Meeting Standards for Massachusetts Educators

My Experience Student Teaching

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Teachers in Massachusetts are required to meet five major standards. All teachers must "plan curriculum and instruction, deliver effective instruction, manage classroom climate and operation, promote equality, and meet professional responsibility." Student teachers are also required to meet these standards to demonstrate prowess as a teacher. This paper outlines how I met the requirements while student teaching at Doherty Memorial High School in Worcester, Massachusetts.

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Chapter One

Education in Massachusetts

In President Barack Obama 2011 State of the Union address he stated, "We know what it takes to compete for the jobs and industries of our time. We need to out-innovate, out-educate, and out-build the rest of the world."[1] The most noticeable discrepancies in our educational system seem to be coming in the areas of Science, Technology, Engineering, and Mathematics (STEM). "U.S. students in the Class of 2011, with a 32 percent proficiency rate in mathematics, came in 32nd among the nations that participated in Program for International Student Assessment (PISA)."[1] In six countries plus Shanghai and Hong Kong, a majority of students performed at the proficient level, while in the United States less than one-third did. Shanghai topped the list with a 75 percent math proficiency rate, well over twice the 32 percent rate of the United States.

Only a little more than half (51 percent) of Massachusetts students are proficient in math, while Minnesota, the runner-up state, has a math proficiency rate of just 43 percent. Only four additional states—Vermont, North Dakota, New Jersey, and Kansas—have a math proficiency rate above 40 percent. Some of the country's largest and richest states score below the average for the United States as a whole, including New York (30 percent), Missouri (30 percent), Michigan (29 percent), Florida (27 percent), and California (24 percent).

The United States falling behind other countries is not a new issue. In an attempt to get our students back on track they passed the Massachusetts Education Reform Act of 1993. It aimed to change the Massachusetts education system over the seven years following its creation. Several objectives included in the act aimed to provide "greater and more equitable

funding to schools, accountability for student learning, and statewide standards for students, educators, schools and districts."[2]

Some of the noticeable changes included state frameworks, Massachusetts Comprehensive Assessment System (MCAS) testing, graduation standards, foundation budget, charter schools, increasing learning time in school, teacher testing, and the monitoring of district performance. This reform made several significant changes within Massachusetts schools. The biggest impact was on our teachers. After the act they were mandated to follow specific frameworks, ensure their students were performing well on standardized tests (MCAS), and pass tests in the their subject area as well as a basic literacy test. (MTEL).

Teachers in Massachusetts are required to meet five major standards. All teachers must "plan curriculum and instruction, deliver effective instruction, manage classroom climate and operation, promote equality, and meet professional responsibility."[3] It is imperative for them to show mastery in each of these areas to produce success in the classroom.

Doherty Demographics

Doherty Memorial High School opened in the fall of 1966. It replaced two schools which closed: Worcester Classical High School and Worcester Commerce High School. It is one of the seven public high schools in Worcester, Massachusetts and it schools high school students from the west side of the city.

Doherty as a whole is about equally diverse compared to the rest of its district, but significantly more diverse than the state. Unlike both the district and state the female population is greater than the male population. I taught three different classes, of mostly sophomores. The demographics of my classes were also similar to the demographics of the

Enrollment by Race/Ethnicity (2011-12)				
Race	% of School	% of District	% of State	% of My Classes
African American	13.7	13.6	8.3	23
Asian	10.2	8.1	5.7	7
Hispanic	27.2	38.4	16.1	45
Native American	0.8	0.3	0.2	0
White	46.3	36.4	67.0	23
Native Hawaiian, Pacific Islander	0.0	0.0	0.1	0
Multi-Race, Non-Hispanic	1.9	3.3	2.5	2
Enrollment by Gender (2011-12)				
	School	District	State	My Classes
Male	658	12,648	488,736	41
Female	673	11,763	464,633	19
Total	1,331	24,411	953,369	60

school as a whole, except for the gender distribution in which my classes contained more than double the amount of males as females.

Some other key demographics that actively affect education are whether or not they are English Language Learners, special education, and/or low income. Doherty has a higher percentage of all of those minorities except for special education students. Also, when trying to motivate students it is important to know their future plans. Knowing different demographic post graduate trends enables the teacher to teach students useful information for where they are heading and possibly encourage at risk students.

