The Effect of Classroom Discipline and Attendance on Middle School Math Academic Achievement

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Abstract

The purpose of the study is to determine if math academic achievement has a relationship with the amount or duration of discipline removal and attendance. Another purpose is to better improve classroom discipline procedures as a result of this study to create a better learning environment. To improve academic success the intent is to look for a pattern within the discipline practices and academic achievement. A quantitative approach with a quasi-experimental design was employed for this study. The researcher collected data for a total of six weeks from eighth grade participants during the fall semester of 2019. The participants in this study were 117 eighth-grade students aged 12-15. The instruments being utilized included skyward, and the schools established APR (alternate placement room) list. Data from Skyward and Alternative Placement Room (APR) was analyzed descriptively. Results revealed that there is not a direct relation between math academic achievement and discipline or attendance, although 44.44% of the time absences lead to grade decreases. When it comes to discipline 50% of students had a lower improved score than the average for the pretest on the chapters covered in the study, while 36% had overall grade decreases.

Keywords: discipline, attendance, math achievement

The Effect of Classroom Discipline and Attendance on Middle School Math Academic Achievement

Discipline is the practice of training people to obey rules or a code of behavior, using punishment to correct disobedience (Oxford University Press, 2019). Discipline for this study refers to the consequences following referrals for not following school policy, while classroom management is how the classroom runs and progresses by the use of skills and teacher techniques that keep students organized, focused, and academically productive (Great Schools Partnership, 2014). Discipline is a big part of education and possesses many benefits as well as downfalls but does the bad outweigh the good. Schools across the country have been working on their need to adjust the method of discipline used in order to meet the needs of their students and the current culture and view of discipline itself. While some schools are "stuck in the mud" or unsure about how to changing for the better others are being proactive and making these well needed adjustments. These changes have pointed schools in the direction of the restorative approach, which is proactive, while others, including the district included in this study, are still in the traditional approach, which is reactive. With either approach, it is necessary to use the data to ensure that it is working for a majority of students in order to create a safe and effective learning environment.

Academic achievement is directly related to the amount of time that students are present and attentive inside a classroom (Perry & Morris, 2014). This is especially true as students reach the middle grades (6-8), as they progress in their education and classes become more independently based there is more riding on their attendance. With multiple teachers and more responsibilities, students cannot afford to miss the lessons for illness let alone discipline.

This study is to determine if the type of discipline or the amount of missed class days due to discipline and attendance is proportional to class achievement. It also assists to determine if certain managements or reactions can be adjusted to improve the classroom environment. This study could lead to changes in classroom discipline approaches in order to help students succeed.

The overall purpose of this study is to determine if there is a relationship between the type or amount and duration of disciplinary action and attendance to student academic achievement. Another purpose is to better improve classroom discipline procedures as a result of this study to create a better learning environment. To improve academic success the intent is to look for a pattern within the discipline practices, attendance, and academic achievement.

This study is guided by the following two research questions:

1. Does the frequency or duration of discipline removal have a direct relation to math academic success?
2. Does school attendance have a direct relation on math academic success?

This study hypothesizes that the greater the number of times a student is removed from class due to discipline the lower the academic achievement. Along with the hypothesis that the longer the student is removed or absent from class the lower the academic achievement. Lastly, that the more structured the discipline approach the better outcome for the learning environment to lead to academic success. The more structured the discipline approach the closer the researcher adheres to district guidelines and policies. Discipline approach aligns with the research questions because the more control seen within classroom management the less discipline removal may be required to curb classroom behaviors, and the larger the chance for academic success.

In the following literature review, the researcher discusses the importance of discipline and attendance on classroom achievement. Students who have more support from parents and family at home have a better chance of academic success (Benner, Boyle & Sadler, 2016), but that is not the only factor that influences the chance of success in students. Involvement of parents in both the home and school environment is a major impact (Benner et at., 2016). A factor that is rarely mentioned but always thought of is the impact of classroom discipline on academic success. Whether discipline is present or not tends to not be the issue. The issues that have an impact are the frequency, duration, and approach of classroom discipline and school attendance. In this review the information to be uncovered is how these three subcategories of discipline effect academic success of students especially in the middle school level. By digging into data and classroom strategies that have previously been reported, it assisted in determining if frequency and duration of discipline along with classroom discipline approaches and attendance have an impact on academic achievement, more specifically if it impacts math achievement.

Frequency of Discipline

School discipline has been a topic of discussion for many years, using a range of practices and outlooks to fix situations that present differently. According to Predy, McIntosh, and Frank behavior problems have been found to present differently across elementary, middle, and high school (2014). Across all grade levels the most common exhibited behavior was defiance (Predy, McIntosh, & Frank, 2014). Within middle schools most of the problem behaviors tend to be adult directed, such as defiance (31%) and disruption (18%), schools that participated in this study had a total of 403,172 referrals, received by 118,582 students; they break up these results by the number of referrals received per student (Predy et al., 2014). Eighty-three percent of the students made up the zero to one total of office discipline referrals,

12% received two to five referrals in total, and 5% received six or more total (Predy et al., 2014). The students who had a higher frequency of referrals were more likely to be removed from the classroom environment participating in less curriculum instruction decreasing their chance of academic success due to classroom behavior. Some of these behaviors can dealt with inside the classroom, while others may require the student to be removed rather than redirected.

The amount of time spent in schools and the quality of instruction and learning during that time directly affect achievement. Although in middle schools with multiple teachers each day it can be a difficult task to control quality of instruction and learning, this can be done by including workshops, professional development, and other methods to keep improving quality teaching; while relying on observations to show accurate teaching abilities. Black and Predy et al state that academic achievement is negatively affected when students are not in the classroom (2014), whether it is due to discipline or attendance was not specified. Black continues to state that this is also true if the environment interferes with their ability to focus on schoolwork (2016). Black's review shows a link not only between discipline for the individual students but for the negative impact on the peers with them in their classes. Their peers deserve to be able to learn in an environment that is conducive to learning not being interrupted by poor behaviors and distractions.

With the environment of a classroom being impactful on their learning it is important to note that through observation teachers tend to try and intervene with behaviors before removing these students and their negative behaviors from the classroom. The practice of teacher interventions is seen as a good thing for the students with behavioral problems because they can remain in the learning environment. However, it is a negative impact on the classmates of that student who have to be brought off task every time the teacher has to redirect behaviors in the

room. When the same student is consistently being the discipline problem the teacher will eventually rule out interventions because they do not work with that particular student and will remove the student from the environment quicker and more frequently to prevent power struggles if any occur. Removing the student once all interventions have been ruled out is for the sake of the remaining students but at harm to the student who does not remain in the classroom, leading to a decreased chance of academic success. When the teachers are removing the students, who become discipline problems what they are trying to do is get rid of or curb unwanted behavior. With discipline, curbing unwanted learner-behavior is needed, especially when it impacts negatively on academic performance (Foncha, Ngoqo, Mafumo & Maruma, 2017). If looking to improve education for all learners to flourish, discipline must be maintained in the school and the classroom (Foncha et al., 2017). Differences in frequency can be due to differences in acceptable behavior from one classroom to another, if one teacher believes that a little conversation in class is allowed during notes, as long as it is not disruptive or off topic, and another teacher does not allow any talking, the teacher who has the higher expectations will more than likely have issues with some classroom discipline.

The idea of having different acceptable behaviors is more likely to happen in a middle school classroom where the students have multiple teachers in one school day. Foncha et al. support this idea when they state that some see discipline as a "coercive mechanism" rather than the process of creating a consensus of acceptable behaviors (2017). Building on to that, the agreed upon behaviors should have agreed upon consequence to go along with the behaviors for each action in order to produce the behavior previously deemed acceptable (Foncha et al., 2017). Having discipline consequences and acceptable behaviors agreed upon not only applies to those students and actions who are frequently problems, but also the duration of the consequences.

Frequency and duration go hand in hand, when it comes to those frequent issues discipline should also be progressive. With a progressive discipline each time the behavior repeats with the same student the consequence gets more severe, this is where the transition from frequency to duration occurs. The more frequently a behavior occurs the more class time students are more likely to miss out on causing a decrease in chance of academic success. For some students the disciplinary consequence will not change how they behave, this idea will be discussed more in the duration portion of this review.

Duration of Discipline

Many of the students by middle school receive administrative consequences that are primarily exclusive and reactive, tending to be detentions, in-school suspension, or out-of-school suspension (Predy et al., 2014). The problem with these types of disciplinary consequences is that they have been shown to decrease instruction time and school engagement while increasing problem behaviors. The length of time that a student is removed from the classroom affects the amount of the curriculum they are exposed to leading to a decrease in their chance of academic success. Every effort should be made not to have the student removed from the classroom for extended periods of time. Sometimes that cannot be done, whether it is due to extreme actions performed by the student or some other deciding factors. We as educators need to recognize the effect these consequences have on the students' outlook on school and especially their academic success.

Many schools argue that suspending misbehaving students can deter misbehavior and create a better learning environment for other students (Cobb-Clark, Kassenboehmer, Le, McVicar & Zhang, 2014). While the study provided by Cobb-Clark, Kassenboehmer, Le,

McVicar, and Zhang shows that high school graduation rates were 40% lower for students who were suspended, while more than 305 of sophomores who dropped out had been previously suspended (2014). Cobb-Clark et al. found that having been suspended from school is strongly related to the chance of completing high school and obtaining university entrance (2014). The study continued with the previously mentioned study of Predy et al, showing how these common disciplinary measures can harm student's chances at academic success. While the statistics used deal more with high school students, we also have to admit that for some the behavior that leads to suspensions does not just appear when entering high school. For some students the behavior starts at younger grades, both in elementary and middle school. It may be safe to say that the harm done to their academic success is done early when they are first learning the information they will need to succeed in upper grades.

If the students are not in any school environment because of being suspended or expelled their achievement suffers (Black, 2016). The suffering academic achievement can be related to suspensions; thus, it can be shown that schools with more suspensions tend to have the lowest test scores (Black, 2016). In a time when high stakes test scores play a heavy role in education this is a key statement, that more suspensions equal lower test scores. While Black may not have been referring to tests like the Measure of Academic Progress (MAP) or the Partnership for Assessment of Readiness for College and Careers (PARCC) they still are impacted by the duration of time students are removed from classrooms for disciplinary reasons. Having a school with multiple discipline problems cannot "simply suspend their way out of discipline problems"; schools with this approach tend to create a negative climate, which lowers the academic achievement of all students (Black, 2016).

With duration of discipline the main consequences discussed are in and out-of-school suspensions. As previously stated by Predy et al. 2014 these are becoming the primary type of consequences, which remove the student from the learning environment. The threat of a lengthy suspension can reduce discipline issues, leading to increased achievement for students who are on the edge of creating a problem (Kinsler, 2013). Kinsler mentions how discipline can increase academic achievement, as a result it shows how discipline can provide a positive change for some students. The suspension lengths are distributed conditionally on the type of offense and the number of previous offenses, where more severe offenses result in longer suspensions, and the same occurs for the more offenses they have (Kinsler, 2013). The goal in increasing severity of punishments or consequences is that it will deter the behavior in the future, which however does not always happen. There have been in the past students where the consequence has no bearing on the behavior they will continue to perform.

"Losing classroom time as a result of suspension has a small negative impact on performance, whereas exposure to a disruptive behavior significantly reduces achievement" (Kinsler, 2013, p. 382) his statement is one that becomes a deciding factor in duration of discipline as well. It may not seem fair to harm another student's chance of academic success in order for their peers to succeed, but a small negative impact is better than significantly reducing achievement. Kinsler's study he also states that students who were suspended were significantly more likely to be retained students (2013). With these students tending to be retained it goes to prove that suspensions or consistently missing curriculum can harm chances of academic success, however there is no way to know why exactly they were retained. Kinsler continued to state that on average students who misbehave "score more than half a standard deviation lower" on end of year tests when compared to their classmates who are well behaved (2012, p. 360).

