

Worcester Polytechnic Institute
Teaching Practicum IQP
at
Forest Grove Middle School

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Chapter 1

Forest Grove Middle School

1.1 Effect of Education Reform Act on Massachusetts Education

What is it?

The Education Reform Act was passed in June 1993 and implemented dramatic changes in public education over the course of a seven-year period. It put aside more funding for education and insisted on more accountability for student learning. A new set of statewide standards revamped Massachusetts education from top to bottom (Parker).

The Standards

The new standards were put in place to provide guidelines at the school, student, educator, and district levels. School authority and school policies were reorganized to have a common structure for all Massachusetts schools (“District/School Administration”). The curriculum was also reorganized and mainstreamed so that it could be used across all districts and schools. These new curriculum standards also brought new graduation requirements. Prior to the Education Reform Act, graduation requirements were primarily set by the school alone, for the most part. Now, the state has a number of requirements that act as a mandatory base, although individual schools may still have additional requirements. Changes were also made to the budget to put aside more funding for education (“School Finance”).

Organization

There were a number of major regulations that were created when school authority and policies were reorganized. The length of the school day devoted to core academic subjects was regulated to 900 hours per school year at the elementary school level and 950 hours per school year at the

secondary school level. A student council became mandatory for all school systems, which helped to better define the roles for school committees. Principals received more authority than before, and teachers were required to be tested (“District/School Administration”). All Massachusetts teachers must now pass two tests: one in the subject area he or she will be teaching and one testing his or her literacy and communication skills. The schools that do not meet these standards can be deemed as “underperforming” by the Board of Education and taken into receivership. (Parker)

The curriculum was also overhauled in order to regulate learning across the board. Before the Education Reform Act, the only statewide educational requirements were history and physical education (“District/School Administration”). Throughout the first year of the Act, the Common Core of Learning was established to assist in making lesson plans as well as standardize the expectations, goals, policies, and practices throughout school systems. Science/technology, mathematics, world languages, the arts, and health were all additions to the Common Core that were approved in December 1995, followed shortly after by the approval of English/language arts in January 1997 (“District/School Administration”). Charter schools were also introduced to school districts. These schools allowed some flexibility on these new regulations, on the condition that the same results would be produced. Although they receive less funding than public schools, they are unable to charge tuition, as they are not private schools (Eskenazi).

Graduation Requirements

Prior to the Education Reform Act of 1993, graduation requirements were usually set at the local level. Now, statewide standards depict exact conditions that need to be met in order to receive a diploma (Parker). “High-stakes” tests were introduced that were based on these new standards. All students must take and pass these exams in order to receive a diploma. The Massachusetts Comprehensive Assessment System (MCAS) exam is administered in fourth, eighth,

and tenth grades. Every student must pass the tenth grade exam in English Language Arts, Mathematics, and Science and Technology/Engineering in order to graduate (Parker).

Budget Changes

It is estimated that over \$2 billion more is spent on education now than before the Education Reform Act was passed. A “Foundational Budget” was established, which outlined an adequate spending level for a school district. On average, the cost of each student is approximately \$5,500, but that can differ based on the demographic region (“School Finance”). The goal was to have all students at the Foundational Budget by the year 2000. The Foundational Budget for Worcester is shown in the following chart from an F14 presentation that was made in March of 2013 (City Council Education Committee):

Category	Students	Rate	Total
Pre School	1,009	\$3,555	\$3,586,995
Kindergarten Half	15	\$3,555	\$53,325
Kindergarten Full	1,437	\$7,110	\$10,217,070
Elementary	6,510	\$7,153	\$46,566,030
Jr. High / Middle	4,331	\$6,781	\$29,368,511
High School	4,118	\$8,456	\$34,821,808
ELL PreK	505	\$4,544	\$2,294,720
ELL K Half	-	\$4,544	\$0
ELL KF-12	7,987	\$9,088	\$72,585,856
Vocational	1,759	\$12,894	\$22,680,546
Special Ed In District	999	\$24,745	\$24,720,255
Special Education Out of District	244	\$35,848	\$8,746,912
Low Income Elem	11,750	\$3,393	\$39,867,750
Low Income Other	7,301	\$2,744	\$20,033,944
Totals	26,908		\$315,543,722

1.2 Comparison of Massachusetts Education and TIMMS

TIMMS

TIMMS is an acronym for “Trends in International Mathematics and Science Study.” It shows the standings of the U.S.’s fourth and eighth graders in mathematics and science compared to those of over 60 other countries. Over 20,000 students participate from over 1,000 schools in the U.S., in

addition to the almost 500,000 who participate around the world. Statistics have been collected every four years since 1995 (U.S. Department of Education).

How does Massachusetts compare?

Massachusetts consistently performs very well compared to the rest of the nation, as well as other countries. East Boston fourth and eighth graders outscored the nation, as well as many international peers, in 2007. The fourth graders ranked second in science and tied for third in mathematics in the world. The eighth graders tied for first in science and ranked sixth in mathematics in the world. Thirty-six hundred students were tested from 95 randomly-selected schools in Massachusetts. Twenty percent of the eighth graders tested met the advanced benchmark in science and 16 percent met the advanced benchmark in mathematics. In addition, Massachusetts continues to improve. From 1999 to 2003, the scores for eighth graders tested have increased by 34 points in math and 23 points in science (“TIMMS Results Place Massachusetts Among World Leaders in Math and Science”).

1.3 Curriculum Frameworks for Grade 8 Numeracy

What are Curriculum Frameworks?

Curriculum Frameworks were put into place after the Education Reform Act of 1993 to mainstream the material being taught. It is a result-driven outline that sets specific standards and learning goals, based on world-class standards. It is continually updated and changed to keep up with the current standards and needs (“Educator Services Teaching & Learning Curriculum Resources”).

Grade 8 Mathematics Standards

On the Massachusetts Department of Education website, the eighth grade mathematics standards are broken down into three major areas (“MASSACHUSETTS CURRICULUM FRAMEWORK FOR MATHEMATICS”, *Current Curriculum Frameworks*):

- **Expressions and Equations**

Students should be able to “formulate and reason about expressions and equations.” They should be comfortable working with exponents of both integer and radical value. They need to understand the relationships between proportions, lines, and linear equations, as well as analyze and solve linear equations.

- **Functions**

Students should understand the concept of what a function is and how to use it to describe a quantitative relationship. They must have the ability to define, evaluate, and compare functions, as well as the ability to use model relationships between quantities.

- **Basic Geometry and Probability Skills**

Students should be able to analyze figures and space of two and three dimensions using distance, angle, similarity, and congruence. This should give them the ability to solve real-world problems using three-dimensional shapes. They should also be able to understand and apply the Pythagorean Theorem. Finally, they should be able to investigate the patterns of association in bivariate data.

1.4 The Common Core of Learning and Forest Grove’s Conversion Plans

What is the Common Core?

The Common Core of Learning was developed as part of the Education Reform Act of 1993 (Paraker). It outlines broad goals and emphasizes interdisciplinary learning. Its creation and implementation is the first of a three-step process to mainstream schools and curriculums. The second step is to create a rigorous curriculum guide in the seven major academic areas to help teachers design more thorough lesson plans. The third and final step is to have a comprehensive system that assesses the individual performance of each student as well as the collective performance of each school as a whole (Antonucci).

Why?

The Common Core was created in hopes of preparing students for the future. It is designed to give students the knowledge that is required in order to be successful in either post-secondary education or a substantive career path directly from high school. This is, in part, a result of a college education becoming “the norm” in society and a “routine expectation” for many career paths. In addition, the demand for careers has steadily increased over the past fifty years, and a higher education is often times required in order to be able to properly perform the required skills (Maryland State Department of Education).

Future Plans

A new curriculum is currently being developed and is slated to be in place by the year 2015. Maryland and Massachusetts educators are working to develop the new curriculum, which is intended to be adopted nationally. Massachusetts has already implemented 15 percent of the new standards outlined in the frameworks, in addition to its own existing standards (Maryland State Department of Education).

Worcester's Plans

Worcester has incorporated the Common Core into its 2012-2013 Action Plan (“SCHOOL ACCOUNTABILITY PLAN”). Common Core mapping was identified as the best teaching strategy and is expected to continue to expand as the Core gains greater acceptance. A new curriculum map has been created for guided math groups based on Core standards (“Overview for Parents: The Common Core Standards”). In addition, current standards are being reviewed and reevaluated based on the new standards set forth by the Common Core. The plan is to adjust current standards as necessary to be in a position to adopt the new education system once its design is complete. The belief is that the Common Core provides a better assessment of the students’ knowledge, offering a greater variety of question types and a better use of technology, which provides quick and clear

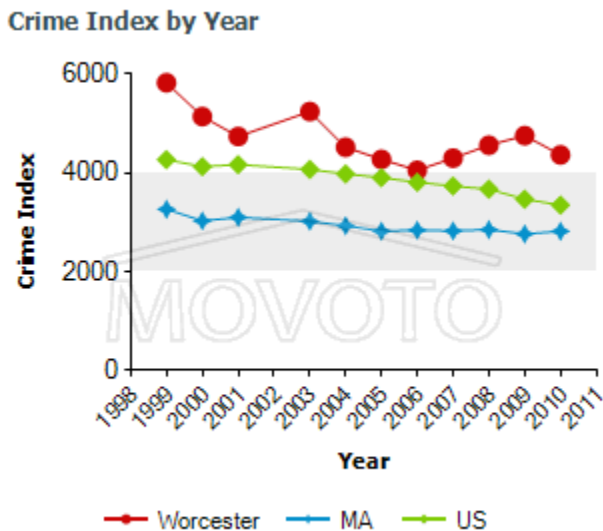
feedback. In addition, the school is working to replace out-of-date books with new books that have been written based on Common Core standards (Antonucci).

1.5 Forest Grove Socio-Economic Demographic Profile

Worcester

Forest Grove Middle School is located in a neighborhood in the Salisbury Street area of Worcester, Massachusetts. In the immediate neighborhood surrounding Forest Grove, 51 percent of the population has a household income of less than \$30,000 per year, and 35 percent has a household income of \$30,000 to \$74,999 per year. About 67 percent of the neighborhood’s residents speak English and about 20 percent speak Spanish, which is the second-most common language in the area (“Neighborhood Information for Worcester, MA 01605”). The particular area in which Forest Grove is located has a lower crime rate in comparison to the rest of the city.

Worcester as a whole, however, has a rather high crime rate in comparison to the rest of the state and the country (see graph below):



(“Neighborhood Information for Worcester, MA 01605”)

	1999	2000	2001	2003	2004	2005	2006	2007	2008	2009	2010
Worcester	5821	5136	4733	5238	4515	4270	4050	4297	4558	4752	4361
MA	3262	3026	3098	3018	2928	2819	2838	2823	2849	2761	2817
US	4266	4124	4163	4067	3977	3900	3808	3730	3667	3466	3345

(“Neighborhood Information for Worcester, MA 01605”)

Forest Grove Middle School

Forest Grove is populated by 882 seventh and eighth graders and is one of four middle schools in Worcester. Of these 882 students, 49 percent of them are eligible to receive free lunch and 9 percent are eligible to receive subsidized lunch, leaving 42 percent in the financially capable category. The student body itself consists of 49 percent female and 51 percent male.

Approximately 50 percent of these students are Caucasian, 24 percent are Hispanic, 14 percent are African American, 9 percent are Asian, 3 percent are multiple races, and less than one percent are Native American (“Forest Grove Middle School Information”). Most students attend Forest Grove for both their seventh and eighth grade years, but there are some cases in which students only attend for their eighth grade year. The vast majority of these students come from one of twelve feeder elementary schools in the city. The student-to-teacher ratio at Forest Grove is about 14.4 to 1, but the school system is striving to lower that number (“Forest Grove Middle School Information”).

1.6 Forest Grove MCAS Profile

The MCAS exam is a comprehensive “high-stakes” test that is based on the new curriculum standards. As discussed in Section 1.1, this exam must be taken and passed in the tenth grade (with specific re-test options in eleventh and twelfth grades, if necessary) in order to receive a diploma. It tests students’ knowledge in English Language Arts, mathematics, and Science and Technology/Engineering (Parker).

Since the year 2008 Forest Grove has been monitoring the percentage of students who score Proficient or above in the seventh and eighth grades. The figure has continued to increase for the

most part, although there are a few years that are inconsistent (“Worcester, MA Test Scores and Information”).

Percentages at or above Proficient Level Gr.7

	2008	2009	2010	2011
ELA	57%	58%	63%	65%
Math	33%	46%	51%	40%

The seventh grade scores have increased fairly consistently since 2008, with the exception of the mathematics scores in 2011 (“Worcester, MA Test Scores and Information”).

Percentages above Proficient Level Gr.8

	2008	2009	2010	2011
Science	19%	27%	30%	28%
ELA	67%	74%	69%	74%
Math	36%	43%	48%	50%

The eighth grade scores have also increased somewhat consistently from 2008 to 2011, with the exception of science, which dropped two percent. The goal is for all eighth grade scores in all disciplines to reach at least 50 percent, in the hopes that students will be better prepared by the time they take the tenth grade exam.

1.7 English Language Learners

Who are English Language Learner Students?

English Language Learner students, or ELL Students, are students who are learning English as a second language. Due to the fact that English is not their native language, it is often difficult for these students to function normally in an ordinary English-taught classroom. In addition, cultural differences can make learning (and teaching) a challenge (Clark, Garcia).

What is “Sheltered English Immersion”?

Sheltered English Immersion, or SEI, refers to a technique to teach English to ELL students. The technique was first formally documented in 1983 by Keith Baker and Adriana de Kanter. It outlines a method of teaching in which the vast majority of the day is devoted to learning English as a

language, while academics are secondary in priority (*SEI Guidelines*). Students and teachers are expected to read, write, and speak in English. The teachers should treat English as if it was a foreign language, and use appropriate visual techniques to aid in understanding. SEI outlines a very rigorous timeline that students must follow in order to leave the program and graduate. Once a proficient level is reached, the students are considered “fluent English proficient” and are allowed to move on. However, under federal law, they are still monitored for two additional years (Vohs).

Chapter 2

Review of the Numeracy Math Course

2.1 Numeracy in the Course Sequence

Numeracy is a course designed to help students who are struggling in math at the middle school level. It is not their primary math course, but rather a review of many of the basic topics upon which their regular math class builds. Since it is not a mandatory course, Numeracy is not represented in the standard course sequence or curriculum standard. Rather, students who have difficulty in math will take it in place of an elective in order to improve their math skills.

2.2 The Need for Numeracy

Numeracy was introduced as a need-based class within the past ten years at Forest Grove Middle School. It has proven to be extremely valuable in helping students prepare for the MCAS examination, as MCAS questions are presented in class on almost a daily basis. Since the course does not have a direct curriculum to follow, the teachers can focus on any topics that seem to be a struggle or are heavily emphasized on the MCAS. Numeracy is a flexible course that can be adapted to the needs of the students in an attempt to address any gaps that may exist in their mathematical foundation after their previous math classes.

In addition, Numeracy is an excellent starting point for students who are new to the school and may have a limited mathematical background. There were a number of ESL students at Forest Grove, many of whom did not speak any English and undoubtedly would have been less successful in a regular-level math class. One of the Professional Standards for Teachers is the need to teach all students. The Numeracy course enabled many of the ESL students to succeed by allowing them to move at a slower pace. Learning basic mathematical concepts in a more visual way helped them to remember and apply the concepts more readily going forward. Students who were new to Forest

Grove were also placed in the Numeracy class, allowing the school to better gauge their math skills and decide into which math class they should ultimately be placed. In addition to providing a basic math education, Numeracy provided an excellent social opportunity and cultural starting point for many transfer and foreign students coming to Forest Grove Middle School.

