



Huffman Prairie Flying Field

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Huffman Prairie Flying Field Curriculum Unit Overview

Summary

This curriculum was designed particularly for Huffman Prairie Flying Field. Although, it was designed for Huffman Prairie Flying Field, the lessons included candy taught in the classroom without going to the field. This teacher's guide has been put into three sections and can be modified to each teacher's style of teaching. If the entire guide is used, it should take approximately two weeks to complete. We suggest this be used in grades 5 through 8.

Big Picture

We have developed a variety of "Pre-trip" Activities to be used to engage the students in the history of flight. The Wright Brothers faced a variety of different challenges that most students will face when trying to create a project in their place of employment, such as money, employees, and transportation.

Preparation for the Unit

The teacher must call Wright Patterson Air Force Base to arrange for a tour until new road is completed. Which will be completed by 2003. Each activity has a list of materials needed to complete the activity. Most materials are common to normal classroom materials.

Overview

On the following page is a summary of the unit including brief summaries of each Authentic Learning Task (ALT). This table provides an overview of the tasks in the unit sections and shows how the activities in the different teaching areas relate to each other.

Huffman Prairie Flying Field Curriculum Unit Summary

Pre-Trip Activities	On-Site Activities	Post Trip Activities
<p>ALT 1 - Area and Perimeter Students will be able to find the area and perimeter of a polygon. Students will learn in small group settings. 6th Grade Math Outcomes. OGT Math Competencies</p>	<p>ALT 1 – Flying Field Orientation Students will learn why the Wright Brothers used Kitty Hawk to start their experiments. Students will learn in small group settings. 6th Grade Science Outcomes. OGT Science Competencies.</p>	<p>ALT 1 – Your Opinion Students will write two paragraphs summarizing the trip. Students will explain what they liked and didn't like, and what they would change, if anything at all. Students will work in an individual setting. 6th Grade Writing/Reading Outcomes OGT Writing/Reading Competencies</p>
<p>ALT 2 – The Honey Locust Tree Students will read a small passage and then answer compressions questions of the passage. Students will learn in teacher led discussions. 6th Grade Writing/Reading Outcomes OGT Writing/Reading Competencies</p>	<p>ALT 2 – Learning To Fly Students will learn how to determine speed. Students will learn in small group settings. 6th Grade Science/Math Outcomes OGT Science/Math Competencies</p>	<p>ALT 2 –Flight Path Students will use maps and their notes from the trip to draw a “bird’s eye view” of the flying field. Students will learn in small group settings. 6th Grade Citizenship Outcomes OGT Citizenship Competencies</p>
<p>ALT 3 – Land of Puzzles Students will use 8 vocabulary words to use in a variety of different activities. Students will learn in small group settings. 6th Grade Writing/Reading Outcomes OGT Writing/Reading Competencies</p>	<p>ALT 3 – “Higher, Orville, Higher” Students will use ratios and proportions to find the height of a “thorn tree”. Students will learn in small group settings. 6th Grade Science/Math Outcomes OGT Science/Math Competencies</p>	<p>ALT 3 – School For Flyers Students will imagine that they are one of the first people to buy a Wright Flyer. Students will write a newspaper article explaining what they see and feel. Students will work as a whole class and then individual work setting 6th Grade Writing/Reading Outcomes OGT Writing/Reading Competencies</p>

Transfer Activity

The class will be separated into 6 groups of different people of the early 1900's. The students will role play the different groups of people and act out what they think people were saying and feeling towards the Wright Brothers' project. Students need to use all previously learned information to complete this skit. Each and every activity in some way relates to this Transfer Activity, either through projects or different experiments.

Section One: Pre-Trip Activities

ALT One: Area and Perimeter

Summary

Students will be able to find the area and perimeter of a polygon.

Competencies

1. Students will learn the formula to find the area and perimeter of different polygons.

Time

Allow 20- 30 minutes for explanation and drill and practice.

Materials

Ruler, meter stick or yard stick (or anything students can use to measure the classroom), paper, pencil, and eraser.

Instructions

See Worksheet

Evaluation/Assessment of Student's Competency

Students will be assessed by the understanding and completion of the assignment. Students will compare their measurements with their classmates to see if they differed in any way.

