ABSTRACT

General information about United States' aircraft is provided in this program activity guide for teachers and caregivers in Air Force preschools and day care centers. The guide includes basic information for teachers and caregivers, basic understandings, suggested teaching methods and group activities, vocabulary, ideas for interest centers, and lists of teacher resources, local resources, and related books as well as directions for making and flying paper airplanes. (Author/RH)
This guide is one in a series designed to help teachers and caregivers in Air Force preschools and child care centers plan activities for children. It was prepared by HQ AFMPC/MPCSOB, with assistance from Dr Juanita Boggs and Ms Linda Brant, child development consultants.
1. **BASIC INFORMATION**

Aircraft are a very important part of the life of a child who lives on or near an Air Force base.

Aircraft can be defined as any maneuverable vehicle that flys in the air. Aircraft include:

- **Balloons** which fly because they are lighter than air. A balloon is lifted into the air by gas. Balloons are not very maneuverable.

- **Giders** are aircraft that resemble airplanes, but have no engine. They fly in air currents. A glider is launched by an airplane that tows it into the air.

- **Airplanes** which have fixed wings to provide lift and engines to provide thrust.

- **Helicopters** which have rotating blades to provide lift and thrust.

- **Manned rockets and spacecraft** (including the space shuttle "Enterprise") which are propelled by rockets to provide thrust and lift to send them into outer space.

The first manned flights were in a balloon filled with hot air. This balloon, built in France in 1783, carried two passengers 300 feet into the air. Early day inventors experimented with gliders by launching them from high places. The first successful manned glider flights were between 1891 and 1896 in Germany. Gliders were impractical because they were hard to control.

In 1903 two bicycle builders from Dayton, Ohio, Wilbur and Orville Wright, made the first successful airplane flight. The flight took place near Kitty Hawk, North Carolina, in an airplane named the "Flyer." The Flyer was a biplane with a 12-horsepower gasoline engine.

After the Wright Brothers' flight, other pilots and inventors began working to improve airplane design. Almost every year, planes flew faster and farther than they had flown the year before. The world's fastest aircraft are rocket planes. Until recently rocket planes have not carried passengers or cargo.

Today's airplanes can be divided into five main groups:
Commercial airliners are large planes owned by airline companies. These planes carry passengers and cargo. The Boeing 747, McDonnell Douglas DC 10, and the Concorde are the largest planes flown commercially.

Light planes are smaller than commercial airliners. These single- or twin-engine propeller planes are used for sport, recreation, and business. They can land and take off at small airfields.

Military planes are used by the nation's armed forces. Some military planes are special adaptations of commercial or light planes. For example, the Boeing 707 has been adapted as a troop transport and also as a tanker for refueling other planes in the air. Other military planes are made for a specific use. For example, the F-15 fighter jet is designed to carry weapons.

Helicopters are rotary wing aircraft. Helicopter blades act as wings and rotate to provide the lift allowing the helicopter to take off vertically in a confined area. Helicopters have multiple uses. They are used to transport people and cargo to remote areas where regular airplanes can't land. They are used in rescue operations both on land and at sea.

Special purpose planes are designed for specific jobs. Seaplanes (or floatplanes) can take off and land on water. Farmers hire crop dusting planes to spray their fields with chemicals. Some planes are used specifically for fighting forest fires. Ski planes are equipped with large skis which allow them to land on snow.

Since many Air Force children are familiar with military aircraft, the teacher may want to emphasize the types of planes located on the base. The following list is by no means complete, but it does include some of the major airplanes used by the Air Force in 1980:

**Military Aircraft**

**Trainers**

Trainers are used to train Air Force men and women to be pilots. They are also used to take a few people from base to base.

**T-37.** This jet trainer is also known as the "Tweetie Bird" or "Tweet." It is a subsonic jet. The two pilots sit side by side.

