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THE ACADEMY OF NATURAL SCIENCES of DREXEL UNIVERSITY

WINS Women In Natural Sciences

UNEARTHING INTEREST IN PALEONTOLOGY FOR WINS INTERNS

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NEW JERSEY STATE MUSEUM NATURAL HISTORY

ABSTRACT

Women In Natural Sciences (WINS) is a free after-school and summer science enrichment program at the Academy of Natural Sciences of Drexel University (ANSDU) for high school girls in Philadelphia. The program strives to develop scientific competence in girls and inspire them to pursue the sciences in their academic and professional careers. WINS focuses on girls whose households may be facing financial limitations, placing a special emphasis on households headed by a single parent, grandparents, non-parent guardians, or foster parents. The "typical" WINS student is an African American girl from a single parent household with an annual family income of less than $40,000.

Since its founding in 1982, WINS has introduced over 700 girls to careers in science and other professions by providing hands-on science workshops, career and college exploration, and positive youth development. The program's mentoring and support has resulted in:

- 100% of WINS students graduating high school (compared to 60% graduation rate for the Philadelphia School District)
- 96% enrolling into college immediately after graduating (compared to 48% for the district)
- 60% go on to study in a STEM (Science, Technology, Engineering and Math) field

WINS participants are employed as either ANSDU scientific interns or as Museum Explainers. Internship opportunities are available in various departments, including the paleontology lab, ichthyology, vertebrate zoology and botany.

In the summer of 2012, four paleontology interns from the program, along with the WINS Manager, participated in a paleontological expedition with the New Jersey State Museum's Paleontology Field School based in Red Lodge, Montana. This trip provides them with an opportunity to experience many of the paleontological and scientific processes of prospecting, discovery, excavation, lab preparation and identification of the same fossils, and interpretation. WINS participants then are able to better interpret the science and their experiences to the general public and their peers, thus becoming effective mentors and role models within their communities.

WHAT IS WINS ALL ABOUT?

Women In Natural Sciences (WINS) is a free after-school and summer science enrichment program at the ANSDU for high school age girls in the School District of Philadelphia. In addition to a strong emphasis on academics and science, WINS also provides a uniquely nurturing environment, a community of like-minded friends, and experiences not typically found in school.

WINS I begins in the summer after 8th grade with eight weeks of environmental exploration in and outside of the city. During the school year, weekly workshops and monthly field trips give the interns the opportunity to be directly involved with the scientists, collections, and resources of the Academy.

Once students have successfully completed WINS I, they have the opportunity to participate in the second phase, WINS II, through the rest of their high school years. Though the program still continues to focus on science, college and career exploration and positive youth development activities provide them with a well-rounded experience.

Field trips, workshops and behind-the-scene tours by ANSDU scientists are all programmed to expose the participants to science in action. Internships with Academy scientists and with collaborating organizations are also presented to explore career opportunities while at the same time getting real life experience.

THE PALEO LAB

Fossil collecting in the field is a part of the WINS curriculum, so Paleo Lab interns begin their internship with a cursory knowledge of paleontological field work. Recent trips have included Inversand and Big Brook, both well-known Late Cretaceous fossil sites in New Jersey. They also receive basic information on dinosaurs by the lab manager, Jason Poole, as part of their lessons. Finally, they usually have had the experience of working at the "Dig" in Dino Hall.

The 4 interns work part-time in the Paleo Lab. Their status as interns, as opposed to "just volunteers," gives them a higher level of responsibility and involvement, including management of the lab, and overseeing older volunteers.

Following the 2011-2012 school year the 4 WINS Paleo lab interns joined college students, teachers, and fossil enthusiast in the Paleontology Field School in Red Lodge, Montana. The Paleontology Field School is a scientific and educational field program lead by paleontologists from the New Jersey State Museum.

The field school's first day included an orientation giving a basic summary of the region's geology, paleontology, and local history, as well as information on the specific sites we were visiting. The next day four days were spent searching, collecting, and excavating fossils in different sites, all which had been previously visited by the field school's team. They had the opportunity to:

- Prospect and collect fossils from the hillsides with Expedition Leader Dave Parris. Right away they learned that most fossils found are bits and pieces that will need to be put together at a later date, or tiny bits that can easily be overlooked.

