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Effects of Self-Assessment on Math Homework

Diane Swartzlander
Seward, NE

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Abstract

In this action research study of my eighth grade differentiated Algebra students, I investigated the effects of students using self-assessment on their homework. Students in my class were unmotivated and failed test objectives consistently. I wanted students to see that they controlled their learning and could be motivated to succeed. Formative assessment tells students how they need to improve. Learning needs to happen before they can be assessed. Self-assessment is one tool that helps students know if they are learning. A rubric scoring guide, daily documentation sheet and feedback on homework and test correlations were used to help students monitor their learning. Students needed time to develop the skill to self-assess. Students began to understand the relationship between homework and performing well on tests by the end of the action research period. Early in the period, most students encountered difficulty understanding that they controlled their learning and did not think homework was important. By the end of the year, all students said homework was important and that it helped them on quizzes and tests. Motivating students to complete homework is difficult. Teaching them to self-assess and to keep track of their learning helps them stay motivated.

The purpose of this study was to focus on the lack of student motivation.

I started a new position this past year teaching two sections of differentiated Algebra. Differentiated students are students who have been identified as gifted and excel in mathematics. I had high expectations that my students would be excited to learn Algebra. These were gifted students, which I knew could be challenging, but I looked forward to it. What I had not anticipated was the lack of motivation that the students demonstrated. Students were disgruntled and continually complained that they did not like the class, or they wanted to be in the "easier" Algebra class. They constantly asked, "Why is this class so hard?" I was dismayed by their attitudes and wasn't quite prepared for them. I could see that the students' behavior affected their progress and their ability to learn Algebraic concepts. I saw their learning start to stagnate and focus on just "doing the work" while not gaining any understanding of what they were learning. They did not see the big picture or what was to be gained from the class.

I thought about my own experience in Math in the Middle and how I encountered Algebra again. It was hard, but I knew where the course was taking me. These students did not seem to have the confidence and determination to tackle something difficult. Why? Algebra is a complex subject and the majority of the students did not know how to handle it. They wanted it to be easy. They knew basic concepts and could complete computational problems. In algebra, though, the concepts were combined into one problem, and they couldn't quickly work through a problem to be done with math homework.

During class one day I gave them time to work, and one student blurted out, "Why is this so hard?" The rest of the class stopped, and everyone had a dazed look. I threw the question right back at the class. "Why is it so hard?" Their responses were not enlightening until one student blurted out, "Because it used to be easy." I asked her why, and she said, "Because we knew it

already." At that point she slapped her hand over her mouth and realized what she had said. That is when I realized that these students were so used to math being easy and that they did not know how to handle it when it became more difficult. They wanted to quit, give up and not put forth any effort. I believe a successful teacher helps students want to learn. Motivation and desire are the foundations of learning, and I wanted to instill that in my students. If students are not motivated, they will not learn or use their capabilities to the fullest. They needed to find success within themselves and take charge of their learning. If these students could find that success, it would further their academic progress as well as give them the skills to become life-long learners. These students have the capability to achieve that.

Problem Statement

In my class test scores have been continually low, and not all students completed the assigned homework. I began to question what the test scores told me. Was learning taking place? Had students learned the objectives? How did I know for sure that students were learning? How did the students know whether they were learning? What immediate feedback had I given them to help them monitor their learning? Why was Algebra so hard for them? Test scores gave me summative assessment, but I wanted formative assessment information. I wanted to know what affected their learning on a daily basis and whether that correlated to the low test scores. This was a new mathematical learning experience for these students. They needed to learn how to monitor their learning so they would know how to improve. Formative assessment gives students feedback during the learning process, and I can use it to guide my instruction. One form of this method is teaching students to self-assess their work. Students then can see their progress and, in turn, feel successful. If students feel successful, they become motivated. Students who are motivated begin to learn and test scores can improve.

Literature Review

Summative assessment has been used throughout teaching to determine whether students have learned. Summative assessment includes grading homework, quizzes, tests and other projects or activities assigned to students. Summative assessment concludes the assignment or activity. In other words, it is used to determine what an individual has learned. Black, professor emeritus in the School of Education, King's College, London, and Wiliam, head of school and professor of educational assessment at the School of Education, King's College, stated in 1998 that high-stakes testing has dominated teaching and grading has been overemphasized. With grading, low-achieving students believe that they do not have the ability to learn, which has a negative impact on their progress. Shepard, a professor in the School of Education, University of Colorado at Boulder, CO, in 2000 describes the historical perspective of high-stakes testing and how it has had a negative effect on teaching and learning. Test scores may go up, but student learning hasn't. High-stakes testing has taught students that effort is related to externally administered rewards (tests) rather than the excitement of learning new ideas.

Shepard (2000) describes formative assessment, feedback teachers give while students learn, as necessary during the middle of the teaching and learning process. She believes that assessment needs to be ongoing so the teacher can use it to guide instruction. Black and Wiliam (1998) found formative assessment improved achievement by 35 percent and that the gains were most significant in low-achieving students. Teachers provide feedback to students so the students know what areas they need to improve. The authors state that formative assessment needs to include self-assessment, but students need to be trained how to assess themselves. Shepard states that when students assess their work they develop ownership of the assessment process and criteria become clear and reasonable. Woodward, a professor at University of Puget Sound,

Monroe, a fourth grade teacher in Tacoma, Washington, and Baxter, president of Educational Inquiries, focused their research in 2001 on teaching students how to self-assess using a rubric scoring guide. The rubric gave students a framework that focused on their progression of learning. This research included low-achieving students and students with learning disabilities. Harrison, a lecturer in science education at King's College London, Lee, a teacher advisor for the Warwickshire County Council, Marshall, a lecturer in English education at King's College London along with Black and Wiliam (2004) believe that self-assessment is an essential part of learning, but that students are not skilled in self-assessing and that it takes time to develop this skill. Concrete examples need to be given so that criteria are clear. Leahy, Lyon, and Thompson, all work in the Learning and Teaching Research Center, Princeton, NJ with Paul Wiliam. In 2005 their research focused on five assessment-for-learning strategies that included student self-assessment. These authors found that students can assess their work with guidance from their teacher through student-friendly rubrics or rubrics developed by both students and teacher. The use of formative assessment is a change for both teacher and student. The change from summative to formative assessment takes time. When a shift from summative to formative assessment takes place, adjustments in teaching happen while learning continues. Tan, an academic staff developer with Temasek Polytechnic, Singapore, and doctoral candidate with University of Technology, Sydney, in 2004 cautioned the use of self-assessment as a source of empowerment or discipline. Teachers should make clear why students use self-assessment. Teachers should avoid using it as discipline. The motive needs to be clear to allow for collaboration between the teacher and student.

When comparing summative and formative assessments, it becomes clear that for students to become involved in their learning progress, they need to know whether learning is

taking place. Summative assessment becomes pointless to the students if they fail. Both assessments have a direct impact on student motivation, which is a concern for all teachers. If students are not motivated, they are not going to put forth effort and learning suffers. Intrinsic versus extrinsic motivation parallels formative and summative assessment. Woodward's (2001) work with low-achieving and learning-disabled students saw high levels of growth of achievement and motivation when self-assessing through the use of rubric scoring. Students saw their progress and, in turn, felt successful. Black, Harrison, Lee, Marshall, and Wiliam (2004) state that formative assessment that includes self-assessment allows students to focus on understanding what is to be learned rather than getting a correct answer. Working through the process develops intrinsic motivation, which Midlleton and Spanias, both at Arizona State University (1999), identified as the goal theory. An individual with a learning goal values the skill and believes success is due to hard work. The researchers found that students tended to be motivated intrinsically if they believed mathematics was a process through which they could work. By using self-assessment in the classroom, the teacher's role shifts from presenter to leader. Teachers guide the self-assessment process to allow time for students to work through their learning and to monitor their progress.

