copilot had to grab with a grappling hook while suspended in the air. On one of Lindbergh's flights from Brownsville, he mysteriously lost bags of mail for an entire month.

Lindbergh understood the importance of the Kelly Act to the overall scope of commercial aviation. When President Roosevelt cancelled the Kelly Act in 1934, Lindbergh wrote a telegraph stating:

Your present action does not discriminate between innocence and guilt and places no premium on honest business. Your order of cancellation of all air mail contracts condemns the largest portion of our commercial aviation without just trial.
Davies, 156.



Aviator Stinson

In 1914, Marjorie Stinson, sister to the famous "Flying Schoolgirl" Katherine Stinson, became the youngest woman pilot in America to receive her license. She weighed only 101 pounds and was discouraged from attending flight school out of a concern that her weight might deter her from properly handling the controls.

When Marjorie attended the Wright brothers' flying school in Dayton, Ohio, other students teased and bullied her for her unprecedented confidence in flight. Like her sister, Marjorie first debuted her flying skills as a stunt pilot. In Brownwood, Texas, Stinson conducted a 35 minute flight that included a figure eight over a crowd of a thousand onlookers. Despite the unpredictable crash following her figure eight in Brownwood, Stinson continued her flight career to become the first female pilot for air mail.

The Stinson family owned and operated the Stinson School of Flying in San Antonio where Marjorie taught for a number of years. The Stinson sisters also worked extensively with their brothers to promote aviation in San Antonio. Very appropriately, when Marjorie Stinson died in 1975, her ashes were airmailed to San Antonio and scattered across Stinson Field in a 1931 Curtiss plane.



Brownsville Airport

In 1928, the city of Brownsville passed bonds to begin building the Brownsville Municipal Airport. The airport celebrated its grand opening when Lindbergh completed his historic flight from Mexico City. Nearly 20,000 people gathered at this event. One attendee in the crowd was Amelia Earhart.

Upon its opening, Brownsville Airport spanned approximately 251 acres. Its buildings and lighted runways were designed for day and night flying. In 1929, this airport had only two runways, and they were made of gravel, sand, and salt.

By 1931, the US Department of Commerce gave the Brownsville airport its highest rating based on its safety and innovative facilities. The city continued to build new facilities and a weather station to accommodate the service of multiple airlines including: Pan American's Western Division, Braniff Airways, and Eastern Airlines.

The chief engineer for Pan Am, Andre Priester, created techniques to train pilots for "blind flying". The Brownsville-Pan Am Municipal Airport became a prime training location to help keep pilots oriented in tricky weather situations. Trainee pilots sat blindfolded on a swivel chair and were taught the importance of flying with navigation instruments only. Pan Am opened an overhaul facility on Brownsville's airport base that refurbished and restored many planes for further use.



Leland Snow

Leland Snow has been called the "Thomas Edison of agricultural aviation" by Texas Monthly magazine. Snow grew up in Brownsville, Texas, and earned his pilot's license at the young age of 17. At the age of 20, he became a crop duster in the Rio Grande Valley.

In his position as an agricultural aviator, Snow grew disappointed in the "flying hunks of metal" used for crop dusting. As an aeronautical engineering graduate student at Texas A&M, Snow designed his own crop duster as part of his master's program. Unfortunately, Snow struggled to find loans that would finance his new invention.

In 1958, businessmen in Olney, Texas, searched for a growing industry that would bring economic prosperity back to the downtrodden community. In Olney, Snow received funding from an old-World War II Navy airfield to create a production plant. When investors first witnessed Snow's crop duster, it sat lopsided on a small spare tire he used for a last-minute fix.

Snow's "Air Tractor" revolutionized crop dusting for its precision, safety, and easy maneuverability. His planes could fly close to the ground and make tight turns over large fields. Since his first design, Snow has created 30 separate aircraft designs that are still in use.



Frequent Flyers

- JN-4 Plane, The Jenny: designed by Glenn Curtiss during World War I, this surplus plane carried mail at 80 miles per hour with nearly 300 pounds of mail on each trip, making it faster than a railroad's ability to make deliveries over long distances. This was a single-engine, wooden biplane, meaning two fixed wings stacked above each other.
- Curtiss created the Carrier Pigeon biplane in the 1920s to replace the Jenny; it was sleek, strong, and sold specifically for night flights.
- A Ford manufactured plane in the early 1920s, nicknamed the "Tin Goose", comfortably sat six passengers and roughly 1,200 pounds of mail. This plane was the first widely used airmail and passenger plane for many private airlines, like the National Air Transport and Texas Air Transport.
- In 1927, Texas Air Transport used the Pitcairn PA-5 Mail Wing plane for airmail transportation. This plane could hold up to 500 pounds of mail - more than most competitors.
- The National Flying Farmers Association started a program that led to the design of the AG-1 by Fred Weick. In 1950, its inaugural flight marked the first time a plane was designed specifically for application of poisonous chemicals from the air.