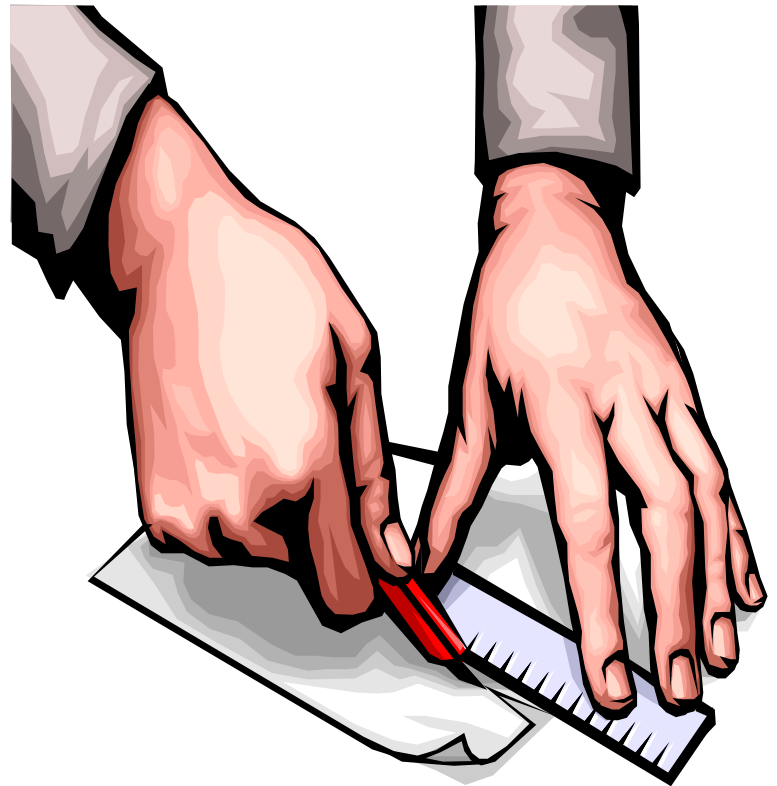
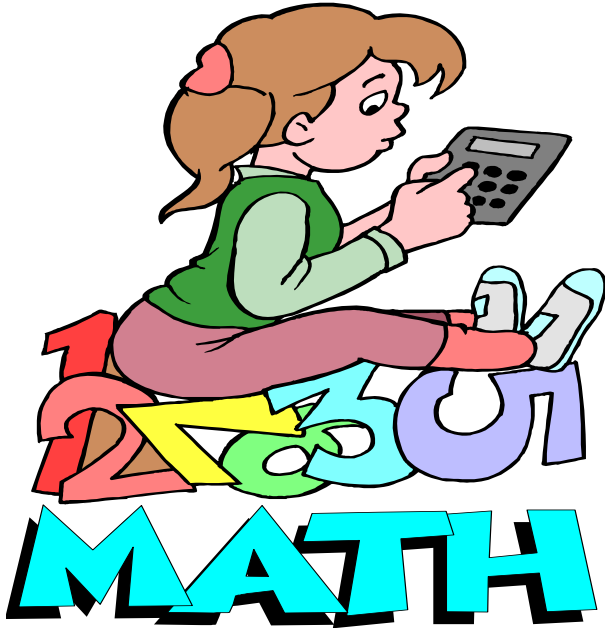
Closure

Students will use the formulas they had just learned during the trip to measure the 1905 and 1910 hangars at Huffman Prairie Flying Field.

(Huffman Prairie Flying Field) ALT One: Handout One

AREA AND PERIMETER

Using measurement devices, the students will measure the classroom and find both the area and perimeter and show all their work to find each.



Section One: Pre-Trip Activities

(Huffman Prairie Flying Field)ALT Two: The Honey Locust Tree

Summary

Students will read the passage on the history of the Honey Locust Tree and they will be able to explain how it helped the Wright Brothers solve a basic control problem.

Competencies

1. Students will read the passage and be able to write answers to the comprehension questions at the end of the passage.

Time

15-20 minutes (**Please allow time for a class discussion!**)

Materials

Worksheet containing the information on the Honey Locust Tree

Instructions

See Worksheet

Evaluation/Assessment of Student's Competency

Students will be assessed by the understanding and discussion questions on the reading passage.

