The Sky's the Limit!

National Museum of WWII Aviation
Colorado Springs, CO
## Kindergarten Program: Sky’s the Limit!
### National Museum of WWII Aviation
### Length: 2 hours

<table>
<thead>
<tr>
<th>Station Standard (15-min. duration)</th>
<th>Activity</th>
<th>Supplies</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Wing Shape</strong></td>
<td>Fly airplanes. Identify basic shapes that make up the plane and how the plane moves.</td>
<td>Balsa or Styrofoam gliders</td>
</tr>
<tr>
<td><strong>Timeline Takeoff</strong></td>
<td>Put pictures of planes in order from oldest to newest. Why did you choose to put them in this order?</td>
<td>Timeline Takeoff Boards</td>
</tr>
<tr>
<td><strong>Airplane People</strong></td>
<td>Body planes—draw and decorate, measure armspan v. height</td>
<td>Butcher paper, Markers/crayons, Tape measures</td>
</tr>
<tr>
<td><strong>Airplane Simon Says</strong></td>
<td>Simon says using axes of flight</td>
<td>none</td>
</tr>
</tbody>
</table>
Teacher Materials Provided

- Electronic copy of curriculum materials
  - Pre-lessons #1, #2, #3
  - Student worksheets, lab questions, and assessments
  - Background information for teachers—NOT INTENDED FOR STUDENT DISTRIBUTION!
  - National Museum of World War II Aviation Information
  - Teacher and Student Surveys
*Note: the curriculum guide has blank pages in different places. These are intentional, to allow easier double-sided printing.

- Curriculum and content support whenever you need it!

Before Your Visit to the Museum

- Complete the Pre-Evaluation.
- Complete Pre-Lessons #1, #2 and #3 in the curriculum guide. Each lesson is designed to take no more than two class periods.
- Split your class(es) into groups. The amount of groups will depend on class size. Split the class into a maximum of six groups. Choose one leader from each group to be the "Flight Leader". Let students know which groups they are in ahead of time; it will make the museum orientation more efficient, leaving your students with as much time as possible for the program!
- Arrange for transportation to the museum. If you are receiving assistance for transportation funding, please let us know if you will need a check ahead of time, or if your school/district will invoice us.
- Arrange for chaperones. You need one adult to accompany each small group. If you will not be able to get chaperones, please contact Rachel Greenfield immediately.
- Decide whether students will eat lunch back at the school, go out to eat for lunch, or pack their own lunches and eat out on the ramp at the museum.
- If you are planning on eating lunch at the museum, please let us know ASAP!
Your Visit to the Museum

- Make sure that you have directions to the museum from your location. The address for Mapquest/GPS is **755 Aviation Way, Colorado Springs, CO 80916.** Follow the signs for museum parking, not for Westpac Restoration.
- If possible, have students enter the museum in their smaller groups.
- Students should leave backpacks, large purses, etc. on the bus or at school. We will provide students with clipboards and pencils or pens.
- Everyone is welcome to bring cameras, although photography is allowed in the museum only (not at Westpac Restorations).
- Bring your signed pre-evaluations, if you have not sent them ahead of time.

After Your Visit to the Museum

- Wrap up your visit! Talk about your visit with your students, or complete the reflections or assessments in the curriculum guides. Find out what interested them, what surprised them, etc. If students have questions that you are unable to answer, feel free to direct them back to the museum during public hours (Tuesday, Thursday and Saturdays).

If you have any questions, just ask!
Rachel Greenfield
k12programs@worldwariaviation.org
Office: 1-888-843-0671 (option 5)

Mailing address: See The Change USA
Attn: National Museum of WWII Aviation K-12
Programs 1755 Telstar Drive, Suite 300
Colorado Springs, CO 80920
Evaluation Procedures

**GENERAL PROCEDURES**

1. Log onto Physics Lab using the log in information your Mission Coordinator provided you with.
2. For teachers, take your survey on Physics Lab and submit your answers.
3. To complete the student evaluations, download the printable version of the Pre-Visit Student Evaluation and the Post-Visit Student Evaluation from Physics Lab, have students fill out the surveys.
4. Bring student’s pre-visit evaluation to the museum on the day of your visit.
5. Scan and email your students post evaluations to your Mission Coordinator or mail the completed evaluations to the address below.

