

THE EFFECT OF STANDARDS BASED GRADING ON THE DEVELOPING GROWTH  
MINDSET IN A HIGH SCHOOL PHYSICS CLASSROOM

by

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DEDICATION

For my Father, who taught me patience.  
For my Mother, who taught me ambition.  
For my students, who taught me everything else.

In memory of Brian Davis (1961-2020)

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## ABSTRACT

This Action Research project investigated the impact of standards-based grading (SBG) on developing a growth mindset for students in a high school physics classroom. Originally termed by Carol Dweck, those with a growth mindset have the innate ability to constantly improve through effort and a willingness to take on challenges. Having this type of mindset should set students up for success regardless of their future profession. However, many students do not possess this mindset. Often students avoid challenges and seek the easiest path towards the highest grade possible, even if this path results in little to no lasting understanding.

It is difficult to foster a growth mindset in a classroom using a traditional grading system because students quickly adapt to game the system and receive the best grade possible with the least amount of effort. Instead, the SBG system focuses on understanding and streamlines the gradebook to only reflect student mastery of the content. To succeed in this grading system, students must work on skills such as seeking out feedback and being aware of their own academic misconceptions.

At the conclusion of the research process, students became more receptive to feedback and improved their perception of making mistakes. Students reported that SBG gave a better picture of their understanding compared to a traditional gradebook. They also noted that the frequent assessments associated with SBG helped them become more aware of their understanding. Finally, students saw a substantial decrease in test anxiety as their final letter grade was strongly deemphasized and as they gained a better awareness of what their grade truly represented.



## INTRODUCTION AND BACKGROUND

### Context of the Study

As I went through my fourth year of teaching, I found myself getting more and more invested in the idea of assessment. How to assess accurately, with what level of regularity, and reduce test anxiety associated with assessments. Our physics team focuses on using a Standards-Based Grading system (SBG) instead of a more traditional method in our science department. Content-based standards are determined at the beginning of each unit and are assessed multiple times with increasing difficulty to assess the level of mastery. This grading system uses a four-letter rating system (Proficient, Refining, Still Learning, Needs work) instead of points on each student's assessments. By focusing on feedback over points, students can focus on what they need to improve to understand the material better instead of getting caught up in how much an assignment is worth in the gradebook. This study's findings were shared with my team, science department, and school administrators to help our school as we continue to modify and improve our grading methods.

As my students like to ask (and I cringe to hear), "How many points is this worth?" Or, "How can I earn back points?" Or everyone's favorite, "How can I get extra credit?" Students are so focused on grades, points, and success on paper that they are beginning to fear mistakes and challenges. I have seen many instances of learned helplessness where students feel unable to try something new because they do not want their grades to reflect potential failure. Not only that, but they have also begun to associate success in school with self-worth. Many students believe that "they just are not

good at \_\_\_\_\_" and don't have the ability to improve. This belief is heartbreaking and alarming, given that they will soon be out of high school and into college or the workforce. Eventually, students will run into challenges and will be expected to work through obstacles in any vocation. Now is a crucial time to practice and foster a mindset that will set them up for future success.

In education, a mindset is a lens through which students see their pursuit of knowledge. It is an attitude or inclination about one's ability to learn, whether or not we are born with our qualities and skills or if they can develop through commitment and hard work. The traits of a growth mindset include embracing challenges, welcoming constructive criticism, and accepting mistakes. While these may be initially uncomfortable traits, they can be seen as a way to learn and develop skills over time. Perseverance and grit are seen repeatedly as essential traits of leaders and are excellent predictors of success after formal education ends. It seems that we, as educators, should be doing everything we can to instill this mindset in our students to give them their best chance of future success. Therefore, my project's goal was to see if using a Standards-Based Grading (SBG) model would help foster a growth mindset in students.

SBG focuses on feedback over points that could help improve students' ability to accept and even seek constructive criticism. SBG focuses on assessing a concept multiple times to check for proficiency. Using this grading method, students could learn to see that their mistakes helped them reach mastery instead of as negative impacts on their grades. Also, to see if the students were more willing to go after challenges knowing that, while

they may have made mistakes, they had the potential to emerge in a better place than had they not tried at all.

This study was completed throughout the 20-21 school year at Glenbrook South High School (GBS) in Glenview, IL. Two sections of a junior-level physics course were used in this study. Due to the COVID-19 pandemic, students were either remote or hybrid for the entirety of the school year. As of 2019, our school had 3,078 students. As a whole, the students are incredibly high performing with a 96% graduation rate in the 19-20 school year, and 91% of students have enrolled in a two-year or four-year college following graduation (Illinois Report Card, 2019). Within our school population, 11% of students have an IEP, 18% qualify as low-income, and 4% qualify as English Language Learners (Illinois Report Card, 2019). Our students and parents are highly motivated and achievement-driven, so much so that it leads to massive student burn-out. Students are deeply driven by grades and have forgotten how to see making mistakes as a way to improve instead of as a way to show their failures. In short, our students are in dire need of a new way of assessment. Ideally, an assessment that relieves stress, improves retention, and helps them develop the mindset they need to succeed in life after physics.

### Focus Questions

The focus question for this study was, What is the impact of using a Standards-Based Grading format on forming a growth mindset in students in a physics classroom?

My sub-questions included the following:

1. How do students' mindsets change throughout the treatment plan?
2. How are proficiency scores impacted by students changing their mindsets?
3. How will implementing SBG in a new content area impact me as an instructor?

## CONCEPTUAL FRAMEWORK

### Introduction

Goodhart's Law, expressed simply by Dame Ann Marilyn Strathern, states, "When a measure becomes a target, it ceases to be a good measure" (Strathern, 1997, p. 308). When a quantitative measurement (grades) is chosen as an indicator for student success in schools, it will stop functioning as an indicator. Students have a primary objective, "maximize your grades." They focus on that goal, even at the expense of gaining lasting knowledge. If memorization and copying others' work leads to higher grades than taking the time to learn it for oneself, then a majority will follow this path. When a final grade becomes both the students' target and how we measure their learning, we must recognize the fallacy of grades as good measures of knowledge gained.