Title	% of School	% of District	% of State
First Language not English	43.5	43.8	16.7
Limited English Proficient	16.5	28.6	7.3
Low-income	56.2	72.1	35.2
Special Education	15.1	20.7	17.0
Free Lunch	48.8	65.8	30.4
Reduced Lunch	7.4	6.3	4.8

Student Group	# in Cohort	% Graduated	% Still in School	% Non-Grad Completers	% GED	% Dropped Out
All Students	280	87.1	0.0	2.1	5.7	4.6
Male	137	85.4	0.0	1.5	5.1	7.3
Female	143	88.8	0.0	2.8	6.3	2.1
ELL	22	95.5	0.0	4.5	0.0	0.0
Students w/disabilities	35	71.4	0.0	5.7	11.4	11.4
Low income	168	83.9	0.0	3.0	7.1	6.0
High needs	180	82.8	0.0	3.3	7.8	6.1
Afr. Amer./Black	43	95.3	0.0	4.7	0.0	0.0
Asian	26	88.5	0.0	0.0	7.7	3.8
Hispanic/Latino	57	71.9	0.0	5.3	10.5	10.5
Amer. Ind. or Alaska Nat.	2	-	-	-	-	-
White	149	89.9	0.0	0.7	5.4	4.0
Nat. Haw. or Pacif. Isl.	-	-	-	-	-	-
Multi-race, Non-Hispanic/Latino	3	-	-	-	-	-

MCAS as described earlier was part of the 1993 Reform Act. These scores have several implications. Teachers are judged by student scores and improvement, certain budgeting decisions are based on the scores, and students are required to score at least Proficient in order to graduate. Due to the many implications of students' scores it is important to take into consideration how Doherty students are currently performing.

Doherty students were somewhat under the statewide achievement in the Spring 2010 MCAS, but considering their demographics in comparison I consider their MCAS scores quite

impressive. Looking at the ALL GRADES sections Doherty students are actually outperforming

the state average!

MCAS Tests of Spring 2010
Percent of Students at Each Performance Level for Doherty Memorial High

Grade and Subject	Proficient or Higher		Advanced		Proficient		Needs Improvement		Warning/ Failing	
	SCHOOL	STATE	SCHOOL	STATE	SCHOOL	STATE	SCHOOL	STATE	SCHOOL	STATE
GRADE 10 - ENGLISH LANGUAGE ARTS	71	78	15	26	56	52	24	18	6	4
GRADE 10 - MATHEMATICS	67	75	42	50	25	25	21	17	11	7
GRADE 10 - SCIENCE AND TECH/ENG	45	65	5	18	40	47	47	28	8	8
ALL GRADES - ENGLISH LANGUAGE ARTS	71	68	15	16	56	52	24	24	6	8
ALL GRADES - MATHEMATICS	67	59	42	26	25	33	21	27	11	15

Knowing and adjusting teaching style to the demographics, future trends, and MCAS

performance of one's students can serve as a "secret weapon" of sorts for teachers. Regardless

of this knowledge there are five standards all effective teachers must master. Through my 150

hours of student teaching I strived for each of them. Some came naturally, while others were

quite challenging, and need time to master.

Chapter Two - Plans Curriculum and Instruction

The first standard for Massachusetts's teachers is to plan curriculum and instruction. The

Department of Education breaks down this standard into nine different components. Through

my students teaching I attempted to meet these standards.

1. Draws on content standards of the relevant curriculum frameworks to plan sequential units of study, individual lessons, and learning activities that make learning cumulative and advance students' level of content knowledge.

   I taught three different classes each day; periods five, six and seven. Periods five and seven

were college level classes, while six was an honors class. I covered the following four Common

Core standards. I covered numbers seven, nine, and ten with all of my classes, and I covered

number eight with my honors class.

"Congruence   G-CO

7.   Use the definition of congruence in terms of rigid motions to show that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent.
8.   Explain how the criteria for triangle congruence (ASA, SAS, and SSS) follow from the definition of congruence in terms of rigid motions.

Prove geometric theorems.

9.   Prove theorems about lines and angles. *Theorems include: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints.*
10. Prove theorems about triangles. *Theorems include: measures of interior angles of a triangle sum to 180°; base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point.*"[4]

         My lessons began with the ninth standard. Once students mastered theorems about

lines and angles we were able to build on the knowledge with the introduction of triangles and

the correspondence between relationships with lines and relationships with triangles. Due to

the cumulative nature of mathematics it's crucial for teachers to create a sense of continuity from class to class.

To ensure a sense of continuity I started each class with a "Do – Now" assignment for students to spark their memory of what was covered in the previous lesson. Another successful way I enhanced continuity was through meaningful homework assignments. By repeating exposure to concepts though several mediums (lecture, notes, guided discussion) students were able to advance their level of content knowledge.

2. Draws on results of formal and informal assessments as well as knowledge of human development to identify teaching strategies and learning activities appropriate to the specific discipline, age, level of English language proficiency, and range of cognitive levels being taught.

In order to draw on formal and informal assessments it was necessary for me to create these assessments. In the appendix I have included copies of the two exams I created, and administered to my classes. (Note: Period five and seven exams are different than that of period six.) In addition to these formal assessments, there was regular informal assessment; monitoring student work, asking content specific questions, pop quizzes (graded and ungraded).

