Reducing Student Frustration Instruction

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Abstract

Frustration in the classroom during math instruction can result over time in the onset of math anxiety. This professional research study looked at the instructional practices that can reduce student frustration within a general fourth grade classroom. By observing student response to instructional practices and reflect on changes that can be made to reduce frustration, effective strategies aligned with research can be used to teach math and reduce frustration of the students. Group activities, collaboration, valuing mistakes, offering support, and providing adequate time to work through solutions can help students build their math skills and reduce frustration.

Introduction

Mathematics can be a source of anxiety for students in the classroom. The introduction of stress while doing math has been found to severely reduce access to working memory, which prevents a person from providing answers to questions they could otherwise produce (Beilock & Decaro, 2007). Individuals may have solutions stored in their mind, but anxiety shuts down access to that part of the brain resulting in the inability of the individual to solve the problem. The information, even though it is known by the individual, cannot be accessed, resulting in poor performance. Poor performance in turn causes greater anxiety, which then causes continued poor performance, a devastating feedback loop that will eventually cause an individual to believe they are just not good at math (Sundem, 2016), and can cause the onset of math anxiety.

Problem Statement

Students enter the classroom with existing feeling about mathematics that affect their ability to recall necessary information to complete mathematical tasks, practice skills, and learn new material. Frustration during math instruction was being observed and was feared it could result in the onset of math anxiety and affect performance. Reducing student frustration during math instruction was necessary to help students gain confidence in their abilities and to develop their mathematical skills.

Rationale

Changing the "mathitude" of students and reducing anxiety can help students access more of their brain which should increase their assessment scores, since anxiety shuts down access to working memory. Students with anxiety toward math will have lower scores since their anxiety keeps them from accessing materials stored in their brain. Strategies can be developed within the

classroom environment to help students overcome math anxiety and to develop a growth-mindset. By comparing student feelings toward math with their math scores, success of the intervention could be determined.

Literature Review

Math anxiety is a real affliction that attributes to a reduction in math performance for those who suffer from it by reducing the use of the brain associated with numerical and math cognition (Young, et al, 2012). The learning environment in which mathematics are taught can affect the onset of math anxiety, as well as provide those with math anxiety a way to overcome their trepidation. Reduction of perceived stresses by use of instructional strategies can allow students to perform better. Providing opportunities to identify and reflect about specific feelings toward math improves self-guidance and motivation (Furner and Duffy, 2002). Besides self-reflection, the mathematics classroom can make math more relevant (Boaler, 2015) and provide opportunities for students to perceive math as fun (Afari, et. al., 2013; Ku, et. al.,2014), which will help reduce math anxiety. Use of mini-games can encourage confidence (Ku, et.al., 2014), as well as use of manipulatives, cooperative group work, discussions, making questioning and conjecture a part of math, justification of thinking, use of writing for thinking, feeling. Problem solving, making content integration a part of instruction, using technology, being a facilitator, and assess learning as part of the instruction (Furner, 2017) can be utilized to help reduce stress felt by students about mathematics. Bibliotherapy, the use of children's literature to help students explore their feelings and promote discussions about the topic of mathematics and their frustrations, is another means to enrich the classroom (Furner and Duffy, 2002).

Parental Influence

Parents are a critical component in the development of a positive math attitude (Furner and Duffy, 2002) and are the first influence in mathematics, even before school begins. Math anxiety has been shown to onset before children have much formal experience with mathematics (Harari, Vukovic, and Baily, 2013), indicating that parents play a significant role in the feelings their children have toward math. Math anxiety affects an assortment of people, with no distinction in demographic characteristics, IQ, or reading skills (Harari, Vukovic, and Baily, 2013; Young, Wu, & Menon, 2012). Adults suffering from math anxiety are known to put off such tasks as balancing their checkbooks or helping their children with homework due to the debilitating fear they feel when faced with math problems.