Some caution that removing students from classrooms should only be a last resort. They continue to state "high rates of out-of-school suspensions exhibit low achievement" even if that individual is not suspended (Perry & Morris, 2014, p. 1068). The high rates in relation to low achievement is similar to what Black (2016) wrote with the exception of mentioning students who were not suspended themselves having lower test scores. Perry and Morris are making a connection between school suspension and incarceration stating that removing students from educational environment is like removing criminals from civilian life (2014). The connection although harsh makes a point, removing a child from school is taking away their ability to learn how to function when surrounded by peers at the same age, this would be similar to criminals being removed from civilian life and losing the ability to be a functioning member in a society.

When focusing on school suspension they continue to state that it is correlated to poorer grades and lower performance on tests in science, math, and history (Perry & Morris, 2014). The relationship between suspensions and test scores is a common topic that has been mentioned many times within this review, showing a direct link between duration of discipline practices and academic achievement. Within Perry and Morris' study they mention a quasi-experimental study that followed groups of suspended and non-suspended students. After two years, the suspended group was nearly five grade levels behind the non-suspended group, showing a greater effect between suspensions and academic growth (Perry & Morris, 2014).

Many of the studies used for the category of duration of discipline all mention the idea that "exclusionary discipline policies are necessary for school safety" (Perry & Morris, 2014, p 1070). School safety is important not only for the student's health, but also for their chances to succeed by providing an environment that is conducive to learning. Black made a remark in his paper stating that since the 1970's chances of suspensions or expulsions for students have

doubled and tripled (2016). He then continues to state that some schools hand out more suspensions then they have students, suspending individuals' multiple times (Black, 2016). Multiple suspensions show not only the need to adjust discipline to benefit the students but also the idea that these students effected are not getting their chance to succeed academically. These disciplinary consequences that lead to school safety tend to be overused, which is why having a good classroom discipline approach does quite a bit in preventing suspension worthy behaviors.

Discipline Approaches

While discipline approaches vary between schools and from teacher to teacher, they may not seem to play a part in academic success. The approach taken does play a part in success because without order, rules, and procedures there is no clear path for the students to follow to reach success. Every teacher has to locate the approach that works best for their classroom and fits the atmosphere they want. Calling out students, yelling and using sarcasm, sitting or standing still, disconnecting routines from behavior and expecting students to be still and silent are approaches Englehart recommends avoiding (2013). Englehart states that calling students out causes a power struggle that can ruin relationships, he continues, "the teacher would like to win, but the student has to win" (2013, p 103). The conflict changes the direction of a classroom; an individual conversation could have corrected the behavior while keeping all students on a track to success. With yelling and using sarcasm, and sitting or standing still, the problem of creating public confrontation and disruptive behavior this once again interrupts the academic environment (Englehart, 2013). While sarcasm is sometimes the language middle school students and teachers may default to, it is a good idea to try to avoid it whenever you can.

Disconnecting routines from behavior simply means that routines should make behavior predictable to minimize chances for students to be of task, this leads into the idea of expecting students to be still and quiet (Englehart, 2013). We should have high expectations, but they should be reasonable for the students that we teach. The last two approaches of disconnecting routines from behavior and expecting students to be still and quiet are used because they deal with the development of middle school students, who's default is chaos (Englehart, 2013). We have to teach them to harness their chaos, to show our passion for topics at times that are more appropriate, and the same goes for social interactions. The students will to learn that everything has a time and a place, and that talking during notes or an assessment will not help them in any way which is why we place high but reasonable expectations.

While Englehart talks about what to avoid Gage, Sugai, Lewis, and Brzozowy speak of things that are positive like school-wide positive behavior supports (2015). School-wide positive behavior supports (SWPBS) are associated with increased positive school climate, and academic achievement, as well as a decrease in problem behaviors as a whole (Gage, Sugai, Lewis, & Brzozowy, 2015). While this study focused on school wide behavior, similar programs could be introduced into individual classrooms if they include the same procedures. The underlying assumption in this study was that with the school having better behavior the time previously used to address misbehavior would be redirected to curriculum and instruction. The schools that participated in this study show an increase in math and reading achievement (Gage et al., 2015).

An increase in achievement and a decrease in discipline is something that all schools strive for and can be done with positive behavioral supports. Positive behavioral supports are great for the morale of the school because it promotes good behavior and the students who often follow all the rules, do what is expected, and go above and beyond. These students don't always

get the recognition that they deserve, and having a positive behavioral support is a good way to recognize those students and promote their good behavior in hopes that others will follow.

Positive behavior supports are a great incentive to prevent discipline issues but what if they still occur. Another approach is restorative practices, this approach could help reduce the differences in school discipline (Kline, 2016). "Restorative practices present schools with an opportunity to respectfully respond to students' inappropriate behavior", the goal was to teach strategies to resolve conflict and manage misbehavior in a peaceful manner (Kline, 2015, p.99). Restorative practices were used school wide but much like positive behavior supports can be used in individual classrooms. These restorative practices could help maintain a classroom cultures of acceptance and give students feelings of belonging that could prevent behavior issues.

While Kline's article talks about restoring relationships through justice circles there are other approaches that can be taken (2016). Apology letters, fixing item that was broken out of anger, or doing a good deed, these are some small things that can be done to improve broken relationships and could be seen as restorative practices. Using these restorative practices allows students to take responsibility of their actions and learn that doing something good in return is better than just saying the words "I'm sorry". Restorative practice is an approach that would work best with minor issues that may not be severe enough for consequences like in or out-of-school suspensions, or even alternative placement because it doesn't remove them from the classroom but instead has them take responsibility.

Aside from the physical approach to disciple, the student perceptions have an impact as well. The way students perceive their teachers in terms of motivation can impact their achievement, self-efficacy and intrinsic motivation. It is suggested that students who view their teachers' motivational behaviors positively ultimately improves their performance in multiple

subjects (You, Dang, & Lim, 2015). They continue to state that a teacher's behavior may influence the student's emotional state, goal setting, and persistence (You et al., 2015). The idea of a higher motivation for students leading to higher academic success can be seen in many classrooms that foster a welcoming and supportive learning environment. The more a teacher is perceived to be positive and motivational the more likely students are to respond in the same way. Students tend to prefer teachers who believe in them and tell them that they will "be awesome", or "rock the test", because sometimes we need the students to know that we believe in their abilities when they might not know that themselves. Positive motivation is especially important in math, because many students believe that they are just not math people and will never learn or understand it so positivity and motivation in necessary to improve their outlook.

Influence of Attendance

While discipline does play a major part in the school day, students must also attend school on a regular basis in order to be successful. Attendance goes with discipline for a number of reasons, the most relevant one to this study is the fact that "missed educational time in school may lead to poor grades" (Parke & Kanyongo, 2012, p.161). Many students may not be aware that attendance impacts academic achievement, in researching attendances impact we may succeed in "helping guide students towards decisions and behaviors that would positively impact their achievement" (Kim, Shakory, Azad, Popovic & Park, 2019, p. 1).

It is also important to recognize that attendance is necessary for learning, which is true because if you are not present you are missing instructional time (Parke & Kanyongo, 2012). Daily attendance is necessary to succeed, and consistency of what school you are attending is important as well. Although this study does not take into consideration students' mobility, which tends to be higher in urban and low socioeconomic areas, it is important to note that movement

between schools has a negative impact on student achievement as well as their social and emotional functioning (Parke & Kanyongo, 2012).

Some researchers argue that it is not enough to only be present or attend school, they state that you must also engage and participate in the instruction (Kim et at., 2019). While this statement may be true it is important to first attend school in order to become confident enough to participate. Some basic understanding may be needed in order to participate in lessons based off of previous day's work. The study conducted by Kim, et al. was also conducted in a college setting and although it is true that participation is key in the learning process it is conducted in setting where attendance is built in as a percentage of final grades (2019).

When it comes to math achievement in the middle school setting attendance is key. Parke and Kanyongo included that "students who were absent 20% of the time scored 20 points lower than those who attended nearly every day" (2012, p. 163). While that percentage was generalized to all of school grades, we need to take a closer look at math achievement. For middle school Parke and Kanyongo noted that the relationship between grade and attendance was significant, where those who attended regularly or with stable attendance scored better in math than those who were not attending school (2012). It was also noted that differences were present between ethnicities, but the overall trend remained the same, those with better attendance did better in math achievement on their state assessment (Parke & Kanyongo, 2012).

Overall, you can see there are plenty of approaches, methods, and systems that can be used in individual classrooms to prevent, or peacefully resolve discipline issues without a negative effect on student achievement. There are also non-physical or tangible ways to promote academic achievement; this can be done through the teachers' motivational behavior and promoting school attendance. The one thing I would take from all of this research is that having

a plan and routines is a necessity to achieve success and reduce the frequency and duration of classroom discipline, while fostering a community focused on student success. The impact of discipline approaches might not be noticeable in small amounts but when small issues break away at relationships and communities it eventually becomes a major problem. When it comes to attendance having these routines and a community focused on student success may lead to an increase in student attendance because the student wants to be in your class. No matter if you are adjusting discipline or focusing on attendance, making a change in one or the other could lead to an increase in student academic achievement, may it be in math or any other subject.

Methods

A quantitative approach was used for this study and it utilized a quasi-experimental design. The researcher collected data for a total of six weeks from eighth grade participants in the researcher's classroom during the fall semester of 2019. The participants in this study continued as usual, learning planned content, while the teacher researcher gathered data on classroom discipline and attendance throughout the lessons. The following information details the participants, setting, data source and research materials, and data collection procedures.

Participants and Setting

The participants were purposefully selected students from the Teacher Researcher's eighth grade math classroom in a central Illinois town with a population of approximately 17,300 residents. Five groups of students participated. The participants are male and female students aged 12-15. Approximately 117 students in regular eighth grade math classroom took part in this study with 57 males and 60 females. All participants who receive math instruction from the researcher in the general education classroom participated in this study.

The setting of this study is an eighth-grade math classroom in a middle school located in a central Illinois town that is in a rural community. The middle school is newly combined from two previous middle schools and is a seventh and eighth grade building. At the time of this study there three eighth grade math teachers, teaching approximately 450 eighth grade students. The information following this statement was gathered from the Illinois School Report Card System used by the Illinois Board of Education. According to the recent Illinois School Report Card, Raiders Middle School, one of the schools used in the merger, there were 464 students in attendance comprised of 40% White students, 45% African American students, 2% Hispanic students, and 13% Two or More Races. According to the Illinois State Report Card 63% are low-income students, with 1% homeless students and 22% with an Individualized Education Plan (IEP). The other school used in the merger was Reds Middle School, which is the current location for the combined school. According to the recent Illinois School Report Card, Reds Middle School had approximately 344 students in attendance comprised of 35% White students, 45% African American students, 4% Hispanic students, and 16% Two or More Races. According to the Illinois State Report Card 77% are low-income students, with 2% homeless students and 15% with an IEP.

Data Source and Research Materials

To conduct this study the teacher researcher used three different instruments. The instruments are as follows:

- An established APR (Alternate Placement Room) list that is used school wide. This list is used to keep track of what students are to be in alternate placement instead of traditional classroom setting. The students are placed here for disciplinary reasons.

- Skyward systems for disciplinary and attendance data along with the Skyward grade books.
- Assignment grades such as pre and post-tests along with homework will be checked throughout the study.

Data Collection Procedure

This six-week study began a week before the conclusion of midterm for first quarter. The midterm grades served as the starting point for the data collection procedure along with the beginning of chapter two on exponents and scientific notation. Chapter Two from the Go Math Curriculum covered three and a half weeks, from September 16th through October 9th and included topics on exponents and scientific notation. Chapter Three**,** also included in this study, took two and a half weeks, from October 10th through October 25th which covered information on proportional relationships. The classes participated in math lessons five days a week at approximately 40-minute classes. During this time, participants engaged with the day's lesson, followed the normal routine and expectations that were previously established at the beginning of the school year. These expectations are refreshed weekly. The Teacher Researcher recorded daily attendance and submitted any disciplinary referrals through the online program Skyward and kept the classroom grades up to date.