It was important for me to monitor which teaching methods I used in conjunction with results from these various levels of assessment to gauge student comprehension and advancement. I quickly noticed students didn't retain much information they were strictly given via lecture, and class notes. In comparison assessment showed students mastered topics significantly more efficiently when teacher guided practice was provided.

3. Identifies appropriate reading materials, other resources, and writing activities for promoting further learning by the full range of students within the classroom.

Students in any given classroom have a wide variety of strengths and weaknesses. Even in the mathematics classroom it is important to integrate interdisciplinary learning. At least a couple times a week one of the homework problems would require students to 'justify your using words.' Also on exams in was important for students to explain their reasoning. Not only is it important for students to be well rounded, but the ability for students to express themselves in words will be important as students progress into more difficult proof based classes.

4. Identifies prerequisite skills, concepts, and vocabulary needed for the learning activities.

Once again due the cumulative nature of mathematics it imperative to identify necessary basic knowledge students need to learn new material. Before I was able to begin conquering the geometric common standards I needed to revisit algebra topics. Students were weak in writing equations of lines, and because that it necessary in many geometry concepts it was re-taught. Also at the beginning of each chapter key vocabulary was identified and defined.

5. Plans lessons with clear objectives and relevant measurable outcomes.

'If you don't know where you're going you can't get there.' Students need to know what they're working towards. Generally I accomplished this verbally. I would discuss the layout of a chapter with students, breaking down what we would cover by week, and day. In more detail I'd outline what we were going to cover in the next couple days and how it fit into the bigger picture.

Students were able to self-monitor their progress through the daily homework assignments. I've included a sample lesson plan I used during my student teaching in the appendix to further demonstrate this component of this standard. Upon reflection I believe it would be advantageous to not only verbally give students these objectives, but also provide them with a written outline of topics covered and measurable outcomes.

6. Draws on resources from colleagues, families, and the community to enhance learning.

Teaching is sometimes considered a "scavenging" occupation; collecting relevant and successful teaching resources from wherever possible. As an inexperienced teacher my colleagues gladly offered many resources. During many of our lunch breaks various colleagues shared strategies that worked for them, and that did not work for them.

In addition to these informal sharing times, at the monthly department staff meeting there was a "best practices" segment. Each month the department head selected a different teacher to share a best practice they had used in their classroom. They would demonstrate the lesson to the other teachers, answer questions, and give pointers to help other teacher create an even better experience for their students.

7. Incorporates appropriate technology and media in lesson planning.

The classroom in which I taught was unfortunately not equipped with a projector. This would've significantly improved my teaching, and I believe student's content knowledge. Lessons mostly consisted of utilization of the white board. Integration of different colors often gave students a clearer understanding of topics. Calculators weren't commonly encouraged, but certain lessons called for them. Fortunately we did have access to the computers in the

library. Students were taken into the library for a few days to learn some excel skills, specifically in creating tables, equations, graphs, and trend lines.

8. Uses information in Individualized Education Programs (IEPs) to plan strategies for integrating students with disabilities into general education classrooms.

Several of my students had IEPS. Brandon in my fifth period was one of these students. To accommodate Brandon I would stay after school regularly to re-teach material. Often he only wanted some extra examples to go through in addition to the homework. These subtle and easy accommodations allowed Brandon to remain in a general education classroom.

9. Uses instructional planning, materials, and student engagement approaches that support students of diverse cultural and linguistic backgrounds, strengths, and challenges.

Multicultural classrooms bring many new challenges to teachers. One issue I ran into was collaboration versus individualism. Two of my fifth period students, (non-Americans) Azal and Hana, were from more collective cultures. Therefore they wanted to work together on every assignment. Instead of denying them of this cultural comfort I had an assignment each week that featured group collaboration. I also allowed them to work in tandem on homework assignments.

Chapter 3 - Delivers Effective Instruction

The next standard is for teachers to deliver effective instruction. This standard is split into four sections:

1. *Communicates high standards and expectations when beginning the lesson:*
   a. *Makes learning objectives clear to students.*
   b. *Communicates clearly in writing, speaking, and through the use of appropriately designed visual and contextual aids.*
   c. *Uses engaging ways to begin a new unit of study or lesson.*
   d. *Builds on students' prior knowledge and experience.*

At the beginning of each lesson I made learning objectives clear to students, as well as creatively engaged students. I would peak students' interests and gauge prior knowledge by asking pointed questions about topics they should have covered in previous courses. I would proceed to explain what I was going to cover in the current lesson, along with what they should be able to do after each lesson. Oftentimes I would also provide a bigger picture for students explaining how the current lesson fit into our current chapter.