Studies indicate that parents can pass down their own math anxiety to their children through their actions or avoidance of mathematical situations (Boaler, 2015) and frequent help with a child's homework can actually reduce the amount of mathematics learned over the course of a school-year (Maloney, et.al., 2015). The link between a child's mindset is not directly linked to the parent's mindset, but rather to the parent's perception of failure (Haimovitz and Dweck, 2016). Haimovitz and Dweck determined parents who perceived failure as a debilitating occurrence in their child's educational career resulted in the child believing intelligence to be fixed. Changing the belief system of a student in their ability to learn mathematics is a greater force than their actual success in mathematics (Dossel, 2016). Being aware of the influence parents play, both positively and negatively, and monitoring parent-student interactions with math, can help reduce the negative influence on the mindset of their child (Dossel, 2016).

Growth Mindset

Messages from teachers or parents are often internalized, and contribute to a fixed or growth mindset. Students with a fixed mindset believe that no amount of effort will change the overall ability they have to learn, whereas students with a growth mindset believe they can develop their abilities through hard work, good strategies, and effective instruction (Haimovitz and Dweck, 2017). Studies of the brain have shown that the average brain has the ability to attain any knowledge that is successfully provided and the idea of a "mathematical brain" to not be a real condition (Boaler, 2015). There are not people more suited to learn mathematics, only those more receptive, open minded, and believing they are able to learn the information. People who suffer from math anxiety respond to a fear and are unable to access the information they have stored in their mind. Math anxiety acts the same way in the brain as a phobia (Young, Wu, & Menon, 2012), and just like a phobia, math anxiety can be overcome.

Students with a growth mindset are believed to be more resilient to math anxiety. By having a growth mind-set, students tend to have self-efficacy and a positive attitude which help in overcoming math anxiety. Comparisons of scores of 372 undergraduates between the MARS (math anxiety rating scale) and self-efficacy scores demonstrated that students with higher self-efficacy continued to work through mathematical problems despite their anxiety (Akin & Kurbanoglu, 2011). In the study conducted by Stipek, et al., three classes were compared, one class using the traditional methods of performance through completion of worksheets, and two emphasizing mastery of concepts rather than performance (Stipek, et.al., 1998). Those classes that encouraged mastery performed better and were more motivated to learn. The underlying principles adopted through the Common Core Standards drive the idea of mastery over performance and should be utilized to help students develop skills that can help them overcome

the possibility of math anxiety and become resilient to future influences that can negatively impact their mindset (Boaler, 2015).

Classroom Environment

The classroom environment can be designed to encourage a growth mind-set and to help reduce stress felt by students working with mathematics. Incorporating strategies that allow students to work on mastery instead of right answers and accept failure as an opportunity to learn can change a student's overall mindset. Encouraging mistakes promotes a growth mindset (Boaler, 2015). Students must be allowed to make mistakes and to review their work for errors in order to help them learn. Struggling is critical to the mastery of a topic and also reinforces a growth mindset (Boaler, 2019). Students should be paired or grouped to allow an exchange of ideas and be allowed to discuss their struggles. Debriefing to examine the group's thinking is an important component to ensure no misconceptions are presented in student groups.

Discussing feelings about mathematics can help students realize that everyone struggles, but that resilience and persistence are necessary to overcome anxiety. Students must also be allowed to identify their feelings toward mathematics. Students must be provided opportunities to describe and reflect about specific feelings toward math in order to learn self-guidance and improve motivation (Furner and Duffy, 2002). Left unaddressed, student's negative feelings can be internalized and interfere with their performance. Akin and Kurbanoglu found that students who display attitudes of self-efficacy can work through math anxiety and succeed, despite an onset of anxiety (Akin and Kurbanoglu, 2011). Students who persist can overcome their anxiety.

