“We hate math!”
Motivating Fifth Grade Math Students

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Abstract
How can student motivation and time on task be improved when working with 5th grade math students? What types of strategies could be used to increase motivation and time on task? What types of strategies are the most effective? Throughout the year, students in my math class have displayed poor attitudes towards their math learning. This inquiry project was designed to help me learn how to engage unmotivated math learners. Different teaching strategies and reward systems have been implemented into the instructional time to help increase the fifth graders’ math attitudes. Come see what I've found!

**Background Information**
Teaching Context

Ferguson Township is a small, rural school in Pine Grove Mills, Pennsylvania. Many of the students who attend this school come from families in which farming is their main source of income. The school consists of grades K-5, and there are three hundred and twenty-seven children who attend Ferguson Township Elementary. Of these three hundred and twenty-seven children, only fifteen are minorities.

My class consists of twenty-three students. This home base class possessed a variety of learners and personalities. In fifth grade, math instruction is grouped according to the academic level of the child. At Ferguson Township, fifth graders switch teachers for math instruction. This year there were three levels of learners: above grade level, grade level, and below grade level. As an intern, I had the opportunity of working with the below grade level group of math learners that presented many academic, as well as, behavioral challenges. This mix of twenty math students consisted of seven girls and thirteen boys. In particular, eight students in this class received Title I support for mathematics in fourth grade. During fifth grade, that support was no longer available. One child received minimal learning support assistance. One student in this class was Hispanic while the rest were Caucasian. Generally, this was a weaker academic group across the curriculum.

This group of students possessed similar poor math attitudes. They did not want to be in math class, not only because they didn’t enjoy math, but also because, in the past, they had a hard time learning mathematical concepts. These attitudes have followed them throughout the years as evidenced by comments that are shared from previous teachers.
Additionally, there were a variety of personalities in this class. One young girl suffered from Attention Deficit Disorder (ADD). This disability required her to try extremely hard to focus on the activity at hand. Many times, this child had to be redirected in order to get through the sixty-minute period. She often brought books to read during class and attempted to read these books during class because she was more interested in reading than learning the day’s math lesson.

There were three boys in the class that excelled academically. Two of these boys dealt with organizational and motivational issues throughout the year. These boys enjoyed math and often became frustrated during class because there were numerous times when students needed to be lectured about their behavior or redirected to focus before instruction could begin. I could sense their frustration through comments that were made during the class periods, and the emotions expressed throughout the class period.

**Rationale**

Many students in this class had problems getting along with each other. Many boys often teased the girls. There were times when children made fun of others and frustration was easily visible through the children’s attitudes in class. Many of the students in this class had a hard time controlling their amount of talking. There were days when I would be constantly reminding the students to stop talking. Even after implementing many different types of behavior management strategies with the children, I still found myself spending much of my class time managing rather than teaching.

For as long as I can remember, I have always been drawn to work with children who need extra attention -- students who need a little push to make them shine, or
students who might need some structure to keep them on track. No matter how frustrating these situations can be, I always find that they create some very memorable teaching moments.

The students in this class were easily distracted and highly unmotivated. The students were not taking their learning seriously, and it was causing me to become easily frustrated, upset, and tired. Many of my reflective journals display this frustration. (Appendix A: 1) I knew that I had to do something to help motivate these children to want to learn math. It became one of my ultimate goals to see how I could manage the class effectively to increase their abilities.

Not only were the students not motivated in math class, but they were also not on task. Class assignments were not getting completed in class, and homework assignments were not being turned in. I noticed that some of the children who struggled the most seemed embarrassed to ask questions. I assumed that these students were afraid to ask questions because they feared the reaction of the teacher. I became quite irritated with the attitudes of the students. Perhaps this affected their lack of not asking questions.

After conferences in the Fall, my mentor and I decided that we needed to regroup our specific math group. There were many students who were struggling quite a bit with the material, and these students needed to move at a slower pace. It was at this time that I gained a math group of my own to teach. At this point during the Fall semester, I was extremely worried with the attitudes of the students in my group. Due to the amount of talking and off task behavior, I assumed that the children did not want to be learning math. Their behavior was very distracting to my teaching, and I found myself redirecting behaviors more than helping students learn. The first step that I took in putting an end to
the excessive chatting and off-task behavior was implementing a math behavior contract. (Appendix A:2) This math behavior contract was my way of gaining some sense of control over the children’s behavior. I valued the students’ opinions greatly, and I made sure that they were the main authors of this math behavior contract. After much discussion, the children and I came up with a plan to attempt to put an end to the distractions that were occurring throughout our math learning time. This behavior contract would serve as a “threat” to the students. This described what would happen to the students if they did not follow the contract. As the teacher, it was my job to enforce the contract. This helped reduce the behavior problems for a short period of time, but as the students became more comfortable around me, I found myself struggling again with controlling the students’ chattiness and enforcing the contract.

**Inquiry vs. Project**

I could not understand why the children continued to behave the way that they did. Even after all of the effort and time we put in to writing the behavior contract, many students still were not following the classroom rules. However, despite all of these challenges that these students presented, I knew that there had to be something to get these children to develop a love for learning. I knew there was some way that I could help these children control their urge to talk. I knew that I could try to help these students become motivated learners. How? I was not entirely sure, but I was determined to find out what it was. Was it parent involvement? Did I need to implement a more effective behavior management system? Did I need to get the kids out of their seats in the morning? Did we need to have a math warm up everyday? What do the students want to make this math experience more meaningful?
I chose to develop an inquiry that tested different teaching strategies and techniques to help improve student motivation and time on task. Sometimes the struggling learners are forgotten. In my opinion, I feel that some teachers become so frustrated with the children, and they tend to give up quite easily. It was my goal to find out how student motivation and time on task could be improved during math time.

In order to find out how student motivation affected students’ attitudes in class, it was important for me to develop a system of learning for these struggling students because I felt that they needed just as much attention as the excelling students. Every classroom is going to present challenges to the teacher in the front of the room. Some teachers will be challenged with adapting instruction to meet the needs of many different levels of students’ learning. Our future classrooms will present teachers with the test of adapting instruction to meet the needs of all of the learners in the classroom making sure to not leave any level of learning untouched.

