

Aviation Park Teacher Packet



GRADE
K-5

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About the Aviation Park Teacher Packet

The Aviation Park Teacher Packet supports K-5 on and offsite learning at Aviation Park (2659 Barrett Lakes Blvd, Kennesaw, GA 30144) next to the Cobb County International Airport. The teacher packet includes activities corresponding with four onsite exhibit installations including *Mechanics of Motion*, which explores the science of flight, *Lessons in Liftoff*, which explores jobs in aviation, *Wheels to Wings*, which explores the history of flight on the local, state, and national level, and *What Happens Up There? From Taxi to Landing*, which explores the experience in the cockpit.

The four exhibit installations take an interdisciplinary, interactive approach that increases learning and engagement in science and social studies. They combine learning with playing to create multiple points of access and an experience that builds with each visit to the park. The exhibit installations are aligned with the Georgia Standards of Excellence (GSE), creating numerous opportunities for the use of Aviation Park as a field trip destination. Primary sources and digital interactives via QR code provide detail for students to explore the past and present through the built environment.

The teacher packet and exhibit installations were developed by Town Center Community Alliance, Inc. in partnership with the Department of Museums, Archives and Rare Books (MARB) at Kennesaw State University. Pre-service teachers in Kennesaw State's Bagwell College of Education contributed to content development for this teacher packet.

These lessons meet the criteria for the following K-5 Georgia Standards of Excellence:

SOCIAL STUDIES

KINDERGARTEN

SSKCG2: Describe examples of positive character traits exhibited by good citizens such as honesty, patriotism, courtesy, respect, pride, and self-control.

SSKE1: Describe the work that people do such as: police officer, fire fighter, soldier, mail carrier, farmer, doctor, teacher, etc.

FIRST GRADE

SS1H1: Read about and describe the life of historical figures in American history.

b. Describe how everyday life of these historical figures is similar to and different from everyday life in the present (for example: food, clothing, homes, transportation, communication, recreation, etc.)

SS1E1: Identify goods that people make and services that people provide for each other.

FOURTH GRADE

SS4E1: Use the basic economic concepts of trade, opportunity cost, specialization, voluntary exchange, productivity, and price incentives to illustrate historical events.

f. Give examples of technological advancements and their impact on business productivity during the development of the United States (e.g., cotton gin, steamboat, steam locomotive, and telegraph).

FIFTH GRADE

SS5H1: Describe how life changed in America at the turn of the century.

b. Describe the impact on American life of the Wright brothers (flight), George Washington Carver (science), Alexander Graham Bell (communication), and Thomas Edison (electricity).

SS5H2: Describe U.S. involvement in World War I and post-World War I America.

b. Describe the cultural developments and individual contributions in the 1920s of the Jazz Age (Louis Armstrong), the Harlem Renaissance (Langston Hughes), baseball (Babe Ruth), the automobile (Henry Ford), and transatlantic flight (Charles Lindbergh).

SS5H4: Explain America's involvement in World War II.

- e. Describe the effects of rationing and the changing role of women and African Americans or Blacks; include “Rosie the Riveter” and the Tuskegee Airmen.
- f. Explain the role of Eleanor Roosevelt and the U.S. in the formation of the United Nations.

SS5H6: Describe the importance of key people, events, and developments between 1950-1975.

- a. Analyze the effects of Jim Crow laws and practices.
- b. Explain the key events and people of the Civil Rights movement: Brown v. Board of Education (1954), Montgomery Bus Boycott, the March on Washington, Civil Rights Act, Voting Rights Act, and civil rights activities of Thurgood Marshall, Lyndon B. Johnson, Cesar Chavez, Rosa Parks, and Martin Luther King, Jr.
- d. Discuss the significance of the technologies of television and space exploration.

SCIENCE

SECOND GRADE

S2P2: Obtain, evaluate, and communicate information to explain the effect of a force (a push or a pull) in the movement of an object (changes in speed and direction).

