



# **Teaching Practicum Forest Grove Middle School 2010-2011**

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Completed in Partial Fulfillment of Requirements for the  
Bachelor of Science Degree in  
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**Abstract**

Although I am majoring in Electrical and Computer Engineering, I have always hoped to teach at some point in my career. Being able to complete WPI's required Interactive Qualifying Project (IQP) by taking part in the school's Teacher Preparation program was one of the main reasons I decided to attend WPI. After completing 75 hours of observation, and 150 hours of teaching in an eighth grade math class at Forest Grove Middle School in Worcester, MA, I will be able to earn an initial Massachusetts teaching license. This experience has been very rewarding, and has solidified my hope of someday becoming a secondary math teacher. This report documents my experience, and provides sample quizzes, worksheets, and lesson plans that I created during my time at Forest Grove.

**Acknowledgements**

I would like to thank those who made it possible for me to complete my IQP.

First, I would like to thank Professor Goulet for guiding me through the process of completing the teaching practicum. I contacted him during my first year at WPI about the program, and since then have been guided through the steps I needed to take to eventually earn my teaching license. Also, I would like to thank him for matching me up with a great teaching mentor.

That leads me to my mentor, Mr. Michael True. I could not have asked for a better teacher to work with. Allowing a stranger into your classroom cannot be easy, but he welcomed me and gave me a lot of good advice that he has learned during his time as a teacher. I would also like to thank him for being so understanding of my circumstances and allowing me to adjust my schedule based on what I was doing in my WPI classes.

I would like to thank my family for supporting me during this experience. It was always good to have somebody who would listen to my recollection of the entire school day.

Lastly, I would like to thank all of the teachers that I have had during my school career. This experience has made me realize how difficult teaching actually is, and has also made me realize how lucky I have been to have had such great teachers from elementary school through college. They taught me more than just math or English, they taught me a lot of techniques that were useful during my time at Forest Grove Middle School, and will be useful when I become a teacher and have a class of my own.

## Table of Contents

Abstract .....	1
Acknowledgements .....	2
Chapter One: Forest Grove Middle School .....	4
1.1 Demographics.....	4
1.2 MCAS Results.....	5
Table 1- Percent of Students at Each Performance Level.....	5
Chapter Two: Eighth Grade Numeracy .....	7
Chapter Three: Course Materials .....	8
Figure 1- Daily Board Work.....	8
Figure 2 – Eno Board and Projector .....	10
Chapter Four: Classroom Management .....	11
4.1. Massachusetts Professional Standards for Teachers.....	11
4.2. The League of Nations/DaVinci Group.....	13
4.3. The League of Nations.....	16
4.4. The Hot Scholars.....	18
4.5. The DaVinci Group.....	20
4.6. Dealing with Absences and New Students .....	22
Chapter Five: Assessment.....	23
5.1. Classroom Assessment.....	23
5.2. MCAS .....	24
Chapter Six: Conclusion .....	24
Appendix A.....	26
Syllabus.....	26
Mr. True’s Explanation of the Numeracy Course.....	26
Appendix B .....	27
Sample Lesson Plan .....	27
Sample Board Work.....	29
Example of Problems Projected onto the Eno Board.....	29
Example of a Worksheet with Notes and Problems that was Projected onto the Eno Board.....	30
Appendix C .....	32
Mr. True’s Class Schedule.....	32
Forest Grove Middle School Bell Schedule (Mr. True’s classes follow the Wave One Schedule).....	32
Appendix D.....	33
Sample Quiz.....	33
MCAS Analysis .....	34
Notes and New Questions similar to Actual MCAS Questions.....	35

## **Chapter One: Forest Grove Middle School**

Forest Grove Middle School is one of four middle schools in the city of Worcester, Massachusetts. Students attend Forest Grove for 7<sup>th</sup> and 8<sup>th</sup> grade. During these pivotal years in a child's development and education, teachers at Forest Grove strive to prepare every student to develop the necessary "skills, experiences, and knowledge to advance to the next level of their education."<sup>1</sup>

### **1.1 Demographics**

Based on the 2000 census, the total population of Worcester was 172,648, with 23.6% of the total population under the age of 18.<sup>2</sup> The median household income in Worcester during this time was \$35,623, over \$6,000 below the median national household income of \$41,994. Presently, a total of 23,988 students are enrolled in the Worcester Public School system, 3,077 of whom are enrolled in the city's middle schools.<sup>3</sup>

Each school in the Worcester Public School System publishes a School Improvement Plan outlining the goals and demographics of the school. From Forest Grove's plan, in the 2008 academic year, 855 students were enrolled at the middle school. Of the total number of students enrolled during 2008, 47.6% of the students were Caucasian, 15.4% were African American, 23.5% were Hispanic, 11.5% were classified as Asian or Pacific Islander, and 2% were Native American. The vast majority of the students, 77.7%, were considered to be regular education students, while 22.3% were considered to be special education students. A tenth of the student population, 10.6%,

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<sup>1</sup> Worcester Public Schools Middle School Level School Improvement Plan 2008-2010: Forest Grove Middle School, p. 2

<sup>2</sup> United States 2000 Census <<http://quickfacts.census.gov/qfd/states/25/2582000.html>>

<sup>3</sup> Massachusetts Department of Elementary and Secondary Education (ESE)  
<<http://profiles.doe.mass.edu/profiles/student.aspx?orgcode=03480000&orgtypecode=5&>>

were ESL or LEP students. The data provided about the student population also states that 52.7% of the students during the 2008 academic year were eligible for free and reduced lunch.<sup>4</sup> When compared to the demographics provided for the other three middle schools in Worcester during the same academic year, Forest Grove was found to have had the lowest percentage of students eligible for reduced or free lunch.

## 1.2 MCAS Results

The Massachusetts Comprehensive Assessment System (MCAS) tests the proficiency of students in subjects and topics described extensively by grade in the Massachusetts Curriculum Frameworks. The students at Forest Grove are given the MCAS test in both 7<sup>th</sup> and 8<sup>th</sup> grade and are tested in English Language Arts (ELA), and mathematics. Eighth graders are also tested in Science and Technology. The MCAS results for the students who took the exam in the spring of 2009 can be seen in Table 1.