What is the purpose of a grade? For one, grading is a form of feedback to students to know where their knowledge still lacks. Instructors respond to grades and adapt their instruction to better suit the students. Put simply; grades are a form of communication between two parties of knowledge acquired. To be successful communicators, grades must be reliable, objective, and ideally, motivate students to remedy their misconceptions.

### Are Grades Reliable?

Can we assume that if all teachers on the same course team are given the same set of assessments to grade, they would agree with the "correct" grade? In two studies conducted by Starch and Elliot (1912, 1913), they looked at two very different subjects,

Math and English, to see if the given assessment scores would be uniform regardless of the instructor. They found that out of the 142 teachers asked to grade the same English paper, the grades varied from 50% to 98% between the teachers (Starch & Elliot, 1912). The follow-up study, which looked at Geometry, showed that Geometry scores ranged from 28-95% among the different teachers (Starch & Elliot, 1913). If we cannot ensure that different teachers on the same course team will grade unanimously, can we guarantee the same grade from the same individual teacher on multiple occasions? In another study, Eells (1930) asked 61 individual teachers to grade the same history and geography papers twice, eleven weeks apart. The percentage of teachers that gave the same grade on both occasions ranged from 16%-90%. The conclusion was, “variability of grading is about as great in the same individual as in groups of different individuals” and that assignment of scores amounted to “little better than sheer guesses” (Eells, 1930, p. 52). Knowing that factors like the student’s handwriting, the instructor’s mood, and the time of day all can impact the assessment’s final grade, there is little reason to believe that grades are a reliable communicator of student progress (Iamarino, 2014).

### Are Grades Objective?

As is described by Marzano and Heflebower (2011), “In the traditional system, students acquire points for various activities, assignments, and behaviors, which accrue throughout a grading period. The teacher adds up the points and assigns a letter grade” (p. 34). Scriffiny (2008) said, “when I was pressed to describe the qualitative difference between an A, B, C, D, or F, my answers were vague” (p. 71). Does an “A” mean that you have mastered at least 90% of the coursework? Not necessarily. That single final

percentage can represent anything from behavior to attendance, test scores, and even being impacted by if the student completed their notes in the “correct” color pen (Iamarino, 2014). Grading has become so subjective where, “A 90% vs an 80% vs a 70% does not effectively say what a student does or does not know. It may be a good marker of work completion or participation or behavior or anything else that currently muddies a gradebook” (Iamarino, 2014, p. 5).

As students go from teacher to teacher, each instructor may value different aspects of schooling, represented in their gradebook. For example, maybe one prioritizes homework, another favors classroom participation, and another heavily weights their test grades. (Iamarino, 2014). Students pick up on what each instructor values and changes their behavior accordingly to achieve their cumulative end goal of receiving the best grade possible, “In an environment that prioritizes points, students are often quick to identify and isolate the quickest methods of attaining those points, regardless of whether or not the activities they complete to get them are actually beneficial to the learning process.” (Iamarino, 2014, p. 5).

A student could be learning very little but still have a high grade in the class if they are good at “playing school.” Even if their test scores are poor, if they complete all of their homework, participate in class, or do extra credit, they might still walk away with a decent letter grade (Marzano & Heflebower, 2011; Scriffiny, 2008). For a grading system to be effective, it “must not allow students to mask their level of understanding with their attendance, their level of effort, or other peripheral issues” (Scriffiny, 2008, p. 72). The way the traditional 100-point grading system operates has multiple flaws when it

relates to grade objectivity. The most glaring flaw is that it cannot discern when a student has mastered a learning objective. Without communicating this knowledge to both teacher and student, misconceptions might fly under the radar, never remedied as their very existence has yet to be acknowledged.

### Are Grades Motivating?

When students ask, “why do we need to learn this?” how often is the response, “you’re going to have to know this for the test.”? If the threat of a bad grade is used as a way of compelling students to learn, they will view learning as a chore to be accomplished and not as a journey to undertake.

In a study, 130 teachers were surveyed to discern their perceptions on the link between motivation and grades (Stan, 2012). When asked, “Why do your students learn?” teachers responded that students learn to earn a grade (26% of responses), because “they must” (35% of responses) and “because they have to come to school anyway” (6%) of responses. These three categories combined show a significant amount of perceived student motivation for learning that has nothing to do with mastering learning goals (Stan, 2012).

Not only are students unmotivated and overly pressured to get a good grade, but studies also show that students graded on how well they learn the material show a lower quality of thinking compared to those who are ungraded. One study found that out of 91 fifth-grade children, the graded group students showed better rote learning, the students in the nongraded learning groups had greater interest and conceptual learning (Grolnick & Ryan, 1987). Once the students were free of the pressures associated with a cumulative



grade, they could take the time to enjoy the learning process, which resulted in more lasting knowledge. In short, “The task (critical thinking) is naturally obscured by points-based grading in that there is no clear way to apply the acquisition of points to anything other than a gradebook. A better system would make it a priority to clarify for students the practical connections between achievements inside and outside of the classroom” (Iamarino, 2014, p. 3).

Traditional grading systems are not accomplishing their intended goals. At the core, points-based grading is insufficient as an assessment of acquired knowledge. In this system, students are not motivated to think critically nor take on challenges because they want to avoid losing out on the highest grade possible. In short, the 100-points based system does not foster growth mindset development. The Standards-Based grading system has the potential to blend teacher & student goals and create assessments that get to the heart of education. A SBG system allows for students to be challenged, yet supported, while informing both the student and teacher about their progress and so both can more accurately assess their learning. All of these are necessary in order to develop growth mindsets in students.

### What is Standards-Based Grading?

Characteristics of a Standards-Based Grading system (SBG) include repeated assessments that increase in the level of difficulty and immediate, specific student feedback on assessments in place of points to more accurately evaluate students’ understanding and keep them accountable for mastering the content (Iamarino, 2014).

