

Why are we doing this??

Many students have felt a sense of anxiety/stress when it comes to learning math. Many fear that math is something that you are either good at or not. There is also this sense of pressure that students feel because they view math as something that you are either right or wrong. What many students struggle to understand is that the beauty of math is not so much in the solution but the thinking and creativity that goes into trying to solve the problem. In addition to this, students constantly feel pressure to perform due to grades. The anxiety students feel with regards to grades is like a dark cloud that hangs over them. No matter what is going on in class, or how much they are enjoying the topic they are learning, there is still this looming pressure to perform in order to receive the highest grade possible. Whether it's higher achieving students or lower achieving students, many students' focus is on performing in order to achieve a certain grade. What this has caused is a focus on performing (memorizing) rather than a focus on learning. We want students to enjoy learning. Isn't that the purpose of going to school?

With this being, last year we tried to make a shift by encouraging students to take risks and not be afraid to make mistakes. However, when it came time to grading tests, students were still penalized for having wrong answers. How can we encourage students to not be afraid to make mistakes and then penalize them for doing it on a test? This sent mixed messages and has been on our minds over the course of the summer. After careful thought, we're curious to try this. What if we remove grades? Would students no longer feel pressure or worry about their performance? Would this free students up to be more creative and to take more risks? Would this lead to students being more curious and wanting to go deeper and to understand why things work the way they do? Would this lead to more of an intrinsic motivation of students wanting to do well and to learn?

Let's find out...

What will this look like?

Typically, in the past, letter grades have been used to help assess students and/or to provide feedback to their student on where they are at in the class or how much they are understanding. With our new grading system, students will still be assessed in these areas but rather than attaching a letter grade or score to an assignment or test, students will receive written and/or verbal feedback. In other words, students will still have homework, daily class assignments and assessments but rather than seeing a letter grade or score at the top of the assignment, they will receive a piece of written feedback or verbal feedback during a one on one meeting with the teacher. Throughout the semester, each student will have a one on one meeting with their teacher. This will be an opportunity for students and their teacher to have a conversation around what the student is understanding in class, what areas of being a "mathematician" they are doing well in and areas that they can improve in. Students will be asked to bring in pieces of evidence (assignments, journals, assessments, etc.) to provide evidence for their claims. This will help give their teacher

Typically, Powerschool has been used to track students progress with assignments and to give parents and students an indication of where they stand in the class on a day to day basis. Powerschool will still be used throughout the year to let students know where they stand but rather than putting in a score, students and parents will see a comment regarding the assignment. This comment will let parents and students know how the student is doing in the class and possible areas to continue to work on.

Throughout the year, students will be maintaining a portfolio that includes a variety of their work to be used as evidence to demonstrate their learning. This will help hold students accountable to complete the daily assignments and to help prepare them for their defense. At the end of the semester, students will meet with their teacher, present their portfolio and negotiate a final grade (A-F) for the semester. This will count as their final assessment for the semester.