2.3 Frameworks

“Learning” is one of the guiding principles in the Mathematical Curriculum Framework. Many students struggle in math because they do not understand the reasoning behind the mathematical operations they are performing. Although Numeracy does not present topics in as much depth as a regular-level math class, it works to teach students the concepts behind their operations, rather than just memorizing a set of rules. In addition, real-world examples and applications are defined (such as the need to understand decimals in order to understand money) to help reassure students that there is meaning and worth behind the concepts.

“Technology” and “Assessment” are both guiding principles in the Mathematical Curriculum Framework as well. During my time at Forest Grove Middle School, we brought the Numeracy students to a computer lab one day per week. There, they would play an educational math game called “First in Math.” This program allowed students to log in and practice a variety of different skills, from simple addition all the way up through algebra. Sometimes we would assign a specific topic for the students to practice, based on something relevant to our classroom work. Other times we would allow the students to choose any topic they felt they needed to practice. This flexibility allowed each student to discretely practice skills in areas in which he or she was struggling, without being embarrassed, having to feel the pressure of asking a “stupid question,” or feeling self-conscious that they are “holding up the class,” which are common worries of many middle school students. In addition, we as the teachers were able to view each student’s progress and see where some of the difficulty lay, which helped us to better explain concepts in class. In the case of

Numeracy, technology and assessment worked hand in hand to help give students basic math knowledge—and by extension, to give teachers valuable feedback to assess and enhance the effectiveness of their teaching methods.

Another guiding principle of the Mathematical Curriculum Framework is “Equity.” Numeracy provides a more equitable environment for students of all backgrounds than does an average math class. Students are given the tools to refresh a past topic or, if their prior education omitted or did not successfully convey a particular skill, introduce themselves to an unfamiliar topic. Since Numeracy is offered at the seventh and eighth grade levels, students are given a reasonable base from which to build, and they are on a more level playing field when they enter high school math classes. Equality was a major focus when creating the Numeracy math class.

“Literacy Across Content Areas” is another guiding principle of the Mathematical Curriculum Framework. As there is not a textbook assigned for the Numeracy class, practice problems, homework assignments, and past quizzes and tests were all stored in the students’ notebooks and used for reference as their own book. Students were encouraged and required to take the time to write legibly and in a way that they could understand when they looked back for reference. In addition, we paid careful attention to use the correct specific mathematical terms when introducing topics (such as “numerator” and “denominator”) and correcting students when the incorrect terminology was used (such as “top number” and “bottom number” when referring to fractions). By emphasizing the correct vocabulary, the students are more likely to recognize the terms going forward, whether it be on a standardized test like MCAS or in future math classes.

2.4 Background Knowledge for Success in Numeracy

The Numeracy course covers a number of different topics upon which many other math skills are dependent. Some of the topics covered include operations on fractions, operations on decimals, multiplication and long division skills, probability, basic geometry, and basic problem solving skills.

There is a heavy emphasis on understanding the concepts behind the actions, rather than simply memorizing a process and blindly following it. Overall, Numeracy serves as a review of the fundamental topics needed to be successful in standard math classes, both current and future.

Due to the fact that Numeracy is an extra math course, and specifically designed as a review, very little prior knowledge is needed to be successful in the class. The course reviews many basic topics, even as far back as multiplications tables and fractions. This allows students with extremely limited mathematical background to begin with the basics and become successful. Students who knew their times tables well and understood the concepts behind a fractional part of a whole were generally more successful than those who had to look up products on times table charts, but ultimately all students were able to grasp the concepts. Generally speaking, it is most helpful to have a working knowledge of the basic operations on both whole and fractional numbers, but the course does review these concepts, so it certainly is not mandatory.

Chapter 3

Teaching Methods and Materials

I had the opportunity to experiment with a number of different teaching techniques during my time at Forest Grove Middle School. I found that it was easiest to follow the teacher's format for the most part, since the students seemed to function best when a familiar routine was in place, whether or not I happened to be present for their particular class on any given day. I designed both classwork and homework assignments, and I used them to gauge how well I had explained the concepts during the class.

3.1 Daily Routine

In general, each class was conducted in a similar fashion. Students were expected to hand in their homework within the first five minutes of class. Anyone who had a question on the previous night's homework was welcome to ask at the beginning of the class. Anyone who did not have a question would get started on the classwork. Classwork consisted of anywhere from 15 to 25 problems that addressed three areas: the previous day's material, an extension of the previous day's material, and if all was going well, an introduction of a new topic. We generally attempted to base about 60 percent of the problems on previously-introduced topics, 30 percent on extensions of earlier topics, and 10 percent on the introduction of something new. Students worked independently on the classwork, asking questions when necessary. Often times I would provide one-on-one assistance while the students worked, answering questions and helping when they got stuck. If I noticed that a number of students appeared to be struggling with the same concept, I would do a similar problem on the board to help refresh them on the process. In addition, the classroom teacher would often be providing one-on-one assistance to struggling students as well, and he would give me feedback about topics I might want to go over again. The second half of class

was spent going over the classwork one question at a time. I would usually have students give answers and explain their process, as well as explore other possible ways of coming to the same answer. This approach seemed to be helpful in giving everyone a chance to ask questions as well as leaving enough time for everyone to attempt the questions.

Although most classwork was done individually, we occasionally would try moving the desks together and having the students work in pairs or small groups on a longer assignment. For example, I developed a word problem that had to do with volleyball and serving percentages which exercised the students' probability, proportions, and percent skills. Students worked in small groups to solve each part of the word problem. At the end, each group gave their answers for each part, and we evaluated which ones could be considered plausible and which ones did not make sense. Group work proved to be effective when the students basically knew how to do the work (in other words, it was not brand new material) but when it was still in-depth and challenging enough that they could not work through it extremely quickly. While we did find success when this balance was achieved, in many cases the classroom ran more smoothly and more was accomplished when students worked individually.

I found that I was frequently able to finish reviewing the classwork in less than half of the class time, so we often had about ten minutes at the end of class to look at practice MCAS problems. Students would copy the question and list of answer choices and attempt to solve the problem. We would go over the problem and demonstrate how to get the correct answer before the students left. Or, if we did not have enough time to go over it, the question would become an additional homework problem and we would reveal the correct answer the following day. MCAS prep questions became a growing priority as the year went on and the exam drew closer, so we increased the amount of time we spent on them throughout the year. Class ended with the assignment of homework, which was expected to be turned in the following day.

3.2 Homework

Homework was presented at the end of class. Students were expected to copy the assignment before they left. The homework assignment was generally modest and was designed to be finished in 30 minutes or less. The homework usually consisted of problems that served as a review of the topics presented in that day's lecture (about 90 percent of the questions) and one or two "challenge" problems that expanded on a previous topic in a new way (often an introduction to the following day's material).

The main goal of the homework was to review what we had covered in class that day and "cement" the concepts that the students practiced during their classwork. Another goal was to help them to begin thinking about ways to expand and extend these topics. Finally, the homework acted as an introduction to the following day's concepts, which helped students develop a basic familiarity with the new ideas and hopefully come to class with some interest, questions, and thoughts of their own on the topic.

Writing was not heavily emphasized in these homework assignments. However, it was necessary that the student accurately and legibly copy the problems from the board in order to be able to solve the problems that night. Students were allowed to abbreviate long word problems, but they had to read the problem well enough to weigh which information was vital to answering the questions. When we went over solutions, whether homework or classwork, students were expected to write the correct answers and the steps to achieving the solution.

With respect to correctness, the standards to which we held students on homework assignments were rather low. Our main goal was to get all students to at least make a reasonable attempt to solve the problems. When grading assignments, we would give all students who at least made an attempt at the homework full credit. Students who made an attempt and were correct got a bonus point. Students who simply wrote an answer without showing any work, as well as students

who did not hand in an assignment at all, did not receive any credit. The overall goal for the homework was to get students to think about the concepts we had presented to them in class and make an attempt to apply them. Only after a number of homework assignments were given on a topic did the issue of correctness become a priority, and then it was in the form of tests and quizzes.

3.3 Raytheon's "Math Moves U" Presentation

Throughout my time at Forest Grove, we placed enormous emphasis on the concept of applying the skills learned at school to everyday life. Many students struggled to think of reasons they needed to understand obscure subjects and how it would actually translate into their lives or into a potential career. Fortunately for me, my dad has been an electrical engineer at Raytheon for the past 30 years and is very involved in a volunteer program called "Math Moves U," which is aimed at spurring interest among middle school students in the fields of math, science, engineering, and technology.

The Math Moves U program has a number of different interactive demonstrations, such as electricity, sound waves, and weather, just to name a few. In this particular case, my dad brought in a number of electronic and magnetic experiments and demonstrations, and he explained how math was extremely important in order for these experiments to work properly. He extended this topic to get the students thinking about engineering in an everyday sense, which connected the dots as to how important math is in the everyday world. In addition, each student was given two AA batteries, two wires with alligator clips, a resistor, and an LED light bulb, then taught how to use these pieces to construct a mini flashlight. We were able to get every student's flashlight working properly, and they were thrilled to discover that they could keep their working flashlights and bring them home to show their parents. Overall, the Math Moves U demonstration was a huge success. The students were completely engaged and seemed genuinely interested in understanding how and why these experiments worked. They were attentive and anxious to learn more, and it was a unique and

fascinating way to merge math with science, engineering, and everyday life. My dad and I will be returning to Forest Grove at the end of May to do another demonstration, this time on weather.

Chapter 4

Classroom Atmosphere

While I was at Forest Grove Middle School, I worked with four classes per day. Each class was part of a “cluster,” which is a specific group of students who generally travel together through their classes. The clusters are distinguished by name. I worked with three clusters: the Revolutions, the Challengers, and the Hot Scholars. Three of my daily classes were comprised of eighth graders, and one was a class of seventh graders.

I, myself, came from a very small town with only one middle school, graduating with a class size of only 86 students. Therefore, it was a bit overwhelming to me at the beginning to be part of a school system in which students changed schools so frequently and came from such a wide variety of living situations. I was surprised by the number of students who came to class unprepared and said it was because they could not afford notebooks and school supplies at home. The teacher would often buy the class notebooks and pencils out of his own pocket to give them the best possible chance in his class. I took the opportunity to gather all of the leftover pencils and erasers my brother and I had accumulated over the years, and I filled a gallon-size Ziplock bag to donate. Many of the students were thrilled and genuinely appreciative, despite the fact that the supplies were used and, in some cases, very well worn. It made it much easier to get started and focus on learning when we had plenty of supplies to go around.

Each class had its own “personality,” which had a tendency to change depending on key members’ behavior and who was present. Certain teaching techniques proved more successful than others for different situations.

4.1 Meet the Classes

4.1.1 The Revolutions

Although the schedule rotated, the first class of the day was always the Revolutions cluster. It was an eighth grade class mainly comprised of the homeroom students, although there were a few additional students who joined after the designated homeroom time had ended. This class was generally well behaved in our early-morning time slot, although they were known to be a very difficult group later in the day. As a whole, this class was one of the strongest-performing classes on tests and quizzes. They typically picked up the material quickly and were generally very active when it came to class participation.

There were a few key students who had behavioral issues in this class. One student had moved to America from Syria and seemed to crave a great deal of attention from his teachers. He was always ready to give an answer to a question, right or wrong, and always had his hand raised as high as possible and would wave it to try to get our attention. In addition, if another student was selected to answer a question, he frequently had the tendency to speak out after the other student's answer with comments like, "I got that, too!" or, "No, no, no, I didn't get that!" His need for attention seemed to be amplified after a weekend or a vacation week, at which times he would actively seek out a teacher with whom to converse immediately upon arrival. As this need for attention likely stemmed from some type of issue at home, we made every effort to be compassionate and accommodating, but it was also important that we stay on track with our classroom environment as a whole and ensure that his behavior did not irritate or offend other students when they answered. We politely reminded him that there were other students in the class as well, that everyone needed a turn, and that he needed to be respectful. In addition, we tried to make it a point to pay attention to him in homeroom before class, which definitely seemed to improve his behavior during the actual class.

Another student in particular was extremely intelligent, but he had a number of behavioral problems. Depending on his mood alone, the class could be a huge success or a total battle. At the beginning of the year he came in most every day in a very argumentative mood and would stir up the entire class, cracking jokes and disrupting lectures. We had heard from other teachers and from the student himself that his home life was difficult and that his grandmother had recently passed. We worked hard to choose our battles and prioritize which misbehavior was the most important to stop first. In addition, we made sure to praise him for his strong academic performances. Eventually his antics subsided, and full-blown episodes became few and far between. We found that he typically worked best in a desk that was secluded from the other desks and located toward the back of the room. Keeping him behind the other students helped reduce some of the visual distractions, since the other students knew they were being much more obvious (and therefore visible to us) when they would turn around to look at him. Although he is still known to cause trouble in other classes even now, recognition for strong academic performances and “picking our battles” seemed to work best to subdue his problematic behaviors during Numeracy class.

A number of the students in this class seemed to drastically change their behavior on a day-to-day basis. Again, we assumed this was most likely due to how their morning had gone at home. There were a few girls in particular who would be very interested and engaged one day, and the next day would be very argumentative and not want to do any work. We addressed this by again picking our battles and giving students their space, while trying to persuade them on a one-on-one level to do the work. By approaching them individually they did not have the added stress of a class potentially knowing about their problems, which made them less defensive and more likely to attempt the day’s work.

Attendance was an ongoing issue in this class. Due to the fact that it was first period, there were often students who arrived late or missed the class entirely because they had missed the

school bus. In addition, due to some of the class's behavioral issues later in the day, there were a number of students who were suspended on a regular basis. This made it exceedingly difficult to maintain continuity when attempting to keep all of the students on the same topics and to give tests and quizzes that gave everyone a fair chance.

4.1.2 The Hot Scholars

The Hot Scholars cluster was our only seventh grade class. Although they were only a year younger than the students in the other clusters, the difference in maturity levels became more and more pronounced as the year progressed. The Hot Scholars were not as tightly knit of a group as some of the other clusters. Although most students seemed friendly enough with one another, they did not seem to have the same friendship circles that other clusters had formed.

This class had the tendency to be one of the most rambunctious classes. There were many days that they would come running into the room to try to steal one another's seats. They would knock each other's books on the ground and chase one another around the room. They would often write little notes on the white board and would be extremely loud until they were specifically directed to settle down.

At the beginning of the year, when I was still observing, I felt obligated to speak up during one of these episodes. The teacher was not yet back from lunch, and a female student asked me if the class was allowed to leave if he did not return within five minutes. I made light of it and said no, that they would have to stay because I counted as a teacher. She immediately told me I was not an actual teacher and that I should "learn how to teach," to which the entire class erupted into laughter. I told her that I was there to learn how to teach just as she was there to learn math, so in order for both of us to do our jobs she would need to sit down. She did as she was told, but I did not feel confident that I had control over the class until the teacher returned.

Another day, the teacher stepped out during a quiz. As soon as he shut the door behind him, the entire class began whispering. I told them that this was a quiz, which meant no talking and no sharing answers. This time another girl said, "You aren't a real teacher," and went back to talking to her neighbor. I was again surprised by this response and began to get more agitated as I told them to stop talking. The teacher came back shortly thereafter and the class returned to its quiz. I was unsure how to get the students to respect me as a teacher and see me as more than just someone observing their class, but the situation seemed to correct itself as I began to teach the class independently. Once I was regularly leading class lectures and disciplining as I went, the students generally respected, listened to, and obeyed me, even when their actual teacher left the room.