SBG requires grit on the students' part, forces them to become more aware of their understanding, and supports that making mistakes is ok and vital to keep developing. Students are aware that they will have multiple attempts to show their understanding allowing them to take on more significant challenges in a lower stress environment. SBG does not penalize students for not having mastered the content at the beginning of a unit. In a traditional gradebook, students are quizzed throughout a unit, and these individual grades are averaged to create a final grade. Even if two students completed the unit with the same understanding level, the student who understood the material earlier in the unit would end up with a better final grade. SBG better shows the progression of learning and their final understanding compared to a traditional grading which is the "average" of the learning that took place throughout the grading period. SBG focuses on aligning all assignments to specific standards, their final grade is much more focused on showing their understanding of the standards as opposed to all of the other things that get wrapped into a traditional grade such as behavior, participation, homework completion, and others.

SBG could help teachers adjust their instruction because they know what their students know and do not know. "The basic principle at work [in standards-based grading] is that words open up communication, whereas numbers close it down (O'Connor, 2009, p. 123). Instead of points and grades on assessments, SBG offers chances to conference with the students making their grade more of a partnership instead of the students passively accepting whatever the instructor determines is their level of mastery. When understanding is reduced to a letter or number, it is difficult for students

to see their own education role. If they are told and shown that achievement and success are linked with high grades, ideally ones that can be obtained with minimal effort, it will be nearly impossible to develop growth mindsets. A student who never learns to struggle is one who never learns to overcome a challenge. While they may make it through formal education in this way, the day is coming when they will face something they do not know how to accomplish. Have they learned how to overcome, or will they crumble in the face of challenges?

### What is Growth Mindset?

In Carol Dweck's book, "Mindset: The New Psychology of Success," she establishes that having grit is one of the best indicators of success both inside and outside of traditional schooling (2006). Grit is defined as the willingness to take on challenges and the ability to look at mistakes and correct them. The most motivated/resilient students are not the ones who think they have a lot of fixed or innate intelligence. Instead, it is the students who believe their abilities can be developed through their effort and learning (Dweck, 2006).

Dweck compares the growth and fixed mindset and defines what a typical learner looks like in each mindset (Dweck, 2006). Those with a fixed mindset struggle with new challenges; they fear making mistakes at the risk of looking "dumb." As Dweck (2006) puts it, "The fixed mindset does not allow people the luxury of becoming. They already have to be" (Dweck, 2006, p. 25). On the other hand, those with a growth mindset enjoy challenges because it means they will walk away being smarter, stronger, or just better equipped for the future. In short, "a growth mindset is based on the belief that your basic

qualities are things you can cultivate through your efforts, your strategies, and help from others” (Dweck, 2006, p. 6).

Individuals with each mindset view mistakes or challenges very differently. Those with a fixed mindset avoid mistakes at all costs. The goal of effortless success is always on their minds as it is the only sure way to prove to onlookers that they are just as bright as they seem. (Dweck, 2006). In Dweck’s book, individuals were asked, “When do you feel smart?” Those with a fixed mindset replied with answers like, “when something is easy for me,” or “when I don’t make any mistakes” (Dweck, 2006, p. 24). Those with a growth mindset responded, “When it’s really hard, and I try really hard, and I can do something I couldn’t do before” (Dweck, 2006, p. 24). Everyone faces challenges. Everyone has the potential to learn to and to grow. A successful person is not one who has never had to try. A successful person has been tried and has reached the other side.

So many students are trapped in a fixed mindset. The view of feedback as a personal attack because to miss points means they are not smart. They cannot sit in the discomfort that comes with being a novice, which means they are not experiencing the sweet success of overcoming a challenge. The students who do not have to study are raised on pedestals and praised for their ability to succeed with the least amount of effort possible. However, the day will come when they will face their first trial that they cannot effortlessly hurdle.

If we wish to prepare students for the challenges ahead, the best way to do so is giving them the supports they need to develop, “the mindset that allows people to thrive during some of the most challenging times in their lives” (Dweck, 2006, p. 7). Regardless

of where they go after high school, there is no situation that would not be better off if one's mindset was to "convert life's setbacks into future successes" (Dweck, 2006, p. 7).

### How does Standards-Based Grading Impact Students' Mindsets?

Young children are an excellent example of growth mindsets in action. Their lives revolve around observing, trying, failing, observing and failing again; until finally mastery is accomplished. So, what changes when they get to school? Dweck would say the issue is, "as soon as children are able to evaluate themselves, some become afraid of challenges...of not being smart" (Dweck, 2006, p. 16).

One way that using the SBG model helps develop growth mindsets in students is by deemphasizing focus on points and grades when assessing understanding. It would be beneficial for teachers to "make grades as invisible as possible for as long as possible... because helping students forget about grades is the single best piece of advice for creating a learning-oriented classroom" (Kohn, 1999, p. 42). The presence of grades is found to reduce students' willingness to take on challenges. As the pressure mounts to receive an "A," students are unlikely to take on a risk that could jeopardize this goal, even if it means choosing the easiest possible assignment that can maintain their grade (Harter & Guzman, 1986). If it is agreed that reducing the focus on grades will help the students develop a growth mindset, the question remains, how does using SBG fulfill that goal?

In Erik Tietzen's study, he used SBG in a high school physics classroom to gauge student attitudes towards the meaning of grades. He found that student views of the importance of a letter grade decreased by 35% throughout the treatment period. It was also found that there was an overall improvement of content knowledge compared to his

students operating in a traditional 100-point grading scale system. Students had a more robust understanding of how their understanding directly impacted their final grade compared to students who not assessed through SBG (Tietzen, 2017)

In another study conducted by Mannix, students in a biology course were exposed to both SBG and traditional grading for two different units. The study found that 34% of students mastered each learning objective using a traditional grading method. After the third quarter of using SBG, that average increased to 46% of students mastering all learning objectives (Mannix, 2014). The study also noted that students were far more likely to request help and feedback on their work and began actively looking for ways to improve their understanding as the number of students who came in for help went from 0% to 18% between the two tested quarters (Mannix, 2014). The author cites the experience that, “the SBG grading system helped shift the conversations between the teacher and students from missed assignments and extra credit to learning and understanding” (Mannix, 2014, p. 22).

Both of these studies imply a strong link between using SBG and students displaying traits such as grit, seeking feedback, focusing on understanding over points, and content retention, all of which are characteristics directly linked to developing growth mindsets.