**Main Wondering and Sub Questions**

When we were introduced to inquiry, I thought about all of the questions that had gone through my mind about teaching and the students in my classroom. The experience with my math group helped me narrow my focus for this inquiry. I wanted to not only benefit the students with this inquiry, but I also wanted to make sure it was something that would help me as a beginning teacher. I knew I wanted to choose something that would affect my students’ attitudes in the future. I have always loved learning, and I wanted to spread that love for learning into the hearts and minds of these struggling math students. I thought about how hard it is for young students to be motivated during
instruction especially when they have difficulty with a particular subject. I began to brainstorm ideas for my inquiry:

- *What are some different strategies that I could use with my math group to increase their motivation and time on task?*

- *How can I make a system like this work for students who lack responsibility and parental involvement?*

After speaking with my Professional Development Associate (PDA) and my mentor, I decided that I wanted to focus the inquiry around students’ time on task and their motivation. I wanted my students to have a large part of this inquiry. I wanted them to know that they could voice their opinion about the way math class was taught. After much thought, my main wondering asked:

- *How can student motivation and time on task during math be improved?*

After I decided my main wondering, I came up with sub questions that helped me finalize my plan:

- *What strategies could be used to increase motivation and time on task?*

- *Which strategies are most effective?*

- *Will creating a behavior management system with rewards and consequences help them?*

- *Did I need to incorporate more hands on activities? Do they need more individual seatwork/more partner work?*

- *Will developing a weekly progress report for my math group increase motivation and time on task during class work if it is sent home to the parents?*
- How can I make math learning more interactive and interesting?
- Will the children benefit from reporting on their learning each week?
- How are different students affected by the structure of the math lessons?
- How will my attitude affect the students’ time on task and motivation during math?

These questions helped me guide the inquiry project throughout the weeks of the semester. I was able to use these wonderings as a map to lead my inquiry project to success.

**Research**

Motivation can be categorized into two separate topics: extrinsic and intrinsic. Intrinsic motivation is the desire to do something based on the enjoyment of the behavior rather than a reward. Extrinsic motivation is the desire to do something based on the potential reward that will be received at the end. These different types of motivation are found in the classroom. It is important that the students are intrinsically motivated to do their work in order to reap the benefits from their education. All students need to be motivated to learn. Student motivation efforts should not be solely directed at students who have low levels of motivation. In order for all children to benefit from high levels of engagement, all students need to be motivated (Anderman & Midgley 1998).

Every year motivating students and keeping them on task presents a challenge to even the veteran teachers. As students get older, their interest in academics slowly filters away because of their involvement in other things:

Once children start school, they begin forming beliefs about their school-related successes and failures. The sources to which children attribute their
successes (commonly effort, ability, luck, or level of task difficulty) and failures (often lack of ability or lack of effort) have important implications for how they approach and cope with learning situations. (Lamsden 1994)

These attitudes that students develop create problematic situations when they come to school. If students do not want to be at school, they have a hard time being motivated to get any of their work done. Less motivated and disengaged students become easily frustrated, do not try their best, and often give up easily when challenged. Although teachers may not be able to increase motivation at home, research says teachers have a large effect on students’ motivation in school (Anderman & Midgley 1998).

As part of my inquiry, I made an effort to adapt specific practices into my classroom. With this specific struggling math group, I knew that if I could motivate the students to learn in mathematics, it might make the rest of their day a bit easier. Half of the battle that students face is becoming motivated to do work. If students can learn to enjoy learning, it will make their experience in the classroom much more pleasant. We have to model this excitement in our own behavior as a teacher.

Instructional time is very important. Many teachers will argue that there are not enough minutes in the day to teach the children everything we want them to know. It would make sense to say that most students learn material best when they are interested in what they are learning. They will complete the task to the best of their ability and immerse themselves in learning if they are excited about what is being taught. Even highly motivated students need schoolwork that actively engages them by building on their interests and prior knowledge. Research states that the most successful teachers must develop activities with students’ basic needs in mind in order to engage them in the
learning (Ames 1992). Students need work that helps them develop competency, obtain a sense of autonomy, create connections with others, and provide opportunities for self-growth (Anderman & Midgely 1998). Teachers are challenged with creating this type of environment that meets all or most of these needs. All of these factors contribute to the students’ motivation during class.

The teacher in the classroom also needs to make sure he/she creates an environment that encourages positive attitude and increased motivation. As the teacher, there are many things he/she can do to promote this type of environment. According to Linda Lamsden (1994), teachers’ beliefs play a role in helping students develop their own motivational strategies: “Classroom climate is important. If students experience the classroom as a caring, supportive place where there is a sense of belonging and everyone is valued and respected, they will tend to participate more fully in the process of learning.”

**Inquiry Plan**
Description

There were many aspects of this question that I wanted to answer, and I planned on using every resource I could find to answer my question. I knew that a lot of work was going to have to take place from my end due to the feedback that I planned on receiving from the students and their parents. My ultimate goal was to develop a classroom that was a place where these struggling learners enjoyed coming. I planned to implement different ways to assess and to instruct the students. I wanted them to reflect on their learning so I could gauge their motivation each week. I planned to incorporate parents into this inquiry in order to see if their involvement would help the students’ attitudes improve during math instruction time. I hoped that I would be able to capture students’ attitude changes and on task math behavior through quotes from the students.

Not only did I need to have the children reflect on their learning, but also I needed to reflect on myself after every lesson. I knew that in order to improve the learning environment for the children, I needed to be a good role model for the work and attitude that I wanted them to produce. I hoped to create a system to help the children become more interested and excited to be in math class. I believed that it was my job to help the children become more responsible and dedicated to math in order to help them achieve success throughout the remainder of the year and future years to come.

Data Collection

As the teacher, I needed to find ways to differentiate learning to see where this particular group of learners would excel. I knew that I had to offer times for individual work, partner work, small group work, manipulative work, and lecture based instruction. I rotated through these different teaching styles to find a happy medium for the learners
in the class. I used the comments from the students to prepare different types of lessons. I found that many students started to become more comfortable approaching me with concerns about their learning. I used these comments as fuel to diversify my instructional strategies.