Grade and Subject	Advanced/Above Proficient (%)		Proficient		Needs Improvement		Warning/Failing	
	Forest Grove	State	Forest Grove	State	Forest Grove	State	Forest Grove	State
7 <sup>th</sup> Grade Math	15	16	31	33	24	30	31	21
8 <sup>th</sup> Grade Math	20	20	23	28	25	28	32	23

Table 1- Percent of Students at Each Performance Level<sup>5</sup>

The results are encouraging in that they show that Forest Grove's percentage of advanced students is equal to the state average; however it is disconcerting that the number of

<sup>4</sup> School Improvement Plan 2008-2010: Forest Grove Middle School, p. 9

<sup>5</sup> ESE,

<[http://profiles.doe.mass.edu/mcas/performance\\_level.aspx?linkid=32&orgcode=03480415&orgtypecode=6&](http://profiles.doe.mass.edu/mcas/performance_level.aspx?linkid=32&orgcode=03480415&orgtypecode=6&)>

students who are at the Warning/Failing level is far above the state percentage. Despite this fact, the state says that the school's aggregate population has made adequate yearly progress in 2009.<sup>6</sup> From 2001-2004, and in 2006 and 2008, the school did not make adequate progress, so the fact that the school is progressing should be noted, but it should also be acknowledged that there is still a large amount of improvement needed. In the school's school improvement plan, Forest Grove's mathematics department states that during the 2008-2010 school years, they hope to decrease the number of 8<sup>th</sup> grade students in the Warning/Failing category from 36% in 2008 to 31%, and from the percentage of 7<sup>th</sup> grade students in the same category from 24% to 19%.<sup>7</sup> It seems that in 2009, the number of 8<sup>th</sup> grade students in the Warning category decreased, while the number in the same category in the 7<sup>th</sup> grade increased.

Students in the Worcester Public School System also take part in Measures of Academic Progress (MAP) testing. This is a computer-based test that measures a student's progress from the time they are in elementary school through high school.<sup>8</sup> The questions that the student receives during the test are based on how he or she has performed on previous MAP testing; therefore, not every student receives the same test. The results provide teachers and administrators with information on each individual's strengths and weaknesses in different academic areas and are helpful in placing students in the correct level class for each subject.

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<sup>6</sup> ESE,  
<[http://profiles.doe.mass.edu/ayp/ayp\\_report/school.aspx?linkid=31&orgcode=03480415&orgtypecode=6&](http://profiles.doe.mass.edu/ayp/ayp_report/school.aspx?linkid=31&orgcode=03480415&orgtypecode=6&)>

<sup>7</sup> School Improvement Plan: Forest Grove, p. 29

<sup>8</sup> Northwest Evaluation Association <<http://www.nwea.org/products-services/computer-based-adaptive-assessments/map>>

## **Chapter Two: Eighth Grade Numeracy**

During my time at Forest Grove Middle School, I was a student teacher in Mr. Michael True's eighth grade Numeracy class. This class was designed as a math class that eighth graders who struggle with basic math could take in addition to their core math course. Although it was designed for students who have not traditionally succeeded in mathematics, there are also students who take the class who enjoy and have a good understanding of the mathematical concepts covered through the eighth grade. Mr. True teaches students from each of the four clusters into which the eighth graders are divided: the League of Nations, DaVinci, Hot Scholars, and Champions. The Champions are mixed into our numeracy groups and do not have a separate class section. Much of the curriculum that Mr. True follows is meant to help students to succeed on the MCAS. During the school year, Mr. True planned to cover fractions, decimals, percents, basic algebra, and basic geometry. A copy of the syllabus for the class, as well as Mr. True's explanation of his course, can be found in Appendix A. Communication between Mr. True and the eighth grade math teachers from each cluster ensures that the material covered in the class complements what is being done in the core math classes that the students are taking.

Many of the students who are in Mr. True's class also took the seventh grade Numeracy class, which focuses on order of operations, basic adding and subtracting of positive and negative numbers, multiplication, and division. These topics were reviewed, and explained once again, in Mr. True's class. Since math is a subject on which each topic builds upon the previous one, it is crucial that Mr. True understands what the students already know, and what they have yet to cover. Daily meetings with the seventh

grade Numeracy teacher also have helped Mr. True develop a better understanding of the material that has been covered, along with what topics the students struggled with in the previous school year.

### Chapter Three: Course Materials

Mr. True's class is unique in that there is no textbook; each student has a notebook in which he or she copies and completes the daily board work that is assigned. Each day, once the students are seated, they are given approximately 20 minutes to complete 10 to 15 problems that have been written on one of the three whiteboards in the classroom. The questions on the board generally consist of review material as well one or two problems that introduce new concepts. A picture of how the board work looks daily can be seen in Figure 1, and a sample of the board work can be seen in Appendix B.

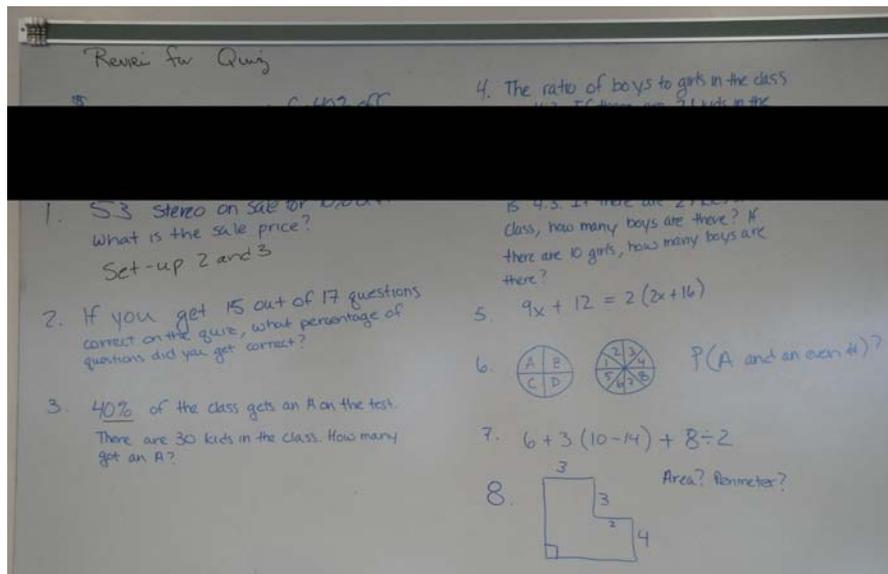


Figure 1- Daily Board Work

By allowing the students the time to work on the problems independently, students have the opportunity to ask questions and receive one-on-one assistance. They often ask about how to complete certain problems and the concepts required for some of the more

difficult questions. The problems are also consistent with what has been submitted as the lesson plan on the first day of every school week. The lesson plan outlines what the students will be able to do after the week, how students will be evaluated, and the curriculum frameworks that will be covered during the course of the week. A lesson plan that I submitted can be seen in Appendix B.