## METHODOLOGY

### Demographics

This study aimed to determine the effectiveness of using a Standards-Based grading method on developing growth mindsets in high school students. The subjects of this study were two classes of 23 eleventh-grade students at Glenbrook South High School ( $N=46$ ). All of the students were enrolled in physics tracked at the "regular" level. Between the two classes, six students have an IEP or a 504 plan. This project was conducted during both semesters of the 20-21 school year, from August 2020 to May 2021. The research methodology for this project received an exemption from Montana State University's Institutional Review Board, and compliance for work with human subjects was maintained (Appendix A).

### Treatment Plan and Data Collection Strategies

Students were given the *Initial Mindset Survey* within the first two weeks of school, which collected data regarding their current mindset (Appendix B). The survey included ten scenarios that students typically encounter, such as receiving negative feedback on an art project or performing poorly on an exam. The scenarios were meant to represent a different pillar of growth mindset, such as accepting feedback and learning from mistakes. Each question had two required responses, the first being a multiple-choice scale with five possible responses. The responses represented a range from a highly fixed mindset to an extreme growth mindset. The second part was a short answer section for students to explain their responses more fully. After students completed the

survey, I analyzed each section and determined which characteristics of growth mindset were already prevalent and needed more development. The data were then shared with the class. Each student was commissioned to choose an aspect of growth mindset to focus on for the school year.

Before beginning physics content, students were taught about the fundamentals of the Standards-Based Grading system. Students were shown samples of gradebooks and were told to determine which student "deserved" the highest grade and explain their choice. Students concluded that traditional grading methods did not successfully express individual improvement. This exercise led to a discussion about Standards-Based Grading and how their grade would no longer represent factors like behavior, participation, homework, or extra credit. Instead, their grade would be dependent on whether or not they had mastered the content. This mastery was to be assessed by frequent "Opportunities to Show Understanding," which would assess predetermined content-based standards (Appendix C). An Opportunity would be 3-6 questions in length, completed individually, and reviewed by the instructor, who would rate their understanding using a 4-level system as listed below.

1. Proficient (P)
2. Refining (R)
3. Still Learning (L)
4. Needs Work (N)

Ideally, students would begin at a "Still Learning" or "Refining" level of understanding and progress to a "Proficient" as they continued to be assessed on the standard. As long as the student maintained "Still Learning" on every assessment, representing they



understood the fundamental aspects of the assessed standards, they would maintain a 75% in the course. Students that maintained a "Refining" on most standards would be able to maintain an 83% or an 87% depending on the ratio of P's, R's, and L's. Students who repeatedly showed proficiency on each standard would be able to earn up to a 95%. If a student repeatedly turned in blank assessments or showed little to no understanding, they would end up with a 50% final grade. However, this is only in extreme cases and only if repeated interventions did not work.

Each of their assessment attempts was recorded in a spreadsheet shared with the student during individual grade conferences (Appendix D). Quarterly grades were determined by the instructor and student using evidence from the gathered assessment data.

Throughout the first semester, multiple class discussions were held regarding growth mindset, which challenged their worldviews and required them to defend their position on whether intelligence was a fixed trait. Students were routinely challenged to go beyond their comfort level through optional and complex physics problems at the end of each unit. Whiteboarding was done frequently to improve responses to feedback as students would be required to critique and complement other groups' work. Individual emails that requested a one-on-one meeting were sent out to any student who appeared to be struggling with the material. Eventually, students started reaching out for help from the instructor and independently requested a meeting to master the material better. These requests were recorded throughout the treatment period.

At the beginning of the third quarter, students were given the *Midpoint Student Survey*, which asked them to reflect on their growth as learners and how they felt SBG impacted their mindsets (Appendix E). In that survey, students had an option to select if they would be interviewed regarding their answers. Twelve students, 26% of the study group, agreed to be interviewed and individual conferences were held throughout March. With their permission, I recorded their interviews and used their thoughts for qualitative data. In these meetings, students were asked to expand on how they have seen their mindsets being changed and how they feel SBG impacted this process (Appendix F).

At the beginning of the fourth quarter, students were given the *Final Student Survey*, which asked them for their concluding thoughts regarding SBG and to determine if there was a significant shift in mindset. The survey included a Likert scale of *highly disagree* (1), *disagree* (2), *agree* (3), and *highly agree* (4) in responses to questions that ask them to reflect on their growth mindset goal that they selected in August. I chose this method because it can provide quantitative data while also giving them a chance to express their opinions more than a “Yes” or “No” style survey. Growth mindset is typically displayed along a gradient and using a Likert Survey continues to support the point that a changing mindset is a multi-step journey that is not achieved overnight. There was also a free-response section where students could expand on their reflections. I like the ability to use descriptive data to not only have quantitative data, but also to have some qualitative. The data from these questions was compared to the pre-treatment and mid-treatment surveys.

After compiling the survey data, the students were categorized into low, medium, and high levels of a growth mindset. It was also noted which students had the most dramatic shift from the pre-treatment survey to the post-treatment survey. Each of these groups was then compared to their number of PRLN's received on their Opportunities for Understanding. The goal was to see if the students who started with a fixed mindset but developed a growth mindset also showed a higher level of mastery than the students who did not have as dramatic a mindset shift.

Finally, I kept a teacher journal which recorded my own observations of how I felt students were responding to this method of grading as well as my reflections on the course as a whole. To ensure reliability and validity, my advisor was shown each of my data collection tools and approved them before using them in class. I also had multiple colleagues look over my data collection tools, especially my daily assessment opportunities. My surveys were confirmed by my Instructional Coach and were based on the work done by Carol Dweck regarding characteristics of growth mindset.

Table 1. Data Triangulation Matrix.

Data Triangulation Matrix	Pre-survey	Mid-survey	Post-survey	Proficiency Scores	Interviews	Teacher Journal
Research Questions						
<i>Primary Question</i>	✓	✓	✓	✓	✓	✓
<i>Sub-question #1</i>	✓	✓	✓		✓	
<i>Sub-question #3</i>	✓	✓	✓	✓	✓	
<i>Sub-Question #4</i>					✓	✓

## DATA ANALYSIS

Results

The *Initial Study Survey* was given to both physics sections before starting the treatment ( $N=42$ ). The five possible responses are on a 1-5 scale, with "1" being the most fixed mindset and "5" being the most growth mindset. Based on table 1, students showed the most potent growth mindset in "Worldview," "Feedback," and "Offered Help." In these three categories, the total responses showed that 36% of students responded with a "5" on worldview, 34% for feedback, and 31% for offered help (Figure 1). Students showed the most fixed mindset in "Feedback" and "Making Mistakes." In these categories, 12% of students responded with a 1 or 2 on "Feedback" and 8% on "Making Mistakes" (Figure 1). As a result of these findings, the midpoint and final data collection focused on the three categories that were still heavily in a fixed mindset.