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See The Change USA  
Attn: National Museum of WWII Aviation K-12 Programs  
1755 Telstar Drive, Suite 300  
Colorado Springs, CO 80920

**EVALUATION TIMELINE**

<table>
<thead>
<tr>
<th></th>
<th>Pre-Evaluation</th>
<th>Day-of Evaluation</th>
<th>Post-Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Who?</td>
<td>4th-12th grade students</td>
<td>4th-12th grade students</td>
<td>Teachers and 4th-12th grade students</td>
</tr>
<tr>
<td>Time Frame</td>
<td>Any time before beginning NaMoWWIIA curriculum</td>
<td>Will be completed at NaMoWWIIA immediately following program</td>
<td>Will be completed any time within one month after visit.</td>
</tr>
<tr>
<td>Time Requirement</td>
<td>5-10 minutes</td>
<td>15 minutes</td>
<td>5-10 minutes</td>
</tr>
</tbody>
</table>

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**Please Note:**

Collecting data about teacher experience and student knowledge is crucial to continue receiving funding for the programs. Thus, for those teachers and students participating in this program, completing all evaluations is mandatory. Thank you for helping us collect data about our program so we can continue to provide teachers and students with the best overall experience with the education program!
Pre-lesson #1:
It’s a Bird! It’s a Plane!
Adapted from “Parts of an Airplane,” NASA Aeronautics Research Mission Directorate, Museum in a Box, EP-2010-12-465-HQ

Time requirement: 20 minutes
In this activity, the students will learn about and observe properties of objects and materials, as well as characteristics of organisms, and will develop the ability to distinguish between natural objects and objects made by humans as they identify the similar components and understand their purposes.

Materials:
- Group KWL chart on board or large piece of paper
- Student sheets
- Download of “I’m Getting on an Airplane” mp3 and/or lyrics

Procedure:
1. Begin by brainstorming things that fly. Pick several, and ask students what they all have in common.
2. Next, distribute copies of each of the bird pictures to the students (found following the lesson procedure), keeping a copy for yourself which will be used as a demonstration piece.
3. Hold up one of the bird pictures and ask the students to name each of the major parts:
   - Head
   - Body
   - Wings
   - Tail
   - Legs & Feet
4. Repeat the process with another of the bird pictures. This time, ask the students what each part is for.
   - **Head**: This is what the bird uses to think, hear, eat and see
   - **Body**: Holds the other parts together; digests food
   - **Wings**: Provide the lift needed for the bird to fly
   - **Tail**: Helps the bird both steer and fly in a straight line
   - **Legs & Feet**: Allow the bird to land and walk on the ground
5. Repeat the process with the final bird picture. Ensure that the students now understand that while each of the birds looks different, the names of the body parts are the same. If desired, use the tape or thumbtacks to secure the bird pictures to the wall for easier reference during the next step.
6. Hold up the picture of the airplane. Ask the students to use what they have just learned about birds to identify the main components. At this point, they will likely name each part using bird terms. There is no need to correct them yet. You will review the parts of an airplane in Lesson 3.
7. Finally, point to each of the parts again, but this time tell them the actual name and how it correlates to the bird.
   - **Head – Cockpit**: Instead of a bird’s brain and eyes, this is where the pilot sits and controls the plane.
**Body – Fuselage:** While the bird holds food in its belly for fuel, the airplane holds jet fuel or gasoline. The fuselage is also where all the people and bags go.

**Wings – Wings:** Unlike the bird, the airplane doesn’t flap its wings to provide lift. Instead, the plane uses the shape of its wings to provide lift. Also, instead of using its wings to provide thrust like the bird, the airplane uses engines.

**Tail – Tail:** The part of an aircraft commonly referred to as the tail is really called the empennage. It works much the same as a bird’s tail, guiding the airplane through the air and helping it fly in a straight line.

**Legs & Feet – Landing Gear (or Undercarriage, Wheels, etc.):** The plane uses these wheels to move on the ground like a car, just like the bird walks on the ground.
A robin in flight
A seagull in flight
A hummingbird in flight
An airplane in flight
Pre-lesson #2:
Plane Puzzles

Adapted from “Parts of an Airplane,” NASA Aeronautics Research Mission Directorate, Museum in a Box, EP-2010-12-465-HQ

Time requirement: 20 minutes
By completing jigsaw puzzles of airplanes, students will reinforce their abilities of technological design as they review the concept that it takes many individual parts of differing shapes to build an object.