Three times a week within the time frame of this study**,** the teacher researcher collected data based off the school provided APR list. The teacher researcher collected data weekly that was based on class grades, reported discipline through Skyward and attendance. At the end of the time frame, the Teacher Researcher compared pre and post-test data of student grades to class

attendance and discipline. The Teacher Researcher also looked at homework assignments and compared them to class attendance.

During Week One, covered the first chapter on exponents and scientific notation. The week started with a pre-test on the chapter to collect information on what the students had learned previous to this school year. After completing the pre-test, the Teacher Researcher used the data to adjust lessons if needed. Less than ten students had covered this topic before nothing had to be adjusted. At the end of Week One, which included Fast Bridge testing, the classes began the first lesson titled Integer Exponents.

In the following week, Lesson One titled *Integer Exponents* continued, and the students completed a homework assignment. The assignment required them to use the integer exponent rules that were taught throughout the lesson. After completion of this lesson, the classes moved into Lesson Two titled *Scientific Notation with Positive Powers of 10*. This lesson was completed by the end of Week Two, along with the homework assignment.

Throughout Week Three, classes continued onto lesson three and four. Lesson Three, titled *Scientific Notation with negative Powers of 10*, was completed along with the homework assignment by that Wednesday. Lesson Four which was titled *Operations with Scientific Notation* was completed by the end of the week, which included the homework assignment.

As Week Four began, classes were reviewing for the chapter test that was given on Tuesday, October 9th. This completed the first chapter being taught. The classes then began chapter three with a pretest, this chapter is titled *Proportional Relationships*. By the end of week four each class had begun the first lesson of Representing Proportional Relationships.

Week Five included the completion of the first lesson and homework assignment. Once lesson was completed, Lesson Two titled Rate of Change and Slope began. That week wrapped up the second lesson and also included completion of the homework assignment that matched.

Finally, in Week Six classes began and completed the third lesson titled *Interpreting the Unit Rate as Slope*. The students also completed the homework assignment for that lesson prior to beginning the chapter review. The study concluded on Friday of week six with the Chapter Three test. Throughout each week, the Teacher Researcher kept track of attendance and discipline records for all participants involved in study. In addition, the researcher kept track of grades that corresponded with each assignment given.

Data Analysis and Results

Data was analyzed using descriptive analysis. The researcher collected pre- and post-test scores along with homework scores, overall class grade and class attendance for participants within the six-week time frame. The first three and a half weeks were over Chapter Two on *Exponents and Scientific Notation*, while the final two and a half weeks were over chapter three on proportional relationships. Both chapters were covered using the school districts Go Math curriculum for eighth grade.

Data Analysis

A descriptive analysis is used to analyze the collected data to answer the question of if there is a relationship between the type and or amount and or duration of disciplinary action and student academic achievement. Each week scores gathered included; pre- and post-tests, along with homework assignments, overall class grade, and attendance. All data collected from pre-

and post-tests were organized and reported as percentages out of a hundred. The homework scores were reported as points out of five.

The overall class grades were recorded as percentages along with the increase or decrease each week. The researcher also took note daily on attendance and marked each participant as present (p) or absent (a). Absences for discipline were noted differently, for suspended it was marked as a-sus, for consequences it was marked as cons, if the student had to be removed it was marked as p-KO for present but kicked out.

Results

For this study, the focus is on the grade changes and attendance as each week progressed. The later focus will be directed to overall change per chapter in relation to days missed for discipline and days missed for excused and unexcused absences. The overall class grade changed in terms of percentage for the entire six weeks of the study in relation to class attendance because of discipline or other related absences. For the sake of the data management, the researcher kept those whose grades remained the same as part of the increasing grade percentages, all homework assignments were out of 5 points, while the chapter two test was 28 points and the chapter three test was 18 points. With the large group of participants (n=117), the data was tabulated into five graphs to represent five classes numbered groups one through five. The student ID numbers were numbers assigned to each student at first registration in district and their current schedules were assigned randomly at the beginning of the year

First week results. In the first week of data collection,100% of the participants engaged in this study had an increase, or no change, in their class grade. The mean grade to start this study was 61.41%. The increase ranged from 0% or staying the same to 100% for the three new

students, that were already included in the total of 117. The mean grade at the end of week 1 was 69.66%, which was 8.25% higher than starting mean. The largest increase during the first week was 51%, the highest-grade increase in week one was 5.85%, with 108 students with an increase range of 0% to 12%. Eight of 108 participants' grade remained the same with neither an increase nor decrease. None of the participants had a decrease in their grade for the first week.

While this was the first week of data collection and it was also the first chapter, chapter two, being covered within this study. The first week was also Fast Bridge testing which is why only on assignment was used for the chapter being covered. The assignments given during the first week included the chapter pretest. When the pretest was administered it was completed with scores ranging from 0% to 36%, or 0 pts to 10 pts and an average of 3.36 points or 12.34%.

The attendance within the first week, 41 (35%) participants out of 117 were gone for at least one day or more. Eleven participants (9.4%) were removed for discipline purposes while 30 participants (90.6%) were out for excused or unexcused absences. The absences for the first week average around 0.63 days, which included those who were present all week. Excluding those who had perfect attendance, the mean for those 41 participants was 1.8 days, ranging from 0-4 days. The range in grade increases was 2%-8%, with the mean change being 3.6%; for decreases there was no range because no grades decreased related to attendance.

Second week results. In the second week of data collection, 38 (32.47%) of the 117 participants, had an increase or no change in their class grade. Not including the 15 participants who had 0% increase the average grade increase was 7.78% for the remaining 23 participants showed an increase range of 0% to 16.72%. The remaining 80 participants (68.37%) of participants had a decrease in week two, with a mean decrease of 4.24%. At the end of the week the mean grade was 68.28%, that is 1.38% lower than week one.

Throughout Week Two of data collection, there were two assignments including lesson 2.1 homework and 2.2 homework. For the 2.1 homework assignment, 59 participants (50.43%) completed the assignment while 58 participants (49.57%) did not submit the assignment. The assignments that were turned in and completed they had an average grade of 3.31 points (66.2%). On homework assignment 2.2, a total of 71 participants (60.67%) completed the assignment while 46 participants (39.31%) did not submit the assignment. Completed assignments had an average grade of 4.36 points (87.2%). The completion of assignments is impacted by each participant's class attendance. The participants who missed instruction on these topics also have a lower chance of success on future content due to lack of exposure on the basics required to succeed.

Throughout the second week, attendance had approximately 51 participants (43.58%) were gone for at least one day. Ten participants, or 19.61%, were removed for discipline purposes while 41 participants (80.39%) were out for excused or unexcused absences. The absences for the second week average 0.58 days per participants, ranging from 0-5 days that week. The mean included those 66 participants who had perfect attendance, without those participants the mean was 1.33 days per participant. There were 48 participants who missed less than 2 days, their grade showed a mean decrease of 2.68% and a range of change from 33% decrease to a 28% increase. For the 3 participants absent more than two days had an average decrease of 14.33%, ranging from a decrease of 7% to 33%. It is important to note that on the Wednesday of Week Two there was a district wide half-day for students due to teacher professional development in the afternoon.

Third week results. Throughout Week Three of data collection, 37 out of the 117 participating students (31.62%) had an increase or no change in their class grade. The mean

grade increase was 3.52% with a range between 0%-34% increase and there were however 22 participants (59.45%) whose class grade remained the same. The remaining 80 participants (68.37%) had a decrease in week three of data collection, with a mean decrease of 3.01% with a decrease range between 1%-17%, with 28 students dropping 2% points. At the end of week three the mean grade was 67.67% which was 0.61% lower than week two.

During this third week of data collection there were two assignments including lesson 2.3 homework and 2.4 homework. For the 2.3 homework assignment 81 participants completed the assignment while 37 did not submit the assignment, with an average grade of 4.33 points (86.6%) majority of participants (67) scored 4 or 5 points. On homework assignment 2.4, a total of 44 participants (37.61%) completed the assignment. While 73 participants (62.39%) did not submit the assignment, with an average grade of 3.54 points, or 70.8%, majority (35 students) scored 3 or 4 points. The completion of assignments continues to be impacted by attendance.

Week three's attendance had approximately 39 (33.33%) participants were gone for at least one day. Ten participants (25.64%) were removed for discipline purposes while 29 participants (74.35%) were out for excused or unexcused absences. The absences for the third week average around 0.55 days per participant, ranging from 0-5 days that week, the mean and range both included 78 participants with perfect attendance. Not including the participants with perfect attendance, the mean number of days missing was 1.64 days per participant, ranging between 1-5 days, with a standard deviation of 1.12. Participants missing less than 3 days fall into this category, there are 33 of them. Those 33 participants have a mean decrease of 1.96%, with an overall range of change between 17% decrease and 2% increase. Out of those 33 participants, 30 of them fall within one standard deviation (3.26) of the mean. For those 6 participants who missed 3 or more days, 5 participants had a decrease, while the remaining

participant had no change in their grade. The range in grade decreases was 4%-15%, with a mean of decrease of 10.2%.

Fourth week results. During week four of data collection chapter two was completed and chapter three was begun. Throughout this week, 52 of the 117 participants (44.44%) in the study have kept their grades the same or increased their total grade percentage. While 19 participants (36.53%) had their grades remain the same, the remaining 33 participants (63.46%) had a mean increase was 3.8% ranging from increases of 1%-10%. Sixty-five participants (55.55%) fall into the category of decreasing grades this week with a mean decrease of 3.86%. Scores were decreasing within a range of 1%-21%. The average grade for the end of week four was 66.71%, which is lower by 0.96% compared to the previous week, which was 67.67%.

This week consisted of the chapter two final test and the chapter three pre-test. For the chapter two final test, the average score was 15.59 points (55.68%) which showed a mean increase in scores at 44.12% from the pretest administered in week one, the change in score was within the range of a 29% decrease and a 92% increase. Sixty-six participants showed an increase in their chapter two test scores while five of the participants showed a decrease in their scores from the pre to post or final test, the mean decrease was 10%, with a range in decrease between 4%-29%. The decrease may be a result of students guessing the correct answer on some of the multiple choice questions correctly on the pretest while incorrectly on the posttest. There was a total of 20 participants who were absent on test day, and 18 participants were able to take the test during the six weeks of data collection, the remaining participants received 0%. When the chapter three pretest was administered, it had scores ranging 0%-66 % and a mean of 5.48 points (30.49%). Those that were absent for the pre-test received a zero for the reference of grade growth. It is important to note that on the Wednesday of week four there was another

district wide half-day for student attendance due to teacher professional development in the afternoon. In years pasts student attendance on these days has been considerably lower.

This week's attendance had approximately 34 (29.05%) participants were gone for at least one day. Five students (14.7%) were removed for discipline purposes while 29 students (85.29%) were out for excused or unexcused absences. The absences for the fourth week, which included the participants that had perfect attendance that week, with a mean of around 0.57 days per participant, ranging from 0-5 days that week. Excluding the 83 participants who had perfect attendance, the mean is 1.97 days per student. Ten participants missed 3 or more days and 8 of those 10 (80%) had a decrease in classroom grade, while the remaining 2 participants (20%) had 0% change, kept their grade the same. The range in grade decreases the range was a 1%-21% decrease, with a mean decrease of 7.13%.

Fifth week results. Throughout week five 46 out of 117 participating students (39.31%) had an increase or no change in their class grade. The mean grade increase was 1.54% percent with a range of percent increase from 0% to 16%, there were however 24 participants whose class grade remained the same. The remaining 71 participants (60.68%) had a decrease in week five of data collection, with a mean decrease of 2.63% percent with a range decrease from 1% to 9%. Week Five had a mean grade of 65.71% which was 1% lower than the end of week four.