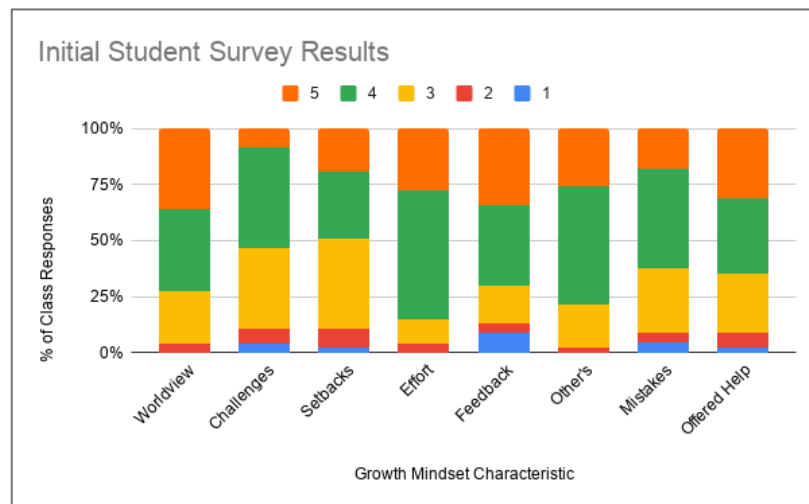


Figure 1. Percentages of initial student mindsets regarding specific characteristics of a growth mindset, ( $N=42$ ).

Figure 1 shows that at the beginning of the treatment plan, students were all over the map in terms of their mindsets. For example, while the “Feedback” category had the most students select a “1,” which states “I ignore all negative feedback.” But this category also had a high number of students select a “5” which states that “I request critical feedback, even if it isn’t easy to hear.” Some students followed up their responses and said “feedback is one of the ways that makes you better. It makes you a stronger person.” Some responses qualified their answer and stated that they only liked feedback if it actually told them how to improve instead of just pointing out errors.

In the “Making Mistakes” category, the students who rated themselves as a 1 or 2 were effectively saying that they “Actively hide or ignore their mistakes” or “Make excuses for their mistakes” respectively. Multiple responses included self-reflections about their struggles with anxiety and embarrassment over “looking dumb”. One student added that, “I’m ok making mistakes, but I don’t want to make it in front of a large group. I’d rather be able to pull the instructor aside and meet one-on-one.” Eight students initially rated themselves as a “5” on “Making Mistakes,” which was much lower than the 16 students who rated themselves a “5” on “Accepting Feedback.” In this case, a “5” response on “Making Mistakes” was, “I deliberately stretch myself knowing that errors will lead to future growth.” One of the students who rated themselves at a “5” added that, “Even when I know I’m going to be wrong, I still present my work. I feel like it would be a benefit to my classmates to see how to do something, so they don’t make the same mistakes that I did.” Clearly, there was a wide range of mindsets at the beginning of the treatment plan. The focus in the following months was to positively shift the mindsets of

the students who initially scored themselves at a 2 or lower, while also maintaining the students who initially scored themselves as a 4 or higher.

The *Midpoint Student Survey* was administered at the end of the first semester, after 16 weeks of the treatment. In this survey, students responded to questions regarding their progress in "Overcoming Challenges," "Making Mistakes," and "Accepting Feedback." ( $N=42$ )

The first section asked students how they felt when they began their daily opportunity assessment to stimulate their willingness to take on challenges. On a 1-5 scale, 62% of students responded with a "5-This may be difficult, but I believe I can accomplish it." Only six students (13%) responded with a three or lower (Figure 2).

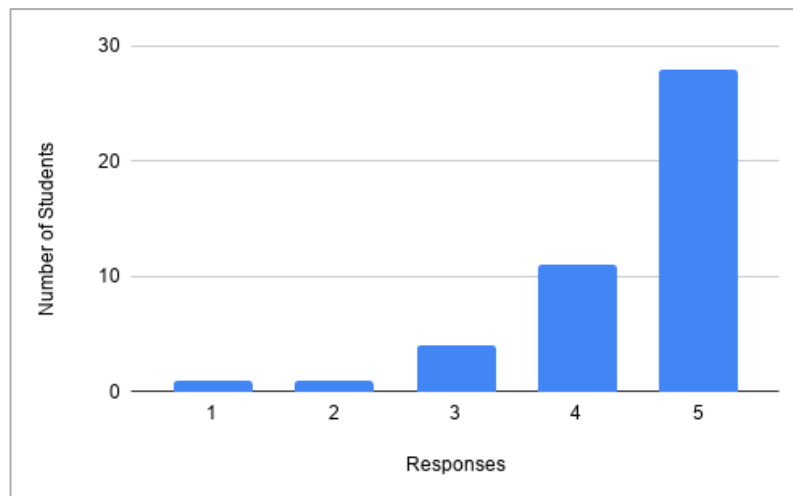


Figure 2. Student responses to Midpoint Student Survey question-taking on challenges, ( $N=42$ ).

Students expanded on their responses with comments such as, "I never know what to expect, but I know whatever it is, I will be able to accomplish and succeed. And if not, I will be able to learn from it." Students reported feeling confident about their abilities and appreciate that the daily opportunities let them know what they still don't understand.

Many students understand that there are frequent opportunities to see their progress and have decreased test anxiety when they know they will get a chance to try again without damaging their grade. As another student reported, “Even if I do mess up, there will always be more opportunities for me to grow my understanding and ask for help.”