**T-38 Talon.** This jet is the Air Force's basic jet trainer. It is a supersonic trainer with twin engines. The
two pilots sit, one in front of the other. The US Air Force Demonstration Squadron, the Thunderbirds, performs precision aerial maneuvers using T-38s.

**T-41.** This single engine propeller plane is made by Cessna and is the first plane a pilot will fly during pilot training.

### Bombers

Bombers drop explosives on enemy targets. They are equipped with radar and bombsights to find the target and direct bombs to it. Bombers also launch missiles.

**B-52 Stratofortress.** The B-52 Stratofortress, also known as the "Buff," is a long-range heavy bomber. It is the primary manned strategic bomber for the US. It can carry nuclear or conventional weapons. A fleet of B-52s is always on alert for immediate take-off in case of war.

**KC-135 Stratotanker.** This is the Air Force's "flying gas station." Although it is not a bomber, a squadron of KC-135s will be at every base where B-52s are located. The KC-135 carries fuel and can refuel B-52s as well as fighter and cargo planes in mid-air.

### Fighters

Fighters are designed to shoot down enemy aircraft and attack ground targets. They are generally smaller and faster than bombers. They provide air defense by serving as interceptors to fight against enemy planes. They provide tactical air support for our ground troops by bombing and destroying enemy positions.

**F-4 Phantom II.** This is a twin engine, two-seater, all-weather tactical fighter bomber.

**F-15 Eagle.** This twin engine supersonic tactical fighter has electronic systems and weaponry to detect, acquire, track and attack enemy aircraft. It is highly maneuverable.

**F-16.** This is one of our newest air combat fighter. It is a single engine, single pilot aircraft and can go twice the speed of sound (Mach 2). It is extremely maneuverable.

**F-111.** This aircraft has terrain-following radar which allows it to fly at very low altitudes while still maintaining high speeds. It has variable wings (can stick straight out or move backward).
Cargo

Cargo planes are used to move people and things to wherever they are needed.

C-141 Starlifter. This plane is known as the "work horse" of the Air Force. It is the first jet aircraft designed to carry military troops and cargo. It can be refueled in mid-air by the KC-135.

C-5 Galaxy. This is the world's largest aircraft. It is almost as long as a football field and as high as a six-story building. It is the only aircraft that can transport any piece of the Army's combat equipment, including tanks and helicopters. The C-5 is used for bulky, heavy cargo and the C-141 is used for personnel and less bulky lighter cargo. Together they can carry fully equipped, combat-ready divisions to any combat area in the world on short notice.

C-130 Hercules. This tactical cargo plane is designed for short fields and adverse conditions. It is a cargo plane for war and can land on dirt fields. The C-130 carries troops and cargo. It can also be used to drop paratroopers and to drop cargo by parachute. Some are used for search and rescue and in aerial refueling of helicopters.

Helicopters

Helicopters are used for many purposes.

HH-3. This aircraft is known as the "Jolly Green Giant." It lands troops in combat zones. It is also used for search and rescue operations. It can carry cargo and drop pararescue medics ("PJs"), can carry supplies to remote locations (radar sites) where airplanes can't land, and hover and drop a hoist to extract someone from a terrain which is too rough for even a helicopter to land.

HH-53B. "Super Jolly Green Giant." This aircraft is larger than the HH-3, but performs similar jobs.

Many people are needed in order to get an aircraft airborne. Some of these people are:

Ground Support Personnel

Maintenance personnel fix planes, keep them flying and refuel them.
Life support personnel take care of all flying equipment and survival gear for crew members. They also provide training in the use of such gear.

Air traffic controllers direct aircraft movement on the ground and in the air.

Aircraft Crew Members

Pilots include the aircraft commander and copilot.

Navigators help keep the plane on the correct course and keep track of the plane's location at all times.

The electronic warfare officer (EWO) operates specialized electronic equipment designed to counteract enemy radar and radio jamming equipment.

The flight engineer monitors aircraft instruments to ensure that all aircraft systems are functioning properly.

The loadmaster supervises the loading of cargo and passengers and makes sure the load is properly balanced in the aircraft.

