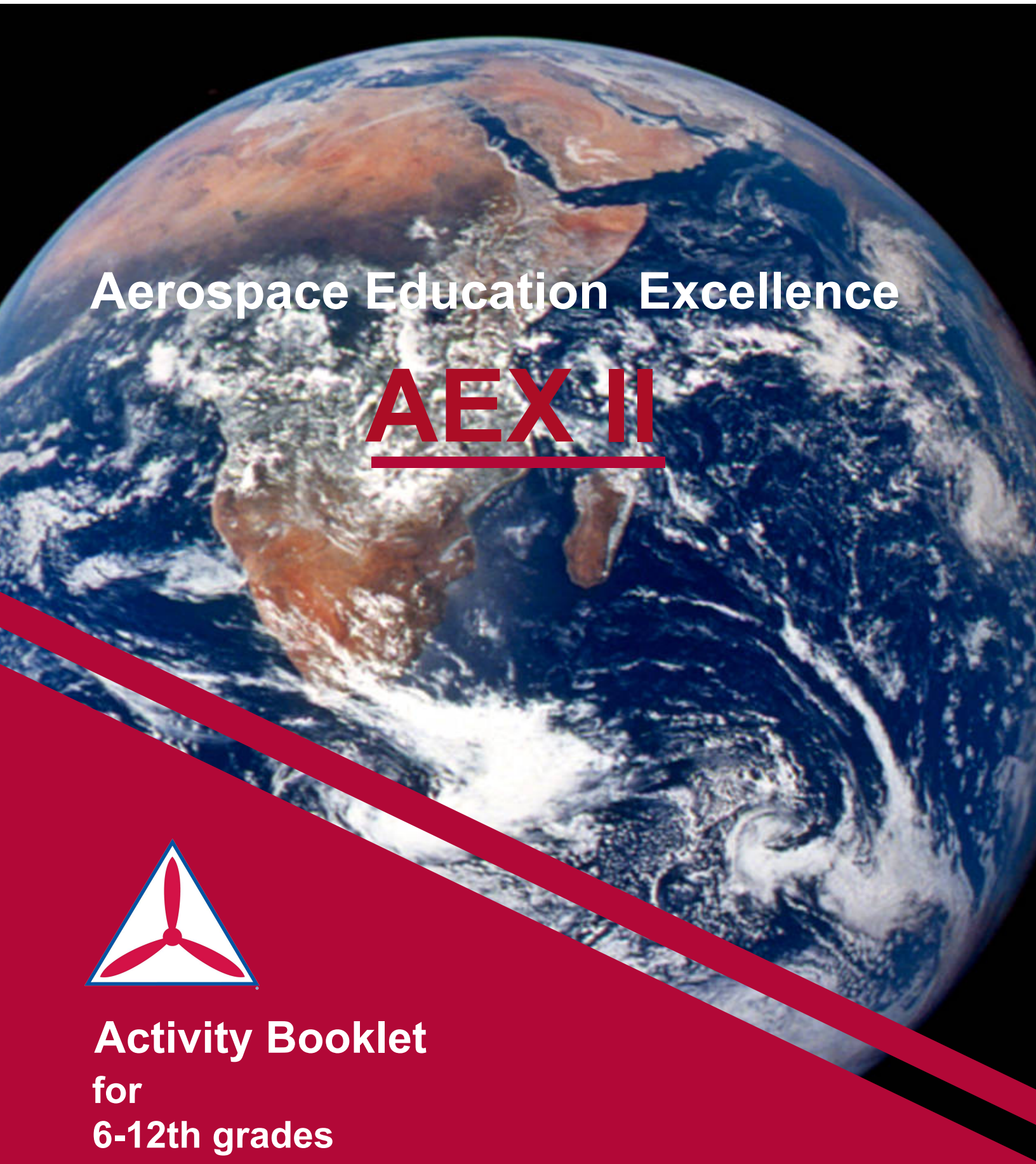


Aerospace Education Excellence

AEX II

Activity Booklet

for

6-12th grades

PRODUCED BY
CIVIL AIR PATROL
AEROSPACE EDUCATION DIRECTORATE

QUIMBY'S QUEST

HARRIET QUIMBY, FIRST LADY OF AEROSPACE and HER AIRPLANE, THE BLERIOT XI

OBJECTIVE – Students will be introduced to America's first licensed woman pilot and be able to build a working model of her Bleriot XI airplane and fly it to simulate her 1912 flight across the English Channel.

