



**Murrysville Community
Library**

**Librarian/Volunteer
and Student Surveys
for Murrysville
Community Library's
CCSS/NGSS Pilot for
Summer Reading Club**

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Introduction

Murrysville Community Library's (MCL) CCSS/NGSS Pilot for Summer Reading Club introduces Common Core State Standards (CCSS) in mathematics and Next Generation Science Standards (NGSS) into annual children's Summer Reading Club (SRC) programming. The two-year pilot included professional development and workshops in the summers of 2014 and 2015. The project emphasizes "foundational skills necessary to master reading," with a special focus on incorporating mathematics and science, generally for grade levels K-8.

The central purpose of the project is to train and guide library administrators, staff, volunteers, and 3rd party providers in math/science content and pedagogy. The project seeks to enrich library capacity and demonstrate and provide math and science learning continuity and sustainability for students between academic sessions, during out-of-school summer months, all embedded in a SRC reading enrichment experience. The Math & Science (MSC) Collaborative of Western PA, which provides services for 138 public school districts and non-public schools and is a comprehensive and award-winning organization for advancement of K-12 STEM learning, provided training. The MSC has developed a complex array of training for teachers, administrators, and institutions of education, which will be revised specifically for this project.

Survey Design

Murrysville Community Library contracted with the Collaborative for Evaluation and Assessment Capacity (CEAC) to evaluate the impact of the 2014-2015 CCSS/NGSS Pilot for Summer Reading Club program. Two surveys were constructed for students and librarians to examine the effect of the program on the students and the training participants, particularly with regard to how their familiarity and understanding of mathematics and science concepts progressed. Survey responses for multiple-choice questions addressed following evaluation questions:

- *Do participating library staff, volunteers, and/or third parties develop or extend their knowledge and understanding of STEM content and learning engagement strategies?*
- *Do participating library staff, volunteers, and/or third parties develop or extend their application of STEM content and learning engagement strategies?*
- *Do child and adolescent learners engage with STEM concepts and processes in their involvement in the Summer Reading Club and/or their use of the library during summer months?*
- *Do child and adolescent learners report more positive perceptions of and attitudes toward STEM concepts and processes as a result of their involvement in the Summer Reading Club and/or their use of the library during summer months?*

Key Findings

Key Findings for the Training Participants

- Roughly half (67%, n=10) of the training participant respondents had received prior professional development in math or science.
- As a result of the math and science professional development, almost all responses (85.7%, n=12) indicated that the training participants better understood how children thought about math and science.
- A large majority of responses (85.7%, n=12) indicated that the training participants felt more confident in their ability to select more appropriate resources to improve children's knowledge of math and science.
- All responses indicated that the training participants could better help students to appreciate the value in learning math and science.

Key Findings for the Students

- Gender and grade level seemed to have no impact on the students' enjoyment of the program, nor their interest in science.
- A large majority of respondents (65%, n=52) had participated in library programs before.
- Almost all responding participants (81%, n=63) reported that they believed the summer reading programs at the library helped to get them ready for school.
- 68% of students (n=55) said that they believed that librarians were good sources of information, but only 56% (n=31) of those students said they would actually go to the library for information.
- Girls were more interested in mathematics as a result of the program overall, while boys were more interested in science.
- Half of the students (n=41) stated that they would use the library more to learn about science as a result of participating in the *Superheroes!* summer reading program.

Training Participant Survey

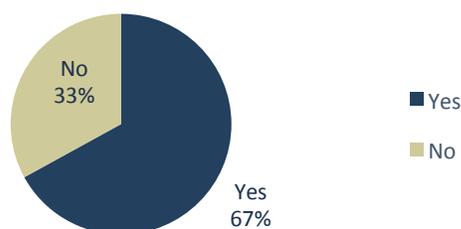
Respondent Characteristics for Training Participants