I gauged their motivation and on task behavior through the use of a weekly student survey. (Appendix B:1) This student survey provided me with the necessary information and data from the students that I needed in order to change my instruction from week to week. The children filled out this survey each Friday in the beginning of the period. It was my way of having the students reflect on their week of math learning. Students rated their motivation in math on a one to five scale, commented about their behavior in math class, and described new procedures they wanted to see during math time. It was my hope that this survey would help guide my lessons to a place that invited the learners.

This survey asked the children to rate their math attitude on a scale: ☺ 2 3 4 ☹. Students filled in their favorite part of math class in that particular week and their least favorite part of math class. Students were also required to comment on things they did and did not understand. They also commented on something that they wished they could have changed during math class. Students reported on the times when they did their best and worst work throughout the week. Over the weeks that I collected this data, I gained insightful information about the students’ attitudes and thoughts about math. These surveys helped me change my instruction to meet the needs and wants of the students in the class.
In addition to a weekly student survey, I sent home weekly progress reports to the children’s parents and/or guardians. I informed the parents through a letter in the beginning of the marking period that I was going to be sending home these reports. (Appendix B: 2) Throughout the data collection process, I was able to send home progress reports four times: February 20th-24th, February 27th – March 3rd, March 27th – 31st, and April 3rd – 7th. (Appendix B: 3, 4, 5, 6) More progress reports would have been sent home, however, the fifth graders had one week off for Spring Break and another week off for Pennsylvania System of School Assessment tests (PSSA).

Each progress report highlighted the activities that were completed in class during that particular week, the areas where I saw many children needed extra help, and an area for parents’ comments. On these progress reports, it also stated the upcoming lessons that were going to be taught during the next week. All of the information that I could provide to the parents to help keep them informed was stated on this form. I encouraged the parents to respond with comments on the report each week.

I also played a game with the students every day called “Beat the Teacher.” I invented this game as a way to monitor the behavior of the students throughout the class period. On the chalkboard, I set up a tally column for the students and a tally column for the teacher. When the students came into class quietly, began their daily math review at their desks, worked hard during math, raised their hands to speak, etc. the students received points in their tally column. However, if this was not the case, and the children created much disruption to the class, I awarded myself with a point in my column.

Throughout the period, tallies were added to the appropriate column. At the end of the period, if the students had more tallies than the teacher, marbles were added to a jar
depending on the amount of total tallies. If the teacher won, however many more tallies the teacher had than the students, those marbles were taken out of the jar. This was a visual representation of the students’ on-task behavior throughout the entire class period. When the students filled the jar with marbles, they would be awarded with a special “fun day” during the math instructional period. This game was used as motivation for the students to control their behavior throughout the class period. If they could see that the teacher was obtaining more points, I hoped that they would begin to do their work, stop talking, and focus on learning.

As I mentioned above, I valued the students’ opinions greatly throughout this whole inquiry. I recorded the comments of the children in the class as often as I could. I believed that if I could present lessons to the children that were enjoyable, they would be more motivated and on-task during math instructional time. Additionally, I valued the input of my mentor. She helped keep my spirits up when I believed that the inquiry was not working. After each math lesson, we made a point to debrief at some point during the day so I could reflect on how I felt the lesson went. These conversations were a valuable tool to the inquiry project because she had also been able to see the students’ growth as learners in the math classroom.

**Data Analysis**

In order to analyze the data that I collected, I reviewed all of the student surveys first. I made a chart (Appendix C: 1) that listed the names of each student, the date of the survey, and the number that the student rated math class that week. The scale that was used for students to rate their attitude used this rating system: ☹ = boring, 2, 3, 4, ☀=fun. After recording each student’s math rating for that particular week, I used a
yellow highlighter and highlighted each student whose individual attitude rating improved every week. Eight of the twenty students showed increased attitudes over the three weeks. After I recognized those students, I used a red crayon to identify the students who showed no change over the three weeks. Each week, these students rated their math attitude the same. Two of the twenty students showed no change over the three weeks. Additionally, three students showed decreased math attitudes over the three weeks. They are marked with a “D” on the analysis sheet. Lastly, I recorded overall attitudes. I took the attitude ratings from the first week and compared it to the attitude ratings of the last week. This data is reproduced in the evidence for claim one.

To analyze the next set of data, I compiled the progress reports and grouped them by student. I paper clipped each child’s returned progress reports together to read through parent comments. I used the math progress reports hand in sheet to help me decipher which students’ attitudes improved in accordance to how many progress reports were handed in. (Appendix C:2) I used a red marker to circle each child that handed in all four of the progress reports. A green circle was placed around the children who handed in three of the four reports, and a brown circle was placed around the children who handed in two or fewer progress reports. Of the twenty students in the class, five children handed in every report, six children handed in three reports, and nine children handed in less than half of the progress reports. I grouped the students’ progress reports into three groups and stapled them together: group one – handed in every report, group two – handed in three reports, group three – handed in less than half of the reports.

Finally, I had the students each write a mini reflection of how they believed their attitudes had changed in math since the beginning of the year. In the beginning of the
year, students were assigned to write a journal entry that discussed the following ideas: strengths in math, weaknesses in math, reasons why I am strong in a particular subject, reasons why I am not strong in a particular subject, and what I want to learn this year in fifth grade math. Students were asked to discuss their attitude in math on a small Post-It note. With a red marker, I underlined commonalities among the students to see what caused a change in their attitudes, if anything at all. (Appendix C: 3)
What I Have Learned

Claims and Evidence

Claim 1: When the teacher implements instructional changes according to student input and requests, student attitudes have the potential to improve.