It is essential for teachers to be able to communicate clearly though many different mediums. Asking questions verbally communicates, while writing notes on the board to be copied, and clear instructions on assignments communicates via writing. To communicate through a visual and contextual aid and to engage students I had to implore different methods. For example, in beginning the lesson on Triangle Sum Theorem I showed the students a large triangle. I then cut the three angles off of the ends and showed how they fit together to create a 180 degree angle.

2. *Communicates high standards and expectations when carrying out the lesson:*
   a. *Uses a balanced approach to teaching skills and concepts of elementary reading and writing.*

b. *Employs a variety of content-based and content-oriented teaching techniques from more teacher-directed strategies such as direct instruction, practice, and Socratic dialogue, to less teacher-directed approaches such as discussion, problem solving, cooperative learning, and research projects (among others).*
c. *Demonstrates an adequate knowledge of and approach to the academic content of lessons.*
d. *Employs a variety of reading and writing strategies for addressing learning objectives.*
e. *Uses questioning to stimulate thinking and encourages all students to respond.*
f. *Uses instructional technology appropriately.*
g. *Uses effective strategies and techniques for making content accessible to English language learners.*
h. *Demonstrates knowledge of the difference between social and academic language and the importance of this difference in planning, differentiating and delivering effective instruction for English language learners at various levels of English language proficiency and literacy.*

I've attached additional lesson plans to provide comparison in teaching styles I utilized to address various student needs. I believe the comparison in lesson plans effectively demonstrates my achievement in many of these components. In terms of ELL (English Language Learners) students it was important for me to speak clearly, and audibly to help them understand me. I also needed to be willing to repeat myself, and be able to explain in things using more basic English words. Another technique that benefitted ELL students was allowing students to explain some concepts and directions to each other.

3. *Communicates high standards and expectations when extending and completing the lesson:*
    a. *Assigns homework or practice that furthers student learning and checks it.*
    b. *Provides regular and frequent feedback to students on their progress.*
    c. *Provides many and varied opportunities for students to achieve competence.*

In the attached lesson plans I've included the corresponding homework assignments that I assigned. Homework was due the following day, and I would give students a grade between zero and two based on effort and completion. We would also include time in class to review

difficult homework problems. I utilized the program Engrade which was commonly used throughout the school. Students could check their current average, all past assignments, and their corresponding grades. This allowed students to be responsible for their own grades, and gave them a very accurate and updated overview of success. Regular homework along with quizzes allowed students to improve their grades.

4. *Communicates high standards and expectations when evaluating student learning:*
   a. *Accurately measures student achievement of, and progress toward, the learning objectives with a variety of formal and informal assessments, and uses results to plan further instruction.*
   b. *Translates evaluations of student work into records that accurately convey the level of student achievement to students, parents or guardians, and school personnel*

Students were given pop-quizzes on a weekly basis. Students were given 10-15 minutes to complete them, and they generally consisted of two to three problems. These quizzes were sometime graded, and posted on Engrade for students, parents, and school personnel to monitor, and sometimes only used for evaluation. If students performed well on quizzes I concluded they understood the material, and its applications, and they responded well to the current teaching style. Generally I would see minor errors on several quizzes showing me what concepts I needed to revisit, and clarify.

Chapter 4 - Manages Classroom Climate and Operation

The next standard is to manage classroom climate and operation

1. *Creates and maintains a safe and collaborative learning environment that values diversity and motivates students to meet high standards of conduct, effort and performance.*
2. *Creates a physical environment appropriate to a range of learning activities.*
3. *Maintains appropriate standards of behavior, mutual respect, and safety.*
4. *Manages classroom routines and procedures without loss of significant instructional time.*

This standard was both easy and difficult. Maintaining a safe environment for students was relatively easy. There are many school rules in place ensuring safety that are followed within the classroom. Maintaining an environment conducive to learning was not as simple. Because of my relative closeness in age student were less likely to respect me. I compared it to being a babysitting compared to a parent.

In order to create an environment of learning some pointers I'd give a new teacher include several different techniques. It' important to be authoritative immediately and demonstrate you are their friend, but their teacher. It's much easier to be too strict initially and then gradually adjust, than to let them have free reign and then try to obtain control. Another beneficial tactic is to never create a double standard. If you don't allow them to use their phone, or talk over other people you shouldn't do it either. Regardless of my techniques this was daily battle with both good and bad days.

Chapter 5 - Promotes Equity

Then we have the fourth standard, for teachers to promote equity.

 1. *Encourages all students to believe that effort is a key to achievement.*

Encouragement is imperative in the lives of many students. Teaching scaffolding is oftentimes the critical element of student understanding in their zone of proximal learning. This was achieved verbally in my classroom. Oftentimes my students would choose to 'give up' before they began a problem claiming it to be "too hard." To spur them on I would ask them questions about the problem they do understand and build up to discover what the problem requires of them. This not only helped them master the content, but gave them a sense of achievement in conquering a "too hard" problem.

