



Aerospace Education

January - February 2009

News

Inspiring Students To Excel

Astronaut and Former CAP Cadet, Eric Boe

Young people sit in squadron meetings or classrooms across America and dream of their futures. Some dream of becoming a famous sports star, some dream of becoming a rock star and some dream of becoming an astronaut. For one former CAP cadet, that dream is now a reality. Eric Boe began his journey as a student and cadet in Atlanta, Georgia. As a member of the Atlanta Composite Squadron in the 1980's, Eric Boe distinguished himself with the CAP General Carl A. Spaatz Award (the highest cadet award in CAP) in 1983. He later graduated from the Air Force Academy and entered the Air Force. His career has been built on the goals he set for himself and the dedication and perseverance that have dictated his life.

From a strong family background (son of retired Air Force Major and Mrs. Gerald Boe of Doraville, Georgia) and strong peer group (Atlanta CAP Composite Squadron), Eric Boe has brought honor to his family and the Civil Air Patrol.



Astronaut Eric Boe at Kennedy Space Center

Currently as a Civil Air Patrol Senior Member from Florida Wing and Air Force Colonel, Eric Boe has completed his first mission as pilot aboard the Space Shuttle Endeavor. The mission was in support of the International

Space Station and lasted for 15 days in November 2008. Eric Boe carried his Spaatz coin with him into space in honor of his CAP cadet experience. He credits his CAP years for solidifying his dream of being a pilot and for giving him opportunities to participate in unique experiences, such as the International Air Cadet Exchange (IACE) as a sponsoring family.

Also a top-notch pilot, Eric Boe's military service includes flying 55 combat missions over Iraq in support of Operation Southern Watch after the Gulf War and more than 4,000 flight hours in more than 45 different aircraft. His military decorations include the Meritorious Service Medal, Air Medal, and Aerial Achievement Medal.

Eric Boe is truly a role model for young people in CAP and in the classrooms of America who dream of one day being a pioneer of spaceflight and conquering the unknown.



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Aerospace Education News

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If you have news, events, or ideas we might consider for the newsletter, please submit them electronically to jjstone@capnhq.gov.



Eric Boe, right, is honored as the former Civil Air Patrol Cadet graduating highest in order of merit in the class of 1987.



In the ACE spotlight ...

Aerospace Connections in Education Leader, Ada Matthews, TX 430

Ada Matthews loves children. She has also become an avid fan of flying, thanks to CAP. These two passions have led her to begin an ACE program at her CAP TX430 squadron location in Wichita Falls, TX. She is inspired by both the adults and children who are working with her in this program.

How did this all begin? Ada's late daughter, Annabelle Matthews, was excited about aerospace throughout her brief life. She won a NASA award while in the sixth grade for participating in the creation of a solar airplane with her school. Her interest in aviation and space grew through the years. After her death a few years ago, her two young children came to live with Ada, and Ada began sharing the aerospace interest of their mother with the children. Being involved in CAP was a natural fit for the children, but they were not old enough to participate as cadets. Thus, Ada, who had begun homeschooling her

grandchildren, found out about the CAP's new elementary program: Aerospace Connections in Education (ACE). Ada asked if she could participate with her own grandchildren, as well as the children of the CAP squadron members with whom she was associated.

There is now an ACE meeting going on with the younger siblings of cadets, the daughter of her Commander Randy Stafford, and even local military members' children at the same time the squadron's cadets meet. The elementary children use the ACE curriculum that is taught by SM Al Gonzales, a local health emergency services coordinator. The ACE program compliments the middle and high school CAP AE cadet curriculum (the Dimensions modules and the Journey of Flight textbook) that is taught by Capt James Schaeffer, a pilot and aerospace engineer.

"The ACE program has provided an opportunity for the younger children to become enthralled by aerospace, just like the cadets and adults have become. Al and James are awesome teachers who exude enthusiasm and knowledge to the children," Ada exclaims. "We have all grade levels and academic levels of children, from grade one to six; from dyslexic to gifted, and the aerospace program excites them all."

Ada recently took an orientation flight with Emergency Services Officer Robert Pohlmann, as seen in the photo. She now feels that aerospace should be brought to the forefront of every cadet and composite squadron, as this subject has the capability to motivate even the most at-risk persons, adults or youth.



