

2014 NOAA Mid-Atlantic Region Teacher at Sea Alumni Workshop Summary
March 14-16, 2014
NOAA Silver Spring Campus
Silver Spring, MD
Jennifer Annetta, The College of Exploration/NOAA Teacher at Sea Program

The NOAA Mid-Atlantic Region Teacher at Sea Alumni Workshop was held on March 14-16, 2014 in Silver Spring, MD at NOAA's Silver Spring Campus Headquarters. Seventeen Teacher at Sea alumni from the Mid-Atlantic region (DC, DE, MD, VA, WV) attended a three-day professional development workshop in order to strengthen oceanographic content knowledge and build an alumni network in their region.

Alumni gained both physical and marine oceanographic content knowledge from NOAA scientists, NOAA speakers and hands-on activities. Content included: sea floor topography and mapping, wind-driven ocean currents, invertebrate zoology (focus on sponges and cnidarians), tide prediction, geodesy, and NOAA data in the classroom.

Alumni toured NOAA's Science on a Sphere, Gateway to NOAA, NOAA's Science Center and Auditorium, and the Smithsonian National Museum of Natural History's Q?rius Education Center.

Workshop Goals:

The goals of the workshop are aligned with selected NOAA Teacher at Sea Program goals. In summary, the goals are to enhance teachers' science content knowledge, share NOAA resources, and begin to build a network of alumni in the Mid-Atlantic region.

Short-term Goals (Skills and Knowledge)

Teachers will:

- Understand how NOAA oceanic and atmospheric research is linked to National Education Science Standards and Ocean Literacy Principles. (AMS/Maury Project modules)

Mid-term Goals (Behavior and Action)

Teachers will:

- Use NOAA data and resources in classroom activities. (NOAA Data in the Classroom, Science on a Sphere, Gateway to NOAA, NOAA National Geodetic Survey, Historic Tide Machine, NOAA National Systemics Lab)
- Use NOAA-related career information in classroom activities, when mentoring students and when working with colleagues. (poster presentations, NOAA speakers, tour of NOAA facilities)

Long-term Goals (Social, Environmental, and Economic)

In support of NOAA's mission, the Teacher at Sea Program will:

- Build an understanding of earth system science. (AMS/Maury Project modules, Science on a Sphere, NOAA scientists and speakers)
 - Model instruction of physical foundations of selected oceanographic topics and issues and explore ways in which these understandings and concepts can be incorporated in curricula.

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- Build working relationships among teachers, emphasizing collective participation of groups of teachers.
- Build relationships among NOAA scientists and teachers.

Main Workshop Components:

- **Speakers/Topics**
 - Dr. Kathryn Sullivan - Under Secretary of Commerce for Oceans & Atmosphere and NOAA Administrator
 - Eileen Sobeck – NOAA Fisheries Assistant Administrator
 - Dr. Allen Collins - Zoologist and Curator of Jellyfishes and Glass Sponges, National Marine Fisheries Service (NMFS), NOAA National Systemics Lab - *Behind-the-Scenes Look at Smithsonian Collections and Genetics Lab*
 - Trish Mace - Senior Ocean Education Specialist, Smithsonian's National Museum of Natural History - *Q?rius Education Center*
 - Todd Ehret - NOAA Physical Oceanographer – *History of Tide Prediction and Tide Prediction Machine Demonstration*
 - Bryan Hirschman – TAS, 2009 and American Meteorological Society (AMS)/Maury Project Peer Trainer – *Measuring Sea Level From Space and Wind-Driven Ocean Circulation*
 - Britta Culbertson - TAS, 2013 and Albert Einstein Distinguished Educator Fellow, NOAA Office of Education – *NOAA Science on a Sphere (Ocean Topics) and NOAA Data in the Classroom*
 - Cheryl Oliver - Senior Program Advisor for NOAA Preserve America Initiative – *Gateway to NOAA*
 - Dave Doyle - Retired Chief Geodetic Surveyor, NOAA National Geodetic Survey (NGS) – *Geodesy*
- **Poster Presentations** – Teachers prepared and shared posters describing their NOAA Teacher at Sea experience and how they translated that experience for their students, colleagues, and community.
- **Tour of the Invertebrate Zoology Collections and Genetics Lab at the Smithsonian National Museum of Natural History (NMNH)** - Dr. Allen Collins presented his research and experience as a NOAA National Marine Fisheries Service (NMFS) Zoologist in the NOAA National Systemics Lab. He's also the curator for medusae and glass sponges in the Department of Invertebrate Zoology at the Smithsonian's National Museum of Natural History. Several scientists from NOAA NMFS work in the museum in a cooperative arrangement. Dr. Collins's research focuses on the evolutionary history of relatively simple animals, cnidarians (such as jellyfishes and corals), sponges, and the phylum Placozoa.

