

BYRAM HILLS CENTRAL SCHOOL DISTRICT
ARMONK, NEW YORK

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Title of Project: *Incorporating Aspects of Standards-Based Grading into a Traditional Math Classroom*

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School/Grade: Byram Hills HS -Grades 9-12

SUMMARY OF *INVESTIGATORS OF PRACTICE* ACTION RESEARCH PROJECT

Context:

For the past few years I have been making changes to my classroom with the goals of improving student engagement, having students take more responsibility for their own learning, alleviating some of the anxiety and frustration encountered in some classrooms, and reinforcing the habits of mind; specifically persistence and metacognition.

In my Geometry and AP classes, the students are arranged at round tables where they use the cooperative learning model on a daily basis. (See APPENDIX 1) On most days students are using whiteboards and dry erase markers to show their reasoning on selected problems as they engage in lively discussions. Students then share their findings with their peers and their final results are challenged by both myself and their peers to ensure accurate mathematical reasoning, as well as good mathematical language and notation. This model enables me to circulate around the room having individual and small group discussions, challenge or remediate individual students, and listen in carefully to how my students think about particular problems. It is not uncommon to find me working on a particular concept with one table, while a second table puts up their work for the class to view, and three other tables are engaged in a lively debate. To an outsider this model may look chaotic, but it has helped me promote the goals I mentioned above.

Last year I researched the effects of using Standards- Based Grading (SBG) in my AP Calculus class. Those results can be found in my 2015 research entitled *Using Standards Based Grading in the Mathematics Classroom*. I was generally pleased with the results and hoped to use the same type of assessment in all my classes this year. There would be challenges to overcome; the first being that expanding to five classes, instead of one, would be very time-consuming. Secondly, last year the other teacher teaching AP Calculus was also using SBG; whereas, this year I would be one of four teachers teaching Geometry, and the only one using SBG. Lastly, I was concerned that on-level sophomores would not respond as positively as AP seniors did to SBG.

I knew that compromises would need to be made, but I was eager to challenge myself to find ways to bring Standards-Based Grading into my Geometry classes so that my students would become more resilient and independent problem-solvers.

Action Plan:

I decided that my research would revolve around the question "What aspects of Standards-Based Grading can be incorporated successfully into a traditional mathematics classroom and how does

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this affect student performance and anxiety levels?”. The first and probably most important step in this process was to clearly communicate to my students how our classroom models and values a growth mindset approach.

Carol Dweck’s work in this area has been a real eye-opener for me. She explains that those who believe in a fixed mindset believe that basic qualities, such as intelligence and talents, are fixed traits and that these traits can merely be documented. They do not necessarily link effort with success in an area, but rather the innate trait associated with it. In a growth mindset, successes can be nurtured through effort, persistence, and hard work. It encourages people to use their intelligence and talents as a starting point to achieve greater accomplishments through time. In the classroom this translates into teaching students to develop a love of learning where accomplishments are personal and success is not solely based on a comparison to others.

“If parents want to give their children a gift, the best thing they can do is to teach their children to love challenge, be intrigued by mistakes, enjoy effort, and keep on learning. That way, their children don’t have to be slaves of praise. They will have a lifelong way to build and repair their own confidence.” (Carol Dweck)

I made a copy of this quote (changing parent to teacher and children to students) and displayed it in my classroom along with other such posters promoting a growth mindset. (See APPENDIX 2) I used the first few weeks of classes to set up a few general guidelines regarding our classroom work and assessments.

- (1) Mistakes will occur frequently and that is great! It means that we are learning and growing. We can learn just as much from errors as we can from correct solutions.
- (2) Your only competition is yourself. If we help each other, everyone benefits.
- (3) One homework, quiz, or test will never be responsible for determining your quarter grade. All of our exams are cumulative so that there are multiple opportunities to demonstrate that you have mastered a particular concept. You can also demonstrate understanding through your work with your peers and your class presentations of problems.
- (4) You have to try something; you always know something. Mathematics values communicating ideas and making connections.
- (5) Some people will learn a concept faster than others. This is not a race.
- (6) Effort is important. What does effort look like? (I distributed the Effective Effort Rubric. (See APPENDIX 3)

These “rules” became our class mantra. The work of Jo Boaler, particularly in the area of setting up positive classroom norms, helped establish these guidelines. My focus then went to assessments. What parts of SB grading had had the most positive influence in my Calculus class? (You may want to visit my 2015 research on Standards-Based grading). I knew that creating a

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separate sheet for each student where I addressed each standard individually would take time and effort that I didn't have. To work, feedback still needed to be timely and relevant.

