



**Tri-State
Consortium**

Eastchester Union Free School District

Tri-State Consortium Consultancy: K-8 Science

November 3-5, 2021

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K-8 Science Consultancy

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The Consortium: Mission

“The Tri-State Consortium is an alliance of public school districts committed to systems thinking and collaborative inquiry as pathways toward continuous improvement. Working together as colleagues and critical friends, we apply the standards of the Tri-State model to benchmark member districts' progress in advancing teaching and learning. Consortium members support each other through external peer review of programs and practices, study groups, conferences and topic-based seminars designed to deepen professional learning.”

The Charge as Presented by Assistant Superintendent Wynne and Superintendent Glass:

“You (the members of the Tri-State team) are visiting as “critical friends” at a pivotal time in our work with science. For the past five years, we have been incrementally implementing the Science 21 program at our K-4 level, as well as completing critical professional and curricular development around the NGSS at our 6-8 level. In addition, our Technology teachers have played a critical role in assisting with the infusion of technology, engineering and STEM-related practices into our overall curriculum. At this time, we have decided to limit the scope of our visit to K-8 as our 9-12 program is truly just beginning their work in preparation for NGSS. We have many questions as we begin to reflect on our work thus far and look to the future development of the program. We are asking for your insight and feedback on where we are as a system based on two essential questions for the visit.”

Essential Questions:

- 1. To what extent are the core elements of the Next Generation Science Standards (NGSS) being implemented in grades K-8 in the EUFSD?**
 - a. To what extent are the students in grades K-8 immersed in NGSS science and engineering practices?
 - i. Ask questions and define problems
 - ii. Engage in argument from evidence
 - iii. Analyze and interpret data

- iv. Construct explanations and design solutions
- v. Develop and use models
- vi. Plan and carry out investigations
- b. To what extent are the NGSS present and represented in written curriculum, student tasks, work products/experiences, and physical learning environments in K-8 classrooms?

2. To what extent is the *Science 21* program being implemented with fidelity and meeting the needs of providing a robust science program, aligned to the NGSS, at the K-4 level?

The district work will also be examined through the lens of
Tri-State indicator #4- Curriculum and Instruction:

Teachers and administrators collaborate to develop an articulated and aligned curriculum designed to ensure optimal student results. When making curricular and instructional decisions, teachers and administrators consider current research and evidence of student performance from multiple sources. In their planning, teachers purposefully select and differentiate strategies and resources that advance the learning of all students.

The Approach

- It must be noted that this visit took place just ten weeks into the 2021-22 school year as the nation and the district were still in the throes of responding to the COVID pandemic. The previous 18 months of teaching and learning had been a mix of remote, hybrid and in-person models, social distancing and mask wearing were still being practiced in the classrooms and schools, students had not had the “full complement” of typical science instruction in the last two school years, and teachers’ professional learning had also been remote-based or paused. Additionally, the district leadership team included a new district Supervisor of STEM as well as new school leaders. However, even with those factors in play, the district was fully prepared to move forward with the work of preparing students and staff to meet the NGSS.

- The twelve members of the visiting team spent two full days in Waverly, Anne Hutchinson, Greenvale, and Eastchester Middle School observing in K-8 classrooms, interviewing teachers and administrators, and engaging with focus groups of students in grades 6-8. They also met with high school faculty representatives of the science department. Throughout all interactions with staff and students, visiting team members were collecting evidence of instructional practices, systemic planning, professional learning, resources, use of time, and institutional structures that support and promote the Next Generation Science Standards in K-8 and the implementation of the *Science 21* program in grades K-4. Team members were also noting where there might be gaps, needs for further support, or the possibility of improved coherence across grade levels and/or schools. All of the observations were discussed among team members, summarized, and then “tested” in a consultancy protocol with school and district administrators. The team verbally shared questions and recommendations for the district’s consideration and potential actions. A summary of the team’s observations and recommendations for district consideration and planning follows.