Seeing, first-hand, the impact of aerospace in her life and the life of CAP cadets and ACE students, Ada just can't help but feel a renewed sense of purpose in her life... to pass on her deceased daughter's dreams of flight. "What better legacy to give to a young person who needs direction in life? Ah, life is good!"



Seniors, cadets and students participate in Ada Matthews' activities



Cadet experiences a simulator



Ada and Emergency Services Officer, Robert Pohlmann, during orientation flight

"The ACE program has provided an opportunity for the younger children to become enthralled by aerospace, just like the cadets and adults have become."

---Ada Matthews

In the AEO Spotlight.....

Aerospace Education Officer, Capt Lynn Toney, AL 801



In the Boaz, Alabama school system, if you called roll by titles you would find that one woman answers many times. Lynn Toney is the Gifted Specialist for Boaz City School System (BCSS), the Coordinator of the CAP Aerospace Connections in Education (ACE) Program for Boaz and the Deputy Commander of the BCSS Squadron AL 801. Her squadron duties also include Aerospace Education Officer and being a member of the finance committee. She not only “changes hats” but literally changes clothes during the day to accommodate her many responsibilities. On Thursdays, during the school day, she starts with the ACE program t-shirt and then changes into her CAP uniform for the 3:00-5:00 p.m. CAP squadron meeting.

Lynn's educational background provides her the expertise she needs to reach and educate the children in her care. She has her B.S. in Elementary Education, her Master's degree and an ED.S. in Special Education and has an aspiration of obtaining a Doctorate in Educational Leadership.

Among the many field trips and activities that Lynn has conducted for her students and squadron, the latest was a July trip to the Birmingham airport to visit the 117th Air National Guard. The group was given a special tour of the refueling KC-135 airplane. Lynn's cadets have also done community service projects, such as being ambassadors for an ELL (English Language Learners) class from a local school where the teacher was a CAP Aerospace Education Member (AEM). The cadets met the class at the Northeast Alabama Regional Airport where they helped them participate in a paper airplane contest. The experience enriched the cadets' lives and the lives of the participants.



Lynn Toney (sixth from the right) and CAP squadron members pose in front of CAP airplane.

In August of this year, Lynn was given the ACE Coordinator of the Year award by CAP National Commander, Major General Amy Courter, at CAP's National Board meeting in Orlando, Florida. Lynn was able to talk about her

squadron and the ACE program and how well the two have worked together in her school system. This was the highlight of Lynn's summer and a great culmination to a year full of excitement and change for her students and cadets.

Lynn Toney believes the ACE Program and CAP are both wonderful assets for the BCSS, and she is thankful that she teaches in a system where being world class is something they do every day. After wearing the CAP and school hats during the day, Lynn goes home at night and puts on her most important hat...that of mother to her son and daughter, who are both CAP cadets. We wish to thank Lynn for giving so unselfishly of her time and talents to make aerospace shine in the eyes of so many students.



Lynn Toney (far left) poses with Major General Amy Courter (second from left) and SER Commander Col Jim Rushing (far left) at CAP National Board

“I believe the ACE Program and the CAP are both wonderful assets for the BCSS, and I am thankful that I teach in a system where being world class is something we do everyday!”

----Lynn Toney



Aerospace Connections in Education (ACE) Program Money for Math, Cash for Character

(Submit lessons anytime from Jan. 6, 2009 - March 24, 2009)



Do you have a great elementary aerospace lesson that promotes math or good character? Submit it to us, and if we select your lesson to use in our elementary aerospace curriculum, we'll send you \$100! Just follow our format and obey some simple rules in order for your lesson to be considered. For a sample lesson, please visit our website at www.members.gocivilairpatrol.com/ae, and look for "Money for Math Sample Lesson," and "Cash for Character Sample Lesson." Additionally, you may download the "Lesson Template." You may submit as many lessons as you like! Email questions or your submissions to Angie St. John at astjohn@capnhq.gov, or fax them to her at 334-953-6891 anytime between now and 5:00 P.M. CST on Tuesday, March 24. Emails with a Word document attachment of the lesson plan are preferred. Don't forget to include your name and contact information!