*The Midpoint Student Survey* also assessed student acceptance of academic mistakes and perception of critical feedback. In total, 48% of students strongly agree that the Standards-Based Grading system has improved their acceptance of academic mistakes. Also, 55% of students strongly agree that the SBG system has improved their perception of critical feedback. In both cases, 0% of students responded “Strongly disagree” or “Disagree” to either scenario (Table 2)

Table 2. Midpoint Student Survey response percent per question, ( $N=42$ ).

Student Survey Question	5-Str. Agree	4-Agree	3-Neutral	2-Disagree	1-Str. Disagree
“Has SBG improved your acceptance of academic mistakes?”	48.9%	40%	11.1%	0%	0%
“Has SBG improved your perception of critical feedback?”	55.6%	33.3%	11.1%	0%	0%

Finally, in a free-response question, students were asked if they felt the SBG grading system impacted their views on learning. Students frequently reported that SBG had decreased their test anxiety, increased their likelihood of taking on challenges, and



overall changed their perception of success as a student. One student reported, "SBG has completely impacted my views on learning. Now, I go for the challenge because I know that if I get it wrong, my grade won't suffer." Another said, "SBG makes learning less stressful and allows me to focus on my understanding and growing as a learner." One student compared their experience with SBG to a traditional grading system, "In other classes, I'm not a good test taker, and when I make mistakes, it's hard to correct myself. But in this class, there is less pressure to get every question right. Then I can try harder to learn how to solve the problem instead of just trying to get the right answer." As one response succinctly put, "I'm not longer looking at how many I got wrong. I'm looking at how much I have learned."

The *Final Student Survey* was given at the beginning of the fourth quarter, 32 weeks into the treatment plan. Students responded to the prompt, "Do you feel as though you have grown in Growth Mindset characteristics such as taking on challenges, making mistakes, and accepting feedback?" From the total results, 23.8% of students Strongly Agreed, 54.8% of students Agreed, and 21.4% were neutral ( $N=42$ ). There were no students who disagreed or strongly disagreed. One student expanded on their answers and said, "learning from mistakes is the best way to learn, and feedback is the best way to grow and improve. This class gave me time to practice those skills, which changed the way I learned." Another commented, "During the first semester, I was still hesitant to make mistakes, but now I know it's perfectly fine to make many mistakes when you're learning something new." One response was particularly impactful, "SBG helped me understand the relationship between the work I put into the class and my understanding of

the material. I used to think those were separate things." Many students qualified their answers and said they felt they'd already had a growth mindset before physics class, so while they can't say they grew dramatically, this class strengthened their mindsets.

The students specified what about the SBG system they felt improved their growth mindset. Many students cited that "without the stress of a letter grade, students can focus more on learning." Other students said that "feedback helps a lot with improving mistakes, and it shows me what I need to practice." One response summed it up well, "SBG focuses on feedback instead of points. The frequent assessments help me learn from my mistakes as well." Most importantly, "I used to look at my grades as my sole tool to represent myself. I now see that I am so much more than my grade."

Some students compared their experiences to courses with traditional grades and said that "Normally I look at how poorly I did on a quiz, in this class, I can look at how much I improved from quiz to quiz." Many responses cited that grades using points increased their stress and weren't a very accurate representation of what they knew. One student noted, "Our grading system is an improvement over one that uses numbers. For example, my grade in English plummeted at the beginning of the semester because I received a single 4 out of 6 points on an assignment. Even though that is considered an "above average" score on the AP test, this shows that this is all based on knowledge and not numbers."

In the *Final Student Survey*, students responded one final time on "constructive feedback" and "making mistakes." Like the *Initial Student Survey*, responders used a 1-5

scale, with 5 being the strongest growth mindset response. Figure 3 displays the final survey results compared to the initial survey in the areas of feedback and mistakes.

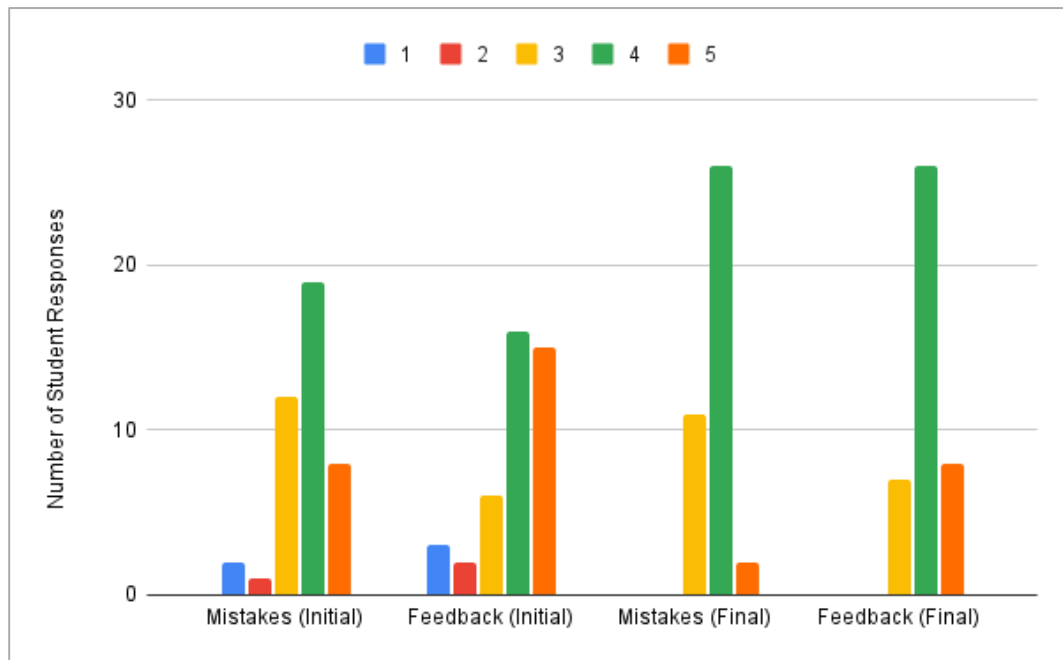


Figure 3. Student responses to Final Student Survey and Initial Student Survey question-perception of mistakes and feedback, ( $N=42$ ).