An e-mail containing a link to the survey was sent to 34 training participants. Sixteen training participants responded to the survey (68%) and 15 respondents actually completed the entire survey. Of the 15 respondents, 14 (93%) were female, and 1 (7%) was male. All of the respondents identified themselves as “white” with origins in any of the original peoples of Europe, the Middle East, or North Africa. Fourteen of the respondents (93%) listed having completed a Master’s Degree or a higher level of formal education. When asked to choose the areas of undergraduate concentration, respondents chose some form of education most often (53%) as an area of major, while the fields of mathematics and science were only chosen three times (20%). Of the respondents who cited completing coursework beyond the Bachelor’s degree, 38% completed their coursework in a STEM field. Of those who completed a degree in library science, 80% focused on school library education, and 1 person listed no specific specialization. Forty percent (n=6) of respondents identified themselves as either librarian or children’s librarian. The remainder of the respondents included 5 volunteers, 2 library directors, and 2 board members. Most of the librarians (67%, n=4) had worked in the library for 10 or more years, and 67% (n=4) of the librarians stated that they devoted more than 50% of their time to K-8 programs and services.

Sixty-Seven percent of respondents (n=10) answered that they had received prior professional development in math or science (Figure 1). Of the ten respondents, experiences with math and science varied greatly. 3 people responded that they had received their professional development experience with the Math & Science Collaborative last summer. Others had taken education classes in math or science or even completed a graduate degree in a STEM field.

Figure 1: Prior Professional Development Experience in Mathematics and Science

Training Participants' Prior Professional Development Experience in Math and Science



Portions of Carol Dweck’s Mindset Quiz were incorporated into a selection of five preliminary questions to test the reception of the staff and volunteers to the mathematics and science professional development they experienced. These questions were geared toward the examination of the staff’s opinions of the malleability of children’s intelligence, talent, and understanding of mathematical and scientific concepts. Of the 14 respondents who answered the questions, 10 (71%) respondents disagreed with the idea that *one cannot change his basic intelligence*, and 11 (79%) respondents argued

that it was possible to *change even the basic level of talent*. Additionally, 11 respondents (79%) disagreed with the idea that, “*not all children had the potential to become mathematically competent.*”

Analysis Overview and Findings for Training Participants

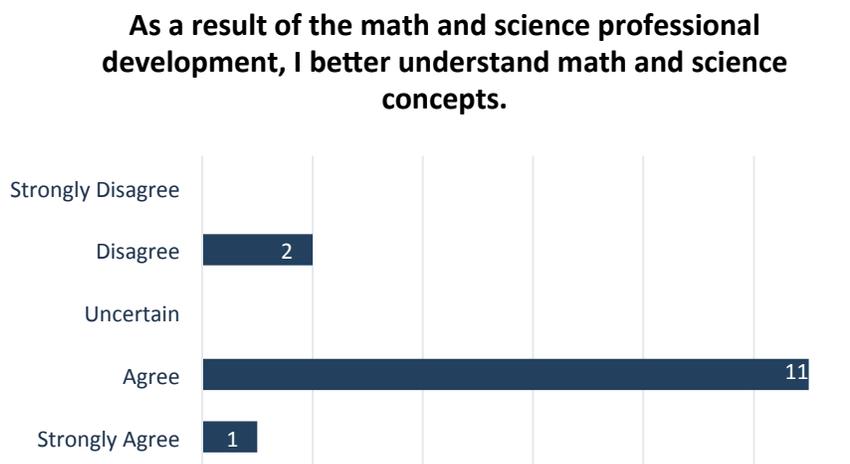
In analyzing the data, basic descriptive statistics were used for scaled questions. Qualitative analysis strategies were conducted on the open-ended questions of the survey. Many of the open-ended questions elicited a wide range of answers, as is evidenced in the statistics and findings below. In forming the report, survey items and responses were organized based on the following evaluation questions:

- *Do participating library staff, volunteers, and/or third parties develop or extend their knowledge and understanding of STEM content and learning engagement strategies?*
- *Do participating library staff, volunteers, and/or third parties develop or extend their application of STEM content and learning engagement strategies?*

Do participating library staff, volunteers, and/or third parties develop or extend their knowledge and understanding of STEM content and learning engagement strategies?