Dembo and Eaton, both at the University of Southern California, in 2000 described self-regulation in six different dimensions: motivation, methods of learning, use of time, physical environment, social environment and performance. The authors state that motivation includes goal setting, developing positive beliefs, and maintaining the beliefs when challenged. Self-observation and evaluation should be given the most attention for students to discover how to take charge of their learning. Their discussion of self-regulation encompasses motivation and self-assessment into a broader spectrum of providing students the opportunity to develop life-

long skills. Barron, School of Education at Stanford University, found in his 1998 research with fifth-grade students that 50 percent of students interviewed confirmed they felt proud after assessing themselves and being allowed to revise their work.

Formative assessment includes feedback from the teacher and peers. Black and Wiliam (2004) stress that feedback on all kinds of student work, including tests, should give guidance on how to improve. Feedback needs to be communicated so that the information is useful to the students and that they know how to improve. Shepard (2000) describes feedback as going beyond checking student work or tests and giving them back. Effective feedback includes giving hints, asking leading questions and intervening with direct questions when needed to guide students' thinking. This kind of feedback helps maintain motivation and self-confidence. Black, Harrison, Lee, Marshall, and Wiliam (2004) discuss how formative use of summative tests can help students reflect on the work they have done. This takes the use of summative testing to a new level. Opportunities for students to rework test questions can help them understand how their work might be improved. Feedback motivates students if it attends to task involvement and focuses on what needs to be done. In Barron's (1998) research on 111 students using teacher feedback, 77 percent of the students made at least one revision suggested by the teacher. This demonstrated that students had read and understood the feedback given by the teacher. The use of feedback, according to Leahy, Lyon, Thompson, and Wiliam (2005) is to move the learners forward. Grades and scores do not provide useful feedback to students. The authors also discuss the use of peer feedback in conjunction with self-assessment. By introducing peer assessment, students can practice assessing work. Black, Harrison, Lee, Marshall, and Wiliam believe that peer-assessment needs to be taught along with self-assessment as both help to develop the intrinsic value of learning.

The overall goal is to improve student performance, which was addressed in all the articles. Student performance tells whether they have learned. This can be gauged by summative and formative assessments. All students have the ability to learn. The challenge becomes how we, as teachers, can provide for that to happen.

> Standards can be raised only by changes that are put into direct effect by teachers and pupils in classrooms. There is a body of firm evidence that formative assessment is an essential component of classroom work and that its development can raise standards of achievement. (Black & Wiliam, 1998, p. 148).

My research focuses on the use of formative assessment, specifically student self-assessment. Previous research in this area has proven the positive aspects of teaching/guiding students to use self-assessment to improve motivation and performance on summative assessments. In my research I wanted students to use self-assessment to help monitor their learning and to see the correlation of completed homework and learning the objectives.

Purpose Statement

The purpose of my research is to teach students how to self-assess their homework. In the research I read, homework was not specifically addressed. Homework provides practice for what is being learned, even though students do not always see the value in doing their homework. It was my intention to use self-assessment on their homework to see whether it would improve the frequency of homework submitted, improve motivation about doing homework, and influence performance on tests and quizzes. Students had the opportunity, by collaborating with me, to participate in designing a rubric to self-assess their homework. I feel this had relevance in the research that has been conducted on self-assessment since homework is an integral part of mathematics learning. My research questions were 1) How does student self-assessment influence frequency of homework submitted? 2) How does student self-assessment influence

performance on tests and quizzes? and 3) How does student self-assessment influence motivation about doing homework?

Method

This research was conducted in my mathematics classroom during the spring semester, 2007. For each of my questions I gathered the following data: documentation of homework submitted, student portfolios of progress of learning, rubric scoring of homework, documentation of student grades on quizzes and tests, objective cards of math objectives passed or not passed, and documentation of the number of re-takes on objectives not passed. Additional data was gathered using a student attitude survey, pre- and post-, and a focus group discussion.

I gave the student survey before we began our discussion on the rubric scoring guide (Appendix A). I had students use their student account number so that I would not know their identities. I gave the post- survey the last week of school, again using their student account numbers. I then matched the pre- and post- surveys to see whether if any changes had occurred.

To begin using the rubric scoring guide, the students and I worked together on developing their rubric. I had made a generic one and gave each student a copy of it. They looked it over in table groups of three, and I told them to make changes on their own copy that would help them use it. As a class we shared the changes, which I made on an overhead copy of the generic rubric. When completed, we went over it together one more time, and the class agreed that this was what they would be happy using, and all understood it. (Appendix B). I then gave them each a folder with a copy of a documentation sheet that they would use daily (Appendix C). This would be part of their portfolio and how I would collect their homework each day. I collected the folders, stapled the completed rubric to their homework and placed a new rubric inside for the next day. The documentation sheet was for one week, so at the end of

each week I placed a new one inside. At the beginning of fourth quarter, I placed all the documentation sheets for each week in the folder, and I could remove each week's on Friday. I began data collection the beginning of the third quarter, March 19, 2007 and concluded May 11, 2007. I explained to students that we would use the rubric scoring guides and that they were to use their documentation sheets inside their folders daily.

To organize the student homework turned in, I used a computer-based program, Grade-Pro. Students were not given grades, but if homework was turned in with a rubric and it was completed, they received a "yes" in the grade book. This gave students a 100 percent; if students did not complete the homework, they received a "mi", which stood for missing, and it recorded a 0 percent. Students could turn in completed homework at any time for full credit. For each objective taught I recorded the homework and the test over the objective side by side (Appendix D). In doing this, I quickly saw whether students who turned in their homework passed the objective on the test and vice versa. Each objective on the test was graded separately so students could retake that specific objective and not the entire test. Tests and retake tests were kept in students' folders. The focus group was conducted after school with a small group. Eight students indicated they would attend, but only three showed up. The discussion was recorded and lasted about 45 minutes.

A few interruptions made collecting data problematical. They included a tornado drill, the absence of a few students that were gone for a week on a Washington D.C. trip with their Social Studies teacher, a field trip divided the class in half for two days, and my absence for two days. Since I teach the differentiated (gifted) Algebra class, both sections are made up of students from two different teams. During the field trip, when I had half a class for two days, two different students commented, "I like having a small class; it's quieter and easier to learn." I forget that

they wanted to learn and had a hard time when others interfered with that process. I met with other Algebra teachers during each quarter throughout the school year, and all voiced concern on chapters 9 and 10, which cover new and difficult topics for students. These two chapters were taught during my data gathering. The degree of difficulty was high, and even my mathematically strong students struggled with the concepts.