One of the students in this class seemed to have an issue with being bullied. I was not aware of it at first, as he was very smart and always seemed happy enough in class. As time went on, I realized that he did not seem to be conversational with many of the other students during class. One day, he was giving an answer to a problem and stuttered, and another student immediately jumped in to say, "Why do you talk like that?" and the whole class laughed. The student didn't react much to it, so it seemed as if this was not the first time. I told the class that everyone speaks differently and it is important to be respectful of one another. I brought up how I, myself, used to have a lisp, which was something I was very self-conscious about. The student seemed to really appreciate my input and repeated his initial answer with a smile on his face. He thanked me after class, saying it meant a lot to him. After that incident I did not experience anyone else making fun of the way he spoke.

As a whole, this class tended to struggle more with new material. Part of the reason, of course, was that they were our sole seventh grade class, and therefore they were always being compared to eighth grade students. Aside from some of the respect issues mentioned earlier, the class was

generally well-behaved. A number of the students had to be strongly persuaded to put in the effort and do their work, but once the process was underway, they were often times successful.

Attendance issues were less of a problem in the Hot Scholars cluster. Most students were fairly well-behaved and did not often get suspended. As we never had this class first period, any students who had missed the school bus or were tardy for some other reason had resolved those issues by the time of our class.

4.1.3 The Challengers

The Challengers cluster was another group of eighth graders. Their cluster was a good bit smaller than the Revolutions and Hot Scholars clusters, so this class was a fairly tightly-knit group, despite the fact that they were rather diverse in circumstance. The group ranged from students with behavioral disorders, to students who had repeated eighth grade, to students who simply needed an elective. This made it difficult at times to assess the class as a whole, as the students often had so much going on in the background and were operating from such varied perspectives. Attendance was a serious issue for this class; there were a number of students who were constantly suspended or changing schools (and sometimes changing back again). This made it very challenging to keep students up to date on assignments and to introduce new topics.

Fortunately, the class had its own “personality” and was a good group to work with. Although they struggled academically at times, they were generally quite motivated and worked hard. Many of them were interested in hearing about real-life applications and careers that depended on the skills they were learning. These students proved to be very visual learners, and I found it helpful to use pictures and diagrams to explain concepts. This also seemed to help the students retain the information, as they remembered silly analogies or pictures I had drawn on the board to demonstrate the concepts.

There was one student who was a member of the class for only a few months before he was moved to another school. He was well known within the school for fighting and having temper tantrums with teachers, but he was always very respectful in our class. At the beginning I could not imagine such behavior from him, because he always exhibited good manners in my presence and thanked me when I would help him with a problem. As the year went on I knew his reputation as troublesome must have been true, as he was constantly being suspended and I was spending a great deal of time helping him to make up his Numeracy work. Still, I never witnessed the negative behavior myself. He was very interested in the work I did in college and would often ask me questions about computer science and the types of jobs that people with a degree in computer science would be able to do. I told him about all of the math classes I had to take, and how I used to struggle in math when I was younger. He seemed to gain confidence that although math was a struggle for him at that point in time, he could learn it and become successful. Throughout my time at Forest Grove, this particular student made enormous academic strides. He began the year earning scores of 20's and 30's on his quizzes, but by the time he left, he was earning 60's and occasionally 70's. He still had days when he was less committed, and he still had a number of behavioral issues in other classes, but on the whole he began to show huge improvements before he moved.

There were two students in the class who had sufficient math skills that they did not specifically belong in a Numeracy class. One student took the class as an elective because he did not want to take a foreign language, and the other student took it because he had repeated the year and needed another math credit. Both students were very smart and scored very well on all of their assignments, but they had two very different personalities. The first student, who simply took the class to avoid a foreign language, was very vocal that he knew the material already and that he was bored. He would outwardly say, "How do you not know that? It's so easy!" when a student would

struggle with an answer. As a result, the other students were critical and would make fun of him for being “too smart.” It seemed to be a cycle, and the more questions he answered the more they would pick on him, which would cause him to act bored and superior when they did not know an answer. We addressed the issue with the individual student and explained how important it was to be respectful of all skill levels, and we explained how doing so would help the other students accept him and make for a more pleasant experience for him, as well. Although he did not appear to become best friends with the other students, their classroom relationship did improve when he stopped speaking out of turn.

The other student, who had repeated the grade, initially seemed to be preoccupied and depressed a majority of the time. He would sit in the back at a desk completely isolated from the others and most days would not speak unless he was specifically asked to answer a question. As the year went on, the teacher worked to include him in the class and would try to talk to him about other topics outside of class (for example, the student enjoyed collecting old coins). Eventually, the student began to be more open and would do his work. When asked a question he would answer, frequently offering very little explanation beyond a one-word response. Although he was obviously not happy to be in the class, he seemed to make his peace with it and was successfully completing assignments and answering questions as the school year progressed.

Another student in this class had a behavioral disorder and had been moved into the Numeracy class directly from a behavioral disorder program. He was known to steal (often office supplies from the teachers, but sometimes larger items as well if he had access) and was fairly unpredictable. At the beginning of the year, he seemed unable to focus on anything and would ask to go to the restroom on a daily basis (and leave for almost fifteen minutes sometimes). One day, we had given a quiz on material to which he had not paid much attention during the preparatory lectures. At the end of class, we were aware that he was awkwardly standing around the bin where students handed

in their quizzes, but we initially did not think too much about it. After class, we found his quiz crumpled in the trash and discovered he had taken another student's quiz out of the bin, erased the student's name, and written his own name on the quiz. In order to avoid a conflict between the students, we restored the original student's name on the quiz and, the following day, told the other student that we had not received a quiz from him. He did not act surprised in the least and simply said that he would take a zero. After a few months, we allowed this student to use a calculator for some of the problems. This gave him a bit of an advantage in some cases, but he seemed to like the special treatment and he began to change his attitude. Although he still had a tendency to yell out answers (since he could come to the answer much more quickly using a calculator), he began to think through the problems more logically in order to use the calculator effectively. We found that although the calculator was doing the basic math operations for him, he was gaining a much higher understanding of the problems by breaking them down and figuring out what he needed to enter into the calculator. It was not an ideal situation, but the student seemed much more excited to learn and appeared to retain a good deal more of the information, while at the same time his behavioral issues were at least somewhat abated.

4.1.4 The Revolutions 2

The Revolutions 2 cluster was a subset of the first Revolutions cluster. This group was an English Language Learning (also known as "English Second Language" at Forest Grove) class. At the beginning of the year, there were only a handful of students in this class who knew any English at all. These students would often attempt to translate instructions for other students who spoke their common language (most often, Spanish). There were also several students who did not speak either English or Spanish, and, predictably, these students seemed to be confused a great deal of the time.

The language barrier caused a variety of challenges, beyond the obvious. Many of the students would call out and interrupt the class, or talk to other classmates in their own language and claim they were translating something. Sometimes we would attempt to discipline students only to have them say they did not understand what we were saying.

Revolutions 2 was one of the first classes in which I really became involved. It was a smaller class, so it was less intimidating to walk around and provide one-on-one assistance. In addition, many of the students did not speak English, so I was able to help them by writing out examples and using pictures. This individual help was easier for me than getting up in front of the class and attempting to lead a lecture, so it served as an excellent transition into the second half of my practicum. As a whole, this class was one of the most challenging groups, both because of the language barriers and the diverse cultural backgrounds from which the students came, but it definitely gave me the opportunity to become more comfortable with teaching.

There was a girl in this class who did not speak any English at the beginning of the year. She spoke Hindi, and only one other student in the class knew some Hindi as his second language. She appeared to be rather disturbed by many of her classmates' loud outbursts and often did not understand our instructions. Regardless, she would follow our examples and point to steps that she did not understand. Within a few months she had picked up many English words and was beginning to do very well in the class. She seemed less bothered by her classmates' antics and would smile and say hello to me every day when she came to class. In addition, she began to make friends with some of the other quieter students in the class and would work with them on problems and attempt to answer their questions. By the end of my time at Forest Grove this student was the top student in the class and was consistently receiving perfect scores on assignments.

A number of the boys in this class were more forward with the comments they would make to me. I was taken aback when some of them would openly and blatantly attempt to flirt with me, as

this was not something I had anticipated or prepared a response for. At the beginning I was unsure how to react, because it seemed any response or even acknowledgment encouraged it more. I experimented with a variety of responses from exhibiting that I was angry and insulted, scolding, and explaining that it was inappropriate, to trying to just laugh it off and make a joke of it, but the behavior continued despite either response. I eventually determined that the best response was to ignore it altogether and pretend I just had not heard. At the beginning this was challenging, due to the fact that they would blatantly repeat themselves and other students would hear and laugh. But after ignoring a few repetitions, they eventually lost interest. By the time I left Forest Grove, they had stopped making such comments completely.

On one particular day we had two students who came to class acting rather out of character. One student who was generally fairly quiet was extremely outspoken and giggly. The other student was very distant and reserved, whereas he was generally quite animated and talkative. Some of the other students in the class thought it was very funny, which made for a very unruly day of teaching. I heard from students in later classes that those particular students had experimented with marijuana that morning, which truly surprised me. I did not expect to encounter any drug issues at the middle school level, especially not during school hours. Nonetheless, we kept a closer eye on them over the next few weeks, and fortunately we did not have any more issues of that kind. Although this was not an ongoing issue, it was one that definitely surprised me.

I was extremely impressed by the overall dedication of the students in this class. Many of them spoke little to no English when we began and by the time I left, all of the students who had been there since the beginning were able to converse fairly well with me. There was one girl who switched into our class about halfway through the year and did not speak any English. She was the only one in the class who spoke Vietnamese, so she did not talk to anyone and had no one to translate for her. One day I was demonstrating how to do long division for her. She watched me do

it once, snatched the pencil from my hand, and immediately did the next four problems. I assumed she had seen it before and that I had been reviewing, so I moved on to another topic. She had not seen the next topic, and it was toward the end of class, so I did an example and wrote out key words in English in the margins and told her we would finish it tomorrow. The next day, she came in with all of my words translated into her own language and was showing me her answer to the previous day's example, which she had done correctly as a result. She carried a Vietnamese to English dictionary and would painstakingly take the time to translate each word for herself. I was extremely impressed by this dedication and she, too, was soon excelling and picking up the new topics very quickly.

This class had issues with attendance when students would get suspended. Most of the students came to school regularly, but a number of them would get into trouble in other classes and end up being suspended with some regularity. In addition, there were constantly new students being added to the class, many of whom spoke different languages than even the other students in the class. This made it extremely difficult to build on the previous topics and we were constantly backtracking to cover material again.

4.2 Behavioral Issues

There were a number of behavioral issues that I encountered throughout my time at Forest Grove. One of the earliest issues I had to overcome was the fact that many students did not perceive me to be a "real teacher," so they felt they did not have to listen to me. This problem seemed to get better as I began to teach more and work with the students, because I would discipline them regularly and was backed up by their regular teacher. In addition, I found that many classes were very rambunctious when they had Numeracy after their lunch period. I addressed this

issue by attempting to settle the students as they came in, rather than trying to settle the entire class once everyone had arrived and the group was collectively out of hand.

Many of the behavioral issues seemed to be related to the students' home lives. Certain students would act very differently on a seemingly-random basis, but as I got to know the students better it became clear that many of them had issues at home that would impact their mood, focus, and performance at school. I attempted to address these types of issues by talking with the students one-on-one, rather than disciplining them in front of the class. Many of these students seemed to respond better if they were discretely asked to change desks rather than being asked in front of the class. Although this did not rectify all of these types of behavioral issues, it did seem to help with a fair percentage of them.

4.3 Successful Methods and Student Involvement

I explored a number of teaching methods, but found that few were universally successful across all of my classes. As outlined in Chapter Three, lectures and instructor-led classwork proved to be most effective overall. This helped to keep the class in order, since the student work was primarily independent, and it left time for one-on-one help for the students who were struggling. In addition, it provided the flexibility to add additional problems if students appeared to be moving more quickly than planned, which reduced downtime and the potential for students to begin distracting one another.

I also found that having students explain their answers was a universally successful method. Listening to students' explanations helped me to see where they may have gone wrong, while at the same time helped the students to think back over the process they had followed to solve a problem. During these types of discussions we would often come up with little phrases, pneumatics, or diagrams that the students would find amusing and which would help them to remember concepts.

On occasion students would work in groups, but in many cases the class would get off topic unless they were closely monitored. The students would often start off working in earnest, but once they felt they had completed a sufficient amount of the assignment they would begin chatting about unrelated topics. Therefore, it seemed more productive to keep most work individual and have students interact via class discussions while reviewing the work.

Many students were shy about giving their answers in front of the class for fear of being wrong. I could sympathize with this because I, myself, was a shy student. I tried to give students confidence by walking around while they worked, pointing out problems they had solved correctly and asking them to be ready when I asked for an answer. Many students were less timid once they knew they had the right answer and simply had to explain their logic. As the year went on, students became more comfortable with their peers and less nervous about giving an incorrect answer.

While this approach seemed to encourage most students to participate and become involved, there were still students who did not want to answer. At first, I would sometimes implement the “cold call” strategy and call on them randomly. I found most students did not like this technique and perceived it to be punitive, so I began giving students who did not seem engaged a warning to “be ready for the next one,” or I would assign them a specific upcoming number. This technique gave them an extra minute to think about what they wanted to say and have an answer prepared, rather than putting them on the spot as the cold call technique did. Between these two techniques, I could usually elicit participation in classwork discussions from the majority of students.

4.4 Attendance

Attendance was an issue in a number of the classes I taught. Some students would be absent because they missed the school bus and could not arrange a ride, while others would be absent because they were suspended. Some of these students received “in-house suspension,” which

meant they were kept in a separate room all day and supervised by the vice principal. These attendance problems posed two major problems. The first issue came about when students missed school, fell behind, and were unable to stay after school to make up the work because they could not coordinate a ride home. Although we tried to be flexible and work with students during their lunch or free periods, many students would not show up and ultimately ended up being given a zero for a missed quiz or test. Taking a zero for a major assignment heavily impacted the students' grades, which in turn brought down their morale and undermined their will to work. This not only decreased their own productivity, but it also increased the probability that they would ultimately become a distraction to other students, as they no longer understood the material or no longer cared about their own work.

The second major issue with came about as a result of in-house suspensions. Due to the fact that the students were kept isolated from the rest of their class, the teachers had to come up with assignments to keep the students busy all day. This was difficult because we often had little notice of the suspension and had to prepare an assignment quickly. As most of our classes consisted of lectures, there was not always a suitable assignment to be had, and the student also missed the opportunity to move forward into new material with the rest of the class. Attendance was one of the most challenging issues to overcome.

In order to combat this, we often tried to schedule times at which students could come make up work, even during the school day if they had difficulty arranging a ride afterwards. In addition, I would often write summary note sheets for each topic, so I would be able to give these to absent students as a reference sheet. These note sheets also proved to be useful when a new student was introduced to the class, because it gave the student a reference for some of the earlier materials. Although attendance was undeniably a struggle in many of the classes I taught, we did our best to

accommodate the students and provide every opportunity for them to learn the missed material and keep their grades up.

Chapter 5

Assessment

A number of assessment tools were used to ensure the necessary concepts were being presented in a manner the students were able to understand. Each day, we went over the classwork as a group and used the feedback from student answers to dictate what topics the following lecture should reinforce and introduce. In addition, we gave weekly quizzes on the pertinent material. These quizzes showed how well the students were able to retain the information and apply it without the help of their notes or the teacher's hints. A pretest exam and a midterm exam were given to see how far we had come since the beginning of the year and to ensure that the major topics we had covered were being retained. Finally, we used an online program called First in Math to help us gauge where students individually stood on certain topics, which helped us to plan our future lesson plans.