As with the 2014 survey, the majority of the survey was geared toward the assessment of the improvement of training participants’ understanding of mathematics and science and how to teach young students various STEM concepts through the use of the Summer Reading Club. When asked about the training participants’ understanding of mathematics and science, 12 respondents (86%) agreed or strongly agreed that the professional development programs helped them to better comprehend STEM content, and 12 respondents (86%) stated they better understood how children think about mathematics and science. The majority of respondents (86%, n=12) also indicated that they felt more confident in their ability to provide math and science programming at the library in the future. Furthermore, those who did not believe that the training improved their understanding of STEM concepts were those with already strong foundations – those with graduate experience in a STEM area – and those who did not respond with an increased understanding of how to teach STEM concepts to children were those with STEM teaching experience. These positive responses indicate a second year of success of the professional development program in educating the training participants in STEM content.

Figure 2: Effect on the Training Participants’ Understanding of Math and Science Concepts (Post-Professional Development)

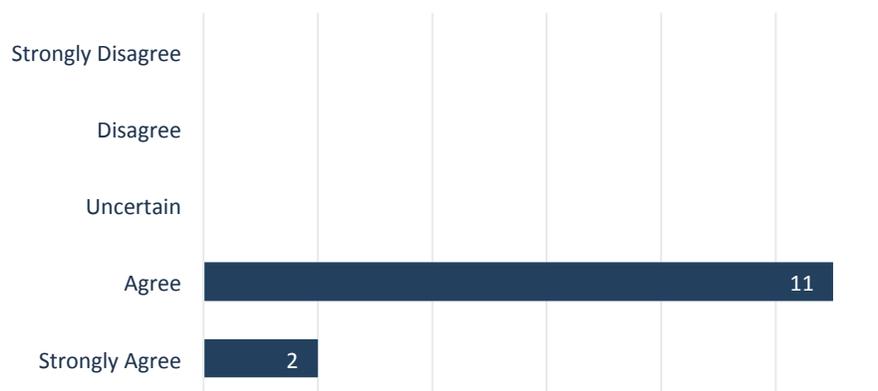


Do participating library staff, volunteers, and/or third parties develop or extend their application of STEM content and learning engagement strategies?

The majority of the questions in the primary evaluation were centered on the training participants' comfort level with the application of their knowledge of STEM content. The professional development program was intended to teach the training participants how to educate young children in basic mathematics and sciences content. After attending the professional development experience, 13 respondents (93%) indicated that they were more confident in their ability to further children's math and science knowledge through appropriate resources, and the majority of respondents (79%, n=11) believed that they were better able to answer students' questions about various STEM concepts. 13 respondents (93%) indicated that they believed they could now better assist families in helping their children learn and understand math and science. Moreover, 13 respondents (93%) stated that they could better help children appreciate the value of learning mathematics and science as a result of the program. Operating under the assumption that the training participants used the knowledge and application base they learned in the course of the professional development program and will continue to use this knowledge in the future, the PD program was indeed successful in developing respondents' application of STEM content and learning engagement strategies.

Figure 3. Effect on Training Participants' Confidence in Helping Children to Appreciate STEM Concepts

As a result of the math and science professional development, I can better help children appreciate the value of math and science.



A complete list of the library staff and volunteers' responses are available in the appendix at the end of this report. The majority of responses indicated that the collaboration, hands-on projects and experiences, and especially tie-ins to literature improved respondents' understanding and application of STEM content. Some respondents indicated that there was either too much lecture or too much repetition. One respondent indicated that it was difficult to attend because the times of the PD workshops made it difficult for her family life because of when school buses run. Overall, approximately a third of the respondents (36%, n=4 of 11) had no complaints with the professional development program and were entirely pleased with the education they received.