Instead, I used a large index card for each student, where after each assessment I noted which standards had been met, areas which still needed support, and general observations about the students' work and understanding. I also did an item analysis using my three Geometry classes as a single group. Here I was able to accurately record which particular questions caused difficulty and any other observations that were relevant. I explained to my students after every assessment that I had written feedback and suggestions on their papers. It was their responsibility to read the feedback and identify areas of concern or difficulty. The students struggled with this the first two or three times and an early observation was that they needed some direct guidance with this.

The other change I made was to establish "growth points" as part of the formal grading process. I repeatedly stressed the fact that effort alone does not necessarily result in growth points; however, with effective effort and good work habits growth usually follows.

Guidelines for Growth Points

After each assessment, students were expected to read feedback and analyze errors. Students when coming for extra help after school were encouraged to bring specific questions to work on, which could come from past exams or homework assignments. There were several ways that students could earn growth points (demonstrate a deeper level of understanding): answering similar questions on later assessments, through classroom interactions with peers or presentations of class problems, coming after school and having discussions with me, or by completing related or more complex problems in my presence. Students with a failing grade were expected to make test corrections and see me at least once after school. After reevaluating one's understanding, I would sometimes be able to raise their grade to a 65. At other times, there would still be a need for remediation, so a grade of 29 might become a 50. The student would then be advised to come back for some additional help at which time a new evaluation could be made.

In addition to these small incremental changes, I award growth points at the end of a quarter (usually having an effect of 0-1.5 points on their overall average). I would refer back to my index cards and notes to see how well the student had responded to the feedback and if weaknesses in earlier standards had been addressed.

At the end of the first quarter, after grades for the quarter had been determined, I gave every student in my Geometry classes a small survey to complete. After recording the results I met 2 different days with small groups of students to get some additional feedback. I was also working closely with two of our resource teachers. Letting them know that some of the struggling students had opportunities to improve their understanding, enabled them to focus on specific standards for remediation.

I repeated the survey after the third quarter and again with small groups of students. I was sharing my findings with colleagues who were also researching Standards-Based grading. Some of these discussions centered around specific students who were in several of our classes.

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In addition, I changed some of my homework assignments and graded assignments to better reflect a standards-based model. For several homework assignments I listed particular topics and assigned problems to each. Students had to submit a designated number of problems, but had choice to which standard and which questions. After the second time I did this, I had the class discuss with me the pros and cons they found with this method. There were several group activities where I awarded points (0-8) if a group could show mastery of a previously learned concept in a new context. Many of the groups chose to do this by presenting to the class, while others did specific questions in the packet. Many collected homework assignments were ungraded and had only comments.

Results:

There are three areas I want to address: student attitudes, student anxiety, and student achievement.

Student Attitudes

- ❑ After exams, the number of questions regarding grades or point values decreased. More students were asking questions such as *Is there a website where I can practice more questions like this? or Can I come by after school to go over 3? This type of question I got wrong twice before. I need help.*
- ❑ Students were generally more positive about Math. On the first survey 22 out of 45 students identified with the statement *Math is very difficult to me.* On the later survey only 9 students chose that option and 10 chose *Math's difficulty depends on what topic/unit we are doing.*
- ❑ On the first survey only a handful of students circled all the options that went into grading. An overwhelming majority circled only test scores, graded homework, and participation. The second time more than 30 students out of 45 circled all the options, with about half of those adding in time after school. 12 of the remaining 15 circled all the options except effort.
- ❑ When asking if growth points changed the way they prepared/studied, the number of yesses increased from 6 out of 45 to 33 out of 45.
- ❑ More students seemed to be coming for after school help. An interesting change was to see how many students would just sit together and ask each other questions when I was working at another table.
- ❑ The number of students preferring the tables increased from 78% to 87%.

Student Anxiety

- ❑ There was a considerable decrease in student anxiety regarding testing, although for several students this remained an issue. There are at least four students identified as having severe anxiety that did not manifest this in Geometry. One of the more positive comments I overheard was when

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one of my students received a test back with a D and began to be upset. One of her table partners turned to her and commented "It's OK. Figure out what you don't know and we'll help you. Remember, you have more chances to get this."

- ❑ I did get positive feedback from 5 or 6 parents who commented that the students were having a more positive response to test days.

