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Kyle Lannin Poore  
*Crete, Nebraska*

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# **How to Better Prepare for Assessment and Create a More Technologically Advanced Classroom**

Kyle Lannin Poore  
Crete, Nebraska

A report on an action research project submitted in partial fulfillment of the requirements for participation in the Math in the Middle Institute.  
University of Nebraska – Lincoln

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## **How to Better Prepare for Assessment and Create a More Technologically Advanced Classroom**

### Abstract

In this action research study of my classroom of 8<sup>th</sup> grade mathematics, I investigated how to better prepare these students for quizzes and how technology can be used in the classroom. I discovered that there are many different ways to challenge students and help them prepare for assessments. There are also many ways to use technology in the classroom if one has the opportunities to use some of the tools, such as Power Point and Algebra Tiles. As a result of this research, I plan to increase the scores on state standards while also allowing the students to enjoy technology during this process.

Teachers are always looking for just the right recipe which will get all students to do well on assessments and to work well. Every day it seems as if something new is presented to challenge teachers. When one finds something new and successful, something else comes along and outdates what one has found. I am doing this action research project to help find a way to prepare students for assessments, yet still allow them to have fun in the classroom. Technology is everywhere these days, so we need to find ways to include that into our classrooms.

I have been teaching 8<sup>th</sup> grade mathematics for three years now. Each year I have to turn in my state standards scores and each year I see low numbers. I work very closely with our 7<sup>th</sup> grade teacher to give these standards assessments and keep a smooth transition from 7<sup>th</sup> to 8<sup>th</sup> grade. The scores are constantly below the state average for scores, so we need to find a way to bring the scores up as a group of 5<sup>th</sup> through 8<sup>th</sup> grade teachers. This will not work unless we can get teachers across all grade levels working together to make a difference in student achievement.

### **Problem of Practice**

The purpose of this study is to create techniques to incorporate technology into the 7<sup>th</sup> and 8<sup>th</sup> grade math classes to improve instruction and Annual Yearly Progress (AYP). In the 7<sup>th</sup> grade classroom I will incorporate problem solving and in the 8<sup>th</sup> grade classroom incorporate test preparation and test taking skills, to share with 5 - 8 math teachers to help with alignment and School-based Teacher-led Assessment Reporting System (STARS).

My first goal is to work on curriculum. I want to create a curriculum guide for all current and future teachers with the 8<sup>th</sup> grade standards as the outcome of their teaching. This will reflect new knowledge of exactly what concepts are being taught learned and mastered at the 5 – 8 levels and will form adoption of new math curriculum textbooks for the next school year that reflects our new alignment.

The current state of my classroom is that our school has about 125 students per grade level that have had up to 12 – 15 different 6<sup>th</sup> grade math teachers (five from the public elementary school, one from the private elementary school, three from country Schools, plus transfers and ELL students) and one level of math at the 7<sup>th</sup> grade level. From conversations with students, there were lots of different topics covered and also lots of different depth levels and techniques used through 6<sup>th</sup> grade. The students who are in 5<sup>th</sup> and 6<sup>th</sup> grade classrooms would have had the same concepts taught at the same depth using similar teaching and problem solving techniques that the 7<sup>th</sup> and 8<sup>th</sup> grade classrooms use to create continuity among stakeholders related to 8<sup>th</sup> grade standards and AYP throughout 5 – 8. I will be generating techniques regarding how the curriculum is presented using technology to improve instruction. I will also generate knowledge of problem solving techniques, test preparation, and test taking skills for AYP and STAR's testing.

My next goal is to create a curriculum and pacing packet for each grade level (5-8) to know what the students know and need to learn for mastery level as their grade level for the 8<sup>th</sup> grade STARS standards. I also want to create a STARS standards test for each grade level to support the learning of important mathematics at each level, and also to develop test preparation and test taking skills for these tests. Additionally, I will create uses of technology in our classrooms essential in teaching and learning middle school mathematics and enhancing student involvement and learning. My last goal is to develop problem solving activities to build new mathematical knowledge, knowledge, and adapt a variety of appropriate problem solving strategies to daily life.