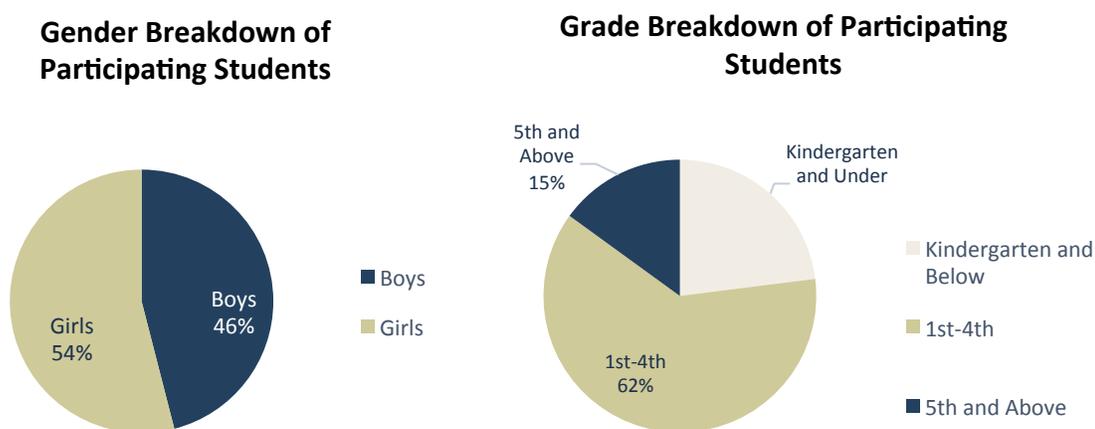
Student Survey

Respondent Characteristics for Students

An e-mail containing a link to the survey was sent to the librarians of each participating library. They were instructed to forward the survey link to all participants of the *Superheroes!* summer reading program. Of 81 survey respondents, 37 identified as boys and 44 as girls. There was a fairly equal distribution among grades for younger children, 19 Kindergarten and younger and 50 between 1st and 4th grades, but only 12 students 5th grade and above completed the survey. The majority of the respondents (55%, n=42) indicated they attended Ligonier Valley Library and 40% (n=31) of respondents indicated Murrysville Community Library, 5% indicated Adams Memorial Library, and 1 respondent indicated New Florence Library.

When asked what the students enjoyed learning about, 39 of 81 students responded with an interest in math, science, or both. Girls expressed more of an interest in math, while boys expressed more of an interest in science. 65% (n=53) of respondents stated that they were interested in reading about animals, with science claiming fourth place (51%, n=31). Other popular answers included music, sports, technology, reading and writing, and people. When asked what the respondents did during their summer vacation, 72% of participants (n=58) reported that they visited the library during the summer, and 64% (n=52) reported that they read over the summer. Other popular answers included going on vacation, visiting family, swimming, and playing with friends.

Figures 4 and 5: Student Characteristics



Of the 81 respondents, 47 (77%) reported participating in a summer reading club program previously. The majority of these respondents (52%, n=42) signed up for the program themselves, 22 respondents (27%) kept track of the books they read, and 54% of participants (n=44) attended a library program or activity. However, 18 respondents (22%) cited reading enough to win a prize.

Analysis Overview and Findings for Students

In analyzing the data, basic descriptive statistics were used for scaled questions. Due to the wide grade range of the students, participants were grouped into three age groups – Kindergarten and below, 1st through 4th graders, and 5th graders and up. The primary evaluation of the survey was geared toward the

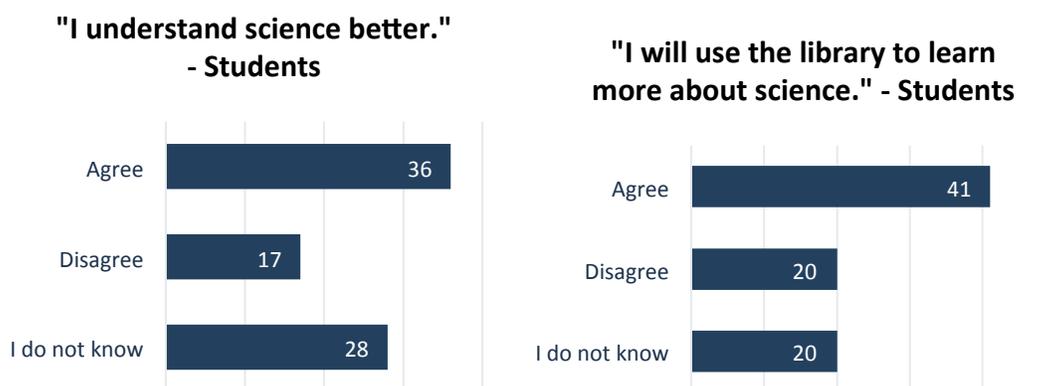
effect of the summer reading program on adolescent interest in mathematics and science. In forming the report, survey items and responses were organized based on the following evaluation questions:

