NORTHWEST EARTH AND SPACE SCIENCES PIPELINE

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2018 NESSP STEM Educator Summits

In the United States, the demand for a skilled workforce in science, technology, engineering, and mathematics (STEM) fields exceeds the number of prepared students. Paradoxically, the lack of representation of underserved students such as those living in rural areas, immigrants, English language learners, students with low socioeconomic status, those with disabilities, and students from diverse minorities area usually underrepresented in STEM areas, reduces the diversity in the US workforce and negatively impacts American economy.

The Northwest Earth and Space Sciences Pipeline (NESSP) gives students and teachers in the Pacific Northwest access to innovative and informative educational materials that engage student interest in STEM. Our goal is to strengthen the STEM education by providing cultural sensitive content that responds to the unique needs of various types of learners. In this sense, NESSP adheres to the principles of equity, inclusion, and quality education, by creating programs and opportunities to support continuous improvement in teaching and learning of 21st century skills and prepare more students for educational and career success in STEM areas by meeting their diverse needs.

The 2018 NESSP STEM Educator Summits are designed to promote more inclusive and equity-minded programs to transform STEM education and make it accessible to underserved and underrepresented students. This summit applies a co-creation model to first, understand education access gaps, and then develop methods for creating culturally relevant STEM activities, which leverage NASA Science, to engage and successfully prepare underserved students for high wage and high demand careers through academic excellence. Issues to be addressed during this summit include integrative, cross-disciplinary, and culturally responsive STEM teaching and learning practices that recognizes and creatively uses the students' experiences and cultural capital; inclusive programs designed to broadening participation in STEM; practices to advance hands-on learning; and introduction to NASA opportunities through NESSP. One of the main goals is to help educators recognize the assets and funds of knowledge present in their students to better prepare relevant material that will allow students to connect science to their everyday lives.

During the 2018 NESSP STEM Educator Summit, educators will be able to participate in group discussions, workshops, and hands-on activities designed in accordance with National Science Education Standards (NGSS) and guided by experienced educators and scientists. They will also be able to listen to relevant key speakers and interact with other members of different underserved communities. These activities have been designed to provide a strong background in science and to complement existing educational resources.

Through the different sessions, participants will:

- Become familiar with NASA Missions and content

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- Interact with NASA experts and other scientist coming from underserved and/or underrepresented communities
- Examine how equity and social justice principles relate to STEM education
- Explore, learn, and implement hands-on and inquiry-based activities
- Exchange ideas, experiences, and best practices with other educators who work with underserved communities
- Make meaningful connections between STEM contents and students' life experiences
- Incorporate the engineering design and science inquiry cycles in hands-on activities that can be replicated back in the classroom
- Learn about tools used in developing cultural proficiency that will help them to better engage with their students.
- Discover how to better connect curricular STEM topics, with standards as well as with effective STEM teaching & learning strategies.
- Access to material and opportunities to organize STEM summer camps back in their communities.

Throughout the planned activities sessions, participants will get familiarized with NASA Missions and contents, as well as with the lessons designed for this year summer camps around three main areas:

A. Rockets and exploration of the solar system

The development of new technologies is taking space exploration to a new level. In a couple of decades, the first human colonies in the Moon and Mars are expected to be established. As a way to connect new generations to this trend, in this summer camp participants will explore the physics principles that support the design of technology used in the exploration of the solar system in NASA missions. The objective is that teachers participate in hands-on activities to faciltate their understanding of what is an appropriate learning progression to engage students in learning about rockets and space exploration.

NGSS: MS-ESS1-3, MS-PS2-2, MS-ETS1-2, MS-ETS1-4, HS-PS2-1, HS-PS2-3, HSP-PS3-3

B. Robotics and surface exploration

Using LEGO MINDSTORMS EV3® and Arduino basic electronic sets, participants will be able to apply the engineering design process by building and learning to program automated vehicles able to tackle challenges, while exploring the exciting worlds of robotics and engineering. The objective is that teachers learn and apply the engineering design process in the creation of the of missions to explore other planets.

NGSS: MS-ETS1-2, MS-ETS1-4; HS-PS3-3

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C. Environmental Sciences and remote sensing

Through the application of principles of earth sciences and technology, will learn how to plan missions, collect data, and integrate Global Positioning Systems (GPS) and Geospatial Information Systems (GIS) technologies as part of environment assessments. The objective is that teachers develop a system thinking by examining the interdependent structures of dynamic ecospheres at different scales using technological tools.

NGSS: MS-ESS2-5, MS-ESS3-5; HS-PS3-3