 2. *Works to promote achievement by all students without exception.*

It was also common for students to compare themselves to each other. "I'm not as smart as Jamal, let him do the problem." Also, I has a student Richard who needed major probing to show any effort in class. Both of these scenarios demonstrate possible exceptions to total student achievement. In the first situation it was relatively easy to affirm students in what they do know and guide them through a problem. Richards situation however was a little more tricky. On a daily basis I would remind him that in my classroom, I don't allow students to "sit around and do nothing." Unfortunately, I generally used coercive persuasion to motivate him; "If you're not going to do work and participate, then you can go sit in the vice principal's office and do nothing."

3. *Assesses the significance of student differences in home experiences, background knowledge, learning skills, learning pace, and proficiency in the English language for learning the curriculum at hand and uses professional judgment to determine if instructional adjustments are necessary.*

This element of the fourth standard comes with time. As I began to better understand my students not merely academically, but with a more whole-student perspective it was easier to address certain issues. After spending about five months with these students I was beginning to be able to evaluate issues considering the student as a whole. One student in particular, Emily in my fifth period class, had lower learning skills and a slower learning pace. To accommodate her while students were doing independent work I would check on her understanding and re-explain concepts with which she struggled.

4. *Helps all students to understand American civic culture, its underlying ideals, founding political principles and political institutions, and to see themselves as members of a local, state, national, and international civic community.*

This was rarely addressed in the lesson plan, but rather instilled through discussion at the end of class. Students were curious about topics such as jury duty, and history. Also the pledge of allegiance was recited every morning.

5. *Collaborates with families, recognizing the significance of native language and culture to create and implement strategies for supporting student learning and development both at home and at school*

As a student teacher I did not collaborate with families as well as I should have. The online grading system Engrade did allow parents access to students progress.

Chapter 6 - Meets Professional Responsibilities

The last standard is to meet professional responsibilities.

1. *Understands his or her legal and moral responsibilities.*

As a teacher there are several legal and moral responsibilities. Many of them are reviewed

with the teachers at the beginning of the year. I understand my legal and moral responsibilities.

2. *Conveys knowledge of and enthusiasm for his/her academic discipline to students.*

As a student, the teacher's knowledge and enthusiasm for their area of discipline was

crucial to motivating me and equipping me to succeed. This standard is generally expressed

verbally. On some days at the beginning of class I would exclaim, "I love this stuff!!" or "Today

we're reviewing how to graph the equation of a line, and this is some of my favorite stuff to do

in math!"

3. *Maintains interest in current theory, research, and developments in the academic discipline and exercises judgment in accepting implications or findings as valid for application in classroom practice.*

As a current WPI student, I was enrolled in more advanced mathematics classes as I was

student teaching. This ensured that I maintained interest and improvement in the academic

discipline. While it would not be realistic for me to teach them directly from one of the lectures

at WPI, I would summarize the general topics as they pertained to what we were learning.

In my sixth period honors class I often mentioned how these mathematical building blocks

we were currently learning would help them in their mathematical future. Specifically when we

learned geometric proofs, I shared with students that because I did not put effort into learning

proofs in high school I struggled more with them in when I needed to write more advanced proofs in college.

4. *Collaborates with colleagues to improve instruction, assessment, and student achievement.*

Similarly to the sixth component of the first standard I recognized that my colleagues were extremely valuable and willing resources. Sometimes if I was struggling with a student's behavior I could approach their math teacher from the previous year to find out what techniques work well without having to try them all myself. It was also advantageous to discuss these matters with the teacher I was directly under, Mr. Edi Naço, as he had already taught these same students.

5. *Works actively to involve parents in their child's academic activities and performance, and communicates clearly with them.*

The utilization of the program Engrade made it easy to incorporate parents, as they had access to student's grades. In the future I believe it would be beneficial for me to be more active in involving parents.

6. *Reflects critically upon his or her teaching experience, identifies areas for further professional development as part of a professional development plan that is linked to grade level, school, and district goals, and is receptive to suggestions for growth.*

As a new student teacher I often felt I was "groping in the dark." It was imperative to evaluate my teaching methods daily to improve and adjust to my specific classes. It was also helpful to have Edi evaluate me. Several times through my student teaching experience Edi was able to identify areas I could improve by watching me teach. For example after my first couple lectures I was talking too quickly and he made me cognizant of it so I was able to fix it.

7. *Understands legal and ethical issues as they apply to responsible and acceptable use of the Internet and other resources.*

For any member of our technological society there are several legal and moral responsibilities in using the internet and other resources. I've been exposed to many of them as usage of technology has increased. Because the internet allows us access to information with relative ease it is important to know how to properly cite your sources. I understand my legal and moral responsibilities in this area.