Evidence: Due to the student survey evidence, I was able to conclude that students’ math attitudes improved when I adjusted my lessons to meet the wants they requested in their surveys. Students stated that they wanted to be out of their seat more during math instruction. I made an effort to implement lessons into the classroom where the children were more active. For example, we spent one week on angle measurement. In an active lesson, we compared the field of view of an owl to the field of view of a human. Students worked with an assigned partner and took turns measuring each student’s field of view and range of motion using yarn and protractors. Students then compared their results to the owl’s results. (Appendix D: 1) This weeklong activity reinforced angle measurement, in addition to group work and cooperation.

Another math lesson was taught after the students requested more active math instruction. During this math lesson, each student received a cup of M&Ms. The students were required to find the fractional parts of their particular cup of M&Ms. Students needed to find the fractional color of blue M&Ms in relationship to the whole bag. After finding the fraction, students needed to reduce it, and then write the fraction in ratio form. The children loved this activity. A girl, stated, “My favorite part of math this week was when we did the M&M chart.” (Appendix D: 2) More students commented that they also enjoyed this activity because it gave them something to work with that was not just a worksheet.
The students were so anxious to continue math instruction throughout the rest of the week. This made me extremely happy to come to class because I knew the children would be engaged and interested in the material of the lessons. Everyday before we started math, the students would say, “What are we doing today? Is it going to be fun like yesterday?” The students made these comments because I changed instruction due to their requests on the weekly student survey forms. These comments and attitudes observed in class lead me to believe that attitudes were improved over the weeks.

Overall, when comparing the students’ attitudes during the first week to the students’ attitudes during the third week, I obtained the following results: Fifty five percent of the students ended with a higher attitude than they stated in the first week, twenty-five percent of students showed no change in their attitude from the first week to the last week, fifteen percent decreased from the first week to the last week, and five percent of the students did not have sufficient data to show attitude change. This means that they were only in school on one of the days that the surveys were taken. After analyzing this particular form of data, I was able to make my first claim about student motivation according to these student surveys.

**Claim 2: The higher the amount of parent involvement, the greater the chances for positive student attitude change.**

**Evidence:** Each week I paid close attention to the attitudes of the students. I compared their current behaviors to the behaviors that they displayed earlier in the year. I continued to notice certain students becoming more attentive and interested in math instruction. One girl, Mollie, began the year constantly struggling in math. She would comment on the fact that she did not understand any of the material that was being
taught. In her opinion, she thought it was too hard, and she did not want to try to do it.

Throughout the year, I noticed that when she was given more time to complete assignments, she usually did much better than when working in a small amount of time. With each progress report that was sent home, I noticed a positive change in Mollie’s attitude. Mollie’s parent returned each progress report, and this child’s attitude began to improve during math instruction. Mollie was turning homework assignments in on time making sure they were complete. Earlier in the year, Mollie would fill out numerous homework slips that documented assignments that she did not complete because she was confused. However, ever since progress reports have been sent home, Mollie has not turned in one homework slip.

During class, Mollie would often show a confused look on her face. She would ask numerous questions about the material being taught. Within the last month, Mollie has made comments in math class such as “Math class is AWESOME!” Just the progress of this one student shows how helpful parent involvement can be for improving children’s math attitudes.

Another case supports this claim as well. One of the students in my math class, Josh, receives learning support. In the beginning of the year, he struggled to understand math concepts. Similarly, Josh was not handing in homework assignments and had acquired numerous homework slips. Looking back through the comments that his mother replied within various emails, she stated on March 1st, 2006, “Thanks for your dedication
and hard work. Josh is "excited to have the THON\textsuperscript{1} Lady for his math captain"...his exact words. We're glad to see he's excited about math!" (Appendix D: 3)

There was a huge increase in Josh’s attitude during math class. His participation increased greatly, and there were even times when he would help other students learn the new math concepts that were being taught. I could tell that he was excited to be in math class because each morning he was completing his work, following directions, and participating in math discussions whereas before, Josh often forgot his homework, rarely participated in class discussions, and was occasionally found off task during instructional time. In addition to Josh’s attitude, Josh’s math grade improved tremendously. This boost in self-confidence helped make math class more bearable and quite excitable for this young learner.

With the successes of both of these students, it is also necessary to address parent involvement from the other end of the spectrum. One child, Nathan, struggled with math in the beginning of the year. He had trouble paying attention during math instruction. He would often comment that he did not understand the material that was being taught. Because of this, he would appear to tune out any mathematics conversation that was occurring during instruction. When he was called on, Nathan would not know the answer to the question either because he was not listening or because he did not understand the material. He was often found doodling on papers and distracting the children he was sitting next to by talking. Nathan would often fill out homework slips for incomplete work, and these slips were not regularly returned with parent signatures. Nathan missed

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\textsuperscript{1} The Penn State Dance Marathon has aided in the fight against pediatric cancer for the past 30 years. THON\textsuperscript{TM}, as Penn State students affectionately call it, consists of 700+ dancers who do not sit nor sleep for 48 consecutive hours. THON\textsuperscript{TM} is the largest student-run philanthropy in the world, benefiting the Four Diamonds Fund, which operates out of Penn State Children’s Hospital at Hershey Medical Center.
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numerous recesses because he did not turn in any of his signed homework slips. Parent progress reports were sent home each Friday. Nathan did not return any of the four reports that were sent home. Even after numerous reminders and homework slips, Nathan still did not return any of the progress reports that were sent home. It was evident that the lack of parent involvement did not help Nathan’s attitude in math class.

Each week, Nathan still rated his math class attitude below a two. Some of the comments he wrote on his student survey stated: “If I could change one thing about math this week, I want more fun. Maybe a tutor to explain it easier. Less homework. Make it more fun for me.” Next week I want to learn “how to have fun so I can learn better.”

(Appendix D: 4) Nathan’s comments lead me to believe that his math attitude was still not improving. He was still turning in numerous homework slips each week, and his participation in class was still quite low. There were not many signs of motivation or on task behavior that Nathan exhibited even after the progress reports were sent home. This lack of parent involvement has possibly not allowed Nathan to make the attitude improvement he is capable of accomplishing.