The radio operator operates the radio to keep in touch with ground units and other aircraft.

2. BASIC UNDERSTANDINGS.

Airplanes can carry people and things from one place to another.

Airplanes can carry large numbers of people long distances in very short periods of time.

Airplanes carry supplies and other materials to those in need.

Small airplanes or helicopters fly into remote places where other kinds of planes cannot be used.

Airplanes come in different sizes and shapes and travel at different speeds.

There are many different kinds of airplanes: transport planes, cargo planes, passenger planes, seaplanes, war planes, helicopters, jets, gliders, rockets, etc.

The Air Force has special planes which are used to protect our country.
Many people are responsible for getting aircraft airborne: maintenance crew, pilot, navigator, air traffic controller, flight engineer, etc.

People in a hurry to travel a long distance often fly on a passenger plane.

Aircraft are used when there is a disaster (flood, fire, earthquake, rebellion) to remove people as quickly and safely as possible or to bring in supplies, medical aides, firefighters, paratroops, etc.

Aircraft have been designed to carry weapons, troops, land, vehicles, etc, during times of war.

Many parents' jobs in the Air Force are to fly planes or help planes fly.

3. WAYS OF INTRODUCING THE SUBJECT TO CHILDREN. Most pre-school children whose parents are in the military will have used air transportation with their families. Caregivers can encourage discussions by asking the children: "Where did you go?" "How did you feel about flying?" "What did you eat?" "Who served you?" "Who flew the airplane?" "What are some of the things a pilot does? a flight attendant? a navigator?"

Invite parents who fly aircraft or who work on aircraft to come to the center to tell about their jobs.

Display models and pictures of the various kinds of aircraft.

Read stories about airplanes.

Take trips to the flight line to watch the airplanes take off and land! If possible go inside the airplanes flown on your base.

4. VOCABULARY.

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5. ACTIVITIES FOR GROUP TIME

Music

"THE PILOT OF THE PLANE"
adaptation by Juanita Boggs
(Tune: "Wheels on the Bus")

The reservation clerk calls
Come on board, come on board, come on board
The reservation clerk calls
Come on board, on our first airplane trip

The pilot on the plane says
Buckle up, buckle up, buckle up
The wheels on the plane go
Up, up, up
The stewardess offers
Juice and milk

The children on the plane shout
"Look down there!"
The wheels on the plane go
Down, down, down

The people on the ground cheer
Hooray, they're here
The people on the plane leave
1, 2, 3, 1, 2, 3, 1, 2, 3
Ending our airplane trip.

"DOWN AT CAPE KENNEDY"
unknown origin
(Tune: "Down at the Station")

Down at Cape Kennedy, early in the morning
See the shiny rockets standing in a row
(on knees, arms point above head)
Here comes the astronaut, pulling all the levers
(pulling motion)
Zoom, Zoom, Zoom, Zoom—Off we go!
(slowly get to feet, fly around the room)
"I'M A LITTLE AIRPLANE"
adaptation by Bonnie Flemming*
(Tune: "I'm a Little Teapot")

"I'm a little airplane: (raise arms to side at shoulder height)
I can fly (turn right arm in front of you for propeller)
Here is my throttle: (reach hand out to instrument panel)
Give me a try. (push throttle in)

When I get all revved up (make engine noises)
Then I fly (move forward down runway)
Off the runway (keep moving forward)
To the sky! (go up on tiptoe running forward)


Records


Fingerplays or Poems

Airplane

The airplane has great big wings; (Arms outstretched)
Its propeller spins around and sings. (Make one arm go)
"Vvvvvv!

The airplane goes up; (Lift arms)
The airplane goes down; (Lower arms)
The airplane flies high (Arms outstretched, turn body around)

Over our town!


