

# Partnership

Fall 2014 Issue: Volume 24, No. 1

## Letter from the WHSTEP Co-Chairs

Change is in the air – The official end of summer has passed as we head into the fall season. The leaves are turning color. New and exciting things are happening in all three WHSTEP districts (Falmouth, Mashpee, and Bourne) as well as within the WHSTEP organization.

We welcome Abigail Smith as our new WHSTEP Administrator, taking over for Pat Harcourt who is with us in spirit and on a new adventure in Maryland. We will miss Pat. The Executive Board also has a new infusion of insight and energy with the addition of Judy Harbison & Bob Heller (Lawrence School, Falmouth), Tom Hoppensteadt (Mashpee Middle High School), Lee Horner (KC Coombs School, Mashpee), Jane Perkoski (Bourne High School), and Linda Werner (Morse Pond School, Falmouth). It is exciting to have so many teachers on our board across the districts, bringing a wealth of knowledge and classroom expertise. Building upon relationships established during last year's Liaison Dinner, our new partners from the area science & technology business community have lent their voice and unique perspective during both the biannual public WHSTEP meetings as well as our monthly executive board meetings. These partners include Falmouth Scientific Inc., Teledyne Benthos, McLane Research Laboratories and Hydroid.

Global Climate Change is the theme for the upcoming 2014 Liaison Dinner. Our annual school year kick-off event will be Wednesday, October 15 from 5:30 – 7 at the Landfall Restaurant in Woods Hole. A special shout out to WHSTEP business partner, board member, and Landfall owner Don Estes for his long time support of WHSTEP and hosting the liaison dinner. This year's evening will feature many current and cutting edge research on the topic of climate change and sea level rise.

With evolving technology, researchers are able to learn more about our planet and can explore places previously unreachable. This was evident during our first Family Science Night event, Drone-a-palooza! On September 24, members of the research and business scientific communities joined together to display the capabilities of new technology that can be used to explore the air, land and sea. Many have online databases that can be accessed by educators. The evening featured student researchers Evan Brodie and Troy Otter from Falmouth High (their other partner Emma Shank was at soccer practice). The team presented their study of algal growth and eutrophication on Shiverick's Pond in Falmouth using an aerial drone and Go-Pro camera. WHSTEP looks forward to hearing more from these young scientists in the future!

WHSTEP continues to evolve to best meet our primary mission of bringing the scientific, business and education communities together to enhance science education. Please keep an eye out for future WHSTEP events such as our Teacher Science Safaris, Winter and Spring Meetings and Family Science Nights. If you blink you may miss us. We may be at your location soon!

We are both looking forward to another exciting year of the Partnership!

### **Suzanne Avtges**

Mashpee Middle High School

### **JC Weber**

Marine Biological Laboratory

#### **In This Issue:**

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## WHSTEP General Meeting 2014 at the Woods Hole Research Center (WHRC)

- Deb Scanlon & JC Weber



On January 15<sup>th</sup>, a standing-room only group of area teachers, community members and researchers from the local research institutions packed the auditorium at the Woods Hole Research Center for the WHSTEP General Winter Meeting. Building upon connections sparked at the WHSTEP Liaison Dinner last October, representatives from two of the local science & technology businesses, Falmouth Scientific, Inc. (FSI) and McLane Research Laboratories were also in attendance.

The meeting opened with a presentation by Dr. Glenn Bush, a Woods Hole Research Center scientist, on his work to reduce deforestation in African communities. The attendees learned about the REDD (Reducing Emissions from Deforestation and Forest Degradation) initiative of the United Nations Environmental Program. REDD creates an incentive for developing countries to protect and wisely use their forest resources. Such management policy is critical as the world confronts climate change. These strategies make forests more valuable not harvested, by creating a financial value for the carbon stored in trees.

Following the seminar, there was an open conversation between teachers and the scientific community about finding ways to best utilize the truly unique scientific character and resources of our area to enhance the support of science and technology education in our local schools. The consensus was that students need to have opportunities to see and experience what happens in scientific research institutions and scientific industry.



Mentoring and internships were topics that garnered a lot of discussion as solid and direct ways to provide opportunities for students. Mentoring could be a single event or a short or long-term commitment. It could be a visit or a placement for a student at a research laboratory or at one of our area science and technology focused business. Both teachers and scientists shared stories of how opportunities to work in research laboratories, both after school and during the summer, have had lasting impacts on students interested in science. The WHSTEP liaison network is a great way to initiate these connections. Teachers stated

that student internships at the high school level are urgently needed and would be very useful. Students can even arrange to earn credit for internships which could take place during either the summer or the academic year. Mentorship of a science fair project could be the basis for an internship.