Chapter 7 – My WPI education

Worcester Polytechnic Institute is a prestigious and academically demanding school. Being an Actuarial Mathematics major here has provided me with many advantages in my teaching experience. The level of difficulty in my high school classes to prepare me for college, along with some of my college classes ensured abundant knowledge of specific subject matter as demanded by the curriculum.

Going through the Calculus sequence here at WPI cemented many mathematical concepts I had learned in high school, and also gave me new perspective on them though differentiation in teaching. For example, my knowledge of Multivariable Calculus enabled me to motivate students on why learning area was important. This glimpse into their mathematical future peaked students interest and motivated them to master their current material.

The age old question of "when am I ever going to use any this" has always plagued math teachers. Because I am studying actuarial mathematics I was able to offer students a career option that was math based. Another useful strategy in proving the relevance of mathematics was tying it to something students are interested. I would sometimes ask students what careers they were interested in and show them how this math knowledge would be crucial. Besides their future careers students were also motivated when I was able to connect the math we were learning to things in which they were currently interested. I achieved this by incorporating topics of interest into word problems, or as examples in class.

It is invaluable to be able to engage students and provide a means of enthusiasm for the content you're covering in class. It's an ever changing art that separates good teachers from truly extraordinary teachers. Teacher need to always be on the lookout for ways to incorporate relevant topics into their math classroom.

Chapter 8 – My Classes

Period Five

Period five was the first class I taught. There were 17 total students; eight females and nine males. This class was very eclectic. There were three ELL students, and four students with IEPs. This class presented many challenges, but was a valuable learning experience. Hana and Azal who I addressed earlier were both in this class. They often worked together on assignments, were diligent and attentive and attained some of the highest grades in the class.

Another dynamic duo in the class was Tamara and Shaina. Shaina was a freshman in geometry and very intelligent. School however was not a priority for her which significantly hindered her progress. She would perform very well on assessments but rarely ever attempt homework. Her behavior also presented an issue, as she was suspended more than once during my teaching time. Tamara was not nearly as naturally gifted, but like Shaina preferred to not pay attention, or show effort without continual prodding. I constantly had to monitor this two for cheating.

Jamal also brought an interesting mix to the classroom. He has taken the course previously, but stopped trying halfway through the course and had to retake it. He had already mastered the material from the beginning of the course and constantly provided a distraction for other students. Surrounding students suffered much learned helplessness through relying on him, and feeling inadequate in comparison to him.

Brandon was one of my IEP students. He was relatively high functioning but struggled to stay attentive too long. He often stayed after school for extra practice problems, and showed a high level of concern for his grades. His behavior was sometimes and issue and occasionally I would be worried he was going to be emotionally overwhelmed and fail to handle himself properly in class, but thankfully he was always able to stay under control.

Richard and Mike were another partnership in the class. Both were interested in impressing the class and showing they were smart, but neither wanted to put forth the effort on their own. They were both pretty consistent with homework, but rarely participated or listened to lecture on their own fruition. They were regularly significant distraction to the entire classroom, and several times throughout the period I would need to stop their talking.

Aniel and Emily were two very similar students. Their content and background knowledge is extremely low, but they are eager to improve and learn. They were attentive in lecture, and attempted homework. They both however needed outside the classroom support to stay on the same level with other students in the class.

The other students: Geovany, Tatiana, Kane, Diomar, Gerlyn and Keith were generally attentive and participatory in class. They were fairly consistent with completing assignments, and performed proficiently on assessment. Usage of cell phones was a constant struggle with this class. I unfortunately wasn't initially strict enough with cell phones creating a bigger problem throughout out the classroom.

Period Six

Period six was my honors class. They were the last class I started teaching and were the biggest. There were 24 students; 16 males and 8 females. They were part of the Engineering and Technology Academy (ETA) at Doherty. This program was designed to equip students to either enter the technical workforce or pursue higher education in an engineering field. Students tended to be more self-motivated, and very receptive to me as a student at an engineering school.

This class presented the biggest challenging in differentiating my role as a teacher and not a peer. Al l the students wanted to be friend and therefore cause me to spend more time talking rather than teaching. Some of the biggest culprits of this were some of the male students who sat in the front row; Christi, Edwin, Nicholas, and David. It was important for me to maintain this distinction to ensure respect from the students. I did this by not giving any of them special attention over other students, and only answering questions related to the content material.

Some of the best students in the class were very diligent, hardworking, and showed true passion for the subject area. They asked purposeful questions, exceed expectations on assignments and proved their prowess on assessments. Some of these star students were: Christina, Mike, Nana, Matthew, Barbara, Evans, Ryan, Stephanie, Danielle, Christian and Jessica.

The ability to have had a projector would have been beneficial in all my classes but specifically this one. This uses of technology ensures students know what they need to be

paying attention to, decreases off-topic conversations, and reduces the wasted time of me writing on the board. This addition would have revolutionized not only the climate but also the educational value of this class.