- a. Plan and carry out an investigation to demonstrate how pushing and pulling on an object affects the motion of the object.
- b. Design a device to change the speed or direction of an object.
- c. Record and analyze data to decide if a design solution works as intended to change the speed or direction of an object with a force (a push or a pull).

FOURTH GRADE

S4E3: Obtain, evaluate, and communicate information to demonstrate the water cycle.

- a. Plan and carry out investigations to observe the flow of energy in water as it changes states from solid (ice) to liquid (water) to gas (water vapor) and changes from gas to liquid to solid.

S4E4: Obtain, evaluate, and communicate information to predict weather events and infer weather patterns using weather charts/maps and collected weather data.

- b. Interpret data from weather maps, including fronts (warm, cold, and stationary), temperature, pressure, and precipitation to make an informed prediction about tomorrow’s weather.
- c. Ask questions and use observations of cloud types (cirrus, stratus, and cumulus) and data of weather conditions to predict weather events.

S4P3: Obtain, evaluate, and communicate information about the relationship between balanced and unbalanced forces.

- a. Plan and carry out an investigation on the effects of balanced and unbalanced forces on an object and communicate the results.
- b. Construct an argument to support the claim that gravitational force affects the motion of an object.
- c. Ask questions to identify and explain the uses of simple machines (lever, pulley, wedge, inclined plane, wheel and axle, and screw) and how forces are changed when simple machines are used to complete tasks. (Clarification statement: The use of mathematical formulas is not expected.)

FIFTH GRADE

S5P2: Obtain, evaluate, and communicate information to investigate electricity.

VISUAL ARTS

KINDERGARTEN

VAK.CR.1: Engage in the creative process to generate and visualize ideas by using subject matter and symbols to communicate meaning.

- a. Generate individual and group ideas in response to visual images and personal experiences.
- b. Produce visual images using observation, experience, and imagination using a variety of art materials.

VAK.CR.2: Create works of art based on selected themes.

- a. Create works of art emphasizing one or more elements of art and/or principles of design.
- b. Use pictures to tell a story.

FIRST GRADE
VA1.CR.1: Engage in the creative process to generate and visualize ideas by using subject matter and symbols to communicate meaning.
<ul style="list-style-type: none"> a. Generate individual and group ideas in response to visual images and personal experiences. b. Generate visual images in response to open ended prompts, themes, and narratives. c. Produce multiple prototypes in the planning stages for works of art (e.g. sketches, models).
VA1.CR.2: Create works of art based on selected themes.
<ul style="list-style-type: none"> a. Create works of art emphasizing one or more elements of art and/or principles of design. b. Create works of art that attempt to fill the space in an art composition.
SECOND GRADE
VA2.CR.1: Engage in the creative process to generate and visualize ideas by using subject matter and symbols to communicate meaning.
<ul style="list-style-type: none"> a. Generate individual and group ideas in response to visual images and personal experiences. b. Produce visual images in response to open-ended prompts, themes, and narratives. c. Produce multiple prototypes in the planning stages for a work of art (e.g. sketches, 3D models).
VA2.CR.2: Create works of art based on selected themes.
<ul style="list-style-type: none"> a. Create works of art to express individual ideas, thoughts, and feelings from memory, imagination, and observation. b. Create works of art emphasizing multiple elements of art and/or principles of design.
THIRD GRADE
VA3.CR.1: Engage in the creative process to generate and visualize ideas by using subject matter and symbols to communicate meaning.
<ul style="list-style-type: none"> a. Utilize multiple approaches to plan works of art incorporating imaginative ideas, universal themes, and symbolic images. b. Apply available resources, tools, and technologies to investigate personal ideas through the process of making works of art. c. Produce multiple prototypes in the planning stages for a work of art (e.g. sketches, 3D models).



VA3.CR.2: Create works of art based on selected themes.

- a. Create works of art to express individual ideas, thoughts, and feelings from memory, imagination, and observation.
- b. Create works of art emphasizing multiple elements of art and/or principles of design.

FOURTH GRADE

VA4.CR.1: Engage in the creative process to generate and visualize ideas by using subject matter and symbols to communicate meaning.

