K-12 SCIENCE PROGRAM EVALUATION

2021-2022

Brighton CENTRAL SCHOOLS

K-12 Science Program Evaluation Committee

THANK YOU to our science committee members!		
Parents/BOE	Teachers/Admin	
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Introduction

Program evaluation is a means of accessing and organizing information about student achievement and the role current curriculum and instructional practices play in supporting that achievement, the results of which play a key role in evaluating the effectiveness of a school. As a learning community concerned with continuous improvement, Brighton Central School District utilizes its program evaluation process to establish the impact of its instructional practices on the overall development of its students. More than an audit, the evaluation uses pertinent data to assess the ongoing efforts to improve student learning. Every five years educators representing a specific content area evaluate that area for grades K-12 to gain a comprehensive view of the district-wide scholastic program. In addition to the ongoing annual reviews at individual grade levels, this in-depth study helps the district in its continued efforts to improve instruction. The data used in this evaluative process reveal areas of success as well as areas in need of attention.

The current Science program evaluation was initiated in the summer of 2021 and began with a review of the district led evaluation in 2016. Committee members felt that reviewing this previous work and updating the goals for the current program to meet state standards and expectations would result in the most comprehensive evaluation but still represent the work that was done previously. As with most evaluations, two separate dimensions were reviewed; the expectations for student achievement and the capacity of the organization to support the teachers who teach science. Due to the COVID-19 pandemic, student learning was disrupted for two years, and traditional assessments were not given to students. For this reason, many student data points that may have typically been accessed and helpful in defining goals were not available.

Process

The evaluation design was created with two objectives in mind:

1.) To evaluate the extent to which Brighton students achieve the goals of the K-12 Science program and meet local, state, and national standards.
2.) To evaluate the extent to which the district supports student achievement through curriculum development, instructional practices, and assessment alignment.

Defining Program Goals and Outcomes for Student Achievement

During its initial meeting the committee focused on defining the overall goals for the work for the school year. These goals stemmed from a review of previous work as well as input from all stakeholders involved in the program evaluation.

Science Program Evaluation Goals:

1. To capture what curriculum and concepts are taught at each grade level K-12.
2. To develop an understanding of teacher awareness of New York State Science Learning Standards (NYSSLS) implementation.
3. To complete a gap analysis of Brighton's current state in comparison to full implementation of NYSSLS.
4. To develop a culturally responsive method for students to communicate the scientific method.
5. To review student data to determine who is enrolled in each class (acceleration, etc.) and consider pathways for opportunities and possible roadblocks.

Defining Data Sets

Once each of the goals were defined, decisions were made concerning which data elements would be the best measures for each of the areas. As stated earlier, it was the intent of the evaluation team to collect data from a variety of sources to better support any conclusions and subsequent recommendations that were developed. In addition to multiple data sets, the team also looked at multiple data types. Drawing from the work of Bernhardt (2004) and others, data reflected four main types: demographic, perception, achievement, and process data. These data were both quantitative and qualitative in nature and were thought to thoroughly measure the indicators identified for each dimension. The following data sets were utilized during this evaluation.

1. Surveys
    - Teachers
2. BHS Course data
    - All Science classes for 9th -12th broken down by demographics - ELL, Gender, Race, IEP, 504, AIS. Also, the same for 8th graders taking Earth Science Regents class

Data findings as organized by goals

To capture what curriculum and concepts are taught at each grade level K-12.

- Review Smithsonian curriculum and 6-12 curriculum.
- Question 5 – Kindergarten teachers: What science topics do you teach through the year?
    1. Animal and plant needs, weather, forces and motion, seasons
- Question 6 – Are you using the Smithsonian kits?
    1. Primarily yes
- Question 7 for 1st-5th – Are you covering any additional topics?
    1. Top answers – animals and weather
- Question 14, If you teach AP classes, in addition to the AP curriculum, do you teach any additional topics?
    1. Top answers – everyone is different.
    2. All AP classes teach extra content post AP exam – is this aligned? Is there a need for this to be aligned or defined? Possible goal for future work?

- Question 15, If you teach Regents classes, in addition to the Regents curriculum, do you teach any additional topics?
    1. Observation from responses – some Regents classes teach outside the curriculum. Is there a need for alignment? Possible goal for future work?

To develop an understanding of teacher awareness of NYSSLS implementation.

- Question 12 – For 6-12 teachers, please review the New Vision for Science Education. What excites you about the new vision? What concerns you?
    1. Excites (top answers): Hands on, open-ended discussions, modeling, constructing explanations
    2. Concerns (top answers): Assessment alignment, less content covered, time and classroom management
    3. There were MORE responses about what excites teachers and fewer concerns listed.
- Question 17 – How would you describe your current state with respect to the NYS Science Learning Standards (NYSSLS)? This is on a scale of 1 (low) to 5 (high).