Photo credits

BESSIE COLEMAN, THE FIRST AFRICAN AMERICAN LICENSED PILOT shown here on the wheel of a Curtiss JN-4 "Jennie" in her custom designed flying suit (circa 1924). Courtesy of The Smithsonian Institution. <https://airandspace.si.edu/multimedia-gallery/web11673-2010hjpg>

CHARLES LINDBERGH, TO THE REAR, flies passengers Mrs. Bill Fuller and Barrett. Courtesy of University of North Texas Libraries, The Portal to Texas History, texashistory.unt.edu; crediting The University of Texas at Dallas.

KATHERINE AND MARJORIE STINSON. Courtesy of The Smithsonian Institution. <https://airandspace.si.edu/multimedia-gallery/3973640jpg>

BROWNSVILLE INTERNATIONAL AIRPORT, Courtesy of postcardpost.com

CROP DUSTING PLANE. *istockphoto.*

CURTISS JN-4 USAF. *Public domain.*



AERIAL SEEDING A FIELD.

Unknown; (texashistory.unt.edu/ark:/67531/metaph202445/m1/1/?q=airplane): Courtesy of the University of North Texas Libraries, The Portal to Texas History, crediting Museum of the Gulf Coast.



SAMPLE LESSON PLANS

Elementary (K-5th Grade)

Social Studies 16.B/17.A—describe how technology changes communication, transportation, and recreation.

1. The airmail act made it faster for people to get their mail. Explain the process of the Kelly Act, or read *Sadie the Air Mail Pilot* by Kellie Strom to help students understand that the invention of commercial flight helped improve communication and transportation.
2. Then, have the students break into two groups and sit crisscross in a line, one student sitting in front of the next. Have each student put their hands behind their back.
3. Write a message on a piece of paper and give it to the last person in each team. Time the students to see who can deliver the mail to the front of the line the quickest by passing the note from behind their back to the person in front of them.
4. Finally, write the same message on a paper airplane. Have students set up the same experiment and see which 'mail' makes it to the front of the line first—the note that is passed from student to student, or the paper airplane the instructor flies.
5. Ask students to discuss why it is faster to have the airplane deliver the note as opposed to passing it. Are there ways to make the transportation technology faster or more efficient? Brainstorm some ideas with your students.

English Language Arts and Reading 7.D—retell, paraphrase, or summarize texts in ways that maintain meaning and logical order.

- When tracing the development of commercial aviation, it is clear that there is a line from the airmail act to private airlines, more airport availability to passenger and entertainment flight.
- Retell the narrative from Theme I and have students draw a picture on a separate note-card of each new development. Once the pictures are complete, have the students pair up with a partner and see if they can retell the story to each other in a logical order using their images as an aid.



ARMY AIRMAIL PILOT LT. TORREY WEBB RECEIVES A CELEBRATORY WATCH from a representative of the Hamilton Watch Company. Each of the pilots flying the first day's mail between Washington, DC, Philadelphia, Pennsylvania, and New York City received a Hamilton Watch. Webb flew the Curtiss Jenny JN-4H between New York City and Bustleton airfield near Philadelphia on May 15, 1918.

Courtesy of the National Postal Museum, Curatorial Photographic Collection
https://arago.si.edu/record_194254_img_1.html

Middle School (6th–8th Grade)

English Language Arts and Reading 10.A—summarize the main ideas and supporting details in text, demonstrating an understanding that a summary does not include opinions.

1. Have students read a chapter about Bessie Coleman or the Stinson sisters from *Women Who Fly* by Lynn Homan and Thomas Reilly.
2. Then, have students write a summary about what they read. Once complete, have a few students present their summary to the class. Selections from this book are available as a google eBook.

Science 2.A, D, E—plan and implement comparative and descriptive investigations by making observations, asking well-defined questions, and using appropriate equipment and technology; construct tables and graphs, using repeated trials and means, to organize data and identify patterns; and, analyze data to formulate reasonable explanations, communicate valid conclusions supported by the data and predict trends.