Findings

My first question was, "Will self-assessment on their homework improve the frequency of homework submitted?" The frequency of homework turned in improved slightly when I began my data collection, and grades improved for some students. Toward the middle of the third quarter, the frequency of completed homework began to drop. During this time, we were working on new and difficult topics that students had never seen before. (Appendix E)

Chapters 9 and 10 were the most difficult, and students struggled with the concepts. On the students' weekly documentation sheet inside their portfolios, one section was titled, "One thing that was hard." Under that title students had written, "Why is this so hard?" or "I do not get how to use the quadratic formula," or another frequent one was, "How do you know how to factor the quadratic?" I used these questions or comments to help guide my instruction the next day. Students were not consistent about filling in these parts of their documentation sheets, which was frustrating. These comments gave me direct feedback that I could use. I explained that to students, but they often forgot to fill them in, or we ran out of class time before they could write responses. Other times it seemed too much for them to stop and fill this in at the end of class. If I stopped class sooner, I felt as if I were rushing my instruction to make sure to allow time for students to write on their sheets. (Appendix C)

The student pre- and post- attitude survey results were interesting. Students rated their responses on a scale of 1-5, 1 being the lowest and 5 being the highest. On the pre-survey I found it interesting that doing their homework was important as 16 out of 20 gave it a 4 or 5, and on the post survey 19 out of 21 gave it a 4 or 5. In addition, 17 out of 21 on the pre-survey answered 4 or 5 to the statement that homework helped them understand what they learned in class. On the post survey, 19 out of 21 gave it a 4 or 5 (see Appendix A).

During my focus group discussion, I asked them whether homework helped them learn the concepts. Their responses were: “Practicing helped us learn them,” “Homework gives me a lot of extra practice” and “It prepared me for the tests.” These responses showed that students recognized the importance of homework and verified the significance of homework to them. (Student Interview, March 15, 2007)

We then discussed what they did when they got stuck or did not know how to solve a problem. Their responses touched upon note taking. I had not addressed nor taught note taking, and these students helped me to realize how valuable it is. One student said, “Taking notes was helpful; taking them home I could see how we did it in class.”

All three talked about being able to look in the back of the textbook for the answers. “When I get stuck at home, I look at the answer at the back of the book to help me figure it out.” Another student commented, “Assign problems with the answers in the back because you can work backwards to figure how to get that answer” while another added, “If you assign problems with the answers you should make sure students show their work, otherwise they just copy the answers.” I told students all along that they could and should check the answers in the back of the book while they are working to see whether they were doing them correctly. I required them to show their work, but not all did.

All three agreed that the rubric did not help them since they do their homework anyway. But one student made the comment, “But for those who do not do their homework, using the rubric was helpful because when they did not do well on the test they could go back and see that they did not do their homework.” That’s exactly what I had hoped that students would realize.

We then discussed using the daily documentation sheet, and again all three said it did not really help them as they were already writing down the objective. But one student changed her comment and said, “It was helpful, but it was hard to find the time to write it down.”

My second question was, “Will self-assessment improve motivation about doing homework?” Printing up a grade report for each student provided the most powerful correlation between completed homework and learning the objective. I had each objective’s homework listed and beside it the test score students received before retakes. Several students commented, “Gee, I guess I should do my homework.” I asked them why they said that and a student responded, “Well, when I look at this grade report I noticed that when I did my homework I did better on the test.” I asked the class whether any others had noticed the same thing on their grade reports, and several agreed they had. For the students who had been doing their homework consistently, this was an affirmation to them that their effort paid off. For those who did their homework regularly, but failed the objective, I was concerned this would negatively affect their attitude. But as I looked at their overall grade reports, two students continued to complete their homework. Two others began to turn in their homework less frequent, but they came in consistently to retake objectives not passed. Both commented to me that they wished they had done their homework. (Appendix D)

My third question was, “Will self-assessment on their homework influence performance on tests and quizzes?” For each student I was able to print up a graph that showed the homework

and test average and how they compared to the class average (Appendix E). When looking at each student's graph, I saw a direct correlation between homework being submitted and test scores. I also have documentation from students' portfolios on who retook objectives that were not passed the first time. Students who did not turn in homework, but scored high on the objective's tests retook the tests. After completion, tests were checked and returned to students. I had students sit in table groups of 3 or 4 and directed them to help each other fix the problems that were incorrect. I had the groups pre-arranged so that at least one person in each group had recorded the correct answer for each problem. If this wasn't possible, I allowed them use their books to see whether they could figure out their errors. If they couldn't, then it provided an opportune time for me to re-teach the lesson. If there was a specific concept, or objective, that most of the class failed, I used that opportunity to re-teach that specific objective. Chapters 9 and 10 had the most objectives that students came in to retake during second semester.

The two categories in which I saw the biggest gain from the pre-survey to the post-survey responses were to the following statements: "Going over homework in class is helpful", and "Homework helps prepare me for the quizzes or tests." In "Going over homework in class is helpful", the survey score went from a 10 to 15, giving it a 5 point increase, and for "Homework helps prepare me for quizzes or tests," the score went from 10 to 13. All categories increased except two: "I think I'm good at math," and "I do my homework." The latter decreased by 1, giving it a 4 or 5. I thought this was interesting since the ratings for importance all increased.

The focus group discussion was disappointing since only three out of the eight students invited attended. Their comments, though, were helpful and insightful. I learned from this how valuable it is for me to know the student perceptions as opposed to what I perceive is going on with instruction. All three commented that the class went too fast. Sample comments were: "You

go too fast and doing the homework made it more difficult" and "Complicated equations, like quadratics, were hard to remember." They felt frustrated when I would introduce new concepts while they were still trying to understand what I had just gone over. Listening to the comments made by three of my top students helped me realize how struggling students must have felt (Student interview, March 15, 2007).

Students then responded to the question, "What can the teacher do differently next year to help students learn Algebra?" Unanimously they said, "Slow down." That's difficult to do when the district mandates that teachers cover all the objectives listed on the math card by the end of each semester. Other comments were: "Take notes," "You should give us study guides" and "Post the formulas in the classroom."

The evidence presented here supports my belief that doing homework is an essential part of learning Algebra. Students can see the correlation between doing homework and passing tests. Motivating students through the use of self-assessment by using rubrics on their homework can help those who are not consistent in completing assigned work. From the pre- and post- surveys, students demonstrated that they knew doing homework was important, that it helped them understand what they were learning, and it helped prepare them for quizzes and tests.

Conclusions

In conclusion, my findings support what Black, Harrison, Lee, Marshall, and Wiliam (2004) believe: self-assessment is an essential part of learning, but that students are not skilled in self-assessing and that it takes time to develop the skill. Using the homework as a formative assessment was a challenge, and I felt that students were just beginning to see and understand the importance of doing homework. Their survey responses and the frequency of completed homework showed that they saw the relevance in doing math homework. Formative assessment

includes self-assessment that allows students to focus on understanding what is to be learned rather than getting a correct answer. This was a major shift for students who were used to getting grades on homework and having it handed back to them without discussion. If students completed their homework and made changes during class discussions, they received full credit for their work. More time needs to be spent on self-assessment, and I think an integral part of this process is peer-assessment, which I did not address in my research. Black, et al., believe that peer-assessment needs to be taught along with self-assessment. Used together, they help develop the intrinsic value of learning. My research helped me understand the value of self-assessment and how it can be used as a learning tool for students. Students can begin to see that they are in control of their learning and that doing their homework is the beginning of taking charge of the learning process.

Implications

As a result of my action research, I plan to continue using the daily documentation sheet and introduce how to peer- and self-assess at the beginning of the school year, not just in the third quarter. I firmly believe that students need to begin to take charge of their learning. They need to see that their hard work pays off and that they can be successful. Formative assessment can be used to guide my teaching and provide a better understanding of where my students are in their learning. Summative assessment is a tool to show whether they have learned the material, but I need to be able to know if they are learning the concepts before they get to the summative assessment. Students need to have a tool to document their success in completing their homework and passing the objectives. Once they begin to see the correlation, motivation can develop. When students are motivated, learning can and will happen.