Throughout Week Five of data collection, there were two assignments including lesson 3.1 homework and 3.2 homework. For the 3.1 homework assignment, 63 participants (53.84%) completed the assignment while 54 participants (46.15%) did not submit the assignment, with a mean grade of 4.33 points, or 86.6%. Forty participants (63.49%) who completed the assignment received 5 points (100%) on the assignment. On homework assignment 3.2, a total of 51 participants (43.58%) completed the assignment while 66 participants (56.41%) did not

submit the assignment, with a mean grade of 3.61 points (72.2%). The completion of assignments is impacted by each participant's class attendance.

Week Five only consisted of four school attendance dates; this was due to the fact that there was no student attendance on Monday for Columbus Day. This week's attendance had approximately 41 (35.04%) participants were gone for at least one day. Six participants (14.63%) were removed for discipline purposes while the remaining 35 participants (85.36%) were out for excused or unexcused absences. The absences for the fifth week had a mean around 0.54 days per participant including the 76 with perfect attendance that week. The amount of days ranged from 0-4 days that week. Excluding those with perfect attendance the mean number of days missed was 1.53 days per participant. For the 7 participants who missed more than 2 days of school this week, 6 participants (85.71%) had a decrease in classroom grade, while the remaining participant (0.85%) still had a grade percentage. The grade increases were 1% while the decreasing grade range showed grade drops from 2% to 4%, with a mean of 2.66%.

Sixth week results. In week six, the final week of data collection**,** 82 out of 117 participants (70.09%) had an increase or no change in class grade. The mean grade increase was 3.28% percent with an increase range of 0% to 21%. There were 17 participants (14.52%) whose class grade remained the same this week. The remaining 35 participants (29.91%) had a decrease in week six of data collection, with a mean decrease of 2.26% with a decrease range of 1% to 6%. The average grade at the end of week six of data collection was 67.34% which was a 1.63% increase from week five. The mean was also above the beginning mean by about 5.93%.

Throughout week six of data collection, there were two assignments that included lesson 3.3 homework and the Chapter 3 final test. For the 3.3 homework assignment, 58 participants (49.57%) completed the assignment while 59 participants (50.42%) did not submit the

assignment, with a mean grade of 4.76 points (95.2%) for those who submitted the assignment. Approximately 84.48% of the participants received 5 points (100%).

Week six ended the first quarter, so if participants missed the chapter test, they were given a zero because there was no time for makeups and for many that signified a decrease from pre to post test for chapter three. This may have skewed the data due to the fact that some of the participants may have shown growth in their math abilities. For the Chapter Three final test the mean score was 9.84 points (54.72%) with a range in scores from 0% to 100%. Chapter Three test overall showed an average increase in scores of 4.29 points (23.84%).

Twenty-one participants showed a decrease in their scores from the pre to post test, the mean decrease was 30.81%, with a range in decrease between 55% and 5%. Within those 21 participants there were 18 that were absent on chapter three test day who received zeros. Without those students the mean decrease adjusts to 19.57%, within a range decrease from 5% to 44%. Four participants remained the same and were included as growth from the pre to post test, the mean for only score increase was 37.36%, with a mean test grade of 12.2 points (67.78%). Without those 5 participants who showed no growth the mean increase is 39.05% with a mean score on the test of 12.71 points (70.63%).

Week Six is another week that consisted of four school attendance dates; this was due to the fact that there was no student attendance on Friday because of Parent-Teacher Conferences. This week's attendance had approximately 42 (35.89%) participants were gone for at least one day, and 75 (64.01%) participants with perfect attendance this week. Four participants (12.5%) were removed for discipline purposes while 38 participants (32.47%) were out for excused or unexcused absences. The absences for the sixth week have a mean around 0.53 days per participant, ranging from 0-4 days that week.

Excluding the 75 participants with perfect attendance the mean days missed per participant becomes 1.5. For those participants who missed 3 or more days, 4 participants had a decrease in classroom grade, while the remaining participant still had a grade percentage increase. The increase was 2% and for grade decreases, the range was that scores decreased was between 1% to 5%, with a mean decrease of 3.25%.

Table 1

Percentage of Participant's Attendance According to the Week and Type of Attendance

	Attendance		Absence Reasoning	
Week	Full Attendance	Absent (One Day)	Removal	Excused
1	65	35	9.4	90.6
2	66.42	43.58	19.61	80.39
3	66.67	33.33	25.64	74.35
4	70.95	29.05	14.7	85.29
5	64.96	35.04	14.63	85.36
6	35.89	64.01	12.5	90.48

The figures presented below show the change in overall math grade over the six weeks of data collection along with the number of overall absences. Figure 1 shows first groups grade change over six weeks, Figure 2 shows group two's grade changes, Figure 3 for group three's grade change, figure 4 for group four's grade change, and Figure 5 for group five's grade changes over the six weeks of data collection.

