Pre-Visit Preparation
Level 3: 9th - 12th Grade
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  o Aviation Learning Center Standards Supported
Welcome to the Aviation Learning Center. Your students are about to embark upon a two-hour immersive pilot training and ground school inspired program in which they will experience aeronautical science, piloting protocols and the thrill of flight.

Engaging hands-on lessons connect classroom content (sciences, math, technical reading) and real world skills (problem solving, teamwork) to the aviation world. The Aviation Learning Center encourages students to find their place in that world and gives them the tools to get there.

The program is geared toward three academic age groups; upper elementary (4-5), middle (6-8), and high school (9-12). Each level is designed with age appropriate challenges and learning, and supports current educational standards (Common Core State Standards, Next Generation Science Skills, & 21st Century Skills).

On the day of your visit, your class will be divided into two groups. (Within the groups, students will work in pairs throughout the entire Aviation Learning Center experience.) The two groups will rotate through three different areas of the ALC: Rajpaul Learning Laboratory, Cirrus Hangar and Flight Simulator Bay.

- In the Rajpaul Learning Laboratory, students explore aeronautical topics and concepts that pilots study in ground school.
- In the Cirrus Hangar, students plan a course and create a flight plan. They also perform a pre-flight safety inspection of an actual Cirrus SR-20 aircraft.
- Finally, in the Flight Simulator Bay, students put their new skills to use—when they step into the simulators and fly the route they charted in the Hangar.

The Aviation Learning Center combines STEM topics, real world skills and fun for an inspiring and memorable experience for all participants.

If you have any questions or comments about your upcoming Aviation Learning Center experience, please do not hesitate to contact us at alc@museumofflight.org or at 206.768.7188.

Happy Flying,
The Aviation Learning Center Staff
The Museum of Flight
About the Aviation Learning Center
OVERVIEW

Students will learn about the science of flight and experience what it takes to be a pilot. They will perform a pre-flight safety inspection on a real airplane, create a flight plan, and fly the route in flight simulators.

BIG IDEAS

• Forces of Flight
• Navigation and Map Reading
• Parts of a Plane
• Flight Controls

OUTCOMES - What will students know or be able to do by the end of the lesson?

• Identify the preparations a pilot must undertake before flying.
• Appreciate the value of math and science skills in the real world.

VOCABULARY

• Force
• Aileron
• Elevator
• Rudder
• Nautical Mile
• Knots
• Latitude & Longitude
• Simulator
FOR YOUR VISIT

PREPARING FOR YOUR MUSEUM VISIT

• Please arrive at the Museum 15 -30 minutes before the program start time. This allows time for lunch storage, bathroom breaks, check-in, and group organization.
• All programs must end at the original end time, regardless of when the program starts.
  Headcount - # of students ______
  # of chaperones ______
• Please leave backpacks at school or on the bus.
• Bring lunches in a box with school name on it. These will be stored adjacent to the Alaska Airlines Aerospace Education Center.

ARRIVAL AT THE MUSEUM

• Students should wait on the bus or outside until a MOF representative greets the group and stamp the students’ hands.
• Please wait for students whom arrive separately in the Museum Lobby.
• Teachers will check in at the Alaska Airlines Aerospace Education Center (AEC), at the nose of the MD-21 Blackbird. Student and chaperone headcounts are needed at this time.
• Upon check in, groups can reserve a lunch time for one of the Museum’s indoor lunch areas. Reservations are made on a first-come, first-served basis.
• Lunches will be stored adjacent to the AEC.
• After students are dropped off at the Museum, buses are parked in the West campus, behind the Charles Simonyi Space Gallery. After parking, drivers are welcome to get a chaperone nametag from the AEC and tour the museum.
• If you will be late, please call the AEC at (206) 768-7239.

YOUR DAY AT THE MUSEUM

Program name(s) ____________________________________________________________

Program start time(s) ________________________________________________________

Program end time(s) _________________________________________________________

Location (where to meet) _____________________________________________________

For Teachers
FOR YOUR VISIT

PREPARING FOR A MUSEUM TRIP

Student Names
1.
2.
3.
4.
5.
6.
7.
8.
9.
10.

ARRIVAL AT THE MUSEUM

If you arrive separately from your teacher, please wait for them in the Museum Lobby.

All students must follow the Museum’s TREES:

**T - Toe rails** - stay outside the gray and black striped barriers around the aircraft

**R - Running** - use your walking feet in the Museum

**E - Eating** - eat only in the designated lunch area

**E - Elevator** - save the elevator for visitors who need it - take the stairs

**S - STICK** - students must AT ALL TIMES stick with their chaperone (including bathroom breaks and while in the gift shop)

YOUR DAY AT THE MUSEUM

Program: ____________________________________________________________

Time: ______________________________________________________________

Location: __________________________________________________________

Departure Time: ____________________________________________________

Chaperones
FOR YOUR VISIT

FURTHER EXPLORATION

• Check out the future of space travel in the Charles Simonyi Space Gallery
• Explore the evolution of technology from WWI through WWII in the J. Elroy McCaw Personal Courage Wing
• Board the Concorde and Airforce One in the Aviation Pavilion
• Celebrate Washington State history and the Boeing story in the original Boeing factory, the William E. Boeing Red Barn
• Go back in time and explore the history of space exploration in the Lear Gallery and the APOLLO Exhibit
• See the transformation of aviation over the ages in the T.A. Wilson Great Gallery
• Watch movies in the William M. Allen theater- tickets available at an additional charge
• Ride one of the flight simulators in the T.A. Wilson Great Gallery- tickets available at an additional charge
Assigning Teams
PRIOR TO ARRIVING AT THE MUSEUM OF FLIGHT

• Use the Aviation Learning Center Roster to divide your class evenly into two groups, Alpha Flight and Bravo Flight.
• Assign partner teams within the groups; students will work in these pairs throughout the entire program.
• If your class has an odd number of students, a student may work alone or in a group of three.