Elementary school teachers present expressed a strong interest in learning more about science topics and are looking for ideas and materials to use in the classroom. Images and samples are especially useful. Educators present at the discussion wanted to communicate to institutional liaisons and directors how greatly they value the open house events and especially the opportunities to visit labs and facilities, meet scientists, and attend presentations. One suggestion was for science institutions to have outreach themes or topics that might continue throughout a season or a year.



Photo by Dee Sullivan

Teachers were also very interested in the possibility of obtaining and using data sets for students. Bringing real life examples of active science into the classroom has tremendous benefit and actively graphing and interpreting real world data strengthens basic concepts learned from textbooks. Visualizations, graphics, and maps are extremely useful. Nathan Wilson, the director of The Encyclopedia of Life at the MBL, relayed to the teachers that their group maintains a large database that is available to the public. The paradigm of proprietary data is beginning to change and these big data sets are becoming available. These sets of data could be simplified, or subsets extracted, for students.

The teachers present also expressed how much students love technology and instruments. WHSTEP in past has sponsored an “instrument petting zoo” and it could be possible to coordinate this effort again.

With the growing incentive of research institutions to incorporate community outreach into their work, it would be helpful to quantify those benefits to the community -- which, this group agreed, are significant. WHSTEP, as a bridge between the educators and the area research institutions and technology businesses, could certainly play a role facilitating that communication.

*The following are the suggestions and requests that developed in the WHSTEP General meeting in January, in a condensed form that can be used as a handout for discussions with colleagues.*

## Discussion on Ways to Increase Science and Technology Education in Upper Cape Schools



### Mentoring/Internships

- Mentoring of a student by a scientist or engineer is a good way to provide opportunities for students; mentoring could be a single event or a short or long-term commitment. It could be a visit or a regular collaboration with a student at a lab or business.
- Opportunities to work in institution labs, both after school and during the summer, have had lasting impacts on students interested in science. If a business or laboratory has the means to host a student, a proven approach has been to contact the science department at the schools; WHSTEP can help with this.
- Student internships at the high school level are urgently needed and would be very useful. Students can arrange to earn credit for internships. Mentorship of a science fair project could be the basis for an internship.
- WHSTEP can help organize a “career day” for junior high level students to introduce them to science and technology professions and businesses.

### Open House Events for Elementary School Teachers

- Teachers at the elementary level are very interested in learning more about science topics and are looking for ideas and materials for teaching science. Images and samples are especially useful. Some valuable existing or past programs that have had positive impacts include:
  - [MBL](#) Public Discovery Days
  - [WHOI](#) Public Events (sharks; deep sea explorations)
  - [NMFS](#) Woods Hole [Aquarium](#) access and events
  - [SEA](#) Open Ship events
- Student or Science Teacher visits to science institutions
- Educators present at the discussion wanted to communicate to institutional liaisons and directors how greatly they value the open house events and especially the opportunities to visit labs and facilities, meet scientists, and attend presentations
- One suggestion was for science institutions to have outreach themes or topics that might continue throughout a season or a year



### Data Sets

- Teachers were very interested in the possibility of obtaining and using data sets for use in class. The data sets would be most useful if they are simplified. Visualizations, graphics, and maps are also extremely useful. The [Encyclopedia of Life](#) has a large database and a variety of data sets
- The paradigm of proprietary data is beginning to change; big data sets are becoming available. These could be simplified, or subsets extracted, for use with students
- Students love technology and instruments; WHSTEP in past has sponsored an “instrument petting zoo” and could do this again
- Local data sets are of high interest to students and teachers
- Institutions are under pressure to reach out and serve the public; it would be helpful to quantify the benefits to the community -- which, this group agreed, are significant -- of outreach events, to help inform cost/benefit analysis of outreach programs. WHSTEP might be able to help with this.



