

Airmail to Airlines





U.S. AIR MAIL

A Teacher's Guide
Airmail to Airlines

GRADES 3 THROUGH 5



Smithsonian
National Air and Space Museum

Educational Services
Public Services Division
Exhibits and Public Services Department

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DEDICATION

For my father, Capt. Samuel Charles Walls, a Navy aviator and lifelong lover of airplanes

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Special thanks to Pat Gillan Milne for contributing the art work of her father for use as the cover to and as a poster with this guide; and to the Docents at the National Air and Space Museum who contributed so generously to this Guide.

COVER ARTWORK

"First Commercial Air Mail" by Paul W. Gillan (1918-1998)
30" x 50" oil on canvas

Artist, Paul Gillan (1918-1998) pictured in 1984 with his painting, *First Commercial Air Mail*. This painting won the 1984 contest sponsored by the National Air and Space Museum in celebration of the exhibition, "The Golden Age of Flight." The painting is in the collection of the National Air and Space Museum.

Paul Gillan created nostalgic paintings well known for their historical accuracy and detail. Mr. Gillan was chief designer for General Motors, before devoting himself full time to painting.

Educational Services
National Air and Space Museum
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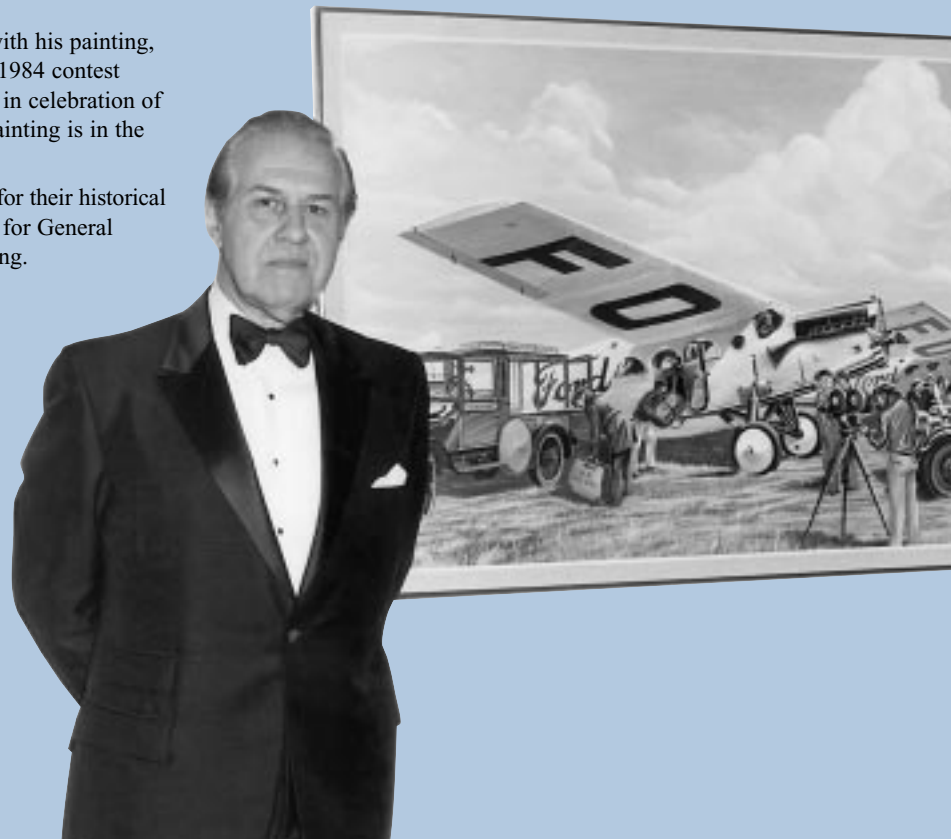


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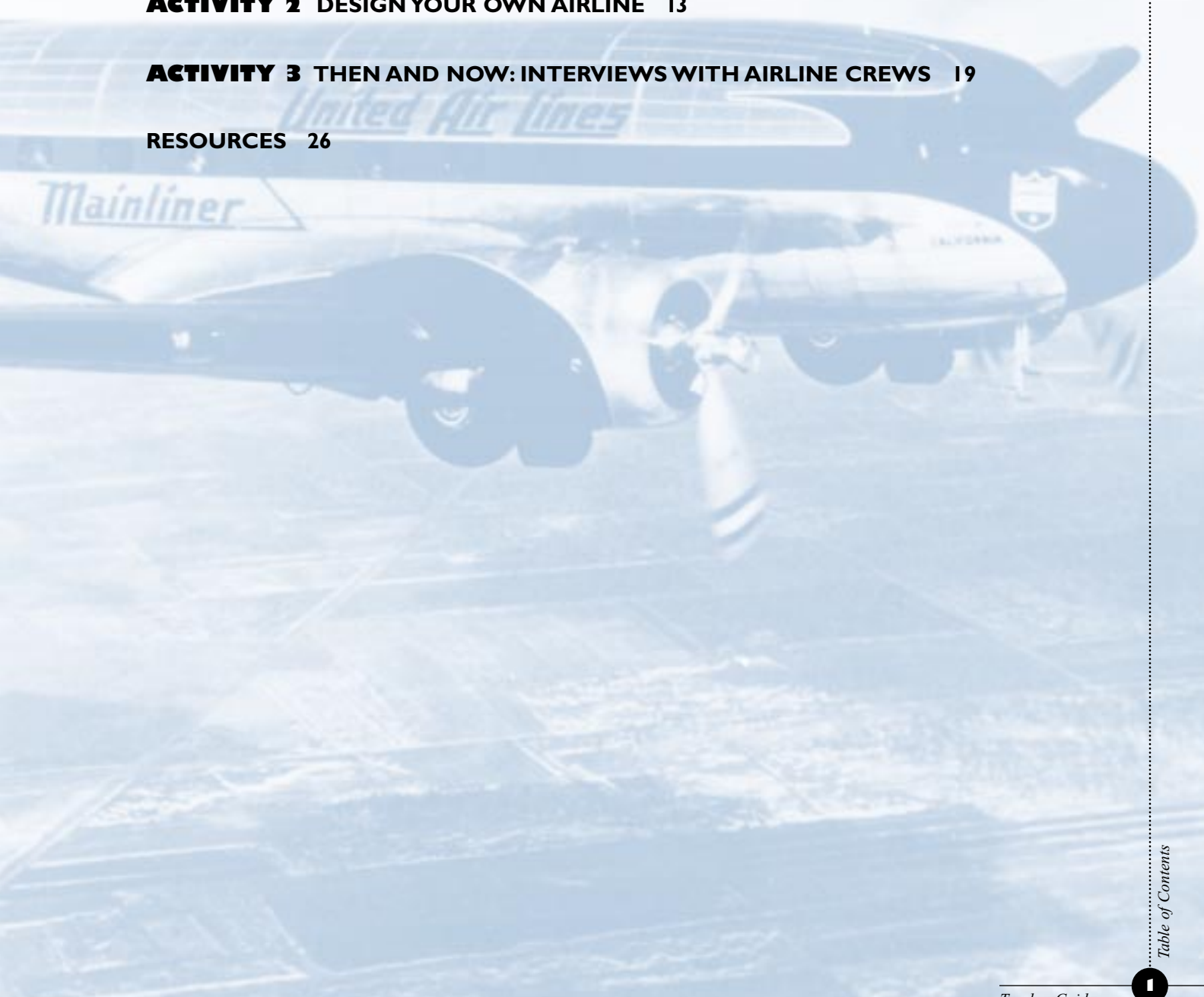
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The “Air Transportation” Gallery

Express packages...airports and airplanes...airmail letters...fresh produce out of season...air traffic control towers...vacations...emergency medical supplies...a visit from your grandma...