NATIONAL STANDARDS –

Next Generation Science Standards (www.nextgenscience.org):

Disciplinary Core Idea Progressions

Physical Science Progression

- HS PS2.A: Forces and Motion

Crosscutting Concepts

- Systems and system models
- Energy and matter
- Structure and function

Science and Engineering Practices

1. Asking questions (for science) and defining problems (for engineering)
2. Developing and using models
3. Planning and carrying out investigations
6. Constructing explanations (for science) and designing solutions (for engineering)

BACKGROUND — (Based on information from Harriet Quimby, America's First Lady of the Air, by Ed Y. Hall, 1993, https://www.nationalaviation.org/our-enshrinees/quimby-harriet/, and photos from https://airandspace.si.edu/)

There is still some debate about the time and place of Harriet Quimby's birth; the evidence points to May 1, 1875, in the State of Michigan. Her father, William, and mother, Ursula, also had another child and her name was Kittie. After a failed attempt at farming, the Quimby's headed to California and settled in the San Francisco area. In her younger years, Harriet aspired to be an actress, however, she ended up as a journalist working for the San Francisco Bulletin. She wrote articles about art colonies in Monterey and San Francisco's Chinatown. By 1905, Harriet set out for New York where she eventually got a job with the prestigious publication, Leslie's Illustrated Weekly. Her writing style indicated that she had an excellent formal education. Her articles were aimed mostly at women and ranged from household tips to financial guidance. Her work also included interviews of many unusual people and, on one assignment, she was invited to visit the Vanderbilt automobile race track. She was given a ride in a race car and, after several 100 mile per hour laps, she was literally hooked on high speed. She even purchased her own car and advised readers on how to maintain automobiles "properly." In 1910, Ms. Quimby attended the Belmont Park International Aviation Tournament. This visit eventually changed her life. She met John

and Matilde Moisant. John's brother, Alfred, operated a flight training school in the town of Mineola, New York. John was somewhat of a national hero for his skill and accomplishments in aviation. He promised Harriet and Matilde that he would teach them how to fly; however, prior to doing this, a tragic accident took his life during an exhibition in New Orleans.

Harriet was still determined to learn to fly so, in the summer of 1911, she started training. She tried to keep it a secret by showing up for her early morning flights wearing a long duster coat and a helmet. Eventually, the word got out and she became "headline news" in her own newspaper. This was during a time when women were supposed to be "at home" and certainly not out driving fast motorcars or flying.

On July 31, 1911, Harriet passed her ground and flight tests and became the first American woman to receive an internationally recognized pilot's license. She was second in the world by only a few days. During her qualification trials, she set a record for precision landing by being only 7' 9" from an official mark... a feat that many men had failed to achieve!

Harriet Quimby was an outstanding beauty. Had she pursued her earlier desire to be an actress, there is little doubt she would have been a star. She became known as the "Dresden China Aviatrix," which at the time was the equivalent of what we now call "gorgeous!" In her newspaper, she wrote about her training, and she even speculated on the future of aviation. This included airline travel, aerial photography, safety and airmail.

On July 25, 1909, Louis Bleriot, a well-known French aviator, became the first human in history to fly across the English Channel. He did this feat in an airplane of his own design. Bleriot became an international celebrity, and this inspired Harriet to become the first woman to make the flight.