Research

- **Don't praise students for being "smart". Rather, praise them for their hard work.**
(<http://www.youcubed.org/wp-content/uploads/2015/03/teacher-article-youcubed2.pdf>)
 - "It is extremely important that neither parents nor teachers praise children in fixed ways, telling them they are 'smart'. When children are told they are "smart" they often feel good, but later when they fail in some situation, and everyone does, they think "Hmm, I am not so smart". Always praise what children have done, instead of the person eg "It is wonderful that you have learned how to add numbers", not "wow you can add numbers, you are so smart." Further advice on ways to talk and praise students is given in the parent guidance on www.youcubed.org."
- **Mistakes need to be valued**
(<http://www.youcubed.org/wp-content/uploads/The-Mathematics-of-Hope-5.pdf>)
 - "Research has recently shown something stunning—when students make a mistake in math, their brain grows, synapses fire, and connections are made; when they do the work correctly, there is no brain growth (Moser et al. 2011). This finding suggests that we want students to make mistakes in math class and that students should not view mistakes as learning failures but as learning achievements (Boaler 2013a). Students do not, as many assume, need to revisit a mistake and correct it to experience brain growth, although that is always helpful; brain growth comes from the experience of struggle. When students struggle with mathematics, their brains grow; being outside their comfort zone is an extremely important place to be. Mathematics classrooms throughout the U.S. are often set up to make students feel good by giving them lots of questions they can answer. Teachers believe that mistakes and struggle are unproductive and try to shelter students from them. This culture needs to change."
 - Jo Boaler "Mistakes and brain growth: <https://www.youtube.com/watch?v=btDHUHZ6fAw>
- **Math classrooms need to move away from focusing on performance and focus more on learning**
(<http://www.youcubed.org/wp-content/uploads/2015/03/teacher-article-youcubed2.pdf>)
 - I have argued elsewhere (Boaler, in press) that students in math classrooms in the US often believe that their role is to perform, showing they know math and can answer questions correctly, rather than to learn. It is very hard to be in a math class in which you are constantly working on short, closed tasks that you get right or wrong, and maintain a growth mindset. When we open math tasks we encourage the opportunity for important learning and for viewing math as a learning subject. Tasks that are narrow and closed encourage students to believe that math is a performance subject – that is, they are in math class to show what they know. Many students think that they come to math class to answer questions correctly, not to learn. This was brought home to me recently when a colleague, Rachel Lambert, told me that her 6--year old son had come home and said he hadn't enjoyed his math class, when she asked why he said "Math is too much answer time and not enough learning time".
- **Alfie Kohn** (<http://www.alfiekohn.org/article/case-grades/>)
 - **How grades affect students' learning negatively**
 - *Grades tend to diminish students' interest in whatever they're learning.*
 - *Grades create a preference for the easiest possible task.*
 - *Grades tend to reduce the quality of students' thinking.*
 - **Portfolios:** "Portfolios, for example, can be constructive if they replace grades rather than being used to *yield* them. They offer a way to thoughtfully gather a variety of meaningful examples of learning for the students to review. But what's the point, "if instruction is dominated by worksheets so that every portfolio looks the same"? (Neill et al. 1995, p. 4)."
 - **Rubrics:** "It's not enough to replace letters or numbers with labels ("exceeds expectations," "meets expectations," and so on). If you're sorting students into four or five piles, you're still

grading them. Rubrics typically include numbers as well as labels, which is only one of several reasons they merit our skepticism (Wilson, 2006; Kohn, 2006).”

- **Grades and comments (students only look at the grade and don’t necessarily read the comment):** “It’s not enough to add narrative reports. “When comments and grades coexist, the comments are written to justify the grade” (Wilson, 2009, p. 60). Teachers report that students, for their part, often just turn to the grade and ignore the comment, but “when there’s only a comment, they read it,” says high school English teacher Jim Drier. Moreover, research suggests that the harmful impact of grades on creativity is no less (and possibly even more) potent when a narrative accompanies them. Narratives are helpful only in the absence of grades (Butler, 1988; Pulfrey et al., 2011).”
- **“We should give grades because that’s how it’s going to be in college”:** “The claim here is that we should do unpleasant and unnecessary things to children now in order to prepare them for the fact that just such things will be done to them later. This justification is exactly as absurd as it sounds, yet it continues to drive education policy.”
 - To address one common fear, the graduates of grade-free high schools are indeed accepted by selective private colleges and large public universities — on the basis of narrative reports and detailed descriptions of the curriculum (as well as recommendations, essays, and interviews), which collectively offer a fuller picture of the applicant than does a grade-point average. Moreover, these schools point out that their students are often more motivated and proficient learners, thus better prepared for college, than their counterparts at traditional schools who have been preoccupied with grades.
- **Example of a teacher who got rid of grades:** “I spoke recently to several middle and high school teachers who have de-graded their classes. Jeff Robbins, who has taught eighth-grade science in New Jersey for 15 years, concedes that “life was easier with grades” because they take so much less time than meaningful assessment. That efficiency came at a huge cost, though, he noticed: Kids were stressed out and also preferred to avoid intellectual risks. “They’ll take an easier assignment that will guarantee the A.” Initially Robbins announced that any project or test could be improved and resubmitted for a higher grade. Unfortunately, that failed to address the underlying problem, and he eventually realized he had to stop grading entirely. Now, he offers comments to all of his 125 students “about what they’re doing and what they need to improve on” and makes abbreviated notes in his grade book. At the end of the term, over a period of about a week, he grabs each student for a conversation at some point — “because the system isn’t designed to allow kids this kind of feedback” — asking “what did you learn, how did you learn it. Only at the very end of the conversation [do] I ask what grade will reflect it... and we’ll collectively arrive at something.” Like many other teachers I’ve spoken to over the years, Robbins says he almost always accepts students’ suggestions because they typically pick the same grade that he would have.”