**Claim 3: Test and quiz pressure creates negative math attitudes and poor motivation during instruction.**

**Evidence:** At one point early in the semester, I assessed my students on a weekly basis. Many of the children in the class struggled with basic math concepts, and I tried to gauge their understanding each week. Quizzes, or mini reviews, as I tended to call them created a sense of uneasiness with the class. One observation from my PDA stated: “~ the quiz seems to scare them… will you give some review problems each morning to help them gain practice and confidence?” (Appendix D: 5) It was evident to my PDA that the
children struggled with their confidence and attitudes whenever they were assessed on a particular subject.

Throughout the beginning of the year, math lessons seemed quite bland. Due to the PSSA testing, many lessons were taught through lectures and seatwork in order to cover the most amount of material possible to prepare the children for the PSSA testing. Many worksheets were completed in class, and lessons tended to be rushed. After observing students’ body language, I was able to conclude that they were not interested in math. For many students, it was hard to stay awake in the morning for they were often putting their heads down on their desks and closing their eyes. Student participation during the weeks leading up to the tests was minimal. I was not able to detect whether or not this was nervousness or a lack of positive attitude that lead to this behavior.

During the week of April tenth, students took part in State College Area School District math placement testing. Over the course of two days, students were required to complete two thinking tests that would help determine their placement for the next year of math instruction. It was evident that there was a lack of motivation and an overall poor attitude in the classroom. In reference to my teacher notes from April tenth (Appendix D: 6), students were discouraged because of the district-thinking test. Many of the students asked “Why do we have to do this?” One student even commented that he hated math because of the tests that the students were required to take part in.

However, once the pressure of the tests had diminished, there was much more instructional time available for math lessons that used manipulatives and allowed the students to get out of the seats and explore mathematics learning. Students commented
that they wanted to do more activities that were “hands-on.” I made sure that many of the lessons that I taught used manipulatives to help the students understand the concepts.

After reviewing the reflections that the students made about their math class attitudes, I found a trend in the comments that were made on their sheets. Students made comments such as: “I have gotten better at math scence I started math in fifith grade. After the P.S.S.A.’s it has been fun in math.” (Appendix D: 7)

This evidence displays how students’ math attitudes can change and decrease due to the pressure of any type of assessment that may take place in the classroom. Students begin to disassociate with what is going on in the classroom and tend to act negatively toward the subject material. Their classroom participation decreases, and their enthusiasm for the subject matter is lost in their nervousness of the assessment.
My Conclusion and Future Direction

Conclusion

This inquiry project has opened up ideas about teaching that I was too naïve to consider otherwise. After completing this inquiry, I have developed claims about teaching that I will implement into my future years of practice. I have learned that no matter how easy the books make it seem, it takes a lot of effort, dedication, and persistence from the teacher to assist in motivating the students to learn.

When you are working with a group of struggling learners, many of them may possess attitudes that deter them from learning. Some are not interested in the subject matter; some children do not have the support system to help them; some children need numerous opportunities to learn. Every day is a challenge to keep these children motivated. There will be times when you think that the children are not having any trouble during math. They are engaged, listening, and motivated. The next day the teacher steps into the classroom, it may appear that the students have forgotten everything they were taught. I have learned that it is very important, not only as the children’s teacher, but as their role model, to make sure this frustration is not apparent during instruction because this will rub off onto the students, and they will feed off of the teacher’s frustration.

Keeping this in mind, I have learned that it is extremely important to self-reflect and analyze lessons. This will help me to continuously improve my lessons to cater to the needs and wants of the students. Being a new teacher, I understand that changes and improvements can be made to lessons. Everything any human does is a work in progress, and there is always room for improvement. I will make it my job, as a future educator, to
constantly reflect on my lessons in order to find ways to engage students and keep them motivated to learn.

After all of the research, I have concluded that every student needs something different to help him or her become motivated to learn. For some students, it may just be an additional assignment, others a private talk with the teacher, or a student game that offers a class reward. It is essential that teachers are able to distinguish the different factors that contribute to student motivation in order to gain balance in the classroom. These practices combined help young teachers learn to motivate struggling learners and keep them on task during instruction.

**New Wonderings**

Many questions have arisen throughout this inquiry that I hope to study throughout my future years of teaching:

- *Would weekly parent phone calls increase the students’ time on task and/or motivation?*

- *Does the arrangement of the desks have anything to do with motivation and time on task?*

- *Do the children need more responsibility in class to be motivated?*

I am sure that many more questions will come about as I continue this study throughout the rest of the year. I do not believe that I will be able to find a definite answer as to one thing that motivates students to learn. I hope to find a culmination of things that I can use to help increase student motivation and time on task throughout my forthcoming years of teaching.
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Appendix A: 1

10.29.05
Reflection

When I walked into school on Monday, I was told that I would now be teaching math for the rest of the semester. I was going to be given a small math group because our math class needed to be split into two separate instructional groups. I was one nervous kid, especially because I was getting the lower instructional group? What was I going to do with their behavior problems, their attention problems, their excessive talking, etc? I only had about fifteen minutes to prep myself for the first lesson. I was nervous and scared, but at the same time excited and ready to tackle the lesson. My teacher gave me three things to cover not expecting me to go over everything. She also told me that she didn’t think that the kids would be able to handle all three things so it was ok if I didn’t cover them.

11.18.2005
Reflective

This week, I spent a lot of time out of my classroom teaching science in Houserville. I wasn’t able to teach math for three days, and I came back with a bad report about my math group. Apparently, they were extremely misbehaved for my mentor teacher and that upset me quite a bit especially since they were the ones who made the math contract. I don’t know how forceful she was with the contract, but I know that she gave out many warnings during math. The first day I had my math group back, I came down on them. I told them that I was disappointed in them because they were the children who created the contract so they had to be the ones setting the example for the other children in the class. I felt as though some of them cared, but others still have no “fear” of the contract. (What do I do with these guys since they don’t respond?) I mean it’s not all of the children, but there is one kid in particular who just doesn’t care. He won’t follow directions, etc. I talked to his homeroom teacher, and she states that he is just as much of a mystery to her as he is to me. I am worried that he’s not going to be where the other kids are because he just doesn’t care. (It’s sad.) I don’t want to burn myself out trying to get this kid to understand! (Am I just taking this too far?)
Math Behavior Contract

I, ____________________________, agree to follow directions (do what Ms. Hollinger and Mrs. Stone expect of me) during math class every day. This includes: raising my hand when I would like to share something (not interrupting anyone), keeping my hands and feet to myself, listening to the ideas of everyone in the group (both teachers and students) and trying my best to do the math I'm asked to do.