What do the words *air transportation* mean to your students?

The world of air transportation is a familiar one. Even if they’ve never been on an airplane, every child can recount *somebody’s* air travel experience. And although they’re most likely unaware of it, every one of your students has been profoundly affected by air transportation.

The growth of commercial aviation and its impact on all our lives are the themes of the “Air Transportation” gallery at the Smithsonian’s National Air and Space Museum. Who built the first airliners? What were early passenger flights like? Why is air travel safe? Do airplane tickets cost too much? How has air travel changed our world—and our lives? During a school group tour, your class will compare modern airliners with early transport airplanes to answer these and other questions. While they explore the gallery’s hands-on Discovery Carts, they’ll test out their answers with the “real stuff.” As they unfold the story of commercial aviation, they’ll discover its role in transforming our world. Because of technological advances, every aspect of our lives has been accelerated, from the time it takes to travel from one country to another to the speed with which new ideas and products can be exchanged.

To schedule a school group tour, call the Office of Tours and Reservations at (202) 357-1400 or visit our web site (<http://www.nasm.si.edu>). For more information about educational programs on air transportation at the Museum, contact Educational Services, National Air and Space Museum, Smithsonian Institution, Washington, DC 20560-0305 or visit our web site.

How to Use This Guide

This guide will help your class get the most out of a trip to the “Air Transportation” gallery. If you’re *not* scheduling a visit to the National Air and Space Museum, the information, suggestions, and activities it contains will be equally useful. Expand a study unit on forms of transportation, prepare for a trip to your local airport or air museum—the material you find here can be adapted to fit the needs and interests of your students.

What will you find in this guide? Background information, a resource list, blackline masters, extension ideas, and full instructions for three multidisciplinary activities. Activity 1 acquaints your students with the history of air transportation, Activity 2 enhances their museum or airport experience with airplanes, and Activity 3 builds on what they already know and are learning about careers in aviation. All three activities appeal to different learning styles, strengthen critical thinking skills, support national education standards, and—most important—have real-life connections for your students.



To reinforce these connections, “Molly’s grandma” introduces each activity. Let Grandma tell your class anecdotes from earlier days of aviation that give context and meaning to the corresponding activities. As you and your students discover the rich history of aviation, your class will see the impact air transportation has had on their lives.

And remember, the most successful museum field trips often cover the least physical ground. Limit the “field” by focusing on a single exhibition, and you’ll encourage your students to probe its topic deeply to reach new levels of understanding.

To talk over any of the suggestions in this guide or to share your own strategies and successes using these materials, contact Educational Services, National Air and Space Museum, Smithsonian Institution, Washington, DC 20560-0305.

NATIONAL EDUCATION STANDARDS ADDRESSED IN THIS GUIDE

National Standards for United States History

- ★ Historical Thinking
- ★ Living Together in Families and Communities, Now and Long Ago
- ★ The History of Peoples of Many Cultures Around the World

National Geography Standards

- ★ Human Systems

National Science Standards

- ★ Science and Technology

Language Arts Standards

- ★ General Skills and Strategies of the Writing Process
- ★ General Skills and Strategies for Reading a Variety of Informational Texts





Take Off: An Air Travel Matching Game

TIME REQUIRED: ONE CLASS PERIOD **GRADE LEVEL:** 3 THROUGH 5



“When I was a girl, going somewhere on an airplane was a big event. And if anyone took an airplane trip when *my grandmother* was growing up, it was reported in the town newspaper!” *Molly’s grandma remembers when families were just starting to enjoy traveling by air. Before the 1950s, most people thought it was too uncomfortable, too expensive, and too risky. Now, it’s a favorite way to go places! What helped air travel’s popularity “take off?” Match your cards with the squares on the game board to find out!*

OVERVIEW

This activity introduces the history of air transportation. Students match dates, milestones in air transportation, and photos of museum objects to create a visual time line.

OBJECTIVES

- ★ Demonstrate understanding of changes in transportation and their effects by investigating the design and development of aircraft and the people involved (History Standard 8 [B])
- ★ Draw upon the visual data presented in photographs (History Standard 2 [G])
- ★ Hypothesize influences of the past (History Standard 3 [K])
- ★ Contribute to group discussions (Language Arts Standard 8)
- ★ Prepare a time line showing how transportation and communication have changed (Geography Standard 11)

For each student:

- ★ One copy of two blackline masters:
Take Off Game Board and Game Cards
- ★ Scissors
- ★ Glue

For the class:

- ★ One copy of blackline master:
Milestone Cards

PREPARATION

1. Photocopy the three blackline masters. Make enough copies to give each student a game board and game card set. Copy the milestone cards once.
2. Pass out the game boards and game card sets. Separate the milestone cards, demonstrating careful cutting to your students. Pass out the scissors. Allow time for your students to cut their game card sets apart and place them picture-side up near their game boards. Collect the scissors.
3. Choose the first “game leader.”

PROCEDURE

1. Introduce the theme of the activity. Read what Molly’s grandma remembers about early air travel.
2. Begin the game. Ask the game leader to randomly select a milestone card and read it aloud. Each milestone card gives clues about a significant event or development in air transportation.
3. Match the object with the milestone. Encourage your students to examine the photos on their game cards to find the object that fits this description. The first student to make the correct match is the new game leader.
4. Create a time line. When did that milestone take place? Instruct your students to set the first game card on the appropriate square on their game board.

- Continue the game. Ask the new game leader to select another milestone card. The first child who correctly matches this card becomes game leader for the next round.
- Complete the time line. End the game when all the game cards have been matched. Distribute the glue. Lead your students in gluing the game cards in their correct positions.

REFLECTIONS AND DISCUSSION

- ★ Each of these milestone cards represents a beginning point or a change in air transportation. How? (Clues can be found in “Background Information” below.)
- ★ Did these milestones change life for Molly’s grandma? Have they changed life for *you*? In what ways?
- ★ People need to communicate with each other. When air transportation began, the industry’s only goal was faster communication—by mail! What are some other kinds of transportation? Do they make communication easier? How?

EXTENSIONS

Make a large-scale time line as a class project. Record the milestones highlighted in the matching game, then add other advances. Create an air transportation bookshelf with selections from the “Resources” section in this guide. Allow enough independent research time for each child to identify one item to add to the time line. Include breakthroughs in other types of transportation and communication. Expand the time line with illustrations of correlating developments in music, sports, fashion, movies, and other areas of popular culture.

MUSEUM CONNECTIONS

All but one of the photos on the game cards show real objects in the “Air Transportation” gallery. How many can you find?

Note to teachers: The missing object—the nurse’s cap—is included in the collection of objects in the Museum’s Discovery Carts.