Materials:
- Airplane puzzles: you may purchase your own or you may use the pictures that follow the lesson plan. Print or glue them onto foam core and use a craft knife to cut along the lines.

Procedure:
1. If you have not completed Activity 1 – Birds & Planes, discuss the Background information with the students. It is important for this activity to convey the basic concept that many parts can come together to build the whole, rather than attempting to understand how they interact together in flight.
2. Depending on the number of students and puzzles available, divide the class into even sized groups. Provide each group with a completed jigsaw puzzle. Ask them to study the puzzle, then remove and jumble all of the pieces. If you are teaching older students, begin with the puzzles in many pieces already.
3. Ask the students to reassemble the puzzle. Repeat this as desired, rotating the different puzzles amongst the groups.
4. After the students have completed the puzzles, discuss the following:
   a. **What picture did the puzzle make?** An airplane
   b. **Where would we find airplanes?** At the airport
   c. **If a part was missing, could you still tell it was an airplane?** Answers will vary by student
   d. **Could we take a part from each of the different puzzles and make a completely different airplane?** Most likely, no. It is important for the students to understand that each part is specially designed to work with one aircraft and the parts are not interchangeable. Have the students picture a big bird with wings from a really tiny bird; could it fly? No, because the wings were designed for the small bird, not the big one.
Pre-lesson #3:
I’m Getting on an Airplane
(Field Trip Preparation)
Adapted from “Getting on an Airplane,” NASA Aeronautics Research Mission Directorate, Museum in a Box, EP-2010-12-463-HQ

Time requirement: 30 minutes
In this activity, students will learn about the properties of objects and materials, and the abilities of technical design as they utilize prior knowledge regarding airplanes. Also, they will record questions they have about airplanes and how airplanes fly and identify the main parts of an airplane.

Materials:
- Group KWL chart on board or large piece of paper
- Download of “I’m Getting on an Airplane” mp3 and/or lyrics

Procedure:
1. Begin by asking students: Who has ever been on an airplane? What was it like?
2. Next, ask the students: What do we already know about airplanes?
3. Now, ask students: What don’t you know about airplanes that you wish you knew? What questions do you have about airplanes? What do you hope to learn or see at the museum?
4. Use the answers from above to complete the Know and Want to Know sections of a group KWL chart about airplanes. (Note: save this chart until after your visit to the museum, as it will be used as part of the wrap-up activity.)

Sample:

<table>
<thead>
<tr>
<th>K</th>
<th>W</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>What do we already know about airplanes?</td>
<td>What do we want to know about airplanes?</td>
<td>What have we learned about airplanes?</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5. Display the blank diagram of an airplane on the projector or overhead and ask them to remember as many of the parts they can from what they learned in Lesson 1. If a word bank is needed, put the following terms on the board: fuselage, cockpit, engine/propeller, horizontal stabilizer, vertical stabilizer, ailerons, rudder, elevator.
6. As a group, decide on the “correct” answers to the diagram. Listen to the “I’m Getting on an Airplane” song to help students remember or discover the answers. You may also wish to display the lyrics so that students can read along.
“I’m Getting on an Airplane”
Lyrics

I’m gettin’ on an airplane, but how does a plane fly?
There are many parts in an airplane, to keep it movin’ through the sky
I’m gettin’ on an airplane, but how does a plane fly?
There are many parts in an airplane, to keep it movin’ through the sky

The body is the fuselage, it carries people and cargo
The pilot sits in the cockpit, for command and control
Jet engines or propellers provide the needed thrust
In order to lift the plane in the air, wings are a must

I’m gettin’ on an airplane, but how does a plane fly?
There are many parts in an airplane, to keep it movin’ through the sky

In the tail of the plane, are some smaller wings
They keep the craft flying straight, a very important thing
The horizontal stabilizer controls the pitch
The vertical stabilizer controls the yaw – but that’s not all...