Techniques can be presented to students, such as controlling their breathing, visualizing success, or using positive "I" messages, when they begin to feel anxious (Furner and Duffy,

2002), giving them coping strategies that can help them with any anxiety they feel. Allowing students opportunities to examine how their anxiety was created can challenge the fears that they have and help students to overcome their math anxiety (Furner, 2017). Students must be allowed to speak truthfully about their feelings toward math in order to create any change in their "mathitude". Directing students to utilize a "math feelings journal" can help them manage their anxious feelings, rather than letting the anxiety take over and inhibit their abilities. Students can use their journal while waiting for assistance instead of becoming frustrated over their inability to solve problems, helping them to work through their frustrations.

Reinforcing the idea of a growth mindset, valuing mistakes, teaching students' mathematical competence, discussing shared struggles, working in groups, helping students to persist in problem solving, and learning coping skills can be implemented within the classroom to help combat anxiety and help students increase their ability to learn the math expected.

Question

Can math anxiety be reduced by enhancing the classroom environment with positive and humorous messages about math, emphasizing mastery over correct answers, and providing students opportunities to discuss their feelings toward math?

Background

This study took place in a general fourth-grade classroom that consisted of 24 students, 13 boys and 11 girls. In this classroom math occurs after first recess from 9:50a.m. until lunch recess which begins at 11:10a.m. Seating is arranged in rows to discourage talking during instruction. The Port Angeles School District uses the Eureka Math Curriculum. Each lesson of Eureka provides an opportunity to practice fluency for less than ten minutes and then provides a

new concept to be taught. After the concept development students work on a Problem Set independently until recess, completing a required amount before being excused. Homework is assigned every weeknight. A system of stars, checks, and minuses has been established to evaluate work and provide students with feedback. Reviewed work is not merely corrected for right or wrong answer, but for understanding of concepts as well. Exit Tickets, which are a short assessment of one to four questions that can be done in less than 15 minutes, are given on occasion to help gauge understanding of each student.

Methodology

Initially, my intent was to introduce an intervention in the classroom that would help students change their "mathitude", helping students overcoming math anxiety by reinforcing positive messages about mathematics and providing opportunities to interpret and discuss their feelings toward math. The intervention would compare the "mathtitude" of individual students with their scores on assessments from the beginning of the intervention to the end. Through observation, self-assessment of feelings, and assessment of work, as well as a before and after survey of "mathtitude", a comparison would determine the effectiveness of the intervention and any connection to improvement. Trends of students' feelings would be tracked to determine if students were feeling more confident as the intervention continued or less confident as content became more difficult.

Before I began my intervention, however, our classroom was experiencing a lot of tears, avoidance of work, refusal to copy down answers from the board after working through problems as a group, and submittal of incomplete homework. Assessments indicated students were understanding the materials, but there were a high number of students experiencing

frustration during class. Frustration in the classroom affects how students progress in learning new materials. If they become frustrated often it can lead to the development of math anxiety. I had intended to propose an intervention to help reduce math anxiety in the classroom (see Appendix A), but felt it necessary to first understand what was causing the frustration. Even though the initial proposed intervention would pinpoint students with negative feelings toward mathematics and fit within the existing curriculum, it would require disruption to an already frustrating environment.

Dilemma

As a new teacher it was unclear to me what was causing students to be frustrated. Was it simply an anxious group unwilling to learn new content? We discussed with previous teachers if this group suffered from math anxiety, but they reported that as a group it was never an issue. Were other classes finding the curriculum difficult and experiencing similar frustrations? I observed another fourth-grade class to see if there were similar reactions to the new concepts, but there were no tears or avoidance in the other class. So, what was causing our students to be frustrated? Could changes to my instruction reduce the group's frustration?

I have the opportunity through my instruction to help encourage a growth mindset, enhance skills, and teach new materials. Rather than completely change the established environment and propose my intervention at a time of high frustration, I instead used this opportunity to observe my own instructional practices within the established environment to better understand what I could do to reduce the current frustration of my students. My approach evolved from an intervention to help students overcome math anxiety to a Professional

Development Study of my own teaching practices, posing the question: "What instructional practices can I use to help reduce frustration and tears during math instruction in my classroom?"