Closure

Students will be able to see similar trees at Huffman Prairie Flying Field and will use an on-site activity to measure the size of the tree using ratios and proportions.

(Huffman Prairie Flying Field) ALT Two: Handout Two

The Honey Locust Tree

A forty-foot honey locust or "thorn" tree on Huffman Prairie Flying Field, the descendants of which still exist in the middle of the flying field to the left of this trail, inadvertently helped the Wrights solve the last major control problem faced with their 1905 Flyer. The Wrights used the thorn tree as a pylon when circling the prairie, but were sometimes unable to stop circling because the hip cradle device that controlled their wing warping was unable to overcome the pull of centripetal force. On September 28, 1905, Orville Wright found himself circling on a collision course with the locust tree, with its long, sharp thorns. In desperation, he discovered that by turning the front rudder down to its extreme position, the force of gravity supplied just enough power to allow the hip cradle mechanism to pull the airplane out of its stalled condition. Solving this last basic control problem allowed the Wrights to begin thinking about marketing their aircraft. Orville narrowly missed the tree that day and landed with a small branch of the tree impaled in one of the airplane's struts.

What characteristics does a thorn tree have?

How did the tree help to solve one of the final flight flaws?

What part of the tree got stuck in the airplane struts?

Section One: Pre-Trip Activities

(Huffman Prairie Flying Field) ALT Three: Land of Puzzles

Summary

Students will use new vocabulary words from the different pre-trip activities to design their own puzzle or activity.

Competencies

1. Students will be creative and create an activity to allow another student to perform or do using the vocabulary words given to them during different activities.

Time

30-60 minutes

Materials

Paper, pencil, crayons, markers

Instructions

See Worksheet

Evaluation/Assessment of Student's Competency

Students will be assessed by their classmates based on creativity and work put into the project.

Closure

Students will use words that will be used on the field trip and they will become familiar with the words being used.

(Huffman Prairie Flying Field) ALT Three: Handout Three

Land of Puzzles

Using at least 8 new vocabulary words from these pre-trip activities, design one of the following:

- Some type of puzzle you could trade with a friend in your class.
- A puzzle for someone learning about the Wright Brothers and flight that is 2 or 3 grades younger.
- Make a file folder or board games that you could play with a classmate.
- Write a fictional story at least 3 paragraphs long.
- Write a poem that is a page long.
- Make a poster.

Have fun and be as creative as you can!!!!

Section Two: On-Site Activities

(Huffman Prairie Flying Field) ALT One: Flying Field Orientation

Summary

Students will use this activity to realize why the Wright Brothers used Kitty Hawk instead of Dayton due to the 15 mph of wind found there.

Competencies

1. Students will follow the procedures on the worksheet to find out why wind was important to the Wright Brothers.

Time

30-45 minutes

Materials

Two pennies, two coffee filters, pencil, and paper

Instructions

See Worksheet

Evaluation/Assessment of Student's Competency

Students will be assessed on the completeness and understanding of the activity. Students will compare their data with their classmates to see if answers differed in anyway.

Closure

Students will be able to see how much of a factor wind can be while doing an experiment.

(Huffman Prairie Flying Field) ALT One: Handout One

Flying Field Orientation

One of the requirements the Wright Brothers had to get their planes into the air was at least 15 mile per hour winds and they found that at Kitty Hawk. The brothers soon realized that it would be easier to conduct their experiments closer to home. They found the perfect site, Huffman's field just outside of Dayton. The only problem was that Dayton just didn't have enough wind.

Activity:

- 1) The first student will put a penny in each hand and hold both hands at the same distance from the ground.
- 2) One student will watch the ground where the pennies will hit.

Which penny will hit the ground first? _____

- 3) Drop the two pennies simultaneously.
- 4) Did both pennies hit the ground at the same time? _____ Why or why not?
- 5) Repeat several times. (The results should be the same each time)

Now you will repeat the same exercise with two coffee filters.

- 1) One student will hold a coffee filter in each hand and hold both hands at the same distance from the ground. Do not crumple or fold the filters.
- 2) One student will watch the ground where the filters will hit.

Which filter will hit the ground first? _____

- 3) Drop the two filters simultaneously.
- 4) Did both filters hit the ground at the same time? _____ Why or why not?