Period Seven

This was the second class I started teaching. They were also a part of the ETA but were a lower level class. There were 19 students; 16 males and only 3 females. The male dominance definitely affected the culture of the classroom. During my observation stage of teaching I was most anxious about taking over this class. Misbehavior seemed rampant and I felt as though it was never safe for the teacher to turn his back on the class.

Even though there were very few females in the class they made their presences known. Naomi and Wendellys were some of the highest achievers on assessments, specifically exams. They were both consistent with homework but certainly made their presence known in classroom. They were thankfully friends and got along with each other, but they both had what I'd consider "short fuses." On different occasions both had "meltdowns" in the classroom.

Camden and Fitzroy were two gentlemen in the class who regularly switched between being good friends and mortal enemies. They found great difficulty in not talking to each other, throwing things at each other. They were in constant competition and generally I classroom distraction.

Norberto and Roberto were two other key players in the culture of my period seven class. Norberto was often suspended and when he was in class he was just a distraction.

Roberto started off in the same situation, but as he discovered his could master the material and be successful in class and requested to move near the front, showed effort, and brought up his grade significantly. Showing off their intelligence was very important to both of them and motivated them in different ways.

Emmanuel and Jaryd were silent types. They were both extremely intelligent and performed well on assessment. They showed some effort in class, but had they put forth some effort on homework and asking questions they would have easily moved from understanding concepts to mastering concepts.

Danilo and Tyson were not as naturally gifted as some of the other students, but they were enjoyable to have in class. They were considerate in paying attention and allowing others to pay attention. They both showed good effort and a genuine desire to learn the material and be successful in my class.

Many of the students such as Harvey, Joe, Fransico, Stephen, and Wesley were self-motivated, intelligent, and successful in my class. While there were many different characters in this class, and I was initially rather concerned this class proved to be one of the easier ones in terms of classroom management once I became familiar with the class as a whole and the students as individuals. Many of these students significantly impressed me at the end of my student teaching through group activities, and their ETA projects.

Resources

1. Peterson, Paul E., Ludger Woessmann, Eric A. Hanushek, and Carlos X. Lastra-Anadón. "Http://www.hks.harvard.edu/pepg/PDF/Papers/PEPG11-03_GloballyChallenged.pdf." *Globally Challenged: Are U.S. Students Ready to Compete?* (2011): 1-34. Web.
2. Goulet, John. *Overview of the Massachusetts Education Reform Act of 1993*. N.d. TS. Worcester Polytechnic Institute. Web.
3. "Regulations for Educator Licensure and Preparation Program Approval - Education Laws and Regulations." 603 CMR 7.00: Regulations for Educator Licensure and Preparation Program Approval - Education Laws and Regulations. N.p., n.d. Web. 23 Feb. 2013.
4. "Educator Services Teaching & Learning Curriculum Resources Curriculum and Instruction."*Common Core State Standards Initiative*. N.p., n.d. Web. 13 Feb. 2013.

Appendices

1. 2011 Massachusetts Curriculum Frameworks for Mathematics – Geometry
2. Formal Assessments
3. Sample Lesson Plans

Overview

Congruence

- Experiment with transformations in the plane.

- Understand congruence in terms of rigid motions.

- Prove geometric theorems.

- Make geometric constructions.

Similarity, Right Triangles, and Trigonometry

- Understand similarity in terms of similarity transformations.

- Prove theorems involving similarity.

- Define trigonometric ratios and solve problems involving right triangles.

- Apply trigonometry to general triangles.

Circles

- Understand and apply theorems about circles.

- Find arc lengths and areas of sectors of circles.

Expressing Geometric Properties with Equations

- Translate between the geometric description and the equation for a conic section.

- Use coordinates to prove simple geometric theorems algebraically.

Geometric Measurement and Dimension

- Explain volume formulas and use them to solve problems.

- Visualize relationships between two-dimensional and three-dimensional objects.

Modeling with Geometry

- Apply geometric concepts in modeling situations.

STANDARDS FOR

MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.

2. Reason abstractly and quantitatively.

3. Construct viable arguments and critique the reasoning of others.

4. Model with mathematics.

5. Use appropriate tools strategically.

6. Attend to precision.

7. Look for and make use of structure.

8. Look for an express regularity in repeated reasoning.

Content Standards

Congruence **G-CO**

Experiment with transformations in the plane.

1.   Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.
2.   Represent transformations in the plane using, e.g., transparencies and geometry software; describe transformations as functions that take points in the plane as inputs and give other points as outputs. Compare transformations that preserve distance and angle to those that do not (e.g., translation versus horizontal stretch).
3.   Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself.
4.   Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.
5.   Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using, e.g., graph paper, tracing paper, or geometry software. Specify a sequence of transformations that will carry a given figure onto another.