Student Achievement

- ❑ For many of my students, Math presents some type of struggle. During the discussions I had with students, a common response was *I hate when a test ruins your average*. Very few students linked their letter grade with how well they knew or didn't know the material. I was sometimes challenged by others that the students grades were slightly higher than in the past. My response was that it was true. The misconception was that the new grade was just an inflation; whereas, it represented the increased understanding and was actually a more realistic accounting of their ability.
- ❑ The challenge I faced with the students coming for extra help was the fact that coming for extra help in itself did not change a grade. It afforded students the opportunity to remediate areas of concern and demonstrate to me understandings that may not have been clear in their written work. It gave me opportunities to speak specifically to a student about concrete issues and methods to improve. I also encouraged them to show me that their understanding was deepened by presenting in class or taking a leadership role at the table.
- ❑ Our classroom in September looked very different than the one people could see later in the year. Early in the year, conversations at the tables were often not math related, one student who enjoyed math would take the lead and the others would often follow blindly, and few students volunteered to present problems to the class. By the end, many of these scenarios changed. Students rushed in to choose which problem to present, often asking their tablemates for their suggestions. Everyone at the table joined in the discussions, with some of the stronger students encouraging others to join in. Students would leave their tables when stuck to visit another table for suggestions, rather than just asking me. The level of student engagement rose considerably.

Concerns

- ❑ Standards-Based Grading is time consuming and with all the responsibilities placed on us during the day, individual feedback can be a daunting task.
- ❑ SBG only works well when students are held accountable. Although students are given multiple opportunities, some fail to take advantage of this fact. There was a student or two that the teachers using SBG discussed. All were eager to see these students succeed, but they resisted some of the practical suggestions made. I can't claim that SBG helps everyone, but it definitely helped some for whom traditional grading did not.
- ❑ I had to rewrite most of my assessments to be cumulative and to include topics that I had students

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working on improving.

- ❑ There are students who complained about the “extra work”. Many wanted me to just give them work to take home and show me later. Some when challenged began to take a more active role in class. Others never made the connection and continued to struggle on a regular basis.
- ❑ The classroom was often a noisy place, which may be an issue for some students. For me, I often had concerns regarding pacing and the Common Core. These were often “softened” by the fact that my students were retaining past topics better and had experienced more in class time with problem-solving and seeing mathematical applications.

Despite some of these obstacles, I still feel that the benefits of SBG outweigh the negatives and I will continue to find ways to incorporate it in my classroom.

Implications:

I think that the work I started here is a good jumpstart to the type of classroom I envision. I hope to explore how I can change my assessments to incorporate more of what I value in the classroom: collaboration, problem-solving, growth-mindset, and real world applications.

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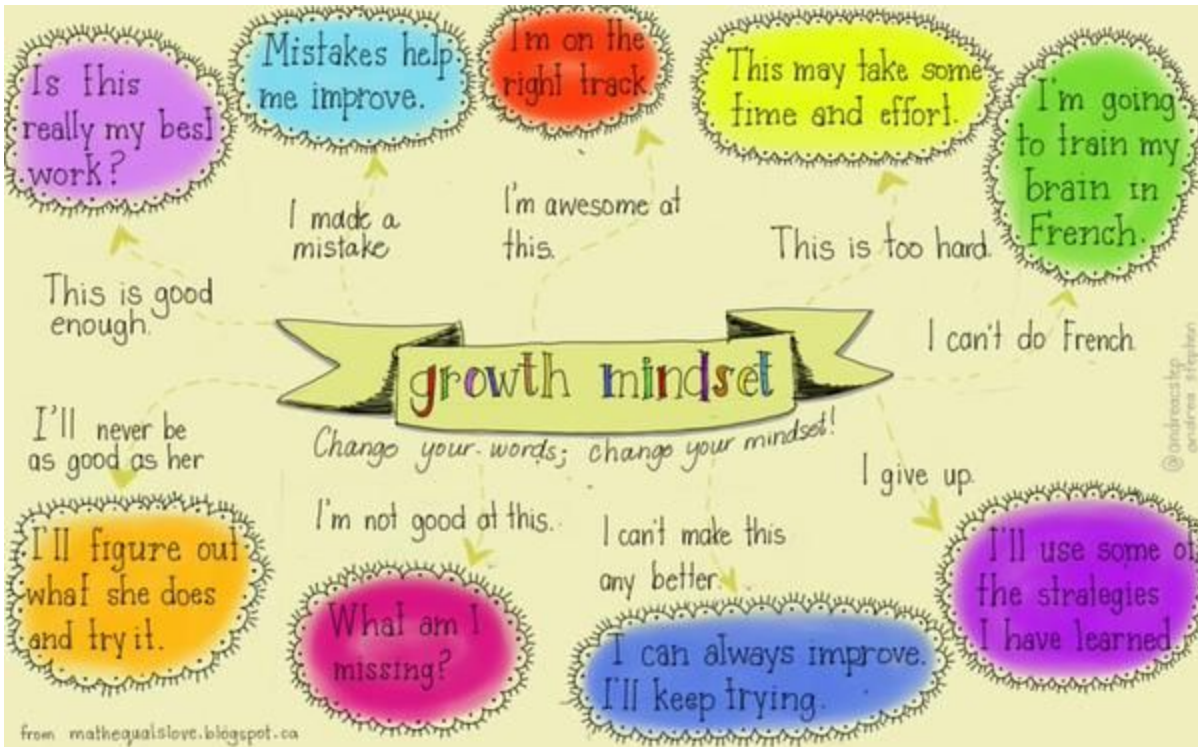
APPENDIX 1