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- **Yale Medical School Model**

- <https://medicine.yale.edu/education/admissions/education/yalesystem.aspx>
 - In the first two years, there are no grades and there is no class ranking. While grades are not given and rank order not established, evaluation of students is an important part of the educational process. The faculty considers small-group teaching with interchange between faculty and students to be the most effective means of teaching and evaluation. Students should expect direct questioning at seminars and laboratories as an important adjunct to the evaluation process. The

final decision of acceptable performance for a given course remains with the chairman of the department and/or the designated director of the course. Freed from concerns about class rank, students tend to learn for their future rather than for tests. Competition for grades is eliminated and students are eager to help one another. Class spirit is remarkably high year after year.

- <http://yalemedicine.yale.edu/autumn2002/features/feature/53052/>
 - “The discussion on how best to teach—and how to assess learning—is not a new one. In its earliest days, the Yale System under Dean Milton C. Winternitz, M.D., rejected the traditional yardsticks of student achievement. Examinations and grades would undermine the very educational atmosphere the Yale System was meant to create—a collaborative, almost intimate world in which leading clinicians and scientists engaged and inspired a select group of bright, motivated students. But the system depended on a social contract. If students were to have the independence to design their own medical studies in the preclinical years, they would also be expected to rise to an unprecedented level of responsibility. Faculty, in turn, would have to spend the time necessary to follow and evaluate the students’ progress. “The Yale System is predicated on teachers wanting to teach and students wanting to study”
- **“Do grades matter?”** ([youtube video](#))
- **Math in the media** ([youtube video](#)) - For the majority, math is shown negatively in the media. This helps to contribute to the mindsets that many students have regarding their perspective on math.
- **Arguments for the disadvantages of no grades**
(<http://everydaylife.globalpost.com/disadvantages-school-grades-7119.html>)
- **Homework:** (<http://www.apa.org/pubs/journals/releases/edu-0000032.pdf>) - Answers parent concern #3
 - “This is surely our work’s main message to teachers, that doing homework is still valid nowadays in technically sophisticated learning contexts. Our data indicate that it is not necessary to assign huge quantities of homework, but it is important that assignment is systematic and regular, with the aim of instilling work habits and promoting autonomous, self-directed learning. Homework should not exclusively aim for repetition or revision of content, as this type of task is associated with less effort and lower results (Trautwein et al., 2002). On the contrary, homework should present a certain level of challenge or difficulty, without being so challenging that it discourages effort (Dettmers et al., 2010). In the last decade, school homework has been connected to principle variables such as effort, responsibility, study techniques, causal attributions before the task, and self-efficacy (Kitsantas & Zimmerman, 2009).”
- **Grade inflation - Alfie Kohn** (<http://www.alfiekohn.org/article/dangerous-myth-grade-inflation/>)
 - “The bottom line: No one has ever demonstrated that students today get A’s for the same work that used to receive B’s or C’s. We simply do not have the data to support such a claim.”
 - In fact, what is most remarkable is how rarely learning even figures into the discussion. The dominant disciplinary sensibility in commentaries on this topic is not that of education — an exploration of pedagogy or assessment — but rather of economics. That is clear from the very term “grade inflation,” which is, of course, just a metaphor. Our understanding is necessarily limited if we confine ourselves to the vocabulary of inputs and outputs, incentives, resource distribution, and compensation.
 - What are the critics assuming about the nature of students’ motivation to learn, about the purpose of evaluation and of education itself? (It is surely revealing when someone reserves time and energy to complain bitterly about how many students are getting A’s — as opposed to expressing concern about, say, how many students have been trained to think that the point of going to school is to get A’s.)

