

Passports



The Sky is the Limit!

Grade: 6-8

Description of our Tour:

Information for Trip Leader:

Lesson Outcomes:

The student will learn:

- The parts of a plane
- How planes fly
- The history of flying and the contributions of the Wright Brothers and Amelia Earhart.

Activities:

Activity # 1: Paper Airplane Lab!

Have your students test their piloting skills by making and flying paper airplanes! At the end of this resource guide you will find the directions for making paper airplanes. Model how to make an airplane to your students and then let them create and decorate their own. Afterwards, the students can practice flying their airplanes to see whose flies the furthest. They can make several different kinds of paper airplanes to see what effect the wing length and body shape have on the flight pattern. After several trials, the students can record their results and draw conclusions.



Activity # 2: Amelia Earhart



Amelia Earhart is one of the most famous pilots in history. Not only is Amelia Earhart a famous pilot, she is also a famous poet. At the end of this resource guide, you will find several of Amelia's poems. After reading the poems and participating in the passport, have your students brainstorm some exciting or risky experiences they have had. Then the student can write their own poem about their experience.

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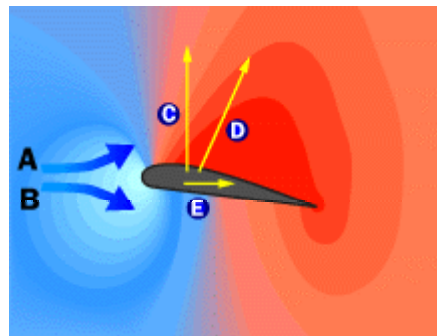
Challenge Questions:

1. What are the main things a plane needs in order to fly?
2. Name the people who were the first to fly and where the first flight took place.
3. How does a plane fly?
4. Amelia Earhart is famous for flying across what ocean?
5. What was Earhart attempting to do on her last flight?

Responses:

1. Wings, engine, tail, pilot, etc.
2. The Wright Brothers had the first flight at Kitty Hawk, NC. Orville Wright was actually piloting the plane when it first flew.
3. Students may not know the specific terms, but something along the lines of: when the plane goes really fast, the wings help the airplane lift off the ground.

*** The more complicated answer:* Lift is a force on a wing (or any other solid object) immersed in a moving fluid and it acts perpendicular to the flow of the fluid. (Drag is the same thing, but acts parallel to the direction of the fluid flow). The net force is created by pressure differences brought about by variations in speed of the air at all points around the wing. These velocity variations are caused by the disruption and turning of the air flowing past the wing. The measured pressure distribution on a typical wing looks like the following diagram:



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A. Air approaching the top surface of the wing is compressed into the air above it as it moves upward. Then, as the top surface curves downward and away from the airstream, a low-pressure area is developed and the air above is pulled downward toward the back of the wing.

B. Air approaching the bottom surface of the wing is slowed, compressed and redirected in a downward path. As the air nears the rear of the wing, its speed and pressure gradually match that of the air coming over the top. The overall pressure effects encountered on the bottom of the wing are generally less pronounced than those on the top of the wing.

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- C. Lift component
- D. Net force
- E. Drag component

When you sum up all the pressures acting on the wing (all the way around), you end up with a net force on the wing. Basically, the pressure on the top of the wing is lower than the pressure on the bottom of the wing. The net pressure creates a lifting force.

4. The Atlantic Ocean

5. She was attempting to fly around the world.

Vocabulary Words:

Airplane: a motor-driven or jet-propelled aircraft kept aloft by the forces of air upon its wings

Cockpit: The area of the plane where the pilots sit

Drag: an aerodynamic force that resists the motion of an object moving through a fluid (air and water are both fluids).

Engine: the machine that provides the plane with power.

Flight: the act, manner, or power of flying

Landing: When the plane comes back and lands on the ground

Lift: the aerodynamic force that holds an airplane in the air

Pilot: The person who drives the plane.

Tail: similar to an animal's tail, on a plane it's at the back end.

Take-Off: When the plane first lifts off the ground and goes into flight.

Thrust: the forward force produced by a jet or rocket engine

Weight: how heavy something is, the force of gravity acting on an object

Wright Brothers: They were the first to fly a plane.