She sailed to England in March of 1912 and eventually met and became friends with Louis Bleriot. Harriet had plans to purchase a new 70 horsepower Bleriot airplane, but one wasn't available at the time. She convinced the builder to let her use one of his 50 h.p. model XIs for her attempt to fly the Channel. Some of the glory of her flight was taken away when, just days earlier, a woman had flown across the English Channel as a passenger. The pilot on that trip was Gustov Hamel. Quimby and Hamel became friends and days before Harriet was set to depart, he offered to fly her trip in a disguise. He said he would land somewhere secret so that Harriet could come out and be in the plane when the French people found her. She declined and decided to make the trip as planned in her Bleriot XI!

The Bleriot airplane had a 25' 7" wingspan. It was 29'3" long and weighed 661 pounds. The height was 8'7" and had a wing loading of 4.38 pounds per square foot. The original engine was made by Anzani and it was a 3 cylinder, 25 h.p. air-cooled radial that turned a Chauviere 2-bladed propeller. The Bleriot was constructed of ash, bamboo, steel tube and covered with a rubberized fabric. In the early morning hours of April 16th, 1912, Harriet took off flying this airplane near the English city of Dover. Cruising speed was around 36 miles per hour. It was a gray, cloudy day and many times she flew in clouds and conditions that were extremely dangerous. She had intended to land in Calais but ended up south of there on a beach near Hardelot. The flight took 59 minutes. When she landed, local fishermen gave her a champagne welcome and carried her on their shoulders to an awaiting crowd. Unfortunately, Harriet did not receive the recognition she deserved because just two days earlier, the great ocean liner, Titanic, had sunk and this still dominated much of the world news.

Activity Three: Quimby's Quest

After returning to the United States, Harriet hired a publicity manager and one of the events on her "calendar" included the Third Annual Boston Aviation Meet near Quincy, Massachusetts. She was scheduled to fly a new two-seat Bleriot that had been shipped from France. The event organizer, William Williard, was given the privilege of making a promotional flight with Harriet. History describes him as being overweight and excitable. These were two characteristics that eventually brought disaster to the flight. Harriet and her passenger took off and flew out over Dorchester Bay in front of thousands of spectators. At an altitude of approximately 1500 feet, it was observed that Williard apparently unbuckled his seat belt and leaned forward to attempt communication with Harriet. Apparently, Harriet had unbuckled her seat belt to answer him and it was at that time, the Bleriot pitched downward throwing Williard out of the aircraft. It was observed that Harriet tried to regain control, but she too was thrown from the plane. Both died in the fall.

Harriet Quimby was a very skilled pilot and there is speculation that, had she lived, her career would have totally overshadowed that of Amelia Earhart. Some historians even say that she could have been the first human to fly the Atlantic solo. She was flying before World War I, and years ahead of Lindbergh and Earhart.

Initially, she was buried at Woodlawn Cemetery in New York. A year later, she was moved to the Kenisco Cemetery where she remains today.

The story of Harriet Quimby demonstrates how a very brave, young American woman not only achieved the first pilot's license, but also made a historic flight under some very dangerous circumstances. This literally opened the door for women to enter the world of flight.

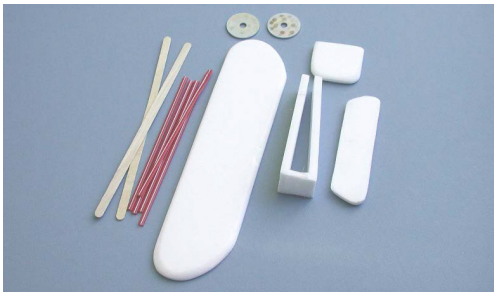
EXTENSION QUESTIONS FOR BACKGROUND DISCUSSION –

1. Discuss what the life and times were like, especially for women, in the period from 1900 to 1912.
2. Investigate the performance of airplanes during the time period from 1900 to 1912.
3. Investigate the weather/climate of the English Channel during April. (Harriet flew in fog and rain before landing on a sunny beach)
4. Discuss what Harriet Quimby's role might have been had she been alive during World War I.
5. Speculate what her career might have been like had she lived through the era of "barnstorming."
6. Show the video "Harriet Quimby: Women Who Dare" (https://youtu.be/NTyI_nqnUro) and lead a discussion on other women who have pushed the envelope.