The teachers in grades 5 – 8 will be given techniques to incorporate technology, problem solving, test preparation, and test taking skills within their classroom to improve continuity of

instruction and testing. This will also involve and thereby create stakeholders in the 5<sup>th</sup> and 6<sup>th</sup> teachers with regard to the STARS and AYP testing. Teachers in 5 – 8 will be given a packet of instructional techniques involving technology, problem solving, test preparation, and test taking skills to use in their classroom to coordinate instruction throughout the grades to improve AYP & STARS testing. They will also be given a new curriculum guide with the 8<sup>th</sup> grade standards as the outcome of their teaching, a new knowledge of exactly what concepts are being taught, learned, and mastered at the 5 – 8 levels. This will help with the adoption of new math curriculum textbooks for the 2006-2007 school year that reflects our new alignment and will be the final output of this research.

### **Literature Review**

Every day I walk into my classroom and think to myself, what can I do today to best reach my students? I hate to say it, but the final goal for these students is to do well on the quizzes that I give on a bi-weekly basis, which are reported to the state according to the state assessments. What I have to figure out is whether I am teaching to the test or testing what I teach?

One problem that seems to be surfacing is regarding letter grades. I want to know if an F is an F. What I mean by that is when one sees a 69%, which is widely considered an F, is that F the same for a student who has a 34%? “Mastery orientation refers to the perceived importance and value students place on the task itself” (Brookheart, 2000 p. 3). For example, some students will feel happy with a 69%. If they have been at a 34%, this is over a 100% increase in their score, but they are still failing. Therefore, would an F not be a success for this student?

According to Sowder (2000), motivations are learned. The students will interpret their successes and failures, and if they do not achieve success at least 70% of the time the students

will shut down. When I grade the students' homework it is graded for completion only, not for content. This somewhat inflates their grade, since they could miss all the problems on the homework and still receive a 100%. They do not see the grade inflation, but it is something I know is there. I do this because I feel this helps motivate the students to continue to be successful.

Wilson (2002, p. 3) said, "teachers must use assessments that do more than simply ask students to repeat information; rather, assessments should uncover students' deep understanding of the material." Teachers do have to remember they can not have a deep understanding in all topics. This is good to think about, but it does not relieve the pressure put on by state standards that say students should have deep understanding in all areas.

I look at technology as being something I can use to get the students more hands on in the classroom. I do not like how most of the work I have done in the classroom with my students in the past dealt solely with just taking notes with pencil and paper. With students living in a video game era, anything with buttons will get kids tuned in. An article I read stated excellent proof to this theory. "Technology will get students more involved in the process of the work, and challenge their thinking as well as look for other ways to problem solve" (Ursini, Orendain, & Butto, 2001, p. 34 ).

There are many important items to consider when it comes to the curriculum taught versus what should be covered. What I mean by this is some teachers still believe what worked 10 years ago will still work today. This can be true in many cases, but teachers all need to work to be a part of the ultimate goal--standards--at least as far as curriculum is concerned. Even though scores are low, teachers continue to pile more on the plates of our students. This brings me to a great point in an article by Watson (1995, p. 3), "There are two types of teachers,

elementary major teachers, and secondary level teachers.” Watson is saying that there are very few teachers who are specialized in middle level students as well as middle level curriculum. I teach on a staff of five core teachers, of which I am the only middle level major.

Some teachers in our school do not agree with the middle school philosophy, and therefore they want to continue to teach to their own set of standards. The middle school philosophy is the idea of how to handle working with students who are in a transitional phase of their lives. I see this mostly as including treating these students like they are no longer in elementary by the second semester of their 6<sup>th</sup> grade year, and treating students more like they will be treated in high school the second semester of the 8<sup>th</sup> grade year. We have to convince each other there is a reason to make changes. These changes to align curriculum could benefit not only the students but the school as a whole.