I helped to set up the consequences below and I agree with what will happen if I do not follow expectations.

Plan:

First problem:              warning
Second problem:             spend 10 minutes of recess with Ms. Hollinger
Third problem:              Time to Think paper
Fourth problem:             parent phone call

Student: ____________________________
Teacher: ____________________________
Parent: ____________________________

Date: November 9, 2005
Appendix B: 1

Name___________________ Date_________

I would rate my math class this week as:
(☹=BORING, ☻=FUN)

☹ 2 3 4 ☻

My **favorite** part of math this week was:

_____________________________________________________________

My **least favorite** part of math this week was:

_____________________________________________________________

If I could **change** one thing about math this week...

_____________________________________________________________

I **don’t** understand:

_____________________________________________________________

I **do** understand:

_____________________________________________________________

I did my **best** work in math this week when:

_____________________________________________________________

Next week, I **want to learn** about this in math class:

_____________________________________________________________
Hello Parents!

It’s hard to believe that we’re more than halfway through the school year! Your children have been working extremely hard all year during math class, and Mrs. Stone and I have been very impressed with their progress. This year we have covered many subjects in math class: place value, decimals, fractions, multiplication, division, and measurement.

In an effort to keep you all up to date with what is going on in your child’s math class, I am going to begin sending home math class reports each week. These class reports will highlight the activities that we have completed each week in addition to what we feel the children should work on at home to improve their math performance. It is important for me to communicate with you in order to provide your child with the help that he/she may need for success.

As a parent, you are the most important person in the life of your child. Your perspective and feedback can help me help your children succeed in fifth grade math. I appreciate your help with this task. This will help me guide their learning throughout the rest of the year.

For those of you who prefer that I email the weekly reports home, please send the bottom half of the sheet back to school complete with your email address. Thank you so much for your help!

Sincerely,
Sue Hollinger

Name:__________________________
Child’s Name:_____________________________
Email Address:______________________________________
Dear Parents and Guardians,

I have attached your child's first weekly progress report! This paper highlights three things: the lessons that we have covered in the past week, activities that I believe your child will benefit from, and a section. It would be very helpful for me to have your feedback on your child's progress. For those of you who have received this report through email, you may respond to the email with any comments.

I absolutely understand how busy your home life must be. I hope that you may be able to complete the take home task home with your child and create a time where you might have a chance to sit down with him/her and review the progress report. If this is not possible, I understand that as well. Feel free to ask your child about the things he/she has done in class, and ask him/her to teach you about the things we have been learning.

If you have any questions, please do not hesitate to contact me at SJH2O@scasd.org, 235-0872 (Home), or 231-4119 (Ferguson). I really appreciate your help!

Thank you!

Sue Hollinger
## Math Weekly Progress Report

<table>
<thead>
<tr>
<th></th>
<th>What we did in class</th>
<th>What to work on at home</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MONDAY</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2/20</td>
<td>NO SCHOOL</td>
<td></td>
</tr>
<tr>
<td><strong>TUESDAY</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| 2/21                 | Reviewed area & perimeter  
                       | Area = l x w  
                       | Perimeter = l + l + w + w  
                       | ![Diagram of a square]  
                       | space inside object measured in sq. units  
                       | Homework: perimeter work.  
                       |                         |
| **WEDNESDAY**        |                      |                         |
| 2/22                 | DATA ANALYSIS:  
                       | mean-average  
                       | median-middle #  
                       | mode - most-frequent #  
                       | range - lowest # = highest #  
                       | Homework: data analysis work.  
                       |                         |
| **THURSDAY**         |                      |                         |
| 2/23                 |  
                       | Each child illustrated  
                       | and defined one term from the list.  
                       | Items were hung in the room.  
                       | Students traveled to copy definitions.  
                       | Homework: revise measurement packet  
                       | Practice geometry definitions.  
                       | Practice geometry definitions  
                       | Coordinate geometry  
                       | how to write an ordered pair  
                       | Homework: geometry measurement packets due Mon.  
                       |                         |
| **FRIDAY**           |                      |                         |
| 2/24                 | Finish copying vocabulary terms  
                       | Introduce coordinate geometry  
                       | How to write an ordered pair  
                       | Homework: geometry measurement packets due Mon.  
                       |                         |

Teacher Signature: [Signature]  
Parent Signature: [Signature]  

Comments...
Appendix B: 4

Hello Parents! We have been working extremely hard in math class over the past few weeks in order to get ready for the Pennsylvania System of School Assessment Tests that are coming up next week. (March 21st – March 24th) All of the students have been hard at work learning geometry. We have learned about shapes, angles, circles, symmetry, and many other geometric ideas! This report covers material that we learned prior to spring break, material that we learned this week, and material we tentatively plan to cover the week after the PSSA tests. It is my hope that I can keep you up to date with what your child will be learning in the upcoming weeks to help prepare you for assignments that will be coming home, etc. I want to thank all of you for taking time to complete the take home assignments with your children. It is my hope that they are teaching you some things that your children have been learning in math class. Any comments or suggestions that you have for me would be greatly appreciated. If you have any questions, please don’t hesitate to contact me. (email: SJH20@scasd.org, phone: 814-235-0872, or Ferguson: 814-231-4119) Thank you!

Monday, Feb. 27th

On this day in math class, we learned some new vocabulary terms that would help the students clearly understand subsequent lessons throughout the unit. For homework, the students completed a take home task that required them to find specific examples of geometric forms in their homes. Students must be familiar with the terms in the front of their geometry books for PSSA testing. At home, it might be helpful to review these terms with your child.