Visit the WHSTEP website at:  
<http://www.whoi.edu/whstep/>

For announcements about events related to science and math, subscribe to the WHSTEP listserver at:  
<http://lists.mbl.edu/mailman/listinfo/whstep>

## Project Mentoring and Science Fairs 2014

- Pat Harcourt & JC Weber

Carrying on a unique and valuable tradition, WHSTEP organized the science fair project mentoring program at the Lawrence School in Falmouth for the 17th year in January 2014. Volunteers from all around the WHSTEP scientific community dedicated the time to meet with 7<sup>th</sup> and 8<sup>th</sup> grade students and help them design and refine their science projects. Students met with the volunteer mentors one-on-one for 15 to 25 minutes during their science class periods. The students' science fair project topics included plants, basketballs, water sampling, and building a greenhouse with plastic water bottles.

WHSTEP extends sincere thanks and appreciation to our 2014 volunteers for taking their time to help the students at the Lawrence School:

Kate Ackerman, USGS; Sarah Bender, WHOI; Brian Buczkowski, USGS; Sara Bysshe, WHSTEP; Nancy Church, WBNERR; Molly Cornell, WHSTEP; Deb Coulombe, WHMSI; Libby Fifer, AmeriCorps Cape Cod; Pat Harcourt, WHSTEP; Porter Hoagland, WHOI; Sam Kelsey, MBL; Emily Moberg, MIT; Lauren Mullineaux, WHOI; Jim Newman, WHMSI; Lynn Parks, WHSTEP; Jim Rassman, WBNERR; Rob Reynolds, Zephyr Marine; Chris Sherwood, USGS; Liese Siemann, MBL MRC; Amy Siuda, SEA; Victoria Starczak, WHOI; Kama Thieler, WHOI; Suzanne Thomas, MBL; Sarah Tulin, MBL; Bill Waite, USGS; JC Weber, MBL; Camille Weinberg, WHSTEP; Oliver Zafiriou, WHOI

Scientists in many area labs hosted students and mentored their projects; and many scientists and engineers served as judges to support the science fairs at Falmouth High School, Falmouth Academy, Bourne Middle School, and St. Margaret's School in Buzzards Bay.

We are pleased and grateful to have had strong representation from WHSTEP partners at the Falmouth District Science Fair. Staff from partner institutions set up engaging display tables at the fair, highlighting their research activities and

educational opportunities, and talking with students about careers in science and technology. WHSTEP would like to thank Mike Lima, Falmouth Scientific; Beth Liles, Marine Biological Laboratory; Andrea Toran, USGS Woods Hole Science Center; Kama Thieler, Woods Hole Oceanographic Institution; Juliana Miller, Sea Education Association; Craig Connolly and Kathleen Savage, Woods Hole Research Center; Grace Simpkins, National Marine fisheries Service; and Kristen Lans and Nathan Wilson, Encyclopedia of Life.



Mike Lima describes the work of Falmouth Scientific at the Falmouth District Science Fair in March.  
Photo by Pat Harcourt



Beth Liles of MBL introduces children to some local marine creatures at the Falmouth District Science Fair.  
Photo by Pat Harcourt



## WHSTEP Spring Science Safari: Geophysical Fluid Dynamics Lab

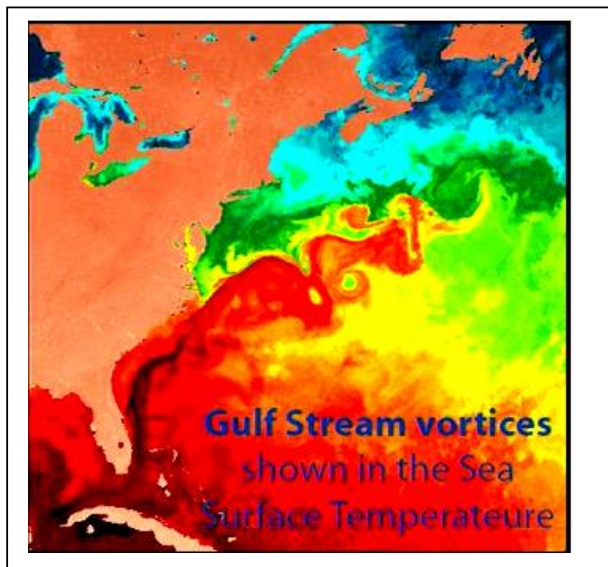
- Pat Harcourt

Teachers had a rare opportunity to attend a special Open Lab event at WHOI's [Geophysical Fluid Dynamics Lab](#) at the Reinhart Coastal Research Center on Thursday May 8. The event, organized by Dr. Claudia Cenedese, was especially designed to provide practical and fun ways for teachers of all grade levels to teach about physical oceanography.