Commendations

Essential Question 1

- In all schools, students expressed an interest in inquiry-based science and an appreciation for hands-on science investigation.
- Many teachers across all grade levels embraced the opportunity to teach science and noted the interest and joy that students experience when conducting hands-on work.
- The use of NGSS vocabulary was noted in classrooms across the district.
- Posters, resources, and tools that support the language and processes of the NGSS were evident throughout classrooms.

- The first three units of grade 7 science are NGSS aligned.
- 7th grade teachers give common assessments and students actively design the questions, models, and procedures of inquiry-based lessons.
- Summer of 2021: 3 PD days were given at specific grade levels to immerse in NGSS and reframe units.
- The MS 6th and 7th grade teachers have common time for collaboration and grades 6th-8th are moving toward solid curricular alignment.
- A 6th grade classroom is an exemplar of NGSS integration and application.. Use it as a model for other grade levels.
- There are elementary teachers who are very good at posing good design thinking questions and can be a great resource and guide for colleagues.
- 5th grade teachers are designing their curriculum and it is NGSS based and highly engaging.
- MS worked with a consultant to unpack the standards and sequence their curriculum.
- The STEM classes at the elementary schools are designed around NGSS.
- The 6th grade STEM Exploration course is well designed and very much appreciated by the 20% of students who get to experience it.
- Teachers have a strong desire for the grade 2-5 schools to collaborate to ensure alignment and to share the best of their work.
- The Greenvale principal has experience using Science 21; principals and the Supervisor of STEM are aligned in their understanding of and dedication to the integration of NGSS standards.
- Teachers note that the district is generous with summer money for collaboration and curriculum design and that enables them to develop comfort with and expertise in the science units.

- The Supervisor of STEM and principals are collaborating to create a clear vision of NGSS integration at all grade levels.

Essential Question 2

- BOCES training for *Science 21* has been provided for all teachers on a grade-by-grade rollout (although delayed by COVID factors and changed to online delivery format).
- There is evidence of teachers working hard to adapt the *Science 21* units to students' background knowledge and vocabulary and to generate excitement about the units.
- Resources are adequate if not plentiful across the grade levels.
- There were many examples of high levels of student engagement in Science 21, STEM, and fifth grade lessons that aligned with NGSS.

Suggestions for Consideration/Action

Essential Question 1

- Consider using the *Science Inquiry Indicators Checklist* to design units of study and as an observation tool.
- Think and plan systemically to deepen K-12 alignment of NGSS and to capture and build capacity around current exemplars across the district.
- Engage staff in *unpacking and understanding* NGSS with focus on students:
 - Asking questions and defining problems
 - Engaging in argument from evidence
 - Analyzing and interpreting data
 - Constructing explanations
 - Developing and using models
 - Planning and carrying out investigations

- Consider using technology to share models of exemplary work across the district (video archives, science newsletters, living curriculum documents).
- Consider ways to promote and support collaboration between 8th and 9th grade science teachers.
- Support more opportunity for collaboration at the elementary level both vertically and horizontally, as well as between schools, for the purpose of lesson design in a “learn, apply, reflect” continuous cycle.
- Consider having the 6th grade teachers work with their MS colleagues to design NGSS based curriculum.
- To strengthen the implementation of NGSS and insure the vertical spiraling of the standards, consider ways to promote collaboration between 8th grade teachers and the HS teachers.
- Consider changing the schedule to a cycle instead of days of the week as students are missing classes for snow days, days off, etc.
- Clearly define the role of the K-12 Supervisor of STEM and who partners with her to get the work done.
 - Math lead at the elementary level
 - Science lead at the elementary level
 - STEM lead at the elementary level
 - Literacy lead at the elementary level
 - STEM lead at the MS/HS
- Clarify the Supervisor of STEM’s role for everyone in the district and ensure that she has the authority across departments and schools to advance the NGSS work.
- Employ the *Back to the Future Protocol* for planning next steps. “IF we do this well, what will our schools look like in 5 years?”
 - What will you see kids doing?
 - What will you see teachers doing?
 - How will it be different from today?
 - Then, once you can describe what you want to look like in 5 years, backward plan, determine what that dictates/ means for year 1?