1. Stand in front of your class and ask them to write down a prediction about what will happen when you throw a paper airplane. Then throw the plane and ask if their predictions were correct.
2. Break students up into groups and ask them to create an experiment. Students will work together to build one paper airplane per group. They will then form a hypothesis, make a chart, and run a test three times to evaluate the success of their airplane.
3. Then, have students write a paragraph about the results of their experiment and allow each group to present their findings to the class.



KATHERINE STINSON, AVIATRIX, with Curtiss Stinson special aerobatics biplane. Courtesy of the Library of Congress, Prints and Photographs Division
<http://hdl.loc.gov/loc.pnp/ggbain.26946>

JROTC CADETS NEGOTIATE AN OBSTACLE at the Leaders's Reaction Course at Grafenwoehr, Germany. Courtesy of The U.S. Army
<https://www.flickr.com/photos/35703177@N00/3675247091/>

High School (9th–12th Grade)

If you have students interested in aviation, encourage them to explore the Aircraft Owners and Pilots Association (AOPA). This group is designing a STEM curriculum in alignment with national education standards for high school students as a career and technical training education. The curriculum is available for all interested schools through an application process.

Check out AOPA here: <https://youcanfly.aopa.org/high-school/high-school-curriculum#requirements>

Another opportunity for high school students interested in aviation is the United States Air Force Junior Reserve Officer Training Corps (JROTC). The program is available for students who are in 9th-12th grade and are citizens of the United States.

JROTC attempts to “educate and train high school cadets in citizenship and life skills, promote community service, instill a sense of responsibility, develop character, leadership, and self-discipline through education and instruction in air and space fundamentals and the Air Force’s core values of integrity first, service before self and excellence in all we do.”

Many independent school districts in Texas partner with JROTC programs. For more information on those school districts, visit the JROTC website here: http://www.af.mil/About-Us/Fact-Sheets/Display/Article/104476/air-force-junior-reserve-officer-training-corps/ADDITIONAL_ACTIVITIES

Additional Activities

1. Fly like an aviator! A group activity for young children.

Imagine learning how to fly a plane in school, while also learning how to identify your ABCs and count to 10. In the early 1900s, students were expected to learn about aviation in elementary, middle, and high school. Part of their education was physical fitness, as pilots had to be in good shape to fit inside a plane. Do you think you have the team work it takes to fly a plane?

You will need: Hula Hoops, Start and Finish Line (and a lot of space!).

First have your pilots warm up. Be sure to do a lot of stretching—no aviator should be flying with sore muscles!

In this activity for young children, have four children stand with their backs to the center inside a hula hoop, each holding on to the hula hoop. The game works much like “Red Light, Green Light”. As you call out “Green Light”, students will move toward the finish line. “Yellow Light” means students must slow down, and “Red Light” means they must stop. The difficulty is that each student is facing a different direction, but they must work together to “navigate” their airplane toward the finish line.

2. Design your own plane! An activity for any size group, first grade to high school.

Imagine you have been selected to create the next plane to deliver mail in Texas. Your plane needs to be faster than the other competitors.

You will need: Paper, Scissors, Paper Clips, Tape.

- For young children, it is best to have volunteers work with students to create a basic paper air plane—many patterns and resources for creating a paper airplane are available online.
- For older students, allow them time to create their own design for a paper airplane. When all students are finished, have them “race” their plane against a competitor to see whose plane either flies the farthest or the fastest. Then, you can attach paperclips to the end of the planes to establish which plane can carry the most weight the farthest.

3. Navigation Skills for Aviation! (Geography TEKS 4.C, 15.B, 5.A)

Geared for elementary and middle school students.

Pilots must learn how to read a map before receiving their pilot’s license. Do you know how to read a legend? Do you think you could follow a map through an obstacle course?