For first-hand experience with some air transportation objects, look for Objects in Time, an activity in one of the Museum’s Discovery Carts!

BACKGROUND INFORMATION

Each of the eight game cards shows an object connected with the beginning or development of air transportation. Use the information below to help your students explore the short- and long-term impact of these milestones.



1. Early Navigation (c. 1910)—Before 1920, airplanes had almost no safety equipment. Engines, compasses, and altimeters were unreliable, and crashes were frequent. To see where he was going, a pilot had to look over the side of the airplane to spot railroads, rivers, and other landmarks. If visibility was poor, he easily could get lost. In a fog, he couldn’t even tell if he was flying the right way up. During the early years of airmail, pilots used maps like this one to navigate. Air Mail Service pilots also had a booklet giving distances and compass courses. But radio navigation systems—enabling pilots to fly longer distances, through fog, and at night—weren’t common until the late 1930s. Today, pilots usually navigate with the help of computerized instruments that calculate their airplane’s position. They also maintain radio contact with control towers along their routes. But they also still use a printed guide—an aeronautical chart. This chart shows high-altitude jetways—the “freeways of the sky” that all jets must follow—and includes communications information, restrictions, and cruising altitudes.

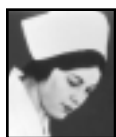


2. Beginning of Air Transportation (1918)—The U.S. Air Mail Service, which began in 1918, was the proving ground for air transportation. It operated like a pony express in the air, with relays of pilots and planes carrying mail to major cities throughout the country. To make this service possible, the government provided airfields, hangars, a point-to-point radio network, spare parts, airplanes, and pilots. In 1925, private companies began to take over the delivery of mail for the government. These early airlines made more profit on mail than passengers. Occasionally, passengers would squeeze in with the mailbag pouches, only to be left behind when more mail came on board. Not surprisingly, few passenger tickets were sold in these early days. But the government’s long-range goal—to be a “laboratory for the advancement of commercial aviation...the first step toward the universal commercial use of the aeroplane”—was achieved. Airlines today make their profits

from passenger tickets and cargo, and since 1975, no additional postage has been required for airmail.



3. Safer Night Flights (1926)—In the early 1920s, airplanes operated without accurate instruments, and an airmail pilot on a night flight often was guided only by bonfires. To improve safety, the Post Office used a system of powerful beacons to construct a lighted airway across the continent. Placed 16 kilometers (10 miles) apart and rotating every 10 seconds, these beacons could be seen 60 kilometers (40 miles) away. With a marked airway to follow at night, pilots could make airmail service both practical and reliable. Earlier, transcontinental mail took 91 hours via rail; after the beacon system was completed in 1926, it took only 29 hours via air (including fuel stops). Today’s transcontinental trip is about five hours.

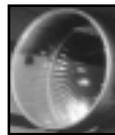


4. The First Female Flight Attendants (1930)—When the airlines hired the first female flight attendants in 1930, they required that all applicants be registered nurses. Earlier, the co-pilot or a male steward attended to baggage, ticketing, ground duties, and passengers. But the airlines realized that safety concerns prevented many people from flying. Having registered nurses as flight attendants eased the worries of passengers and their families. In 1935 public confidence in air travel was boosted further when the film industry began allowing their stars to fly. Today, flight attendants are safety professionals, seeing themselves—as one flight attendant described herself—“as somebody who knows how to open the door of a 747 in the dark, upside down, and under water.”



5. Overnight Travel (1936)—Until 1929 passengers couldn’t cross the United States by air, and even then they had to make part of the trip by train. Air travel was expensive, uncomfortable, risky, and not very popular. The only good reasons to choose it were the novelty and speed of flying. Airplane cabins weren’t pressurized or well heated. Flights were noisy (See the cotton balls in the picture. These were given to passengers to put in their ears!) and rough; passengers often got chilled, light-headed, or nauseated; and many planes had to be hosed out after they landed. Pressurized airliners were introduced in the early 1940s. Flying at higher altitudes,

they were faster, smoother, and more efficient. Regular passenger flights across the Pacific began in 1936. In 1939 flights crossed the Atlantic as well. To increase their comfort on these long trips, passengers were given overnight flight bags containing toiletries and other amenities.



6. Greatly Increased Speed (1958)—In 1929 a cross-country trip took 48 hours. In 1958, when the first successful jetliner went into service in America, the same trip took a little over 5 hours. Jet engines increased airplane speeds from 560 kilometers (350 mph) to over 800 kilometers (500 mph), and soon even the word *jet* was used to mean “speedy.” Jet airliners have many other advantages: they require less maintenance, carry more passengers, and can fly at higher altitudes than the earlier piston-engine airplanes. For passengers, this meant faster, more comfortable trips and much lower fares. Consequently, annual passenger ticket sales increased dramatically. Today’s mass commercial air travel market and tourist industry is based on the jet engine.



7. Affordable Tickets (1970)—Wide-body jets like the 747, which was first flown in service in 1970, revolutionized air travel. By reducing maintenance expenses and spreading costs over a greater number of seats, the 747 allowed lower fares and made air travel more accessible to the general public. Seating more than 400 passengers, the 747 is still the largest commercial passenger jet.



8. Computerized Flying (1989)—The state-of-the-art technology used in the Airbus A320 (launched in 1989) gives us a glimpse of the future for commercial aviation. Many of its systems are computerized, and it was the first airliner to use computerized flight controls. With this system, commonly known as “fly-by-wire,” electrical signals are used instead of mechanical controls to link the cockpit with the movable surfaces that control the airplane. Rather than mechanical gauges and instruments, the cockpit has integrated panel displays for the flight crew to monitor the on-board systems. The Airbus A320 was also the first commercial aircraft to replace the pilot’s and co-pilot’s control columns with sidestick controllers. Computerized flying lowers fuel consumption and maintenance costs and increases reliability and safety. In most new aircraft today, computers control almost all the flying.

take off



1918

*Beginning of Air
Transportation*

1930

*The First Female
Flight Attendants*

c. 1910

Early Navigation

1926

Safer Night Flights

1900

Name:

Grade:

Date:

1958

*Greatly Increased
Speed*

1989

*Computerized
Flying*

1936

Overnight Travel

1970

Affordable Tickets



ROTATING BEACON



BOEING 747 AIRCRAFT NOSE



JET ENGINE



PASSENGER'S OVERNIGHT FLIGHT BAG



MAILBAG WITH LETTERS



SCROLLING MAP



NURSE'S CAP



AIRBUS A320 "GLASS" COCKPIT

<p>With this, an airplane could go twice as fast. Why would that make air travel more popular?</p>	<p>Flight crews watch this to check on their airplane's operating systems. What is controlling their airplane's flight? How could this change air transportation?</p>	<p>By moving this, airlines got their start by doing an important job for the country. What else do airplanes carry from place to place?</p>	<p>Airlines gave this to their passengers to make them more comfortable. On what kind of trips would this be most useful?</p>
<p>Following this helped pilots get where they wanted to go. How did navigation become safer?</p>	<p>This gave pilots a lighted pathway to follow from the air. How did this let airplanes make longer flights?</p>	<p>The person who wore this made passengers feel safe. Why would this help airline companies get bigger?</p>	<p>More than 400 passengers can fit in this airplane. How does that make air travel easier for everyone to fly?</p>



Design Your Own Airline

TIME REQUIRED: ONE HALF-DAY FIELD TRIP AND ONE CLASS PERIOD

GRADE LEVEL: 3 THROUGH 5



“In my grandmother’s day, safety was the biggest concern. Seeing the trusted ‘Ford’ name on an airplane’s tail reassured people—they knew it was a company that built reliable machines. Now the words and symbols on an airplane tell us other things.