For a teacher who wants to include peer- and self-assessment in their teaching, starting with peer-assessment would help students learn how to assess homework. Students can learn what to look for in homework while the teacher role models how a good answer or problem should look. Students can learn how to write anecdotal notes on the homework they are assessing, which will help them with their own work. This process can switch to self-assessment when the teacher sees that students are comfortable with the assessment process. Students need to have some form of documentation about their homework, quiz, and test progress. When students can see this, the correlation process begins.

Formative use of summative tests can help students reflect on the work they have done. (Black, et al, 2004) When students have the opportunity to rework test questions it can help them understand how their work might be improved. When students work collaboratively it reinforces their learning and motivation improves. Allowing students this time to work together also gives the teacher an opportune time to re-teach concepts to specific students.

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Appendix A

Student Survey Questions Student Code: _____

Please give your honest response to each statement, **1** being low and **5** being high.

	Low				**High**
1. I like math (algebra).	1	2	3	4	5
2. I think I'm good at Math (algebra)	1	2	3	4	5
3. I do my math (algebra) homework.	1	2	3	4	5
4. When I do not understand my homework, I ask for help from my friends/family.	1	2	3	4	5
5. When I do not understand my homework, I ask for help from my teacher.	1	2	3	4	5
6. I think doing math (algebra) homework is important.	1	2	3	4	5
7. Going over homework in class is helpful to me.	1	2	3	4	5
8. Getting grades on homework is important.	1	2	3	4	5
9. Homework helps me understand what we learned in class.	1	2	3	4	5
10. Homework helps prepare me for the quizzes or tests.	1	2	3	4	5

Appendix B

January 29, 20007	Objective:	
○ Homework Rubric Score Completion: _____ Concepts: _____ Errors: _____ Checking: _____ Total: / 16	Today I felt:	
	One thing I learned today:	On time! Tardy Absent
	One thing that was hard:	SS BR Recovery TF
January 30, 20007	Objective:	
○ Homework Rubric Score Completion: _____ Concepts: _____ Errors: _____ Checking: _____ Total: / 16	Today I felt:	
	One thing I learned today:	On time! Tardy Absent
	One thing that was hard:	SS BR Recovery TF
January 31, 20007	Objective:	
○ Homework Rubric Score Completion: _____ Concepts: _____ Errors: _____ Checking: _____ Total: / 16	Today I felt:	
	One thing I learned today:	On time! Tardy Absent
	One thing that was hard:	SS BR Recovery TF
February 1, 20007	Objective:	
○ Homework Rubric Score Completion: _____ Concepts: _____ Errors: _____ Checking: _____ Total: / 16	Today I felt:	
	One thing I learned today:	On time! Tardy Absent
	One thing that was hard:	SS BR Recovery TF
February 2, 20007	Objective:	
○ Homework Rubric Score Completion: _____ Concepts: _____ Errors: _____ Checking: _____ Total: / 16	Today I felt:	
	One thing I learned today:	On time! Tardy Absent
	One thing that was hard:	SS BR Recovery TF

Appendix C

Math - Problem Solving : Algebra Homework 3rd period

Teacher Name: D Swartzlander

Student Name: _____

CATEGORY	4	3	2	1
Completion	All problems are completed but 1.	All but 2-3 of the problems are completed.	Several of the problems are not completed.	Over half to none of the problems are completed.
Mathematical Concepts	I have 100% understanding of the mathematical concepts used to solve the problems.	I have 80-90% understanding of the mathematical concepts used to solve the problems.	I have 70-80% understanding of the mathematical concepts needed to solve the problems.	I have below 70% understanding of the concepts needed to solve the problmes. I Need Help.
Mathematical Errors	90-100% of the steps and solutions have no mathematical errors.	Almost all, 80-90%, of the steps and solutions have no mathematical errors.	Most, 70-79%, of the steps and solutions have no mathematical errors.	More than 70% of the steps and solutions have mathematical errors.
Checking	The work has been checked and all appropriate corrections have been made at my table group.	The work has been checked and almost all appropriate corrections have been made with some disagreement at my table group.	Work has been checked, some corrections were not made and my table group did not agree on answers.	Did not check with group and no corrections were made.

Appendix D

SCORES CHART

SWARTZLANDER
Lincoln Public Schools
TERM 2: ALGEBRA D - PERIOD #3
Thu, Jun 7, 2007

	21 of 21 Students	Mis..	Overall		72 of 72 Assign.	1 Pg. 401-2 #12,13,18,22,2.. Homework 1/26/2007	2 7.1 graphing linear systems Test 2/1/2007	3 pg. 408 22-34 even, 42 &.. Homework 1/29/2007	4 pg 414 11,13,21,28,39,43 Homework 1/31/2007	5 7.2 linear systems/substi.. Test 2/1/2007
						100	8	100	100	12
1		1	90.6 A	M		yes	8	yes	yes	12
2		32	52.2 F	M		mi	8	mi	yes	10
3			97.1 A			yes	8	yes	yes	12
4		12	83.0 B	M		yes	8	yes	yes	10
5		17	83.3 B	M		mi	8	yes	yes	12
6		14	77.3 C+	M		yes	8	mi	yes	12
7			95.6 A			yes	8	yes	yes	12
8		2	84.4 B	M		yes	8	yes	yes	12
9		21	81.2 B	M		yes	8	mi	yes	12
10		31	61.5 D	M		mi	4	mi	mi	12
11		9	73.4 C	M		yes	6	yes	mi	12
12		24	62.0 D	M		mi	4	yes	mi	12
13			96.7 A			yes	8	yes	yes	12
14		5	86.4 B+	M		mi	6	yes	yes	12
15		2	94.2 A	M		yes	8	mi	yes	12
16		17	67.2 D+	M		yes	8	yes	mi	8
17		7	88.8 B+	M		yes	8	yes	yes	12
18		4	77.5 C+	M		yes	8	yes	yes	12
19		2	94.0 A	M		yes	8	yes	yes	12
20		1	93.2 A	M		yes	8	yes	yes	12
21		2	94.5 A	M		yes	8	yes	yes	12
•	Points					100	8	100	100	12
•	Avg Score					100	7.4	100	100	11.6
•	Avg %		82.6			100	92.9	100	100	96.8
•	St. Dev		13.0			0	16.1	0	0	8.5
•	Max		97.1			100	8	100	100	12
•	Min		52.2			100	4	100	100	8

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TERM 2: ALGEBRA D - PE..

	Students	6 7.3 word problems Homework 2/1/2007	7 7.3 linear syst. combinati.. Test 2/1/2007	8 7.4 story problems Homework 2/6/2007	9 7.4 solve linear systems Test 2/15/2007	10 7.5 # sol. for linear syst.. Test 2/15/2007	11 7.6 graphing linear systems Test 2/15/2007	12 8.1 multipl. prop. of expo.. Homework 2/16/2007	13 8.1 Mult. property of exp.. Test 2/23/2007	14 8.2 pg 459 #30-40 even... Homework 2/21/2007	15 8.2 zero/neg. exponents Test 2/23/2007
		100	12	100	12	12	12	100	18	100	15
1		yes	12	yes	12	12	12	yes	17	yes	15
2		mi	4	mi	12	12	9	mi	18	yes	9
3		yes	12	yes	12	12	12	yes	18	yes	15
4		mi	12	yes	10	12	12	yes	14	yes	12
5		mi	12	yes	12	12	12	yes	17	yes	14
6		yes	10	mi	12	12	6	mi	12	yes	9
7		yes	12	yes	12	12	10	yes	15	yes	12
8		yes	8	yes	8	12	10	yes	14	yes	15
9		yes	12	mi	12	12	10	mi	15	yes	12
10		yes	12	mi	8	12	6	yes	17	mi	12
11		yes	12	yes	12	12	12	mi	18	yes	15
12		yes	12	mi	12	10	12	yes	18	mi	9
13		yes	12	yes	12	12	12	yes	15	yes	15
14		yes	12	yes	10	12	10	yes	15	yes	15
15		yes	12	mi	8	10	12	yes	17	yes	15
16		mi	12	mi	8	10	10	yes	14	yes	9
17		yes	12	yes	10	12	12	yes	16	yes	15
18		yes	12	yes	12	12	12	yes	14	yes	12
19		yes	12	yes	12	12	12	mi	18	yes	15
20		yes	12	yes	12	12	10	yes	15	yes	15
21		yes	12	yes	8	12	12	yes	14	yes	12
•	Points	100	12	100	12	12	12	100	18	100	15
•	Avg Score	100	11.3	100	10.8	11.7	10.7	100	15.8	100	13
•	Avg %	100	94.4	100	89.7	97.6	89.3	100	87.6	100	86.3
•	St. Dev	0	16.1	0	14.4	6	15.6	0	9.9	0	15.7
•	Max	100	12	100	12	12	12	100	18	100	15
•	Min	100	4	100	8	10	6	100	12	100	9