- Students should be set against one another in a race for artificially scarce rewards. “The essence of grading is exclusiveness,” Mansfield said in one interview. Students “should have to compete with each other,” he said in another.
- In other words, even when no graduate-school admissions committee pushes for students to be sorted, they ought to be sorted anyway, with grades reflecting relative standing rather than absolute accomplishment. In effect, this means that the game should be rigged so that no matter how well students do, only a few can get A’s. The question guiding evaluation in such a classroom is not “How well are they learning?” but “Who’s beating whom?” The ultimate purpose of good colleges, this view holds, is not to maximize success, but to ensure that there will always be losers.
- **Grading: This issue is not how but why - Alfie Kohn** (<http://www.alfiekohn.org/article/grading/>)
 - A second rationale for grading — and indeed, one of the major motives behind assessment in general — is to motivate students to work harder so they will receive a favorable evaluation. Unfortunately, this rationale is just as problematic as sorting. Indeed, given the extent to which A’s and F’s function as rewards and punishments rather than as useful feedback, grades are counterproductive regardless of whether they are intentionally used for this purpose. The trouble lies with the implicit assumption that there exists a single entity called “motivation” that students have to a greater or lesser degree. In reality, a critical and qualitative difference exists between intrinsic and extrinsic motivation — between an interest in what one is learning for its own sake, and a mindset in which learning is viewed as a means to an end, the end being to escape a punishment or snag a reward. Not only are these two orientations distinct, but they also often pull in opposite directions.
 - Scores of studies in social psychology and related fields have demonstrated that extrinsic motivators frequently undermine intrinsic motivation. This may not be particularly surprising in the case of sticks, but it is no less true of carrots. People who are promised rewards for doing something tend to lose interest in whatever they had to do to obtain the reward. Studies also show that, contrary to the conventional wisdom in our society, people who have been led to think about what they will receive for engaging in a task (or for doing it well) are apt to do lower quality work than those who are not expecting to get anything at all.
 - **Supportive Assessment**
 - Here are five principles of assessment that follow from this support model:
 - 1. Assessment of any kind should not be overdone. Getting students to become preoccupied with how they are doing can undermine their interest in what they are doing. An excessive concern with performance can erode curiosity — and, paradoxically, reduce the quality of performance. Performance-obsessed students also tend to avoid difficult tasks so they can escape a negative evaluation.
 - 2. The best evidence we have of whether we are succeeding as educators comes from observing children’s behavior rather than from test scores or grades. It comes from watching to see whether they continue arguing animatedly about an issue raised in class after the class is over, whether they come home chattering about something they discovered in school, whether

they read on their own time. Where interest is sparked, skills are usually acquired. Of course, interest is difficult to quantify, but the solution is not to return to more conventional measuring methods; it is to acknowledge the limits of measurement.

- 3. We must transform schools into safe, caring communities. This is critical for helping students to become good learners and good people, but it is also relevant to assessment. Only in a safe place, where there is no fear of humiliation and punitive judgment, will students admit to being confused about what they have read and feel free to acknowledge their mistakes. Only by being able to ask for help will they be likely to improve.
- Ironically, the climate created by an emphasis on grades, standardized testing, coercive mechanisms such as pop quizzes and compulsory recitation, and pressure on teachers to cover a prescribed curriculum makes it more difficult to know how well students understand — and thus to help them along.
- 4. Any responsible conversation about assessment must attend to the quality of the curriculum. The easy question is whether a student has learned something; the far more important — and unsettling — question is whether the student has been given something worth learning. (The answer to the latter question is almost certainly no if the need to evaluate students has determined curriculum content.) Research corroborates what thoughtful teachers know from experience: when students have interesting things to do, artificial inducements to boost achievement are unnecessary (Moeller and Reschke 1993).
- 5. Students must be invited to participate in determining the criteria by which their work will be judged, and then play a role in weighing their work against those criteria. Indeed, they should help make decisions about as many elements of their learning as possible (Kohn 1993). This achieves several things: It gives them more control over their education, makes evaluation feel less punitive, and provides an important learning experience in itself. If there is a movement away from grades, teachers should explain the rationale and solicit students' suggestions for what to do instead and how to manage the transitional period. That transition may be bumpy and slow, but the chance to engage in personal and collective reflection about these issues will be important in its own right.