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After the presentation, he took the alumni on a tour of behind-the-scenes collections stored at NMNH in the Invertebrate Zoology Department. While on the tour, alumni had an opportunity to see a scientist prepare slides of box jellyfish sting cells in order to research how these function. They also toured a genetics lab and learned how information is collected and processed by scientists.

- **Q?rius Education Center at NMNH** is an interactive and experimental learning space that brings the unique assets of the Smithsonian's National Museum of Natural History – the science, researchers, and collections – out from behind the scenes. Visitors are invited to be an active and contributing part of this dynamic and engaging community.
- **NOAA Science on a Sphere (SOS)** is a room sized, global display system that uses computers and video projectors to display planetary data onto a six foot diameter sphere, analogous to a giant animated globe. Researchers at NOAA developed SOS as an educational tool to help illustrate Earth System science. Animated images of atmospheric storms, climate change, and ocean temperature can be shown on the sphere, which is used to explain complex environmental processes, in a way that is intuitive and captivating.
- **American Meteorological Society/Maury Project Modules** – *Measuring Sea Level from Space and Wind-Driven Ocean Circulation*. Each module was structured in the following manner:
 1. hands-on content demonstration
 2. pre-content knowledge evaluation
 3. background information power point
 4. module instruction
 5. questions and answers
 6. post-content evaluation
- **Gateway to NOAA** is a permanent exhibit on NOAA's Silver Spring Campus. The exhibit features imagery, multimedia presentations, and historic artifacts that illustrate the components and history of NOAA.
- **NOAA National Geodetic Survey (NGS)** – Dave Doyle spoke to the alumni about his experience as the chief geodetic surveyor for NOAA's National Geodetic Survey. While there, he was responsible for the development, technical design, and management of plans and programs that enhance the U.S. National Spatial Reference System. Throughout his career, he provided technical assistance in geodesy to international, federal, state, and local surveying, mapping, and GIS agencies. NGS' authoritative spatial data, models, and tools are vital for the protection and management of natural and manmade resources and support the economic prosperity and environmental health of the Nation.
- **NOAA Data in the Classroom (NODE) Project** facilitates access to an expanding collection of NOAA data by providing a set of curriculum materials, with accompanying interactive web activities, data visualizations and animations. There are currently four

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modules for grades 5-8 designed to help teachers and students use real scientific data to explore dynamic Earth processes and understand the impact of environmental events on a regional or global scale.

- **Grade Level Discussions** – Alumni met in grade level groups to discuss how to adapt workshop content for use within their curricula. They also shared ocean science projects that they've instituted, creative strategies for teaching ocean topics, and ways to overcome challenges that they face within their schools.
- **NOAA Teacher at Sea Website Resources** – Teacher at Sea staff demonstrated TAS website features and suggested ways to use them in the classroom.
- **Education Geocaching** - Geocaching is a cross-curricular activity that educators, leaders and facilitators may incorporate into their programs with great success. Geocaching involves team-building, problem-solving and other valuable educational outcomes.

Workshop Planning Team:

- Jennifer Annetta, Education Consultant - The College of Exploration/Alumni Coordinator - NOAA Teacher at Sea Program
- Emily Susko, Program Support Specialist – NOAA Teacher at Sea Program

Advisors:

- Jennifer Hammond, Director – NOAA Teacher at Sea Program
- Cheryl Oliver, Senior Program Advisor for NOAA Preserve America Initiative
- Elizabeth McMahon, Deputy Director – NOAA Teacher at Sea Program
- Rob Ostheimer, Web Developer – NOAA Teacher at Sea Program
- Peter Tuddenham, President/Executive Director - The College of Exploration
- Kristina Bishop, Vice-President/Academic Director – The College of Exploration