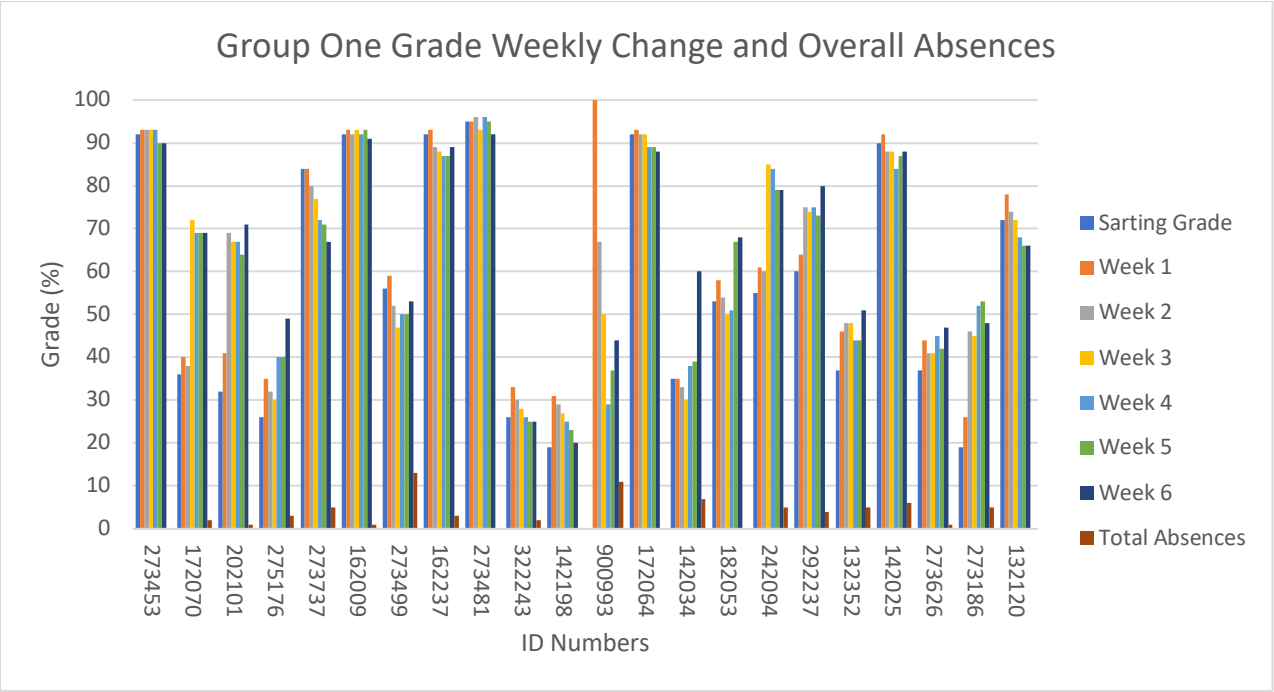

Figure 1. Scores of Group One Math with Overall Absences of Missed Instruction

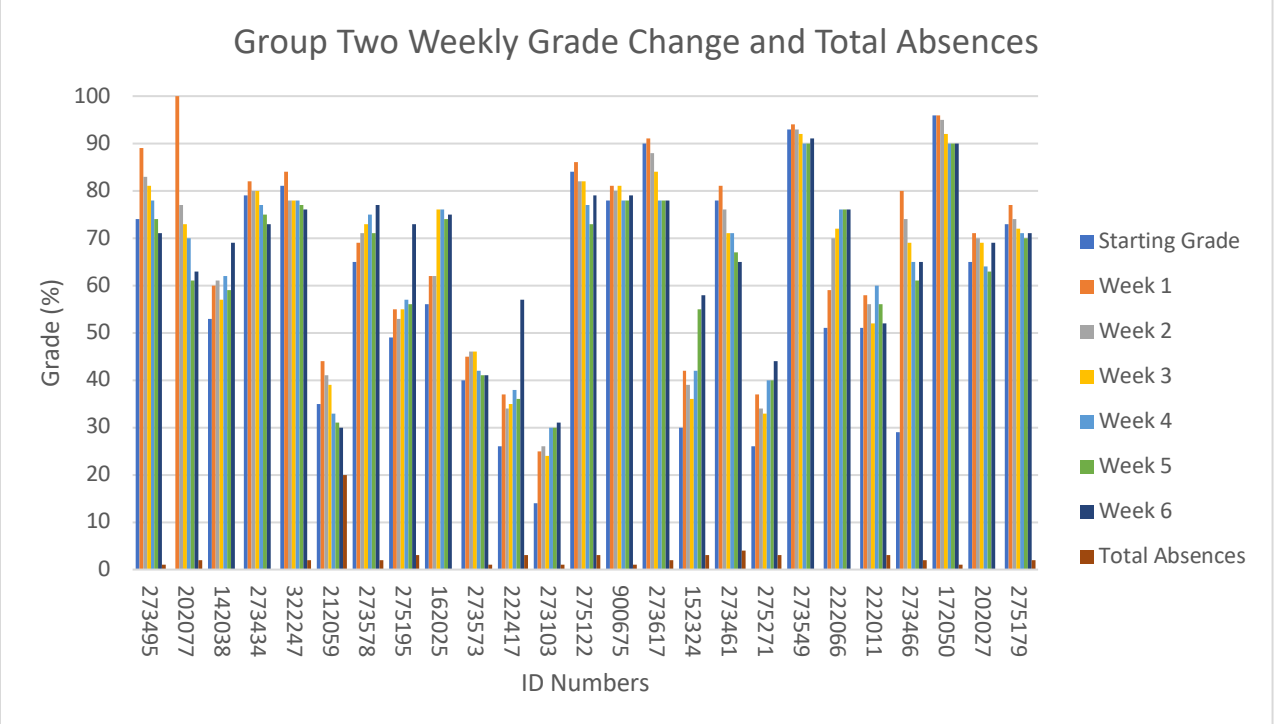

Figure 2. Scores of Group Two Math with Overall Absences or Missed Instruction

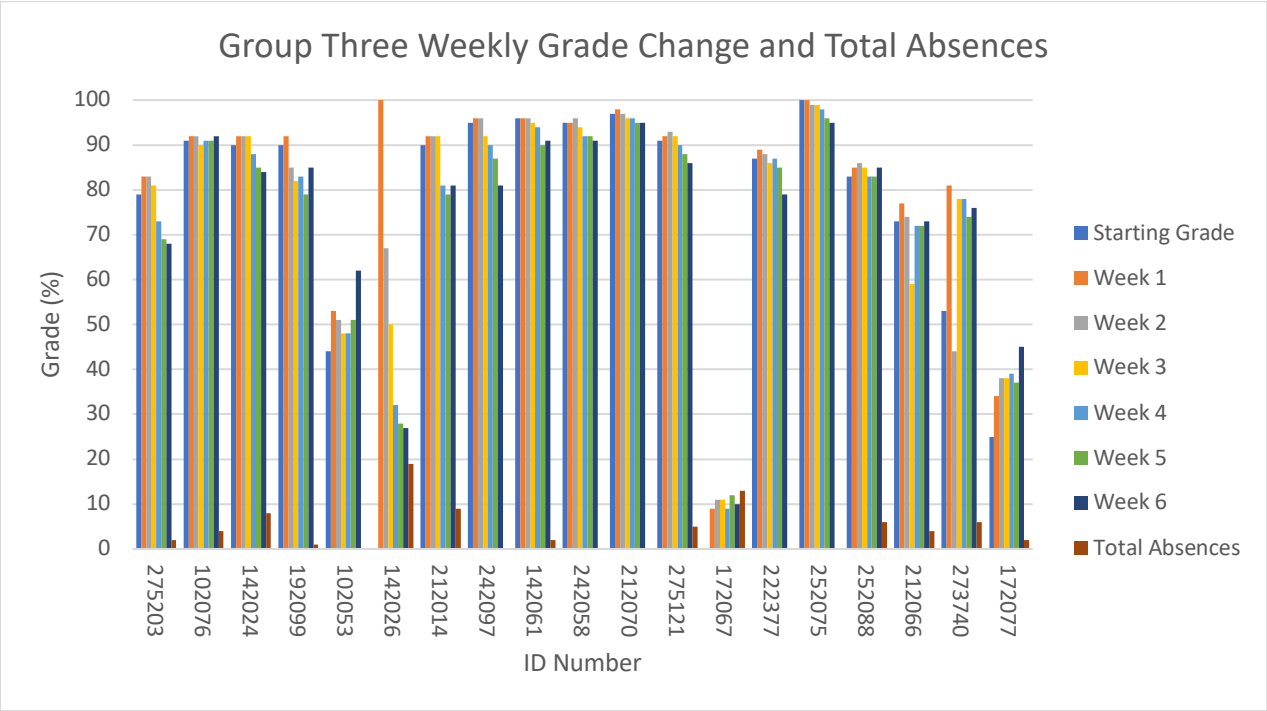

Figure 3. Scores of Group Three Math with Overall Absences or Missed Instruction

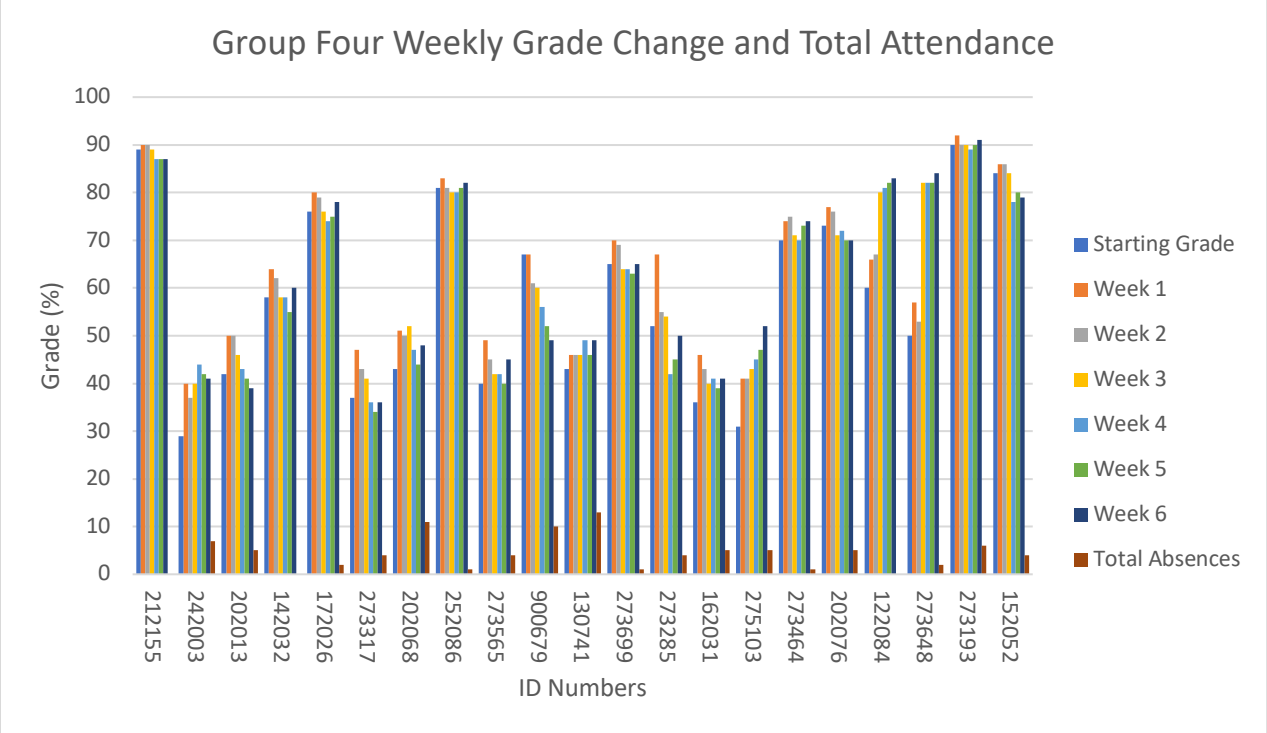

Figure 4. Scores of Group Four Math with Overall Absences or Missed Instruction

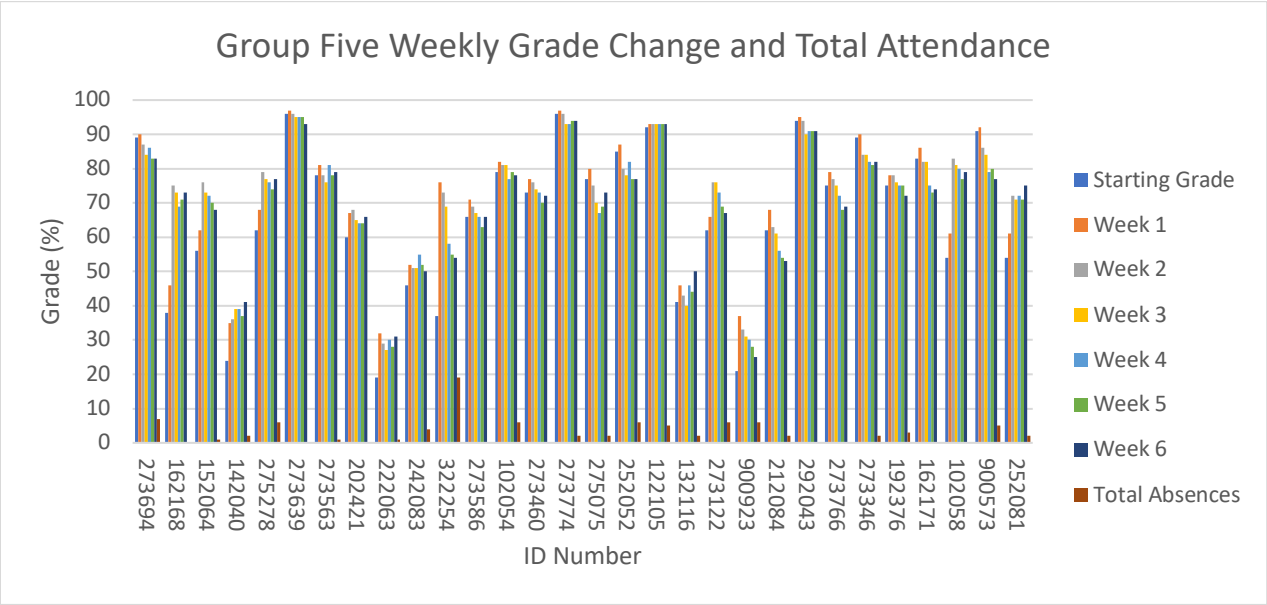

Figure 5. Scores of Group Five Math with Overall Absences or Missed Instruction

Chapter two math. This section will describe the results based on the chapters of math instruction. Chapter Two took three and a half weeks to cover, the final two and a half weeks were for Chapter Three. As previously stated, the pretest was administered scores ranged from 0% to 36%, or 0 to 10 points and a mean of 3.36 points (12.34%) when completed.

During the three and a half weeks used to cover this chapter, 81 participants (69.23%) were absent at least one day, with 36 (30.77%) having perfect attendance throughout the entire chapter. The mean number of missed days per participant was 2.07. Seventy-one participants (60.68%) were absent for 1-5 days, 9 participants (7.69%) were absent for 6-10 days, with one participant (0.85%) being absent for 11 days and no one was absent for more than 15 days. Table 2 on the following page, the number of days absent, the frequency and the percentages are listed for each increment.

The Chapter Two Final Test, as previously stated, was given in Week Four, had average score of 15.59 points or 55.68%. These results show an average increase of 44.12% from the

pretest administered in Week One, the change in score was in the range of a 29% decrease and a 92% increase. Those who had perfect attendance had a mean score of 60.75%. The 71 participants that were absent for 1-5 days have a mean score of 57.31%. Table 2 presents the breakdown for the mean scores based off the absence frequencies, for Chapter Two along with the percentage for each of those intervals.

Table 2

Chapter Two Frequency and Percentage of Participants Absences Ranging from One to Eleven Days and Corresponding Mean Test Score.

Days	Frequency	Percent	Mean Test Score
0	36	30.77	60.75
1	28	23.93	63.61
2	16	13.68	48.69
3	12	10.26	58.17
4	11	9.4	51.27
5	4	3.42	59.25
6	2	1.71	53.5
7	2	1.71	26.5
8	2	1.71	24.5
9	1	0.85	0
10	2	1.71	3.5
11	1	0.85	53
Total	117	100	

Chapter three math. In regard to the Chapter Three test it was previously mentioned that in Week Four the pretest was administered and completed with scores ranging 0%-66% and a mean score of 5.48 points (30.49%). Those that were absent for the pre-test received a zero for the reference of grade growth. During the two and a half weeks used to cover Chapter Three, 58 participants (49.57%) were absent at least one day, with 59 participants (50.43%) having perfect attendance this chapter. Fifty-four participants (46.15%) were absent for 1-5 days, 4 participants (3.42%) were absent for 6-10 days, and no participants were absent for more than 10 days.

The Chapter Three Posttest was reported in Week Six the mean score was 9.84 points (54.72%) with a range in scores from 0% to 100%. Chapter Three test overall showed a mean increase in scores of 4.29 points (23.84%). Twenty-one participants showed a decrease in their scores from the pre to post test, the mean decrease was 30.81%, with a range in decrease between 55% and 5%. Within those 21 participants there were 18 that were absent on Chapter Three Test Day who received zeros. Without those participants, the mean decrease adjusts to 19.57%, within a range decrease from 5% to 44%. The 59 participants (50.43%) who had perfect attendance all chapter had a mean score of 66.12%. The 54 participants absent for 1-5 days have a mean test grade of 45.35%. Four participants were absent for at least 6-10 days with a mean test grade of 0%. Table 3 (shown below) illustrates not only attendance frequency and percentage along with the mean test score for each absence amount, for Chapter Three.

Table 3

Frequency of Absences and Percentage of Participants With Corresponding Mean Test Score.

Days	Frequency	Percent	Mean Test Score
0	59	50.43	66.12
1	16	13.68	66.25
2	21	17.95	47.19
3	7	5.89	26.86
4	9	7.63	23.33
5	1	0.85	0
7	1	0.85	0
9	1	0.85	0
10	2	1.71	0
Total	117	100	

Overall analysis. Overall, after the six weeks of data collection, the mean grade change was 5.91%. This is after the completion of all tests and other related assignments to each chapter. Out of the 117 participants, 64 of them (54.7%) had an increase or no change in their overall math grade. Leaving the other 53 participants (45.3%) having a decrease in their overall math grade after the six weeks of data collection.

For the 64 participants who had an increase in their grade, 13 of the participants (20.31%) with an increase also had perfect attendance and their mean increase was 16.82%. There is one participant (0.85%) that showed no change in grade and had perfect attendance, the no change in grade however is still considered an increase. Table 4 (shown below) presents the frequency of missed days and the mean grade increase for each interval.