5.1 Weekly Quizzes

At the end of each week, we would administer a quiz that covered that week's material. Often times it would include relevant material from previous weeks, as well. These quizzes typically took about three quarters of the class period and were projected on a screen that everyone could see. The students would fold a paper in half vertically and write their answers on the left while showing their work on the right. This format would allow us to identify simple mistakes that caused an incorrect answer, despite a genuine understanding of the work, which allowed us to give students partial credit where appropriate.

The goal of these quizzes was to test the students' knowledge of the week's topics, as well as refresh previous concepts. This helped us to gauge whether or not we were ready to move on, and if we were not ready to move on, it helped us to identify the sticking points. By giving a weekly quiz we had many grades for each student, so poor performance on a single quiz could be absorbed

without much negative effect on the overall grade for the course. In addition, frequent quizzes minimized the number of large unit exams we gave, since the topics were being tested in smaller portions. We found that frequent, smaller quizzes usually yielded higher scores, both because the topics were fresh in their minds, and because the format allowed virtually all of the students ample time to finish.

5.2 Pretest and Midterm Exam Progress

At the beginning of the year we administered a pretest exam that covered the topics that would be addressed in the Numeracy course. The exam was graded for assessment purposes, but it did not factor into the student's grade for the course. Its goal was to determine where the class stood academically and help us gauge which subject areas most needed to be addressed, or to identify any subject areas which already seemed to be proficient. It was a 50-question exam and the students were allowed two full 50-minute class periods in which to complete it. Many students did not even finish the exam, let alone score well. Only two students scored above a 60 in any of our classes.

We gave the same exam a second time approximately halfway through the school year and the improvement was evident. Most classes averaged scores that were at least 25 points higher than the first time they took the exam. Individually, every student in every class showed an improved score except for two students (both of whom scored two points lower on the midterm than the pretest). It is planned to give the exam a final time at the end of the year, in hopes of seeing another marked improvement.

A spreadsheet containing the students' individual scores, as well as the class distribution, can be found in Appendix C.

5.3 First in Math Program

First in Math was a computer program that the students would work with once a week in the computer lab. As addressed in Chapter 2, First in Math provided the students with an environment

in which they could play math games to practice various skills. These skills ranged from relevant material we were covering in class to any topic in which the student felt he or she would benefit from some additional practice. We were able to assess the students' progress from our own teacher account, in which we could see the games that the students attempted and the statistics of their performances. In cases where all students were asked to work on the same topic, the feedback was similar to that of having quizzed the entire class, allowing us to gauge each student's success on the same set of problems, but with none of the stress or negative connotation of being formally tested. In addition, this electronic tool gave us information we would not glean from traditional testing, such as how many tries it took each student to answer a question correctly. Although we did not use First in Math as our primary assessment tool, it was another useful device for helping to determine how students were doing with certain concepts, and it was certainly helpful and effective for planning future lessons.

5.4 MCAS

The MCAS exam was a major topic of discussion during my time at Forest Grove. Many MCAS questions were administered in the students' regular math class, but we worked to add some to our daily routine, as well. We would usually end the class with an MCAS question that would be projected on the board. The students would take a few minutes to work independently, and then we would take a vote as to which multiple-choice answer they thought was correct. We would ask some of the students to explain why they thought a particular answer was correct, and finally we would reveal the correct answer and demonstrate how to solve the problem.

We found that a consistent and major issue with the MCAS problems was that students frequently did not understand exactly what the question was asking. We got into the habit of defining key words and identifying pieces of information before we began solving the problem. By taking a moment before trying to do the math to simply underline or circle the important

information, the students seemed to do much better and ultimately have much greater success solving the problems correctly. We reinforced this habit by encouraging students to use the same technique when solving problems in class, so that hopefully the process would become rote by the time they were presented with the exam.

To continue to improve MCAS results, we could strive to incorporate more practice problems and also to introduce different types of problems. We currently focus mainly on multiple choice questions, but we could also introduce more short answer and true-or-false questions, to mimic the variety of question styles represented on the actual exam. Helping students to be more familiar and proficient with a particular type of problem will most likely help them to be more successful in that area, but there is also overlap in the skill sets that will likely impact their success with other types of problems, as well. For instance, when we offered the occasional short-answer question, many students followed the same protocol of picking out valuable information and identifying a process before attempting to actually solve the problem, improving their chances of solving the problem correctly. This was very promising to see, and it seems more practice with a variety of problem types would only improve student performance further.

Summary

The time I spent at Forest Grove Middle School was an experience like no other. Although there were some challenges along the way, I found that overcoming these challenges proved to be one of the best accomplishments of all. Teaching in Worcester, which is a far more urban setting than the one in which I was raised, presented new challenges that I had not even considered encountering, but it also reaffirmed that regardless of the environment and circumstances, students will benefit academically if educators make thoughtful, creative, and empathetic decisions about how to teach. Learning to allow for the fact that students come from very diverse economic and cultural backgrounds, and that they may have a great deal more going on in their lives than what they experience in the classroom, graphically illustrated for me how certain teaching methods that worked well for some students or classes may be far less effective for others. Despite my own learning curve in this area, I feel I honestly had a positive impact and helped these students to improve their grades as well as their mindset. I know that I, myself, grew as a person and gained self-confidence.

At the beginning, I was very nervous to teach the class. The teacher I worked with was very understanding and allowed me to go at my own pace. I was nervous that I would teach the students something incorrectly, or that even if I knew the material perfectly, I simply might not be “good at it,” and the students would not understand my explanations. From the time I first considered teaching, I was aware that there is a significant difference between knowing the material and being able to teach it to someone else. I was reminded of a teacher in high school who, after many years of success in industry, decided he wanted to “give back” to the community and teach. Although he was extremely capable and intelligent, he simply never found a way to successfully share his knowledge in a manner that students could understand and grasp, and a career in teaching never materialized for him. This was a fear I experienced whenever I thought about teaching a class myself.

In reality, my experience proved much more instinctive than I anticipated. I found that working one-on-one or with small groups of students was much less intimidating, as it was informal and they were less intimidated to ask questions as we went. In addition, the experience of observing the teacher every day made the thought of teaching less foreign. In particular, I watched his demeanor and was aware of the presence he commanded in the room. He was able to keep order in the class without having to yell or even raise his voice, but rather by speaking confidently and directly. In addition, he was able to make jokes and draw real-world examples that related to the topics we were studying, while still conveying the necessary concepts. Despite the fact that he was clearly the one in charge, the students seemed to feel genuinely respected.

After a few weeks I began to feel more confident just by watching him, and I applied many of his techniques when I would lead a lecture myself. I began attending various faculty meetings, where I was able to hear different teaching approaches. I came away convinced that the teacher I received as a mentor was an excellent match for me, both in terms of personality and teaching style. Many of the techniques I hope to master as a teacher one day are ones he is successfully employing right now, in a very polished, accomplished way. My mentor provided me with the best guidance I could have asked for. His style was relaxed and patient, and he helped me to gain the confidence I needed to overcome my own mental obstacles and begin teaching the class myself.

Once I began actively teaching the class, I faced a number of challenges. One of my biggest struggles was discipline. I do not like scolding or punishing, as I am sure many teachers would agree, and I was not sure how to do it effectively. I would get nervous and end up sounding insecure, which did little to compel a student to stop talking to his neighbor. I found that the more I taught the class, the confidence came with the territory. Gradually I was able to get students to cooperate without interrupting too much of the class or having to yell.

In addition to administering discipline, I realized that I had to gain a better understanding of why many students misbehave. I knew this would help me formulate effective techniques to avoid having misbehavior escalate to the point of requiring formal discipline. I grew up in a small town with very little economic or cultural diversity. I was aware that there were other children my age who had much more to deal with than did I, but knowing something intellectually and experiencing it directly are two different things. I had little occasion to directly encounter students in those situations until I was teaching at Forest Grove. I was shocked and saddened that some students could not afford school supplies, and I was sincerely moved by the teacher's personal generosity. I was genuinely dismayed to hear the stories of the lives some of these students went home to every day. When these students would act up in class, I had sincere compassion for what I felt was probably motivating at least part of their behavior. While this actually made it more difficult for me to discipline them in a sense, I knew their long-term success (both academically and in life) would depend on their ability to cooperate and behave appropriately. I also had to think about the other students in the class whom they were distracting. It was a fine line to walk, and having compassion definitely helped. I found the best way to deal with most indiscretions was to address the problem on an individual level, so as to avoid the public embarrassment in front of the class. It was never easy for me to discipline the students, but I definitely gained confidence as time went on, and now I feel I have techniques to discipline effectively and with compassion when it is necessary.

Another major challenge I encountered was the constantly-changing student body. Many students would move away with little notice and sometimes move back into the district just a few weeks later. Other students would transfer in, from all different backgrounds and cultures, and have very diverse math backgrounds for which we would have to try to compensate. The language barrier was enormously challenging, and yet it also brought some of the warmest and most rewarding moments. I recall working with a student who spoke very limited English but was very excited to have grasped a

concept I was teaching him through diagrams, and as he was leaving the classroom that day, he turned and said to me, "Thank you for teaching me! I love it!"

Attendance was a serious challenge, as well. With a number of students being suspended fairly regularly, it was difficult to continue moving forward. Other students would regularly miss school because they did not have rides or would simply skip, which posed many of the same problems. My summarized note sheets helped somewhat, but it was still a constant battle. However, I felt that it was a good experience for me to learn to adjust my lesson plans and to have those summarized note sheets to provide to students who may have missed class time for a more traditional reason, such as an illness or a doctor's appointment.

Despite the classroom challenges, I feel my time at Forest Grove was very productive and successful, and I believe I had a positive effect on many of the students. Academically, we saw a great deal of improvement between the pretest exam and the midterm exam. Additionally, students excelled on various quizzes I created to test the topics I presented in my lesson plans. I feel I connected with the students beyond academics, as well. I had a number of students who would talk to me before or after class about outside issues and tell me that I was "easy to talk to," because I was closer to their age and still in school, but still old enough for them to relate to me as an adult. I believe I also motivated several students to seriously consider college, because I shared the fact that I, too, had struggled with math at times when I was their age, and yet they see me now as a successful student at a technical college. It seemed that the students always worked better when the teacher would talk to them about the importance of college and explain applications of the math they were learning. Another highlight was having my dad come into the classroom and do one of his Math Moves U demonstrations for the students. It took a few months to get all of the CORI forms and paperwork through, but it was an enormous success, and I really felt that the students came away with a lasting effect, particularly those who normally did not have much interest in class but seemed to really connect and be interested in the

demonstrations. I felt that this was a perfect way to drive home the point that although much of the math seems obscure now, future classes and concepts will build on what they are learning now, and these same skills may become important in a future career.

Overall, I can only describe my experience at Forest Grove as overwhelmingly positive, valuable, and rewarding. I am exceedingly grateful to have had the opportunity to work with so many excellent students and professionals. I am also very thankful that I had the ability to extend my practicum through C Term, when I had a lighter course load, and to continue to teach and work with the same students.

I spent 267 hours at Forest Grove from August 2013 until May 2014. Of these 267 hours, 85.5 were spent observing the teacher lead the class and 181.5 were spent where I, myself, directly interacted with and taught the students. I learned a great deal from this experience, not only about how to teach, but also about myself and about relating to others. The teacher with whom I had the good fortune to work has given me the confidence and tools I will need to be successful in the field. This experience has also made me realize that I was not only learning from the teacher, but also from the students. I know I am a better person and will be a better teacher as a result of my time with the students at Forest Grove Middle School. I will carry the lessons I learned, and a host of fond memories, with me always.

Appendix A

❖ Lesson Plan for Algebra and Order of Operations Review:

Algebra and Order of Operations Review (including negatives)

a.) Board Work (PEMDAS practice with negatives)

1. $4 - 6 - 8 = -10$
2. $3(4 + 3) - 7 * 2 = 14$
3. $9 * 4 + (-5 * 6) = 6$
4. $(3 * -4) + 7 - 8 = -13$

(Review)

Add/subtract the following, convert to mixed number:

5. $2/3 + 5/11 = 37/33$ OR $1 \frac{4}{33}$
6. $1 \frac{1}{2} - 1/3 = 7/6$ or $1 \frac{1}{6}$

Divide (write remainder as fraction):

7. $41642/3 = 13880 \frac{2}{3}$

(Algebra practice with PEMDAS and negatives)

8. $2x - 4 = 6$ $x = 5$
9. $7x - 4 = 3(12 - x)$ $x = 4$
10. $2(2y - 6) = 3y - 17$ $y = 5$
11. $3y - 12 + 6y = -y + 18$ $y = 3$
12. $7x + 3 - 6x = 2(x + 1)$ $x = 1$
13. $4x + 4(x + 2) = -2(2x - 6)$ $x = 1$

b.) Motivation

- Algebra is used all through high school and college in upper level math classes. Simple algebra is used every day even in your head (like when someone pays you and you have to make change).

c.) Instructional Objective

- Students will be able to compute the value of an unknown variable in both simple and complex algebra statements with multiple operations and negatives. Students will recognize when to combine like terms and simplify.

d.) Development of Lesson

- Solve problems:
 - 1-4:
 - Introduce idea of number line if they are struggling?
 - Emphasize the importance of carrying the negative through operations
 - Emphasize the importance of following order of operations (even when it seems simple and unnecessary)
 - 5-6:
 - Remind to convert to mixed number
 - Remind how to find a common denominator
 - Remind how to borrow
 - 7:

- Remind to put remainder as fraction
- Bonus: put fraction as decimal?
- 8-13:
 - #12: do not leave variable negative- always swap the sign
 - When you solve for a variable you can plug it back in to check your work
 - Remind to follow order of operations even though it has variables
 - Be careful with distributive property and keeping track of signs

e.) Summary

- Variables are just placeholders for numbers- the letter doesn't change the number's value
- Be careful not to lose signs when doing longer computations with multiple operations

f.) Homework

- $4 - 6x + 14 = 36$ $x = -3$
- $-2(y + 9) = 7y$ $x = -2$
- $5x + 3(2x + 2) = -4x + 1$ $x = -5$

❖ **Lesson plan for Algebra, Probability, and Review of Negatives:**

Algebra Practice and Practice with Negatives

Combining like terms, PEMDAS, operations with negatives, probability

a.) Board Work

(review)

- 1.) $14 - 10 - -1 = 5$
- 2.) $6 + 3 - 5 + 2 = 6$
- 3.) $(1/3)^3 = 1/9$
- 4.) $(1/2)^4 = 1/16$

(Order of Operations with negatives)

- 5.) $-6 / 2 = -3$
- 6.) $4 * -3 = -12$
- 7.) $5 + 8 * -2 = -11$
- 8.) $3 * 2 (-6 + 5) = -6$
- 9.) $4 * -3 + 6 * -4 = -36$

(Algebra)

- 10.) $6x + 4x + 2 = 12$ $x = 1$
- 11.) $2x - 5 + 12 = 6x + 31 + 8x$ $x = -2$
- 12.) $-6 + 3x - 5x - 3 = x$ $x = -3$
- 13.) $2x = 0$ $x = 0$
- 14.) $-16 - x + 4 + 3x = 2x + 4 - 4x$ $x = 4$
- 15.) $5 - 7x + 2 = -4x - 2x - 6$ $x = 13$

(Probability)

- 16.) I have a spinner with 3 colors: Red, Green, and Black.
 - a.) If I spin the spinner 2 times, what is the probability I will spin red both times? $1/9$
 - b.) If I spin the spinner 3 times, what is the probability of getting red, green, black, in that order? $1/27$

b.) Motivation

- Algebra is used all through high school and college in upper level math classes. Simple algebra is used every day even in your head (like when someone pays you and you have to make change).

c.) Instructional Objective

- Students will be able to compute the value of an unknown variable in both simple and complex algebra statements with multiple operations and negatives. Students will recognize when to combine like terms and simplify.

d.) Development of Lesson

- Solve board work:
- 1-4:
 - Combine two numbers at a time
 - Multiply the bottom one by itself x number of times (**Remember to put it back into fraction form)
- 5-9:
 - Emphasize importance of following Order of Operations
 - Break it down- solve each piece by itself and write out the steps to avoid mistakes/missed negative signs
- 10-15:
 - Watch moving terms from one side to the other (dealing with negatives)
 - Watch dealing with negative variables
 - Dividing 0 vs. dividing by 0
 - Emphasize following Order of Operations
 - Does your answer make sense???
- 16: Draw out possible outcomes, or multiply out

e.) Summary

- You can always check you algebra by plugging your value back in
- Always think about your answer after a probability problem- all cases we deal with in this class will be fractional/percentages of 100
- Write out all steps- when breaking down an algebra problem, when solving a probability problem, etc.- helps avoid mistakes

f.) Extra problems/Homework

❖ $-4 * 3 + (6 - 7) - 13$

❖ $8 + 2(-4 - -8) - 6$

❖ $-(3 + 4) - 7 + 20$

❖ $18 - 5 * -10 + -21$

❖ $4x + 3 - 2x + 1 = 3x - 4$

❖ $13x + 10 = 4x + 1$

❖ $2x + 3 * 4x = 28$

❖ $x * 2 - 6 = 11 + 3x$

❖ $2(x + x) - 3 = 19$

❖ $-1(2x + 3x) = 7x - 6$

❖ Group Classwork on Proportions and Percentages

During a volleyball game...