- Plan for grades 7-12 science teachers to accelerate their adoption of NGSS and to prepare for the change in the Regents.
- Use common language around NGSS K-12 among staff and students.
- Bring the STEM teachers into the domain and supervision of the Supervisor of STEM.
- Align hands-on inquiry based work in the Middle School across the grade level teams. Students expressed great interest in the hands- on work but noted differences in access to it across teams.
- Consider ways to expand 6th grade STEM Exploration to reach more, most, or all students (currently at the 20% level).
- Earth science at the 8th grade level might benefit from collaboration time for the teachers; define clear criteria for entry to and exit of the course; and design a more inquiry- based approach than the Regents labs provide.
- Create a plan to inform parents about the upcoming changes in Regents and changes in the science curriculum.
- Prepare administrators who are evaluating teachers to know what they are looking for in the classrooms and to be very familiar with the NGSS.
- Frequently use these questions as a district lens: Are all students getting an equitable science experience? If not, who are the students who are not benefitting from the science program and what needs to happen to engage them?
- Utilize the lesson study approach for professional learning.
- Build capacity around the understanding of all three integrated dimensions: Disciplinary Core Ideas; Science and Engineering Principles; and Cross Cutting Concepts. Place early emphasis on the Cross Cutting Concepts so that teachers and students have those as a solid foundation.
- Build capacity and cross-pollination of ideas with the formation of a K-12 Science Advisory Committee or Council. Systemic questions such as who is expected to

use the NGSS in their classrooms (i.e., art, music, phys. ed.) could be addressed as well as the creation of a vision statement for K-12 science.

Essential Question 2

- Consider a science specialist for the elementary schools to coach, support, and guide the elementary science program (not to replace the classroom teachers' instruction of science).
- Consider having a lab room for 3rd, 4th and 5th grade so classes are in a science environment and materials are organized.
- Provide time for teachers to streamline the very dense curriculum of *Science 21*. Teachers find the full set of materials and the lesson units to be too dense, especially for the time allotted for science instruction. Analyze the length of units with the allotted time in the daily/weekly instructional schedules; make determinations about how many units should be taught each year and which ones. (Focus on the colored pages, not the supplements) When teachers have time to unpack the lessons and make focused choices for instruction, they see their lessons are more efficient and effective.
- Consider ways for secondary teachers to work with elementary teachers to share content knowledge and for the HS to see how elementary teachers incorporate inquiry and discovery into their lessons.
- Supplement the BOCES on-line learning for teachers. The online-instruction is shorter and less interactive than in-person BOCES training was pre-pandemic; teachers might benefit from time together after the core training sessions.
- Use summer curriculum hours to unpack all of the units so that teachers are prepared for instruction during the school year and work from the same curriculum.
- Be consistent across elementary grade levels and schools with the use of *Science 21* informational notices to parents at the start of each unit in order to engage families in students' learning.

- Continue the work recently started between the two grades 2-5 schools to align the science curriculum horizontally and vertically; even Middle School students noted the differences in their science experiences between their elementary schools.
- Select consistent supplemental materials that are supported by the district: Mystery Science?, former units from Foss and Delta?, etc.
- Align report card standards with program and instruction/NGSS.
- The Science 21 pacing calendar is challenging; examine its feasibility and make informed decisions about quantity of units, length of units and time in the schedule.

Advancing the Work

As EUFSD considers and weighs the commendations, questions, and considerations put forth by the visiting team, member districts of the Tri-States Consortium that are also using *Science 21* and aligning K-12 teaching and learning with the NGSS can be an invaluable resource.

Appreciation

Members of the visiting Tri-State team are especially grateful for Eastchester Union Free School District's planning, warm hospitality, and most importantly, its sincere and professional quest to continually grow in its educational practice and service to students. It was a privilege to be in Eastchester's classrooms, to see fine educators in action, and to engage with such energetic, thoughtful, kind, and intellectually curious students.