Professional Development Study

In order to identify triggers of frustration within my classroom, I proposed to turn the research lens onto myself, observing the reactions of my students to my teaching practices and the classroom environment to determine the causes of their frustration. Math lessons would follow the existing curriculum, starting with fluency review, then moving on to an application problem, instructing the concept development, and then providing students opportunity to complete a Problem Set. Exit Tickets would be given occasionally to provide an assessment of the students. Reflecting on the observation of the class and making changes to my instruction I could find strategies to reduce their frustration.

Working through the action research cycles of act, observe, reflect, I would use each lesson taught to identify frustration and use the information gained from those observations to plan the next day's lesson. I kept a daily journal of my observations and would discuss with my lead teacher and the paraeductor who frequented the class during math about my observations. I looked for themes in my study that could help me change my practice to reduce the frustration and tears in my class.

Findings

I was first struck at the level of participation in fluency exercises suggested within the curriculum. Despite some students lacking skills and needing practice, and others not needing practice but seeming to enjoy the review, the group was willing to participate. Choraling multiples, identifying place values, and even working on timed sprints were met with active

participation. Students raised hands to offer answers on a regular basis and enjoyed challenging sets of review questions. It seemed the ability to work as a large group allowed students the opportunity to practice their skills, which helped them gain confidence. There was also support as questions became more challenging. Others' choralling answers could mask any errors. Individual students did what they could do and had the opportunity to learn something in the review. Even the timed "sprints" were met with acceptance and no frustration. Students knew they would not finish their sprint worksheet in the time allotted, and therefore did not feel pressure; they simply did their personal best and tried to improve. There was little fear during fluency exercises. It seemed to me that fluency exercises emphasized doing math with support from the group, with little fear of being caught making mistakes. By using a group exercise, each student could contribute to the point of their skill and drop out when they no longer could keep up. The fluency practice seemed to provide students an opportunity to work on their skills while building their confidence as they were able to state correct answers. I would rarely see students frustrated during fluency review.

Tears and grumbling always seemed to occur during the presentation of new concepts and the application of new skills. I assumed learning new materials was the cause of frustration since the students did not appear to be engaged during instruction; however, students appeared eager to work on their Problem Sets and employ their skills by doing the math rather than listening. I changed my tone during explanation of new materials to see if this affected engagement, but I found that no matter how excited I was, my enthusiasm was not mirrored. I provided opportunities for students to independently work through an example of the skills being shown and invite those who worked through the problem correctly to come to the board and explain their answer to the class. I thought the students would listen to their peers explain the

concepts, but again, students did not seem engaged in the presentation of the solutions. Students were uninterested in seeing others work through the examples, but were engaged with completing the problems themselves. Students became frustrated when they did not have enough time to come up with a solution before one was given or they would be frustrated if their solution was different than the answer. Outbursts of frustration were observed when students did not come up with a solution in the time allotted, or did not come up with a correct answer, which seemed to reduce confidence in their skills, which they would carry with them the remainder of class. This initial frustration would interfere with the students' ability to continue to practice concepts, which would make them even more frustrated. Though the group was working on the example problems, students were working independently. It was not my intention for students to fully understand the concepts until they worked through several problems themselves, yet it seemed that the students believed they should understand the skill as it was taught, rather than learning by doing the math. Students were frustrated when they did not completely understand how to solve the problems right after seeing an example being solved, yet they needed to practice the concepts through the application of the skills to better learn the skill. My explanations were meant to provide examples of how the math was to be done and the concepts the students would be learning. Students would become frustrated when they were confused, expressing their confusion and inability to proceed verbally, and yet they had not even applied the new skills themselves. Emphasizing that learning will occur as they do the math and make mistakes could help reduce the fear students were feeling of not understanding the verbal instructions. I concluded that my lectures needed to be brief and emphasize that students will have the opportunity to learn the skills by working through example problems at their own pace. I want students to realize that understanding would be learned through doing.