- Colleen serves the ball 5 times and 3 go over the net.
- Shannon serves the ball 20 times and 16 go over.
- Alyssa serves the ball 7 times and 1 goes over.



- 1.) a.) What percentage of Colleen's serves go over the net?
(Hint: 3 out of 5 is what percentage?)
b.) What percentage of Shannon's serves go over the net?
c.) What percentage of Alyssa's serves go over the net?
- 2.) At practice, Colleen serves the ball 20 times. If she keeps serving at the same rate as before, how many of her serves go over the net?
- 3.) Shannon serves the ball only 10 times. If she keeps serving at the same rate as before, how many of her serves go over the net?
- 4.) By the end, Alyssa got 11 serves over the net. If she continued serving at the same rate, how many times must she have served?
- 5.) Next practice: Colleen serves 20 times, Shannon serves 10 times, and Alyssa serves 105 times. Based on the original rates, who gets the most serves **over the net**? (Hint: find how many each girl got over the net and compare)
- 6.) There were 200 serves **total** during the next practice. Colleen served 45% of them, Shannon served 40%, and Alyssa served 15%.
 - a.) How many did Colleen serve? (Hint: What is 45% of 200?)
 - b.) How many did Shannon serve?
 - c.) How many did Alyssa serve?
- 8.) (Based on numbers in the previous problem) If each girl continued serving at the same rate as before, how many serves went over the net for...
 - a.) Colleen? (Hint: use Colleen's value from #7 as the total number of serves she attempted and compare to her original rate of 3 out of 5)
 - b.) Shannon?
 - c.) Alyssa?
 - d.) How many serves total went **over the net** during this practice?
 - e.) What percentage of the total serves went **over the net** during this practice?



❖ Tricks/Hints to Solve Each Question (when students were struggling)

#1: Trick \rightarrow the amount that went over are what % of the total attempted

#2: set up proportion using values from the top & compare to 20 attempts

#3: same as #2

#4: same as #2 & #3

#5: set up proportion (like #2, 3, 4) for each girl & take the highest

#6: $a \rightarrow c$: ~~set~~ set up percentage proportions (out of for each girl)

#8 (7): a.)-c.) set up proportion using original values & compare to each girl's ^{attempt} value found in #6

d.) add up all of the values a-c

e.) put total over 200 equals x over 100 as a proportion

❖ Answers to Volleyball Classwork

1.) a) $\frac{3}{5} = \frac{x}{100}$ $x = 60\%$
b) $\frac{16}{20} = \frac{x}{100}$ $x = 80\%$
c) $\frac{1}{7} = \frac{x}{100}$ $x = 14.3\%$

2.) $\frac{3}{5} = \frac{x}{20}$ $x = 12$

3.) ~~$\frac{16}{20} = \frac{x}{10}$~~ $\frac{16}{20} = \frac{x}{10}$ $x = 8$

4.) $\frac{1}{7} = \frac{11}{x}$ $x = 77$

5.) Colleen: $\frac{3}{5} = \frac{x}{20}$ $x = 12$
Shannon: $\frac{16}{20} = \frac{x}{10}$ $x = 8$ Alyssa
Alyssa: $\frac{1}{7} = \frac{x}{105}$ $x = 15$

6.) a) Colleen: 90
b) Shannon: 80
c) Alyssa: 30

8.) a) $\frac{3}{5} = \frac{x}{90}$ $x = 54$
b) $\frac{16}{20} = \frac{x}{80}$ $x = 64$
c) $\frac{1}{7} = \frac{x}{30}$ $x = \sim 4$
d) $64 + 54 + 4 = \sim 122$
e) $\frac{122}{200} = 61\%$

Appendix B

❖ Quiz on Divisibility Rules, Factorization, and Greatest Common Factor

Name: _____ Date: _____

Group: _____

I. State whether each number is **divisible** by 2, 3, 5, 6, 9, and 10:

1.) 100

2.) 9

3.) 1,234

4.) 18

5.) 117

6.) 60

7.) 27

8.) 101,340

II. List all of the **factors** for the following numbers:

9.) 36

10.) 120

11.) 21

12.) 56

13.) 7

14.) 18

15.) 81

16.) 51

III. Divide by the **GCF** (Greatest Common Factor) and simplify:

17.) $\frac{4}{8}$

18.) $\frac{40}{50}$

19.) $\frac{19}{27}$

20.) $\frac{50}{100}$

21.) $\frac{30}{15}$

22.) $\frac{18}{81}$

23.) $\frac{13}{39}$

24.) $\frac{3}{120}$

Bonus: You work from 10:15am until 6:45pm. You make \$15 per hour. How much do you earn?

Bonus #2: In one day, you work for $4\frac{1}{2}$ hours before lunch and $5\frac{3}{4}$ hours after lunch. If you make \$15 per hour, how much do you earn for the day?

❖ Quiz on Adding and Simplifying Fractions, Converting to Decimals, Percentages, and Basic Algebra

Add/subtract:

1.) $\frac{7}{10} + \frac{3}{4}$

2.) $6 - 2\frac{3}{8}$

Simplify:

3.) $\frac{16}{36}$

4.) $\frac{15}{45}$

To Decimal:

5.) $\frac{2}{13}$

To Fraction:

6.) 0.28 7.) 0.9

8.) 70% of 65? 9.) 40% of 15?

Set Up:

10.) 4 out of 5 is what %?

11.) How many out of 14 is 54%? (what is 54% of 14?)

Evaluate $x=1, y=3$:

12.) $5x + y$

13.) $x^4 + 2y$

14.) $(y-x)(y+x)$

15.) $4(y-x)$

16.) \$140 shoes on sale for 20% off. What is the sale price?

17.) $8.4 + 0.13 = ?$ 18.) $2.001 + 11.169 = ?$

19.) $6.014 - 0.9 = ?$ 20.) $12.1 - 2.831 = ?$

❖ Quiz on Scientific Notation, Rounding, Percentages, Long Division, Fractions, and Proportions

Write in Scientific Notation:

1.) 7102

3.) 0.001

5.) 1000.001

2.) 60014

4.) 0.000007821

Write the number:

6.) 4.3×10^2

8.) 1.28×10^8

10.) 9.2×10^5

7.) 8.381×10^{-4}

9.) 7.84×10^{-3}

Round to the nearest...

...tenth:

11.) 62.81

12.) 681.4928

13.) 5.55

... hundredth:

14.) 14.681

15.) 9.0041

16.) 10.8991

... whole #:

17.) 27.28

18.) 106.8111

19.) 99.52

20.) 17.63

21.) What is 10% of 871?

22.) What is 30% of 45?

23.) $4 \overline{)9358}$

24.) $\frac{5}{6} + \frac{5}{9} =$

25.) If I score 4 out of 6 shots in basketball how many will I score if I take 9 shots?

❖ Quiz on Adding/Subtracting/Simplifying Fractions, Mixed Numbers, Improper Fractions, Greatest Common Factor, Least Common Multiple, and Proportions

Add / Subtract:

$$1.) \begin{array}{r} 2\frac{1}{2} \\ + \frac{7}{8} \\ \hline \end{array}$$

$$2.) \begin{array}{r} 4\frac{1}{8} \\ - \frac{5}{6} \\ \hline \end{array}$$

$$3.) 3.1 + 0.9851$$

$$4.) 6.08 + 5.85$$

Simplify:

$$5.) \frac{14}{21}$$

$$6.) \frac{16}{36}$$

To Decimal:

$$7.) \frac{3}{7}$$

To Fraction:

$$8.) 10.65$$

GCF + LCM:

$$9.) 12 \text{ and } 36$$

$$10.) 4 \overline{) 9487}$$

$$11.) 20\% \text{ of } 45?$$

$$12.) 38\% \text{ of } 63?$$

#13-15: a.) State $>$, $<$, $=$, b.) By how much?

$$13.) \frac{5}{6} \bigcirc \frac{7}{8}$$

$$14.) \frac{1}{2} \bigcirc \frac{5}{9}$$

$$15.) \frac{3}{12} \bigcirc \frac{1}{4}$$

Round to nearest 10th:

$$16.) 12.25$$

$$17.) 3.109$$

Evaluate: $x=1, y=4$

$$18.) (x+y)^3$$

$$19.) 6x + 2y$$

20.) I have test scores 100, 30, 96, and 103. What must my final score be to get an 80 average?

21.) Order greatest to least: $3, \pi, \frac{9}{4}, -1, 1.5$

I take 7 shots and score 4 goals during a hockey game.

22.) If I shoot 21 times (at the same rate), how many goals will I score?

23.) If I get 20 goals, how many shots did I take?

24.) Convert to mixed number: $\frac{49}{5}$

25.) Convert to improper fraction: $3\frac{3}{8}$

❖ Quiz on Rounding Whole and Decimal Numbers

Rounding

Round to the nearest...

<u>Tenth:</u>	<u>Hundredth:</u>
1.) 10.871	6.) 210.1913
2.) 6.125	7.) 41.3562
3.) 18.9832	8.) 8.8916
4.) 102.463	9.) 14.5992
5.) 4.5512	10.) 486.7258

Whole number:

- 11.) 14.18
- 12.) 27.9143
- 13.) 49.842
- 14.) 183.46
- 15.) 199.54321

Appendix C

❖ Grade Distribution and Improvement for Pretest and Midterm Exams

Revolution			
Name	Pretest Score	Midterm Score	Difference
Antoine	20	72	+52
James	14	38	+24
<u>Kwadwo</u>	28	58	+30
Dennis	18	58	+40
<u>Naidelyn</u>	8	-	-
<u>Sharaya</u>	18	48	+30
Matthew	46	76	+30
Jose	8	-	-
Alejandra	20	76	+56
Mahlikhi	8	28	+20
<u>Dayanna</u>	16	28	+12
Derrick	60	96	+36
<u>Dinnessa</u>	10	52	+42
<u>Branggie</u>	42	40	-2
Emi	16	76	+60
Jasmine	4	26	+22
Tobey	58	58	+0
Dan	20	32	+12
<u>Jermelin</u>	2	-	-
Jason	42	82	+40
Karolina	50	82	+32
<u>Xamairys</u>	22	66	+44
<u>Eimmy</u>	42	72	+30
Alexander	28	-	-
Hector	4	44	+40
Eric	-	-	-
<u>Janaris</u>	-	8	+8

Grades								
	A 100-90	B 89-80	C 79-70	D 69-60	F 59>	Class Avg.	Avg. Diff.	Avg. # Q's Attempted
Pretest	0	0	0	1	25	23.54%	-	41/50
Individual Scores	-	-	-	60	58, 50, 46, 42, 42, 42, 28, 28, 22, 20, 20, 20, 18, 18, 16, 16, 14, 10, 8, 8, 8, 8, 4, 4, 2			
Midterm	1	2	5	1	13	55.27%	+29.91	
Individual Scores	96	82, 82	76, 76, 76, 72, 72	66	58, 58, 58, 52, 48, 44, 40, 38, 32, 28, 28, 26, 8			

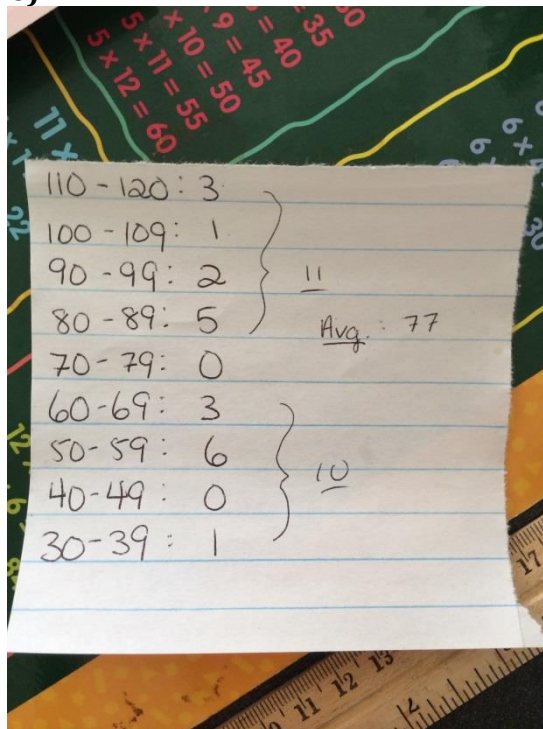
Hot Scholars			
Name	Pretest Score	Midterm Score	Difference
Dominique Alvarez	4	52	+48
<u>Avianna Avarza</u>	6		-
<u>Savannah Beeso</u>	8	34	+26
<u>Sawyer Canavan</u>	8	38	+30
<u>Sonja Carvaylho</u>	30	58	+28
Bianca Correa	12	48	+36
Alicia Davis	20		-
<u>Derek Deacon Demiral</u>		14	+14
<u>Tawanna Edmonds</u>	12	38	+26
Ariel Flores	20	38	+18
Jonathan Glidden	12	50	+38
<u>Damon Gosselin</u>	56	88	+32
Darnell Williams	56		-
Caitlin Kincaid	6	40	+34
Erastus Kuria	14	61	+47
<u>Saydu Kuyateh</u>	2	18	+16
<u>Yadavana Ledesma</u>	2	26	+24
Jacob Medina	6	42	+36
Cristal Nieves Luna	6	4	-2
Dylan Page	10		-
<u>Aleaha Pearl</u>	2	36	+34
Andre Price	6	46	+40
Anna Julia Ribeiro	2	28	+26
Stefan Souza	5	40	+35
Bailey Sullivan	32	56	+24
Beatrice <u>Waithaka</u>	10	36	+26
<u>Stacy Wanioho</u>	0	20	+20
Allison Wood	14		-
Jeremy <u>Xhija</u>	58	64	+6
<u>Matt Gorelik</u>		24	+24

Grades								
	A 100-90	B 89-80	C 79-70	D 69-60	F 59>	Class Avg.	Avg. Diff.	Avg. # Q's Attempted
Pretest	0	0	0	0	29	14.28%	-	33/50
Individual Scores	-	-	-	-	58, 56, 46, 32, 30, 20, 20, 14, 14, 12, 12, 12, 10, 10, 10, 8, 8, 6, 6, 6, 6, 6, 4, 2, 2, 2, 2, 0, 0			
Midterm	0	1	0	2	22	39.96%	+27.44	36/50
Individual Scores		88		64, 61	58, 56, 52, 50, 48, 46, 42, 40, 40, 38, 38, 38, 36, 36, 34, 28, 26, 24, 20, 18, 14, 4			