Table 4

Absence Frequency Ranging from Zero to Nineteen and Mean Grade Increase for Participants.

Days	Frequency	Mean Grade Increase
0	14	16.82
1	9	8.89
2	9	27.22
3	6	20.83
4	6	6
5	6	15.67
6	6	8.33
7	2	18.5
11	2	24.5
13	2	8
19	2	23
Total	64	

The remaining 53 participants (45.3%) had a decrease in their overall math grade after the six weeks of data collection. For those grade decreases, the mean was 5.4%. The range in

absences was from 1 to 20 days. There were 16 participants (30.19%) who had a decrease in class grade with a mean decrease of 4.63% even with perfect attendance. Table 5 below shows the frequencies of days missed and the mean grade decreases for each of the increments. The section following Table 5 (shown below) discusses the results of the study based on the research questions.

Table 5

Absence Frequency Ranging from Zero to Twenty and Mean Grade Decrease for Participants.

Days	Frequency	Mean Grade Decrease
0	16	4.63
1	4	3.75
2	11	5.45
3	5	4.25
4	3	6.67
5	5	8.4
6	3	3.67
7	1	5
8	1	6
9	1	9
10	1	18
13	1	3
20	1	5
Total	53	

Does the Frequency or Duration of Discipline have a Direct Relation to Math Academic Success?

Throughout the first three and a half weeks of data collection, or through chapter two, only 25 participants received discipline removals or suspensions, which is 21.37% of the participant population. There was a total of 54 days of removal. Twenty-eight or 51.85% of those days were suspension days that were given to only 9 participants, which is 7.69% of the total population and 16.67% of discipline removal days. The nine participants were 36% of those who received at least one discipline issue. The following two and a half weeks of data collection or the days used for chapter three, only 8 participants (6.83%) of the population received discipline removal or suspensions. Out of those 8 participants there were 8 suspension days given out of the total discipline days of 12. Those 8 suspension days accounted for 66.67% of discipline issues and were given to four participants (33.33%) of the disciplined population.

Over the entire six weeks, 66 days of instruction was lost due to discipline removal. All 8 participants that received discipline removal in chapter three also received discipline removal in Chapter Two, leaving the total at 25 participants affected by discipline. With the 25 participants affected and the 66 days of instruction lost that averages out to a mean of 2.64 days per participant. Table 6 (shown below) illustrates the 25 participants in relation to the mean grade change of all 117 participants. When examined, participant number 142026 has a steady decrease in class grade and had many days of missed instruction. This participant was new to the class at the start of the data collection; therefore, no grade was available.

Table 6

Mean and Percentage of Score for Six Weeks for Participants with Discipline Days and Missed Instruction.

ID Number	Day 1 Grade (%)	Week of Data Collection						Difference Week 1 to 6	Days
		1	2	3	4	5	6		
Mean	61.41	69.66	68.28	67.67	66.71	65.71	67.34		
172070	36	40	38	72	69	69	69	+33	2
275176	26	35	32	30	40	40	49	+23	2
273499	56	50	52	47	50	50	53	-3	9
292237	60	64	75	74	75	73	80	+20	2
132352	37	46	48	48	44	44	51	+14	2
273186	19	26	46	45	52	53	48	+29	2
275195	49	55	53	55	57	56	73	+24	2
275122	84	86	83	82	77	73	79	-5	3
273461	78	81	76	71	71	67	65	-13	3
222011	51	58	56	52	60	56	52	+1	2
102076	91	92	92	90	91	91	92	+1	1
142026	0	100	67	50	32	28	27	+27	10
212014	90	92	92	92	81	79	81	-9	3
275121	91	92	92	92	90	88	86	-5	3
273740	53	81	44	78	78	74	76	+23	1
172067	0	9	11	11	9	12	10	+10	1
212066	73	77	74	59	72	72	73	0	1
242003	29	40	37	40	44	42	41	+12	4
202013	42	50	50	46	43	41	39	-3	3
900679	67	67	61	60	56	52	49	-18	2
130741	43	46	46	46	49	46	49	+6	1
162031	36	46	43	40	41	39	41	+5	2
273694	89	90	87	84	86	83	83	-6	1
102054	79	82	81	81	77	79	78	-1	3
273122	62	66	76	76	73	69	67	+2	1
Total 25									66

The overall grade does not appear to be negatively affected by the number of removal days. However, the overall grade is not the only aspect affected by discipline removal; chapter test grades are also impacted. Eight participants who were removed for discipline purposes had a decrease in overall math grade.

Table 7, (shown below) the total participant averages for pretest are being compared to those participants who received discipline removals. It is important to note that the discipline in Table 7 below was split into the two chapters. Participants that had more discipline issues in Chapter Two did better in Chapter Three when they were not removed for discipline purposes. Eleven participants scored with a change amount below the mean in Chapter Two and in Chapter Three, fourteen students scored below the average change in score as well, in both situations these participants missed days due to discipline issues.

Table 7

Pre- and Post-Tests Scores for Chapters Taught and Discipline Days with Missed Instruction..

	Chapter Two				Chapter Three			
ID Numbers	Pre	Post	Change	Days	Pre	Post	Change	Days
Mean	12.34	55.68	43.34		30.49	54.72	24.23	
132352	4	10	6	1	16	77	61	1
275195	0	64	64	1	22	61	39	1
222011	29	89	60	1	16	11	-5	1
102076	18	92	74	1	55	0	-55	1
273740	18	78	60	1	0	66	66	0
172067	0	21	21	1	8	0	-8	0
212066	18	82	64	1	66	77	11	0
242003	36	57	21	1	27	0	-27	3
130741	0	50	50	1	38	0	-38	0
273694	31	92	61	1	0	77	77	0
273122	62	53	-9	1	22	61	39	0
202013	4	14	10	2	11	33	22	1
900679	0	28	28	2	27	11	-16	0
275121	0	78	78	2	22	55	33	1
162031	4	39	35	2	16	33	17	0
172070	25	50	25	2	27	72	45	2
275176	0	82	82	2	16	66	50	0
292237	25	75	50	2	27	72	45	0
273461	18	67	49	2	44	50	6	1
273186	0	10	10	2	22	38	16	0
102054	7	53	46	3	27	0	-27	0
275122	0	46	46	3	38	66	28	0
212014	11	25	14	3	0	83	83	0
142026	29	7	-22	7	0	0	0	3
273499	0	53	53	9	50	0	-50	0
Total 25				54				12

Does School Attendance have a Direct Relation on Math Academic Success?

After removing the number of participants that had perfect attendance and those who were removed for discipline purposes, there were 63 participants (53.85%) who were absent at least one day, had a range from 1-19 days and a mean of 3.7 days per participant. The total number of instructional days missed for unexcused or excused absences was 233. There were no participants that had 9, 10, or 12-18 days of missed instruction. Table 8 (provided below) illustrates the frequency for each amount of days missed within the entire six weeks of data collection. The percentage of the population that belongs to that specific frequency can be seen as well.

Table 8

Frequency of Number of Instructional Days Missed and as a Percentage of the Sample

Days	Frequency	Percent
1	15	23.81
2	19	30.16
3	6	9.52
4	5	7.94
5	6	9.52
6	6	9.52
7	1	1.59
8	1	1.59
11	2	3.17
19	1	1.59
20	1	1.59
Total	63	100

As shown in Table 8 majority of the participants that missed instructional days, missed between one to two days. However, missing these days did not automatically mean that there was a decrease in the overall class grade. Out of these participants with absences, 35 of them (55.56%) showed an overall grade increase, while the remaining 28 participants (44.44%) showed a grade decrease over the six weeks of data collection. Table 9 (shown below) demonstrates the frequency of how more participants increased their grade rather than decreased the grade. This was regardless to the number of days of instruction that were missed. In addition, those who decreased their grades had lower number of absences. Grades decreasing the most at two days of instruction missed, while participants who missed only one day had an increase in their grade.

Table 9

Frequency of Missed Days and Percentage of Participants with Grade Increase and Decrease

	Grade Increase		Grade Decrease	
Days	Frequency	Percentage	Frequency	Percentage
1	11	73.33	4	26.67
2	8	42.11	11	57.89
3	3	50	3	50
4	2	40	3	60
5	3	50	3	50
6	4	66.67	2	33.33
7	1	100	0	0
8	0	0	1	100
11	2	100	0	0
19	1	100	0	0
20	0	0	1	100
Total	35	55.56	28	44.44

Findings, Implications, Limitations

Findings

The overall purpose of this study was to determine if there is a relationship between the type or amount and duration of disciplinary action and attendance to math academic achievement. In this is the section**,** the findings of the research questions will also be addressed.

The first research question being; *Does the frequency and duration of discipline have a direct relation to math academic success?* Meaning that the more the participants are removed for discipline reasons the lower their math academic achievement would be. Based off data gathered in relation to discipline, attendance does have an impact on math academic success**,** but there was not enough sufficient evidence to determine if there is a pattern in grade change or a relationship. According to Table 6 (page 39), about the 25 participants (21.36%) whose overall grade was affected by discipline removal or suspensions, 13 (52%) of the participants had grade increases while 12 (48%) of the participants had an average grade decrease. There was no pattern to be discovered in terms of overall grade change; in terms of chapter test successes, same could be said. From Table 7 (page 41) about the 25 participants who had discipline issues, 14 (56%) of the student participants had more than the average test increase in chapter two, and 11 (44%) of the participants had scored more than the average for chapter three as well.

Followed by the second research question; *Does school attendance have a direct relation on math academic success?* Inferring that the more a student is absent from class instruction time the lower math academic success they would achieve. According to Table 8 (page 42), 34 participants (29.05%) missed between one and two days, while 63 participants (53.84%) overall missed more than one day. While it can be determined that attendance does have an impact on math academic success**,** there is not sufficient evidence from the data reported to support a direct

relationship. Although 44.44% of the time absences lead to grade decreases, it does not have a direct relation.

This study had one other purpose; to improve classroom discipline procedures. As a result of the improved procedures it would create a better learning environment. In knowing what the researcher does in terms of discipline procedures, having classroom routines, classroom procedures and listed expectations it can be assumed that these things assist in preventing discipline removals or other situations that ended with discipline issues. In knowing this there is no data to support it, the researcher would have to compare it to another classroom with similar class makeups and lessons. More data would have to be gathered to support this purpose.

Implications

This study has implications for other educators, administration, parents and students. For teachers, this study provides a reasoning for more defined classroom routines and procedures to prevent discipline issues from arising, in knowing that discipline affects grades educators can strive to be proactive instead of reactive when it comes to classroom management. After realizing the impact on teachers, the impact on administration becomes more defined.

This study can assist administrator or administration in providing resources for teachers and professional development. In knowing that attendance and discipline have an impact in grades they can look for ways to assist students who have had to be removed from the learning environment, while still trying to involve them in learning the material that they are missing instructional time about. Besides having impact on the educators and administrators, the study has an impact on the students and their families.

For parents the implication is that it informs them that the more their student is in school and receiving academic instruction the more likely they are of math academic success. They may also be more inclined to instill in their student that being in class is important and teach them proper behaviors required to be in the classroom without being removed from the learning environment. They may also think twice when the student asks to stay home just because they do not want to go to school and tell them the importance of their education once more.

For students, some may need a motivation to continue following classroom expectations and attending school in general. Many of the students who participated in this study still find that their grades mean something to them and if they knew that keeping their grades up would mean coming to school and behaving appropriately, their attendance might improve.

Limitations

One of the limitations to this study would be the short time frame. A time span longer than six weeks would provide more data on all aspects of this study. Discipline, attendance, and math academic achievement would have more data throughout an entire school year or quarter; these relationships appear differently when more data is gathered. If the time frame was longer more data could be gathered on math topics that require more teaching because of the depth of knowledge being required to understand. A longer time frame would also allow for make-ups on test which were missed to get a more accurate account of knowledge gained. The topics covered in this study by the participants were still considered somewhat review topics from the year previous, while expanding on those topics to prepare them for future lessons in eighth grade. Conducting this study throughout a whole school year or two would provide a more accurate account of relationships between attendance, discipline, and math academic achievement.