To be sure passengers recognize an airline and remember what makes it special, designers put the logo on nearly everything—even the coffee cups!” *Molly’s grandma has seen airlines change a lot over the years. How does the work an airline does affect the way its airplanes look? Design your own airline and find out!*

OVERVIEW

This two-part museum/classroom activity encourages imagination, problem solving, and direct experience with airplanes. Students work individually and in teams to observe airplanes, to analyze the relationship between form and function, and to develop their own airline designs.

OBJECTIVES

- ★ Demonstrate understanding of the development of technological innovations and their social and economic effects (History Standard 8 [A])
- ★ Identify and communicate a need and propose, design, implement, and evaluate a solution (Science and Technology Content Standard E)

For each student:

- ★ One copy of the blackline master: Airplane Observations
- ★ Pencil
- ★ Clipboard

For each student team:

- ★ One copy of the blackline master: Design Your Airline
- ★ Pencil
- ★ Clipboard

Note to teachers: Although Design Your Own Airline is intended to be an open-ended and creative activity, it can also serve as an excellent motivator for more in-depth research on aircraft technology. See “Museum Connections” and “Background Information” for suggestions on resources for further study.

PART I: IN THE “AIR TRANSPORTATION” GALLERY

VOCABULARY

- ★ **airplane:** a winged vehicle capable of flight
- ★ **airliner:** a passenger airplane operated by an airline
- ★ **airline:** a business providing scheduled air transport of passengers and other cargo

PREPARATION

1. Arrange for a field trip to the National Air and Space Museum. When you call the Museum, schedule a History of Flight tour and a hands-on activity in the “Air Transportation” gallery. Be sure to mention that your students will be working on the *Design Your Own Airline* activity from this Teacher’s Guide. Request that a copy of the *Looking at Airplanes Visitors Guide* be sent with your confirmation. This publication supports the “Reflections and Discussion” section, below.

2. Observe airplanes through other resources. Visit a local airport, check the Web, or study photos in the local library. Even if you aren't planning a field trip, your class will be able to examine a variety of airplanes. And if you *do* visit the Museum, these resources will make your experience a much richer one.
3. Photocopy the blackline masters. Make enough copies to give one copy of each to every student.

PROCEDURE

1. Take the History of Flight tour with your class. Together with the companion hands-on activity in the "Air Transportation" gallery, this guided introduction to air transportation will help your students learn what to look for when comparing airplane designs.
2. Distribute the Airplane Observations worksheet, clipboards, and pencils to your class. Allow time for each child to choose an airplane for focused observations.
3. Observe and record. Ask your students to use the worksheet to describe the structure and design of their airplanes. Emphasize that they should look for evidence to support their opinions and predictions. Encourage your students to read the text panels and labels for relevant information.
4. Discuss the findings. Reassemble your class. Ask why they selected their focus airplanes and what they learned about them.
5. Divide the class into small teams. Ask for a volunteer reporter from each team. Give each reporter one copy of the Design Your Airline worksheet; collect the surplus clipboards and pencils.
6. Apply what's been learned. Each team will use the worksheets to create a group master plan for a new airline. Remind your students that the information they recorded on their Airplane Observations worksheets can help them make decisions about their own airlines.
7. Share the designs. Allow time for each reporter to describe his team's plans. If time permits, ask team members for the reasons behind specific features of these innovative airlines!

REFLECTIONS AND DISCUSSION

- ★ Stripes painted on an airplane's wings don't change how it flies, but what effect could the *size* of the

wings have? What other parts of an airplane's design might affect the way it performs?

Note to teachers: This activity focuses on observation and prediction. Encourage your students to make hypotheses, read gallery labels, and interview their Docent (tour guide) for information. If your class wants to explore the interrelation of aeronautics and design further, see "Museum Connections" and "Background Information."

- ★ We can guess a lot about an airline's purpose just by looking at its aircraft. Will the design of your airline's aircraft fit the kind of work they will do? How?

EXTENSIONS

- ★ "Pitch" these exciting designs to possible investors! Back in the classroom, have your students write persuasive letters explaining why their airline designs should be adopted. Teams may want to create a presentation board—featuring drawings, "specs," and written descriptions—to help sway potential decision-makers.

CURRICULUM CONNECTIONS

- ★ Art
- ★ Language arts
- ★ Mathematics

MUSEUM CONNECTIONS

- ★ Why *does* the size of an airplane's wing matter? Visit the Museum's "How Things Fly" gallery for hands-on activities demonstrating principles of flight and their impact on aircraft construction design.
- ★ Examine and compare some of the materials used to build airplanes in *Big, Bigger, and Biggest?* and *The Right Stuff*, two Museum Discovery Cart activities.

BACKGROUND INFORMATION

- ★ The *Looking at Airplanes Visitors Guide* highlights the special design features of some of the Museum's most significant aircraft. Use this publication to lead a self-guided tour with your students or to support classroom research activities.
- ★ For further information on aircraft design, send your students to *The K-8 Aeronautics Internet Textbook* (<http://wings.ucdavis.edu>), developed in cooperation with NASA.

Name:	Date:	Grade:
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Airplane Observations

Choose an airplane from the gallery. Examine it carefully and answer these questions.

1. *What materials were used to build your airplane?* _____

2. *How big is your airplane? What is its wingspan?* _____

3. *Calculate the load capacity of your airplane:
weight loaded - weight empty = how much the plane can carry.* _____

4. *Count the number of seats. Remember to include the pilot's seat!* _____

5. *Count the number of wings and engines. Is there a propeller?* _____

6. *What was your airplane used for? How did its design help it do this job?* _____

7. *Does your airplane have a name or nickname? If not, come up with a name of your own for it.*

8. *Is there a seal or design on your airplane? If so, draw it here. If not, create your own design.*

Name:	Date:	Grade:
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Design Your Airline

Use this sheet to develop a master plan for your own airline.

1. *What type of service will your airline provide?* _____

2. *What special features will your airplanes need to do this job?* _____

3. *What type of engine will your airplanes have? Where will the engines be located? Why?*

4. *What materials will you use to construct your airplanes?* _____

5. *What will your airline be called?* _____

6. *What route will your airline travel? Where will it be based?* _____

7. *What will the pilot and crew wear? Draw and label their uniforms on the back of this page.*

8. *What will your airline's slogan be?* _____

9. *Draw your airline's logo on the back of this page.*

PART II: IN THE CLASSROOM

PREPARATION

- ★ Collect a variety of travel posters and airline advertisements. Travel magazines, travel agencies, and airline offices are possible sources. Display a selection in your classroom.
- ★ Create a work station for each team with the supplies listed above.