I determine what math class my students should take their freshman year based upon their quiz score averages for their 8<sup>th</sup> grade year. There are obviously other factors to help make this judgment which includes state assessments. This is one of the toughest things I deal with as a teacher. Our school does do tracking and the high school has a set framework for recommending students for their next educational years. According to Armes (2003) there are many people trying to end tracking. Armes also states that students will compete best if they are in similar ability levels.

There are many factors which determine how students perform on assessments. There are always going to be a wide range of students and abilities. It will be our job as educators to concentrate on how we can meet in the middle. It will be our job to concentrate on how we can meet in the middle to achieve our goals of getting the most out of our students as possible.



### **Purpose Statement**

The purpose of my study is to create techniques to incorporate technology into the 7<sup>th</sup> and 8<sup>th</sup> grade math classes to improve instruction and AYP. In the 7<sup>th</sup> grade classroom, I will incorporate problem solving and in the 8<sup>th</sup> grade classroom, I will incorporate test preparation and test taking skills, to share with 5 - 8 math teachers to help with alignment and STARS Testing.

### **Method**

This is qualitative research on a class of students at my middle school. My responsibilities will be to plan, study and implement problem solving strategies and the use of technology in the eighth grade classroom. I will be conducting the research but I will also be designing and implementing the problem solving and technology as the teacher.

In February of 2006, I kept records of types of technology used and a journal of teacher thoughts about selecting lessons and activities using technology. I administered a student survey about their feelings regarding problem solving. I also administered a student survey/questionnaire about technology in the classroom. Finally, I videotaped lessons involving technology and problem-solving activities. In March of 2006, I kept records of types of technology used and a journal of teacher thoughts in selecting lessons and activities using technology. Finally, I videotaped more lessons involving technology and problem-solving activities.

In April 2006, I kept records of types of technology used and a journal of teacher thoughts in selecting lessons and activities using technology. I also administered a student survey about their feelings regarding problem solving. I then administered a student survey/questionnaire about technology in the classroom, while also videotaping lessons

involving technology and problem-solving activities. I also administered the standards test 8.2.2 (AYP) about problem solving.

Finally in May, 2006, I tabulated all surveys and put them into a graph form. I then reviewed interview data and formulated index cards regarding how the students responded to the questions given. I then reviewed videotaped lessons involving technology and problem-solving activities and formulated index cards. I then analyzed all information gathered and sorted it by overlying themes or comments that are common between all informants and data collected.

5<sup>th</sup> and 6<sup>th</sup> grade teachers from the school district were interviewed. Interviews focused on their perceptions of areas of student weaknesses in math, math content they focus on at their grade levels, and what they want students to already know before entering their grade levels. Interviews were audio taped for purposes of data collection.

All students completed a mathematics attitude survey during math class in February and April, taking approximately 10 minutes each time. All students completed a self-assessment worksheet during math class in February and April, taking approximately 10 minutes each time.

I kept a weekly journal to document our observations of the learning and attitudes of lessons involving technology, problem solving, test preparation and test taking skills from February 1, 2006 to April 1, 2006. I also videotaped my class approximately four times during the research period.

STARS standards reported data for our current classes were collected and compared to the previous two years' classes. Data was be viewed in aggregate form (percentages of students ranked as proficient for each state standard).

The students chosen as research participants were those in the 7<sup>th</sup> grade math class and the 8<sup>th</sup> grade regular math class because these are students of average and below average math

ability who typically have little exposure to problem solving experiences that enhance their abilities to think and communicate mathematically and have poor test taking skills. They are students who we perceive to be most at risk when taking formal standardized assessments with problem solving questions or sections.

### **Analysis**

Before the first quiz I gave during the research period, I had the students play a jeopardy game to review for the quiz. The total group scores were very low with few positive scores. I made the assertion that the quiz scores would be low, and they were. The class average on this quiz was a 68%. It is great to be able to see this could be the problem, but I do not always have time to give quiz pre-views. I have to find other ways to find out if students are picking these things up, and I have to find this out earlier than the day before a quiz.

