



2010 AAAS/Subaru Essay Writing Competition for K-12 Educators Finalist Essay



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Aviation Fascination

Across America, students are not pursuing science, technology, engineering, and mathematics (STEM) studies. The result is that students are not well prepared to pursue those disciplines in college and this limits their opportunities. The reality is that we can change that and show students that these career fields are of utmost importance and excitement. By incorporating the teaching of aerospace, engineering, and renewable energy into the curriculum, we raise interest level, as well as achievement of the students. Aerospace is a vehicle for my students and me to change business as usual into an innovative learning and experiencing laboratory.

My initial interest was sparked by a teacher workshop that our county (Okaloosa County, Florida) offered on the principles of flight and how to integrate it into the curriculum. This two-week course prompted me to want to learn more about these concepts. In order to implement this curriculum in the most successful way, I felt like I needed as much training as I could find. I attended the United States Space and Rocketry Center's Space Camp for Educators in Huntsville, Alabama in the summer of 2008. During this weeklong conference, I was taught principles of

rocketry, historic information on the space program, engineering and design of space habitats and lunar rovers, and many more exciting concepts. The most interesting part of this seminar was hearing all of the cross-curricular ways to incorporate aerospace into my fourth-grade classroom.

The trip to Space Camp was not enough and in July of 2009, I attended an aerospace workshop in Dayton, Ohio. During this conference, my belief in the power of STEM, more specifically aerospace education, was re-enforced. I also had the opportunity to network with a variety of educators interested in aerospace from across the United States.

After these camps, I updated my current aviation curriculum to include more space and rocketry, as well as engineering and renewable energy concepts. Also, in order to implement this curriculum, a certain amount of funding was needed. So I applied for numerous grants to give support to the program. Being a relatively new program to our school, the results were astounding. Not only were my students getting excited, but the response from the other teachers was very positive and the aviation program continued to GROW! The teachers realized that all kids are fascinated by flying, airplanes, rocketry, and engineering. One of the keys to effective teaching is to keep children actively engaged at all times. It didn't take my colleagues long to realize that aerospace is the perfect tool to do just that. Inquiry and aviation go hand in hand.

There are many activities that tie science and math concepts into aviation. For example, we incorporated math into a simple flying contest by





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having a balsa airplane derby where we used the Pythagorean Theorem to find the flight distance of the airplane. The students measured how far forward their plane flew and they also measured the left or the right deviant from a straight line. With these two measurements, the students then used the Pythagorean Theorem to figure out the winner of the contest for the longest distance flown. It was a wonderful motivation to do math and the work was done effortlessly because they all wanted to know the winner of the contest. Using aviation changes the way students see learning, as well as the STEM professions, and promotes a lifelong interest. It uses concrete examples to answer the questions that all teachers face: "Why do I have to know that?" and "When will I use that in the real world?"

From my trip to Space Camp, I learned how to instill and promote teamwork into rocketry activities. The kids learn to initially work as a team by designing a mission patch for the different rocket launches. The patch has to represent each of the team members and have a symbolic meaning. These mission patches represent the teamwork needed to complete the variety of projects that relate to rocketry. For example, the patches are worn when we study force and motion. From straw rockets to water bottle rockets to model rockets, this leads to more real examples of the importance of teamwork symbolized by the mission patches as well as how physical science works in the world around us.

The final piece to success is the focus on STEM education. This was the main focus of the training I received in Okaloosa County, Florida. There are a variety of projects where the students act as engineers. The kids take simple PVC pipes and

engineer wind turbines to explore what number and shape of blades produce the most electrical output. They also learn to work as a team by building different solar powered robots. The students need to learn that renewable energy is the secret to our future and that they hold the key. The STEM curriculum makes science come to life, gives the kids many hands-on activities that are educational as well as enjoyable, and demonstrates once more how science and math can relate to real-life situations.

Another crucial piece to teaching is the utilization of field trips. A part of the curriculum is a field trip to the flight laboratory at the local high school (Choctawhatchee Aviation Institute). Here the kids get hands-on experience flying computer flight simulators. This also promotes a seamless integration between local schools. The ultimate goal is that through the exposure to aviation, the number of kids interested in pursuing careers related to science, technology, engineering, and mathematics will increase.

Funded by a Target Grant, I also took the students to the National Naval Aviation Museum in Pensacola to see the Blue Angels perform and tour the facility. They got to see real-life airplanes up close and personal. Talk about seeing aviation come to life!

To support the engineering aspect of the curriculum, the students went to the Air Force Armament Museum for the Engineers for America Initiative sponsored by Okaloosa County, Florida. Here the students went through different rotations or sorties and performed engineering experiments. This hands-on experience was priceless to my future scientists. The learning that took place on





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that one day at the museum surpassed that of any week in the classroom.

This curriculum has had a huge impact on student learning so far. I have had great success the past three years teaching a full, three-week curriculum on aviation. New this past year was “Flight Fridays” where the students explored aerospace and engineering topics every Friday, seamlessly incorporating science and math. Upon testing my four classes, every child improved his/her grade! They begged daily to learn new things related to aerospace. This not only enhanced my upper level kids, but also ignited a new interest for learning in the kids that needed a “spark.” The infusing of engineering and renewable energy into my curriculum added to the success already in place with aerospace.

The students that were affected by this curriculum have truly been inspired. I have seen drastic attitude changes from not caring about school, to being excited to get in the door. In fact, five of my former students signed up to be in a summer aviation camp and I continue to receive emails from students that contain information about various aerospace topics. To top it off, I had a parent come and thank me on the last day of school for not only opening the door of aviation to her child, but also being the inspiration that led her child to love science and math. This is the feedback that makes teaching worthwhile.

I also taught a summer aviation camp through the University of West Florida, as well as a camp at Choctawhatchee High School for at-risk high-school students using STEM-related activities to engage and intrigue them. In addition, during the school year, I frequently visited the younger

grades to do quick lessons on aerospace and rocketry. This became contagious at my elementary school and anyone who was bitten by the “bug” had that look of excitement in his or her eyes. As a result, teachers began to seek in-service workshops on aerospace, including an Air Force Association workshop that I taught in January, and a summer workshop in Dayton, Ohio on aviation. By showing these teachers how STEM education could make a difference in the education of their students, they were instantly hooked.

I am currently the STEM teacher for all of fourth grade at my school. Every day that I teach, I know that I am exposing the students to the world of science, technology, engineering, and mathematics. Even if it is just one student that is inspired, it could begin a new generation of engineers and designers for America. These students that sit in our classes are the eyes that will see us land on Mars and beyond. They are going to dream what we can't imagine and design things that we can't dream...but it needs to start being encouraged today. STEM education is a new journey that will turn into a great adventure in the lives of these students and it all begins in a classroom. I truly believe that if a student is motivated, he or she can achieve anything and this is the perfect motivation! What a difference we can make by showing students the excitement of aerospace and rocketry, and enforcing the importance of renewable energy—the fuel of our future. Teaching is ultimately about lighting the fire of lifelong learning. STEM education is the spark!

