

Professional Development: Data integration For More Meaningful 3D STEM: Use National Oceanic and Atmospheric Administration's (NOAA) National Centers for Environmental Information (NCEI) and the National Weather Service (NWS) to assist students graphing and analyzing data.

I selected my topic due to a variety of factors. First, our current curriculum asks teachers of third grade science to integrate data into lessons on weather and climate utilizing the source under the title to explore local weather data. However, they neglect to detail exactly how to get local data or navigate the NCEI and NWS data portals. Additionally, in my class Methods of STEM we learned about the importance of data integration as it relates to the nature of science. Finally, I have heard teachers in my district express concern over the gaps in the curriculum creating needs for additional support to assist students in being successful in achieving mastery on their state standardized tests. While the nature of science, inquiry learning, and overall goal of STEM education is not success as measured on a standardized test, I believe the integration of data, how to graph and analyze data, and write a scientific statement about said data will go a long way in assisting students achievement on the state standardized tests. I suspect teachers are skipping this lesson or portions of the lesson to eliminate the analysis of the data because they either fear or do not clearly understand what they are intended to be teaching students about data analysis and integration.

My professional development will integrate NASA assets I learned about in several of my Endeavor courses, in particular, Methods in STEM where we discussed integrating data in our lessons utilizing NASA organizations for more meaningful STEM connections with a focus on the nature of science. Teachers will learn how navigate the NCEI and NWS websites to obtain local weather data for a month focusing on maximum recorded temperature, minimum recorded temperature, and precipitation. Teachers will show students how to extrapolate the data and create a bar graph to be analyzed. The

purpose of this activity is to prepare students for creating their own data sets from which they will extrapolate data and turn said data into a bar graph for analyzation learning the work of meteorologists while doing the work of meteorologists. Teachers need to have practice doing the same work while also learning how to teach interpretation of data sets to students. It is my suspicion many teachers skip this portion of the lesson or inappropriately implement the lesson because of a lack of knowledge or fear of working with data sets. The understanding of how to work with data sets and extrapolate the data directly correlates to items on the Louisiana Education Assessment Program (LEAP) the Louisiana state standardized test. Many of our students fail these items on the LEAP because they fail to understand how to properly work with the information provided. Additionally, integrating data analyzation into science lessons implements three-dimensional teaching addressing science and engineering practices while also focusing on mathematical practices and learning about weather and climate.

My proposed audience will be third grade science teachers. I will likely be provided an opportunity to present to the one other third grade teacher at my school to begin and then provided opportunity to expand the professional development to other teachers in the district. I and the one other third grade science teacher provide education for approximately 120 students. I am also going through state content leader training as well and will be presenting professional development on three-dimensional teaching later in the school year. District wide we have 27 schools with several hundred third grade students. Hurricane Ida has put a halt on content leader training. When we resume, I will be afforded a larger audience to which I can offer my professional development about data integration and three-dimensional teaching. Our planning time is one hour; however, understanding needs for time to conduct a pre and post survey along with need to provide time to ask and answer questions I will plan for my professional development to last one-half hour. Recruitment of my audience will be done by simply obtaining permission to present during collaboration. For a district wide professional development, I will obtain permission from district personnel to send an email invitation as well as add my professional development to the PD portal for teachers to sign up on one of the districts designated PD days.

I will address the following NGSS Performance Expectation:



"Unless otherwise specified, "descriptions" referenced in the evidence statements could include but are not limited to written, oral, pictorial, and kinesthetic descriptions.

3-ESS2-1 Earth's Systems		
Students who demonstrate understanding can: 3-ESS2-1. Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season. [Clarification Statement: Examples of data could include average temperature, precipitation, and wind direction.] [Assessment Boundary: Assessment of graphical displays is limited to pictographs and bar graphs. Assessment does not include climate change.]		
<small>The performance expectation above was developed using the following elements from the NRC document <i>A Framework for K-12 Science Education</i>:</small>		
Science and Engineering Practices Analyzing and Interpreting Data Analyzing data in 3–5 builds on K–2 experiences and progresses to introducing quantitative approaches to collecting data and conducting multiple trials of qualitative observations. When possible and feasible, digital tools should be used. <ul style="list-style-type: none"> Represent data in tables and various graphical displays (bar graphs and pictographs) to reveal patterns that indicate relationships. 	Disciplinary Core Ideas ESS2.D: Weather and Climate <ul style="list-style-type: none"> Scientists record patterns of the weather across different times and areas so that they can make predictions about what kind of weather might happen next. 	Crosscutting Concepts Patterns <ul style="list-style-type: none"> Patterns of change can be used to make predictions.

My

surveys

will ask questions such as “How comfortable are you working with data sets?”, “Have you used the NOAA, NCEI, and NWS before?”, “Do you know what three-dimensional teaching is and how to use it to teach science practices?” and “How often do you skip or briefly address representing data in tables and graphical displays to be analyzed?”. I hope by the end of my professional development teachers will not only be more familiar with using and understanding data sets but understand how integrating data into science lessons addresses each of the three dimensions in the chosen third grade performance standard. Following the professional development, I will send out an additional survey asking about implementation of data integration. Myself and the other third grade science teacher at my school will be able to discuss the implementation of data integration in our next collaboration. I would like to also ask teachers to collect student work for analysis or perhaps a quiz following the lesson. Since we are still working as a district to implement the curriculum, developing ways to collect and analyze data about student achievement, I will have some freedom in designing a quiz to be given to students following the lesson’s implementation. I would like to propose to the district a way to conduct forums at individual schools to discuss the successes and struggles with implementation of the lesson.