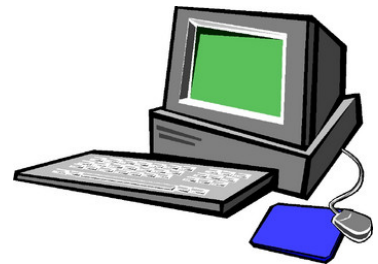
Wing: similar to the wing of a bird, on a plane it's the main lateral supporting surface

Web Resources:

How Planes Work

<http://travel.howstuffworks.com/airplane.htm>

Click on this link and share this simple explanation of how airplanes fly.



The History of Flight

<http://www.ueet.nasa.gov/StudentSite/historyofflight.html>

Click on this link to share with the students some advances in flight from the past to the present.

Amelia Earhart Sites

- <http://www.ameliaearhart.com/>
- <http://www.ameliaearhartmuseum.org>
- <http://www.cnmi-guide.com/history/ww2/amelia/>
- <http://www.ellensplace.net>
- <http://foia.fbi.gov/earhart.htm>

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- <http://www.heroinesinhistory.com>
- <http://www.history.navy.mil/faqs/faq3-1.htm>
- <http://www.poetry4kids.com>
- http://www.space.com/missionlaunches/missions/amelia_plane_010711.html
- <http://www.tighar.org/forum/Forumfaq.html>

Writing Prompts:

- If I could be a pilot, I'd go to _____ because...
- I think flying is _____ because...
- Why do people fly, rather than drive a car or take a bus?
- Would you ever want to be a pilot? Why?

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Paper Airplanes and the Scientific Method

Procedure:

Make a paper airplane of the type you are most familiar with (If you don't know how to make a paper airplane, ask your teacher or watch this video: <http://www.youtube.com/watch?v=-MYsQe5Kw1c>.)

1)). *With your lab partner, measure how far the paper airplane goes each time you throw it.*

Distance of throw #1: _____

Distance of throw #2: _____

Distance of throw #3: _____

Distance of throw #4: _____

Distance of throw #5: _____

Average distance of all five throws: _____

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- 2) What you now want to do is make a guess about what might make your paper airplane fly better. This could be a different method of folding the plane or some addition to the plane design. You may change whatever you like, but remember to only change one thing.

In the spaces below, write down how you think that you can get a better flight distance using the scientific method.

Purpose:

Hypothesis:

Materials:

Procedure (please indicate your **independent** and **dependent variables**, and two **constants**):

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Results:

Conclusion:

Post lab Questions: (Answer using COMPLETE SENTENCES)

- 1) *Was your hypothesis disproved or confirmed? Explain using the information obtained in your experiment.*

- 2) *Do you think this is how scientists conduct their own research? Explain why or why not?*

- 3) *Explain why it was important that you changed only one thing between your initial experiment and your later experiment?*

- 4) *Do you think the scientific method is a good way to make scientific discoveries? If so, explain why you think it is. If not, explain why you think it isn't.*

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Activity #2: Amelia Earhart

Remind the students that flying was both a thrilling and challenging occupation for Amelia Earhart. As you will see in her poems, Earhart had various feelings about flying that ranged from excitement to dreadful awe. Ask the students to brainstorm experiences that they have had that were exciting and risky. Students write down their ideas on a sheet of notebook paper. Here are some questions to guide them along:

- What was the experience?
- What made it exciting?
- What made it risky?
- What kinds of feelings did this experience evoke?

Tell the students that today they will write their own piece of poetry on one of the experiences that they have just brainstormed. Show students some examples of different forms of poetry, including free verse, rhyming poetry, etc. Encourage the students to pick the form of poetry to write with which they are most comfortable. Show an example of a poem written on one of the teacher's own challenging/exciting experiences.

Poetry by Amelia Earhart

From An Airplane

Even the Watchful Purple Hills
that hold the lake
Could not see so well as I
the stain of evening
Creeping from its heart

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Courage

Courage is the price that Life exacts for granting peace,

The soul that knows it not, knows no release
From little things;

Knows not the livid loneliness of fear,
Nor mountain heights where bitter joy can hear
The sound of wings.

[How can Life grant us boon of living, compensate
For dull grey ugliness and pregnant hate
Unless we dare

The soul's dominion? Each time we make a choice, we pay
With courage to behold the restless day,
And count it fair.]*

*This bracketed section was not included in the video but comprises the remaining stanzas of the poem.

(Excerpt from an unfinished poem)

Merciless life laughs in the burning sun
And only death, slow, circling down