- **Growth Mindset Research**

- (http://cpl.psy.msu.edu/wp-content/uploads/2011/12/Moser_Schroder_Moran_et-al_Mind-your-errors-2011.pdf)

- “How well people bounce back from mistakes depends on their beliefs about learning and intelligence. For individuals with a growth mind-set, who believe intelligence develops through effort, mistakes are seen as opportunities to learn and improve. For individuals with a fixed mind-set, who believe intelligence is a stable characteristic, mistakes indicate lack of ability.”
 - “More growth-minded individuals also showed superior accuracy after mistakes compared with individuals endorsing a more fixed mind-set. “

- Growth Mindset Research (London Taxi cab drivers)

- (<https://www.ucl.ac.uk/spierslab/Maquire2006Hippocampus>)

- In conclusion, licensed London taxi drivers show that humans have an amazing capacity to acquire and use for navigation a highly complex spatial representation of a large city. Our

findings suggest that this is accompanied by greater gray matter volume in the posterior hippocampus

- **High school example**

- (<http://www.pri.org/stories/2015-06-18/no-grades-no-problem-how-one-high-school-transforming-learning>)

- Another example of college course and the benefits it had on student learning/effort

- (<https://www.insidehighered.com/news/2010/05/03/grading>)

- ****Research for why grades are not a source of motivation (maybe one of the strongest pieces of research)**

- (https://serval.unil.ch/resource/serval:BIB_329F6E130355.P001/REF)

- In a study that appeared in the *Journal of Educational Psychology* (August 2011), Caroline Pulfrey et al., took Swiss students who were in their upper teens and mid twenties from an English as a foreign language class and asked them to do assignments that involved listening and comprehending.
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 - There were 3 experiments.
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 - In the first experiment, one group of students were told that they would receive a grade for their learning while the other group was told they would not receive a grade. In the second experiment, on a single assignment students either received only a grade, only a comment, or a grade and a comment. The third experiment was similar to the second experiment, but this time the students received their respective feedback and completed a second assignment.
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 - Together these three experiments revealed that the anticipation of a grade, as opposed to no feedback or a comment, increases performance avoidance, a fear of failure and a loss of interest. It's important to note that this was true of both high and low achieving students. While conventional wisdom might tell us that grading should inspire learners to do their best, this is not what the research is telling us.
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 - Common sense might also convince us to adopt a "more the merrier" kind of attitude towards providing students with both a comment and a grade, but again, research shows that the presence of a grade (with or without a comment) is responsible for lower levels of motivation, a loss of interest for learning, and a preference for easier tasks. *Unfortunately, the positive benefits of a formative comment is overshadowed by the negative effects of the grade.*
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 - All this supports [Ruth Butler's \(1988\)](#) research from twenty years ago that grades and grades with a comment are responsible for lower levels of intrinsic motivation for learning.

- Ruth Butler's research on grading (<https://rkportfolio.wikispaces.com/file/view/Butler+1988.pdf>)

- Synopsis <http://www.joebower.org/2011/11/grading-commenting.html>
 - In a study that appeared in the *British Journal of Educational Psychology*, Ruth Butler took 5th and 6th graders, including both high- and low-achieving students, and asked them to work on some word-construction and creative-thinking tasks. One-third of them then received feedback in narrative form, one-third received grades for their performance, and one-third received both comments and grades.
 - The first finding: Irrespective of how well they had been doing in school, students were subsequently less successful at the tasks, and also reported less interest in those tasks, if they received a grade rather than narrative feedback. Other research has produced the same result: Grades almost always

have a detrimental effect on how well students learn and how interested they are in the topic they're learning.

- But because Ms. Butler had thought to include a third experimental condition—grades plus comments—she was able to document that the negative effects of grading, on both performance and interest, were not mitigated by the addition of a comment. In fact, with the task that required more original thinking, the students' performance was highest with comments, lower with grades, and lowest of all with both. These differences were all statistically significant, and they applied to high- and low-achieving students alike.
- Giving feedback is better than giving a score
(http://math.nie.edu.sg/ame/matheduc/tme/tmeV15_2/5.pdf)
- - Research has shown that feedback provided in the form of written comments which clarify student misconceptions is effective in improving students' strategy for processing knowledge and self-regulation of learning.