

Climate Change- Incorporating Current & Real-Time Data

Professional Development

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A. Reason for selecting this topic

It was June 1, 2017, when President Donald Trump announced that the United States would cease all participation in the 2015 Paris Agreement on climate change mitigation. This statement shook me and created a new found enthusiasm in me for teaching my students about the impacts of climate change. To teach this somewhat sensitive topic though, I feel that data needs to be at the forefront of each lesson. Both quantitative and qualitative data are imperative in helping students both see and feel a connection to the changes happening on the Earth due to climate change.

B. Integration of NASA assets/content from Endeavor courses

During the professional development session on climate change, I will be sharing the SPRINTT (Student Polar Research with IPY National and International Teacher Training) curriculum with my colleagues and showing them how they can further enhance these materials with NASA resources such as:

1. Changes in sea ice over last 40 years (simulation)
<https://climate.nasa.gov/vital-signs/arctic-sea-ice/>
2. NASA Summer Arctic Sea Ice Extent simulation and Glacier Modeling
<https://www.nasa.gov/feature/goddard/2017/end-of-summer-arctic-sea-ice-extent-is-eighth-lowest-on-record>
3. Sea level simulator found at
<https://climate.nasa.gov/news/2660/take-the-drivers-seat-on-sea-level-science/>.
4. Global Climate Change: Vital Signs of the Planet
<https://climate.nasa.gov/resources/education/>
5. NASA's app Earth Now- Real time data

C. Proposed Audience

My proposed audience is the Science department in my school, which includes 6th, 7th, and 8th grade Science teachers as well as our special educators who support our teaching. I also plan to invite our STEM teaching coach and our STEM supervisor. This will total approximately fifteen people. The aforementioned teachers reach about 1100 students.

D. STEM Concepts/Learning Goals and Standards

The professional development session I will be holding will address climate change content such as a clear understanding of the concepts under the climate change umbrella (global warming, sea level rise, ice mass loss, shifts in flower/plant blooming, and extreme weather events), first hand testimony from those dealing with the repercussions of climate change on a daily basis, and several examples of ways to incorporate STEM based labs into our teaching of climate change.

NGSS Standards:

1. **MS-ESS3-5.** Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.
2. **HS-ESS3-6.** Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity
3. **HS-ESS3-5.** Analyze geoscience data and the results from global climate models to make an evidence-based forecast of the current rate of global or regional climate change and associated future impacts to Earth systems
4. **HS-ESS3-1.** Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity.

E. How and where to carry out PD

I look forward to implementing the PD during our Science department meeting in March. The session will be one hour long. The staff attending my PD will have access to computers to try out the simulations and explore the SPRINTT curriculum resources.

F. Pre-survey and Post-survey questions

“Roughly three in four middle and high school science teachers are discussing recent global warming in their classes, but there is no cumulative curriculum for children,” Plutzer said in a recent Q&A that appears in the Penn State Research Matters blog. “So teachers are likely to cover the basics, but not go far enough to help students develop a solid scientific understanding,” (Penn State News, February 12, 2016; Eric Plutzer, Penn State Professor of Political Science).

A recent nationwide survey of 1500 teachers yielded surprising results as stated above so I plan on asking my colleagues to complete a pre-survey questionnaire about their comfort level when teaching climate change content. In our district, climate change is taught at the 8th grade level for a few weeks and not again in other coursework in either the middle school or the high school with the exception of a few elective courses that reach a small portion of our student population. I am still developing the pre and post survey questions but I plan to inquire about their own educational level of climate change, feelings on the

importance of teaching climate change, comfort level when teaching climate change content, interest in the topic, and knowledge of available resources.

In my post survey questionnaire I plan to again ask my colleagues for their comfort level after having learned and tried some of the resources available to them, inquire about how they feel that they could incorporate any of the resources and if so, which ones, and where in their curriculum they could see any of the resources fitting.

G. Outcomes/Expectations hoping to see for our educators

By providing this professional development I hope to foster a more collaborative and comfortable environment when discussing and teaching climate change with the Science educators in our middle school. There are many interdisciplinary opportunities when teaching climate change so another hope I have is for other disciplines to get involved in the teaching of this vitally important issue.

H. Follow up with teachers

Each week we meet as Science PLC's so I plan to follow up with the grade level PLC's during the weeks after the PD to see if any of my colleagues have tried out the NASA applications or the SPRINTT curriculum. I will make myself available during the fall as well, when my colleagues teach some of the content area related to climate change such as weather and climate (first unit taught during the school year at the 6th grade level).

I. Data Collection Methods To Be Used

I will be presenting a pre-survey to our teachers via email to solicit how they feel about implementing full STEM lessons and what areas they feel most comfortable teaching as well as those they feel least comfortable teaching (Science, Math, Engineering, and Technology). Being Science teachers, I feel that, in general, we are comfortable incorporating STEM lessons into our teaching but from my own experience, we don't on a regular basis due to curriculum and material constraints. I will also be surveying our STEM coach and our STEM supervisor and asking them a different set of questions focusing on their view of the importance of our Science department teaching climate change.

A post-survey will be given to each participant at the end of the PD session to determine how my department views the resources presented to them and how they may hopefully use them in their classrooms.

I work closely with our STEM coach on an after school competitive Science club so I will also be interviewing her to see how she feels the PD I present can be made available to more of the STEM department.