Quizzes are given every other Friday, with review sheets given as homework every Wednesday before the quizzes. We then go over all the answers the day before the quiz, so students have a study guide that looks exactly like the quiz to study from with all the correct answers on it. This is the one regular thing we do before each quiz. This is a way for me to find out if the students understand the concepts as well, but again this is not until the day before the quiz.

While games are good to use for review, sometimes teachers forget the importance of reminding the students why we are having these games. We would play things like Jeopardy and baseball to help students review. These games can take so much time, it is sometimes difficult to get all 28 students involved in each classroom. If I come up with a question for each kid to do that would be 28 for this specific class. After getting the game started, going over the review sheet for the quiz and answering questions on the review sheet, we only have about 35-40

minutes remaining, which would be having a little over a minute to answer each question. There are some questions I give which this would not be enough time, and if we are playing a game there is always something more we have to do than just answer questions. We could give the review sheet earlier, but this again uses another day, which we do not have many extra days to use. Some schools have no extra days to use.

So, one addition I made to my curriculum this year was notebook quizzes. We use these to mainly see how well the students are taking notes, but they can also be used to find out if students understand the content. We give them 7 minutes to find 5 problems in their notes. We are trying to just help them keep organized notes, but I never taught them how to take good notes. To account for that, I created an outline students can take notes on to help them stay more organized (see Appendix D). The students seemed to enjoy using this, but it still did not increase the average notebook quiz grade.

I was able to sit and interview some students about our project (see Appendix A). One of the biggest questions we wanted answered was whether or not these students felt like they understood how to prepare for assessments. All of the students interviewed stated they did know how to study for assessments. "I work with my mom at home and we review using a white board at home," said one 8<sup>th</sup> grade girl (May, 2006). The students all said they used the created review sheet they get before each assessment. "I always use the review sheet to look at before a quiz," said one 8<sup>th</sup> grade boy (May, 2006). However, he followed that by saying, "I never re-work the problems on the review sheet before the quiz" (May, 2006). The thing which did vary was how much they used the review sheet. A couple said they use it with other strategies, and a couple said they looked over it.

The interview was also a great way to find out how technology was viewed in the classroom. The students all really enjoyed Power Point slide shows to learn. "I liked to see myself and my classmates in the background of the slide show," said one 8<sup>th</sup> grade boy (May, 2006). This takes a lot of time to create a good Power Point slide show, but knowing this was one of the tools used which the students liked the most will motivate me to use this even more. I was able to use Power Points with the students during this time of the study as well as a Jeopardy game for the students to use. I also used some Algebra Tiles to let the students work with some manipulatives as well. I also like using animation to help the students actually see things move into place on the Power Point, so they can keep it straight in terms of what should go where. The key was these were personalized for the students in ways like putting the students' pictures in as the backgrounds and having the students talk in the power point.

I also had a student video tape the class as we worked with some Algebra Tiles. The students were really into it, but once we moved on to pencil and paper notes and myself lecturing, they really shut off. They were all sitting back in their seats, while few took notes. I need to either spice up my lectures or work with manipulatives later in the class period. I also see I need to get the students more involved at the front board. They cannot just sit for an extended period of time.

After talking with other teachers in our school district, I found some interesting things about where we are in terms of students learning from 5<sup>th</sup> thru 8<sup>th</sup> grade. The first and most important thing I noticed when interviewing the teachers is we are not being consistent from grade to grade. "We are not even consistent in teaching math within our grade level," said one 6<sup>th</sup> grade math teacher (May, 2006). This means we are not being consistent with our students, which is leaving holes in our curriculum. "There is one teacher on our team who will not teach

estimation because the students can't understand estimation," said a 6<sup>th</sup> grade teacher. Estimation is a state standard, and is one of the lowest scoring tests we take. This is not really covered in 7<sup>th</sup> grade and we rarely touch on this in 8<sup>th</sup> grade, so they are getting little practice on this concept. I think this is just one example of why scores are low on tests. There should not be a consistent approach, especially if this is expected of the students on state standards.