Understand congruence in terms of rigid motions.

6.   Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure; given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent.
7.   Use the definition of congruence in terms of rigid motions to show that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent.
8.   Explain how the criteria for triangle congruence (ASA, SAS, and SSS) follow from the definition of congruence in terms of rigid motions.

Prove geometric theorems.

9.   Prove theorems about lines and angles. *Theorems include: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints.*
10.   Prove theorems about triangles. *Theorems include: measures of interior angles of a triangle sum to 180°; base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point.*
11.   Prove theorems about parallelograms. *Theorems include: opposite sides are congruent, opposite angles are congruent, the diagonals of a parallelogram bisect each other, and conversely, rectangles are parallelograms with congruent diagonals.*
        MA.11.a. Prove theorems about polygons. *Theorems include: measures of interior and exterior angles, properties of inscribed polygons.*

Make geometric constructions.

12.   Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). *Copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line.*
13.   Construct an equilateral triangle, a square, and a regular hexagon inscribed in a circle.

Similarity, Right Triangles, and Trigonometry   G-SRT

Understand similarity in terms of similarity transformations.

1.   Verify experimentally the properties of dilations given by a center and a scale factor:
      a. A dilation takes a line not passing through the center of the dilation to a parallel line, and leaves a line passing through the center unchanged.
      b. The dilation of a line segment is longer or shorter in the ratio given by the scale factor.
2.   Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides.
3.   Use the properties of similarity transformations to establish the Angle-Angle (AA) criterion for two triangles to be similar.

Prove theorems involving similarity.

4.   Prove theorems about triangles. *Theorems include: a line parallel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean Theorem proved using triangle similarity.*
5.   Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.

Define trigonometric ratios and solve problems involving right triangles.

6.   Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.
7.   Explain and use the relationship between the sine and cosine of complementary angles.
8.   Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems. *

Apply trigonometry to general triangles.

9.   (+) Derive the formula $A = \frac{1}{2}ab \sin(C)$ for the area of a triangle by drawing an auxiliary line from a vertex perpendicular to the opposite side.
10.   (+) Prove the Laws of Sines and Cosines and use them to solve problems.
11.   (+) Understand and apply the Law of Sines and the Law of Cosines to find unknown measurements in right and non-right triangles (e.g., surveying problems, resultant forces).

Circles   G-C

Understand and apply theorems about circles.

1.   Prove that all circles are similar.
2.   Identify and describe relationships among inscribed angles, radii, and chords. *Include the relationship between central, inscribed, and circumscribed angles; inscribed angles on a diameter are right angles; the radius of a circle is perpendicular to the tangent where the radius intersects the circle.*
3.   Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle.
      MA.3.a. Derive the formula for the relationship between the number of sides and sums of the interior and sums of the exterior angles of polygons and apply to the solutions of mathematical and contextual problems.
4.   (+) Construct a tangent line from a point outside a given circle to the circle.

Find arc lengths and areas of sectors of circles.

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* indicates Modeling standard.
(+) indicates standard beyond College and Career Ready.

5.   Derive using similarity the fact that the length of the arc intercepted by an angle is proportional to the radius, and define the radian measure of the angle as the constant of proportionality; derive the formula for the area of a sector.

Expressing Geometric Properties with Equations   G-GPE

Translate between the geometric description and the equation for a conic section.

1.   Derive the equation of a circle of given center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle given by an equation.
2.   Derive the equation of a parabola given a focus and directrix.
3.   (+) Derive the equations of ellipses and hyperbolas given the foci, using the fact that the sum or difference of distances from the foci is constant.
      MA.3.a. (+) Use equations and graphs of conic sections to model real-world problems. *

Use coordinates to prove simple geometric theorems algebraically.

4.   Use coordinates to prove simple geometric theorems algebraically. *For example, prove or disprove that a figure defined by four given points in the coordinate plane is a rectangle; prove or disprove that the point $(1, \sqrt{3})$ lies on the circle centered at the origin and containing the point (0, 2).*
5.   Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point).
6.   Find the point on a directed line segment between two given points that partitions the segment in a given ratio.
7.   Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula. *

Geometric Measurement and Dimension   G-GMD

Explain volume formulas and use them to solve problems.

1.   Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone. *Use dissection arguments, Cavalieri's principle, and informal limit arguments.*
2.   (+) Give an informal argument using Cavalieri's principle for the formulas for the volume of a sphere and other solid figures.
3.   Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems. *

Visualize relationships between two-dimensional and three-dimensional objects.

4.   Identify the shapes of two-dimensional cross-sections of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects.

Modeling with Geometry   G-MG

Apply geometric concepts in modeling situations.

1.   Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder). *
2.   Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot). *
3.   Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios). *
MA.4. Use dimensional analysis for unit conversions to confirm that expressions and equations make sense. *

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