Another limitation would be that all students started at different grades. Not having the same starting point left it hard to determine if grade increases were due to the low start of their grade or the student starting to do work or if the high grade kept grades from dropping when they missed instruction due to absences or discipline.

Reflection and Action Plan

Reflection

As I wrap up this study, I as the teacher researcher have much to reflect on, the thing that has been at the top of the list is the large sample size. Below that came, the extra homework assignments, how to interpret the data without rambling on about numbers, and lastly how to present the information in tables and figures. All of these things made an impact on the data collection, and presentation of information included.

In terms of sample size, the thought early on was that it would be helpful, more data means its more reliable. A bigger sample size provides more data to make connections and see or find patterns within it. However, it seems that in all the data it was easier to get lost in the numbers and take a step back to see how the students were doing. Overall, it also made me more aware of how my students preform not only on homework and tests but also in attendance. Yes, as a teacher attention is paid to who is there and who is not, but you do not notice how it adds up especially over a six-week time frame. It is surprising that you can be out of school, missing instructional time for 20 school days when there are only 28 school days in those six weeks. Not only are they missing out on math instruction but every other subject as well. I guess what I am trying to say is that now because of this I am more aware of those who are excessively absent. I am also more aware of all the great students that I get to teach, so often I get wrapped up in the

miss behaviors that I forget about those who do what I expect of them every single day, that is something that I appreciate about doing this study that will not be easily forgotten.

When it comes to interpreting data, I started with averages overall end of the week grades and the standard deviations to go along with it. From there I went to averages for the homework assignments, pre- and post- tests, and finally number of days missed that week. Even for those topics I found the standard deviations as well along with the ranges for all topics previously mentioned. Once I found all my averages along with standard deviations, I was able to compare data to see which students fell within one standard deviation or not. When it came to working with the numbers, I probably waited a little too long before starting to analyze it. I thought finding the change for each student noting the number of days absent it would make the math go a lot faster. Not until I started to actually find all the averages and everything, did I realize how much information I got, and that there were so many ways I could compare them in order to show how discipline and attendance affect math academic achievement.

In terms of presentation of the information, a large amount of time was spent deciding how to show or present the information gathered and analyzed. With such a large sample size, it was difficult to decide how to create figures. I wanted to originally create a figure with all 117 participants, but that would be too large to put into this paper. So, it was decided that I had to put them in as class groups, one for each hour, first, third, fourth, fifth, and sixth, that was for overall change to show data for all six weeks. When it came to discipline, I used only the 25 students affected by discipline removal or suspensions and created tables instead of graphs; they seemed easier to follow specific student scores. This was a decision once again because of sample size but I compared it to the overall averages for all 117 participants for comparison. That same decision was made when I decided to focus on the 63 students affected by attendance

non discipline related and put it in a frequency table. I focused more on the frequency of days missed and how their grades were affected, whether it was a grade increase or a grade decrease. Overall, it took me practicing multiple methods to figure out what works better for this study.

This overall experience has been a learning curve that has exposed me to parts of my career that I had forgotten. Mostly that the good can be buried in the bad, and that we should let the good things affect our days more than the bad. When it comes to the data, I learned that yes, a large sample size can be helpful in providing information but there is such a thing as too much information. Too much information can lead to things being forgotten or overlooked. However overall, I feel that this was a positive experience that can shape my future in education, it definitely makes me more interested in discipline and attendance influences.

Action Plan

In reaction to this study, I will share it with my co-coworkers, administration, and fellow educators. I feel that the more we are aware of influencers on grades and achievement the more we can prepare for it and prepare our students for the future. I would eventually like to share this information with the community of parents and guardians involved in their students' lives. I feel like the more you know about what can negatively impact achievement the better you can prepare. Any decision that they make after this information is shared may be impacted based off of what they get from this study. I do not wish to publish this study but any work that I may do similar to this in the future that may cover a larger time frame may be published someday. The main goal for this study is to influence people's decisions and ideas to hopefully lead to the best education possible for all students going through the school system because that is what they deserve, it's what we all deserve.

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Appendix A

The pre-test will also be used for the post-test. This statement is true for both chapters.

Name _____ Date _____ Class_____

MODULE 2

Exponents and Scientific Notation

Module Quiz: D

1. Which number is equal to the following?
   9×10^3
   A 90 C 9,000
   B 93
2. Which factor in 5.32×10^9 shows a power of 10?
   A 5.32 C 10^9
   B 9
3. Which is the correct power to change 810,000 into scientific notation?
   $810{,}000 = 8.1 \times$ ____
   A 10^5 C 10^7
   B 10^6
4. Which describes the first factor of a number written in scientific notation?
   A less than 0
   B greater than 10
   C greater than or equal to 1 and less than 10
5. Find the value of 2^3.
   A 6
   B 8
   C 23
6. What is a population of 930,000 people written in scientific notation?
   A 9.3×10^5
   B 9.3×10^6
   C 93×10^6
7. In 9.3×10^{-6} the exponent is a negative number. Which of these describes the value of a number in scientific notation that includes a negative exponent?
   A negative
   B very small
   C very large
8. What is this length in standard notation?
   0.7×10^{-4} inch
   A 0.000007 inch
   B 0.00007 inch
   C 0.0007 inch
9. What is this distance in scientific notation?
   0.0065 meter
   A 6.5×10^{-4} meter
   B 6.5×10^{-3} meter
   C 65×10^{-3} meter
10. Simplify the expression $(5 - 1)^2 - (6 - 5)^3$.
    A 15
    B 16
    C 17
11. Which number is the greatest?
    A 2.3×10^{-3}
    B 1.5×10^{-4}
    C 8.6×10^{-2}
12. What is the missing exponent?
    $v^{-6} = \left(v^{?}\right)^{-4}$
    A –4
    B –2
    C 2
13. A student divided 10 meters of wire into 6 equal parts. Which type of number describes the length of each part?
    A whole number
    B integer
    C rational number

Name _____ Date _____ Class_____

MODULE 2

Exponents and Scientific Notation

14. This number is written in scientific notation. What is the exponent?
    3.5×10^6
    _____
15. The value of 10^4 is 10,000.
    Use this fact to change 5.2×10^4 to standard notation.
    $5.2 \times 10^4 = 5.2 \times$ ___ =
    _____
16. Complete the steps to change 4,700 to scientific notation.
    $4{,}700 = 4.7 \times 1{,}000 =$
    _____ × _____
17. Write your answer in scientific notation.
    $(3 \times 10^5) - (1.4 \times 10^5)$
    _____
18. Write 8.5×10^6 in standard notation.
    _____
19. Use a negative exponent to complete this equation.
    $0.005 = 5 \times 10^{?}$
    _____
20. $0.00087 = 8.7 \times 10^{-4}$
    How many places does the decimal point move to change 0.00087 into scientific notation?
    _____
21. Write 0.0007 in scientific notation.
    _____
22. Write 1.4×10^{-2} in standard notation.
    _____

For 23–26, use the table.

Size (meters)	
water molecule	3.2×10^{-10}
small transistor	1.6×10^{-6}
grain of salt	1.6×10^{-4}
large ant	2.5×10^{-2}
height of Mount Everest	8.9×10^3
diameter of the sun	1.4×10^9

23. Write the height of Mount Everest in standard notation.
    _____
24. Write the size of the ant in standard notation.
    _____
25. Write the largest number in standard notation.
    _____
26. Which is larger, the transistor or the grain of salt?
    _____
27. Which number in this list is the greatest?
    $\pi,\ 4.\overline{686},\ \sqrt{30},\ \frac{18}{5}$
    _____
28. Write your answer in scientific notation.
    $(5.3 \times 10^7) - (1.1 \times 10^6)$
    _____

Name _____ Date _____ Class _____

MODULE 3

Proportional Relationships

Module Quiz: D

Use the table for 1–3.

Dan's Dog-Walking Business

Time (h)	1	2	3	4
Charge ($)	5	10	15	

1. How much does Dan charge per hour for walking dogs?
   - A $1
   - B $5
   - C $20
2. What is the missing number in the table?
   - A 16
   - B 20
   - C 40
3. Which equation shows the relationship in the table?
   - A hours = 5 × dollars
   - B dollars = 5 + hours
   - C dollars = 5 × hours
4. Which table shows a car moving at a constant speed?

   A

Time (h)	1	2	3
Distance (mi)	50	150	250

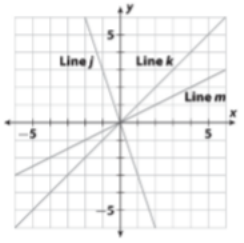
   B

Time (h)	1	2	3
Distance (mi)	50	100	150

   C

Time (h)	1	2	3
Distance (mi)	50	500	5,000

Use the graph for 5–6.



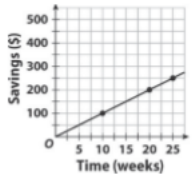
5. Which line has a negative slope?
   - A line *j*
   - B line *k*
   - C line *m*
6. What is the slope of line *m*?
   - A −2
   - B $\frac{1}{2}$
   - C $\frac{2}{3}$
7. Every 3 hours, a machine produces 60 baskets. What is the unit rate?
   - A 3 per hour
   - B 20 per hour
   - C 57 per hour
8. Which of the following is a negative rational number?
   - A −4.5
   - B $-\pi$
   - C $-\sqrt{5}$

Name _____ Date _____ Class _____

MODULE 3

Proportional Relationships

Use the graph for 9–10.



9. Complete the table with the coordinates of the 3 points shown by black dots on the graph.

Time (weeks)			
Savings ($)			

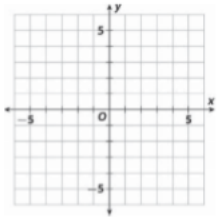
10. Write an equation in the form $y = kx$ for the line on the graph.

_____

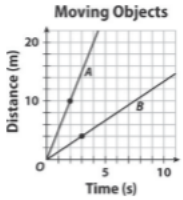
11. Carla is renting a canoe. It costs $80 for 2 hours and $160 for 4 hours. What is the rate per hour?

_____

12. Plot points at (0, 0) and (3, 4). Draw a line through the points. What is the slope of your line?



Use the graph for 13–14.



13. The graph shows 2 objects moving at a constant speed. Find the speed of Object *A* in meters per second.

_____

14. Which moving object has a greater unit rate? Explain how you know.

_____

_____

_____

15. Hiking at a constant rate, Fred covers 1.5 miles in 1 hour. Predict how far Fred can hike in 10 hours.

_____

16. A thin human hair is about 1.7×10^{-5} meter in diameter. Write this measurement in standard notation.

_____

Appendix B

These homework assignments will be used throughout the two chapters being taught as check-in's on current math understandings.

Name _____ Date _____ Class_____

LESSON 2-1

Integer Exponents

Practice and Problem Solving: D

Write each expression without exponents. Then find the value. The first one is done for you.

1. $4^{-4} = \frac{1}{4 \times 4 \times 4 \times 4} = \frac{1}{256}$
2. $6^2 =$ _____
3. $3^5 =$ _____
4. $24^0 =$ _____
5. $7^{-2} =$ _____
6. $10^5 =$ _____

Simplify each expression. Show your work. The first is done for you.

7. $\frac{(3 \cdot 2)^8}{(7-1)^4} = \frac{6^8}{6^4} = 6^{8-4} = 6^2 = 36$
8. $(3)^2 \bullet (3^1)$
9. $4^2 \bullet 4^3$
10. $(4^2)^3$
11. $(4-3)^2 \bullet (5 \bullet 4)^0$
12. $(2+3)^5 \div (5^2)^2$

Answer the question.