Dr. Cenedese developed a series of hands-on activities to teach basic concepts in physical oceanography and fluid dynamics, and set them up as stations in the lab. During the Safari, Dr. Cenedese guided the teachers as they visited each station to try out the activities, and she provided ideas and suggestions for using the activities to teach students in different grade levels. Participants received resources for teaching about these globally important topics.

For example, Dr. Cenedese demonstrated several ways to create a vortex, and explained that a vortex is a region within a fluid where the flow is mostly a spinning motion around an imaginary axis. Vortices are common in the ocean and the atmosphere, and can range in diameter from centimeters to a thousand kilometers.



Dr. Cenedese described the field of physical oceanography and noted that it involves the exploration and study of ocean currents and water properties and their roles in the earth's systems. Physical oceanography has important applications in global climate, oceanic mixing, and coastal studies, as well as being a key element in studies of marine life and primary production, hydrothermal vents, and how the ocean stores carbon dioxide. It might also help you understand the way the cream mixes into your coffee!

WHSTEP extends sincere thanks to Dr. Cenedese for inviting teachers into her lab and sharing her knowledge and expertise.



**Resources for teaching** about the concepts in the Geophysical Fluid Dynamics Lab are posted on the WHSTEP website at <http://www.whoi.edu/page.do?pid=118576&tid=282&cid=193209>

Additional WHSTEP resources for science education can be found on the pages for Events & Announcements: <http://www.whoi.edu/page.do?pid=118576> and Links & Resources: <http://www.whoi.edu/page.do?pid=119296>

## Dr. Ken Buesseler Speaks on Fukushima Radiation at WHSTEP Annual Meeting

- Debbie Scanlon



Dr. Ken Buesseler of WHOI  
Photo courtesy of Ken Buesseler

A good crowd of participants turned out for the WHSTEP Annual Spring Meeting on May 14<sup>th</sup> at the Woods Hole Oceanographic Institution. While one of the draws may have been the stunning view from the 5<sup>th</sup> floor of Clark Lab, most members, liaisons, and friends of WHSTEP came to hear Dr. Ken Buesseler speak about his work compiling a comprehensive and up-to-date dataset on marine radiation levels in the aftermath of the 2011 Fukushima Daiichi Nuclear Power Plant disaster.

Dr. Buesseler, who is director of the WHOI Center for Marine and Environmental Radioactivity, described how nuclear power plants operate, and gave an overview of the disaster and how the contaminated water may have moved.

In January of this year, Dr. Buesseler launched a crowdsourcing campaign to cover the cost of the ongoing collection of seawater samples at 24 locations along the Pacific Coast from Alaska to Canada, down the West Coast of the US and out to the Hawaiian islands. The samples are shipped to the Center for Marine and Environmental Radioactivity lab in Woods Hole for analysis.



Attendees listen as Dr. Buesseler explains how he tracks the levels of radiation in the Pacific Ocean.  
Photo by JC Weber

While Dr. Buesseler does not expect radiation levels to be high enough in the ocean or in seafood to be of concern for human health as the plume spreads 5,000 miles across the Pacific, he said he believes the situation demands careful, consistent monitoring. There is no US government plan to monitor the radiation levels in the ocean along the US coastline. Dr. Buesseler is posting all of the current radiation level data online at [ourradioactiveocean.org](http://ourradioactiveocean.org)



Students in Lawrence School engineering classes run the Iditarod in March Photo by Gene Marchand, Falmouth Enterprise

Another highlight of the program was the report-out by three teams who had carried out science education programs with the help of WHSTEP. Bob Porto, engineering teacher at Lawrence School, described the Iditarod sled his students built with WHSTEP mini grant funds, and showed photos of the school-wide event. Dr. Juliana Miller of SEA described her partnership with WHSTEP co-chair Suzanne Avtges this year. Dr. Miller visited Ms. Avtges' marine science class to introduce the students to careers in marine science and technology. The class kept in touch with students on SEA cruise C-251 in the Caribbean, and the students on the ship answered the high school students' questions about their research projects and experiences. The third project was Ocean Science Saturdays for girls, which is described in this newsletter.

The Annual Spring Meeting provided abundant evidence that WHSTEP is an active and important link joining the science and education communities on the Upper Cape.