Frustration levels felt the highest when examples in the curriculum called the Application Problems were presented. The Application Problems provide real-life situations for using the math being learned, but felt awkward during the concept development. Each student would work through the example problem at a different pace, and students would become frustrated when the solution was provided before they were finished. There was again frustration when students did not have the correct answer. Some students argued about the solution if they had a different answer. It seemed to me that students who argued were trying to rationalize their mistake because they have not yet learned the value in making mistakes, or they needed to discuss their thinking to better understand. Research indicates the importance of real examples being provided in the application of math, but in order to keep the emphasis on application students needed more time to work through these problems, which was limited, and they needed to be able to discuss their individual solution. Unlike fluency exercises which are review of basic skills, the Application Problem uses multiple skills and steps to find a solution, with more than one way to accomplish the task. I was seeing the value of encouraging a growth-mindset, collaboration, and valuing mistakes. Brain sciences explain that the brain actually grows when mistakes are made, even if the correct answers are never provided (Bohler, 2019). I should have encouraged students to work together in groups and discuss their solutions without ever being given the answer. I witnessed students working in isolation becoming frustrated, and research indicating that math should really be collaborative. Students should be allowed to use their different skills to work out these real-life examples and discuss their solutions with others. I should provide more opportunities for collaboration during math instruction and use the Application Problem as the point of discussion. The class was always ready to participate in doing math, so beginning with a

collaborative exercise to engage them in a real-life use of math could set the tone for learning in my class.

I was always surprised at how engaged the class was doing the Problem Set worksheet after the lack of engagement in my explanation of the materials. Some of the students carrying over their frustrations would try to get help, but needed time to get over the frustration before working on the problems. Students would work on solutions and raise their hands if they had questions or had become confused. When support was available, either by a teacher or even another student, then students could continue working through the worksheet. If a lack of understanding was met with a lack of support, the student would become frustrated. Since the students could offer each other support, I rearranged desks and encouraged students to work through problems together. Students were seated next to partners I believed could offer support and when a pairing was successful it helped reduce the frustration experienced by both students. Pairs were purposefully considered based on mind-set and skill. One group noted how well they were working together and how helpful it was for both of them to be seated next to each other, not realizing that was my intention. I observed that frustration was greatly reduced when students had someone they could work through the Problem Set with. As I walked around the room I could hear students discuss their struggle with their partner. The partners could share where they were becoming confused and work through to a resolution, which seemed to help students became more confident to answer the next problem. Not every group succeeded at first, so students were moved until a successful pair or group was attained. One group consisted of three students of varying skills and was notably successful because one student who lacked confidence was boosted when she was able teach skills to one student and was supported by the other student when she was feeling confused. This student did not only need support to feel more

confident, but needed also to be able to offer support others to feel successful and less frustrated. Tears were greatly reduced by this arrangement, showing me yet again the value of collaboration. I learned that students wanted to do the work, but not in isolation.

I noticed that the Problem Sets were always met with a sense of urgency to complete. Recess followed math and students were excused when they completed an expected number of problems based on the available time. Students became frustrated the closer it got to recess if the student felt they were not going to complete enough of the practice sheet to be excused. This frustration occurred in students who take more time to work through solutions, or who think deeply about mathematics. Students who believed that they should be completing the entire worksheet felt discouraged that they did not get done. I recognize that the speed at which a student completes the work does not necessarily gauge their understanding. Problem Sets were meant as practice to help students learn, they were never collected, and I should have taken more time to encourage the doing rather than the completion of the task. The idea that there was a time limit and that they would not get done was causing frustration, when all I wanted was for them to practice math. I decided to give the Exit Tickets to the students as an exit to recess, allowing students to work on their Problem Sets until that time. The Eureka curriculum uses the Exit Ticket as a guide for teaching and assessment, and is one to three questions that is expected to be complete in less than 10 minutes. I presented the Exit Tickets as an evaluation of my teaching and a gauge of the lesson, explaining that this would help guide my future lessons. I expected students to complain about working alone again, but they willingly and quietly completed their assessment, doing their personal best. If students became stuck on a problem, I explained that it was acceptable not to complete those problems as this helped me understand their struggles. Students happily completed this task with no frustration, again demonstrating that students