Tuesday, Feb 28th

Students were introduced to the terms right, obtuse, acute, and straight. These terms helped them identify angle measures. The students learned how to use a protractor to measure and draw angles. For homework, students completed an angle identification worksheet. At home, ask your child what it means to have a right/obtuse/acute/straight angle. See if they can teach you the meaning of these words!

Wednesday, March 1st

Students practiced using protractors to measure and draw angles. As a class, we reviewed the steps of measuring angles. Following this review, the students were quizzed on the terms mean, median, mode, and range. These data analysis terms were introduced to the students previously. They were given a set of temperature data that we had collected as a class and asked to find the mean, median, mode, and range of the data collection. At home, children may practice using protractors to measure angles. We have been practicing in school, but the more practice the children get, the easier it will be for them to measure angles. I can provide a protractor if necessary.

Thursday, March 2nd

Snow Day
Appendix B: 4 (CON’T)

Friday, March 3rd
Teacher Records Day

Week of March 6th – 10th
SPRING BREAK

Monday, March 13th
The students reviewed all of the geometry concepts they had learned up until that day. Students learned about polygon classification, the sum of the angles in a triangle, and triangle classification. For homework, students completed a triangle sum worksheet. At home, students should continue reviewing geometry terms.

Tuesday, March 14th
Students discussed how to classify quadrilaterals. After reviewing Monday’s homework, we talked about the ways to classify quadrilaterals. Students completed a worksheet in class and were assigned three worksheets that they had the option to complete for extra credit. Homework had to be completed on pages 22 and 24. At home, students could complete extra credit assignments to help reinforce important geometrical ideas.

Wednesday, March 15th
The topic of math was congruent and similar figures. As a class, we discussed what makes a figure congruent and what makes figures similar. As a class, we completed two worksheets on congruent and similar figures. We discussed how to draw similar figures using graph paper. For homework, students completed pages 29 and 31 in their geometry packets. Ask your child what congruent and similar mean. They should be able to describe the difference.

Thursday, March 16th
Students created symmetrical dot paintings. We had a discussion about lines of symmetry and what it means when a figure is symmetrical. Students completed worksheets in their packets, and for homework, students were to create a symmetrical illustration. At home, have students find things in the house with lines of symmetry.

Friday, March 17th
Students learned about circles and solid figures today. We discussed and defined radius, diameter, and chord. For solid figures, students leaned about faces, edges, bases, and vertices. Students worked with partners to complete worksheets in their packets.
Appendix B: 4 (CON’T)

UPCOMING MATH

Monday, March 20th
Today, students will be taking a practice PSSA test. Students will be given the opportunity to ask any questions that they may have about the material we have covered this year.

Tuesday, March 21st – Friday, March 24th is PSSA Testing.
There will be no math homework or math class this week.

Monday, March 27th – Wednesday, March 29th
Students will be doing a two day long activity called Now That’s Using Your Head. Students will measure all different parts of their bodies and create ratios, fractions, etc for comparison purposes.

Thursday, March 30th and Friday, March 31st
For the remainder of the week, we will be revisiting fractions and ratios. We will complete numerous activities that will reinforce these concepts with the children.

PARENT FEEDBACK

Please leave any additional questions or comments below. If you feel that your child may need extra help in some of these academic areas, I will do everything I can to help them succeed.

Your input is greatly valued and appreciated! Thank you!

SIGNED_________________________________________________________

DATE_________________
Appendix B: 5

Math Progress Report – (Week of March 27th)
Upcoming Math – (Week of April 3rd)

Monday, March 27
Students used tape measures find a ratio that compared the circumference of the students' heads to the length of their bodies. For homework, students created hypotheses for the given experiments in their measurement books. At home, students should familiarize themselves with different types of ratios.

Tuesday, March 28
Students shared their hypotheses that they had created for homework. Students worked with a partner to create a plan for one of the three experiments listed in the measurement packet.

Wednesday, March 29
In math today, we took quite a long time to discuss some of the behavior that has been taking place in class. Some of the students in the class have been having a hard time following directions. On numerous occasions, instruction has had to be stopped due to lack of attention. Many of the students are talking during instruction, and even after being redirected, students still choose to continue talking. The students shared their thoughts on why they believe this was the case. So I've decided to implement Fun Fridays. I made a deal with the children that if they can stay on task, follow directions, and remain quiet during the class period, math on Fridays will involve activities outside. (weather permitting) I agreed to implement more fun activities during math if they promised to follow the rules of the math class.

Following this discussion, I passed out five strips of colored paper to each child. Students were required to evenly split the certain colors into halves, thirds, fourths, fifths, and sixths. Through discussion, children were able to make connections about fraction multiplication. For example, students realize that when you folded a paper in half and then in thirds, you got sixths. \( \frac{1}{2} \times \frac{1}{3} = \frac{1}{6} \). Once the students realized these connections, they were able to easily divide larger strips of paper into twelfths and tenths. For homework, students created either a brain, heart, or stomach that consisted of fractional parts. If their stomach was split into 20ths,
Appendix B: 5 (CON’T)

students had to account for their favorite foods that composed twentieths. For example, I used the example of my heart. I told the kids that there were 20 fractional pieces of my heart. 4/20's to Penn State, 10/20's to the Math Class, and 6/20's to my family. These fractions added together equal 20/20 or one whole heart. They were allowed to chose whichever number they wanted to use for their denominator as long as their numerators equaled a whole when added together.

At home, please review adding fractions with your children. Remind them that in order to add fractions, common denominators must be created. Many children still seem to be making mistakes when adding fractions.

Thursday, March 30
Each student received cups of M&Ms. we did an activity with M&Ms. All of the students got their own cups of M&Ms. They had to find the fractional parts of each color of M&Ms in their cups, reduce the fractions, and write the ratios for each color. The kids loved the lesson. For homework, the students finished reducing their fractions and created ratios. Of course, they ate the M&Ms, too. At home, students should practice reducing fractions!

Friday, March 31

NO MATH due to a Science Bug Presentation.