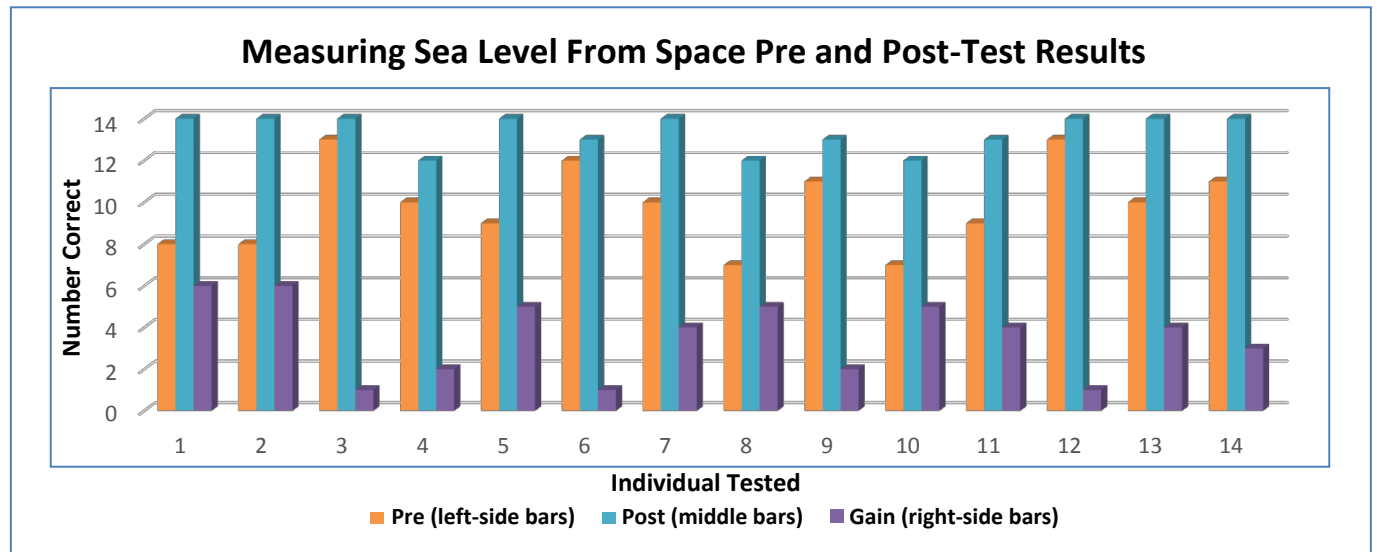
Participants:

- 17 Teacher at Sea Alumni from the Mid-Atlantic Region
- 3 NOAA Teacher at Sea Staff
- 9 speakers

Summary of Maury Project Pre and Post Content Knowledge Evaluations:

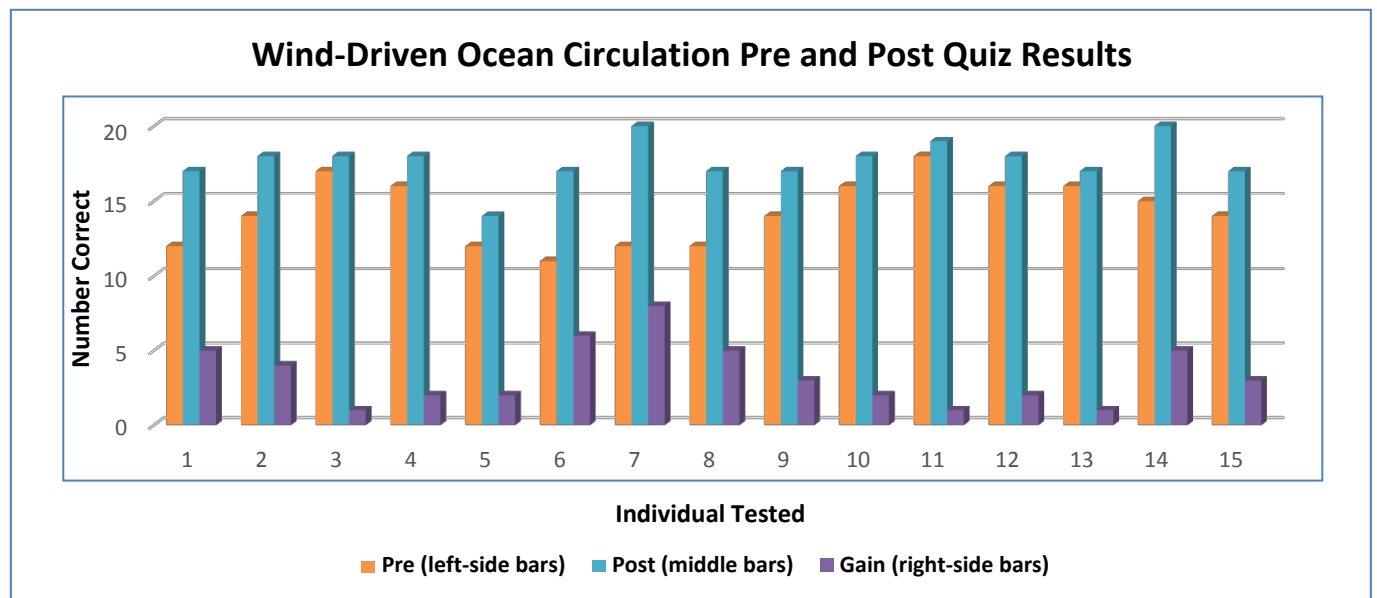
Measuring Sea Level from Space

The same pre and post-test were administered before and after module instruction. The test was comprised of fifteen multiple choice questions. Data shows that teachers had a good understanding of the module objectives prior to instruction, but still demonstrated a gain in knowledge after instruction.