- a. Utilize multiple approaches to plan works of art incorporating imaginative ideas, universal themes, and symbolic images.
- b. Apply available resources, tools, and technologies to investigate personal ideas through the process of making works of art.
- c. Produce multiple prototypes in the planning stages for a work of art (e.g. sketches, 3D models).

VA4.CR.2: Create works of art based on selected themes.

- a. Create original works of art that communicate values, opinions, and/or feelings.
- b. Create works of art emphasizing multiple elements of art and/or principles of design.
- c. Create representational works of art from direct observation (e.g. landscape, still life, portrait).

FIFTH GRADE

VA5.CR.1: Engage in the creative process to generate and visualize ideas by using subject matter and symbols to communicate meaning.

- a. Utilize multiple approaches to plan works of art, incorporating imaginative ideas, universal themes, and symbolic images.
- b. Apply available resources, tools, and technologies to investigate personal ideas through the process of making works of art.
- c. Produce multiple prototypes in the planning stages for a work of art (e.g. sketches, 3D models).

VA5.CR.2: Create works of art based on selected themes.

- a. Create original works of art that communicate values, opinions, and feelings.
- b. Create works of art emphasizing multiple elements of art and/or principles of design.
- c. Create representational works of art from direct observation (e.g. landscape, still life, portrait).
- d. Create works of art inspired by historical, contemporary, and/or social events.

NEXT GENERATION SCIENCE STANDARDS - STEM

KINDERGARTEN - SECOND GRADE - ENGINEERING DESIGN

K-2-ETS1-1: Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.

K-2-ETS1-2: Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.

KINDERGARTEN - SECOND GRADE - MOTION AND STABILITY: FORCES AND INTERACTIONS

K-PS2-1: Plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object.

THIRD - FIFTH GRADE - ENGINEERING DESIGN

3-5-ETS1-1: Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.

3-5-ETS1-2: Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

3-5-ETS1-3: Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

THIRD - FIFTH GRADE - MOTION AND STABILITY: FORCES AND INTERACTIONS

3-PS2-1: Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object.

One

MECHANICS OF MOTION

Objective:

Students will understand the forces of flight by making paper airplanes.

Method:

This activity can be conducted in the classroom in conjunction with a site visit to the *Mechanics of Motion* exhibit or entirely onsite.

Compelling Question:

How do the forces of flight affect a paper airplane?

Materials Needed:

Paper, paper clips, scissors tape, [paper airplane pattern worksheet](#), digital supplement links

Background:

The forces of flight are lift, drag, thrust, and weight. Maintaining balance among the four forces is necessary for any object to stay in flight. While birds have mastered the forces over time through the natural course of evolution, aeronautical engineers master the forces of flight through airplane design and with the safety of passengers and crew in mind.

Lift occurs when air flows around a curved surface, such as an airplane wing. Faster-moving, low pressure air flows over the wing and slower-moving, high pressure air flows under, lifting the plane into the air.

Drag is air pressure that slows an airplane through friction caused by contact. The shape, area, and speed of an airplane affect drag.

Thrust makes an airplane move forward, and it is caused by the airplane's engine speeding up or slowing down.

Weight is the force of gravity pulling an airplane toward the ground; the heavier the airplane, the more pull it must overcome to stay airborne.

Warm-up:

1. Visit *Mechanics of Motion* exhibit and focus on the *What are the Forces of Flight?* panel. Work through the *May the Forces Be With You* activity on the exhibit panel with your students.
2. Work through [Forces of Flight digital supplement](#) with your students or assign it as a pre-activity.