Challengers			
Name	Pretest Score	Midterm Score	Difference
Adrian	4	20	+16
Alexander	8	78	+70
Joseph	4	16	+12
Oscari	2	44	+42
Iyanna	0	22	+22
Danny	2	44	+42
Stephen	6	24	+18
Marc	34	56	+22
Lenin	0	-	-
Dyllan	12	-	-
Noah	54	86	+32
Russell	2	12	+10
Parker	80	92	+12
Samantha	14	40	+26
Arbella	-	16	+16
Ryan	-	18	+18
Jared	-	-	-

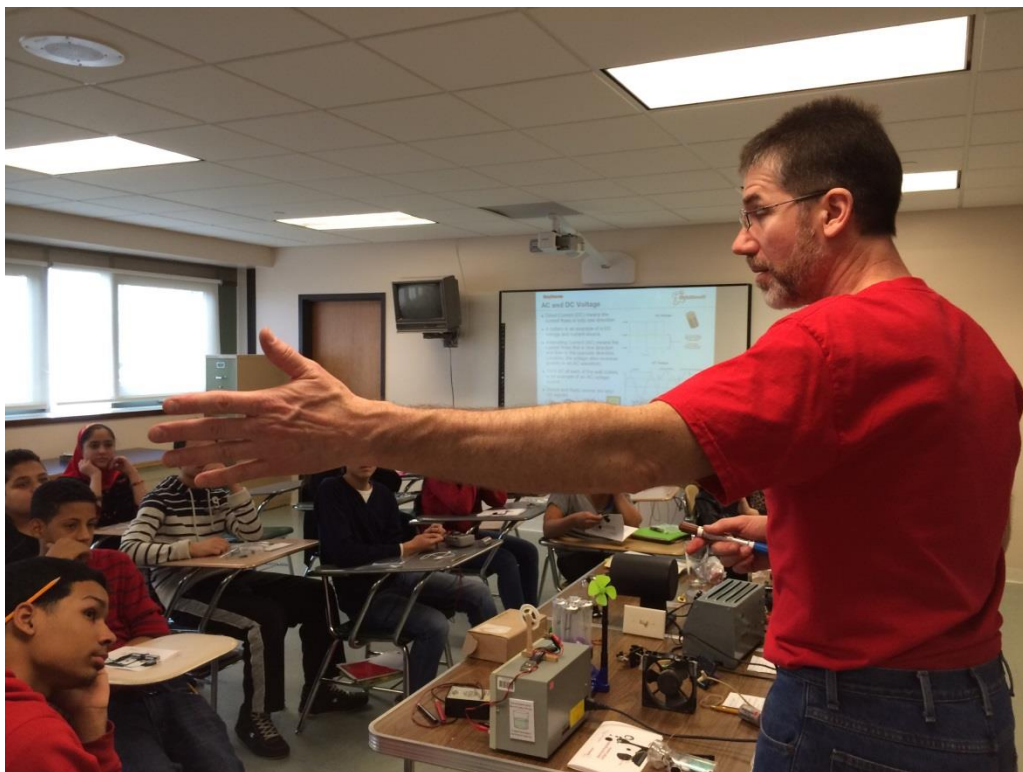
Grades								
	A 100-90	B 89-80	C 79-70	D 69-60	F 59>	Class Avg.	Avg. Diff.	Avg. # Q's Attempted
Pretest	0	1	0	0	15			
Individual Scores	-	80	-	-	56, 54, 18, 15, 6, 5, 5, 3, 2, 2, 2, 2, 0, 0	18.88%	-	30
Midterm	1	1	1	0	11			
Individual Scores	92	86	78	-	56, 44, 44, 40, 24, 22, 20, 18, 16, 16, 12	40.57%	+25.57	

❖ **Grade Distribution on Order of Operations Quiz (determined we needed to review the topic more)**



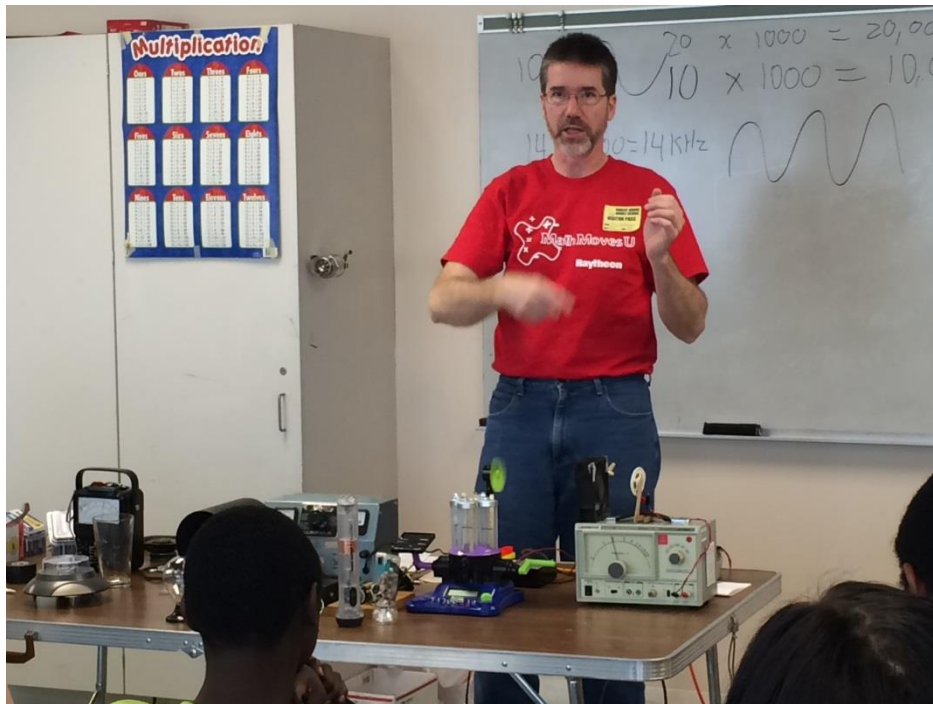
Appendix D

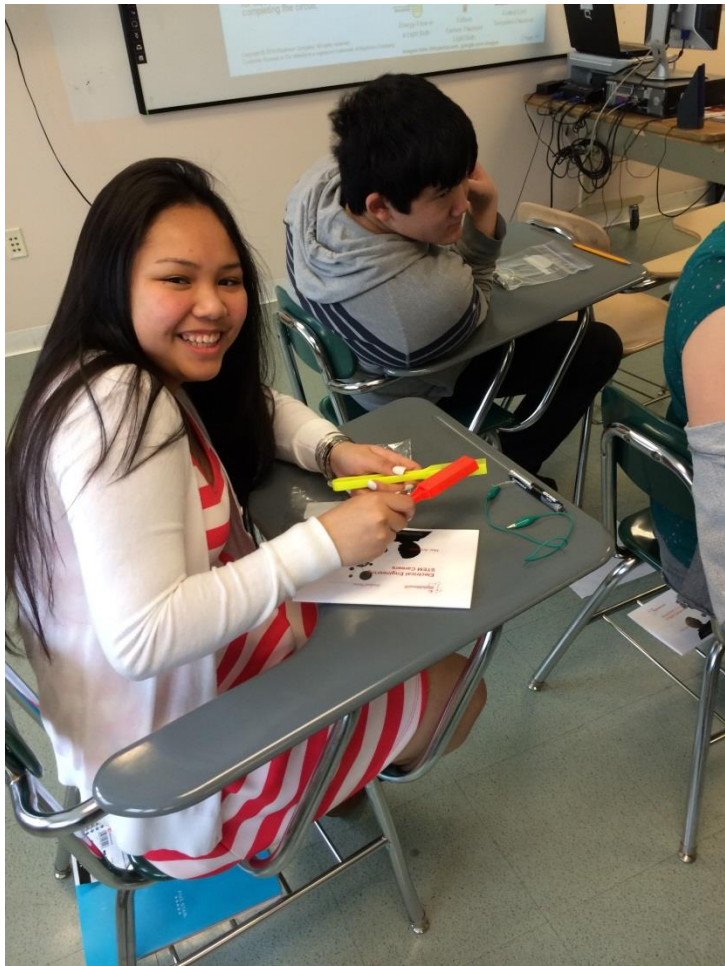
- ❖ Photos from Math Moves U Presentation (*All parties were notified that their picture may be taken and may appear in this report*)

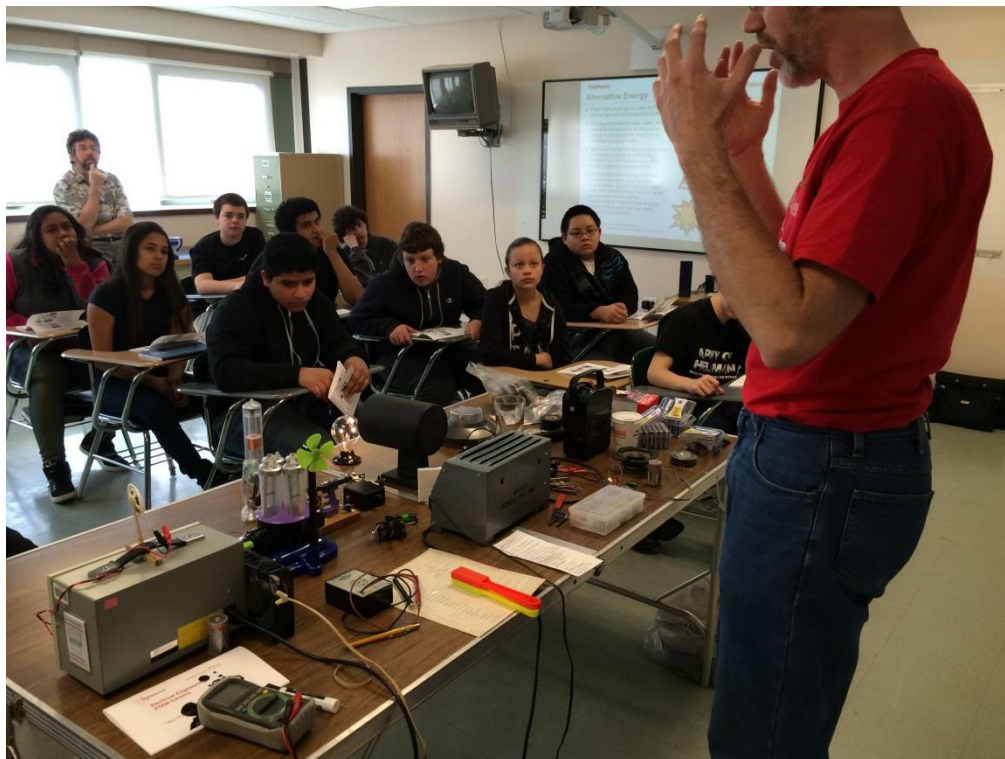













Appendix E

①

Fractions

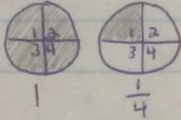
$\frac{5}{8}$ ← "numerator"
 8 ← "denominator"



5 out of 8 pieces are shaded

mixed numbers

$1\frac{1}{4}$
 ↗ ↖
 whole fraction
 number



$\frac{5}{4}$ is an improper fraction (numerator is greater than denominator)


$\frac{5}{4}$ can be converted to the mixed number $1\frac{1}{4}$ by dividing 5 by 4

$\frac{5}{4}$ is the same as 1 (same # top & bottom)

$\frac{5}{4} \rightarrow 4 \times 1 + 1 = 5 \rightarrow \frac{5}{4} = 1\frac{1}{4}$

reducing

$\frac{4}{8} \div 4 = \frac{1}{2}$
 $\frac{4}{8} = \frac{1}{2}$



• Divide numerator and denominator by the same number that will go evenly into both

• Goal: keep breaking down (reducing) until numerator & denominator are prime numbers or have no common factors ("Lowest Terms")

• Prime number: no factors other than 1 and itself
 ex) 2, 3, 5, 7, 11...

• factors: numbers that can be multiplied together to equal a number
 ex) $3 \times 4 = 12$; 3 and 4 are 12's factors

• Common factors: factors that 2 numbers share
 ex) $12: 1 \times 12, 2 \times 6, 3 \times 4$
 $36: 1 \times 36, 2 \times 18, 3 \times 12, 4 \times 9, 6 \times 6$
 Common: 2, 3, 4, 6, 12

Fractions: Adding / Subtracting

Adding

$$\frac{3}{4} + \frac{5}{8}$$

$$\begin{array}{r} \frac{3 \times 8 = 24}{4 \times 8 = 32} \\ + \frac{5 \times 4 = 20}{8 \times 4 = 32} \\ \hline \end{array}$$

$$\frac{44}{32} \div 2 = \frac{22}{16} \div 2 = \frac{11}{8}$$

Answer: $\frac{11}{8}$ or $1\frac{3}{8}$ or $\frac{44}{32}$

- 1.) Find a common denominator (multiply the two denominators)
- 2.) Whatever you multiply the denominator by, also multiply it by the numerator
- 3.) Add numerators only & keep the same denominator
- 4.) Reduce if possible

Subtracting

$$\begin{array}{r} \frac{3 \times 8 = 24}{4 \times 8 = 32} \\ - \frac{5 \times 4 = 20}{8 \times 4 = 32} \\ \hline \end{array}$$

$$\frac{4}{32} \div 4 = \frac{1}{8}$$

- 1.) Follow same steps as adding, subtract numerators

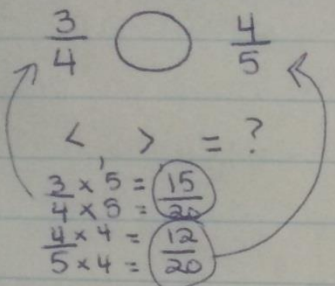
Subtracting (with borrowing)

$$1\frac{1}{4} - \frac{3}{8} = 1\frac{8}{32} + \frac{32}{32} - \frac{12}{32} = 1\frac{12}{32}$$

$$\frac{28}{32} \div 4 = \frac{7}{8}$$

- 1.) We want to subtract $\frac{12}{32}$ from $1\frac{8}{32}$, but the fractional part ($\frac{8}{32}$) is smaller than the amount to take away - borrow ~~1~~ $1 (= \frac{32}{32})$ from the whole part & add it
- 2.) subtract as before

Fractions: Comparing

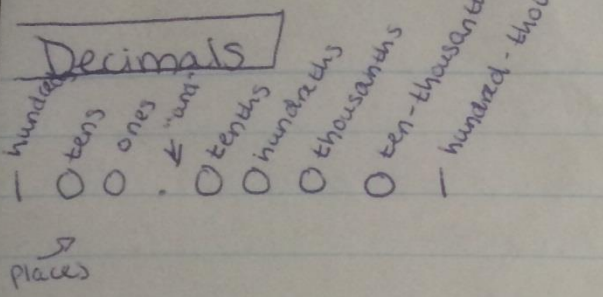


$\frac{15}{20} > \frac{12}{20}$

$\frac{15}{20} - \frac{12}{20} = \boxed{\frac{3}{20}}$

$\frac{15}{20}$ (or $\frac{3}{4}$) is greater than $\frac{12}{20}$ (or $\frac{4}{5}$) by $\frac{3}{20}$

- $\frac{3}{4}$ is greater than ($>$), less than ($<$), or equal to ($=$) $\frac{4}{5}$?
- 1.) Make fractions have common denominator
- 2.) Compare numerators - larger numerator is larger fraction
- By how much?
- 1.) Subtract the two new fractions to find difference



• This number would be read as "one hundred and one hundred-thousandths"

ex)