Now you will repeat the experiment with one flat filter and one crumpled into a ball.

- 1) Now crumple one filter into a ball and leave the other filter flat.
- 2) Hold a coffee filter in each hand and hold both hands at the same distance from the ground.
- 3) One student will watch the ground where the filters will hit.

Which filter will hit the ground first? _____

- 4) Drop the two filters simultaneously.
- 5) Did both filters hit the ground at the same time? _____ Why or why not?

- What was constant in each experiment? _____
- What changed in each experiment? _____

Section Two: On-Site Activities

(Huffman Prairie Flying Field) ALT Two: Learning to Fly

Summary

Students will use this experiment to help them determine the process of finding speed.

Competencies

1. Students will follow the procedures and record the data to help them find the actual speed of the toys.

Time

30-45 minutes

Materials

Meter Stick or Measuring Tape, two wind-up toys, and stopwatch or watch with second-hand, and graph paper.

Instructions

See Worksheet

Evaluation/Assessment of Student's Competency

Students will be assessed by using the formula to find the speed each toy traveled in every ten seconds. Students will then graph their results using a line graph to show the different data, if any.

Closure

Students will be able to see how to determine the speed of an object, just as the Wright Brothers had to 100 years ago.

(Huffman Prairie Flying Field) ALT Two: Handout Two

Learning to Fly-1904

One of the problems the Wright Brothers faced was getting their plane to have enough speed to lift it off the ground. This experiment shows the process of determining speed.

Activity:

1. Put students into groups of four.
2. Determine which student will be the timekeeper, the recorder, toy A manager, and toy B manager
3. Lay the meter stick or tape measure on the ground.
4. Wind up both toys. Use the same amount of turns for both toys.
5. Set both toys down at the starting line. (0cm.)
6. Let go of both toys at the same time and start the stopwatch.
7. Record the distance each toy has traveled every 10 seconds until the first toy stops moving.
8. Repeat the experiment if you have time, using trial 2.

time	Trial 1	Toy A	Toy B	Trial 2	Toy A	Toy B
10 sec.						
20 sec.						
30 sec.						
40 sec.						
50 sec.						
60 sec.						
70 sec.						
80 sec.						
90 sec.						
100 sec.						
110 sec.						

Using the formula $S=D/T$ (Speed = Distance divided by Time) Find the speed each toy was traveling every ten seconds.

Now make a double line graph of the speed of each toy. Put the speed on the Y-axis and the time on the X-axis.

Section Two: On-Site Activities

(Huffman Prairie Flying Field) ALT Three: “Higher, Orville, Higher”

Summary

Students will use ratios and proportions and find how tall a tree is by cross multiplication.

Competencies

1. Students will follow the directions on the worksheet and use the example to find the height of a tall tree at Huffman Prairie Flying Field.

Time

15-20 minutes

Materials

Meter Stick, Measuring Tape, or yardstick, pencil, and paper.

Instructions

See Worksheet

Evaluation/Assessment of Student’s Competency

Students will be assessed by completion of the data and properly using the example given on the worksheet.

Closure

Students will be able to find the approximate height of the tree and use the Pythagorean Theorem to determine the length of the hypotenuse would effect the flight.

(Huffman Prairie Flying Field) ALT Three: Handout Three**“Higher, Orville, Higher”****Activity: How tall is the tree?**

- 1) Locate a tall tree on the Huffman Prairie Flying Field. The Thorn Trees, located in the circular flight path, are descendants of the tree Orville almost collided into.
- 2) Measure the height of one student on the team. (Do not forget to write down if it is in feet or meters.)
- 3) Measure the length of the shadow of the same student. (Do not forget to write down if it is in feet or meters.)
- 4) Measure the length of the shadow of the tree. (Do not forget to write down if it is in feet or meters.)
- 5) Using the equation below and the data gathered fill in the data and cross-multiply to find the height of the tree.

$$\frac{\text{STUDENT}}{\text{SHADOW}} = \frac{\text{TREE}}{\text{SHADOW}}$$

- 6) Compare your data with other groups.
- 7) According to your data, which group's tree is the tallest? Look at your tree and the other group's tree. Which group's tree is the tallest? Does the data agree with your observations? If not check your math.