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Lincoln Public Schools
TERM 2: ALGEBRA D - PE..

	Students	16	17	18	19	20	21	22	23	24	25
		8.2 graph exponential fun.. Test 2/23/2007	**8.3 pg. 466-7 31,35,39,4..** Homework 2/21/2007	**8.1-8.3 Review** Homework 2/23/2007	**8.3 Division prop. of exp..** Test 2/23/2007	**8.4 p. 473 17,25,29,37,3..** Homework 3/1/2007	**8.4 Scientific Notation** Test 3/6/2007	**8.5 7-17 odd, 18-20 all** Homework 3/2/2007	**8.5 Exponential growth** Test 3/6/2007	**8.6 p.488 11,13-16,17-2..** Homework 3/5/2007	**8.6 Exponential Decay** Test 3/6/2007
		6	100	100	18	100	20	100	18	100	10
1		6	yes	yes	18	yes	16	yes	16	yes	10
2		6	yes	mi	16	mi	20	yes	18	yes	10
3		6	yes	yes	15	yes	20	yes	18	yes	10
4		6	yes	yes	14	yes	15	yes	18	yes	10
5		5	yes	mi	18	yes	15	yes	16	yes	10
6		5	yes	mi	6	yes	18	yes	9	yes	7
7		6	yes	yes	18	yes	16	yes	14	yes	10
8		6	yes	mi	10	yes	20	yes	14	yes	10
9		3	mi	mi	16	mi	18	yes	18	mi	8
10		3	mi	mi	6	mi	20	mi	18	mi	10
11		6	yes	mi	14	yes	20	yes	18	yes	8
12		6	mi	mi	12	mi	10	mi	18	mi	4
13		6	yes	yes	15	yes	20	yes	16	yes	10
14		6	yes	mi	15	yes	20	yes	18	yes	9
15		5	yes	yes	18	yes	20	yes	18	yes	10
16		0	yes	yes	9	yes	20	yes	6	yes	10
17		6	yes	yes	15	yes	20	yes	18	yes	10
18		3	yes	yes	9	yes	20	yes	18	yes	10
19		5	yes	yes	15	yes	18	yes	18	yes	10
20		4	yes	yes	15	yes	16	yes	18	yes	10
21		5	yes	mi	18	yes	20	yes	14	yes	10
•	Points	6	100	100	18	100	20	100	18	100	10
•	Avg Score	5	100	100	13.9	100	18.2	100	16.1	100	9.3
•	Avg %	82.5	100	100	77.2	100	91	100	89.7	100	93.3
•	St. Dev	26.1	0	0	21.2	0	13.3	0	18.1	0	14.9
•	Max	6	100	100	18	100	20	100	18	100	10
•	Min	0	100	100	6	100	10	100	6	100	4

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TERM 2: ALGEBRA D - PE..

		26	27	28	29	30	31	32	33	34	35
		9.1 p.507 40,43,44.64,65.. Homework 3/6/2007	**9.1 508 83-86 all** Homework 3/9/2007	**9.1 solving quadratics/sq..** Test 4/3/2007	**9.2 wksht rationalizing d..** Homework 3/20/2007	**9.2 Simplifyiing radicals** Test 4/3/2007	**9.3 wksht graphing quad..** Homework 3/16/2007	**9.3 Graphing quadratic f..** Test 4/3/2007	**9.5 pg. 536-7 47,48,52,7..** Homework 3/27/2007	**9.5 using quadratic formula** Test 4/3/2007	**9.8 pt. 557 9-17 odd only** Homework 3/28/2007
	Students	100	100	16	100	16	100	8	100	12	100
1		yes	yes	13	yes	16	yes	8	yes	10	yes
2		mi	mi	12	mi	6	mi	3	mi	4	mi
3		yes	yes	16	yes	16	yes	8	yes	10	yes
4		yes	mi	16	mi	6	yes	0	yes	12	yes
5		yes	mi	16	mi	3	yes	8	mi	8	mi
6		yes	yes	13	mi	9	yes	4	mi	6	yes
7		yes	yes	16	yes	16	yes	8	yes	12	yes
8		yes	yes	12	yes	9	yes	6	yes	4	yes
9		yes	yes	16	mi	13	yes	8	mi	12	mi
10		mi	mi	12	mi	8	mi	8	mi	4	mi
11		mi	yes	16	yes	12	mi	8	mi	12	yes
12		mi	yes	8	mi	2	yes	8	mi	6	yes
13		yes	yes	16	yes	16	yes	8	yes	12	yes
14		yes	yes	12	yes	16	yes	6	yes	10	yes
15		yes	yes	16	yes	9	yes	8	yes	8	yes
16		yes	mi		mi		yes		yes		yes
17		yes	yes	12	mi	6	yes	8	mi	4	yes
18		yes	yes	16	yes	7	yes	6	yes	4	yes
19		yes	yes	16	yes	12	yes	8	yes	12	yes
20		yes	yes	16	yes	13	yes	8	yes	12	yes
21		yes	yes	16	yes	16	yes	8	yes	12	yes
•	Points	100	100	16	100	16	100	8	100	12	100
•	Avg Score	100	100	14.3	100	10.6	100	6.9	100	8.7	100
•	Avg %	100	100	89.4	100	65.9	100	85.6	100	72.5	100
•	St. Dev	0	0	14.6	0	29.1	0	27.3	0	28.2	0
•	Max	100	100	16	100	16	100	8	100	12	100
•	Min	100	100	8	100	2	100	0	100	4	100

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TERM 2: ALGEBRA D - PE..