Wind-Driven Ocean Circulation

The same twenty multiple choice questions were administered pre and post-instruction. Again, content knowledge was high prior to instruction, but gains were demonstrated post-instruction.



Overall Workshop Evaluation Summary:

An overall evaluation was given at the end of the workshop in order to measure how well the workshop objectives were met and to provide teacher feedback on various workshop arrangements.

A complete summary of the workshop survey responses can be found [here](#).

Highlighted comments follow:

What was the most valuable component of the workshop?

- I'm so honored and thrilled to be a NOAA TAS. I am loving all aspects of this workshop.
- I felt that the lessons and collaborations were outstanding!!!
- Networking and visits with real scientists were my favorite.
- I liked the activities that I can take back with me. I loved the activities that we did, they are applicable to my classroom.
- I love Science on a Sphere.
- Meeting with other TASA was great! I always love to hear how other teachers use their experiences in the classroom or shared with other teachers.
- "Doing" not just listening
- As a teacher inside the beltway, this workshop connected me to very local resources that I can utilize.

How do you feel the workshop could be improved?

- The Maury Project lesson plans were very valuable. I would love more targeted lessons for some of the other topics.
- More hands-on experiential learning about geodesy.
- Maybe add one module or activity targeted to elementary teachers.
- More time in the field.
- I think that the pace/content was great. I really like the idea of having two workshops – 1 in class and 1 in the field.
- More activities are always welcomed.

If you plan to incorporate content activities, and experiences into your curriculum – please explain how.

- I am going to use the info from Allen Collins during state testing review.
- My big plan is to try to get an Oceanography/Marine Biology course instituted in my high school.
- Final project for my IB Chemistry will incorporate data in the classroom as a required research component.

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- I plan to take the content about geodesy and incorporate it into fifth grade math.
- The hydroboxes are a great representation of negative numbers and a way to practice measurement and graphing.
- Use activities with students and impart information to colleagues.
- Use collection boxes as in Q?rius Learning Center as a model for how we display our natural artifacts.
- Geocaching in every class using education for each cache.
- Skype with Dr. Collins and use Q?rius online.
- Use NOAA Data in the Classroom and I'm definitely going to use Science on a Sphere.
- Maury Project activities and content in my earth science classes.
- Bringing in density currents and upwelling into chemistry class.
- I'll use the ocean acidification Science on a Sphere playlist.

How do you plan to work with NOAA scientists in the future?

- I want to initiate a science career day in my school and invite NOAA scientists.
- I'd like to take my students to Science on a Sphere.
- I would love to do research with a local NOAA scientist and involve some of my students if possible.
- I would love to contact NOAA scientists to provide staff development for teachers and to present topics to their students.
- Take tours on our local NOAA ships.
- Perhaps work with Allen Collins or other NOAA scientists to present to the kids.

Other comments:

- Outstanding workshop – looking forward to staying in touch with everyone.
- This is without a doubt the best professional development I have ever attended. I can actually use what I learned.
- I really liked the format of lecture mixed with hands-on and other movement activities.

Grade Level Group Meetings:

High School Group Summary –

- Talked about geocaching and really liked the idea of incorporating facts so that people learn something, or including clues that lead to the next cache.
- Mentioned that in high school, kids are thinking about the future, so they're interested in contacting the scientists to have them talk to their students. That can make a big impact. When students have asked professionals how they got started, they mention meeting someone influential. Great way to bring this into the classroom.
- Discussed how to incorporate ocean topics into other subjects and ways to apply topics to different science classes so it's more interdisciplinary.

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Middle School Group Summary–

- Discussed middle school connections; collaborating and bringing the subjects together in order to make interdisciplinary connections. They also talked a lot about project-based learning, a task or activity that you have to accomplish - working together as a team.

Elementary School Group Summary –

- Discussed how a lot of their colleagues are not knowledgeable in terms of content, so using the TAS website resources to help them understand content is helpful. They said that it is also beneficial to take time to develop hands-on lessons to put on the website, so that a teacher who's less comfortable with the content can pull them up quickly. They can say, hey I'm doing oceanography, and find out about the TAS program along the way.
- Mentioned limited resources and the need to find technology that helps TASA gather regularly that lets them continue to communicate without taking up too much time.

Mid-Atlantic Region Teacher at Sea Alumni Next Steps -

- A second Mid-Atlantic Workshop is planned for October, 2014. A field experience with a scientist, lesson sharing and additional NOAA speakers and resources will be the main components of the workshop.
- Alumni generated the following list of ways that the group may communicate and collaborate. These ideas will be explored and discussed further at the second workshop.
 - Private Facebook group
 - Mid-Atlantic region listserv
 - Lesson and resource exchange – virtual or in person
 - Discussion board on website
 - Online meetings, webinars