Selected entries will be announced in the May AE newsletter.

RULES

- Only lessons submitted by current CAP AEMs or CAP senior members will be considered.
- The lesson must be appropriate for an elementary grade level. (Choose from K-6.)
- The lesson must have an aerospace theme/connection. Aerospace includes topics such as flying, airplanes, rockets, space shuttles, space exploration, planets, stars, and weather to name a few of the more popular aerospace topics.
- The lesson must include national math or character standards. (For national math standards, visit <http://standards.nctm.org/document/appendix/numb.htm>, and for character, visit <http://www.character.org/elevenprinciples>.)
- The lesson must take approximately 30-60 minutes to teach.
- The lesson must **NOT** be taken from

COPYRIGHTED material! NASA lessons are not copyrighted, so you may use their material; however, we highly recommend adding your own special touches to the lesson that make technical information a bit easier to understand, adding your own fun/original ideas to the lesson that may make it flow smoother and make it more appropriate for a specific grade level, etc.

- The lesson must contain appropriate information for each heading within the lesson.

The sample template and other information on the lesson format are available at <http://members.gocivilairpatrol.com/ae>.



Aerospace Education Excellence (AEX) Awards Program

Is your school or unit participating in the CAP AEX award program this year? If you have not signed up for this year's program, please to go: <http://members.gocivilairpatrol.com/ae> and click on the Aerospace Education Excellence (AEX) Award Program bullet. Units should complete the blue application; teachers should complete the red application. Send your completed application or completion report to: aex@capnhq.gov.

The AEX award program is an exceptional way to encourage students, cadets, and adults to become excited about aerospace. With five AEX national academic standards-based activity books for grades K-12 and CAP Senior Members, there are over 88 hands-on activities to infuse AE into the school curriculum or into the unit's weekly programs to fulfill AE requirements.

Completion of six activities and one 2-hour AE activity is an easy way for the classroom or unit to receive a beautiful AE plaque and all participants to receive a nice certificate of accomplishment. It

is not too late to sign up this year, so please join the fun!



Above: Corley, TX students received the AEX award.
Top Right: Janice Wright (Boaz, AL) and students received the AEX award.
Lower Right: Puerto Rico cadets participate in the slinky sound waves activity.





CURRICULUM CORNER

BUILD A TELESCOPE...

(Lesson from NASA website at http://www.nasa.gov/audience/foreducators/informal/features/F_Build_a_Telescope.html). This lesson is in connection with the 2009 International Year of Astronomy.

Objective:

The student will construct a simple refracting telescope and calculate the magnification.

National Science Standards:

Science as Inquiry
Physical Science

Mathematics Standards

Communication
Computation/Estimation

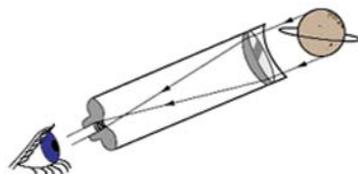
Grade Level: 6 -12

Materials:

- 2 converging lenses (convex lenses)
- telescoping tubes (mailing tubes - sizes should be so that one can slide into the other)
- manila file folder
- scissors
- knife or saw
- glue
- 1 white poster board
- red and black tape

Background:

In a telescope, the lens held next to your eye is called the eyepiece and is usually a short focal length lens or a combination of lenses. The lens at the other end of the telescope is called the objective lens. Light from a distant object is focused by the objective lens to form an image in front of the eyepiece. The eyepiece acts as a magnifier and enlarges that image. The magnification of the telescope can be found by dividing the focal length of the objec-



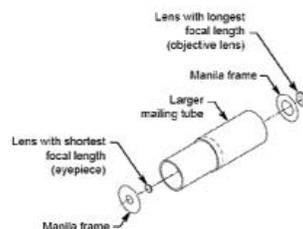
ive by the focal length of the eyepiece.

Procedure:

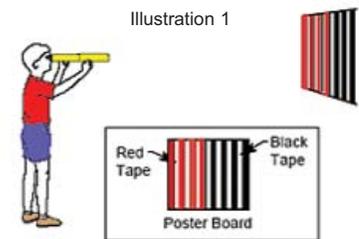
1. The mailing tubes will be the body of the telescope with the smaller one sliding inside the larger one. The length of the assembled telescope will be a little longer than the sum of the focal lengths of the two lenses. (See "Extra Information" section.) Add the value of the focal lengths of the short and long lens together. Divide that length by two and then add another inch. Cut both of the tubes to that length with a knife or saw.