There are many hinged parts that bring about change
Let’s describe them, and see how they affect the plane
The flaps change lift – up and down
And they change drag – fast and slow
The ailerons cause tilt – that’s called roll
Left up – roll left, right up – roll right
The rudder changes yaw – side to side
The elevators change the pitch

I’m gettin’ on an airplane, but how does a plane fly?
There are many parts in an airplane, to keep it movin’ through the sky
I’m gettin’ on an airplane, but how does a plane fly?
There are many parts in an airplane, to keep it movin’ through the sky
I’m gettin’ on an airplane.

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Can you name the parts of an airplane?
Can you name the parts of an airplane?

- propeller
- cockpit
- aileron
- rudder
- vertical stabilizer
- horizontal stabilizer
- fuselage
- elevator
- wing
- propeller
Nose Art
(optional)

Nose art is found on WWII aircraft and on aircraft today. Nose art originally began as a way of identifying aircraft. During the first World War, nose art painted by ground crews generally took the form of stylized squadron insignia. During WWII, considered by some to be the “golden age” of nose art, nose art (and the associated practice of naming the plane) became a way to express the pilot or crew’s personality, served to remind crew members of home and peacetime life, and sometimes even personalized the plane and made it another member of the crew. It also helped distinguish one plane from hundreds of others in its squadron that looked identical to it. Nose art (often extending beyond the nose onto the fuselage or tail) continued to appear on military aircraft following WWII and today can be seen on a number of commercial airlines as well.

Students will see nose art on at least one aircraft at the museum. Because aircrews during WWII were mainly staffed by young men in their late teens or early 20’s, a great deal of nose art on WWII aircraft can be “colorful.” This activity will put nose art into a historical context for students, and help them understand why airmen chose the nose art that they did and the significance that it held for crews. This activity may be done individually or as a small group activity to foster teamwork and communication skills.

Materials:
Student sheets
Art supplies (paper, markers, crayons, paint)

Procedure
1. Introduce the concept of nose art to the students. Examples of nose art follow this lesson plan.
2. Have students walk through the nose art “thought process” (see following page) in order to develop their own nose art (individually or in groups).
3. Once students/groups have decided on the concept of their nose art, they should create a picture of what it would look like.
4. Have students present their nose art to the class, explaining the meaning behind their design and why they chose the different elements.
NOSE ART
Student worksheet

During WWII, aircraft crews often painted “nose art” on their planes. The designs that they chose reflected their personalities, reminded them of home, reminded them of what they were fighting for, and sometimes even personalized their plane and made it part of the crew.

Imagine that you are part of a WWII air crew that has just been assigned to your brand-new plane. Your job, as a new team, is to decide what you want the ground crews to paint on the nose of your airplane. Your nose art might describe your team, your plane, or even include little aspects of each of you as individuals. Use the questions below to help guide your thinking. Good luck!

What kinds of things are important to you?

What kinds of things make you think of home and your loved ones?

If you came in contact with another aircraft, what would you want the nose art to tell the other aircrew about you and your crew?

Use the thoughts above to design your nose art, and to also give your plane a name! Remember that the people who usually painted the art on planes were NOT professional artists, so don’t worry about how “real” your art looks!
NOSE ART

Plane name: _________________________________
Dumbo on a TBM Avenger

Many aircrews—not just those from the U.S.—requested Disney characters because they were “suitable” for humor and patriotism. The Walt Disney Company actually designed a number of insignia specifically for aircrews!

http://www.skylighters.org/disney/
The B-29 Superfortress *Ernie Pyle*.

Ernie Pyle was a famous war correspondent who reported from Europe and the Pacific during WWII.

The P-38 Lightning *Lucky Irish*
This P-38 was named after its pilot, Lt. Gerald O’Donnell
http://www.nose-art.net/P-38.htm
Frontier Airlines

Each Frontier aircraft has a unique tail and a name associated with the plane. Passengers are “introduced” to their plane by the flight crews.
The B-25 *In the Mood*

Students will see the *In the Mood* on their visit to the museum. *In the Mood* was a popular song during WWII.
Visit to the Museum

Please note: this section is not intended for student distribution. This section is to provide the “big picture” of what students will be doing at the museum, not to provide for additional instruction before the visit.

