

Name and Address of the Organization:

Historic Flight Foundation
10719 Bernie Webber Drive
Mukilteo, WA 98275

SUMMARY DESCRIBING THE PROJECT

After a year of planning and research, Historic Flight Foundation and three partner school districts (Mukilteo, North Shore Academy, and Archbishop Murphy) are creating an innovative site-based STEM (science, technology, engineering, and math) program that will serve 1500-2000 students in its first year and grow to serve 3500 and more schools annually by year three.

Classes from grade schools and middle schools will participate in a two-step program in which HFF Docent Educators visit the classroom for a preliminary program which is followed by a field trip to the Historic Flight Foundation (at Paine Field) where they will finish their instructional module incorporating the artifacts into real world learning situations. Each class will receive approximately five hours of instruction focused on 1-2 of twelve STEM modules that align with state mandated teaching requirements for STEM learning.

The 2013-2014 school year will be the field test for the program to refine and improve materials teaching strategies, determine what age groups will benefit most, and create a shared cost structure that the schools can sustain.

At the conclusion of their second class, students will receive an orientation to the aerospace industry in Washington State with an emphasis on how hundreds of suppliers contribute to the development and maintenance of Boeing aircraft. In addition to helping students gain competence in specific STEM subjects, the programs are created to excite and inspire young people to continue to seek learning opportunities in science, math, engineering, and technology.

DESCRIPTION OF THE HISTORIC FLIGHT FOUNDATION

The Historic Flight Foundation, located at Paine Field in Mukilteo, WA is a museum and educational center committed to preserving aviation history, flying a comprehensive collection of historic aircraft, and using the wonder and excitement of flight to promote STEM education among young people from throughout the Puget Sound corridor.

Founded in 2003 by John Sessions, the organization brings together pilots, engineers, mechanics, and history buffs for the common mission of ensuring that people today and for many years to come will have the opportunity to see rare and vintage aircraft in action and to learn the stories of

those who built and flew these scientific marvels, and how they advanced aircraft and flight technology.

Historic Flight Foundation educates, entertains, and inspires over 500,000 people a year who visit the museum at Paine Field; attend special flight weekends, and who see HFF's flying fleet at events and air shows during the year.

HFF is operated by a staff of 5 full and part-time paid personnel and 200 volunteers, many with extensive experience and background in aviation.

HISTORIC FLIGHT FOUNDATION ACTIVITIES AND PROGRAMS

- Historical presentations – Lectures, multi-media shows, first person accounts of historic events
- Pilot training – Assisting pilots to qualify on vintage aircraft and gain flying hours
- Vintage aircraft maintenance – Teaching mechanics how to repair and maintain vintage and historic aircraft artifacts
- General education venues for others – Exhibits and Docents who will help visitors to receive a comprehensive educational experience during their visit to the facility
- Management retreats—A visually interesting full service venue for regional corporations to retreat and meet
- Community gatherings – a facility that can accommodate groups of up to 500 and available for community gatherings and meetings
- Air show performance – A group of vintage aircraft that appear in air shows throughout the United States and Canada
- Movie performance – a venue for members and residents of the area to watch aviation themed classic films often accompanied by appearances of those involved either in the event portrayed or in the making of the film

POPULATIONS NOW SERVED BY HISTORIC FLIGHT FOUNDATION

- Veterans and their families visiting to see the aircraft from their time of service and to share their own stories with their loved ones.
- Aerospace engineering professionals seeking close contact with historic artifacts to better design and build current adaptations.
- History buffs seeking to learn more about the development of modern aviation and the people who made significant advances from the past.
- Families seeking an educational entertainment venue to explore, learn and enjoy.
- Older people connecting our vintage artifacts to signature events and experiences from their youth.
- Vocational training students involved in learning aerospace related trades and desiring to see various aircraft parts up close and in use.
- School groups visiting HFF on field trip to gain exposure to historic aircraft and history exhibits.
- Business using HFF facilities for meetings and events.
- The general public using HFF space for private events.

STEM PROGRAM DESCRIPTION

For the 2013-2014 school year, HFF will beta-test its new STEM supplemental education program primarily with grade school and middle schools from the Mukilteo school district, Archbishop Murphy High School and its private feeder schools, and North Shore Academy. We will serve 1800 students or approximately 60 classes through 2-3 hour educational programs focused on state mandated STEM learning requirements at our facility. Each will be led by a trained docent educator with an assistant and involve the teacher for each class.

Students will first receive an in-class lesson highlighting a specific learning requirement agreed to ahead of time with the teacher. They will then have a second class at HFF that involves team problem solving and interaction with the HFF aircraft and exhibits. An emphasis will be placed on translating theories and concepts to reality by showing how they have impacted flight and flight technology, and then applications to other industries and products. Student teams will work in teams and demonstrate their understanding by making a presentation to their peers and teacher on the materials and concepts presented.

HFF instructors will conclude the second session with an orientation to the aerospace industry in the Puget Sound Region and discuss the career opportunities for those who pursue STEM education.