PROCEDURE

1. Reassemble the teams. Explain to your students that each team will be working together to *sell* their airline to their classmates.
2. Review the master plans. Pass out the completed Design Your Airline worksheets. As your students revisit their designs, ask them to think about what features make their airlines unique.
3. Plan a publicity campaign. Ask each team to come up with an advertising strategy. Will they try to attract families or business travelers? Will they emphasize their airline's efficiency or its luxury? What will make someone choose their airline over the *competition*?
4. Create posters promoting the new airlines. At the work stations, allow time for your students to use the provided supplies to complete posters advertising their airlines. Each team's work should include their airline's slogan, its logo, and a drawing of one of its airplanes.
5. Enlarge your classroom display. Ask each team to present their finished poster to the class. Do your students have a favorite? What *sold* them?

MATERIALS

For each team:

- ★ Completed Design Your Airline worksheet
- ★ Large tagboard or heavy paper
- ★ Pencils
- ★ Ruler
- ★ Markers or colored pencils
- ★ Glue
- ★ Scissors
- ★ Colored paper

REFLECTIONS AND DISCUSSION

- ★ Lead the class in discussing some of the things that might contribute to an airline's success. Does it provide special services for its passengers? Will it carry unusual cargo? Does it provide transportation to hard-to-reach places? Is it especially reliable?



This is an early publicity photo for promoting the use of air cargo.

EXTENSIONS

- ★ What would it be like to be a passenger—or crew member—on one of the teams' airlines? After your students have looked over their classmates' posters, instruct them to choose one of the new airlines for their own imaginary *flight* and write a letter describing that experience.

CURRICULUM CONNECTIONS

- ★ Visual arts




STEWARDESS
IS YOUR
HAT STRAIGHT

MAKE UP NEAR
HAIR LENGTH
CORRECT

BLOUSE CLEAN

INSIGNIA ON
COSTUME JEWELRY
OFF

UNIFORM CLEAN
and PRESSED

SLIP SHOWING

HOSE SEAMS
STRAIGHT

SHOES SHINED

Then and Now: Interviews with Airline Crews

TIME REQUIRED: ONE CLASS PERIOD **GRADE LEVEL:** 3 THROUGH 5



“Pilots and stewardesses seemed almost like movie stars to me when I was little. I dreamed of having as glamorous and as exciting a life as theirs!” *Molly’s grandma remembers hearing lots of stories of adventures and exotic places. What was a career with the airlines really like back then? What is it like now? Let these crew members tell you!*

OVERVIEW

This activity builds on what students already know and are learning about the history of air transportation. Using role-play and interview techniques, students analyze first-person accounts to compare airline travel and careers at different time periods.

OBJECTIVES

- ★ Explain change and continuity over time (History Standard 1 [G])
- ★ Read historical narratives imaginatively (History Standard 2 [C])
- ★ Formulate questions to focus their inquiry or analysis (History Standard 3 [A])

- ★ Write expressive compositions using narrative strategies, relevant details, and ideas that enable the reader to imagine the world of the event or experience (Language Arts Standard 1)
- ★ Use prior knowledge and experience to understand and respond to new information (Language Arts Standard 7)

PREPARATION

- ★ Photocopy the blackline masters. Each student will need a copy of the Interview Questions and the three Remember sheets. Each team will need a copy of the Then & Now diagram.

PROCEDURE

1. Introduce the theme of the activity. Read what Molly’s grandma remembers hearing and thinking about careers with the airlines.
2. Divide your class into two-person teams. Give each team two copies of one of the Remember sheets. Ensure an even distribution: For example, in a class of 24 you might have four flight attendant teams, four mechanic teams, and four pilot teams. The activity will be more successful if all three careers are equally investigated.
3. Then or now? Assign each team member to one time period. Again, the activity will be more interesting if the early and later time periods are equally represented.

For each student:

- ★ One copy of four blackline masters: Flight Attendants Remember, Mechanics Remember, Pilots Remember, and Interview Questions

For each team:

- ★ One copy of the blackline master: Then & Now (a Venn diagram)

For the class:

- ★ Chart paper
- ★ Markers

4. Get a perspective on air transportation. Allow time for each student to silently read the first-person account on her Remember sheet that corresponds to her assigned time period.
5. Assume a role. Inform your students that they have temporarily become the early or current flight attendants, mechanics, and pilots they read about.
6. Share memories and opinions. Pass out the Interview Questions and the Then & Now diagram. Instruct the team partners to fill in the circles together as they interview each other about *their* careers. How were they the same? How were they different? Remind your students to look in their Remember sheets for evidence to support their answers, but reassure them than they may not be able to respond to all the interview questions.
7. Compare experiences. Ask each team to report back to the class. Use the chart paper and markers to create a large Venn diagram summarizing the similarities and differences they discovered.
8. Fill in the blanks. Read one or two of the completed Interview Questions aloud. What do your students still want to know? What questions could they ask to find out? Brainstorm a list and record it on a second sheet of chart paper. As a group, use a third sheet to write a creative interview that answers some of these new questions.

REFLECTIONS AND DISCUSSION

- ★ Molly's grandma was a teenager when she took her first airplane trip—to see *her* grandmother! Before then, she went by train, bus, or automobile. What are the advantages of each of these four kinds of transportation? What are the disadvantages?
- ★ Air transportation began nearly a century ago. How would our lives be different today without it?

EXTENSIONS

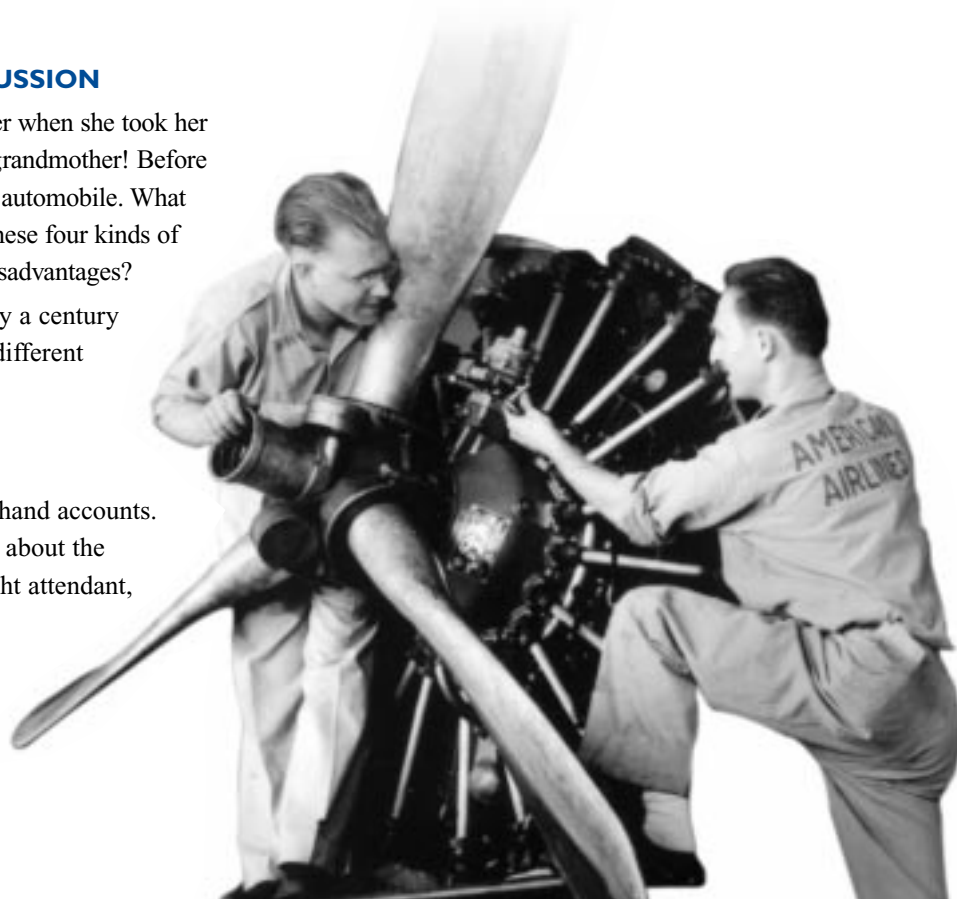
1. Add to our collection of first-hand accounts. Conduct an interview to learn about the career of a current or past flight attendant,

mechanic, or pilot living near *you*. Use the Interview Questions form and send a copy to us here at the Museum.