After the students are given the opportunity to complete the board work, either Mr. True or I go over each question. Students are called on to give an answer and then whoever is teaching will go over the process of reaching that answer and make sure that everyone understands. I have found that having students explain how they reached an answer to be very helpful; it teaches the student how to verbalize the mathematical concepts that they have used, and also reinforces in their mind how to correctly approach a specific type of problem.

Mr. True does not assign a large amount of homework because this is an additional math class, and also because we tend to cover a lot of material during the class time. Following the board work, new concepts are often introduced. In the back of the classroom, there is a projector and Eno board that allows material that is visible on the classroom computer screen to be projected so that it can be seen by the entire class. A picture of the set-up can be seen in Figure 2.



Figure 2 – Eno Board and Projector

The projector is used for multiple purposes; sometimes notes are projected and explained, and sometimes a list of problems for the class to complete is shown on the screen.

Examples of such worksheets that I created can be seen in Appendix B. These worksheets are meant to introduce new concepts and to help students to practice what they have learned. Through the use of such methods, I have seen that there are benefits to having students copy down notes and problems during class rather than assigning homework. By providing notes in such a manner, it is possible to ensure that each student has the notes when it is necessary to study for a quiz. Also, providing problems to do in class rather than at home ensures that the students will actually do the problems. By having the students practice the concepts they have learned while in class, we can make sure that the problems will actually be completed; often students have to show that they have completed the problems, or at least made a good effort to complete the problems, before being dismissed. As of the beginning of 2011, Mr. True has decided to

try assigning about 10 minutes of homework per night. On the occasions that Mr. True has assigned homework thus far, there are few students who turn it in the next day. Hopefully, as the students get into the habit of having nightly homework, the number of students submitting completed assignments will increase. With the addition of a short homework assignment each night, students are now also expected to attempt problems covered in class on their own without having individual help, which teaches students to problem solve and persevere without continuous one-on-one attention.

#### **Chapter Four: Classroom Management**

When I first began my observation at Forest Grove, Mr. True told me that based on his years of experience, each class was sure to have different mixes of personalities that would create a different dynamic for each group that we taught, and I quickly realized what he meant. Before I began teaching the students, I watched how Mr. True approached each class, and how the students reacted to his teaching methods. There were clearly some groups that learned best when Mr. True taught as he would naturally, but he needed to adjust his teaching to accommodate the needs of the students in the other classes. By observing the students prior to beginning teaching, I was able to see the ones who struggled to follow a lecture, had trouble working independently, and were not highly motivated. When I began to teach, I made sure to make an effort to help these kids succeed and work to the best of their ability. In Appendix C, a copy of Mr. True's class schedule and the bell schedule for Forest Grove can be seen.

##### **4.1. Massachusetts Professional Standards for Teachers**

Prior to beginning my teaching practicum at Forest Grove, it was necessary for me to acquaint myself with the Professional Standards for Teachers outlined by the

Massachusetts Department of Elementary and Secondary Education. The standards outline the “knowledge and skills required of all teachers.”<sup>9</sup> The way in which curriculum and instruction should be approached, as well as how teachers should manage a successful classroom are described in detail in this document. It is important that the state curriculum frameworks be followed when planning and implementing a lesson; this objective clearly was met in the required lesson plans developed by Mr. True and myself. In each lesson plan, the frameworks to be addressed were listed so that they could be correlated with the published frameworks document. Providing homework, or an opportunity for students to practice what was learned in class, is an objective stated in the standards that have also been met through the completion of in class problems and the brief homework assignments that Mr. True has begun to give to the students.

The standards that are more applicable to actually teaching a class successfully are described in the section of the document which outlines how to effectively provide instruction to students. It is important for the teacher to ensure that the students understand what is expected of them within the classroom; from the beginning, Mr. True and I made a conscious effort to encourage the students and to tell them that they were all capable of the work at hand. The standards state the importance of engaging the students in a lesson, not simply teaching each topic through lecture. By asking the students questions to stimulate their ability to think critically, as well as occasionally teaching a topic in the form of a game that actively involves the students’ participation, has helped me to meet this standard during my time at Forest Grove, and are described in the class descriptions that follow.

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<sup>9</sup> Professional Standards for Teachers <<http://www.doe.mass.edu/lawsregs/603cmr7.html?section=08>>

The importance of managing a classroom so that the environment is conducive to learning is also a standard that is crucial to address. If a student feels safe, they are more apt to enjoy the subject, and school as a whole. Since the beginning of the year, Mr. True created such an environment; however, as it will be described in the following sections, it is not possible to have complete control of student behavior at all times. Disruptive students can and do interfere with the learning of the rest of the students in class, but if dealt with appropriately, the classroom remains a place where students are able to learn.

Promoting equity in the classroom is also a key component to being a successful teacher. I have learned from Mr. True during the course of my time at Forest Grove that encouraging the students is crucial to their success; knowing that someone cares whether or not they do well is important to the students. It is also important to ensure that all students have the same chance to succeed; as seen in the following sections describing the different classes that Mr. True and I teach, it is important to identify those students who struggle and need additional help so that they will be able to fully understand the material.

The following descriptions of the four classes that Mr. True and I teach describe my personal experiences with the students. The way in which I approach teaching individual students, as well as how I approach teaching classes that respond to different teaching styles, demonstrate my application of the Professional Standards.

#### **4.2. The League of Nations/DaVinci Group**

Although Forest Grove operates on a rotating schedule, Mr. True always has the League of Nations/DaVinci group (LON/DAV) the first period of the day. Due to my class schedule A-term, I did not have an opportunity to observe this class as I did the

other three groups, but I saw that this group definitely responded to Mr. True's style of teaching. He is able to joke around with the kids and tell them quick stories to keep their interest, but they are also able to complete their work at the same time. For the most part, despite the fact that the LON/DAV group is one of our larger groups, this class does not have many discipline problems; it is necessary to tell them to quiet down once in awhile, but that is really the extent of discipline necessary. One other difference between this class and the other groups that we teach is that we have a special education aid present in the room. Having three teachers rather than one may be one of the reasons there are not many discipline issues.