Classroom setup (1)



APPENDIX 2

Classroom Poster (2)



APPENDIX 3

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Effective Effort Rubric

This rubric assesses the learning process—the effective effort that a learner applies.

	Fixed	Mixed	Growth
Taking on Challenges	You don't really take on challenges on your own. You feel that challenges are to be avoided.	You might take on challenges when you have some previous experience with success in a related challenge.	You look forward to the next challenge and have long range plans for new challenges.
Learning from Mistakes	You see mistakes as failures, as proof that the task is beyond your reach. You may hide mistakes or lie about them.	You may accept mistakes as temporary setbacks, but lack strategies to apply what you learned from the mistakes in order to succeed.	You see mistakes as temporary setbacks, something to be overcome. You reflect about what you learned and apply that learning when revisiting the task.
Accepting Feedback and criticism	You feel threatened by feedback and may avoid it all together. Criticism and constructive feedback are seen as a reason to quit.	You may be motivated by feedback if it is not overly critical or threatening. Who is giving the feedback, the level of difficulty of the task, or their personal feelings might all be factors in your motivation.	You invite and are motivated by feedback and criticism. You apply new strategies as a result of feedback. You think of feedback as being a supportive element in the learning process
Practice and Applying Strategies	You do not practice and avoid practicing when you can. You do not have any strategies for accomplishing the learning goals or tasks, or you apply ineffective strategies.	You practice, but a big setback can make you want to quit. You are more willing to practice things you are already considered "good at." You are open to being given a strategy to meet a challenge, but you rarely apply your own strategies unless it is something you are already "good at."	You enjoy the process of practicing and see it as part of the process of getting good at something. You may create your own practice or study plans. You fluidly use many strategies, think of some of your own strategies, and ask others about their strategies.
Perseverance (focus on task)	You have little persistence on learning goals and tasks. You give up at the first sign of struggle.	You may persevere with prompting and support. Unless you are provided strategies for overcoming obstacles, you will stop or give up.	You "stick to it" and have stamina for the task(s). You keep working confidently until the task is complete.
Asking Questions	You do not ask questions or do not know which questions to ask, but you can usually say you don't "get it" if asked.	You might ask questions about a portion of the task that you feel you can do. If you perceive it to be out of your ability, you probably won't ask questions.	You ask specific questions, ask questions about your own thinking, and challenge the text, the task, and the teacher.
Taking Risks	You do not take risks, and if something is too hard you turn in blank work or copied work, if anything at all. You are not engaged in the process/task.	You will take risks if the task is already fairly familiar to you. If not, you will resort to copying or turning in partially completed work.	You begin tasks confidently, risk making errors, and openly share the work you produce.

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Geometry Period _____

1. I feel that:

- (A) Math comes easily to me.
- (B) Math is very difficult to me.
- (C) For me, Math's difficulty depends on what topic/unit we are doing.

2. Circle all that apply.

My grade reflects:

- (A) my test and quiz scores
- (B) my graded homework
- (C) my ungraded homework
- (D) my work at the tables with my peers
- (E) my effort
- (F) my participation
- (G) other _____ (be specific)

3. My grade this past quarter was:

- (A) lower than I expected
- (B) what I expected
- (C) higher than I expected

4. Knowing that you have the ability to earn "growth points" has:

- (A) changed how you study/prepare for exams
- (B) not changed how you study/prepare for exams

5. If a friend joined our class tomorrow, what would you tell them about "growth points"?

6. Do you want me to keep or eliminate the growth points? _____

Why?

7. Are growth points fair? _____

Why?

8. Do you prefer sitting at tables or desks? _____