

Engaging Context Data Integration

The data that I chose to use for my context is from the “My NASA Data” website from the Earth System Data Explorer. There were three data sets from this website that I want my students to utilize by cross referencing the data to arrive at a conclusion. The data set titles are: Vegetation, Soil Moisture, and Monthly Daytime Temperature at Different Heights in the Atmosphere.

The data I chose will enhance the NGSS standard of, “Support an argument that plants get the materials they need for growth chiefly from air and water.” I believe that using data for this particular standard is important as the performance task is asking that the students support an argument, which will require the use of data to support their thoughts and ideas. I think that these three data sets, when used together, will enhance my teaching of this topic because it will allow me to focus on the big picture of global vegetation and plant growth instead of only what one plant needs to grow. I think this will also allow students to see the connection between precipitation and plant growth and have them arrive at the conclusion that water is one of the key factors in plant growth. I can address new objectives with this data set by then using it to have students classify biomes based on their amount of vegetation, soil moisture, and temperature. This will allow students to then begin discussing how these factors relate to the transfer of energy within an ecosystem. I can also bring up the concept of interdependency and cycles of matter within an ecosystem as all of this data allows for plant and animal life to rely on each other and the nonliving factors of their environment for survival. From here, I can also connect these ideas from ecosystems to our next unit of study on earth as a system itself and the various spheres that interact within the system. This changes the way I teach this subject because previously, we were tracking the growth of individual plants, but this allows for students to see the big picture of plant growth as well. Rather than only having data that relates to one type of plant, they can get the big picture of how precipitation and air temperature affect plant growth. There are various related topics to this data set and I believe that allowing them to cross reference the data will make for an even more engaging learning experience.

My opinion of using data in the classroom is that it is essential for scientific thinking. As stated in the article, *Using Phenomena in NGSS- Designed Lesson and Units*, “The goal of building knowledge in science is to develop general ideas, based on evidence, that can explain and predict phenomena.” By using data in the classroom, it allows teachers to spark ideas and questions in the students about the world around them. Through guided inquiry students are then able to see how this data connects to scientific ideas and practices. Students can then formulate their own arguments about the topic, citing this data to help support their thinking and ideas. *Using Phenomena in NGSS- Designed Lesson and Units* also states, “Students who come to see how science ideas can help explain and model phenomena related to compelling real-world situations learn to appreciate the social relevance of science.” This connects to the importance in the use of data in the science

classroom because having students make observations and collect data about the world around them leads to student driven discussions and arguments. Science is nothing without the notion of collaboration and the challenging of each other's ideas. The use and collection of data also gives students proof in scientific facts that they wouldn't have if they were just asked to memorize a concept. Because students are either collecting information or given meaningful information it gives them an engaging experience that they will carry with them beyond that one unit of study. Data is an essential aspect to encouraging an inquiry-based science approach that allows for students to engage in true scientific thinking.

The rationale I have for choosing this data set is that it gives the students a picture of the world, causing them to think about life outside of their community. It also connects to earth's systems as it gives a clear picture of the differences in vegetation, precipitation, and temperature across the globe. When I have previously taught earth science, I have done so in the siloed approach of teaching ecosystem and earth's systems in their own respective units without making many connections between the two of them. With the use of this data set, I can see myself incorporating more cross-cutting concepts between these two earth science units.

A way in which this data can be utilized to integrate across STEM content areas is to have students use the data to aid in an engineering design problem. After having the students familiarize themselves with this data, I would assign them each a region to focus on and have their challenge be to design a that region (or biome) in a box. I would give them constraints for their design such as the volume their box had to be as well as how many plants they would need to fit within the box. I would have them use this data set to figure out how much vegetation is in their region as well as how moist the soil would need to be within in their box. From there, they would need to decide how they would artificially create the correct temperature within the box. They would also need to understand both the standard that plants need air and water for growth as well as the movement of matter within an environment. After having the students plan out and sketch their designs, I would have them create a 3-D model on either scratch or google draw. This way they could be sure the volume of their box was up to the constraint given at the beginning of the challenge. By having the students study scientific data, use technology to finalize their design and conduct research, design the biome in a box, and use mathematical reasoning to fit their design within the constraints; they would have a full integrated experience.

Data Resources:

https://mydasdata.larc.nasa.gov/EarthSystemLAS/UI.vm#panelHeaderHidden=false;ifferences=false;autoContour=false;xCATID=C2440DB71EEA11F37B4B4BAE13BE3D75;xDSID=vegetation;varid=LAI_average-id-6f895e6efa;imageSize=auto;over=xy;compute=Nonetoken;tlo=15-Jan-2001%2000:00;thi=15-Jan-2001%2000:00;catid=C2440DB71EEA11F37B4B4BAE13BE3D75;dsid=vegetation;va

[rid=LAI_average-id-6f895e6efa;avarcount=0;xlo=-180;xhi=180;ylo=-90;yhi=90;operation_id=Plot_2D_XY_zoom;view=xy](#)

[https://mydasdata.larc.nasa.gov/EarthSystemLAS/UI.vm#panelHeaderHidden=false;ifferences=false;autoContour=false;xCATID=49488D07F9E2537C4EA784BCDFBC0E2E;xDSID=soil_moisture;varid=soilw-id-70637cbe91;imageSize=auto;over=xy;compute=Nonetoken;tlo=01-Jan-1948%2000:00;thi=01-Jan-1948%2000:00;catid=49488D07F9E2537C4EA784BCDFBC0E2E;dsid=soil_moisture;varid=soilw-id-70637cbe91;avarcount=0;xlo=-179.75;xhi=179.75;ylo=-89.75;yhi=89.75;operation_id=Plot_2D_XY_zoom;view=xy](#)

[https://mydasdata.larc.nasa.gov/EarthSystemLAS/UI.vm#panelHeaderHidden=false;ifferences=false;autoContour=false;xCATID=2EAD26A8FB68374598062CB08E77D5DE;xDSID=atmos_temp;varid=Temperature_A-id-bb8ac7d55e;imageSize=auto;over=xy;compute=Nonetoken;zlo=1000;zhi=1000;tlo=01-Sep-2002%2000:00;thi=01-Sep-2002%2000:00;catid=2EAD26A8FB68374598062CB08E77D5DE;dsid=atmos_temp;varid=Temperature_A-id-bb8ac7d55e;avarcount=0;xlo=-180;xhi=180;ylo=-90;yhi=90;operation_id=Plot_2D_XY_zoom;view=xy](#)