When I started teaching this group, I realized that there were several students not following the material; most of whom were too shy to ask for individual assistance. There is one student in the class, who due to a disability, is forced to walk with two crutches. He has difficulty writing, and therefore, has a difficult time copying the questions and completing them in a timely manner. It did not seem to me that this had been addressed by Mr. True and the class aid. In fact, until I had met this student, I had assumed from the tests that I had corrected that he was just lazy and did not want to do the work. So on my first day teaching this group, I went over to the student and asked if he wanted help, and he readily agreed. If there were notes or homework questions to copy, I would write them out for him. Also, if he had questions that he was embarrassed to ask in front of the entire class, he would ask me to explain a certain concept to him individually. One day, he gained enough courage to go up to the board to do one of the board work problems. Despite the fact that it is difficult for him to stand and write, he completed the problem correctly, then turned around and gave me a huge smile. I have to

say that this was one of the most rewarding experiences I have had during my time at the middle school. After successfully presenting the problem on the board, he began raising his hand to answer questions, and required much less individualized attention. Having a bit more confidence in himself really has helped him to succeed in the class. At present, he is out of school due to surgery that he had because of his disability, but I hope that when he returns, he will continue to exhibit the same amount of confidence as he did before he left.

In this class, there are also two boys, who are friends, who have difficulty following the material. They are both great kids, so I really want them to be successful. By simply asking if they needed help on any of the problems, they became open to receiving assistance. Now, when I answer one of their questions, they will immediately ask me for more help, which I do not mind at all since it means they really want to do well. I work with these kids each day, always making sure they copy down the problems and understand how to achieve the correct solution. Recently one of the boys scored an 85% on a quiz that many did not do well on which, as a teacher, is very encouraging. The other boy, however, did not fair as well, and is beginning to become discouraged. Mr. True told me at the beginning of the year, and I am beginning to now fully understand, that having a student believe that he or she can succeed, and that there is someone who wants them to succeed, is crucial to a student's performance in class. I hope to encourage this boy so that he will not give up on himself.

There are students like the three I mentioned above who really want help, but there are also students who reject help when it is offered to them. I have encountered a few students within this class who, with attitude, reject any offer of help, but then want

me to help them during a quiz. I feel that as long as I have tried multiple times to offer help, that I have not failed them as a teacher. They have the opportunity to ask me for help at any time, and also, if they pay attention and follow along, they can learn from the problems assigned at the beginning of the class. It is my hope that these students will realize that asking for help is not a sign of weakness, and will eventually begin asking questions when they are confused by a problem.

### **4.3. The League of Nations**

The League of Nations group (LON) is about half the size of the class described in section 4.1. I had the opportunity to observe this class from the beginning of the school year, so by the time I began teaching I had a pretty good idea about the individuals in the class. The LON is an interesting mix of students; there are some kids who understand the concepts very quickly, while there are others who struggle. Many of the students clearly have a chip on their shoulder because of a difficult home life or other challenging circumstances. Over the course of my time at Forest Grove, however, I have seen that the students have become more open, and less miserable, which is encouraging. If school can become a safe and comfortable place for students with difficult home lives, I think that teachers are having a positive effect on their lives.

The first student who I attempted to help was a girl who I knew had repeated seventh grade. From the first day that I was in the classroom, she has always been kind and friendly to me, and very open to receiving help. She struggles in math, but clearly shows a desire to succeed. Whenever she asks for assistance, she is able to clearly articulate her question, and often once I explain how to complete the problem step-by-step, she understands. Mr. True, who has had this student in the past, has even

commented that she has done a complete turn around. I do not doubt that she will be able to pass the class this year.

There are students who struggle, but this group also has a number of students who are highly capable of doing the work assigned in class. They often ask if they have done a question correctly, and if not, are very interested in where they went wrong. The highly motivated, polite, smart students in the class are by far the easiest to teach. Seeing the interest that they have in math is encouraging, and I hope that they pursue this interest in the future.

Along with the hard working students, there are students who have no motivation. It is not necessarily that they are not capable of the work, but that unless they receive continual one-on-one attention, they do not complete the board work. Although these students are not disruptive, it is frustrating that they will not complete the work. There have been a number of times when they have received zeros on their quizzes because they do nothing but write their name on their paper. I have tried to motivate these students by working with them individually, and praising them when they do something correctly, but this has had little to no effect on their performance. The students may have a day or two in a row where they will work hard, but this does not last. Mr. True and I are trying to determine the best way to motivate these kids.

This class has a few students who are disruptive and often need to be disciplined. There is one boy in particular whose mood changes daily; one day he will do his work, the next he will do nothing but try to disrupt the class and fight with Mr. True about anything and everything. On occasion, he has been sent to the principal's office, but he continues to be disruptive as it seems that he has little respect for authority. As the

school year has progressed, there are one or two other students who are beginning to follow his lead. Students who in the beginning of the year worked hard and were focused are now becoming a disruption. Mr. True has had stern talks with these students, but we have yet to see if it will change their behavior. Once these students realize that the school year is halfway over, it is our hope that they will begin to realize the implications of not working hard in class.

#### **4.4. The Hot Scholars**

The Hot Scholars (HS) is a fun class to teach. It is about the size of the LON group, however the students, in general, do not exhibit the same attitude problems. This was the first group that I taught on my own, and it has been very rewarding to see how they have grown over the course of the year.

At the beginning of the year, the vast majority of the students in this group had little to no life to them; it was nearly impossible to get a student to answer a question or raise their hand. The class would be completely silent, and I would receive absolutely no response if I asked the students if they understood how to complete a question. I had one student who fell asleep daily, and all but one student seemed to have blank looks on their faces throughout the entire class period. At this point, I decided that it was necessary to get some energy going in the class, so one day I decided to play a game of “Around the World” with the class using multiplication flash cards. This was the first time that this class exhibited any kind of enthusiasm; they were laughing and cheering for each other. Playing this simple game was a real turning point in how the class responded to me.

Once the class became more engaged, many of the students began to open up to me. They began to ask questions and showed a new willingness to volunteer answers

when we went over the board work. They do ask for individual help, but do not require continuous one-on-one attention to complete their work. When this new class dynamic first developed, there were a couple of students who decided to test me by ignoring me when I called on them or seeing if I would let them go to their locker or the nurse for no reason at all. By remaining consistent in how I teach and not allowing these students to distract the class, I believe that I have gained the trust of the majority of the students in the class.

