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Astro Restoration Project (ARP) Lesson Plans

This summer I worked on developing interdisciplinary lesson plans, aimed at fifth through eighth grades levels for the Astro Restoration Project exhibit of the Astro Payload at the US Space and Rocket Center museum in Huntsville, Alabama. These telescopes are currently on display in Huntsville, but will eventually be on display at the Udvar-Hazy Center, a Smithsonian Museum in Washington, D. C. The goal behind this project was to address the shortcomings in K-12 STEM education by utilizing a interdisciplinary approach that conjoins elements of physics, social studies, fine arts, and English language arts. This provides a more engaging learning experience for students, even those who may not come to the lessons with a deep interest in STEM. Another goal of the project was to provide students the opportunity to see scientists as more than just white men, those traditionally highly represented in STEM careers. When students see people who look like them in various roles, they are more likely to see a much greater range of possibilities for themselves. These lesson plans will eventually be made available on-line and in-person to visitors, as well as to teachers everywhere to use in their classrooms.

Prior to beginning the process of creating lesson plans, I was advised by my committee to spend some time researching the Astro Payload. By doing this I was able to learn more about the Astro Payload itself and in turn make more effective, detailed lesson plans. I spent the first three weeks researching the telescopes, the people behind the project, and the Astro Restoration Project. During the fourth week I was able to travel to Huntsville, Alabama to go visit the US Space and Rocket Center and see the ARP exhibit in person. I was able to see the Wisconsin

Ultraviolet Photo Polarimeter Experiment (WUPPE) telescope and the Optical Sensor Package. I was also able to watch the ARP team restore the handrails on to the Payload. After I returned, my last four weeks of research were dedicated to lesson planning.

I created four lesson plans, all of which focused on a different aspect of the Astro Payload. The first lesson plan I created was about students building/creating their own telescope. The main objectives of this lesson plan were for students to be able to construct a telescope of their own creation and/or a replica model of the telescopes that flew on the Astro Payload (HUT, WUPPE, UIT) and also for students to be able to learn what a telescope is/how it works. The second lesson plan was about the structure of the universe and galaxies. The main objectives of this lesson plan was for students to be able to label and describe structures within the universe, and understand the varying levels of brightness of different celestial objects. The third lesson plan was about the electromagnetic spectrum. The objectives behind this lesson plan were for students to be able to see how everyday objects produce waves that define the electromagnetic spectrum and also see/learn that some of the waves are visible, while others are not. And the fourth lesson plan was about creating a historical timeline and learning about the people behind the project. The objectives behind this lesson plan is for students to be able to name and identify the people involved in the Astro Payload and be able to write historically accurate summaries of the events that took place on a certain date/time frame.

Through working on this project, I was able to better understand the process of transferring informal learning to formal learning, so in other words, transfer museum exhibit learning into classroom learning. I was also able to better my lesson planning skills which is an important skill for me with my goals of becoming an educator. I was able to create closer connections with my advisors, and I learned a lot from them as a result. It is my hope, as well as

the hope of my committee and the Astro Restoration Project team, that this project will become a hand-off project to another student, and it will continue to develop and grow through the various creative hands of many others. I also plan to present my research and lesson plans at Elkin Isaac this upcoming spring and also begin testing my lesson plans with local school districts. Overall, this summer has been an amazing experience for me, and I have learned so much and will continue to utilize everything I have learned through this project with me for the rest of my educational career. I would like to extend my immense gratitude, appreciation, and thanks to the Bethune Fellows Student Research Endowment for giving me the opportunity and allowing me to pursue this research project. Thank you, thank you, thank you!