## WHSTEP Supports Ocean Science Saturdays for Girls

- Pat Harcourt

Dr. Anna Michel of WHOI's Department of Applied Ocean Physics and Engineering approached WHSTEP over the winter to request help identifying and recruiting girls for an engineering education project that is part of her grant funding. In late March, Dr. Michel sent an invitation to middle school girls in Falmouth and Mashpee, asking "Are YOU Curious.... about how a boat floats? Or how an engineer puts a tag on a whale to track its migration? Or how a deep-sea robot can find treasures or creatures on the seafloor? Or how a beach can be cleaned up after an oil spill?"

The Ocean Science Saturdays program brought together 20 girls from Falmouth and Mashpee to spend two Saturdays in April trying out engineering activities. The program was free for participants, and WHSTEP partner Waquoit Bay National Estuarine Research Reserve generously hosted the program.



Dr. Anna Michel coaches a team of girls as they try their hands at designing and building a wind turbine.  
Photo by Dee Sullivan

During the program, the girls learned how marine technology helps people study and learn about the ocean and carry out tasks that would be difficult or impossible for a human. They also learned how engineering and technology can be used to protect, restore, and clean up coastal and ocean areas that have been damaged or degraded.



The girls tested the wind outdoors with anemometers before designing their turbines. Photo by Dee Sullivan

At the end of the second session, several girls asked "When can we come back? Will we do this again next year?" Dr. Michel has written a follow-up grant proposal, with a letter of support from WHSTEP, to carry on her efforts to provide engineering experiences for girls.



The girls worked in teams to construct and test wind turbines. Photo by Dee Sullivan

### Additional resources for engaging girls in science, engineering, and technology

RISE Net engineering & technology for girls  
<http://www.girlsrisenet.org/engineering-for-girls-only>

Girls Excelling in Math and Science  
[http://gemsclub.org/math\\_and\\_science](http://gemsclub.org/math_and_science)

SciGirls connect <http://scigirlsconnect.org/>

## Family Science Night: Drone-a-palooza

Abigail Smith

On September 24<sup>th</sup>, WHSTEP's Family Science Night delved into the topic of autonomous vehicles, better known as drones! Eight different groups featured drones from both sea and air. Community members & students were able to get a first hand view of drone design and technology and learn about the varied applications in science or society. The event concluded with a presentation by a group of Falmouth High School students sharing their "Algae Drone" project.



Troy Otter (left) and Evan Brodie (right) present their "Algae Drone" project to the crowd. The ninth graders used an aerial drone to monitor algal blooms in Falmouth ponds using infrared aerial photography. (project member not shown: Emma Shank)



Students experiment with David Fisechella's aircraft simulator. Photos by Abigail Smith.

WHSTEP would like to thank all of the community participants who volunteered their time and resources to make this an enjoyable and educational event for everyone.



Clayton Jones of Teledyne Webb describes the Slocum glider and APEX drone to Kathleen Savage. Photo by Abigail Smith.

### Drone-a-palooza displays and links:

Connor Ahearn & Alex Ekholm, WHOI  
Argo Floats <http://argo.whoi.edu>

Jason Michaud & Tom Fiset  
Skyflik Aerial Filming <http://skyflik.com>

Peter Traykovski, WHOI  
JetYak  
<http://soundwaves.usgs.gov/2013/12/fieldwork2.html>

Clayton Jones, Teledyne Webb  
Slocum Glider, ROV, APEX drone  
<http://www.webbresearch.com>

Jim Manning, NOAA  
Drifters <http://www.nefsc.noaa.gov/drifter/>

Evan Brodie, Troy Otter, Emma Shank,  
Falmouth High School, Algae Drone  
<http://algaedrone.weebly.com>

David Fisechella, WHOI  
Aircraft Simulator

Alicia Soderberg & Joshua Miller, Harvard  
"Bird's Eye View" Aerial Photography



### WHSTEP Liaison Quick Reference 2014 - 2015

#### WHSTEP Executive Committee

Suzanne Avtges, WHSTEP Co-Chair	Mashpee HS	508-539-3600 x2291	savtges@gmail.com
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#### Institution/Business Liaisons

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	Jim Manning	508-566-4080	james.manning@noaa.gov
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	Kate Ackerman	508-457-2331	kackerman@usgs.gov
Waquoit Bay Natl Estuarine Res Reserve	Joan Muller	508-457-0495 x107	joan.muller@state.ma.us
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	Kama Thieler	508-289-3478	kthieler@whoi.edu
	Joanne Tromp	508-289-3338	jtromp@whoi.edu
Woods Hole Research Center	Zander Nassikas		