2. Let's hear from some *passengers*, too. Interview friends and family members about their recent or long-ago flight experiences.
3. And don't leave out *future* crew members and passengers! Research the prices, connecting flights, and schedules for a trip to neighboring state. What will this same trip be like when *you're* a grandparent? Write an imaginary interview of a pilot, flight attendant, mechanic, or passenger on that future flight.

MUSEUM CONNECTIONS

- ★ Some of stories name things that pilots, flight attendants, mechanics—and their passengers—used on airliners. Which of these objects did you see in the exhibition? Look for similar objects in three of the Museum's Discovery Cart activities—Pilots Then and Now, The Right Pilot for the Job, and Passengers Then and Now.
- ★ What do airline *passengers* remember? If your students enjoyed playing the roles of flight crew members, let them add this missing role with Air Travel Conversations, another Discovery Cart activity.



THEN: Pat Nagel

I was a flight attendant on American Airlines from September 1950 to February 1952, but the preferred title for a cabin attendant in those days was “stewardess.” I became a stewardess because I wanted to fly. Learning to fly was very expensive and pilot jobs for women were almost non-existent. After college I worked for Philadelphia Gas Company as a home economist, testing recipes and teaching cooking classes.

After a year, I was accepted at the American Airlines (AAL) Stewardess School. Being a stewardess was fun, and it was *flying!* AAL paid starting stewardesses \$185.00 per month, minus social security, taxes, and \$12.50 a month for a uniform. I was with the airline for a year and a half—the average length of time; the airlines wouldn’t let stewardesses fly after they married or turned 31.

I was based at New York’s La Guardia Airport, and my favorite flight was to Chicago. We made seven stops before Chicago—an all day affair. We flew on a Convair CV-240 with two pilots, room for 40 passengers and one stewardess. It was my airplane. The passengers at that time were mostly men on business and people who had a lot of money. Flying wasn’t for family vacations. Stewardesses were gracious, in the manner of the time. Consulting our seating chart, we greeted every passenger by name and served them beverages, but no alcohol. Most flights had meal service.

We had a strict uniform. I wore a navy blue skirt, jacket, and cap with a white blouse and navy blue high-heeled shoes. Our in-flight shoes could be flat, but we couldn’t wear them boarding or deplaning, and our hairdos had to be short enough to clear our collars. Also, both stewardesses had to be dressed alike. If one of us removed our jacket, then the other one had to do the same.

I was trained in emergency procedures and always felt safe. I never anticipated any problems, but I knew what to do if there were any. I didn’t expect the airplane to turn over any more than I would expect this room to flip.

In the photo, I’m standing next to Caesar Romero. Mr. Romero was a famous movie star and a passenger on my flight, so American Airlines took this photo to use in advertisements.



NOW: Brigitte O’Ryan

I flew with U.S. Airways from 1993 to 1995, beginning as an “on reserve/on call” flight attendant. I had just graduated from college, and I wanted to travel before going back to school for another degree. My father was a pilot and my mother was a flight attendant, so I wanted to try flying, too. Everyone in my training class wanted to travel, and my roommates and friends from that time are *still* flying.

Because I speak French, I worked on the Philadelphia to Paris flights. I got the passengers seated and settled and helped them get their bags arranged. Flight attendants were responsible for the meals, but on short flights they usually just served drinks and peanuts. Occasionally we’d have a sick person, and passengers always asked, “What can I do when my ears pop?” We put cups on their ears, over a wet towel. It might have helped, but it looked ridiculous!

We had variety in our uniforms. I could choose between two kinds of pants and two kinds of skirts, but I always had to wear them with a blouse, a blazer, and a tie.

People have this fantasy of being a flight attendant as glamorous, which it really isn’t. Sometimes you feel like a “waitress in the sky,” and it can be draining. But it’s still rewarding.

During training, I spent five weeks studying safety. When you’re in a car, you’re at the mercy of other drivers. With planes, you’re only dealing with technical problems. There are backup systems for everything that can go wrong, and everything is checked and double checked. But the second year I was flying, there were two airline crashes in six months. That reminded me that it *could* happen and made me thankful for my safety training!



THEN: George Lynch



I was an aviation mechanic from 1949 to 1990, including four years in the U.S. Air Force and 37 with American Airlines. I've worked on many airplanes, from the DC-4 to the Boeing 757, which was the last plane I worked on. My favorite plane was the Convair 240. It was the first post-war modern air-

liner, and it had features we're still flying today on the 727, like air-driven turbines and air conditioning.

I went to vocational school in Pennsylvania, and I liked mechanics. When I came to Washington, D.C., in 1949, I got a job as an aircraft cleaner with American Airlines. During the Korean War, I enlisted in the Air Force and got my Engine Power Plant license. That qualified me to work on the engines of any civil aircraft in the United States. In 1954 I came back to American Airlines as a junior mechanic. Then I got my FAA Aircraft and Power Plant Certificate, allowing me to work on both airframes and engines.

I worked on planes on layover at Washington (now Reagan) National Airport. I worked from midnight to 8:00 a.m., five days a week. The planes—DC-7s—came in late in the evening and were pulled to a hangar for the layover checks. At least four people worked on each plane. We all worked together, and we brought other people over if we needed them. Each DC-7 took at least 25 man hours of maintenance during the night—20 hours for the engine and five hours for the airframe.

Those were the days of nuts-and-bolts mechanics. Aviation technology was much less sophisticated because most of our instruments were basic and simple—they were air-, wind-, or electrically driven. But any piston engine, when it's running right, will talk to you. In the air, a pilot could see which engine wasn't smooth. On the ground, we could look at the exhaust flames and determine which cylinder was misfiring.

Safety is the creed of the airlines. We always preach safety. The excellent safety record is due to the back-up systems and to training at all phases—from the ground crew to the flight personnel. And manufacturers are just building a better product!

NOW: Loren A. Harvey

I've been a line mechanic with American Airlines for 32 years, since 1967. I've worked on F-100s, Boeing 727s and 757s, MD-80s, and DC-9-80s. Soon I'll be working on 737s. My favorite plane is the MD-80. I like it because I *know* it!