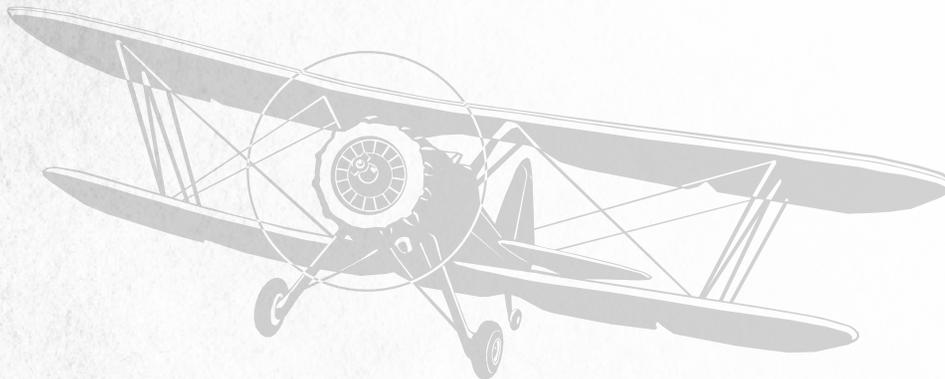
You will need: Crayons, Pencils, Glue, Scissors, Worksheets (see below), and an “Obstacle Course”—as large or as small as you can accommodate in your space.

For younger students, review the cardinal directions and work together to create a mnemonic device for remembering them (like Never Eat Smelly Worms). Then, help students create their own cardinal direction compass—there are many different designs, here is one found on Pinterest: <https://www.pinterest.com/pin/20618110764772328/>

- For younger groups of students, have them use their new compass to find a “treasure” hidden in your room—treasure could include a new pencil, a piece of candy, etc. Create a map for students to follow to the candy (for example, take ten steps N, and three jumps W in order to find the prize). Put students into groups to make this a team activity.

For older students (upper elementary and middle school), it is still a good idea to review the cardinal directions and come up with a mnemonic device to remember them. Then, work with students on reading a map. Explain what resources can be found on a map legend and review your lesson with a worksheet, like the one provided here: https://www.educationworld.com/a_lesson/worksheets/tlsbooks/pdfs/tls005-download.pdf

- For upper elementary and middle school students, set up an obstacle course in your space. You could use a line of blue paper to mimic a river, or set up chairs to create a mountain range. Make a map for your students to follow and see if they can find the treasure!



Other Resources

Plan a field trip to an aviation museum near you!

Looking for another location? Visit this website for more information:

http://www.aviationmuseum.eu/World/North_America/USA/Texas/index.htm

- Texas Military Forces Museum—Austin, TX
- Commemorative Air Force Museum-Rio Grande Valley Wing—Brownsville, TX
- Frontiers of Flight Museum—Dallas, TX
- Texas Barnstorming Museum—Hallettsville, TX
- Lone Star Flight Museum—Houston, TX
- Texas Air Museum at Stinson Field—San Antonio, TX
- Museum of North Texas History—Wichita Falls, TX

Multimedia Aids

- Historypin provides a unique experience to examine historic pictures and stories from communities. Find your neighborhood here: <https://www.historypin.org/en/>
- Texas Department of Transportation provides an overview of the Aviation Division and general Texas aviation history: <https://youtu.be/G7nVa5FLLu4>
- PowToon offers a three minute history of Bessie Coleman: <https://youtu.be/Ar5j25rTLFs>
- Here you will find an example of “Wing Walking” from the 1920s: <https://youtu.be/VKCKAJZ38UQ>
- Barnstormers: <https://youtu.be/FI6STwhPCuI>
- History of Leland Snow and his Air Tractor Company: <https://youtu.be/Ev0JPb4rWUI>
- Aviation in North Texas, as examined by the Texas Historical Commission: <https://youtu.be/zFgQ1CoMyDg>
- Interested in creating an exhibit with this information? Contact the TxDOT photo library for aviation-related images at (512) 486-5838.

Books

Here is a list of aviation books that could be used for pleasure reading, assigned classroom work, or to simply read out loud to a class:

Children

Nobody Owns the Sky: The Story of “Brave Bessie” Coleman
Reeve Lindbergh

Sadie the Air Mail Pilot
Kellie Strom

Amazing Airplanes
Tony Mitton and Ant Parker

Young Adults

Women Who Fly
Lynn M. Homan and Thomas Reilly

Back-n-Forth, Recollections of a Crop Duster
Leonard G. Belisle

We
Charles A. Lindbergh

Adults

Lindbergh
A. Scott Berg

Putting Dreams to Flight
Leland Snow

Low & Slow, An Insider’s History of Agricultural Aviation
Mabry I. Anderson



COVER IMAGE: NEAL DOUGLASS, DECEMBER 2, 1948, AIR-MAIL SERVICE. *Courtesy of University of North Texas Libraries, The Portal to Texas History, crediting Austin History Center, Austin Public Library.*

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Prepared by:

Mikayla Brown
Texas State University
Public History Graduate Student



Environmental Affairs Division
125 E 11th Street
Austin, Texas 78701