Activity: Paper Airplanes and Forces of Flight

1. Hand out paper airplane pattern to each student and instruct students to make a paper airplane from the three choices on the pattern worksheet.
2. Choose one or more students to throw their airplane.
 - a. What is the thrust that allows the airplane to fly?
2. Instruct students to add a paper clip to the front of the airplane.
3. Choose one or more students to throw their airplane.
 - a. How does adding the paper clip change the way the paper airplane flies? How does it add weight that counteract the lift to create a steady flight?
2. Instruct the students to make any other additions to their airplane that they think would improve the flight. Students can use scissors, tape, and more paper clips. Ask the students to consider:
 - a. Is there a part of your plane causing too much drag?
 - b. Does your plane have too much weight?
 - c. How can you increase the lift?
 - d. Can you give your plane more thrust?
5. Choose one or more students to throw their airplane. Ask the student to describe their additions to the airplane. Evaluate the additions to the airplane. Did the additions improve flight? Why or why not?

Wrap-Up:

Evaluate the paper airplane experiment process and discuss what worked and what didn't. Summarize the experimentation process by highlighting that the students made multiple modifications and flight attempts.

Two

LESSONS IN LIFTOFF

Objective:

Students will learn about the services provided by airport workers and the skills needed to operate an airport.

Method:

This activity should be conducted onsite at the *Lessons in Liftoff* exhibit.

Compelling Questions:

What skills are needed to work at an airport? What services does each team member provide in order to fly an airplane and operate an airport?

Materials Needed:

Lessons in Liftoff Search and Find Worksheet; pencils; clipboard; digital supplemental materials

Background:

You need a team to fly a plane and operate an airport. People in aviation work on the ground, in the air, in the shop, in the tower, and even in the office. They include pilots, ground crew, mechanics, air traffic controllers, and airport managers. All of these jobs require a basic knowledge of science and math as well as observation, problem solving, decision making, and communication skills.

Warm-up:

1. Ask students what they know about the types of jobs at an airport. Discuss what skills they think might be needed to work at an airport.
2. Listen to short clips from airport employees:
 - a. [Ground Crew](#)
 - b. [Pilot](#)

- c. [Mechanic](#)
- d. [Air Traffic Controller](#)
- e. [Airport Manager](#)

Activity: *Lessons in Liftoff* Search and Find

1. Divide students in groups to work together
2. Distribute the *Lessons in Liftoff* Search and Find Worksheet.
3. Instruct students to visit each exhibit panel to complete the worksheet. Students will record the skills and service of the job featured on the panel.

Wrap-Up:

Gather students back into one group and ask each individual group to report on one of the jobs. Discuss with the group. Ask follow up questions:

- Did their ideas about what it takes to operate an airport change from the warm up discussion. Why or why not?
- What type of education might be required to work in an airport?
- Do they consider the jobs at the airport to be a service to others? Why or why not?

WORKSHEET 1

 **Lessons in Liftoff Search and Find**

As you read the exhibit panels and look at the images, complete the boxes below. For each job, record the services they provide and the skills required.

Ground Crew 

Services:

Skills:

Pilot 

Services:

Skills:

Mechanic 

Services:

Skills:

Air Traffic Controller 

Services:

Skills:

Three

Wheels to Wings

Objective:

Students will learn about the people, places, and events that influenced advancements in flight technology.

Method:

Activity 3a should be conducted onsite at the *Wheels to Wings* exhibit and Activity 3b could be conducted onsite or in the classroom.

Compelling Questions:

How did airplanes change throughout the years? Who were key contributors flight success and what were their contributions? How do people, places, and events impact our everyday lives?

Materials Needed:

Wheels to Wings Search and Find Worksheet; pencils; clipboard; digital supplemental materials

Background:

After years of experiments, Orville and Wilbur Wright made the first controlled flight in 1903. Their successful airplane flight ushered in a new technological era. During the next 90 years, many other people followed the Wright brothers' example and made significant contributions to the advancement of flight technology. The *Wheels to Wings* exhibit is a timeline of the 20th century that explores the history of flight on the local, state, and national level. The people, places, and events featured on each panel help us understand how flight impact everyday life. They include:

- 1900s: Wright brothers, Ben Epps
- 1910s: Military Aviation Training Center in Augusta, Eugene Bullard
- 1920s: Charles Lindbergh, Huff Daland Dusters Company, Pitcairn Aviation and the U.S. Postal Service
- 1930s: Hazel Raines, Civilian Pilot Training Act
- 1940s: Bell Bomber factory in Cobb County
- 1950s: Lockheed Aircraft Corporation in Cobb County