As for the preparations for test, it seems as though there is not anything concrete to back our claims one way or another. The overall scores have gone up, but I could not see a direct effect from our work in the project and the scores. The quizzes could be tougher or easier in these areas, or maybe we spent more time on a subject than another, or maybe scores rose for other reasons.

Looking at the scores taken for state assessments during the time of our research project, we see a large fluctuation in scores (Table A). For each assessment, there was a different review technique, so in the future we will need to try some more consistent techniques. There has to be a connection in terms of some easier quizzes and some harder quizzes. Obviously when all the students do well, the quiz was probably an easier quiz. The overall average of these assessments was 72.9, which is actually higher than our overall assessments for the 8<sup>th</sup> graders, but the overall assessments scores from Table A show over two years and are just over state assessments. With more consistency it will be interesting to see how much scores will change in the future.

Now looking at the data in graph C and D, (See Appendices B and C) they show a lot about how students really feel about math and how they view themselves as a math student. The first survey is about the students attitudes towards mathematics. Most of the students agree that they like math (43%). This is encouraging since this is the biggest step in having students being successful in math. On the flip side, we see that almost 35% of the students do not study before

assessments. This contradicts the students' comments earlier about studying using the review sheet for the quiz. This is probably just the difference of being honest on a survey that is anonymous and interviewing with the teacher.

**Table A**

<b>pd</b>	<b>Q13</b>	<b>Q14</b>	<b>Q15</b>	<b>Q16</b>	<b>Q17</b>	<b>Q18</b>
3	ab	ab	74	59	49	83
3	64	93	72	ab	62	94
3	108	100	95	81	81	92
3	87	93	90	48	70	56
3	45	89	74	39	35	81
3	40	98	74	56	57	94
3	68	91	74	46	32	86
3	94	98	72	78	81	81
3	68	98	77	76	73	97
3	77	86	87	61	54	ab
3	18	ab	56	33	38	44
3	83	100	79	61	73	92
3	19	77	41	57	70	58
3	66	100	67	85	73	94
3	66	91	92	46	70	83
3	57	98	90	54	41	83
3	70	80	77	63	57	67
3	98	98	100	94	84	97
3	92	100	87	91	54	75
3	57	100	59	61	41	69
3	28	95	69	41	46	78
3	92	100	97	87	78	94
3	77	86	72	30	41	75
3	60	86	72	43	51	67
3	75	95	72	54	68	89
3	91	95	69	85	46	94
3	55	95	72	69	68	
3	72	80	77	48	41	75
	<b>67.7</b>	<b>93.2</b>	<b>76.3</b>	<b>61.0</b>	<b>58.4</b>	<b>80.7</b>

The assessment survey did not tell us much other than students are always looking for the correct answer. Math is drilled so much with being right or wrong that students do not push themselves to find our why they are right or wrong. This will be something we can push more in the future with the tools we are given from Math in the Middle.

**Table B**

math attitude

April

	s. agree	agree	no opinion	Disagree	s. disagree
1	3 13.0%	9 39.1%	5 21.7%	3 13.0%	3 13.0%
2	2 8.7%	10 43.5%	7 30.4%	3 13.0%	0 0.0%
3	2 8.7%	5 21.7%	7 30.4%	3 13.0%	4 17.4%
4	9 39.1%	6 26.1%	2 8.7%	0 0.0%	0 0.0%
5	1 4.3%	6 26.1%	8 34.8%	6 26.1%	1 4.3%
6	9 39.1%	10 43.5%	3 13.0%	0 0.0%	0 0.0%
7	4 17.4%	11 47.8%	7 30.4%	0 0.0%	0 0.0%
	<b>30 + min</b>	<b>21-30 min</b>	<b>11-20 min</b>	<b>1-10 min</b>	<b>None</b>
8	3 13.0%	3 13.0%	4 17.4%	4 17.4%	8 34.8%
	<b>Friend</b>	<b>classmate</b>	<b>family</b>	<b>teacher</b>	<b>no one</b>
9	9 39.1%	6 26.1%	3 13.0%	3 13.0%	2 8.7%