HANDS-ON ACTIVITY – Create a foam model of the airplane that Harriet Quimby used to fly the English Channel in 1912 and use the model to simulate flying over the English Channel (a large blue tarp) and land on the coast of France.

MATERIALS –

a. A foam meat tray or foam plates
b. Four plastic coffee stirring sticks
c. Two wooden coffee stirrers
d. Two fender washers
e. Hot glue gun/glue sticks
f. Utility knife or box cutter
g. Template
h. Thirty feet of nylon fishing line
i. Straw
j. Blue tarp (The English Channel)
k. Stick or thick dowel (2 ft in length)

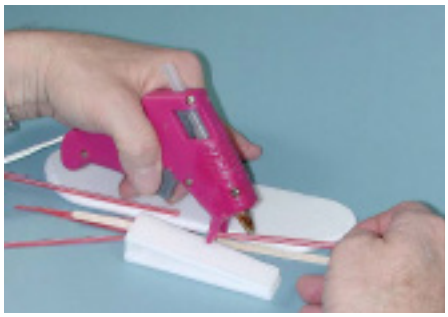


PROCEDURE –

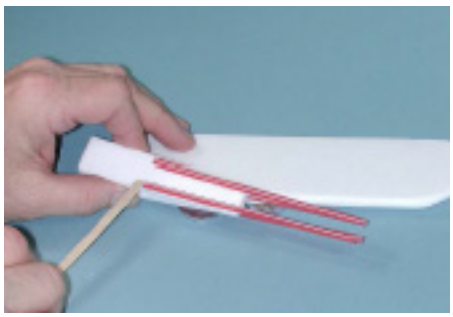
Part 1: The Building of the Bleriot XI

Step 1 – Using the "punch and pull" method, cut out the pieces from the template provided. The template can be taped, or spray glued, to the bottom side of the foam meat tray.

Step 2 – Run a bead of hot glue along the edge of a plastic coffee stirring stick as shown.



Step 3 – Using the template as a guide, glue the four plastic coffee sticks into place along the fuselage.

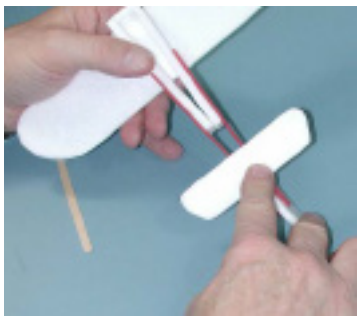


Step 4 – Glue the rudder to the ends of the four fuselage stirring sticks.

Step 5 – To install the wing, run a bead of hot glue around the upper portion of the fuselage as shown.

Step 6 – The wing is mounted to the front of the fuselage. Study the illustration to see where it is mounted.

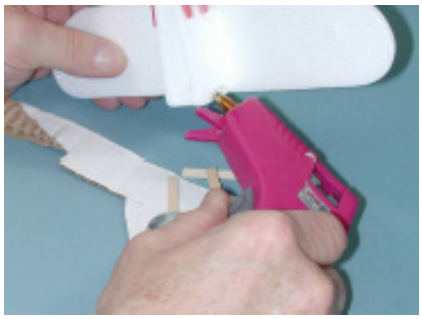
Step 7 – The horizontal stabilizer is mounted at the back near the rudder. Note that it is on the bottom of the fuselage coffee sticks. Check the illustration on how this is positioned.