K-5	6-12
30% 2 or lower 70% 3 or higher	20% 2 or lower 80% 3 or higher 60% 4 or higher

- Question 18 - As your knowledge of NYSSLE has grown over the past years, you may have noticed shift in your teaching practices, beliefs, or both. Describe any changes to your teaching philosophy or practice?

K-5 (highlighted most common responses)	6-12
Internalize practices More choice in how they learn/show learning More mindful of allowing kids to discover Allowing students to be more hands-on More discussion/claims and evidence Building in discourse	Less lecture Fewer tests More collaborative learning More student-centered questions Implemented more arguing w/evidence Learn from activities Introduce topics with more phenomenon and interconnected themes More centered on using curriculum to achieve skills (rather than just learning facts) Doing more

Ask students/discourse Make a claim	Shift to more modeling Encourage kids to explore and learn by doing (so much better) Less memorization/more application

To complete a gap analysis of Brighton's current state in comparison to full implementation of NYSSLS.

- Question 8 1st-5th – While implementing the Smithsonian Science Kits – is there anything that you did not have time to get into that you would like?
    1. Top answers -we need more training, time.
- Question 9 K-5th – What do you think you need further education and training with?
    1. Top answers – Professional development, mystery science, resources, and materials, 4 units is too much
- Question 10 6th and 8th – Do you have a preset curriculum that you follow?
    1. 75% responded yes, 25% responded no (this is 7th grade, and they are working on a curriculum). This should be a possible goal.
- Question 13 – For 6-12 teachers, which would be the most helpful to prepare for full implementation of NYSSLS and new assessments.
    1. Top answers – Summer team time to plan units, practice writing and scoring NYSSLA assessments.

To develop a culturally responsive method for students to communicate the scientific method.

- Question 19 – what is your current state regarding culturally responsive science education? Scale 1 (Uncomfortable) to 5 (comfortable)
    1. 30% at 2 or lower, 70% 3 or higher
- Question 20 – Which of the following culturally responsive practices <u>are you implementing</u> in your science classroom?
    1. Top answers:
        1. Small group/Individualized modeling of phenomena
        2. Whole group consensus modeling of phenomena
        3. Explanation/model checklists
        4. Elicit student ideas and explanations of phenomena continuously (students create explanations using the data they observe)
- Question 21 – Which of the following culturally responsive practices <u>are you interested in learning more about</u> in your science classroom?
    1. Top answers:
        1. Incorporate cutting edge science/current events in unit design
        2. Partner with non-science fields
        3. Interview experts
        4. Engage with citizen science
        5. Invite and recognize multiple ways of knowing science
- Questions 22 – In what ways are you implementing culturally responsive education in your science classroom
    1. *Top answers K-5*: Small group, background knowledge, voice and choice in sharing, peer collaboration in experiments, modeling
    2. *Top answers 6-12:* increased time to hear all perspectives, student voice, asking questions, common experiences for all first, background knowledge

- Question 23 – In what ways do you ask students to demonstrate their understanding, including formative and summative assessments?

k-5	6-12
Posters Projects Exit tickets Discussion/discourse Videos Science notebooks	With words, pictures, and actions Draw models of their new understandings Lab write ups Projects Graphing Modeling Lab reports Tests Quizzes Discussions Evidence-based writing

Recommendations

1. Develop a vertical curriculum map defining curriculum, concepts, and skills at each grade level kindergarten through grade 12.
    a. Clearly defined curriculum concepts and practices for kindergarten
    b. First through fifth grade science curriculum: Prioritization of Smithsonian Science kits
        i. Survey teachers regarding kits and what is used/not used, etc.
    c. After creation of a curriculum map, align science practices to curriculum map
2. Increase teacher understanding of New York State Science Learning Standards (NYSSLS).
    a. Timeline of what has already occurred and what to needs to come for training
    b. Practice writing and scoring new assessments; review sample questions
    c. Continued opportunities for professional development around 3-D teaching
3. Define and implement Culturally Responsive and Sustaining Education practices and Habits of Mind specific to science teaching and learning.
    a. Create a resource for science teachers that categorizes CRSE instructional practices that can be used in science classrooms
4. Review student data to consider pathways to science opportunities and possible roadblocks.

Limitations

One of the primary limitations of this science program evaluation was noted in the lack of standardized data sets. Due to the COVID-19 pandemic, student learning was disrupted for two years, and traditional assessments were not given to students. For this reason, many student data points that may have typically been accessed and helpful in defining goals were not available.

References

Bernhardt, V. (2004) Data analysis for continuous school improvement. Eye on Education. Larchmount, NY.