The teaching process will include group work and discussion. The goal for each program will be that all of the participating students leave with a clear familiarity with the material, be able to

describe it in their own words, and have an understanding how the concepts and theories apply to real world problems and products. Students will complete an exit survey to show what they have learned, and teachers to rate their satisfaction with the material and the process.

The HFF programs are designed to complement and enhance the work of the classroom teachers. Often an outside voice can communicate in a new and different way and validate what is already happening under the standard curriculum. Our educators coming from industry will discuss theories and concepts from a work related point of view.

PROJECT GOALS

1. To create a program that is needed and highly relevant to classroom teacher needs for success in STEM.
2. For each student to fully understand and be able to articulate an important math or scientific concept or theory connected to aviation but with wider adaptability.
3. To heighten interest among students in STEM subjects through innovative and non-traditional teaching in an inspiring setting with ready access to industry professionals in fields related to the subject area.
4. To orient students to the many companies in addition to Boeing that offer career opportunities in the aerospace industry here in the Puget Sound. To show clearly how STEM learning will lead to good employment and career opportunities.

METRICS

Timeline:	Nov 2013-May 2014
Number of students:	1800
Number of classes:	60 (approximately)
Number of schools:	10
Student tested comprehension:	80%
Teacher surveyed satisfaction:	90%
Number of trained educators:	8

SPECIFIC PROJECT ACTIVITIES TO BE IMPLEMENTED

1. Retain and education director to lead the program at HFF and manage the Educators Advisory Council.
2. Form and Educational Advisory Council consisting of key teachers and administrators of school that will use the program and are willing to help shape the educational content.

3. Develop a curriculum based around educational requirements and objectives identified by the schools as critical for their STEM learning strategy.
4. Ongoing recruitment of schools and teachers to participate throughout the year.
5. Creation of a survey tool or post test to measure student comprehension.
6. Development of a Docent Educator training manual and recruitment process
7. Recruit and train at least eight Docent Educators
8. Assign, manage, and supervise Docent Educators
9. Perform individualized follow up with teachers (during the beta test phase) to get feedback on the program for continuous project improvement

PROJECT TIME FRAME

- Phase I- Field Test: Nov 2013 through May 2014
- Evaluation and Program Adjustment: Jun-July 2014
- Phase II- Full scale launch: October 2014

POPULATION THE PROJECT WILL SERVE

1800 grade school and middle school students primarily from North King and Snohomish counties. An analysis of the students from this geographic area approximately 50% will be low income students who qualify and receive federally subsidized free lunches.

EVALUATION PLAN TO MEASURE EFFECTIVENESS

1. Post testing immediately following the learning module with a follow up after one month to measure comprehension of the program content.
2. Conduct a survey of participating teachers within one month of the program to measure satisfaction with the experience and receive feedback for change and improvement.
3. The Educational Advisory Council will review and adjust the program based on teacher ideas and feedback.

FUTURE FUNDING STRATEGY

In the field test year, schools will cover their transportation costs but not pay program fees. As the program achieves stature as a strategic partner with the schools a subsidized fee will be charged for each program with opportunities for financial aid extended to low income populations.

Future funding is expected to be a ratio between earned income from schools (35%) and ongoing philanthropy (65%). Efforts will be made to maintain a cost per student at in the \$20-\$25 range or \$5-\$8 per hour of instruction per student.

HFF will continue to seek business sponsorships for the program or tied to specific schools. Foundations will be approached for funding. Individuals will be approach to underwrite the financial aid component to assist schools with low income populations.

The large local aerospace community has much to gain by connecting young people to science, technology, engineering, and math. These students will be part of the future work force in the aviation and aerospace industry. Our funding model in subsequent years will be to raise 5-8 annual industry sponsors for the philanthropic part of the program.

Growth will be incremental based on the needs and responses from the schools after the first year.

CONCLUSION

This program is being initiated after review and discussion with educators at The Museum of Flight at Boeing Field to ensure against needless duplication. There is school interest in a “north side” program due to traffic time delays and the cost of school transportation. MOF has attracted schools from Seattle to Tacoma leaving out those in north and East (partial) King and Snohomish County.

Teachers and administrators have advised that outside teaching help will bring a new perspective to learning and attract more student attention. The HFF focus on taking an example and showing students how it fits in the “real world” will help to prove the value of their STEM foundational classes.

HFF is intentionally going to a broad group for reasonably modest funding in order to gain many stakeholders in the program. This will keep HFF more accountable as we adjust the program based on our experiences. We also hope that it will keep local companies involved more closely in the work and with the schools.

What can be gained through an average of five hours of STEM instruction per class? The value of the HFF effort will be to inspire and encourage students to continue to take STEM related subjects and participate in STEM programs such as Robotics and CAD design. The common complaint is that these students fail to see the light at the end of the tunnel. STEM subjects don't come easy for most students and STEM careers are some of the least understood. The HFF STEM Initiative is working hand-in-hand with teachers to help continue the learning cycle in STEM.