- 1960s: McCollum Airport in Cobb County, Larry Thompson
- 1970s: Jumbo Jets, Airline Deregulation Act
- 1980s: Museum of Aviation, Dobbins Air Reserve focuses on C-130 Hercules
- 1990s: Greenland Expedition, Atlanta Olympics and Hartsfield-Jackson International Airport

Warm-up:

1. Define the concept of a timeline and watch the [Timeline for Kids video](#) with your class.

Activity3a: *Wheels to Wings* Search and Find

1. Students can work individually or together in groups
2. Distribute the *Wheels to Wings* Search and Find worksheet.
3. Instruct students to visit each exhibit panel to complete the worksheet. A word bank is provided to help students that may need it, but all information can be found in the picture captions and explanations of the time.

Activity 3a Wrap-Up:

Gather students back into one group and ask each individual group to report on one of the jobs. Discuss with the group. Ask follow up questions:

- What was different (or the same) about airplanes in the beginning of the timeline compared to the end?
- Name a person or event from the timeline that contributed to flight history? Why is the person or event important?
- Are there any other people, places, or events in flight history that you think are important? Why?

Work through [Test Your Knowledge - Overview | Rise 360 \(articulate.com\)](#) digital supplement with your students or assign it as a post-activity.

Activity 3b: Image Exploration

1. Students can work individually or together in groups.
2. Assign individual students or groups one *Image Exploration* link:
 - a. [Image Exploration - 1900s](#)
 - b. [Image Exploration - 1910s](#)
 - c. [Image Exploration - 1920s](#)
 - d. [Image Exploration - 1930s](#)
 - e. [Image Exploration - 1940s](#)
 - f. [Image Exploration - 1950s](#)
 - g. [Image Exploration - 1960s](#)
 - h. [Image Exploration - 1970s](#)
 - i. [Image Exploration - 1980s](#)
 - j. [Image Exploration - 1990s](#)
3. Instruct students to analyze the image and click on the buttons to learn more about the picture.
4. After the students have looked at the image and read the information buttons, ask students to record answers to the questions below. Answers can be written on paper or recorded using the digital tool of your choice.

Image Exploration Reflection Questions

1. What is the main subject or focal point of the image?
2. What are other things you see in the photograph?
3. Describe what you think is happening in the photograph?
4. What is one thing you learned from reading the information buttons?
5. How does this image tell a story about flight history?

Activity 3b Wrap-Up:

Ask individual students or group leaders to present their answers. Discuss the answers with the class. Talk about how images tell a story and can help us understand people, places, and events in history.

WORKSHEET 2

Activity 3a: *Wheels to Wings* Search and Find

1. What century does this exhibit take place in? _____
2. In 1907, Ben Epps built a plane in a _____ shop.
3. Where was Georgia's first airport built? _____
4. Delta Air Lines is also known as _____
5. With the Civilian Pilot Training Act, who else could learn to fly?

6. What was the largest plane during WWII? _____
7. Why was there a protest in the Lockheed factory in 1951?

8. How old was Larry Thompson when he began flying lessons? _____
9. There is a _____ at Robins Air Force Base.
10. What event increased world travel in the Atlanta airport? _____

Word Bank

Huff Daland Dusters 19th Century Bicycle Museum
Segregation Women and African Americans 12
1996 Olympics B-29 Superfortress Augusta

Four

WHAT HAPPENS UP THERE? FROM TAXI TO LANDING

Objective:

Students will learn what occurs during each phase of flight.

Method:

This activity should be conducted onsite at *What Happens Up There? From Taxi to Landing* exhibit.

Compelling Questions:

What forces does a moving plane interact with? What do pilots need to do in each phase of flight to be successful?