Data:

Name of tree (if possible): _____

Time of day: _____

Name of student being measured: _____

Height of student measured: _____

Length of the student's shadow: _____

Length of the tree's shadow: _____

Height of the tree (use the above equation): _____

Extension:

Use the Pythagorean theorem to determine how the length of the hypotenuse would effect the flight.

Section Three: Post Trip Activities

(Huffman Prairie Flying Field) ALT One: Your Opinion Matters!

Summary

Students will write two to three paragraphs summarizing the trip to Huffman Prairie Flying Field.

Competencies

1. Students will use correct grammar, punctuation, and spelling and will write according to proper English standards.

Time

20-30 minutes

Materials

Paper, pen, or pencil

Evaluation/Assessment of Student's Competency

Students will be assessed by completion of the work and by following directions given by the teacher.

Closure

Students will be able to express their thoughts and ideas about the trip and give feed back to the teacher on what they liked and didn't like.

Section Three: Post Trip Activities

(Huffman Prairie Flying Field) ALT Two: Flight Path

Summary

Students will draw an aerial view of the flying field from a “birds eye view” perspective.

Competencies

1. Students will be able to utilize their map reading skills during this activity by drawing as close to scale as possible.

Time

30-40 minutes

Materials

Graph paper (if needed), pencil, and paper

Instructions

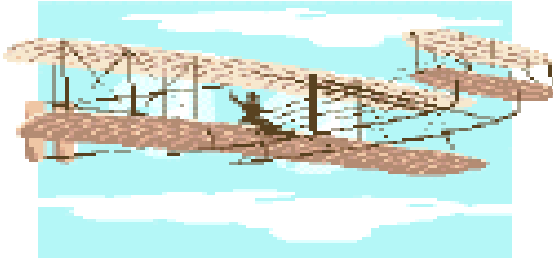
See Worksheet

Evaluation/Assessment of Student’s Competency

Students will be assessed by ability to follow directions.

Closure

Students will be able to imagine what the Wright’s were looking at from an aerial view of the plane looking down at the prairie.

(Huffman Prairie Flying Field) ALT Two: Handout One**Flight Path**

The Wright School of Aviation, founded in 1910 helped to make the Huffman Prairie Flying Field a center of activity for instructors, students, and spectators. If you bought a plane, you received training at both their airplane factory and the flying field. Part of the training included flying the flight path.

Activity

Imagine you are above the flying field in a glider plane. Draw from a ‘bird’s eye view’, the shape of the Huffman’s Prairie Flying Field. Use the fences as guides, but draw it as a view from the sky, looking down. Then sketch in the flight path you would be flying.

Section Three: Post Trip Activities

(Huffman Prairie Flying Field) ALT Three: School For Flyers

Summary

Students will write a newspaper article explaining what it is like to purchase a Wright Flyer and use descriptive words to discuss it with other in the early 1900's.

Competencies

1. Students will use correct grammar, punctuation, and spelling and will write according to proper English standards.

Time

20-30 minutes

Materials

Pencil, paper, and clipboard

Instructions

See Worksheet

Evaluation/Assessment of Student's Competency

Students will be assessed by ability to follow directions, and by using correct grammar and punctuation.

Closure

Students will be able to express their own opinions to each other through this article and react to how each other would feel if they were part of this historical event.

(Huffman Prairie Flying Field) ALT Three: Handout Two

School For Flyers 1910

The Wright Brothers flew many times over Huffman Prairie Flying Field before perfecting the Wright Flyer III. They then began manufacturing their planes to sell to the general public. Once they sold the planes, the buyer went to flight school. The school was held at the factory and the flying field.



Activity:

Imagine you are one of the first people to buy a Wright Flyer III and today is your first flight. Who are you? Where are you from? Why did you buy the plane? What do you see when you go up into the air? What do you feel when you go up into the air?

Write an article for an early 1900's newspaper telling what you see and feel.

Transfer Activity

The Wright Brothers

Orville
Wilbur
Apprentices

Student Flyers

The people who had bought the planes and had to go through the training.

Mr. Huffman and Other Farmers

These farmers who owned the properties at and around Huffman Prairie.

People of the Time

This would include the families and friends of the Wright Brothers, businessmen and women, and anyone else you can think of who could fit this category.