enjoyed doing the math. I found that using the Exit Ticket as their ticket to recess helped reduce frustration because though it had a time limit, students were only expected to complete what they could. Just like the sprints used for fluency review there was a clear expectation and a chance some students would not complete all of the questions, but unlike the Problem Set which was practice of a new skill, the Exit Ticket was the evaluation of what was learned. I observed that even students who had been frustrated during the Problem Set would diligently work to complete the Exit Ticket, proud of their skills, and knowing they would then be free to go to recess.

Summary

I thought my students were afraid to learn new materials, but they showed me that learning math is really accomplished through doing the math. Frustration ran high in my classroom if students lacked confidence in their skills, if they felt confused by the new materials and found themselves with no support, or if they felt a pressure of time constraints. Over time these frustrations that were observed could result in the student suffering from math anxiety. So, "What instructional practices can I use to help reduce frustration and tears during math instruction in my classroom?"

- I can encourage my students to practice basic skills, building student confidence. Reviewing fluency exercises as a group helps students master their individual skills while masking mistakes.
- I can keep my instructions brief and give students time to do the math. I should encourage collaboration of real-world uses of math, allowing discussion between the students on how they would accomplish a task instead of working through an example individually within a larger group.

- I can offer support, both by being available to my students during and after class, and also by allowing groups or pairs of students to work together. Reducing confusion by offering support during practice of new materials cannot be accomplished just through oral instruction or by one individual teacher in the classroom; use the resource of other students and realize the value of math discussions.
- I can encourage students to make mistakes and explain the value of mistakes in the learning process. Just like a math equation, successful learning of new materials equals mastery of old materials plus acceptance to make mistakes while practicing new skills. If students can allow themselves to make mistakes they will learn.

Future Pursuit

I have learned that the classroom environment must encourage students to build their individual skills and to persevere through struggles. I hope to create an environment where students feel confident to ask questions, are willing to make mistakes, feel supported by myself and their peers, and can cope with their frustrations as they continue to work on mathematics. I will emphasize that students will have time to do the math, rather than merely listen to explanations. I would like to implement a "thinking classroom" as discussed by Peter Lillijadahl in a chapter titled: Building thinking classrooms: Conditions for problem solving (Lillijadahl, 2016). The idea is that students work harder when they collaborate at vertical, non-permanent surfaces; ideas are more quickly exchanged and students are willing to scribble down ideas. I experimented with this idea once during my student teaching, brining three students up to the

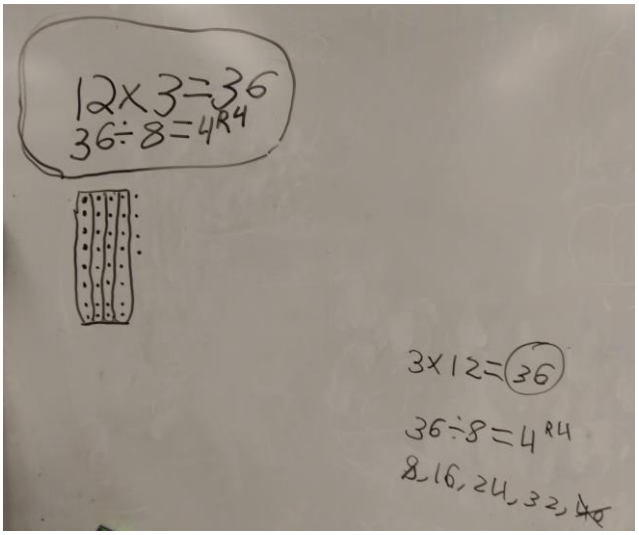

Photo courtesy Donella Clark, 2019

white board at a time, constrained in number by the availability of the white board in the existing classroom. I encouraged discussion between the three students and was amazed at the collaborative work that was produced. Students shared ideas and solutions, and seemed to truly enjoy the experience. I cannot expect all my students to love math the way I do, but I can help them to explore math in a variety of ways that may help them work through any anxiety or frustration to learn something new.