Materials Needed:

What Happens Up There? From Taxi to Landing Search and Match Worksheet; pencils; clipboard; digital supplemental materials

Background:

Different steps of flight require different amounts of force to either push the plane down the runway by increasing speed and lifting into the sky or decreasing speed and landing on the runway to stop. The pilot is responsible for certain actions in each step to control the airplane. In taxiing, the pilot operates the throttle to move the airplane into flight position. In taking off, the pilot operates the yoke to lift the nose and adjust the tail and throttle to increase speed which creates lift. In climbing, the pilot maintains the controls to ensure a consistent ascent. In cruising, the pilot sets the course according to the flight plan and enables auto pilot system. In descending, the pilot operates the throttle and yoke to reduce speed and lower altitude. In landing, the pilot operates the throttle and yoke to cut power and raise the nose and wing flaps for touch down on the runway. In each step, the pilot monitors the instruments and controls in the cockpit.

Warm-up:

1. With your students, watch [What's in the Cockpit – Flying Lessons](#) video.
2. Ask students what they think pilots need to know about the controls inside the cockpit? How is it the same or different than operating other vehicles?
3. Work through [Cockpit 360 Experience digital supplement](#) with your students or assign it as a pre-activity for your students.

Activity: *What Happens Up There?* Search and Match

1. Gather your students at the *What Happens Up There?* exhibit. As the students conduct the activity, take note of any airplanes that you see. It's common to see airplanes in the distance or overhead. When you see an airplane, ask the students what step of flight the plane is in right now. This could be take-off or climbing.
2. Distribute the *Wheels to Wings* Search and Find Worksheet. Students can work individually or together in groups.
3. Instruct students to visit each exhibit panel to complete the worksheet. A steps of flight word bank is provided to help students that may need it, but the steps of flight can found on the exhibit panels.

Wrap-Up:

Gather students back together and discuss the answers to the worksheet. Ask follow up questions:

- What is the yoke? Why is it an important control?
- What is the throttle? Why is it an important control?
- What effect does the change in force (increase or decrease throttle) have on the airplane?

WORKSHEET 3

What Happens Up There? From Taxi to Landing **Search and Match**

As you read the exhibit panels and look at the images, match the pilot actions below to the correct step of flying. (The pilot actions are mixed up and not in order.)

Example:

Pilot Action: Maintain your cockpit controls as the forces of flight lift your plane off the ground. Step of Flight: Taking Off

1. Pilot Action: Turn on autopilot, to allow the plane to fly on its own at the speed and direction written in your flight plan.

Step of Flight: _____

2. Pilot Action: After you are cleared for takeoff, push up your throttle to increase speed.

Step of Flight: _____

3. Pilot Action: Push the throttle up slowly, and turn toward the runway using the nose wheel tiller.

Step of Flight: _____

4. Pilot Action: Pull back your throttle to cut engine power, and adjust your yoke to turn up wing flaps.

Step of Flight: _____

5. Pilot Action: Follow directions from air traffic control and descend at a consistent rate as you approach the airport.

Step of Flight: _____

Word Bank

Taxiing

Taking Off

Climbing

Cruising

Descending

Landing

WORKSHEET 4

What Happens Up There? From Taxi to Landing
Search and Match

Bonus Version

As you read the exhibit panels and look at the images, write one action that a pilot needs to take at each step of flying.

1. Step of Flight: Taxiing

Pilot Action: _____

2. Step of Flight: Taking off

Pilot Action: _____

3. Step of Flight: Climbing

Pilot Action: _____

4. Step of Flight: Cruising

Pilot Action: _____

5. Step of Flight: Descending

Pilot Action: _____

6. Step of Flight: Landing

Pilot Action: _____

Additional Resources for Teachers

The National Air and Space Museum

[Lesson Plans and Activities](#)

NASA

[K-12 STEM Engagement](#)

Specific Topic Areas

Airplanes and STEM

[Teach Engineering](#)

Transportation – Changes in Technology

[Library of Congress Classroom Materials](#)

World War II

[Museum of History and Holocaust Education Teacher Guides](#)

Wright Brothers

[Wright Brothers National Memorial Curriculum Materials](#)



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