2.03 → two and three hundredths

0.3 → three tenths

decimals → fractions

- 2.03 → two and three hundredths
↳ $2 \frac{3}{100}$
 - 0.3 → three tenths → $\frac{3}{10}$
 - 10.01 → ten and one ~~thousandth~~ ^{hundredth} and the value in that place is the numerator.
↳ $10 \frac{1}{100}$
 - 4.2 → four and two tenths of the decimal is the whole number
↳ $4 \frac{2}{10} \div \frac{2}{2} = 4 \frac{1}{5}$
- Write it as you would read it in english
 - Find which place it is in to get the denominator,
 - The number to the left
 - Reduce, if possible

Decimals: adding/subtracting

3.4 + 2.8 = ?

ex)
$$\begin{array}{r} 3.4 \\ + 2.8 \\ \hline 6.2 \end{array}$$

? = 6.2

ex)

2.001 + 6 = ?

$$\begin{array}{r} 2.001 \\ + 6.000 \\ \hline 8.001 \end{array}$$

? = 8.001

ex)

3.284 + 6.9 = ?

$$\begin{array}{r} 3.284 \\ + 6.900 \\ \hline 10.184 \end{array}$$

? = 10.184

ex)

6.7 - 1.3 = ?

$$\begin{array}{r} 6.7 \\ - 1.3 \\ \hline 5.4 \end{array}$$

? = 5.4

ex)

10.001 - 3.8 = ?

$$\begin{array}{r} 10.001 \\ - 3.800 \\ \hline 6.201 \end{array}$$

? = 6.201

1.) Line up decimal points

2.) add ^{or subtract} from right to left (with carries, if necessary) ~~as usual~~ as usual

3.) bring decimal point down

* on a whole number, the decimal is always at the end (can add 0's as place holders)

Long Division

ex) $100 \div 5 = ?$

$$\begin{array}{r}
 020 \\
 5 \overline{)100} \\
 -10 \downarrow \\
 \hline
 00 \\
 -0 \\
 \hline
 0
 \end{array}$$

- 5 doesn't go into 1 $\rightarrow 0$
- put 0 above 1
- 5 goes into 10 2 times
- $5 \times 2 = 10$
- $10 - 10 = 0$
- bring down other 0 from top
- 5 goes into 00 zero times
- put 0 up top
- $5 \times 0 = 0$
- $0 - 0 = 0$
- no more numbers
- Answer: 20

1.) Work from left to right to see if number divided by goes into that digit

• If yes, how many times does it go in without going over?

• If no, bring down next digit, put 0 above that digit

2.) Multiply by number of times it goes in and write below number being divided

3.) Subtract off and bring down next digit

$$\begin{array}{r}
 03 \\
 7 \overline{)23} \\
 -21 \\
 \hline
 2
 \end{array}$$

- 7 doesn't go into 2
- put 0 above 2
- 7 goes into 23 3 times
- $7 \times 3 = 21$
- $23 - 21 = 2$
- no more digits to bring down \rightarrow Done

• if no more digits, number left over is the ~~remainder~~ remainder

• if digits still exist, bring one down and go back to #1 with that new number

Answer: $3 \frac{2}{7}$

* $\frac{2}{7}$ is the remainder

• 2 is left over at the bottom out of the 7 we were dividing by

Long Division (continued)

$$8463 \div 4$$

$$\begin{array}{r}
 2115 \\
 4 \overline{) 8463} \\
 \underline{-8} \\
 04 \\
 \underline{-4} \\
 06 \\
 \underline{-4} \\
 23 \\
 \underline{-20} \\
 3
 \end{array}$$

- 4 goes into 8? yes, 2 times
- ↳ 2 above 8 ~~2~~
- multiply $2 \times 4 = 8$
- subtract $8 - 8 = 0$

- bring down next digit (4)
- 4 into 4? yes, 1 time
- put 1 above 4
- multiply $1 \times 4 = 4$
- subtract $4 - 4 = 0$

- bring down next digit (6)
- 4 into 6? yes, 1 time
- put 1 above 6
- multiply $4 \times 1 = 4$
- subtract $6 - 4 = 2$

- bring down next digit (3)
- 4 into 23? yes, 5 times
- put 5 above 3
- multiply $4 \times 5 = 20$
- subtract $23 - 20 = 3$

• remainder is 3 out of 4 left over

• Answer: $2115 \frac{3}{4}$

Long Division: Decimals

$4 \div 5 = ?$

$$\begin{array}{r}
 0.9 \\
 5 \overline{) 4.0} \\
 \underline{-40} \\
 0
 \end{array}$$

Answer: 0.9

- 4 is smaller than 5, ~~so~~ so the answer will be less than 1 (decimal)
- add decimal point after 4, since 5 can't go into 4, and bring it up top as well
- add zero's after the decimal next to the 4, and evaluate without the decimal (5 goes into 40 how many times)

$2 \div 3$

$$\begin{array}{r}
 0.666 \\
 3 \overline{) 2.000} \\
 \underline{-18} \downarrow \\
 20 \\
 \underline{-18} \downarrow \\
 20 \\
 \underline{-18} \downarrow \\
 20 \\
 \underline{-18} \downarrow \\
 2
 \end{array}$$

- 3 doesn't go into 2 $\rightarrow 0$
- add decimal after 2 and bring decimal up
- add zero's
- 3 into 20 $\rightarrow 6$ times
- 3 into 20 $\rightarrow 6$ times
- 3 into 20 $\rightarrow 6$ times
- repeating: will never stop

* the bar means repeating

Answer: $0.6\overline{66}$

Fractions: Convert to Decimals

$$\frac{3}{13}$$

$$0.2307$$

$$13 \overline{) 3.0000}$$

$$\begin{array}{r} -26 \downarrow \\ \hline 40 \\ -39 \downarrow \downarrow \\ \hline 100 \\ -91 \\ \hline 9 \end{array}$$

- Divide using long division
- Add in decimal and use some decimal division rules as before
- Continue to 2 or 3 decimal places

Answer: 0.2307

$$4 \frac{5}{8}$$

$$0.625$$

$$8 \overline{) 5.000}$$

$$\begin{array}{r} -48 \downarrow \\ \hline 20 \\ -16 \downarrow \\ \hline 40 \\ -40 \\ \hline 0 \end{array}$$

$$4 \frac{5}{8}$$

$$\frac{37}{8}$$

• use whole # on left side of decimal and divide fraction
-OR-

-or-

$$4.625$$

Convert to improper fraction and divide

$$8 \overline{) 37}$$

$$\begin{array}{r} -32 \\ \hline 5.000 \\ -48 \downarrow \\ \hline 20 \\ -16 \downarrow \\ \hline 40 \\ -40 \\ \hline 0 \end{array}$$

Answer: 4.625

Answer: 4.625

Fractions: Convert to mixed number

$$\frac{13}{5}$$

$$\begin{array}{r} 2 \\ 5 \overline{)13} \\ -10 \\ \hline 3 \end{array}$$

Answer: $2 \frac{3}{5}$

- Improper Fraction: top number is greater than bottom number, which means it is greater than 1 ($\frac{5}{5} = 1$ in this case)
- divide top by bottom
- # of times it goes in \rightarrow whole number (in this case, 2)
- remainder \rightarrow numerator (3)
- # dividing by \rightarrow denominator (5)

~~$\frac{27}{4}$~~

$$\begin{array}{r} 6 \\ 4 \overline{)27} \\ -24 \\ \hline 3 \end{array}$$

Answer: $6 \frac{3}{4}$

$$\frac{40}{5}$$

$$\begin{array}{r} 8 \\ 5 \overline{)40} \\ -40 \\ \hline 0 \end{array} \quad \frac{0}{5} = 0 \rightarrow$$

Answer: 8

$$\begin{array}{r} 2 \\ 9 \overline{)21} \\ -18 \\ \hline 3 \end{array}$$

$$2 \frac{3}{9}$$

Answer: $2 \frac{3}{9}$ can be reduced:
 $2 \frac{3 \div 3}{9 \div 3} = \boxed{2 \frac{1}{3}}$

Fractions: Convert to improper fractions

2 1/3

• Goal: get rid of whole number and make numerator larger than denominator

• How? "The 'C' method"

• Multiply the denominator by the whole number and add the numerator, keep same denominator

3 x 2 + 1 = 7 / 3

Answer: 7/3

6 3/4

4 x 6 + 3 = 27 / 4

8 7/10

10 x 8 + 7 = 87 / 10

4 3/6

6 x 4 + 3 = 27 / 6 -> reduce if possible

27 ÷ 3 = 9 / 6 ÷ 3 = 2

Bounding

• You "round" a number to a shorter approximate number

Rules

- 1) digits 0-4 : leave previous digit the same
- 2) digits 5-9 : add one to previous digit

Round to the nearest tenth:

4. 8 4 | 2

Answer: 4.8

• underline the "place" you want to round the number to (in this case, tenths)

• look at the next digit (circle it) and apply rules
→ in this case, 4 falls under Rule #1, so do nothing to the 8

Round to the nearest hundredth:

6.31 7 2

Answer: 6.32

• apply rule #2 (7 is between 5 & 9, so add 1 to 1)

Round to nearest one:

4. 5 0 1

Answer: 5

• apply rule #2

Percents: 10% Rule

• Percent: "out of 100"

- Find 10% of 50

$$\begin{array}{l} 50, \\ \downarrow \\ 10\% \text{ of } 50 = \boxed{5} \end{array}$$

~~Rule~~ • 10% Rule: move the decimal point one place to the left
 * whole numbers always have a decimal at the end

- 10% of 35?

$$35, \quad \boxed{3.5}$$

- Apply 10% rule

- 20% of 52?

$$10\% \text{ of } 52 = 5.2$$

$$20\% \text{ of } 52 = 5.2 \times 2 = 10.4$$

$$\boxed{20\% \text{ of } 52 = 10.4}$$

- Apply 10% rule, because 20 is divisible by 10
- Get 10% of 52
- Multiply by 2, because ~~20~~ $10 \times 2 = 20$

- 40% of 103?

$$10\% \text{ of } 103 = 10.3$$

$$40\% : 10.3 \times 4 = 41.2$$

$$\boxed{40\% \text{ of } 103 = 41.2}$$

- Apply 10% Rule and multiply by 4

Proportions: "The Lonely Guy"

- use proportions to find missing values, usually in word problems

ex)

- If 3 out of 8 cans of soda are coke, how many will be coke if I have 24 cans of soda?

known:

$\frac{3 \text{ coke}}{8 \text{ cans}}$

Find:
 $\frac{x \text{ coke}}{24 \text{ cans}}$

$$\frac{3 \text{ coke}}{8 \text{ cans}} = \frac{? \text{ coke}}{24 \text{ cans}}$$

$$3 \times 24 = 72$$

$$72 \div 8 = 9$$

Answer: 9 will be coke

- Set up: write known values as fraction and label ($\frac{3}{8}$)

- set equal to fraction with missing value: make sure to keep the labels consistent with the first fraction

- Solve: cross multiply

1) multiply the two known numbers diagonal from one another (3×24)

2) ~~draw~~ circle the one diagonal from the unknown: this is "the lonely guy"

3) divide the result from step 1 by the lonely guy ($3 \times 24 \div 8$) to get the answer

Proportions Continued

I score a goal 2 times out of every 12 shots in soccer.

a.) How many goals will I score if I take 24 shots?

$$\begin{array}{l} \frac{2 \text{ goals}}{12 \text{ shots}} \quad \times \quad \frac{x \text{ goals}}{24 \text{ shots}} \end{array}$$

$$2 \times 24 = 48$$

$$48 \div 12 = 4$$

Answer: 4 goals

b.) How many shots did I take if I got 12 goals?

$$\begin{array}{l} \frac{2 \text{ goals}}{12 \text{ shots}} \quad \times \quad \frac{12 \text{ goals}}{x \text{ shots}} \end{array}$$

$$12 \times 12 = 144$$

$$144 \div 2 = 72$$

Answer: 72 goals

Appendix F

Worcester Polytechnic Institute Teacher Certification Program Practicum Log

Name: Haley Andrews

Week Of: 5/27

	Activity	Subject Area	Hours	Signature
Monday	-	-	-	-
Tuesday	-	-	-	-
Wednesday	Observed	Numeracy	1 = 1 observing	
Thursday	-	-	-	-
Friday	-	-	-	-
Totals		Direct Hours	0	
		Observation Hours	1	

Haley Andrews

**Worcester Polytechnic Institute
Teacher Certification Program
Practicum Log**

Name: Haley Andrews

Week Of: 9/2

	Activity	Subject Area	Hours	Signature
Monday	L A B O R D A Y			—
Tuesday	Observed	Numeracy (Gr. 7&8) Math (Gr. 8)	2 • 2 observing	
Wednesday	observed Graded Quizzes ELL help	Numeracy (Gr. 7&8) Math (Gr. 8)	5 • 5 observing	
Thursday	Observed One-on-one ELL help	Numeracy (Gr. 7&8) Math (Gr. 8)	2 2 • 0.5 direct • 1.5 observing	
Friday	Observed Graded pre- tests	Numeracy (Gr. 7&8) Math (Gr. 8)	3 • 3 observing	
Totals		Direct Hours Observation Hours	0.5 11.5 11.5	

Haley Andrews

**Worcester Polytechnic Institute
Teacher Certification Program
Practicum Log**

469 1/2
7/3284
28
48
42
63
1

Name: Haley Andrews

Week Of: 9/9

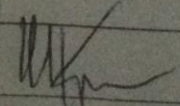
	Activity	Subject Area	Hours	Signature
Monday	• Observing • Grading pre-tests • Providing feedback	Numeracy Gr. 7 & 8 Math Gr. 8	3 • 0: 3 hrs	
Tuesday	-	-	-	-
Wednesday	• Observing Grading • Provide Feedback • One-on-one ELL help	Numeracy Gr. 7 & 8 Gr. 8 Math	5 • 1 direct • 4 observe	
Thursday	• Observe • Grade • Create a quiz	Numeracy Gr. 7 & 8 Gr. 8 Math	2 • 0: 2 hrs	
Friday	• Observing • Grading • Grading quizzes • One-on-one ELL help	Numeracy Gr. 7 & 8 Gr. 8 Math	4 • 0: 3 • 0: 1	
Totals		Direct Hours Observation Hours	2 9	

Haley Andrews

**Worcester Polytechnic Institute
Teacher Certification Program
Practicum Log**

Name: Haley Andrews

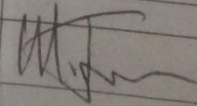
Week Of: 9/16

	Activity	Subject Area	Hours	Signature
Monday	• Grading	Numeracy Gr. 7 & 8	3 O: 1	
	• Observing	Math Gr. 8	D: 2	
	• one-on-one help			
	• small group help			
Tuesday	• Grading	Numeracy Gr. 7 & 8	2 D: 1.5	
	• Observing	Math Gr. 8	O: 0.5	
	• one-on-one / small group teaching			
	• Grading			
Wednesday	• one-on-one help / small group teaching	Numeracy Gr. 7 & 8	5 O: 3.5	
	• Grading	Math Gr. 8	D: 1.5	
	• Observing			
	• discussing curriculum plans			
Thursday	• Grading			
	• one-on-one help (ELL)	Math Gr. 8	3 D: 1	
Friday	• Grading	Numeracy Gr. 7 & 8	O: 2	
	• quizzes			
Totals		Direct Hours	6	
		Observation Hours	9	