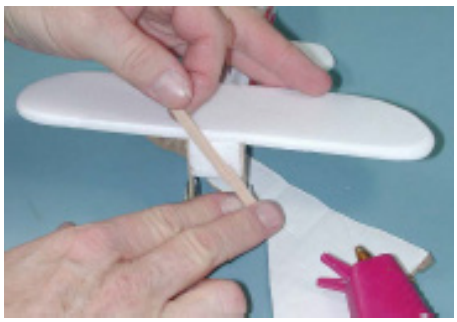
Step 8 – To make the landing gear, you must first mount the fender washers onto the wooden coffee stirring sticks. Cut the stick down to size by using the template as your guide. Then put a glob of hot glue on one tip and press a washer down into the glue. Cut a piece of wood and press this into the glue that oozes through the center of the fender washer. This will hold the "wheel" in place. Make two!

Step 8 – (cont'd.)

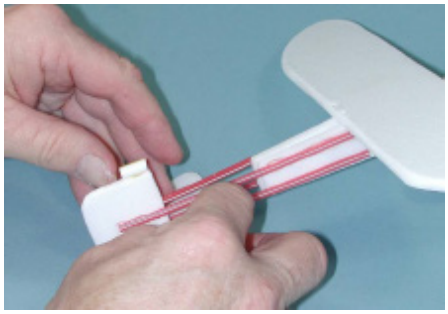
Step 9 – A bead of hot glue is run down the front of the fuselage as shown. Using the lead photograph on this activity, and the illustration, mount the landing gear strut into the correct position.



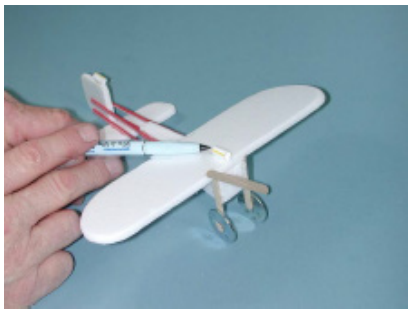
Step 10 – (Optional) Using your imagination, and a coffee stirring stick, make and mount a propeller to the front of the fuselage. This isn't required, but it does add charm!



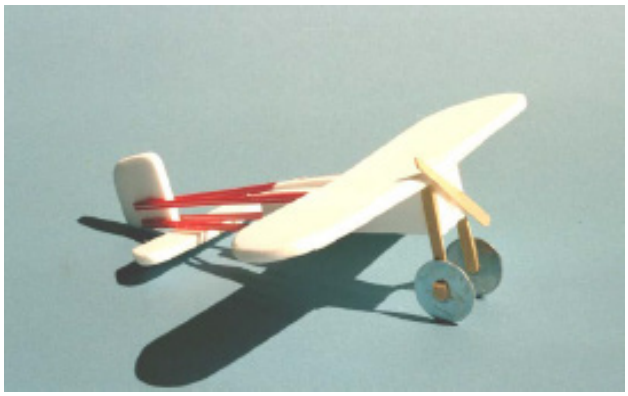
Step 11 – In order for this little airplane to slide down a fishing line we must mount a "carrier" at two points along the top of it. A simple solution is a short piece of straw hot glued to the rudder as shown.



Step 12 – Finally, another short straw is mounted to the upper portion of the wing.



Finished Model of the Bleriot XI



PROCEDURE –

Part 2: Simulating Flying over "The English Channel"

1. Show the video of an RC Bleriot XI Scale Model Flight Demonstration to engage students. (https://youtu.be/9hJDinyEzgc)

2. Flying over the English Channel is a simulation activity where students will "fly" the Bleriot XI model that was created in Part I.

3. The simulation will be set up so that the Bleriot crosses the English Channel and lands in France. The model is piloted by a student sitting in a chair.

4. Place a large blue tarp, or a large sheet of blue bulletin board paper, on the ground to act as the English Channel. Use the floor of a large area like a stage or gymnasium.

5. The "pilot" will be seated about 10 feet away from the "English Channel."

6. A helper, the person who is going to launch the Bleriot, stands on a ladder or footstool, approximately 30 feet away from the seated pilot (see illustration below).

