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Lower School Staff Development Proposal Integration of STEM with Global Perspective

Why Was This Topic Chosen?

Justification

Over the past year, King School has undergone changes in leadership in several areas. With the changes in leadership, came conceptual changes about the way that we deliver education to our students. Our early elementary program has shifted to a Reggio Emilia approach while our Grades 1, 2, 3, 4 and 5 are taking a cross-departmental project-based approach. Because science is taught as a special, most of the classroom teachers do not teach any science in the classroom. While I try to offer resources and support to help extend the classroom curriculum to include project-based STEM activities, teachers can look at these activities as extra work rather than extensions to help build deeper understanding. My goal as the STEM Specialist and Global Studies Curriculum Committee Co-Chair is to offer support and resources to the classroom teachers so that they have a better understanding of how the integration of Science, Technology, Engineering, Math and Global Studies can give our students a more meaningful global perspective and begin to prepare them to become responsible global citizens.

The Council of Chief State School Officers and the Asia Society define Global competence as, “The capacity and disposition to understand and act on issues of global significance.” (Mansilla, V. B., & Jackson, A., 2011)

Focus Group

I propose a one-day professional development opportunity to take place in early April for 37 lower school classroom teachers and specialists from Grades PK-5 who teach to 140 lower school students. The program will be delivered in order to familiarize general education teachers with STEM and NASA resources that they can use in planning and developing integrated project-based activities that focus on geographic regions and economic, political, legal, ecological, and cultural interconnectedness. The program will be presented in King’s Lower School Maker Space in two, three-hour sessions: (i) 8:30 AM-11:30 AM, and (ii) 12:30 PM – 3:30 PM. Teachers will have access to computers, ipads and smart boards.

NASA assets and/or content & STEM concepts

Next year the Lower School will be focusing a region of the world. As an example for this PGD I will use North Africa. Specifically, I will focus on Egypt and use it as an example for all grades, PK-5. I will introduce a topic that may be covered while studying Egypt. I will introduce resources and STEM activities all related to water usage and global water crisis.

Grades PK and K: Properties of water

Resources:

<https://www.jpl.nasa.gov/edu/teach/activity/ocean-world-earth-globe-to-ss-game/>,

<https://www.jpl.nasa.gov/edu/teach/activity/global-warming-demonstration/>

Grade 1: Build on properties of water and water cycle

Resources: <https://pmm.nasa.gov/education/videos/earths-water-cycle>

<https://www.jpl.nasa.gov/edu/teach/activity/precipitation-towers-modeling-weather-data/>

Grade 2: Understanding world's water supply and water pollution activities

Resources: <https://www.nasa.gov/content/esd-freshwater-availability>,

<https://svs.gsfc.nasa.gov/12950>,

Grade 3: Global water crisis and personal water usage chart activity and conservation plan building desalination filters

Resource:

<https://www.jpl.nasa.gov/edu/teach/activity/tracking-water-using-nasa-satellite-data/>

https://pmm.nasa.gov/education/sites/default/files/lesson_plan_files/water%20conservation/Water%20Conservation%20TG.pdf

Grade 4: Understanding and building Aquifers

Resources:

<https://www.nasa.gov/jpl/grace/study-third-of-big-groundwater-basins-in-distress>,

Grade 5: Understanding and Building Water Filters

Resources:

<https://www.jpl.nasa.gov/edu/teach/activity/water-filtration-challenge/>,

<https://earthdata.nasa.gov/earth-observation-data/near-real-time/hazards-and-disasters/drought>

Standards Addressed

4-ESS3-1, MS-ESS3-5,

K-ESS3-3 ,HS-ESS2-4 ,4-ESS2-2 ,5-ESS2-1 ,MS-LS2-1 ,MS-ESS3-1 ,MS-ESS3-2 ,MS-ESS3-3 ,MS-ESS3-4 ,2-ESS2-3 ,2-ESS2-2 ,5-ESS2-2 ,ESS2.C, ESS2.D, ETS2.A, ETS2.B, K-ESS2-1, 3-ESS2-1, 3-ESS2-2, 5-ESS2-1

Survey Information and Data Collection

The pre-survey will be created using survey monkey. The survey will be designed in part to solicit information from classroom teachers regarding:

- understanding of STEM education
- manipulatives or resources currently used to teach global education
- project-based learning already incorporated within classroom instruction
- examples of cross-departmental collaboration
- degree of comfort with technology

There will be a post-survey that asks similar questions to gauge any changes and will include questions about the likelihood of using real-world phenomena and NASA resources to guide the global education program. As the STEM Coordinator and Global Education Committee Co-Chair, a part of my job in the coming years will be to push into the classrooms to help assist the development and implementation of these lessons, activities and programs, which will culminate in a lower school global education STEM museum where students and teachers showcase what they have learned about a particular region of the world.

Outcomes and Expectations

The lessons and activities created will enhance or replace traditional social studies curriculums, which typically culminate in research fairs. Teachers will learn how to support student use of the engineering design process to create integrated STEM projects that focus on a region of the world or culture with a particular emphasis on-issues of global significance.-

I believe this staff development workshop will help us meet the following goals:

Short Term Goals

- Familiarize the classroom teachers and specialists with a sampling of resources and opportunities to build meaningful STEM Global Education projects.
- Fulfill King Lower School's goals by creating more experiential learning with real-world applications.
- Establish strong professional relationships between classroom teachers and specialists.

Long Term Goals

- Dispel misconceptions about STEM. [Again, if you decide to include NGSS, you can point out that NGSS is the product of decades of education research on how students learn science.]

- Create a template for future Global education and STEM projects that includes the classroom teacher-specialist collaboration.
- Use developed projects as a representation of student understanding.

Examples

After the staff development workshop, teachers will:

- Walk away with an example of an integrated STEM-Global Education lesson plan that has been enhanced using real-world phenomena and resources that have been introduced through NASA's Endeavor program.
- Build a model to represent the focus of the sample lesson.
- Develop an enhanced collaborative relationship with specialist and a familiarity with available resources.