**Worcester Polytechnic Institute
Teacher Certification Program
Practicum Log**

Name: Haley Andrews

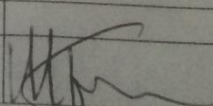
Week Of: 9/23

	Activity	Subject Area	Hours	Signature
Monday	<ul style="list-style-type: none"> • Grading • One-on-one • Ell help 	<ul style="list-style-type: none"> • Numeracy Gr. 7 & 8 • Gr. 8 math 	4 D: 2 O: 2	
Tuesday	<ul style="list-style-type: none"> • One-on-one • Grading • Small group • Ell help 	<ul style="list-style-type: none"> • Numeracy Gr. 7 & 8 • Gr. 8 math 	3 D: 2.5 O: 0.5	
Wednesday	<ul style="list-style-type: none"> • Grading • Grading • Grading • one-on-one • Ell help 	<ul style="list-style-type: none"> • Gr. 8 math • Numeracy Gr. 7 & 8 	5 D: 3 O: 2	
Thursday	<ul style="list-style-type: none"> • Quiz help • one-on-one • small group help • grading 	<ul style="list-style-type: none"> • Numeracy Gr. 7 & 8 • Gr. 8 math 	3 D: 1 O: 2	
Friday	<ul style="list-style-type: none"> • grading 			
Totals		Direct Hours Observation Hours	8.5 6.5	

**Worcester Polytechnic Institute
Teacher Certification Program
Practicum Log**

Name: Haley Andrews

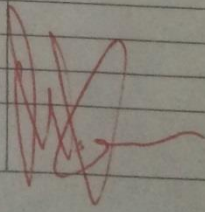
Week Of: 9/30

	Activity	Subject Area	Hours	Signature
Monday	Grading One-on-one help	Numeracy Gr. 7&8 Gr. 8 Math	4 D: 1 O: 3	
Tuesday	Grading One-on-one ELL help	Numeracy Gr. 7&8 Gr. 8 Math	3 D: 1.5 O: 1.5	
Wednesday	One on one help for absent students	Numeracy Gr. 7&8 Gr. 8 Math	5 D: 3 O: 2	
Thursday	Grading Grading Classwork help	Numeracy Gr. 7&8 Gr. 8 Math	3 D: 0.5 O: 2.5	
Friday	-	-	-	-
Totals		Direct Hours	6	
		Observation Hours	9	

**Worcester Polytechnic Institute
Teacher Certification Program
Practicum Log**

Name: Haley Andrews

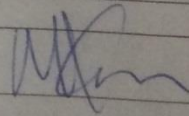
Week Of: 10/7

	Activity	Subject Area	Hours	Signature
Monday	One-on-one help	Gr. 8 math	4	
	Grading	Numeracy Gr. 7&8	0:3 D:1	
Tuesday	• grading • Absent student make-up lesson	Numeracy Gr. 7&8 Gr. 8 Math	3 0:2 D:1	
Wednesday	made • Worksheets • one-on-one/ small group work	Math Gr. 8 Numeracy Gr. 7&8	5 0:3 D:2	
Thursday	• Grading • one-on-one ELL help	Math Gr. 8 Numeracy Gr. 7&8	3 0:2 D:1	
Friday	H O L I D A Y			
Totals		Direct Hours	5	
		Observation Hours	10	

**Worcester Polytechnic Institute
Teacher Certification Program
Practicum Log**

Name: Hayley Andrews

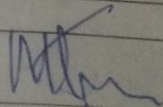
Week Of: 10/14

	Activity	Subject Area	Hours	Signature
Monday	H O L I D A Y			
Tuesday	<ul style="list-style-type: none"> • Grading • Worksheets • created a quiz • Est. help 	Numeracy Gr. 7+8 Math Gr. 8	3 O: 2 D: 1	
Wednesday	<ul style="list-style-type: none"> • review of problems on board (one-on-one) 	Gr. 8 Math Gr. 7 & 8 Numeracy	1	
Thursday	<ul style="list-style-type: none"> • Grading • one-on-one help with board problems 	Numeracy Gr. 7 & 8 Math Gr. 8	4 O: 1 D: 3	
Friday	<ul style="list-style-type: none"> • one-on-one help • grading • Est. help (new student) 	Numeracy Gr. 7+8 Math Gr. 8	5 O: 1 D: 4	
Totals		Direct Hours	9	
		Observation Hours	4	

**Worcester Polytechnic Institute
Teacher Certification Program
Practicum Log**

Name: Haley Andrews

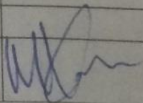
Week Of: 10/21

	Activity	Subject Area	Hours	Signature
Monday	(BREAK)			
Tuesday	(BREAK)			
Wednesday	<ul style="list-style-type: none"> • Grading • Numeracy meeting • one-on-one review 	<ul style="list-style-type: none"> 8th Grade Math 7th & 8th Gr. Numeracy 	<ul style="list-style-type: none"> 4 D: 3 O: 1 	
Thursday	(BREAK)			
Friday	<ul style="list-style-type: none"> • quiz review (one-on-one) • Grading 	<ul style="list-style-type: none"> 8th Gr. Math 7th & 8th Gr. Numeracy 	<ul style="list-style-type: none"> 5 D: 3 O: 2 	
Totals		Direct Hours Observation Hours	6 3	

**Worcester Polytechnic Institute
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Practicum Log**

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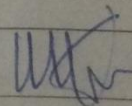
Week Of: 10/28

	Activity	Subject Area	Hours	Signature
Monday	(BREAK)			
Tuesday	<ul style="list-style-type: none"> • Grading Numeracy • one-on-one Gr. 7+8 • Topics review Math 	Gr. 8	5 O: 1.5 D: 3.5	
Wednesday	<ul style="list-style-type: none"> • created worksheets • created exam • one-on-one help 	Numeracy Gr. 7+8 Math Gr. 8	5 O: 2 D: 3	
Thursday	<ul style="list-style-type: none"> • Grading • ELL help • Board review one-on-one help 	Math Gr. 8 Numeracy Gr. 7+8	4 O: 2 D: 2	
Friday	-	-	-	-
Totals		Direct Hours	8.5	
		Observation Hours	5.5	

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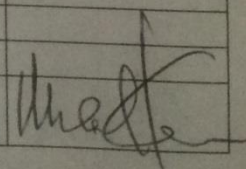
Week Of: 11/4

	Activity	Subject Area	Hours	Signature
Monday	• Grading • one-on-one ESL help • Absent student help	• Numeracy Gr. 7+8 • Math Gr. 8	5 O: 2 D: 3	
Tuesday	• organizing problems for future lessons • one-on-one	Numeracy Gr. 7+8 Math Gr. 8	3 D: 3	
Wednesday	• created worksheet • student's partner for assignment	Numeracy Gr. 7+8 Math Gr. 8	5 O: 1 D: 4	
Thursday	• one-on-one • one-on-one • review for new students	Numeracy Gr. 7+8 Math Gr. 8	5 O: 1 D: 4	
Friday	• one-on-one quiz review • grading	Numeracy Gr. 7+8 Math Gr. 8	3 O: 1.5 D: 1.5	
Totals		Direct Hours Observation Hours	15.5 5.5	

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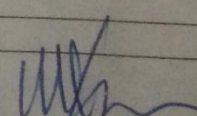
Week Of: 11/11

	Activity	Subject Area	Hours	Signature
Monday	HOLIDAY			
Tuesday	<ul style="list-style-type: none"> • One-on-one • ELL help • Grading 	<ul style="list-style-type: none"> • Numeracy Gr. 7+8 • Gr. 8 Math 	4	
Wednesday	<ul style="list-style-type: none"> • Board work as class • Registered for First In Math 	<ul style="list-style-type: none"> • Gr. 8 Math • Gr. 7+8 Numeracy 	5	
Thursday	<ul style="list-style-type: none"> • proportions practice • Registered First In Math 	<ul style="list-style-type: none"> • Gr. 8 Math • Numeracy Gr. 7+8 	5 O:1 D:4	
Friday	<ul style="list-style-type: none"> • Prof. Goulet observed • volleyball proportions activity 	<ul style="list-style-type: none"> • Numeracy Gr. 7+8 • Math Gr. 8 	5 4	
Totals		Direct Hours	18	
		Observation Hours	1	
		Hours		

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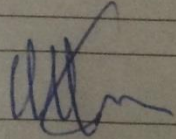
Week Of: 11/18

	Activity	Subject Area	Hours	Signature
Monday	-	-	-	-
Tuesday	• First in Math help • one-on-one ELL help	Gr. 7+8 Numeracy Gr. 8 Math	5	
Wednesday	• one-on-one review • ELL help	Numeracy Gr. 7+8 Gr. 8 math	3	
Thursday	-	-	-	-
Friday	• overall topics review • one-on-one help	• Numeracy Gr. 7+8 • Math Gr. 8	4 O: 0.5 D: 3.5	
Totals		Direct Hours Observation Hours	14.5 0.5	

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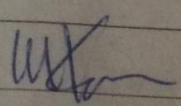
Week Of: 11/25

	Activity	Subject Area	Hours	Signature
Monday	<ul style="list-style-type: none"> • One-on-one help • Overall review • Absent/new 	Numeracy Gr. 7+8 Math Gr. 8	5	
Tuesday	Student review			
	-	-	-	-
Wednesday	H O L I D A Y			
Thursday	↓	↓	↓	↓
Friday				
Totals		Direct Hours Observation Hours	5	

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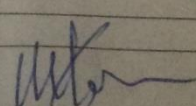
Week Of: 12/2

	Activity	Subject Area	Hours	Signature
Monday	<ul style="list-style-type: none"> • Created Quiz • One-on-one review 	7 th + 8 th gr. Numeracy Gr. 8 Math	5	
Tuesday	<ul style="list-style-type: none"> • First in Math help • One-on-one ESL • Created ESL 	Numeracy Gr. 7+8 Math Gr. 8	4	
Wednesday	<ul style="list-style-type: none"> • Quiz • Quiz • one-on-one help • grading 	Gr. 8 Math Gr. 7+8 Numeracy	5	
Thursday	<ul style="list-style-type: none"> • New student review (ESL) • Board work • General ESL help 	Gr. 8 Math Numeracy Gr. 7+8	2	
Friday	<ul style="list-style-type: none"> • Prof. Gallet observed • Board work 	Gr. 8 Math Gr. 7+8 Numeracy	5	
Totals		Direct Hours Observation Hours	21	
				

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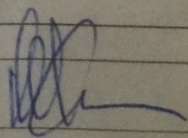
Week Of: 12/9

	Activity	Subject Area	Hours	Signature
Monday	• Board work • one-on-one ESL help • ESL Review	• Gr. 8 Math • Gr. 7+8 Numeracy	4	
Tuesday	• Board Review • one-on-one help • Grading	• Gr. 8 Math • Gr. 7+8 Numeracy	1	
Wednesday	• Grading • Topics Review • Problems on board • one-on-one	• Gr. 7+8 Num. • Gr. 8 Math	5 O: 1 D: 4	
Thursday	• ESL Review sheets • one-on-one ESL help • board work	• Gr. 8 Math • Gr. 7+8 Numeracy	3	
Friday	• Created quiz • grading • one-on-one ESL help	• Gr. 8 Math • Gr. 7+8 Numeracy	3	
Totals		Direct Hours Observation Hours	15 1	

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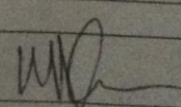
Week Of: 12/16

	Activity	Subject Area	Hours	Signature
Monday	• one-on-one • board review • Ell one-on-one help	• Gr. 8 Math • Gr. 7+8 Numeracy	3	
Tuesday	• First in Math supervision • one-on-one Ell help	• Gr. 8 Math • Gr. 7+8 Numeracy	5	
Wednesday		(BREAK)		
Thursday		(BREAK)		
Friday		(BREAK)		
Totals		Direct Hours Observation Hours	8	

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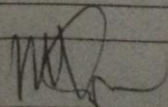
Week Of: 1/20

	Activity	Subject Area	Hours	Signature
Monday	H O L I D A Y			
Tuesday	<ul style="list-style-type: none"> • one-on-one • small group help w/ algebra + negatives 	Math Grade 8 Numeracy Gr. 7+8	3	
Wednesday	S N O W			
Thursday	<ul style="list-style-type: none"> • one-on-one help w/ negatives • review of fractions 	Math Gr 8 Numeracy Gr. 7+8	2	
Friday	S N O W			
Totals		Direct Hours Observation Hours	5	

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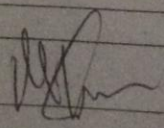
Week Of: 1/27

	Activity	Subject Area	Hours	Signature
Monday	<ul style="list-style-type: none"> ◦ one-on-one help ◦ grading 	Numeracy Gr. 7+8 Math Gr. 8	2	
Tuesday	-	-	-	-
Wednesday	<ul style="list-style-type: none"> ◦ board work ◦ one-on-one help ◦ ELL help 	Numeracy Gr. 7+8 Math Gr. 8	4	
Thursday	-	-	-	-
Friday	<ul style="list-style-type: none"> ◦ one-on-one classwork help ◦ small group work 	Numeracy Gr. 7+8 Math Gr. 8	2	
Totals		Direct Hours Observation Hours	6 4 2	

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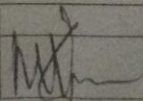
Week Of: 2/3

	Activity	Subject Area	Hours	Signature
Monday	• Grading • one-on-one help • note sheet reviews	Numeracy Gr. 7+8 Math Gr. 8	3	
Tuesday	-	-	-	-
Wednesday	• midterm spreadsheets • one-on-one reviews		4 D: 3 O: 1	
Thursday	-	-	-	-
Friday	• quiz review • grading • one-on-one help	Numeracy Gr. 7+8 Math Gr. 8	2	
Totals		Direct Hours	8	
		Observation Hours	1	

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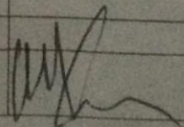
Week Of: 2/10

	Activity	Subject Area	Hours	Signature
Monday	• board work	Numeracy Gr. 7+8	3 D: 2	
	• one-on-one help	Math Gr. 8	D: 1	
	• notes			
Tuesday	• one-on-one help	Numeracy Gr. 7+8	1 D: 1	
	• grading	Math Gr. 8		
Wednesday	-	-	-	-
Thursday	• one-on-one help	Gr. 7+8 Numeracy	2 D: 2	
	• small group review	Gr. 8 Math		
Friday	-	-	-	-
Totals		Direct Hours	5	
		Observation Hours	1	

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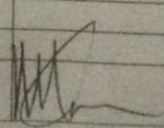
Week Of: 2/24

	Activity	Subject Area	Hours	Signature
Monday	• Review • Board work • MCAS practice	Numeracy Gr. 7-8 Math Gr. 8	3	
Tuesday	-	-	-	-
Wednesday	-	-	-	-
Thursday	• Grading • Observing	Numeracy Gr. 7-8 Math Gr. 8	1	
Friday	-	-	-	-
Totals		Direct Hours	3	
		Observation Hours	1	

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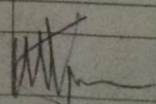
Week Of: 3/3

	Activity	Subject Area	Hours	Signature
Monday	• Grading • One-on-one help • ESL help	Numeracy Gr. 7-8 Math Gr. 8	3 D: 2 O: 1	
Tuesday	-	-	-	-
Wednesday	• Board work • MCAS Review • one-on-one help	Numeracy Gr. 7-8 Math Gr. 8	2	
Thursday	-	-	-	-
Friday	-	-	-	-
Totals		Direct Hours Observation Hours	4 1	

**Worcester Polytechnic Institute
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Name: Haley Andrews

Week Of: 3/9

	Activity	Subject Area	Hours	Signature
Monday	-	-	-	
Tuesday	-	-	-	
Wednesday	-	-	-	
Thursday	-	-	-	
Friday	Math Make U Presentation	Numerals Gr. 7+8 Math Gr. 8	5	
Totals		Direct Hours	5	
		Observation Hours	0	

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