Ten Little Pilots

Ten little pilots
Standing in a row

When they see the Captain
They bow just so

hold up 10 fingers

bend fingers down and up
They march to the left
And they march to the right
They close their eyes
And sleep all night

They march to the left
move both hands with a marching rhythm to the left, and right
They close their eyes
put palms together and under the side of the face
Repeat verse using "nine little," eight little," "seven little," etc.


Stories and Games.

Make two sets of cards using aircraft pictures (if necessary draw your own--include helicopter, commercial airliner, single engine airplane, cargo plane, jet, etc). Mix sets together and have children find the cards that match.

Using aircraft pictures talk about color, size, shapes, numbers. Count the number of wheels, wings, propellers, etc. For added interest chart this information as follows:

"We found 6 wheels, 8 wings, 10 propellers."

Play the Airplane Game. Directions: Select four areas of the playground or multipurpose room to be "hangars." One child is "it." Divide the other children into three groups. Give each group an airplane name (130s, C-5s, T-38s, helicopters, ...any name familiar to the children) and send them to a hangar. There will be one empty hangar. The child (or teacher) who is "it" calls out the name of a plane. The group with that name runs to the empty hangar. "It" tries to catch them before they get to the empty hangar. Anyone who gets caught stays in the center and helps catch the others. The name of another plane is called out until all the children are caught.

Commercially made games and materials:

Wooden flyers: jets, helicopters, etc. (Childcraft)
Balsa wood planes (toy and hobby shops)
Puzzles of airplanes, helicopters (Playskool)
Play Family Airport (Fisher-Price)
Transportation toys: airplane, helicopter, bus, tractor, wagon

Cooking
Make finger sandwiches to serve aboard the airplane during snack time.
Make up flight packs to have for lunch or snack. Pretend to be on a flight when eating them.

Large Muscle
Using packing boxes, crates, boards, etc., encourage children to create airports, planes, etc.
Use sand or dirt to build runways for airplane play.
Take a pretend trip by air with leader taking children on a trip in and out and around the playground equipment; fly low and high; land, take off, etc.

Parachutes
Cut four lengths of string, each about 12 inches long. Tie a piece of string to each corner of a small square of cloth. Then tie the loose ends of all four strings around a small cork, spool, or some lightweight object. Hold the parachute by the middle of the top of the cloth. Encourage children to experiment by dropping the parachutes from different heights (stand on jungle gym, ladder, etc). Tell them to watch the air inflate the cloth as the chute is dropped.

Parachutes are available on many bases. If your center lacks one, check with Air Force salvage. Remove the guy lines from a parachute before using it with the children. Parachute activities require a large open area, either indoors or outside.
"Popcorn"... have the children hold the parachute waist high. Put several tennis balls, Nerf balls, or some balloons in the center. Have them shake the parachute up and down so that the balls or balloons "pop!". See how long the children can keep the popcorn popping.

"Helicopters"... Lay the parachute on the floor. Have the children lift the edges saying "Slowly, Slowly, up and up" ..."Slowly, slowly, down and down". "Quickly, Quickly, up and up" and "Quickly, Quickly, down and down." Repeat this several times.

Encourage the children to make up their own parachute activities. Moving to the rhythm of music is a good parachute activity.

Other Experiences

Visit base operations and the flight line. Possible trips include:
- trip to the control tower
- touring an airplane to explore cockpit, cargo section, check the size of wheels, walk under wings, etc.
- bus trip out to a mobile unit to watch aircraft in touch-and-go's
- visit a squadron... see where pilots work, debrief, study maps, etc.

Contact the life support section on the base to ask for a demonstration of survival equipment and pilot's personal flying gear. Possibilities include bringing to the center or trying on:
- flight suit, boots
- G-suit
- "Mae West"
- shark repellent
- flares
- inflatable raft (type that blows up instantly)
- helmet
- oxygen mask
- clip board
- parachute

Routine Time

At snack time arrange chairs in rows of two or three chairs. Have flight attendants serve snacks of finger foods using rectangular paper plates or styrofoam meat trays for serving trays.
At nap time suggest that it is late at night and the cabin lights will soon go off. Flight attendants will pass out blankets and pillows and remind the children that the captain will make an announcement to awaken them before the plane lands.