- *Do child and adolescent learners engage with STEM concepts and processes in their involvement in the Summer Reading Club and/or their use of the library during summer months?*
- *Do child and adolescent learners report more positive perceptions of and attitudes toward STEM concepts and processes as a result of their involvement in the Summer Reading Club and/or their use of the library during summer months?*

Do child and adolescent learners engage with STEM concepts and processes in their involvement in the Summer Reading Club and/or their use of the library during summer months?

One of the biggest difficulties for the evaluation was that the Summer Reading Club did not solely focus on STEM concepts. In contrast to last year's *Science: Fizz, Boom, Read!*, this year's theme focused on superheroes and incorporated aspects of science. This may partly explain the significant decrease in improvement of understanding and interest in STEM concepts as a result of the program. 44% (n=36) of students reported a greater understanding of science as a result of the Summer Reading Club program. 30 students (37%) reported that they had a greater understanding of mathematics as a result of their participation in the program. Exactly half of the students (50%; n=41) responded that they would use the library as a resource more when it came to learning about science, and 28 students (35%) stated that they would use the library to learn more about mathematics. Thirty percent (n=24) of students stated that they would ask their librarians more questions about mathematics in the future and nearly 40% (n=32) of students reported that they discussed mathematics with their families more as a result of the program. Exactly a third of students (n=27) reported that they discussed science more with their families as a result of the program. Relatedly, 28% (n=23) of students will ask their librarians about science in the future. These lower statistics compared to the previous year's program are likely related to the fact that this year's program did not focus entirely on STEM concepts and the promotion of STEM interest.

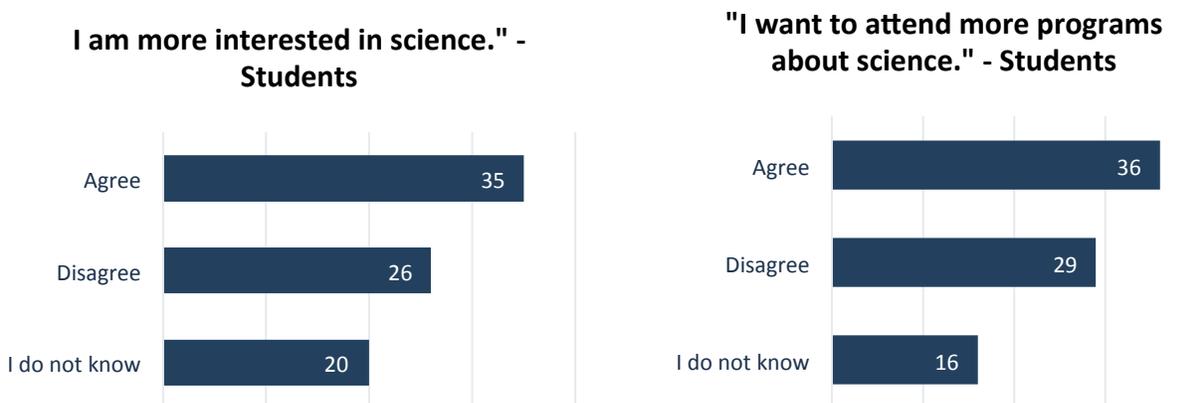
Figures 6 and 7: Students' Understanding and Engagement in Science



Do child and adolescent learners report more positive perceptions of and attitudes toward STEM concepts and processes as a result of their involvement in the Summer Reading Club and/or their use of the library during summer months?