There is one student in particular in the HS class who has made a gratifying transformation since the beginning of the year. In September, he would hardly make eye contact with Mr. True or me. Slowly, he has begun to open up, giving a smile and saying hello. Most recently, he has been volunteering to answer questions, politely correcting a student if they give an incorrect answer, and even asking questions in front of the entire class. Recently, Mr. True spoke with a teacher who is developing an Individual Education Plan (IEP) for this student who said that when she spoke with this student, he said Mr. True's class was his favorite. Witnessing the personal and academic growth of this student and learning that what we have done in this class has made it the child's favorite class is very rewarding, and I hope that he will continue to enjoy math in the future.

There are no major discipline issues in this class. Of course there are a couple of students who on any given day will decide whether they feel like working or not, but there are no seriously disruptive students. The energy in the class has grown so much since the beginning of the year, however, that I have had to begin implementing a technique I learned in elementary school to get them to quiet down while we go over

questions. I raise two fingers in the air and put my finger to my lips to ask for silence, and do not start teaching until each student is silent. At first, the students did not seem to want to follow this, but they are beginning to understand that the quicker they quiet down, the more quickly we can finish the work. Even though quieting the class is something that I have had to implement recently, I am much happier to have a class full of life than one that is completely unresponsive.

#### **4.5. The DaVinci Group**

The DaVinci (DAV) group is about as large as the LON/DAV group that we teach the first period of every day. Mr. True and I both agree that this is by far the most difficult class to teach, and Mr. True has told me that he has never had so many failing students in a class. Not only is DAV a large group, but there are a number of disruptive students, unmotivated students, and students who require continuous individual attention. When speaking with the teachers in the DaVinci cluster, they agree that this group is very difficult to teach. It is not unusual for multiple students to be sent to the principal's office during the course of the class, and for a number of students to be missing from class because they have been suspended. The disruptive members of the class make it difficult for the students who actually want to learn; I will admit that there have been days when Mr. True and I have not had much control over this class.

In addition to the disruptive students, there are those who truly want to learn. There are three students, in particular, who often ask for help on questions, and I am more than happy to help them because they are polite and are hard workers. The fact that they do not require continuous individual attention to complete their work is very helpful

because this class contains the most students who need and benefit from individual attention.

On numerous occasions, I have attempted to help students who I feel are capable of the work, but just do not try. There is one boy who will attempt to complete the work as long as I continuously check on whether he is working; however, without supervision, it is more likely that he will be found drawing cars rather than doing math work. He is very polite, not disruptive, and thankful for my help, even saying that without assistance, he would be completely lost. It is very frustrating as a teacher, however, that he does not have enough self-motivation to work on his own.

Another boy from the class, who both Mr. True and I thought did not have the capability to complete the board work, surprised me one day when I approached him with an offer of help. I was honestly shocked to find that he could do the work once concepts were explained to him while he was fully attentive. He had not paid attention to most of the material that had been covered in class. In fact, I found that he was capable of making calculations in his head that most students were incapable of doing without a calculator. He is another student, however, who does not routinely ask questions, is easily distracted, and will not do work unless closely supervised.

Despite the many disruptive students, there have been success stories in the DAV class. One girl who had been failing the class experienced a turnaround after a parent/teacher meeting in the guidance office. Since this meeting, she has begun to work hard in the class. She asks plenty of questions, is paying attention, and is volunteering answers. Her attitude has improved immensely, and if she continues working as she is now, she will pass the class.

Finding a way to teach this class has been very challenging. Mr. True admits that he has tried pretty much everything he has used during his time as a teacher with little success. There is hope that after the students receive second quarter grades, they will realize that they must change their habits and attitude in order to pass the class, but it is impossible to know if their behavior will change.

#### **4.6. Dealing with Absences and New Students**

Teaching a sequential subject like math is especially difficult when students are absent for a long period of time, and when new students enter the class. During the time that I have been at Forest Grove, there have been two or three students who have been absent for long periods of time due to medical procedures. For students who are absent for longer than two weeks, Mr. True will send weekly copies of the board work. Doing so allows the students to keep up with the rest of the class, so that when they do come back, they will not be too far behind.

Since I have been student teaching, I have found that the addition of new students to a class is a much more difficult problem to deal with than long-term absences. Even when students are transferring from another school in the Worcester school district, they often have not covered what we are teaching in class. For the first two or three weeks, I have found that it is essential to give the new students individual attention. I make sure to ask them if they are having a hard time with specific concepts, try to find out what they have and have not covered, and spend time helping them acclimate to the way Mr. True runs the class. It is hard to give them more than two or three weeks to become caught up, so some of the transfer students end up becoming lost. There have been some, however, who have been able to catch up with the rest of the class.

## **Chapter Five: Assessment**

A major part of teaching is assessing whether or not students understand the material being covered in class. The traditional and best way to assess this is through frequent quizzes, which help the teacher learn whether the students have mastered the material, and through the state-wide MCAS exam.

### **5.1. Classroom Assessment**

The way that Mr. True formally assesses his students is by administering quizzes. The goal is to give 20 to 25 question quizzes to each class every Friday. In reality, the quizzes sometimes do not occur weekly because we have not covered much new material, or it is a shortened week, but the students are given a good number of quizzes to determine their quarterly grade. A sample quiz can be seen in Appendix D. The quizzes that I have written often contain questions that deal with topics that have been covered since the beginning of the year. Because math is a subject that continuously builds on what was learned previously, I feel that it is important that students remember what they have been taught over the course of the year. The quizzes given in Mr. True's class are based on the board work done in each class, so in theory, if students pay attention during class, they should do well on the quizzes. Of course, this is not always the case. After discussing how to best deal with low test scores, Mr. True and I agreed that it would be best to allow students an opportunity to correct their quizzes after they have been initially graded so that they can earn a portion of the points back and hopefully learn from their mistakes. Although this makes grading a bit more time-consuming and difficult, allowing students this chance to retry a problem and improve their grade also lets the teacher learn

who in the class is most motivated to learn and put forth effort. Some students are able to greatly increase their grade, while others make little to no corrections.

## **5.2. MCAS**

One of the main purposes of Numeracy is to help struggling students gain the math skills needed to do well on the MCAS. As referenced in chapter one, Forest Grove has not done particularly well on the math portion of the exam. When I first started at Forest Grove, at Mr. True's and the seventh grade Numeracy teacher's request, I analyzed the MCAS tests from 2005 through 2010 to determine what types of questions occur most frequently. The datasheet displaying the analysis can be seen in Appendix D. I found that the categories most commonly covered were Patterns and Number Sense as outlined in the Massachusetts Curriculum Frameworks. Within these categories, ratios and proportions were very common. Also shown in Appendix D are questions that I wrote mimicking actual MCAS questions to cover these topics. To ensure that students are being exposed to these types of questions, during class we will often project an actual MCAS question on the whiteboard and go over not only the answer, but how to go about solving the problem. Teaching test taking skills is just as important as teaching the students the actual math that they will need to solve the questions. We have found that many students will stay on a question they do not understand rather than moving on to the next question. Reinforcing the idea that it is okay to skip a question and come back to it later has been a concept that we have been trying to reinforce since the beginning of the school year.