7. A nylon fishing line is attached to a control stick on one end (usually a dowel rod or piece of broomstick about 2 feet long) and a high place in the room where the helper is stationed at the other end.

8. The tarp should be in front of the pilot and the space between the broomstick/fishing line attachment and the tarp is the "coast of France."

9. The helper is located at "Dover, England."

10. The helper carefully strings the fishing line through the straw attachments on top of the Bleriot model.

11. The model is held in position by the helper until the pilot calls for a release.

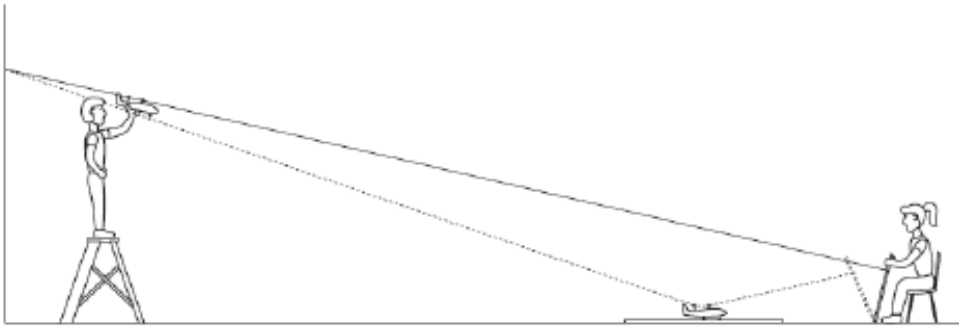
12. Once released, the Bleriot, because of the weight of the fender washers, will slide down the fishing line.

13. The pilot must control the little model so that it flies over the "English Channel" and lands to a full stop at "Hardelot on the coast of France."

14. If the pilot pushes forward on the stick too much, the little airplane will crash into the English Channel.

15. If the pilot pulls back too much, the little Bleriot will over shoot the Coast of France and another attempt will have to be made.

16. Ask the students to think about how each of the variables (angle of string, mass of plane, length of string, position of control stick) affects your ability to get your model from Dover, England across the English Channel to land on the coast of France. Adjust one variable at a time to test its importance to the outcome.