math attitude

May

	s. agree	agree	no opinion	Disagree	s. disagree
1	6 21.4%	8 28.6%	4 14.3%	2 7.1%	3 10.7%
2	6 21.4%	9 32.1%	5 17.9%	6 21.4%	2 7.1%
3	3 10.7%	4 14.3%	9 32.1%	6 21.4%	4 14.3%
4	11 39.3%	9 32.1%	6 21.4%	0 0.0%	2 7.1%
5	5 17.9%	9 32.1%	5 17.9%	4 14.3%	5 17.9%
6	13 46.4%	12 42.9%	2 7.1%	1 3.6%	0 0.0%
7	10 35.7%	10 35.7%	7 25.0%	0 0.0%	0 0.0%
	<b>30 + min</b>	<b>21-30 min</b>	<b>11-20 min</b>	<b>1-10 min</b>	<b>None</b>
8	2 7.1%	6 21.4%	4 14.3%	7 25.0%	7 25.0%
	<b>Friend</b>	<b>classmate</b>	<b>family</b>	<b>teacher</b>	<b>no one</b>
9	16 57.1%	10 35.7%	10 35.7%	15 53.6%	2 7.1%



Table C

self assessment

April

	s. agree		agree		no opinion		Disagree		s. disagree	
1	4	17.4%	11	47.8%	6	26.1%	2	8.7%	0	0.0%
2	2	8.7%	6	26.1%	7	30.4%	4	17.4%	4	17.4%
3	8	34.8%	12	52.2%	2	8.7%	0	0.0%	1	4.3%
4	13	56.5%	9	39.1%	0	0.0%	0	0.0%	1	4.3%
5	3	13.0%	12	52.2%	6	26.1%	1	4.3%	1	4.3%
6	6	26.1%	7	30.4%	9	39.1%	0	0.0%	1	4.3%
7	3	13.0%	8	34.8%	8	34.8%	2	8.7%	2	8.7%
	30 + Min		21-30 min		11-20 min		1-10 min		none	
8	1	4.3%	11	47.8%	6	26.1%	3	13.0%	2	8.7%
	only in head		most in head		both equal		most paper		only paper	
9	1	4.3%	1	4.3%	13	56.5%	8	34.8%	0	0.0%

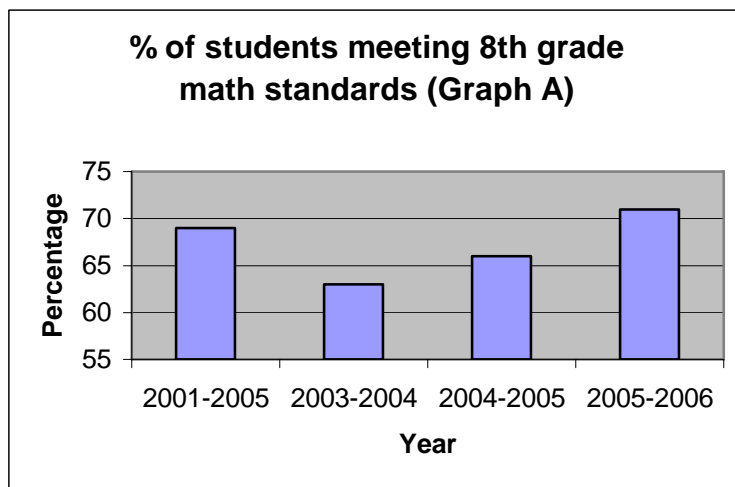
self assessment

May

	s. agree		agree		no opinion		Disagree		s. disagree	
1	9	32.1%	14	50.0%	5	17.9%	0	0.0%	0	0.0%
2	3	10.7%	7	25.0%	11	39.3%	3	10.7%	4	14.3%
3	13	46.4%	10	35.7%	4	14.3%	0	0.0%	0	0.0%
4	16	57.1%	7	25.0%	3	10.7%	1	3.6%	1	3.6%
5	6	21.4%	11	39.3%	7	25.0%	1	3.6%	3	10.7%
6	8	28.6%	11	39.3%	8	28.6%	0	0.0%	1	3.6%
7	7	25.0%	7	25.0%	6	21.4%	5	17.9%	2	7.1%
	30 + Min		21-30 min		11-20 min		1-10 min		none	
8	3	10.7%	11	39.3%	5	17.9%	5	17.9%	4	14.3%
	only in head		most in head		both equal		most paper		only paper	
9	0	0.0%	5	17.9%	7	25.0%	11	39.3%	6	21.4%