## **Chapter Six: Conclusion**

Student teaching with Mr. True at Forest Grove Middle School has been a wonderful experience. It has been fantastic to see the growth among the students that I have been teaching. It is amazing how much they have changed in half a year of school. Seeing a student smile for the first time, or discovering that a struggling student has done well on a quiz is more rewarding than I ever thought it would be. Even teaching my first math class by myself was a great experience; I was not worried, I just taught the class as I felt I would have liked to have been taught in middle school. The vast majority of the students have been kind, respectful, and welcoming, which has made student teaching very enjoyable. I have to say that I have so much more respect for my middle school teachers after going through this experience; students at this age are sometimes unpredictable in their mood and behavior, but somehow, you as a teacher have to be able to teach them. I have found myself using techniques from the best teachers who I have had over my school career and implementing their methods while teaching my classes. It will be difficult to leave the kids because I have become attached and wish them all the best, but I feel that if I have had an impact on at least one child during my time at Forest Grove, the project was well worthwhile.

## Appendix A

### Syllabus

#### **8<sup>th</sup> Grade Numeracy Mr. True**

**I plan to introduce, review and reinforce mathematical skills needed for everyday life. We will start with the basics and continue from there. Often, I will begin with a conceptual approach. Real life applications to many math problems exist, especially at the middle school level, and I feel that it is very important that students see a relevance and relationship when ever possible. When students realize that an understanding of math is in fact required in their everyday lives, they are more likely to be motivated to learn the topics at hand. I will make every effort to relate material to everyday life and to make the topics interesting and useful. This additional math course will also strengthen skills needed to score well in both the MCAS and MAPS testing.**

**In order to achieve at his/her highest level, each student must bring to class every day: a motivated and inquisitive mind, a notebook, a pencil or pen and occasionally a calculator (if possible). Students will be quizzed 4 or 5 times per quarter.**

**I strongly encourage student participation. I even more strongly encourage students to question me when they do not understand the material at hand.**

#### **Mr. True's Explanation of the Numeracy Course**

We will be teaching the 8th grade curriculum, but really emphasizing parts of numbers - i.e. fractions, decimals and percentages. I spend a good part of the year working with parts of numbers, as most of these kids are taking my course called Numeracy, because they still have not mastered work with decimals and especially fractions and percentages. We will also spend time strengthening their skills in working with proportions, some basic geometry, one and two step equations in Algebra etc. Every kid in my class is also enrolled in an 8th grade math course, so they are taking two math classes each day.

## Appendix B

### Sample Lesson Plan

Note: Within the lesson plan, SWBAT stands for Students Will Be Able To and FORCE stands for Focus On Reading Comprehension Everywhere

#### LESSON PLAN FORMAT

Week of: 10/4/2010 Teacher: True  
Math/Numeracy

Discipline:

#### Weekly Objectives

SWBAT: work with the distributive property

SWBAT: solve one and two step algebraic equations

SWBAT: find the prime factorization of a number

SWBAT: understand the meaning of slope

SWBAT: solve for b in the  $y=mx+b$  equation

#### ASSESSMENT

Class participation, note book check, homework check.  
Exams. MCAS question review. Occasionally the problem of the Week.

#### FORCE Initiatives

F.O.R.C.E. Strategy: making inferences. Test taking skills.

F.O.R.C.E. Classroom: Utilize reading and writing skills. Write out thought processes. Rephrase questions into own words. Make inferences about ratios.

Reading, Writing, and Activities: Word wall, overhead transparencies, sample MCAS problems, group work, Problem

of the Week,

FORCE Cluster Reading, Writing, and Activities: Cluster bulletin board, cluster awards for success with FORCE.

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## CONNECTIONS

MA CURRICULUM FRAMEWORKS 08.P.7 - Set up and solve linear equations and inequalities with one and two variables using algebraic methods... 08.N.8 - Demonstrate an understanding of the properties of arithmetic operations on rational numbers - Use the distributive property. 08.N.10 - Estimate and compute with fractions, integers, decimals and percentages. 08.N.12 - Select and use appropriate operations - addition, subtraction, multiplication and division to solve problems. 08.N.5 - Apply number theory concepts, including prime factorization ... to the solution of problems. 8.P.5 - Identify the slope of a line as a measure of its steepness and as a constant rate of change from its table of values, equation, or graph. Apply the concept of slope to the solution of problems. 8.P.6 - Identify the roles of variables within an equation, e.g.,  $y=mx+b$ , expressing  $y$  as a function of  $x$  with parameters  $m$  and  $b$ .

WPS BENCHMARKS: Understand how to work with the distributive property. Understand how to solve one and two step algebraic equations. Understand how to read decimals and convert them to fractions. Understand how to work with fractions and percentages. Be able to convert between decimals, fractions and percentages.

SCHOOL IMPROVEMENT PLAN: SIP 1.1-4 math definitions and word problem. SIP 2.1 Math Dept meetings. SIP 3.1-4 7th and 8th grade curriculum.

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Instructional Resources

## Handouts

Eno Board/Smartboard materials  
Assorted overheads

**Sample Board Work**

October 4, 2010

Give the prime factorization for (Questions 1 and 2):

1. 42
2. 70
3. What is the greatest common factor for 42 and 70? Use the prime factorization.