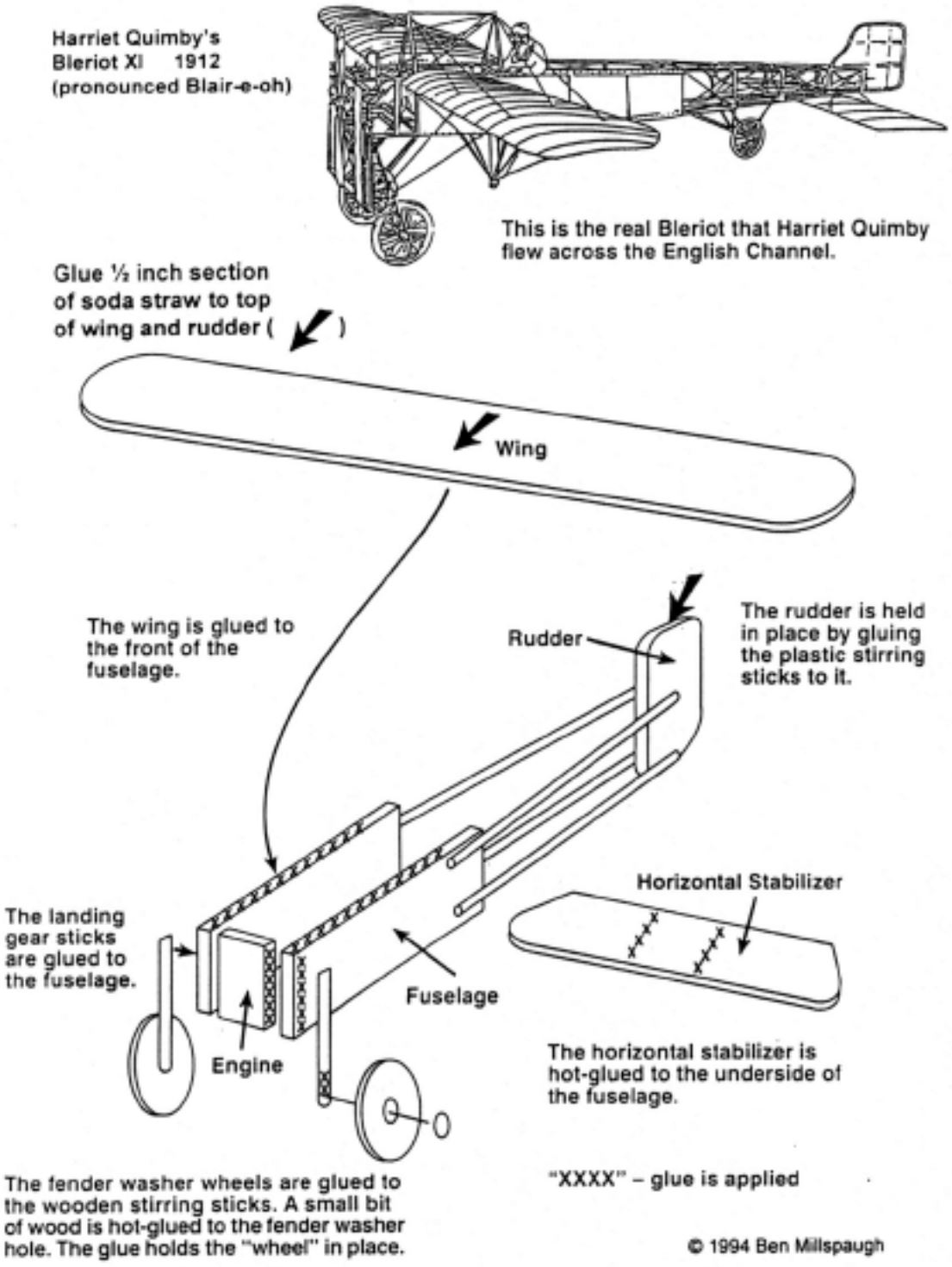
17. Have the students create a table, like the one below, to record the results of their experiment. Encourage them to try each variable at least three times and record the results. Compare findings with other students or discuss results as a class.