2. Use the scissors to cut out two circles from the manila paper that are the same size as the diameter of the mailing tube. These circle frames will mount and center the lenses on the tube. With a knife, cut out circles that are slightly smaller than the diameter of the lenses in the center of the paper frame circle. Glue the lenses to the center of the frame. The shorter focal length lens will be the eyepiece. Glue that framed lens to the end of the smaller tube. Glue the other framed lens to the end of the larger tube.

3. Slide the two cardboard tubes together. You have now assembled a simple refracting telescope (one that uses convex lenses to bend light and bring the object into focus). Look through the eyepiece of your telescope and focus it on a distant object. Slide the two cardboard tubes in and out until you have a clear image. What do you observe?



4. Use the red and black tape to make stripes on the white posterboard (see illustration 1).



Extra information and activity extension:

If you wish to compute the power or magnification (M) of your telescope, you can use the focal lengths from the activity on page 49 of the Educator Guide: *Optics - Light, Color and their Uses* from NASA. This guide can be found at <http://www.nasa.gov/audience/foreducators/topnav/materials/listbytype/Optics.Guide.html>.

M = power or magnification

F_e = focal length of the eyepiece

F_o = focal length of the objective

$$M = \frac{F_o}{F_e}$$

Questions:

1. What is the magnification of your telescope? (see activity above)
2. Evaluate your calculated magnification. Stand at one end of the room and look at the chart with red and white stripes, and black and white stripes. Look directly at the chart with one eye and look through the telescope with the other eye. This may be a little difficult at first, but with a little practice you will find that you can do it.
3. How much is the chart magnified?

BUILD A TELESCOPE...(CONT.)

4. Do you think the amount of magnification observed through your telescope matched the magnification you computed for your telescope?

5. In observing objects through your telescope, did the image appear clear?

6. How was the observed image oriented?

Comment: The useful magnification of a telescope is limited by diffraction. This diffraction limit is about 10 times magnification per inch of diameter of the objective lens.

Example: an objective lens 2 inches in diameter will provide a realistic telescope power of 20 times.

Summary and Assessment:

The convex lenses used to make your telescope in the activity are called converging lenses because they are symmetrical across both the horizontal and vertical axis - thicker across the middle and thinner at the edges to converge light. Converging lenses can be found in many of the everyday items we see in our homes. How many can you find? Have students bring in some examples and explain why they are converging lenses. (A few examples are: paperweights, fish bowls with water in them, bottoms of soda bottles, etc.)

More background information-

Examples of telescopes and how they work:

In orbit about 380 miles (610 kilometers) above the earth, the Hubble Space Telescope views the heavens without looking through the earth's atmosphere. The atmosphere bends light due to a phenomenon known as diffraction, and the atmosphere is constantly moving. This combination of diffraction and movement causes starlight to jiggle about as it passes through the air, and so stars appear to twinkle. Twinkling blurs images seen through ground-based telescopes. Because an orbiting telescope is above the atmosphere, it can produce pictures in much finer detail than a ground-based telescope can.



The Chandra X-ray Observatory (pictured below) is a satellite launched on STS-93 by NASA on July 23, 1999. Chandra is an x-ray telescope. Unlike optical telescopes which possess simple aluminized parabolic surfaces (mirrors), X-ray telescopes generally use a Wolter telescope consisting of nested cylindrical paraboloid and hyperboloid surfaces coated with iridium or gold. X-ray photons would be absorbed by normal mirror surfaces, so mirrors with a low grazing angle are necessary to reflect them. Chandra uses four pairs of nested iridium mirrors, together with their support structure, called the High Resolution Mirror Assembly (HRMA).



What makes a good telescope?

A telescope is judged on these qualities:

Its light-collecting ability

Faint objects are hard to see. Objects appear faint because they're far away, and/or because they glow dimly. The more light a telescope can collect, the better it can see faint objects. Large mirrors and lenses allow telescopes to collect more light.