None of the students' responses were lower than a 3 for either category in the Final Student Survey. Compared to the *Initial Student Survey*, 24% of students increased their self-reported mindset level for "accepting feedback" and "making mistakes" (Figure 3). Eight students originally assessed themselves as a "5" for "making mistakes" in the *Initial Student Survey*, and six of those students decreased their assessment of themselves to a "4" on the *Final Student Survey*. Similarly, eight students assessed themselves as a "5" for "accepting feedback" in the initial survey, but only three students stayed at a "5" in the final survey. While this is progressing in the opposite direction, it shows that students are thinking more about their mindsets and giving a more honest answer than

what they might provide on the first day of school when trying to make a good impression on the instructor.

Students were assessed on nine content standards throughout the school year, divided equally among three units of study. Table 3 lists the unit standards and the number of assessments given for each standard.

Table 3. Number of assessments given for each related standard.

Unit of Study: Scientific Method	# of Times Assessed
(S1) Writing Mathematical Models	4
(S2) Using Models to Make Predictions	3
(S3) Writing "For Every" Slope Statements	4
Unit of Study: Circuits	# of Times Assessed
(EC1) Closed Loop Model	6
(EC2) Resistance Model	7
(EC3) Combination Circuits	7
Unit of Study: Mechanics	# of Times Assessed
(CV1) Position-Time Graphs	7
(CV2) Velocity-Time Graphs	4
(CV3) Acceleration-Time Graphs	5

To be considered "Proficient" in a topic, the student must have successfully gotten a "proficient" rating on at least half of their assessment attempts for the standard in question. For example, if EC1 was assessed six times, any student who succeeded on an

Opportunity at least three times would have shown sufficient mastery. Figure 4 displays the number of standards mastered by the students in the three quarters (N=42). The maximum number of mastered standards was three per quarter.

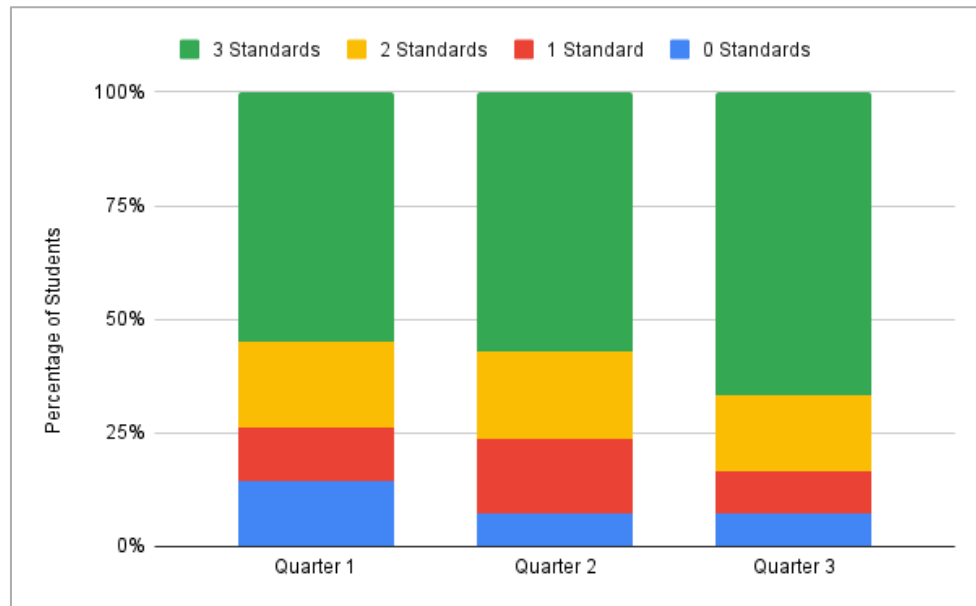


Figure 4. Percentage of students who mastered varying numbers of standards over the treatment period, (N=42).

The percentage of students who mastered all three of the unit standards increased from 55% to 57% to 66% for the three quarters, respectively (Figure 4). The number of students who mastered zero of the unit standards decreased from 14% to 7% for both Quarters 2 and 3 (Figure 4). However, it is difficult to compare the three grading periods because each of the quarters focused on a different physics unit. While there is gradual improvement, it can't be said for certain that the progress wasn't solely because the final unit was easier to understand than the first or second unit.

## CLAIMS EVIDENCE, AND REASONING

Claims From the Study

The main objective of my action research project was to determine the impact of using a Standards-Based Grading format on the formation of growth mindset in students.

My sub-questions included the following:

1. How do students' mindsets change throughout the treatment plan?
2. How are proficiency scores impacted by students changing their mindsets?
3. How will implementing SBG in a new content area impact me as an instructor?

To answer the first sub-question, "How do students' mindsets change throughout the treatment plan?" I used the results from the *Initial Student Survey* to identify the students' weakest aspects of growth mindset at the beginning of the course. Out of the eight measured characteristics, "response to feedback" and "making mistakes" were the two that needed the most improvement. In these categories, 12% of students responded with a 1 or 2 on "Feedback" and 8% on "Making Mistakes" (Figure 1). These two categories became the focus of survey assessment throughout the treatment period. In the *Midpoint Student Survey*, 89% of students said that they agreed or strongly agreed that SBG has improved their acceptance of academic mistakes and their perception of critical feedback (Table 2). The results of the *Final Student Survey* were compared to the *Initial Student Survey* and found that 24% of students increased their self-reported mindset for "accepting feedback" and "making mistakes" (Figure 3). Every student who initially reported themselves at a "1" or a "2" for either category on the *Initial Student Survey*

rated themselves at a “3” or higher on the *Final Student Survey*. In the *Final Student Survey*, students expressed that they found themselves being more willing to accept feedback and were encouraged to take on academic challenges in physics class. To quote one response, “I used to have a big problem being ok with making mistakes in class and life in general. Because of this class, I am seeing that I can learn from mistakes and I’m not as worried about making them.” From my own observations, I saw students who started out completely ignoring feedback become ones who would ask to meet up after school to go over their assessments and do extra problems. I also saw that some students who started the year being unwilling to speak in class eventually become ones who would openly share their thoughts. When I asked the students what had changed, they said that they figured out the fastest way to get better at physics was to start asking questions and participating in class. They were much less worried about saying the “wrong” answer because the sooner they did, the sooner they could learn the correct one.