## Interpretation

This was one of the most successful years our school has had in a few years with regard to state assessments. Our school has gone from 63% of students being at the state average for assessments to this year having a 71% (Graph A). We would like to think it is because of the efforts we have put into better preparing our students over the past two years. We have been in Math in the Middle for the past two years. This program has helped us better understand how to relate to students and how to push ourselves as teachers.



Next year I will be looking to find more ways to reach these students I get to work with. There are many ways to do this, and this research paper is a great starting point to allow me to see what I can work on and what might have or have not worked in the past. Each set of students I get in will show me different skills and it is my job to adjust to those skills. From Math in the Middle, I have learned to challenge not only my students more, but myself. I know there are other ways to reach the students than just the few things I tried this year. It will be fun to see what kind of improvements I can make in the following years for our classroom. I will always be looking for a way to help my students get better. The issue we need to think about as teachers is, are we doing this for the students or are we doing this for our reputation?

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## Appendices

### **Appendix A**

#### Student Interview Questions

1. What is the hardest part for you about taking a quiz?
2. Do you feel like you know how to study for a quiz?
3. Do you feel like you have enough time to take your quizzes?
4. What was most helpful for you to use on you quiz? 5 minute study buddy, use notes, use review sheet on quiz, having the review sheet
5. Did you ever take advantage of a retake? If so, did you do better the second time? If not, why didn't you take advantage of the retake?
6. Do you feel like you know how to take productive notes?
7. Overall, do you enjoy math class? Tell, why or why not.
8. What was the most exciting think for you to see during an average class period? Power point, overheads, white boards (teacher in front), student white boards, TI calculators.
9. Do you feel like you had adequate opportunities to be part of using technology in the classroom?
10. Is there technology you would like to use more, or something else you would have liked to see used?

## Appendix B

### Math attitude survey

- 1) I like math
- 2) I am good at math
- 3) I like working math problems on the board
- 4) I like working in groups on math problems
- 5) I like working by myself on math problems
- 6) I like having technology used in math class
- 7) I am more confident when solving problems in math with the use of technology.
- 8) I study the night before for a quiz and test in math for about:
- 9) When I get stuck working a math problem, I ask for help from:

## Appendix C

### Self Assessment Survey

- 1) I know how and where to start when I am solving math problems
- 2) Solving math problems is fun.
- 3) Solving math problems is important.
- 4) My goal when solving math problems is to get the correct answer.
- 5) I feel good when I am solving a math problem.
- 6) Solving math problems helps me understand why I have learned certain math concepts.
- 7) I am good at solving math problems.
- 8) On average, how much time do you spend on math homework each day?
- 9) It is easier to solving math problems in my head or on paper.

**Appendix D**

Date: \_\_\_\_\_

# WARM – UP

1)

2)

3)

Answer:

Answer:

Answer:

4)

5)

Answer:

Answer:

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Chapter \_\_\_\_ Section \_\_\_\_\_

Title: \_\_\_\_\_

1)

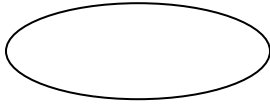
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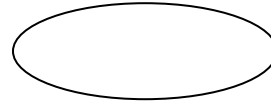
3)

Answer



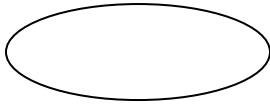
4)

Answer



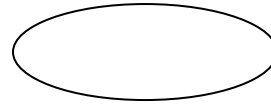
5)

Answer



6)

Answer



**Notes**