13. Find the value of $(2^2)^3$. Then find the value of $(2^3)^2$. What is true about the results? Explain why.

Name _____ Date _____ Class_____

LESSON 2-2

Scientific Notation with Positive Powers of 10

Practice and Problem Solving: D

Write each product in standard form. The first one is done for you.

1. $10 \times 10 =$ 100
2. $10 \times 10 \times 10 \times 10 \times 10 =$
3. $10 \times 10 \times 10 \times 10 =$
4. $10 \times 10 \times 10 =$

Write each number as a product of tens. The first one is done for you.

5. $100{,}000 =$ $10 \times 10 \times 10 \times 10 \times 10$
6. $10{,}000{,}000 =$
7. $10{,}000 =$
8. $100{,}000{,}000{,}000 =$

Write each number as a power of ten and an exponent. The first one is done for you.

9. $1{,}000 =$ 10^3
10. $10 =$ _____
11. $100{,}000 =$ _____

Write each power of ten in standard form. The first one is done for you.

12. 10^1 10
13. 10^3
14. 10^4
15. 10^9
16. 10^5
17. 10^0

Write the exponent for the question mark. The first one is done for you.

18. $3{,}600 = 3.6 \times 10^{?}$ 3
19. $450 = 4.5 \times 10^{?}$ ___
20. $5{,}000{,}000 = 5 \times 10^{?}$ ___
21. $6 = 6 \times 10^{?}$ ___

Write each number in standard form. The first one is done for you.

22. $3.56 \times 10^3 =$ 3,560
23. $9 \times 10^3 =$
24. $6.875 \times 10^4 =$
25. $4.005 \times 10^6 =$

Solve.

26. The volume of a cube is 10 feet times 10 feet times 10 feet. Write this product as one number in standard form.

Name _____ Date _____ Class_____

LESSON 2-3

Scientific Notation with Negative Powers of 10

Practice and Problem Solving: D

Write each product in standard form. The first one is done for you.

1. $\frac{1}{10\times10} = \frac{1}{100}$
2. $\frac{1}{10\times10\times10\times10\times10} =$ _____
3. $\frac{1}{10\times10\times10\times10} =$ _____
4. $\frac{1}{10\times10\times10} =$ _____

Write each number as a product of tens. The first one is done for you.

5. $\frac{1}{100,000} = \frac{1}{10\times10\times10\times10\times10}$
6. $\frac{1}{10,000,000} =$ _____
7. $\frac{1}{10,000} =$ _____
8. $\frac{1}{100,000,000,000} =$ _____

Write each number as both a power of ten and a negative exponent. The first one is done for you.

9. $\frac{1}{1,000} = \frac{1}{10^3} = 10^{-3}$
10. $\frac{1}{10} =$ _____
11. $\frac{1}{100} =$ _____
12. $\frac{1}{10,000} =$ _____

Write in standard form. The first one is done for you.

13. $\frac{1}{10^1} = \frac{1}{10}$
14. $\frac{1}{10^3} =$ _____
15. $\frac{1}{10^4} =$ _____
16. $\frac{1}{10^9} =$ _____
17. $\frac{1}{10^5} =$ _____
18. $\frac{1}{10^{12}} =$ _____

Identify the unknown exponent. The first one is done for you.

19. $0.00036 = 3.6 \times 10^{-4}$
20. $0.450 = 4.5 \times 10^{-}$ _____
21. $0.00000005 = 5 \times 10^{-}$ _____
22. $0.00600 = 6 \times 10^{-}$ _____

Write each number in standard form. The first one is done for you.

23. $3.56 \times 10^{-3} =$ 0.00356
24. $9 \times 10^{-5} =$ _____
25. $6.875 \times 10^{-4} =$ _____
26. $4.005 \times 10^{-6} =$ _____

Solve.

27. The volume of a box is found by multiplying its length, width, and height. The three sides are 0.5 foot, 0.75 foot, and 0.4 foot. Find the product. Write it in scientific notation.

_____

Name _____ Date _____ Class_____

LESSON 2-4

Operations with Scientific Notation

Practice and Problem Solving: D

Add or subtract. Write your answer in scientific notation. The first one is done for you.

1. $2.4 \times 10^2 + 3.3 \times 10^4 + 7.2 \times 10^3$

   $240 + 33{,}000 + 7{,}200 = 40{,}440$

   $= 4.044 \times 10^4$

2. $1.2 \times 10^4 - 1.5 \times 10^3 - 2.2 \times 10^2$

   _____

   _____

3. $7.3 \times 10^5 + 1.6 \times 10^6 + 4.7 \times 10^5$

   _____

   _____

4. $8.2 \times 10^4 - 2.4 \times 10^4 - 1.5 \times 10^3$

   _____

   _____

Multiply or divide. Write your answer in scientific notation. The first one is done for you.

5. $(3.2 \times 10^3)(6.4 \times 10^9) = (3.2 \times 6.4) \times (10^3 \times 10^9)$

   $= 20.48 \times 10^{3+9}$

   $= 20.48 \times 10^{12}$

   $= 2.048 \times 10^{13}$

6. $\frac{9.6 \times 10^5}{5 \times 10^4} =$

   _____

   _____

   _____

7. $(2.5 \times 10^4)(4.1 \times 10^4) =$ _____

   _____

   _____

   _____

8. $\frac{6.4 \times 10^{10}}{3.2 \times 10^2} =$ _____

   _____

   _____

   _____

Write each number using calculator notation. The first one is done for you.

9.	Scientific notation	7.1×10^5		4.4×10^{-3}	
10.	Calculator notation	7.1E+5	3.3E−3		6.9E+5

Answer the questions.

11. How do you write one million in scientific notation? _____

12. A day is 8.64×10^4 seconds long. Write and solve an expression to find how many days are in one million seconds. Give your answer in standard form.

_____

Name _____ Date _____ Class _____

LESSON 3-1

Representing Proportional Relationships

Practice and Problem Solving: D

Use the table to answer Exercises 1–3.

Yards	1	2		4		6
Feet	3		9		15	

1. The table shows the relationship between lengths in feet and lengths in yards. Complete the table. The first column has been done for you.

2. Write each pair as a ratio. $\frac{\text{feet}}{\text{yards}} \rightarrow \frac{3}{1} = \frac{6}{\_\_\_} = \frac{\_\_\_}{3} = \frac{12}{\_\_\_} = \frac{\_\_\_}{6} = \frac{18}{\_\_\_}$

   Each ratio is equal to _____.

3. Let x represent the number of yards. Let y represent the number of feet. The equation that describes the relationship is _____.

Write the equation that describes the relationship.

4. There are 50 stars on each United States flag. Two flags have 100 stars. Three flags have 150 stars.
   Let x be the number of flags. Let y be the number of stars.

   The equation that describes the relationship is _____.

Use the table to answer problems 5–7. Tell whether each relationship is proportional. The first one is done for you.

Lemonade Recipe

Lemons	1	2	3	4	5	6
Sugar (cups)	1.5	3	4.5	6	7.5	9
Water (cups)	7	14	21	28	35	42

5. the ratio of lemons to cups of sugar _____yes_____

6. the ratio of cups of sugar to cups of water _____

7. the ratio of lemons to cups of water _____

Name _____ Date _____ Class _____

LESSON 3-2

Rate of Change and Slope

Practice and Problem Solving: D

Tell whether the rates of change are constant or variable. The first one is done for you.

1. calories per serving ___constant___

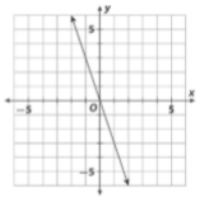
Servings	1	2	5	7
Calories	150	300	750	1,050

2. distance jumped _____

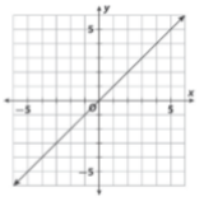
Jumps	2	4	7	10
Distance (ft)	12	24	35	55

Find the slope of each line. The first one is done for you.

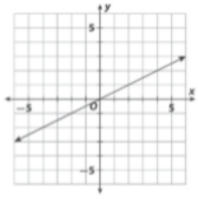
3. slope = ___–3___



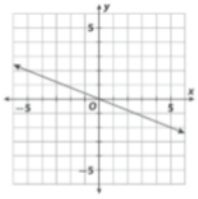
4. slope = _____



5. slope = _____



6. slope = _____



Solve. The first one is done for you.

7. In 3 hours, 654 gallons of water passed through a pipe. What was the average rate in gallons per hour at which the water passed through the pipe?

   218 gallons per hour

8. A car traveled 200 miles in 4 hours. What was the car's average rate of speed in miles per hour?

Name _____ Date _____ Class _____

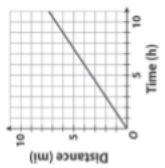
LESSON 3-3

Interpreting the Unit Rate as Slope

Practice and Problem Solving: D

Find the slope. Name the unit rate. The first one is done for you.

1. Miguel Hiking

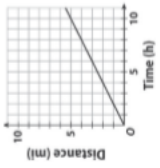


Slope = $\frac{2}{3}$

Unit rate: $\frac{2}{3}$ mile/hour

2. Brianna Hiking

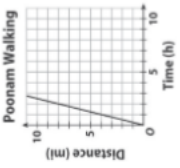
Time (h)	2	4	6	8
Distance (mi)	1	2	3	4



Slope = _____

Unit rate: _____

3. The graph at right represents the rate at which Poonam walks.



   a. What is the slope of the line?

   b. What is the speed (unit rate) at which Poonam walks?

   The equation $y = 3x$ represents the rate, in miles per hour, at which Latrice walks.

   c. The graph of the equation is a line. What is the slope of the line?

   d. What is the unit rate at which Latrice walks?

   e. Who walks faster, Poonam or Latrice? Explain

Appendix C

Stephen Decatur Middle School
Decatur District #61
#1 Educational Park Decatur, IL 62526
Phone (217) 362-3250 Fax (217) 876-8003

Matthew Fraas, Building Principal
Sharifa Blackwell, Assistant Principal
Jared Lamb, Assistant Principal
Beth Poynton, Assistant Principal

August 29, 2019

Dear Institutional Review Board Members,

As the principal of Stephen Decatur Middle School, I approve the appropriateness of the Sarah Jones' study Effect of Classroom Discipline and Attendance on Middle School Math Academic Achievement. Ms. Jones discussed the components of her study as well as the expected outcomes. She will be examining the impact of time spent out of the classroom on achievement. Completing this study at Stephen Decatur Middle School is very feasible and should be able to be completed in one semester.

If you have any questions you may contact me at the number listed above.

Respectfully,

Matt Fraas, Principal

Appendix D

September 10, 2019

Sarah Jones
Sham'ah Md-Yunus
Teaching Learning and Foundations

Dear Sarah,

Thank you for submitting the research protocol titled, "The Effect of Classroom Discipline and Attendance on Middle School Math Academic Achievement" for review by the Eastern Illinois University Institutional Review Board (IRB). The IRB has reviewed this research protocol and effective 9/10/2019, has certified this protocol meets the federal regulations exemption criteria for human subjects research. The protocol has been given the IRB number 19-075. You are approved to proceed with your study.

The classification of this protocol as exempt is valid only for the research activities and subjects described in the above named protocol. IRB policy requires that any proposed changes to this protocol must be reported to, and approved by, the IRB before being implemented. You are also required to inform the IRB immediately of any problems encountered that could adversely affect the health or welfare of the subjects in this study. Please contact me, or the Compliance Coordinator at 581-8576, in the event of an emergency. All correspondence should be sent to:

Institutional Review Board
c/o Office of Research and Sponsored Programs
Telephone: 217-581-8576
Fax: 217-581-7181
Email: eiuirb@www.eiu.edu

Thank you for your cooperation, and the best of success with your research.

John Bickford, Chairperson
Institutional Review Board
Telephone: 217-581-7881
Email: jbickford@eiu.edu