UPCOMING MATH: Fractions and Decimals

Monday, April 3
Today students will be finding fractional parts of words. They will be going on a scavenger hunt throughout the room searching for a treasure. Finding fractional parts of words will help them decipher the clues to find the treasure.
Appendix B: 5 (CON’T)

Tuesday, April 4, Wednesday, April 5, and ½ of Thursday, April 6

During these days of math instruction students will be taking part in an activity called “Here’s looking at you.” Students will create owls using plastic cups, pushpins, and other materials. Students will be investigating this question “How does your range of vision compare to that of an owl?” They will work with partners to investigate for these three days.

Thursday, April 6

For the second half of math, students will do Menu Math. Each student will receive a menu and answer a list of questions that will require them to do computations with the prices of the food in the restaurant.

Friday, April 7 (Fun Friday)

Today students will be creating and playing their own decimal bingo games.

PARENT FEEDBACK

Please leave any additional questions or comments below. If you feel that your child may need extra help in some of these academic areas, I will do everything I can to help them succeed.

Your input is greatly valued and appreciated! Thank you!

SIGNED__________________________________________

DATE__________________________
Appendix B: 6

Math Progress Report (week of April 3rd)

Monday, April 3rd
Today we worked on fractions again. We learned about making fractional parts of words. For example, take the word office. Students were asked to split the word into thirds. This required them to understand that thirds had three equal parts with two letters in them. So the second THIRD of the word office would be the letters FI. Other prompts helped the students decipher the whole words for the sentence of clues. For homework, students were asked to create their own set of clues. This assignment was not due until Wednesday.

Tuesday, April 4th
The students started a long three-day experiment that reinforced angle measurement. Students worked in pairs to begin to compare their vision with an owl’s vision. We reviewed the steps to the experiment, and then students began measuring their peripheral vision out of both of their eyes. They worked in partners to observe and measure. For homework, the students were to finish their fraction clue scavenger hunt.

Wednesday, April 5th
We continued our experiment. The students who hadn’t finished measuring their partner’s eye views started class doing that. Others continued with the experiment and began measuring each other’s range of motion. There was no homework assigned tonight.

Thursday, April 6th
Today in math we checked out measurements for precision and continued our experiment. We began cutting out our angle measurement circles. After building the “owl” and “child” prototypes, we will be able to continue with the rest of this activity. For homework, the children were asked to make the owl and human prototypes for the experiment.

Friday, April 7th
Today we finished up our owl activity. The students compared their fields of view and ranges of motion to an owl’s field of view and range of motion. We had an interesting discussion about the differences between the two. There was no homework assigned tonight.

Upcoming Math (week of April 10th)

Monday, April 11th
Today the students will be going to the computer lab for half of the period to learn how to input answers onto the computer for the upcoming Math Thinking Test that will be
Appendix B: 6 (CON’T)

administered on Wednesday and Thursday. The remainder of the period will be spent working with decimals.

Tuesday, April 12th
There will be no math today due to a school wide assembly.

Wednesday, April 13th
Math Thinking Test (Part A) → This is the district test that will help the school determine the level of your child’s placement for sixth grade math.

Thursday, April 14th
Math Thinking Test (Part B)

Friday, April 15th
NO SCHOOL!

PARENT FEEDBACK

Please leave any additional questions or comments below. If you feel that your child may need extra help in some of these academic areas, I will do everything I can to help them succeed.

Your input is greatly valued and appreciated! Thank you!

SIGNED____________________________________

DATE_______________
Appendix C: 1

MATH STUDENT SURVEYS

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<td>5</td>
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</tr>
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<td></td>
</tr>
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<td>3.0 (avg)</td>
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<td>4</td>
</tr>
<tr>
<td>20</td>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>

# who ended higher: 10
# with no change: 5
# decreased: 2
unable to decipher: 1

PERCENTS

# who ended higher: 55%
# with no change: 25%
# decreased: 15%
unable to decipher: 5%

- Improvement each week (8)
- No change (2)
- 1st higher than last
Appendix C: 3

Student (NK)

I like math a lot better now because the PSSAs are over. We had more time to play games and do fun things like the owl project, Decimal bingo and a lot of other things. I can’t wait to have math outside. Those were the reasons why I like math.

for Miss Hollinger to use like to get out of our seats or do fun activities. After Miss Hollinger listened, she tried our ideas. Now I have so much more fun. I have fun, listen and like math.
Appendix D: 2

Name_ Mollie __________ Date_April 2000

I would rate my math class this week as:
(2=BORING, 4=FUN)

My favorite part of math this week was:

Was when we did the math chart.

My least favorite part of math this week was:

Doing the math with the head and height.

If I could change one thing about math this week...

I would do it in class so every

can understand.

I don’t understand:

It was hard for me to reduce the

fractions on the math chart.

I do understand:

How to do charts like the m&m.

I did my best work in math this week when:

When we did the percentage of the

brain, body, and bone.

Next week, I want to learn about this in math class:

I want to learn more about percentages.

SIGNED Mollie
From: Mother of Josh
Date: March 1, 2006 3:38:28 PM EST
To: Susan J Hollinger <sjh235@psu.edu>
Subject: Re: Math Progress Report (week of February 20th-24th)

Thanks for your dedication and hard work. Josh is "excited to have the THON Lady for his math captain"...his exact words. We're glad to see he's excited about math!

!Mother of Josh
I would rate my math class this week as:
(0=BORING, ☺=FUN)

2 3 4 ☺

My favorite part of math this week was:
working with partner

My least favorite part of math this week was:
hearing lectures.
I was mistaken with the homework.

If I could change one thing about math this week...
I wanted more fun.
Maybe a tutor sometimes who expains it easier.

I don’t understand:
so much at all of the shapes and sizes.

I do understand:
some of the digets.

I did my best work in math this week when:
we were having fun.

Next week, I want to learn about this in math class:
shapes, +, x, /,

SIGNED

3/17/06
Nathan
~ the quiz seems to scare them… will you give some review problems each morning to help them gain practice and confidence?
4.10.04

Kids discouraged by district math thinking test.
- "Why do we have to do this?"
- "I hate math."

Arbor 24
Appendix D: 7

Student (KA)

I have gotten better at math science. I started math in fifth grade after the P.S. 89; it has been fun in math.