Under half of the child and adolescent learners who responded to the survey (43%, n=35) indicated that they had a greater interest in science following the summer reading program. There was no evidence of the effect of age in the percentage of respondents who reported this change, but boys reported a slightly greater interest in science than girls, while girls reported a slightly greater interest in mathematics than boys. Nearly half of the respondents (44%, n=36) indicated that they wanted to attend more programs about science, and 46% (n=37) reported that they wanted to read more books about science. On the other hand, 28% (n=23) of students indicated an increased interest in careers in STEM fields: 28% (n=23) of respondents reported a desire to pursue a career in science as a result of the program and 31% (n=25) of respondents reported a desire to pursue a career in mathematics.

Figures 8 and 9: Students' Interest and Attitude Toward Science



The summer reading program, *Superheroes!* did appear to have a positive effect on the student and adolescent learners, overall, with an increase in STEM interest of 43%. Gender and grade level appeared to have a negligible effect on the results of the program. Students seemed to recognize that librarians were a good source of information on science and mathematics; yet, they did not express high likelihood to go to the library for a deeper understanding of the content. Based on the fact that the program was not specifically geared toward STEM concepts in the 2015 cycle, the results are still impressive, as there was still an increase in interest.

For questions regarding the Murrysville Community Library and its programs, contact:

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Appendix: Open-Ended Responses

What was the most helpful element of the professional development?

Hands-On Approach (n=5)

hands on learning

Some of the hands on experiences in the training.

hands on projects

Learning that whatever area you introduce, math and science can be incorporated. Doing hands- on problems.

Collaboration and Discussion (n=3)

Listening to other professionals perspectives, comments, summaries and “a-ha moments.”

The group setting allowed us to feed off each other through activities and discussion, leading to a deeper understanding of the materials.

As the two year program developed, it became increasingly clear that all of us who were invested in the process had much to give to each other and to learn from each other. An awareness of the open mindset and its ramifications with those with whom we influence was profoundly important.

Literature Connection (n=2)

Examples of tie-ins to literature

For the libraries, the tie in with books was invaluable.

Others (n=3)

Gaining a better understanding about how to make math & science a positive experience for children. I am not an educator, so this is what appealed to me most.

Learning more about being able to increase basic knowledge and abilities.

Recognizing that children are much more flexible and adaptable in intelligence and talent than I originally thought.

What was the least helpful element of the professional development?

Pleased (n=4)

All was worthwhile.

It was all good.

Every aspect of the program added to my knowledge and understanding of effectively presenting science and math materials and programs to children.

It was all very interesting and helpful.

Repetition/Too Much Lecture (n=2)

Extensive repetition. Too many hours of the same thing.

too much lecture

Time Constraints/Attendance (n=22)

The time coinciding with my daughters’ bus stops.

It would have been helpful if all participants attended 100 percent of the time as well as a better attendance from the Children’s Librarians within the county.

Other (n=3)

Did not like the rabbit island/consumption segment.

Unlike in 2014, there was less of an attempt to connect pedagogy and content to standards. I would like to have seen more, at about the level of 2014. However, I know that was not the most favorite piece for librarians.

Difficulties in attempting to put a “square peg in a round hole” meaning that there are many “givens” in youth services inherent in working randomly with a non-captive audience that make the application of scientific principles and evaluating learning outcomes challenging in multi-age groupings of children whose learning modalities, skills, and strengths are often unknown.

Is there anything else you would like to add? (n=7)

no

The experience was not only a growth opportunity for librarians, but for MSC Coordinators too. So, now that STEM-Packs has evolved from this project, the value is at least two-sided.

Am striving to incorporate more math and science in the activity pages I provide in conjunction with the programs I present.

Ours is a covert way of teaching – not “this is science or this is math class.” Not sure the children will know they are getting math or science concepts.

Kudos to the presentation team for their hard work to revise their presentation styles to more closely and realistically parallel the realities of public library environment vs. the public school environment.

I am excited to use what I have learned in my library programming. It was a mind expanding experience.

I appreciate the effort that the trainers spent in modifying their instructional approaches to meet the needs of the children’s librarians/staff to match more realistically to the library environment reality.