During clean-up time advise the children that the plane will soon be landing and they should gather up their belongings and prepare to depart. When they complete picking up and "depart" they can pretend to be the pilot or flight attendant bidding farewell. "I hope you enjoyed your flight with us today. (aboard (name of base) airlines today. Fly with us again."

6. INTEREST CENTERS

Science and Discovery Center

Display pictures or model airplanes of various kinds. Help children to identify the aircraft. Recognize similarities and differences (propellers, wings, number of wheels). Look for symbols and numerals for identification. Consider how different aircraft take off and land (helicopter goes straight up). Note: The models should be strong enough to withstand careful manipulation/handling by children.

To help children understand how a propeller works make a simple pinwheel. Cut square piece of paper into four sections toward center—leave 1/2" uncut. Fold every other point into center overlapping a bit, pin center of pinwheel to a dowel or unsharpened pencil.

Help children understand how a jet engine works. Blow up balloon and let loose. As the air rushes out the open end, the balloon goes in the opposite direction (force of air forces balloon forward).

Help children discover how distance makes things appear smaller. Watch cars being driven away. Observe as long as children can keep vehicle in sight. Ask if car seems to get smaller, larger, stay the same, Why? (You will gain clues as to the thinking of children.)

Walk far away from the playground. Discuss the size of a particular piece of equipment. Watch what happens as you walk toward it. Discuss. Observe airplanes on takeoff. Discuss what is happening to size. Why is it growing smaller, etc?

Make paper gliders by folding paper. Let children decorate their gliders. Do the experiments with the gliders to make them climb and dive, change direction, roll, etc. See attachments for directions.
Dramatic Play Center

Provide children with a variety of blocks, planks, wooden or unbreakable model airplanes. Encourage the building of runways, hangars, traffic control tower (oatmeal box). Cut oatmeal box in half lengthwise to make hangar. Stand upright for tower. Note: Ask open-ended questions such as "Where is the airplane going?" "When will it return?" "What do you think the air controller is saying over his intercom?" (Listen carefully to the conversations of these children to better appreciate the level of their understanding.)

Add travel brochures, suitcases, serving trays, pilot's uniform, and a variety of hats to the center. Encourage play involving planning of trips, vacations, travel on board an airplane, etc. Leave this very open-ended. Note: Children seem less inhibited in play when adults do not structure or place restrictions on the activity.

Improvise with cartons, wooden boxes, chairs, to make an airplane...have seats for passengers, pilot, add wagon to carry luggage on and off plane.

Have children build an instrument panel using a cardboard box. Use aluminum foil for the window and draw the knobs and buttons. Empty thread spools could be attached for knobs.

Prop boxes--gather together items for a prop box. Include goggles, flight suit, crash helmet, mask, gloves, clip board, boots, etc. Encourage free dramatic play combining props with improvised play above.

Reading and Listening Center

Make a tape recording of an airplane story. Add sound effects by taping in airplane sounds. Invite children to listen to the story. (This would be greatly enhanced if head sets could be obtained.)

Select appropriate books and other stories to share with the children: Informational books often have excellent pictures but don't "read well." Review a book before sharing with children. Then decide how the book will be shared. Will you read every page, talk the pictures, tell the story or ask questions to elicit responses from the children?

The following books on aircraft can be read or shown to children:


Hang a parachute over the reading center to create a different atmosphere.

Put used airplane seats in the reading center for added interest.

Display travel brochures and posters. Encourage children to discuss trips they have made or would like to take (reality and fantasy are not necessarily separated at this age).

Art Center

Make a collage of airplane pictures cut from magazines.

Make a shape book (airplane shape). Use tag board or construction paper for the front and back covers. Each child will dictate a story. Story starters: "I like airplanes because...." "The color of my airplane is...." The teacher can write down the child's story and help the child assemble it for the book.