Simplify

4.  $\frac{20}{32}$
5.  $\frac{18}{20}$
6.  $\frac{24}{36}$

List the first 5 multiples for (7,8):

7. 8
8. 12
9. 10% of 42
10. 20% of 230
11.  $\frac{11}{25} = \underline{\hspace{1cm}}\%$
12.  $\frac{27}{99} \approx \underline{\hspace{1cm}}\%$

Solve step by step:

13.  $3X + 42 = 21$
14.  $7X + 2 - 5X - 6 = 30$
15.  $5(3X - 11) = 10X + 15$

**Example of Problems Projected onto the Eno Board**

Adding Integers, Fractions, and Decimals

1.  $-7 + ^{-}7$
2.  $-20 + 4$
3.  $2 + ^{-}5$
4.  $3 + ^{-}8$
5.  $-5 + ^{-}4$
6.  $-6 + ^{-}2$
7.  $-60 + 60$
8.  $-90 + 45$
9.  $30 + ^{-}15$
10.  $1 + ^{-}6$
11.  $2\frac{1}{4} + ^{-}1\frac{3}{4}$

12.  $3\frac{2}{8} +^{-} 2\frac{1}{8}$

13.  $-1\frac{5}{8} +^{-} 2\frac{1}{4}$

14.  $-6\frac{3}{8} +^{-} 2\frac{1}{4}$

15.  $-7\frac{1}{4} + 1\frac{5}{8}$

16.  $-10 + 2$

17.  $5 +^{-} 6$

18.  $-11 + 5$

19.  $-9 +^{-} 2$

20.  $7 + 5$

21.  $3\frac{3}{4} +^{-} 1\frac{1}{8}$

22.  $2\frac{1}{8} +^{-} 1\frac{1}{4}$

23.  $2.75 +^{-} \frac{1}{4}$

24.  $-1.5 +^{-} \frac{3}{4}$

25.  $-6.25 + \frac{3}{8}$

### Example of a Worksheet with Notes and Problems that was Projected onto the Eno Board

#### The Distributive Property

It is necessary to understand the distributive property to solve many algebraic equations; however, the distributive property can also be used to solve expressions that do not contain any variables. For example, consider the following expression:

$$7(4-3)$$

It is most easily solved by using order of operations as shown below:

$$7(4-3) = 7(1) = \mathbf{7}$$

This expression can also be solved, however, by using the distributive property. Multiply 7 by 4 and 7 by 3 as shown below. From there, the expression can be easily solved:

$$\begin{array}{r}
 \overset{\curvearrowright}{\curvearrowleft} \\
 7(4 - 3) \\
 (7*4) - (7*3) \\
 28 - 21 \\
 = \mathbf{7}
 \end{array}$$

From this example, it is possible to see that the distributive property yields the same result.

Use the distributive property to solve the expressions below:

1.  **$4(5-3)$**    2.  **$3(9-6)$**    3.  **$5(8-4)$**    4.  **$2(6-3)$**    5.  **$8(7-5)$**

The distributed property can also be used to solve algebraic expressions. The example below uses the same procedure as the above problem with just integers; however, it is necessary to also solve for the variable.

$$\begin{aligned}
 7(X + 2) &= 35 \\
 \overbrace{7(X+2)} &= 35 \\
 (7*X) + (7*2) &= 35 \\
 7X + 14 &= 35 \\
 7X &= 21 \\
 \mathbf{X} &= \mathbf{3}
 \end{aligned}$$

Use the distributive property to solve the equations below:

6.  **$4(X + 3) = 32$**    7.  **$5(X - 2) = 60$**    8.  **$8(9 - X) = -64$**    9.  **$2(X - 2) = 4$**

### Appendix C

#### Mr. True's Class Schedule

TRUE      Rm 224      LoN - League of Nations  
 DAV - Da Vinci  
 HS - Hot Scholars

2010 2011	1	2	WAVE 1	3	4	5	6	Name:
<b>A</b>	LoN DAV	DAV (1)	<b>L</b>		HS (1)		LoN (1)	Hot Scholars
<b>B</b>	LoN DAV		<b>U</b>	H.S. 1		LoN 1	DAV 1	League of Nations
<b>C</b>	LoN DAV	HS	<b>N</b>		LoN <del>DAV</del> 1	DAV		Da Vinci
<b>D</b>	LoN DAV		<b>C</b>	LoN 1	DAV 1		HS 1	Lunch 10:52-11:16
<b>E</b>	LoN DAV	LoN 1	<b>H</b>	DAV 1		HS 1		

#### Forest Grove Middle School Bell Schedule (Mr. True's classes follow the Wave One Schedule)

**FOREST GROVE MIDDLE SCHOOL  
 BELL SCHEDULE  
 2010 - 2011  
 ALL CLASSES 55 MINUTES  
 AM and PM HOMEROOMS**

WAVE 1	WAVE 2	WAVE 3
Homeroom 8:47 - 8:53	Homeroom 8:47- 8:53	Homeroom 8:47 - 8:53
Period 1 8:56 - 9:51	Period 1 8:56 - 9:51	Period 1 8:56 - 9:51
Period 2 9:54 - 10:49	Period 2 9:54 - 10:49	Period 2 9:54 - 10:49
1st Wave 10:52 - 11:16	Period 3 10:52 - 11:47	Period 3 10:52 - 11:47
Period 3 11:19 - 12:14	2nd Wave 11:50 - 12:14	Period 4 11:50 - 12:45
Period 4 12:17 - 1:12	Period 4 12:17 - 1:12	3rd Wave 12:47 - 1:11
Period 5 1:15 - 2:10	Period 5 1:15 - 2:10	Period 5 1:15 - 2:10
Period 6 2:13 - 3:08	Period 6 2:13 - 3:08	Period 6 2:13 - 3:08
Homeroom 3:08 - 3:10	Homeroom 3:08 - 3:10	Homeroom 3:08 - 3:10

Hot Scholars      Champions      Challengers  
 League of Nations      Revolution      Phoenix  
 Da Vinci      Sequoias      \*Blue Diamonds & Stars

## Appendix D

### Sample Quiz

Quiz: October 8, 2010

You can do this! Good Luck! ☺

1. In the fraction  $\frac{3}{4}$ , the / means \_ or \_\_\_\_\_.
2. What is a prime number?
3. Give the prime factorization of 120
4. Give the prime factorization of 45
5. What is the greatest common factor of 120 and 45?
6. List the factors of 32
7. List the factors of  $33x$
8. Give the first 5 multiples of 25
9. Give the first 5 multiples of 7

Simplify:

10.  $\frac{100}{120}$
11.  $\frac{24}{56}$

Solve:

12.  $2\frac{3}{8} + 1\frac{1}{4} = \underline{\hspace{2cm}}$
13.  $4\frac{1}{4} - 3\frac{1}{2} = \underline{\hspace{2cm}}$

Find:

14. 10% of 73
15. 40% of 250

Solve the following equations step by step:

16.  $6X + 5 = 29$
17.  $8X - 7 = 9$
18.  $3X + 4 = -17$
19.  $9X + 5 = X + 21$
20.  $4(2X - 3) = 20$
21.  $6(5X - 10) = 30$
22.  $5(4X + 7) = 7(4X - 4) + 61$
23.  $3(3X - 4) + 6X = 5(9X + 2) - 32$

Answer the following word problems:

24. Today, I received my weekly allowance of \$10. When I got to school, I paid back my friend who had lent \$4 to me for lunch last week. After school, I purchased a soda for \$2 and a pack of gum for \$1. On my way home, I found a crumpled up piece of paper in my pocket that turned out to be an I.O.U from my friend who had lent me \$5 last week. Do I have enough money to pay him back today? If not, what am I worth at the end of the day? Show your work.
25. You got 44 out of 50 questions correct on your history test. On your math test, you got 23 out of 25 questions correct. Did you do better on your math or on your history test? Show your work.