	Students	36	37	38	39	40	41	42	43	44	45
		9.8 choose best model fo.. Test 4/3/2007	review 10.1-10.4 pg 634 .. Homework 4/5/2007	p 562-3 1-13, 18-20 Homework 3/29/2007	10.1 580 19-29 odd 45-53 Homework 4/9/2007	10.1 +,- polynomials Test 4/13/2007	10.2 pg 587 24-35 all Homework 4/10/2007	10.2 multiplying polynomi.. Test 4/13/2007	10.3 pg. 593 27,30,33,36.. Homework 4/11/2007	10.3 special products of.. Test 4/13/2007	10.4 pg. 600 34-42 even.. Homework 4/12/2007
	Students	12	100	100	100	20	100	16	100	12	100
1		12	yes	yes	yes	16	yes	10	yes	11	yes
2		12	mi	mi	mi	10	mi	6	mi	8	mi
3		12	yes	yes	yes	20	yes	14	yes	12	yes
4		9	mi	mi	mi	20	yes	16	yes	12	yes
5		12	mi	mi	yes	20	yes	14	yes	12	yes
6		12	mi	mi	mi	20	yes	16	yes	11	mi
7		12	yes	yes	yes	20	yes	14	yes	12	yes
8		12	yes	mi	yes	10	yes	16	yes	12	yes
9		5	yes	mi	mi	15	mi	16	yes	12	yes
10		11	mi	mi	mi	0	yes	0	yes	6	yes
11		12	mi	yes	yes	20	yes	12	mi	10	mi
12		9	yes	mi	mi	20	mi	4	yes	8	yes
13		12	yes	yes	yes	20	yes	14	yes	10	yes
14		12	yes	mi	yes	16	yes	14	yes	11	yes
15		12	yes	yes	yes	20	yes	16	yes	12	yes
16			mi	mi	yes	8	mi	14	mi	4	mi
17		4	mi	yes	yes	20	yes	16	yes	10	mi
18		12	yes	mi	yes	6	yes	12	yes	12	yes
19		12	yes	mi	yes	20	yes	12	yes	10	yes
20		12	yes	mi	yes	20	yes	12	yes	11	yes
21		12	yes	mi	yes	18	yes	16	yes	12	yes
•	Points	12	100	100	100	20	100	16	100	12	100
•	Avg Score	10.9	100	100	100	16.1	100	12.6	100	10.4	100
•	Avg %	90.8	100	100	100	80.7	100	78.6	100	86.5	100
•	St. Dev	19.8	0	0	0	29.3	0	27.1	0	18.3	0
•	Max	12	100	100	100	20	100	16	100	12	100
•	Min	4	100	100	100	0	100	0	100	4	100

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TERM 2: ALGEBRA D - PE..

		46	47	48	49	50	51	52	53	54	55
		10.4 solving polynomial e.. Test 4/13/2007	**10.5 pg. 607 12-14/15-2..** Homework 4/9/2007	**10.5 factoring quadratic** Test 4/25/2007	**10.6 wksht/factoring qu..** Homework 4/10/2007	**10.6 factoring polynomial** Test 4/25/2007	**10.7 pg. 622 18,19,27,30..** Homework 4/18/2007	**10.7 factoring special/pr..** Test 4/25/2007	**10.8 pg.629 21-26** Homework 4/19/2007	**10.8 factoring/distributiv..** Test 4/25/2007	**11.1 wksht&646 #24,27,..** Homework 5/1/2007
	Students	20	100	16	100	20	100	16	100	12	100
1		20	yes	14	yes	18	yes	8	yes	8	yes
2		6	mi	0	mi	0	mi	0	mi	0	mi
3		20	yes	16	yes	19	yes	16	yes	12	yes
4		20	mi	16	yes	20	mi	11	mi	11	yes
5		17	yes	12	mi	20	mi	14	mi	12	mi
6		20	mi	8	yes	17	yes	16	yes	12	yes
7		20	yes	16	yes	19	yes	12	yes	12	yes
8		20	yes	15	yes	14	yes	8	yes	12	yes
9		17	mi	12	yes	20	mi	12	mi	12	yes
10		12	mi	12	yes	4	mi	12	mi	12	mi
11		0	yes	8	yes	2	yes	16	yes	0	yes
12		20	mi	8	mi	12	mi	16	mi	4	mi
13		20	yes	16	yes	20	yes	12	yes	12	yes
14		20	yes	16	yes	18	mi	4	yes	12	yes
15		20	yes	12	yes	20	yes	16	yes	12	yes
16		13	yes		yes		yes		yes		mi
17		18	yes	16	yes	20	yes	16	yes	12	mi
18		10	yes	12	yes	18	yes	12	yes	8	yes
19		17	yes	16	yes	20	yes	12	yes	12	yes
20		17	yes	12	yes	18	yes	16	yes	12	yes
21		20	yes	16	yes	20	yes	16	yes	12	yes
•	Points	20	100	16	100	20	100	16	100	12	100
•	Avg Score	16.5	100	12.7	100	16	100	12.3	100	10	100
•	Avg %	82.6	100	79.1	100	79.8	100	76.6	100	82.9	100
•	St. Dev	27.3	0	25.8	0	32	0	27.6	0	33.2	0
•	Max	20	100	16	100	20	100	16	100	12	100
•	Min	0	100	0	100	0	100	0	100	0	100

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TERM 2: ALGEBRA D - PE..

		56	57	58	59	60	61	62	63	64	65
		11.1 Solve proportions Test 5/7/2007	**11.2 pg. 653 #13-31 odd** Homework 5/2/2007	**11.2 solve percent probl..** Test 5/7/2007	**11.4 pg.667-8 9,12,15,18..** Homework 5/4/2007	**11.4 simplify rational expr.** Test 5/7/2007	**11.5 pg 673 #12-33 1st ..** Homework 5/8/2007	**11.5 mulitply/div. Ratl. e..** Test 5/17/2007	**11.6 pg 679 #10-17** Homework 5/9/2007	**11.6 + & - Rational expre.** Test 5/17/2007	**11. 7 pg. 687 #15-22** Homework 5/11/2007
	Students	16	100	16	100	12	100	12	100	20	100
1		16	yes	12	yes	12	yes	12	yes	16	mi
2		12	mi	12	mi	0	mi	12	mi	0	mi
3		16	yes	12	yes	12	yes	12	yes	20	yes
4		12	yes	12	mi	4	yes	12	yes	20	yes
5		12	mi	16	mi	12	yes	12	mi	20	mi
6		7	yes	12	yes	12	mi	12	yes	16	mi
7		16	yes	16	yes	12	yes	12	yes	20	yes
8		16	yes	14	yes	4	yes	12	yes	20	yes
9		12	yes	12	mi	12	yes	12	mi	20	mi
10		16	mi	12	mi	0	mi	4	mi	16	mi
11		4	yes	0	yes	0	yes	12	yes	20	yes
12		12	mi	8	yes	0	yes	12	mi	16	mi
13		16	yes	16	yes	12	yes	12	yes	20	yes
14		12	yes	8	yes	4	yes	12	yes	20	yes
15		16	yes	16	yes	12	yes	12	yes	19	yes
16		8	mi	12	mi	4	yes	8	mi	16	mi
17		16	mi	16	yes	12	yes	12	yes	16	mi
18		12	yes	12	yes	4	yes	12	mi	20	mi
19		16	yes	16	yes	12	yes	12	yes	16	yes
20		16	yes	16	yes	12	yes	12	yes	20	yes
21		16	yes	16	yes	10	yes	12	yes	16	yes
•	Points	16	100	16	100	12	100	12	100	20	100
•	Avg Score	13.3	100	12.7	100	7.7	100	11.4	100	17.5	100
•	Avg %	83	100	79.2	100	64.3	100	95.2	100	87.4	100
•	St. Dev	21.9	0	24.2	0	42.3	0	15.9	0	22.2	0
•	Max	16	100	16	100	12	100	12	100	20	100
•	Min	4	100	0	100	0	100	4	100	0	100

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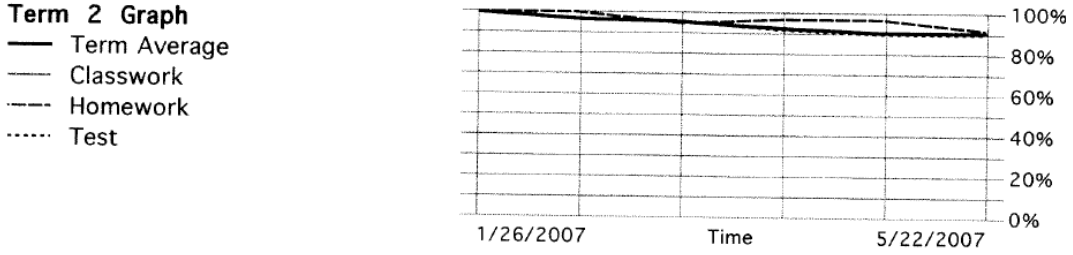
TERM 2: ALGEBRA D - PE..