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Appendix A

Proposed Intervention

An initial survey would be conducted in class to pinpoint students with negative feelings toward mathematics and establish the overall "mathitude" of each student. The survey would also help identify students with growth or fixed mindsets, and opportunities to learn more about the growth mindset will be provided. Students would be asked to watch the Kahn Academy video entitled *"You Can Learn Anything"* with a guardian and answer questions regarding the content to gauge understanding of the idea of growth mindset and to help create a discussion with students and their parent(s).

Math lessons would follow the curriculum, starting with fluency review and Exit Tickets, moving on to an application problem, instructing the concept development, and then providing students opportunity to complete a Problem Set. Students would be paired or grouped to allow discussion of the Application Problem, providing opportunity to discuss their struggles with other students. Students who struggle alone accomplish very little. Allowing students to work together would encourage them to persevere and to continue to work through the problem rather than simply wait for an answer. A quick discussion on each group's thinking and a review of the answer would help encourage mastery and ideas for solutions over right and wrong answers.

In order to establish if students are feeling more confident by assessing their feelings toward the mathematics I will be observing their physical reactions. Problem Sets would have been worked on independently and the opportunity to write in a journal encouraged. Students would be observed for their physical reaction, quickly noting any sign of frustration or fear, which can then be compared with their journal writing and their Problem Set and Exit Ticket. A plus will indicate the student being engaged and working, a slash representing students who are

not engaged but not physically struggling, and a minus for any avoidance behavior or physical tension perceived. Journal writing would be used to provide students opportunities to reflect on their feelings before starting tasks such as Exit Tickets or Problem Sets or while waiting for help. Students become frustrated when they are left to sit with no further instruction, and writing may provide an outlet for them to vent some frustrations while they wait. Exit Tickets would be given the day after students have completed the homework on the concepts they are learning, and will be used to gauge student understanding. Students will be asked to draw an emoji of their feelings toward the content, and if they feel happy, sad, mad, or meh. This will help gauge if students are feeling frustrated or unsure of their abilities and if this is reflected in their score.

Teacher-viewed work would have notes put on it pointing out areas of good thought processes and suggestions for better understanding. Students will have this concept of "grading" explained at the beginning of the intervention to clarify focus on understanding, not right answers. No minuses would be used if something was missed, but students would be given opportunities to relook at work, allowing students to review and ask questions in order to learn from their mistakes. The idea that mistakes are an opportunity to learn would be reinforced throughout the intervention. Students would be reminded that they can ask for assistance at any time if there is a lack of understanding, including one-on-one help during recesses.

Opportunities to write about math would be presented and additional discussions about math anxiety and self-efficacy will be encouraged following the reading of four books: *Math Curse, I'm Trying to Love Math, Everyone Can Learn Math, I Can't Do That Yet.* Students will be asked to discuss these books in small groups and encouraged to share their feelings about mathematics. Writing prompts are also to be presented at least four times to help students address their feeling toward mathematics. Students would be encouraged to explore mathematical

literature, as well as books about growth mind-set, to associate reality and enjoyment of mathematics. Stories would be available to students, and also read aloud, such as *Seeing Symmetry* that can teach concepts about math, or *The Most Magnificent Thing,* which is a story about determination, or stories about mathematicians and their accomplishments, such as, *The Girl Who Loved Math*, the story about Raye Montegue and her persistence in the field of mathematics. Such stories provide students opportunities to be introduced to people who succeeded using math, overcoming adversity, learning new concepts, and reinforcing a growth mindset.