- Descend the steep 600' Dumbbell Hill (and then climb at the end of the day!) to prospect and collect fossils. We were forewarned about this site, telling us it was like "Mordor" since it is hot with no shade and it has a steep ½ mile decent. Once at the bottom we found many fossils, spending the day collecting surface float.
- Collect amber high on a steep mountain slope. After realizing that a couple of the WINS where afraid of heights, we settled them in a lower area, while others went up to the site of a dormant *T. rex* excavation. Not much *T. rex* left, but they did find some of the biggest pieces of amber the group had ever collected there. Also, in the site we all got to see a fossilized log over 70 million years old!

- Work trying to get the fossils out of the hard rock layer. After a lot of work involving rock saws, hammers and chisels, the group was able to get out a long bone, interesting fragments and several teeth, one of which is probably the largest tooth they have found in that site - a large carnivorous dinosaur tooth.
- Jacket a fossil in place. The WINS went to work with the others on the ankylosaur skull material - the more they worked, the more they found. Since there wasn't enough time to properly excavate the specimen, it was decided to leave it in place for next season. The group went to work top-jacketing the fossil and then covering it with soil and rock to protect it from people and the elements.

WHAT DID THE GIRLS GET OUT OF THIS EXPERIENCE?

- A better understanding of what they had been working on in the lab. Getting to work on a real excavation and participating in field work gave them a new perspective on their work. They got the opportunity to see the process from the beginning: prospecting for fossils, jacketing, transporting them, etc. Then they get to open the same jackets and prepare those fossils once they arrive in the lab; all lab activities are conducted and interpreted before the public. Priya remarked "it was interesting to be on the other side of what we usually do in the lab, since we had to prepare fossils in the field for later work in the lab."
- Whether or not they like paleontology. Maranda writes: "While I sat there collecting fossil fragments under the hot sun, I realized something - this was not for me and I did not want to study paleontology…. Because of all the hard work we did, I have gained more respect for the study of paleontology."
- Paleontology requires knowledge in many disciplines – the group had lessons at night to supplement the work being done at night. We had lessons on geology, history and anatomy, which helped in understanding the fossils and the surroundings. In the field we also had "mini-lessons" whenever something interesting was found or even about the site itself.

- Patience and perseverance - they found out that fossils are not easy to find and that it requires a lot of preparation and knowledge to do it right. Breanna mentioned that she learned patience and the value of process. She considers it a positive experience because "I got to meet new people, learn about a specific field of science, do field work, and share my enthusiasm of paleontology with visitors of the Academy."
- Team work and communications are essential. Everyone that participated worked in every aspect of the dig: carrying equipment, jacketing, prospecting, etc. The importance of communication was driven home when one of the participants had to be taken to the hospital. Within minutes of the incident, even though we were in different sites, the team got together and was able to mobilize quickly.

CONCLUSIONS

Internships are important for high school students whether they are in their expected field of study or a new opportunity. An internship at this age is much more than learning a science skill, it is also about mentorship. Mentors at any age are important, but teenagers need to have responsible adults that they can count on. As Jasmin wrote in her review, "what I liked most about my internship was that no matter when or where, at the drop of a hat Jason was there to help me understand anything I didn't quite get. He made learning fun while teaching me how to be a leader and manage a work place as a responsible adult."

In our experience with the WINS, it has opened their eyes to new possibilities even if they decide that it is not what they will be doing in the future. The skill set they acquire during the internships translates to other fields.

In addition the interns are getting numerous intangible benefits. One of the WINS who interned for 3 years said: "This experience was so positive because it helped to guide a path for my future. Without it I wouldn't have known what I want to accomplish and who I want to be in my upcoming years. It has taught me useful techniques like public speaking skills, how to work towards something that you really want and no matter where you come from you can always educate yourself and change your situation if you want to."

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