	Students	66 **11.7 Dividing Polynomials** Test 5/17/2007	67 **11. 8 pg. 694 #14-37 1st..** Homework 5/14/2007	68 **11.8 solve rat'l equations** Test 5/17/2007	69 **12.1 pg. 712 #20-28 all** Homework 5/21/2007	70 **12.2 pg. 719 #18-30 all** Homework 5/22/2007	71 **John Boddy assignment** Test 6/5/2007	72 **CRT** Test 6/6/2007
		8	100	12	100	100	16	28
1		8	yes	12	yes	yes	16	23
2		0	mi	0	mi	mi	12	23
3		8	yes	12	yes	yes	16	23
4		8	mi	12	yes	mi	12	18
5		8	yes	12	yes	yes	0	20
6		8	yes	12	yes	mi	16	18
7		8	yes	12	yes	yes	16	26
8		8	yes	12	yes	yes	16	24
9		8	mi	12	mi	yes	0	23
10		8	mi	12	mi	mi	12	21
11		8	yes	0	yes	yes	16	19
12		0	mi	0	yes	yes	0	21
13		8	yes	12	yes	yes	16	25
14		8	mi	12	yes	yes	16	21
15		8	yes	12	yes	yes	16	22
16		8	mi	6	mi	yes	16	21
17		8	yes	12	yes	yes	14	23
18		4	mi	0	yes	yes	16	18
19		8	yes	12	yes	yes	16	24
20		8	yes	12	yes	yes	16	22
21		8	yes	12	yes	yes	16	24
•	Points	8	100	12	100	100	16	28
•	Avg Score	7	100	9.4	100	100	13	21.9
•	Avg %	88.1	100	78.6	100	100	81.5	78.1
•	St. Dev	31.2	0	40.5	0	0	35.3	8.2
•	Max	8	100	12	100	100	16	26
•	Min	0	100	0	100	100	0	18

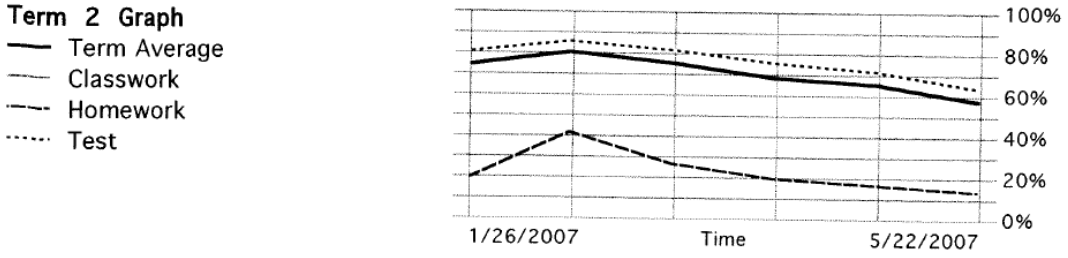
Appendix E

Student 1



Comments

Student 2

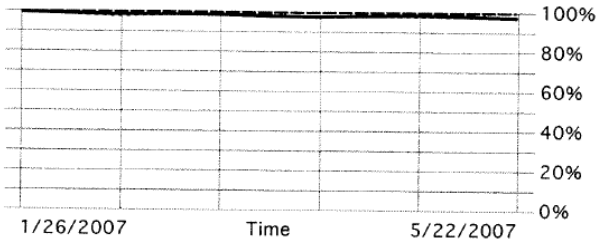


Comments

Retook objectives to improve score

Student 3

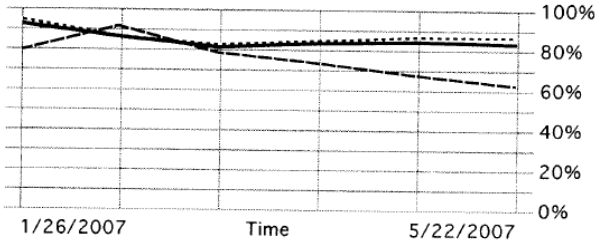
Term 2 Graph
- Term Average
- Classwork
- Homework
- Test