### WHSTEP School Liaisons

#### Falmouth

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Lawrence School (7-8, Math)	Carrie Fitzpatrick	508-548-0606	cfitzpatrick@falmouth.k12.ma.us
Morse Pond School (5-6)	Stephen Kapulka		skapulka@falmouth.k12.ma.us
East Falmouth Elementary (K-4)	Wendy Scholes Kate Skehill	508-548-1052	scholes.wendy@gmail.com kskehill@falmouth.k12.ma.us
Mullen-Hall School (K-4)	Trish Mara	508-548-0568	
North Falmouth Elementary (K-4)	Kathy Bowker Debra McCurdy	508-563-2334	kbowker@falmouth.k12.ma.us
Teaticket Elementary (K-4)	Gordon Starr	508-548-1550	gstarr@falmouth.k12.ma.us

#### Mashpee

Mashpee High School (9-12, Science)	Tom Hoppensteadt (need new rep)	508-539-3600	thoppensteadt@mashpee.k12.ma.us
Mashpee Middle School (7-8, Science)	Mark Rosbach	508-539-3601	mrosbach@mashpee.k12.ma.us
Quashnet School (3-6)	Robin Geggatt (confirm)		rgeggatt@mashpee.k12.ma.us
K.C. Coombs School (K-2)	Lee Horner (need new rep)	508-539-1520	lee.lmh2006@gmail.com

#### Bourne

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Bourne Middle School (5-8)	Robert Ruggiero Sarah Lavoie	508-759-0690	rruggiero@bourneps.org
Bournedale Elementary (K-4)	Jillian Norton	508-743-3800	slavoie@bourneps.org
Peebles Elementary (K-4)	VACANT	508-759-0680	
Upper Cape Tech (9-12)	Kathleen Gausman	508-759-7711 x234	

#### WHSTEP community education and business representatives

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# WHSTEP

## Save the Dates! Upcoming Events 2014 – 2015

OCT 6	Mon 5:00	Executive Committee Meeting at Parker's Boatyard, Cataumet
<b>OCT 15</b>	<b>Wed 5:30-7:00</b>	<b>Liaison Dinner at Landfall Restaurant, Woods Hole</b> -- Climate Change Theme
NOV 3	Mon 5:00	Executive Committee Meeting (location TBA)
NOV 21	Fri	Mini-Grant Proposal Deadline
DEC 1	Mon 5:00	Executive Committee Meeting (location TBA)
JAN 5	Mon 5:00	Executive Committee Meeting (location TBA)
mid-JAN		Science Fair Mentoring at Lawrence Middle School, Falmouth
JAN 30	Fri 5:00	Bourne Public Schools Science Fair
FEB 2	Mon 5:00	Executive Committee Meeting (location TBA)
<b>FEB 4</b>	<b>Wed 4:00-600</b>	<b>WHSTEP General Winter Meeting</b> (location TBA)
FEB		Falmouth Academy Science Fair
FEB 27-28		Falmouth Public Schools Science & Engineering Fair
MAR 2	Mon 5:00	Executive Committee Meeting (location TBA)
MAR 20	Fri	Mini-Grant Proposal Deadline
<b>MAR 25</b>	<b>Wed</b>	<b>Science/Math Teacher Safari</b> (location TBA)
APR 6	Mon 5:00	Executive Committee Meeting (location TBA)
MAY 4	Mon 5:00	Executive Committee Meeting (location TBA)
<b>MAY 8</b>	<b>Wed 4:00-6:00</b>	<b>WHSTEP Annual Spring Meeting</b> (location TBA)

Mashpee High School is looking for science partners for students to intern for their senior culminating project. Anyone interested in mentoring a student please contact Celeste Reynolds, Senior Project Coordinator at Mashpee High School (508-539-3600 ext. 2022). Thanks!

The WOODS HOLE SCIENCE AND TECHNOLOGY EDUCATION PARTNERSHIP (WHSTEP), established in 1989, is a partnership of schools, scientific institutions, businesses, and community resources. Its purpose is to support, promote, and expand science, math, and technology education and science literacy in the participating communities.

### *How to get involved:*

- ✓ Attend a Partnership meeting in January or May, or a Science and Math Safari
- ✓ Contact an Executive Committee member or a liaison with program ideas or feedback
- ✓ Host a teacher tour or class field trip in your lab
- ✓ Volunteer to present your research at a WHSTEP event
- ✓ Serve as a mentor for a student science fair project
- ✓ Make a financial contribution to support WHSTEP programs and grants for teachers