Bonus Questions:

What is  $-3 - 4 - ^{-}6 + 2 - ^{-}5$ ?

Write the equation of the line going through the points (2, 6) and (5, 18)

## MCAS Analysis

MCAS Question Breakdown (Number of Questions on Exam Followed by Standard Number)

Year	# of Questions	Number Sense	Question	Patterns	Question	Geometry	Question	Measurement	Question	Data Analysis	Question	
2010	42	11 Q's		12 Q's		4 Q's		4 Q's		11 Q's		
			1	9	1	11	2	27	1	28	1	8
			1	22	2	17	4	21	3	18	1	24
			2	3	3	37	6	14	4	36	2	15
			3	32	4	4	8	31	5	23	2	33
			5	35	4	41					3	1
			6	10	5	29					3	19
			7	30	6	6					3	38
			8	26	7	5					3	40
			9	7	7	34					4	12
			10	20	8	16					4	25
			12	2	10	13					4	42
			10	39								
2009	17	7 Q's		3 Q's		2 Q's		3 Q's		2 Q's		
			1	5	6	4	1	9	1	15	3	12
			3	10	7	14	7	2	2	17	4	11
			5	16	8	13			3	1		
			7	7								
			8	6								
			9	8								
12	3											
2008	39	11 Q's		12 Q's		4 Q's		4 Q's		8 Q's		
			1	5	1	4	2	23	2	34	2	7
			2	10	2	37	4	19	3	25	2	33
			5	31	3	32	6	21	3	29	2	35
			6	18	4	14	8	28	5	12	2	38
			7	16	5	2					3	24
			8	15	6	1					3	30
			9	6	6	9					4	3
			11	36	7	17					4	39
			12	8	7	20						
			12	11	7	26						
			12	22	8	27						
			10	13								
2007	39	11 Q's		12 Q's		4 Q's		4 Q's		8 Q's		
			2	2	1	1	1	25	1	8	2	13
			3	24	1	16	3	7	3	19	2	26
			3	28	2	23	4	6	3	29	2	30
			3	31	3	14	8	22	5	3	2	33
			4	4	4	37					2	39
			5	11	5	27					3	35
			6	5	6	9					3	38
			7	18	7	10					4	36
			8	12	7	21						
			9	15	8	32						
10	20	9	34									
			10	17								
2006	39	11 Q's		12 Q's		4 Q's		4 Q's		8 Q's		
			1	15	1	6	2	7	1	5	2	10
			2	20	2	3	2	33	1	23	2	21
			3	11	2	12	4	25	3	29	2	37
			3	27	2	35	6	22	3	31	2	38
5	1	3	36					3	19			

		5	14	4	8					3	30
		6	13	4	32					3	39
		10	4	7	2					4	18
		10	16	7	17						
		12	9	7	34						
		12	24	9	26						
				10	28						
2005	39	12 Q's		12 Q's		3 Q's		5 Q's		7 Q's	
		1	26	1	6	4	22	1	20	2	11
		2	32	1	9	4	30	1	37	2	13
		3	24	1	34	6	5	2	33	2	18
		3	36	2	2			3	28	3	3
		5	17	3	15			4	7	3	29
		5	35	4	25					3	31
		6	21	5	38					4	16
		7	10	6	1						
		9	14	7	8						
		10	19	7	12						
		10	23	7	27						
		10	39	10	4						

## Notes and New Questions similar to Actual MCAS Questions

### Ratio and Proportion Questions Similar to MCAS N.3

Notes on ratio and proportion questions:

- The word “rate” is often included in the problem statement
- When a proportion is needed to solve a problem, it usually is stated outright
- Percentages need to be understood to complete certain proportion problems
- It is important to understand how to find the value of one unit even if “rate” or “proportion” is not stated in the problem

### Multiple choice type questions:

Jane drove 150 miles in 3 hours. At this rate, how many hours will it take to drive 200 miles?

Answer: 4 hours

Joe answered 24 calls in 3 hours. At this rate, how many calls can he answer in 5 hours?

Answer: 40 calls

Sam adds 3 teaspoons of sugar to every 8 ounces of coffee. At this rate, what is the total number of teaspoons that will she use when she makes 28 ounces of coffee?

Answer: 10.5

When Kate began making pizzas, she could make 5 pizzas every 8 hours. Now, she can make 5 pizzas every 5 hours. Which proportion could be used to determine the percent decrease in baking time?

Answer:  $\frac{X}{100} = \frac{3}{8}$

Ms. Smith counted 27 students in her math class. The ratio of girls to boys in her class was 6:3. What was the total number of girls in the class?

Answer: 18

The chart below shows the cost for three different size boxes of pencils.

Size	Number of Pencils	Price
Small	3	\$1.50
Medium	5	\$2.00
Large	9	\$2.25

Which is the least cost per pencil?

Answer: Large Box

### Open Response Type Questions

At a candy store, the clerk fills bags of different sizes using 5 pieces of chocolate for every 3 jelly beans.

- a) Write a proportion that can be used to find  $j$ , the number of jelly beans, in a bag of candy with  $c$  pieces of chocolate.

Answer:  $\frac{3}{5} = \frac{j}{c}$

- b) What is the number of jelly beans in a bag of candy with 20 pieces of chocolate?

Answer: 12

- c) The clerk filled a bag with 24 pieces of candy.

How many pieces of candy are chocolate?

Answer: 15

How many jelly beans are there?

Answer: 9

**Notes About Pattern Questions P.2, P.7, P.10**

- A strong emphasis on being able to correlate an equation with a graph. The student is either asked which graph corresponds to a given equation, which graph has the greatest slope, or which graph has a certain slope and y-intercept.
- Students should understand how to plug numbers into an expression or equation.
- There are one step equations to be solved, but there are also more complicated equations that sometimes include inequalities.
- Given certain numbers in the form of a word problem, the student should be able to develop an expression or equation that describes the situation
- The student should be able to write equations from a table of data.