Make aircraft stencils from styrofoam or potatoes. Encourage children to stamp airplanes on construction paper by dipping stencils into tempera paint. Talk about the colors of planes the children make.

Make an aircraft mobile. Best Rainy Day Book Ever by Richard Scarry. Random House (available at discount stores or BX), contains a pattern for a mobile that the children can help construct.

7. TEACHER RESOURCES

Pictures and Displays

Contact the public affairs office for photos of military aircraft.
Contact the local Air Force recruiting office for literature and posters.

Phone local travel agencies or airlines for pictures of planes and travel brochures.

8. LOCAL RESOURCES

Guest speakers could include:
- Aero club member
- Civil Air Patrol personnel
- Maintenance crew members
- Pilot
- Navigator
- Air traffic controller

Commercial airlines: Contact for free promotion items that could be used in the interest centers. Baggage tags, paper napkins, plastic cups, peanuts, might be available.

Information office: Arrange for a field trip to the flight line.

Salvage material: Contact base supply dump (salvage) for old uniforms, helmets, life raft boats, parachutes (drag chutes are smaller), ear phones, airplane seats, control panels, etc.

9. BOOKS


Try these tricky changes

With a few small changes, you can make an ordinary paper airplane fly farther than usual, change direction, and even roll. Here are some ways to do it:

**Go for distance**

To keep the plane from wobbling, add a paper clip. The extra weight will also help the plane fly farther. Put the paper clip near the center of the plane. If the plane climbs too steeply, move the clip toward the front. If the plane nosedives, move the clip back a little. Try different positions. See what happens when you move the clip all the way forward or all the way back.

**Add a roll**

Fold the edge of one wing up. Fold the edge of the other wing down. Now launch your plane. It should roll over and over as it flies.

**Climb and dive**

With scissors, make two small cuts in the back edge of each wing to form tabs called elevators. The cuts should be 1 1/2 inches (4 cm) apart. Try bending the tabs at different angles. Bending them up will make the plane climb. Bending them down will make it dive. Bend the elevators up slightly and watch what happens on a long flight.

**Change direction**

Do you want your plane to change direction? Fold the outer edges of the wings up. Make a small cut in the end of each folded-up wing edge. The cuts form a rudder on each side. When turned slightly, rudders can make your plane head left or right. Fold both rudders to the left and see what happens. Then fold both of them to the right.

**Flying tips for paper planes**

Fly your plane outside, or in a large room where nothing can be accidentally knocked over.

Give the wings of your plane a curled look by gently pulling the wings over the edge of a table.

To help the plane stay up longer, fold it so that the wings are wide.

On a calm day, fly planes made of thin paper. Planes made of heavy paper do best when it’s windy.
How to build a paper plane

Things you will need
- Paper
- Scissors
- Tape
- Pencil

1. Find a sheet of paper the size of this page. Fold the paper in half lengthwise. Run your thumbnail along the fold to crease it.

2. Open the paper. Smooth it out. Fold one corner down. Its inside edge should line up with the crease in the center of the page.

3. Now, fold the other corner down. There should be a point at the top of the paper. Crease both folds firmly with your thumbnail.

4. Remember to keep the point facing away from you. You will make your next folds where the broken lines appear in the picture above.

5. Fold one side of the plane to the center along the broken line. The inside edge should line up with the center crease.

6. Fold the other side of the plane to the center. The new folds will be thick. Run your thumbnail over them to crease them sharply.

7. Turn the plane over. Keep the pointed end facing away from you. With a pencil, draw lines like the broken ones shown in the picture above.

8. Fold the left side of the plane over so it lines up with the pencil line on the right side. Make a sharp crease. Then open that fold.

9. Fold the right side over in the same way. Match its edge to the pencil line on the left side.

10. Open that fold and turn the plane over. Crease the center folds again. Put a piece of tape tightly across the top so the wings pull up slightly.

11. Toss the plane gently forward and upward with a smooth motion. For more flying tips, turn the page.