My father was in the Air Force in World War II. When he came back, he brought a big book of photographs. I used to look at the airplanes in it. My father was mechanically inclined, too; he fixed cars and other things. Your parents have a big influence on you! For training, I went to the Pittsburgh Institute of Aeronautics at Allegheny Airport, where I studied math, aircraft maintenance, and electrical systems.

I work on airplanes at Reagan National Airport. I work the afternoon shift, from 2:30 p.m. to 11:00 p.m. Usually, a crew chief and two or three mechanics work on a shift, but it varies. We work on aircraft as they come in. We don't do



inspections. We talk to the crew to see if there's anything that's a problem. If official regulations say a problem can safely be taken care of later, we "placard" it—we put a sticker on the plane saying, "Don't use this system." When the plane gets to its final destination, the mechanics there will fix it. But the airplanes are such good machines, there isn't a lot to do. We use built-in computerized test equipment. You press

a button and see what the problem is. And I want to tell you, it's accurate! Today you don't want a mechanic to even *have* a toolbox. You want him to have a laptop computer.

The computer is the new toolbox!

The airplanes are what makes airlines safe today. They're fine, sophisticated machines that don't have a lot of problems. And a lot of the problems they do have are "black box fixes." We replace the whole system, then we ship the defective system in a black box to wherever it will be overhauled. We don't see it again until it's fixed. Meanwhile, the passengers are waiting; they've paid their fare. And I can say, "Here's a safe airplane, Captain. It's all yours!"

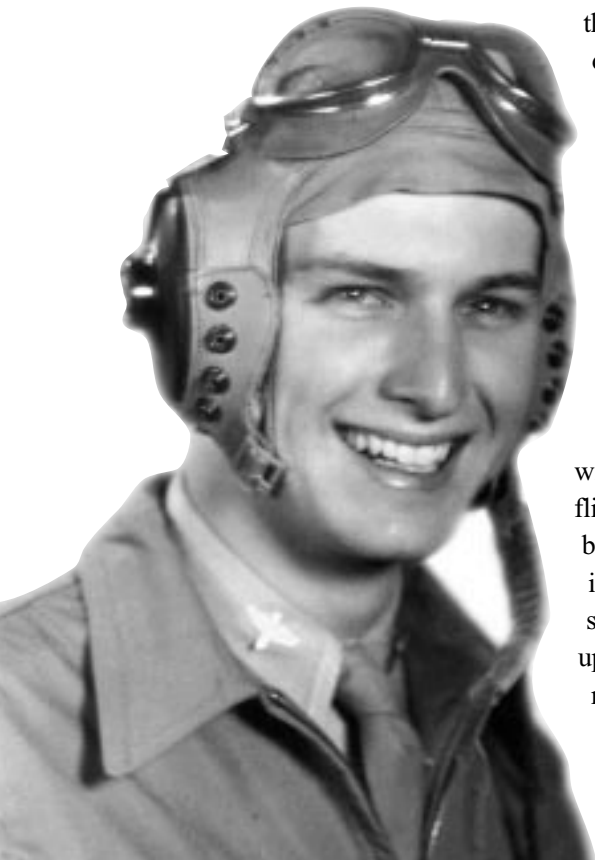
THEN: Blanchard Shattuck

I trained on a Boeing Stearman two-seat, open-cockpit plane in 1943, I piloted DC-3s in the late 1960s, and I flew helicopters in Vietnam. I knew from the age of five that I wanted to go to West Point. Once I was in the Army, I was sent to aviation school in Fort Sill, Oklahoma. It was good training, it was a challenge, and it was fun!

As a training exercise, the flight instructors sent my whole class up—50 planes! “Can you see the terrain?” they asked. “Do you have enough fuel? Where will you land if you don’t?” We did our calculations, got maps, and marked them up to show our routes. We used a compass to get our direction and kept checking to see if the wind was making us drift off course, so we could correct that. When pilots use flight instruments, they follow “IFR.” That stands for “Instrument Flight Rules.” In the 1940s, our instruments weren’t very reliable, and not all pilots were qualified to use them. So we looked for landmarks—rivers, roads, and towns. We always said that, for us, “IFR” meant “I Follow Railroads!”

In an open-cockpit plane, you’re only protected by the windshield. There’s no top. We wore cotton coveralls, canvas flying helmets that snapped under the chin to hold them on, and goggles that were secured by tabs in the helmet. We also wore parachutes, but we weren’t trained to use them. If you got in trouble, you had just *one* chance to learn!

At Fort Sill, there were little dirt or grass landing strips all through the woods. You had to decide where the wind was coming from, then choose your direction for landing. Once I was landing on a dirt strip that machines had plowed, leaving ridges on the side. My open-cockpit plane hit the ridge with its wheel and flipped right over on its back. I was left hanging by my seat belt and shoulder harness—upside down! That made me a great believer in seat belts!

**NOW:** Hugo Ramos

I’m a first officer, or co-pilot, for Northwest Airlines. I’m second in command of the aircraft. I help plan the flight, and I take turns flying the airplane on every other leg of a trip. I decided to fly because of the challenge. I trained on T-37 and T-38 training jets while I was in the Air Force,

and I’ve been flying Boeing 727s since 1995.

The 727 has a three-man crew. Newer, more computerized airplanes have a two-man crew—the computer almost acts as a third crew member. In these planes, a big part of the job of flying is working with the computers. The pilot controls the computer and the computer “flies” the airplane.

There’s a lot of history to our uniforms. Almost all airline uniforms have stripes on the shoulder epaulets and sleeves—four stripes for captain, three for first officer, and sometimes one or two for flight attendants. The captain’s hat is different from everyone else’s, with lightning bolts on the visor. Many uniforms also have historic wings and insignia. Northwest’s insignia is “U.S. Air Mail” because the airline began in 1928 by flying the mail. Sometimes the colors of paint on the airplane tell a story, too. Northwest was one of the first airlines to have regularly scheduled service to Alaska. They started painting their airplanes bright red so they’d be easy to find in the snow. They’re still painted red today.

