2016 Science Curriculum Report

Multicultural Aspect

We spend a good amount of time talking about the history of science and how different theories were discovered by scientists from all over the world including a lot of European scientists throughout the history of our world. We also talk about the importance of using consistent units in scientific measurements when doing experiments and inquiry type learning. In order for scientists to all communicating in what consistent language they have created the SI unit of measurements as well as other terminology in order to ensure that scientists across our globe as well as industries can all be using the same terminology and speaking the same language. We also provide opportunities through our communication with parents and school resources to ensure that students who due to their home life are provided the same opportunities and resources to learn.

What do we want students to learn?

All courses are based on covering the Nebraska State Science Standards. We also are attempting to make sure that students are prepared to take the state NeSA test as well as ACT and SAT exams. We also work very hard to incorporate important life skills that students will need, specifically critical thinking skills, problem solving skills, independent creative thinking processes, and the ability to collaborate and work with others, things that carry over into any field or career that a student may choose beyond their secondary and even college educational experiences. We try to do this by using hands on learning in a lab setting. Allowing students to work in groups to create experimental design and come up with solutions to problems such as in a forensic classes. Learn about different systems within organisms through dissections that may take place in a biology or anatomy physiology class or looking at how states of matter and types of matter interact in our world through chemistry experiments.

We have continued to implement new thoughts and ideas with regards to labs, how we assess our students and what we do with data from our assessments. Through our PLC process we have worked to update our curriculum and ensure that there are no gaps and all of the state standards are being covered through our different courses. We have also discussed how we are going to adjust with students who may not be taking certain courses and opting to take other options to ensure that they are still getting the proper information needed.

As a department we continue to focus a collaborative smart goal of improving the lower quartile of our students in their classroom performance as well as on their NeSA test results. We hope to improve the scoring of our students and get our lower 25% of students to perform at proficiency on their NeSA test. This was something that our school had observed as an area for improvement, getting our lower quartile of students to perform better and have more success in school. To summarize:

- The smart goal for each teacher in the science department was to focus on improving student performance among our lowest quartile (25%) of students in each grade level. For juniors this is measured based on their performance in class but more specifically on their NeSA performance.

How do we know students are learning?

Students are given unit assessments as well as semester final exams in order to measure student performance. Another tool to measure student performance would be NeSA performance in which last year we were at 88% proficiency in the 8th grade and 93% proficiency in the high school both of which were well above state averages. We are able to achieve these high scores through the work that we do on a day to day basis and how we check for learning with our students. We utilize for instance homework quizzes and lab quizzes in chemistry and physical science in order to give small snapshots and check for learning sequences within a chapter to ensure students are getting the material before giving a test. There is also a lot of open questioning, lab work observation, collaboration, question and answer sessions, reviews and handing in of assignments. We will continue to strive for better performances, an ideal 100% proficiency in our NeSA testing and better overall classroom performance.

One of the main ways we have looked at improving instruction and continuing to grow as teachers and a department is working within our PLC groups to improve instruction and identify student performance through data collection. We have developed ways of collecting and analyzing data for assessments in order for us to identify standards in which our students collectively may be performing well on, or struggling with. This allows us to improve, develop and evolve our methods and delivery of instruction as well as possibly go back and revisit concepts that students have demonstrated a poor understanding of. I am copying an example of some data gathered for a unit test in chemistry and can explain how this data is used.

How do we respond when students are not learning?

We have multiple methods of intervention to help students when they are not learning. One of the many great strengths of our school is that we do not allow many students to slip through the cracks and provide them every opportunity to learn material and grow their understanding of concepts across all curriculum. We utilize the after school and lunch GRIP program in which students are referred if they are missing work, needing to make up assignments or having issues with subjects. We also provide times for one on one help before school, after school and throughout the course of the day. Another way we help students learn is through differentiation by providing students with different forms of delivery of information. We may use powerpoint, hands on learning, putting students in groups or pairs, labs and online activities. We also keep parent logs and contact parents when students may be struggling or falling behind in classes. These are multiple ways to ensure that students are given every opportunity possible to be successful.

How do we extend or enrich the learning for students who exceed proficiency?

This year we offered an online physics course through a college which two students took advantage of. We provide a chemistry II and Biology II course for students to get some more knowledge and information based on a potential interest of studying this fields or related fields in their post-secondary education. We have also utilized student groups to help students collaborate pairing higher level students with lower level ones in which the higher level student teaches or assists the lower performing student. This is beneficial for both parties as it allows the lower performing student a different angle to learn and allows the higher performing student to get deeper into the material due to the need to teach to the other. There are also some independent projects and activities for students to do once they have finished the class work or assignments.

Other information

This is the first year offering any science course online through a college and that could be a starting point for future opportunities to do this. We have restructured our staff this year in order to meet the needs of our students with Mr. Manka helping out with physics so that Mrs. Horner could teach some health courses to our students. This moved Mr. O'Connor to teaching freshman Physical Science. We also continue to look at possibilities of restructuring some of the curriculum to best serve our students and to make sure that there are no gaps in which students are missing out on concepts. We continue to look for ways to get more hands on in our learning and have looked into bringing in different substances such as liquid nitrogen to demonstrate behavior of particle and states of matter. We continued to purchase new substances within budget to ultimately develop a two week hands on chemistry lab project referred to as qualitative analysis in which students work independently for two weeks to identify unknown substances. We also continue to evolve with our forensic science curriculum.