Alpha and Bravo Flights will rotate through three different areas of the ALC: the Rajpaul Learning Laboratory, the Cirrus Hangar, and the Flight Simulator Bay.

In the Learning Lab, student pairs will work with one of six topics. Each team will become topic specialists and report back to the entire group at the end of their time in the lab.

• Familiarize yourself with the different stations using the Aviation Learning Center Learning Laboratory Workstations description.
• Assign teams to a workstation using the Aviation Learning Center Roster.
• Bring two copies of the roster to The Museum of Flight.
• Give a copy to the Educator at the beginning of the program.
Use the following descriptions to assist as you assign students to Learning Lab Stations.

**FLIGHT DYNAMICS**
Through hands-on experiments, students explore the basic physics of flight and the four forces of flight and learn how these physical principles make flight possible.

**INSTRUMENT FLIGHT**
Students learn how flight instruments— the compass, altimeter, and attitude indicator-work, and how pilots utilize them to draw conclusions about an airplane’s position and motion.

**NAVIGATION**
Students explore the fundamental concepts of navigation- latitude, longitude, and compass directions, while they practice using a pilot’s chart and other navigation tools to plot a local flight.

**WEATHER**
Analyze the current weather conditions at Boeing Field to understand how weather affects flight and determine if it is safe to fly.

**WEIGHT AND BALANCE**
Working with a variety of model airplanes, students explore the concepts of load weight and center of gravity, and how they affect the flight of a Cirrus SR-20.

**WIND TUNNEL**
Using a wind tunnel and wind tunnel app, students focus on basic aerodynamic theory and the mechanics of lift.
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<tr>
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<th>ALPHA FLIGHT Begins in Learning Lab</th>
<th>BRAVO FLIGHT Begins in Cirrus Hangar</th>
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<tr>
<td>Flight Dynamics</td>
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<td>Wind Tunnel</td>
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<td>Flight Dynamics (team 2)</td>
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<td>Instrument Flight (team 2)</td>
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<td>Navigation (team 2)</td>
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Overview Rajpaul Learning Lab:

Individual workstation supported standards available at upon request

- **Common Core State Standards- English Language Arts**
  - Language: L.9-10.6, L.11-12.6
  - Reading Informational Texts: RI.9-10.4, RI.11-12.4
  - Speaking and Listening: SL.9-10.4, SL.11-12.4
  - Writing: W.9-10.4, W.11-12.4

- **Common Core State Standards- Math**
  - Numbers and Quantity: Quantities: HSN.Q.A.1
  - Numbers and Quantity: Vector and Matrix Quantities: HSN.VM.A.3
  - Algebra: Creating Equations: HAS.CED.A.1
  - Algebra: Reasoning with Equations and Inequalities: HAS.REI.A.1
  - Statistics and Probability: Interpreting Categorical and Quantitative Data: HSS.ID.C.7

- **Next Generation Science Standards**
  - Motion and Stability: Forces and Interactions: HS.PS2-1
  - Engineering Design: HS-ETS1-3
  - Practices: 2,3,4,5,6,7,8

- **21st Century Skills**
  - Work Creatively with Others: 1.A.3, 1.B.1, 1.B.2, 1.B.4
  - Reason Effectively: 2.A.1
  - Use Systems Thinking: 2.B.1
  - Make Judgements and Decisions: 2.C.1, 2.C.3, 2.C.4, 2.C.5
  - Solve Problems: 2.D.1, 2.D.2
  - Collaborate with Others: 3.B.1, 3.B.2, 3.B.3
  - Use and Manage Information: 4.B.2
  - Apply Technology Effectively: 6.A.1
  - Adapt to Change: 7.A.1
  - Be Flexible: 7.B.1, 7.B.2
  - Manage Goals and Time: 8.A.3
  - Work Independently: 8.B.1
  - Work Effectively in Diverse Teams: 9.B.1
  - Manage Projects: 10.A.1
  - Produce Results: 10.B.1.B., 10.B.1E, 10.B.1.F
  - Guide and Lead Others: 11.A.1
Overview Cirrus Hangar:

- **Common Core State Standards- English Language Arts**
  - Reading Informational Texts: RI.11-12.7
  - Speaking and Listening: SL.9-10.1, SL.11-12.1

- **Common Core State Standards- Math**
  - Number and Quantity: Quantities: HSN.Q.A.1, HSN.Q.A.3

- **Next Generation Science Standards**
  - Practices: 4, 8

- **21st Century Skills**
  - Make Judgements and Decisions: 2.C.4
  - Communicate Clearly: 3.A.1
  - Collaborate with Others: 3.B.1, 3.B.2, 3.B.3
  - Use and Manage Information: 4.B.2
  - Adapt to Change: 7.A.1
  - Work Independently: 8.B.1
  - Produce Results: 10.B.1.F

Simulators:

- **21st Century Skills**
  - Work Creatively with Others: 1.B.4
  - Collaborate with Others: 3.B.1
  - Apply Technology Effectively: 6.A.1
  - Adapt to Change: 7.A.1, 7.A.2
  - Be Flexible: 7.B.2
  - Interact Effectively with Others: 9.A.2
  - Work Effectively in Diverse Teams: 9.B.2
  - Guide and Lead Others: 11.A.1