Student will work in their small groups at each station. The class will start with station 1 and will move to the next station activity after approximately fifteen minutes.

<table>
<thead>
<tr>
<th>Station</th>
<th>Activity/Standards and Concepts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classroom (5 min)</td>
<td><strong>Welcome</strong>&lt;br&gt; Squadron division&lt;br&gt; Housekeeping</td>
</tr>
<tr>
<td>Station 1</td>
<td><strong>Soaring with Shape</strong>&lt;br&gt; Parts of a Plane, Forces of Flight, Shapes</td>
</tr>
<tr>
<td>Station 2</td>
<td><strong>Timeline Takeoff</strong>&lt;br&gt; Information About the Past, Observation of Properties</td>
</tr>
<tr>
<td>Station 3</td>
<td><strong>Airplane People</strong>&lt;br&gt; Parts of a Plane, Shapes, Teamwork &amp; Communication, Measurement</td>
</tr>
<tr>
<td>Station 4</td>
<td><strong>Simon Says “Roll, Pitch, Yaw!”</strong>&lt;br&gt; Parts of the Body, Motion and Movement, Locomotor Skills, Communication, Following Rules</td>
</tr>
<tr>
<td>Departure, ~10 min</td>
<td>Day-of evaluations&lt;br&gt; Return dogtags&lt;br&gt; Wrap-up</td>
</tr>
</tbody>
</table>
Suggested Activities:

- Complete the “L” part of the original KWL chart by listing what they have learned through the museum program experience.
- Talk about what they saw and learned using the following discussion points:
  - An airplane is made up of lots of parts. What were some of the parts? Can you name other manmade objects that are made up of lots of parts? How are these parts similar and different? The answer is self-explanatory, but expect responses such as cars, trains, etc. If desired, correlate this to non-mechanical objects such as a pencil, where the lead, eraser and wood shell are considered its parts.
  - If a part was taken away, or missing, would a bird or plane work properly? In most situations involving living or mechanical objects, the answer would be no. For simpler objects like the pencil, it could still function if the item missing was less critical, such as the eraser. Even though objects or living things might be able to function without some of their parts, they wouldn’t be able to do everything. For example, a pencil would still write without an eraser, but what wouldn’t it be able to do? If a bird was missing its feathers, what might it have trouble with?
- Hold a “press conference” for parents and administrators. At this press conference, break the group into small teams. Each team describes what they did at a station, ensuring that each student gets a chance to contribute in front of the audience.
Sky's the Limit and the Colorado Standards

Science Standards Addressed:
- Physical Science 1.1 (K): Objects can move in a variety of ways that can be described by speed and direction
- Physical Science 1.2 (K): Objects can be sorted by physical properties, which can be observed and measured

Math Standards & Skills Addressed:
- Number Sense, Properties, and Operations 1.1 (K): Whole numbers can be used to name, count, represent, and order quantity
- Shape, Dimension, and Geometric Relationships 4.1 (K): Shapes are described by their characteristics and position and created by composing and decomposing
- Shape, Dimension, and Geometric Relationships 4.1 (Grade 1): Shapes can be described by defining attributes and created by composing and decomposing
- Shape, Dimension, and Geometric Relationships 4.1 (Grade 1): Measurement is used to compare and order objects and events

Reading, Writing, and Communicating Standards Addressed:
- Oral Expression and Listening 1.2 (K): Communication relies on effective verbal and nonverbal skills
- Oral Expression and Listening 1.2 (Grade 1): Verbal and nonverbal language is used to express and receive information

Social Studies Standards Addressed:
- History 1.1 (K): Ask questions, share information and discuss ideas about the past
- History 1.2 (Grade 1): Family and cultural traditions in the United States in the past

Physical Education Standards Addressed:
- Movement Competence and Understanding 1.1 (K): Demonstrate body and spatial awareness through safe movement
- Movement Competence and Understanding 1.2 (K): Locate the major parts of the body
- Emotional and Social Wellness 3.2 (K): Demonstrate the ability to follow directions
- Movement Competence and Understanding 1.1 (Grade 1): Demonstrate basic locomotor and nonlocomotor skills, and rhythmic and cross-lateral movements
- Emotional and Social Wellness 3.2 (Grade 1): Follow the rules of an activity