Its resolution

Resolution is the ability to see detail in an object. A telescope with high (good) resolution will be able to see two points of light as being separate from one another. A telescope with low resolution will blur the two points together into a single point of light.

Its magnifying power

Except in the case of solar telescopes, magnification is the least important element of a research telescope.

Magnification depends on focal length. As the magnification increases, the telescope focuses on a smaller piece of the sky. Most research telescopes are designed to operate at the smallest magnification possible, to examine a larger piece of sky. The distance and details they see depends more on their light-collecting ability and resolution than their magnification. Solar telescopes, however, can rely on magnification because they don't have to look deep into space, see much of the sky, or gather much light to clearly view the Sun.

Instrument quality

A modern research telescope is only as good as the cameras and other instruments that record and analyze the light that it captures. Instruments are judged by many factors, such as the quality of their images, how effectively they spread out light, and how much light they capture.



AEO/AEM News and Views



The Air Force Association (AFA) continues their outstanding support of CAP and aerospace education. The

AFA has now contributed over \$250,000 in aerospace grants for our CAP units and our teachers who are promoting aerospace in their squadrons and classrooms. These grants are for \$250, and an application can be found at <http://members.gocivilairpatrol/ae>. The deadline for this current cycle of grants is March 31 and the grants are for our educators who are promoting aerospace. The next grant cycle for units has a June 30 deadline.

The winners for our Fall Educator grant cycle were: Susie Comer (KY); Ruth Criner (TX); John Edsall (FL); John Evans, III (TN); Joe Heilman (OH); Regina Hein (TX); Janie Hill (AR); Diane Keeton (OK); Robin Kennedy (ME); Melissa Kissler (MO); Shari Klausman (KY); Sonia McMichael (CA); Ann Naar (PA); Michael O'Connell (SD); Beth Richert (OK); George Smith (AL); Meggan Starr (OK); Nancy Tashima (HI); Lynn Toney (AL); Janice Wright (AL).

Winners of the winter unit grant cycle will be announced in the March issue of AE News. Congratulations to all!

Aerospace Education Officer of the Year Award

Once again, we would like to remind those that are applying for the Aerospace Education Officer of the Year to submit the nomination package to Wing level so the winner may be sent to Region and that winner to HQ. The deadline for the Wing to receive applications is **January 15**. You may obtain an application form and instructions from Judy Stone by emailing at jstone@capnhq.gov or by going online to <http://members.gocivilairpatrol.com/ae>.

Congratulations to Super AE Members!

Many of our members have extraordinary talents and are being recognized for their contributions to the field of aviation and space. Some of the awards being won by these exceptional educators are:

Jeri Martin - FL - AIAA Foundation Educator Achievement Award

Susan Jukos - NH - AIAA Foundation Educator Achievement Award

Rachael Manzer - CT - AIAA Foundation Educator Achievement Award



Chantelle Rose - OH - A. Scott Crossfield Aerospace Education Teacher of the Year Award

Once again, we wish to invite all of our AEMs and other members who are educators to apply for the CAP Aerospace Education Teacher of the Year Award for 2009. Submission deadline is **January 15**. You may obtain an application form and guidelines from Judy Stone by emailing jstone@capnhq.gov or by going online to <http://members.gocivilairpatrol.com/ae>.

CAP Meets Teachers at National Science Teachers Association (NSTA) Conference

The National Science Teachers Association (NSTA) is a quality teacher organization that has recently embraced the subject of aerospace as an area of concentration for their organizational efforts. CAP's NHQ

and volunteers attend each regional and national NSTA conference in an effort to network with teachers who may be interested in our aerospace and cadet programs.

At each conference, teachers eagerly participate in hands-on activities and learn about the myriad of CAP products and programs. Many teachers become interested in the cadet program for select students who may benefit from the leadership and aerospace opportunities CAP has to offer young people. Thus, an introduction to CAP at these conferences is quite a worthwhile initiative.

Lisa Triolo, of Nampa, ID, attended the NSTA Conference in Portland, OR and won a laptop computer from CAP during a drawing held at the CAP conference exhibit booth. Lisa is a new



Capt Billy Jackson; Debbie Dahl; Lt Col Richard Edgerton; Lisa Triolo; Susan Mallett; and Lt Col Virginia Nelson were joined by Col Ted Kyle and Capt Nick Ham at the CAP Booth.