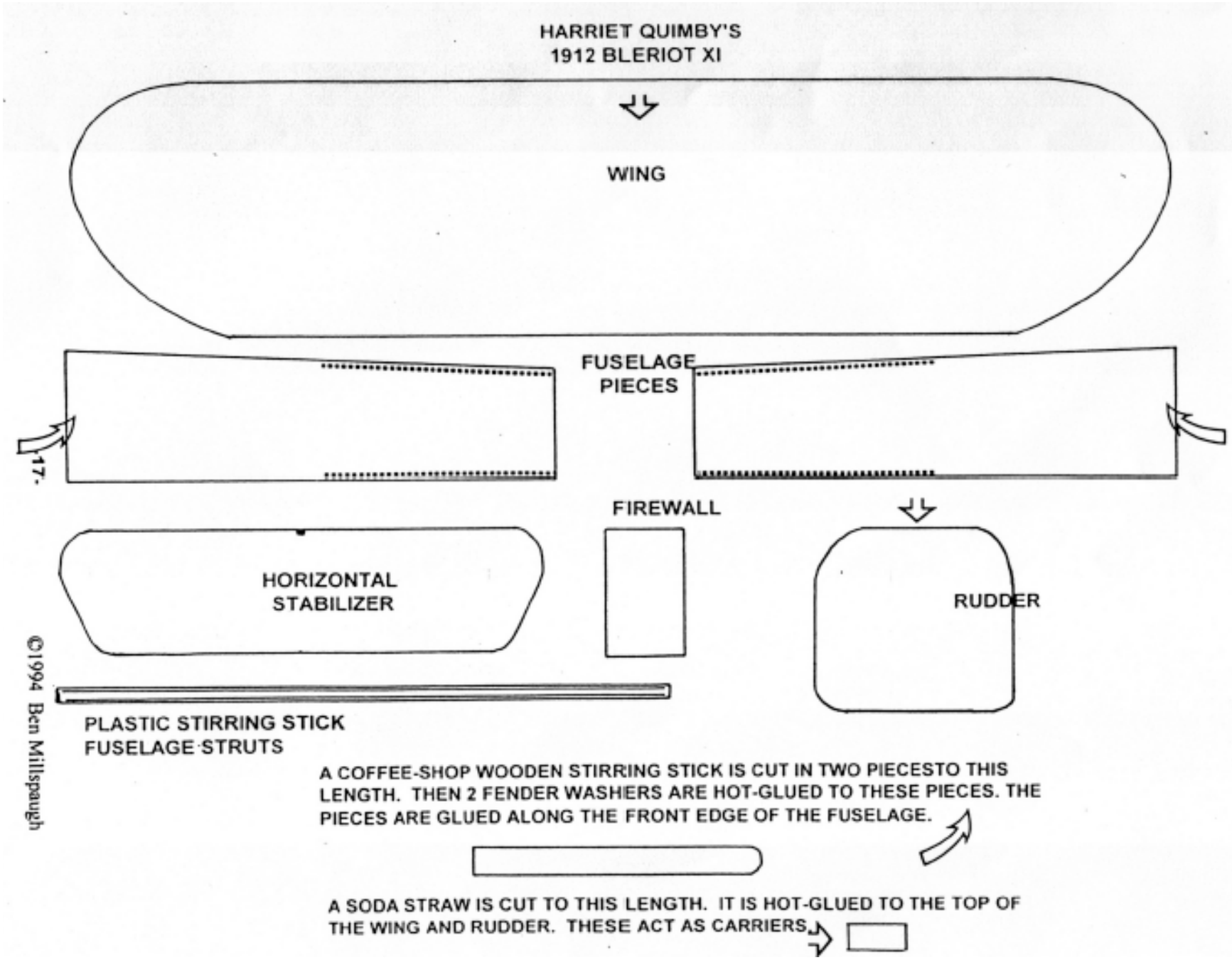
Flight #	Angle of fishing line	Mass of plane	Length of fishing line	Position of control stick (tautness of fishing line)	Results (hit, overshoot, crash into channel)
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					

EXTENSIONS:

- Show the video from space of a nighttime time-lapse of flying over the English Channel from the European Space Agency. (https://youtu.be/RYDCSGPAbrg)
- Create another plane to use for this activity. Suggestions include getting a toy plastic plane with strong wheels and mounting two eye screws into the top of the plane or using another foam plane model that you have built and attach the straws as a guide. Make sure that the plane has weight, like the fender washers, to pull it down the line.
- Find the weight ratio between the Bleriot XI and the airplane you created in the extension above. What are the differences in maneuvering to go the same distance?

ILLUSTRATION - BASIC BLERIOT CONSTRUCTION




HARRIET QUIMBY'S
1912 BLERIOT XI
WING
FUSELAGE
PIECES
17-
FIREWALL
HORIZONTAL
STABILIZER
RUDDER
©1994 Ben Millspaugh
PLASTIC STIRRING STICK
FUSELAGE STRUTS
A COFFEE-SHOP WOODEN STIRRING STICK IS CUT IN TWO PIECESTO THIS LENGTH. THEN 2 FENDER WASHERS ARE HOT-GLUED TO THESE PIECES. THE PIECES ARE GLUED ALONG THE FRONT EDGE OF THE FUSELAGE.
A SODA STRAW IS CUT TO THIS LENGTH. IT IS HOT-GLUED TO THE TOP OF THE WING AND RUDDER. THESE ACT AS CARRIERS.