Factory Workers

This would be the people who worked in the airplane factory.

Media

These people will interview each group for the presentation and publish a newsletter/newspaper article similar to one that might have been published during this time period.

Overview

- Divide the class into 6 groups as shown to the left.
- Spend a couple of class periods letting students research their character's backgrounds.
- They will do a short presentation to the rest of the class.

Details/Ideas of Presentation

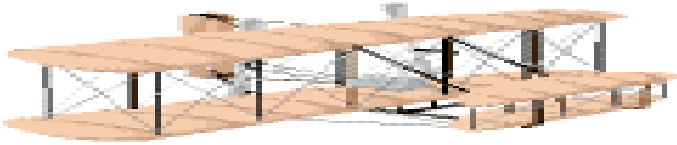
- The media will interview each group and then act out, present, or any other form of entertainment they choose.
- Each group should communicate hardships, joys, concerns, and other feelings associated with their groups characters.
- Decide how to grade. We suggest that the class helps to develop a Four-point rubric so they can help to decide what would be important.

Follow-Up and Ideas

- This project could be short or could extend for a period of time depending upon grade level, creativeness of class and/or teacher.
- The development of the rubric will determine how much time should be spent on this activity.
- This should be a very fun and educational activity. We found that many students would rather present this way than research and write.

Appendix One

Useful Web Sites for Students and Teachers



- 1) <http://www.first-to-fly.com/>
Wright Brothers Aeroplane Company
This site includes a virtual Wright Brother Museum
- 2) http://www.teachnology.com/web_tools/graphic_org/venn_diagrams/
This site allows teachers to generate their own Venn diagrams.
- 3) <http://www.teach-nology.com/>
Web portal for educators, includes lesson plans and a lesson plan generator.
- 4) <http://www.eweek.org/>
Check out National Engineers Week Activities
- 5) <http://education.nasa.gov>
NASA's educational web site
- 6) <http://bob.nap.edu/readingroom/books/nses/html/>
National Research Council Science Content
- 7) <http://www.ode.state.oh.us/>
Ohio Department of Education
- 8) <http://www.centennialofflight.gov>
Centennial of Flight Commission
- 9) http://whyfiles.larc.nasa.gov/need_flash.html
NASA "Why?" Files
- 10) <http://connect.larc.nasa.gov/>
NASA CONNECT Series
- 11) <http://www.nasajobs.nasa.gov>
NASA Jobs
- 12) <http://www.nasa.gov/releases/1999/>
NASA Headquarters News Releases
- 13) <http://science.ksc.nasa.gov/shuttle/missions/missions.html>
NASA Shuttle Missions
- 14) <http://education.nasa.gov/new/>
NASA Educational Workshops for Teachers
- 15) <http://education.nasa.gov/nsip/>
NASA Student Involvement Program
- 16) <http://www.arc.nasa.gov/kids.html>
Ames Research Center
- 17) <http://quest.arc.nasa.gov>
NASA QUEST "WEBCASTS,"
Interactive Events for Students
- 18) <http://nctn.hq.nasa.gov/success/index.html>
NASA Technology Success Stories
- 19) http://iita.ivv.nasa.gov/happenings/event_2.html
Virtual Take Our Daughters to Work Day
- 20) <http://quest.arc.nasa.gov/women/intro.html>
Women of NASA
- 21) <http://www.dfrc.nasa.gov/trc/>
Dryden Flight Research Center
- 22) <http://www.grc.nasa.gov/Doc/educatn.htm>
Glenn Research Center
- 23) <http://education.gsfc.nasa.gov>
Goddard Space Flight Center
- 24) <http://spaceflight.nasa.gov/outreach/index.html>
Johnson Space Flight Center
- 25) <http://www.pao.ksc.nasa.gov/kscpao/educate/educate.htm>
Kennedy Space Center
- 26) <http://edu.larc.nasa.gov>
Langley Research Center
- 27) <http://education.msfc.nasa.gov/>
Marshall Space Flight Center
- 28) <http://www.edu.ssc.nasa.gov/>
Stennis Space Center
- 29) <http://www.larc.nasa.gov/2003/kidscorner.html>
Kids Corner
- 30) <http://www.larc.nasa.gov/2003/pioneers.html>
Flight Pioneers