AEM and her daughter, Rebekah, has also recently joined CAP as a cadet.

CAP Col Ted Kyle stated with enthusiasm, "I made contact with more teachers in one day at the conference than I could do in a year of going to schools. This is the best way to get CAP's materials and information to teachers. The teachers were really excited about using our AE materials because of low cost and ease of use. Our presence in the conference was great."

CAP will be at the national NSTA conference in New Orleans in March. For more information about the conference, go to <http://www.nsta.org/conferences.2009new/?lid=con> Hope to see you there!



REGION TO REGION

NORTHEAST REGION

No events for this issue.

MIDDLE EAST REGION

No events for this issue.

GREAT LAKES REGION

February 12-16

The American Association of Physics Teachers' annual winter meeting will be held in Chicago, Illinois.

<http://www.aapt.org>

March 5-7

2009 Michigan Science Teachers Association will hold its conference at the Detroit Marriott Renaissance Center in Detroit, Michigan.

<http://www.msta-mich.org/conference/>

SOUTHEAST REGION

January 21-24

Florida Education Technology Conference (FETC) will be held at the Orange County Convention Center in Orlando, Florida.

<http://www.fetc.org/default.aspx>

January 24 and February 16-20

NASA's Ready for Liftoff! Workshop for students - Grades 4-8 and Aviation Camp - Grades 6-8 will be held at the Museum of Aviation at Robins AFB in Warner Robins, Georgia.

<http://www.moaeducation.com/Events.php>

January 24

NASA Kennedy Space Center offers a workshop entitled "Keplar: A Search for Habitable Planets Space Science Workshop for Teachers to Celebrate The Keplar Mission and the International Year of Astronomy." The workshop will be held at Kennedy Space Center, Educator Resource Center, in Florida.

<http://keplar.nasa.gov/ed/workshop.html#20090124>

February 12-14

Georgia Science Teachers Association will hold its conference in Savannah, Georgia.

<http://www.georgiascienceteacher.org/>

February 26

An Adventure in Aviation and Space Education, a workshop sponsored by Women in Aviation International Conference and the FAA, will be held in conjunction with the 20th Annual Women in Aviation International Conference and Trade Show.

For registration information, contact WAI at 937-839-4647 or Linda

Chatman at linda.chatman@faa.gov or Debra Myers at debra.myers@faa.gov

February 26-28

20th Annual International Women in Aviation Conference will be held in Atlanta, Georgia.

http://www.wai.org/09conference/2009_conf_seminars.cfm

NORTH CENTRAL REGION

No events for this issue.

SOUTHWEST REGION

January 11-15

89th Annual Meeting of the American Meteorological Society will be held in Phoenix, Arizona.

<http://www.ametsoc.org/MEET/annual/index.html>

February 5-7

15th Annual Space Exploration Educators Conference (SEEC) will be held at Space Center Houston in Houston, Texas.

<http://spacecenter.org/TeachersSEEC.html>

March 19-22

National Science Teachers Association (NSTA) 2009 National Conference on Science Education will be held in New Orleans, Louisiana at the Ernest N. Morial Convention Center.

<http://www.nsta.org/conferences/2009new/?lid=con>

March 21-24

Arizona Science and Engineering Fair will be held at the Phoenix Convention Center in Phoenix, Arizona.

<http://azef.asu.edu/home.html>

ROCKY MOUNTAIN REGION

March 5-7

Montana Aviation Conference will be held in Billings, Montana.

<http://www.mdt.mt.gov/aviation/docs/2009-mtavconf-exhibitor-reg.pdf>

PACIFIC REGION

January 31

The Jet Propulsion Lab, Von Karman Auditorium in Pasadena, California, will host the NASA Keplar workshop for teachers. This workshop celebrates the Keplar Mission and the International Year of Astronomy.

<http://keplar.nasa.gov/ed/workshop.html#20090131>

March 19-21

Washington Science Teachers Association conference will be held at Moses Lake, Washington.

<http://www.wsta.nets>

Special Events

February 15-21- Engineers Week
<http://www.eweek.org/Home.aspx>

2009 is the International Year of Astronomy