Comments

Student 4

Term 2 Graph
- Term Average
- Classwork
- Homework
- Test



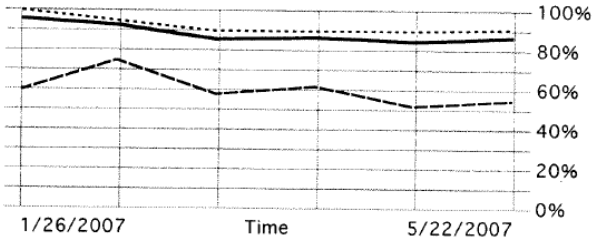
Comments

Retook objectives to improve test scores

Student 5

Term 2 Graph

— Term Average
— Classwork
-- Homework
····· Test



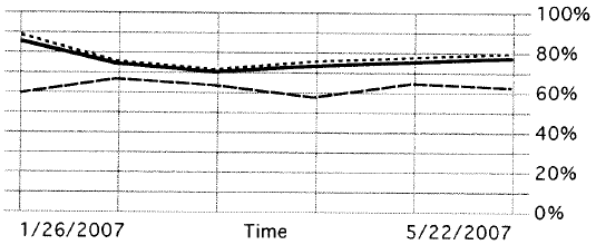
Comments

Retook objectives to improve test scores

Student 6

Term 2 Graph

— Term Average
— Classwork
-- Homework
····· Test

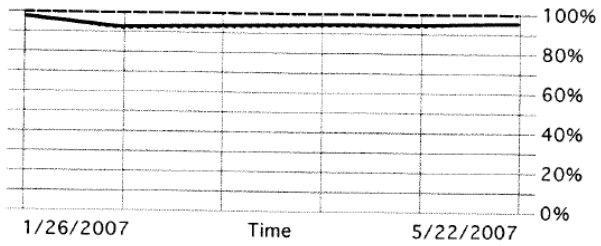


Comments

Student 7

Term 2 Graph

— Term Average
— Classwork
-·-·- Homework
····· Test

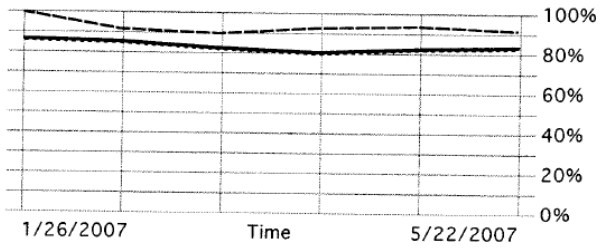


Comments

Student 8

Term 2 Graph

— Term Average
— Classwork
-·-·- Homework
····· Test

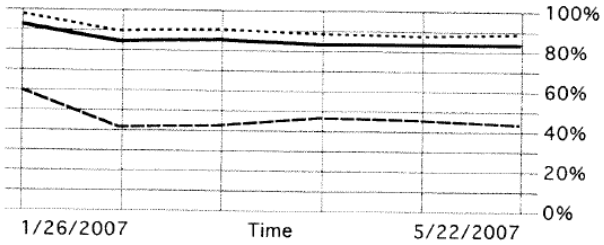


Comments

Student 9

Term 2 Graph

— Term Average
— Classwork
-·-·- Homework
····· Test



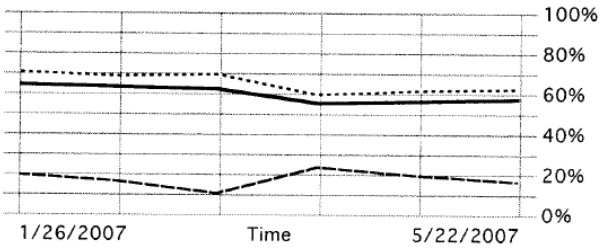
Comments

Retook objectives to improve test scores

Student 10

Term 2 Graph

— Term Average
— Classwork
-·-·- Homework
····· Test

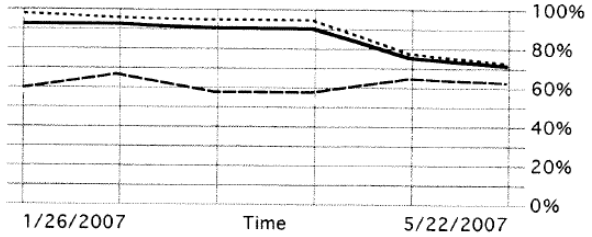


Comments

Student 11

Term 2 Graph

- Term Average
- Classwork
- Homework
- Test

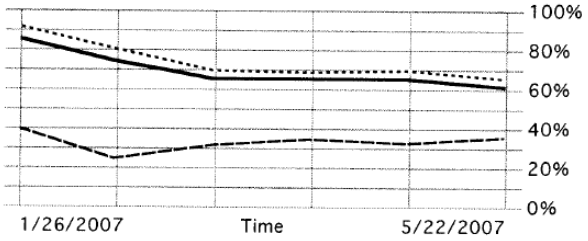


Comments

Student 12

Term 2 Graph

- Term Average
- Classwork
- Homework
- Test

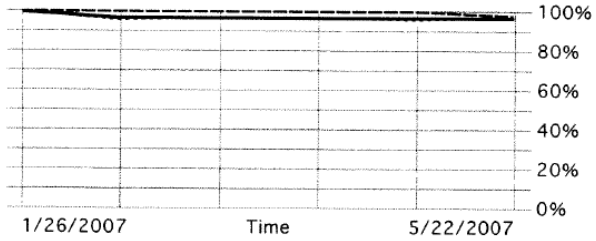


Comments

Student 13

Term 2 Graph

— Term Average
— Classwork
-·-·- Homework
····· Test

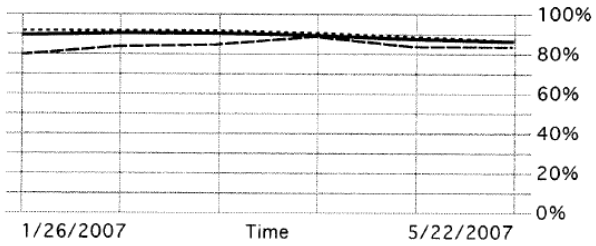


Comments

Student-14

Term 2 Graph

— Term Average
— Classwork
-·-·- Homework
····· Test

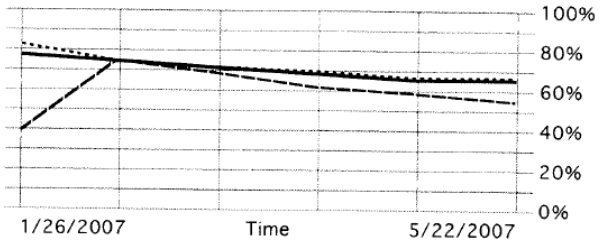


Comments

Student 15

Term 2 Graph

— Term Average
— Classwork
-·-·- Homework
····· Test

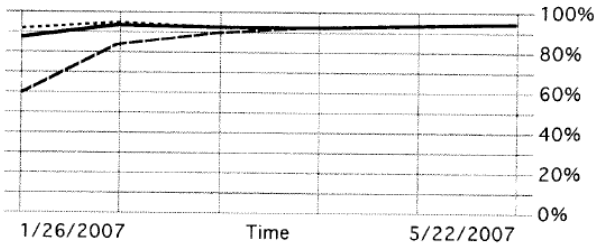


Comments

Student 16

Term 2 Graph

— Term Average
— Classwork
-·-·- Homework
····· Test

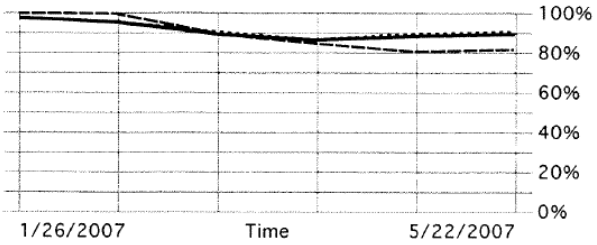


Comments

Student 17

Term 2 Graph

— Term Average
— Classwork
-·-·- Homework
····· Test



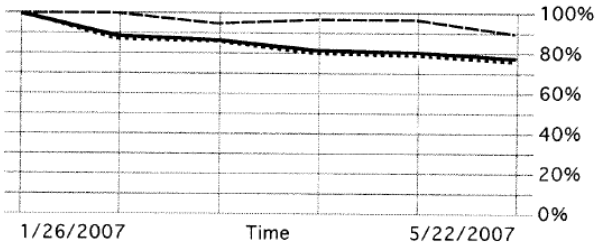
Comments

Retook objectives to improve test scores

Student 18

Term 2 Graph

— Term Average
— Classwork
-·-·- Homework
····· Test

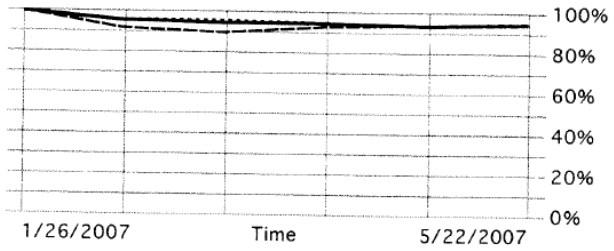


Comments

Student 19

Term 2 Graph

— Term Average
— Classwork
-·-·- Homework
····· Test

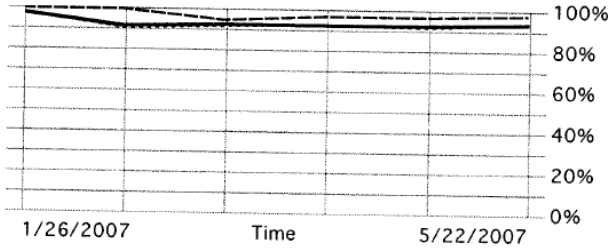


Comments

Student 20

Term 2 Graph

— Term Average
— Classwork
-·-·- Homework
····· Test

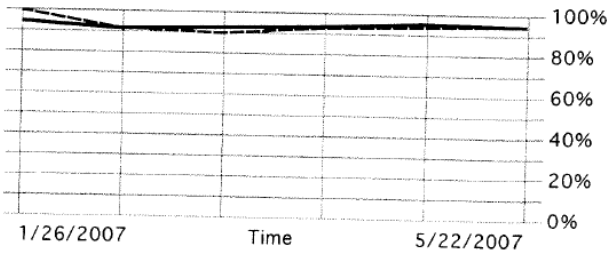


Comments

Student 21

Term 2 Graph

— Term Average
— Classwork
-·-·- Homework
····· Test



Comments