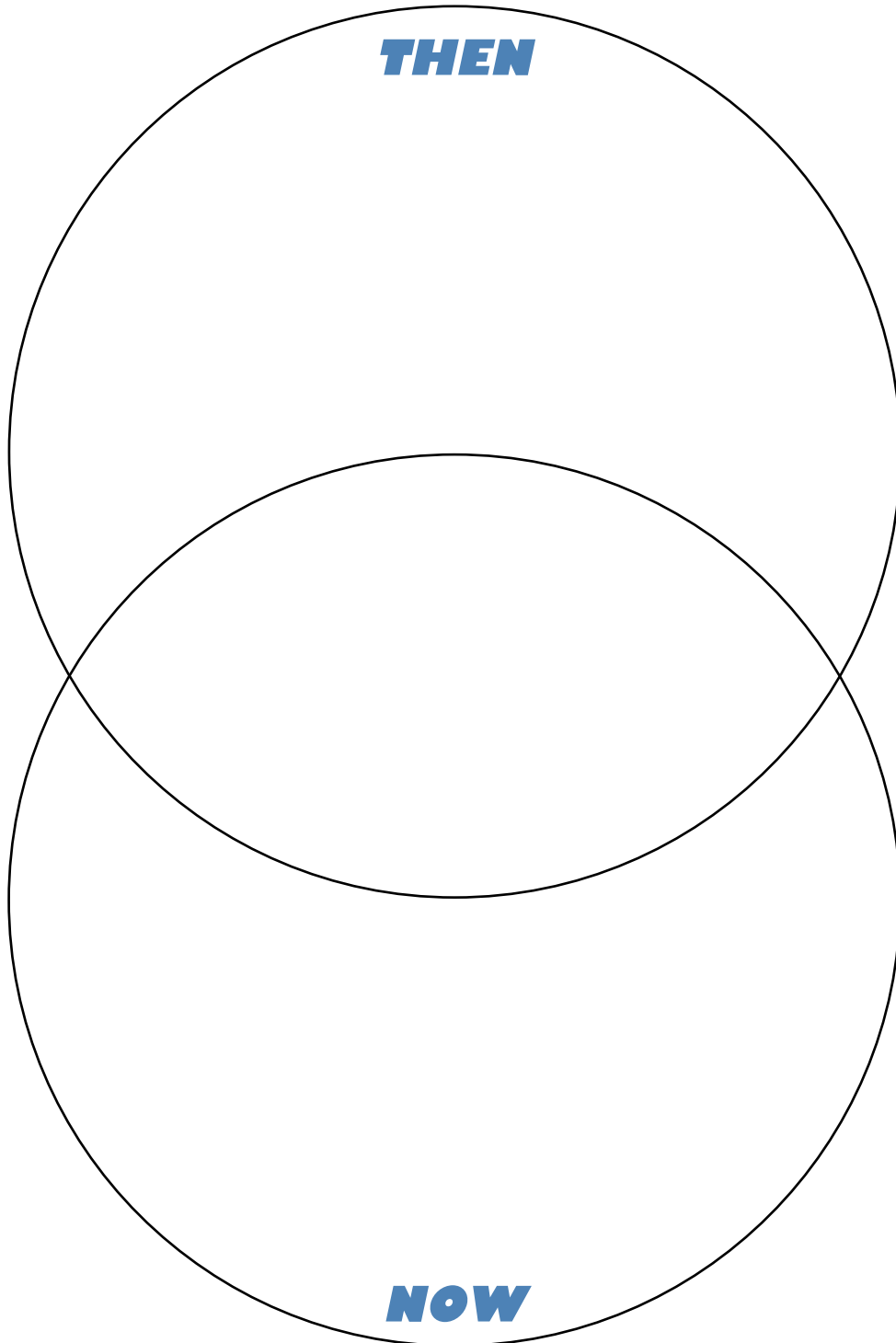
I’ve never had a serious problem with my airplane. The focus is on replacing things *before* they break. Newer planes have separate computers, other backup systems, and manual reversion, so if all the computers failed, the pilot can still fly the plane. That makes airline flights uneventful, and that’s the way we *want* them to be! But if the flights aren’t memorable, the passengers *are*—the kids who come into the cockpit full of excitement, the older pilots who tell you their stories. And having “a window seat” up front is a great feeling—to look out at the world and see the stars in the night sky. You have 150 people behind you, and you know that you’re responsible for them. Whether there’s snow, ice, or wind, you’re going to do it, and you can have no doubt about that!

Name:	Date:	Grade:
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Then & Now

Compare and contrast aspects of the same job in different eras.

JOB: _____



Name:	Date:	Grade:
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Interview Questions

NAME OF PERSON YOU INTERVIEWED: _____

HIS/HER JOB: _____

1. *When did you work for the airlines?*

7. *What was your schedule?*

2. *What was your job called?*

8. *What did you wear to work?*

3. *What were your responsibilities?*

9. *What was flying like for the passengers?*

4. *How did you decide on this career?*

10. *How safe was it?*

5. *How did you learn to do your job?*

11. *What did you like best about working for the airlines?*

6. *Which planes did you fly on?*

12. *Do you have one special memory from your airline career?*

Resources

BOOKS FOR CHILDREN

- Brown, Don. *Ruth Law Thrills a Nation*. New York: Tichnor & Fields, 1993.
- Jennings, Terry. *Planes, Gliders, Helicopters and Other Flying Machines*. A “How Things Work” book. New York: Kingfisher Books, 1993.
- Lindbergh, Reeve. *Nobody Owns the Sky*. Cambridge, Mass.: Candlewick Press, 1996.
- Miller, Molly. *Behind the Scenes at the Airport*. Austin, Tex.: Raintree Steck-Vaughn Publishers, 1996.
- Morris, Neil. *Planes*. A “Traveling Through Time” book. Parsippany, N.J.: Silver Burdett Press, 1998.
- Oxlade, Chris. *Plane*. A “Take It Apart” book. New York: Simon & Schuster/Silver Press, 1997.
- Parker, Steve. *Airplanes*. A “What If...” book. Brookfield, Conn.: Copper Beech Books, 1995.
- Pearl, Lizzy. *The Story of Flight*. New York: Troll Associates/Eagle Books, 1994.
- Rockwell, Anne. *I Fly*. New York: Crown Publishers, Inc. (Dragonfly Books), 1997.
- Spangenburg, Ray, and Diane K. Moser. *The Story of Air Transport in America*. A “Connecting a Continent” book. New York: Facts On File, Inc., 1992.
- Taylor, Richard L. *The First Transcontinental Air Service: The Story of the Tin Goose and the Iron Horse*. A First Book. New York: Franklin Watts, 1995.
- Wickham, Martha. *Mysterious Journey: Amelia Earhart's Last Flight*. A Smithsonian Odyssey Book. Norwalk, Conn.: Soundprints/Trudy Corporation, 1997.

MUSEUMS AND EXHIBITS

BWI Observation Gallery

- (“Walk-in” airplane cockpits and cabins, historic film footage, and more)
- Telephone: (410) 859-7132
- Baltimore-Washington International Airport
Baltimore, Md. 21240
- Open 8:00 a.m. to 9:00 p.m. daily

College Park Airport Museum

- (Exhibitions on the history of this historic airport, the world’s oldest)
- Telephone: (301) 864-6029
- 1985 Corporal Frank Scott Drive
College Park, Md. 20740
- Open 10:00 a.m. to 5:00 p.m. daily

National Postal Museum

- (“Moving the Mail,” an exhibition focusing on the U.S. Air Mail Service)
- Telephone: (202) 357-2991
- 2 Massachusetts Avenue, NE
Washington D.C. 20560
- Open 10 a.m. to 5:30 p.m. daily, except December 25

INTERNET

Aviation history

- NASA Aviation Timeline
<http://k12unix.larc.nasa.gov/flyingstart/aviationtimeline.html>

Aviation Through the Ages

- (A Thinkquest award-winning student-created site)
- <http://tjjunior.advanced.org/3785/>

Aircraft museums

- National Air and Space Museum homepage
<http://www.nasm.si.edu>

Principles of aeronautics

- The K-8 Aeronautics Internet Textbook*
<http://wings.ucdavis.edu>

Simulation

- Airplane Controls*
http://www.sprocketworks.com/d_download/controls.asp
- World Flight 1997: Re-creation and completion of Amelia Earhart's 1937 World Flight*
<http://worldflight.org/>





First Commercial Air Mail by Paul W. Gillan (1918-1998) 30" x 50" oil on canvas