The next sub-question looked at “how does a student’s mindset impact their proficiency scores?” Throughout the treatment plan, students were assessed on nine total standards among three quarters. In the first quarter, 54% of the students successfully mastered all three of the given standards (Figure 4). In the second quarter, that percentage stayed the same but the number of students who didn’t master any standards decreased from 14% in the first quarter to 7% in the second quarter (Figure 4). In the third quarter, 66% of students mastered all three standards, which is a 12% increase from the second quarter (Figure 4). Based on these results, physics mastery was increasing throughout the course of the treatment plan.

As physics proficiency was increasing, the students were showing a shift in their mindsets. As referenced above, when comparing the *Initial Student Survey* and the *Final Student Survey*, 24% of students showed growth in both of the assessed categories (Figure 3). It is unclear which growth came first, the mindset or the physics understanding. One explanation is that students who focused on learning the content were able to reflect and see that their success was due to learning from their mistakes and asking for help. Another explanation is that the students who were struggling started to seek out help and feedback and, as a result, saw an increase in their physics understanding. Regardless of the order, the data supports that a large number of students improved their physics mastery as well as shifted towards a growth mindset over the course of the treatment plan.

#### Value of the Study and Consideration for Future Research

My students thrived on this form of grading for many reasons. First of all, many students told me that it positively impacted their anxiety levels, especially related to taking assessments. Not only did students feel they performed better on assessments because of the deemphasis on points, but they also had better attitudes when it came to revising their work and learning from their mistakes. Students appreciated that they were assessed daily because it allowed them to better track their growth and it made them more aware of what they still needed to learn. Using this grading system helped change the vernacular of my students when it came to their own understanding. The emails students would send if they wanted to get extra help showed this clearly. Students used phrases



like, “I want to increase my understanding of the second standard.” Which is extremely refreshing compared to the normal emails of, “How can I increase my grade?”

A big takeaway from this research is that students flourish when they have immediate and specific feedback on their assessments. On the teacher’s end, this means creating assessments that are specific to the standard and succinct enough to give feedback immediately. An assessment that takes weeks to grade is nearly obsolete by the time it gets back to the student. To develop metacognition, students do best when they have tangible representations of their progress and where they still lack understanding.

If I were to do a project like this again, I would develop a way to continue to assess how their mindsets were developing multiple times throughout the year. While I had a lot of qualitative evidence about how students’ mindsets were changing, I didn’t have as much quantitative data as I would have liked. I appreciate how accurately I could measure their physics content knowledge, but I wish there was a better way to mathematically gauge something like mindset.

One of the other changes I would make is editing the focus of my project to not be on their final proficiency scores. While it is important to know if students were successful at understanding the content knowledge, their assessment scores are not necessarily the best way to assess success as it relates to improving the mindsets. For one, it is difficult to compare quarter to quarter improvement because each grouping brought about a different physics topic. For example, quarter one’s focus was on circuits where quarter two was on constant velocity. Students that might have a natural ability in circuits might not find the same ease in different topics of study. Also, knowing that one of my goals is

to help students be more accepting of mistakes, defining their success as “perfect assignments” is counterintuitive to the goal. In short, I would want my focus to be on a different quantifiable skill such as, “How many times did the student come in for help?” and then compare that piece of data to how their response to feedback changes over the course of the year.

Moving forward, I would like to consider implementing SBG in my other courses. I have seen that if I wish to develop growth mindset, SBG is most likely more efficient and effective way to do that compared to traditional grading methods. I think my students are walking away seeing the benefit of frequent assessment, of quick and efficient feedback, and have found a new freedom in making mistakes, knowing that they are stepping stones on the path to better understanding.

As far as implications for my coworkers and administrators, I hope they see the benefit in this form of grading in developing our students’ resiliency and metacognition. Also, for the way that SBG requires educators to create a more accurate way of measuring understanding. At this point, the physics team is the only group in the science department that uses SBG. Not only that, but we are also the only department in the high school that uses SBG. Regardless of the content taught, the pillars of SBG, feedback, frequent assessment, and deemphasizing points, would be useful in any classroom.

On a broad scale, SBG is only the beginning of how I’d like my classroom to look. Ideally, I want to keep making steps towards a gradeless classroom. While I think SBG is closer to my goal than traditional grading, I still ran into the same problem of some students being too focused on “how many” proficient opportunities they needed to

earn an “A.” Until grades are removed entirely, students will continue to try and game the system. I understand that a gradeless classroom comes with its own set of challenges, especially when it comes to college admissions. However, I will continue to take steps to reduce focus on final grades within the confines of a traditional public school classroom.

I want to note that while I saw a lot of success in my own classroom, not everyone will necessarily have the same results. Doing this philosophy overhaul required a lot of support and resources, especially during the COVID-19 pandemic. My school has predominately students with high SES with many supports in place as well as primarily supportive parents at home. They have been given 1-to-1 Chromebooks, a vast tutoring center, and many more resources compared to other school districts. We were also able to acquire education tools such as Classkick and Actively Learn that made it possible to give frequent assessments and quick feedback even to students who weren't in the building. So, while I agree that using a grading system that focuses on feedback, not points, would be beneficial for any student, I can't claim that it would be a perfectly smooth explanation for any other school if they repeated this research project.

There were many factors that could have skewed the data in this project. The biggest being the COVID-19 pandemic. During the treatment plan, students went from at home learning, to hybrid learning, to partial in-person learning with the instructor still at home, to in-person learning with the instructor in the room, and back to hybrid again. I had students get COVID which resulted in multiple absences. I had multiple students drop out of the course all together. Students reported that motivation for everything was at an all-time low due to the negative effects of being on Zoom for six or more hours a

day. The data related to growth mindset was probably the most inaccurately skewed as it required students to self-assess how they felt about handling challenges while they simultaneously were in the midst of an extremely challenging time. Despite all of this, my students were troopers and were overall very successful in their physics course. I will continue to implement SBG and focus on growth mindset in my physics classes next year when school is hopefully a bit less prone to dramatically change from week to week.

### Impact of Action Research on the Author

At the end of this process, I feel as though I have grown an exponential amount as an educator. First of all, not only was this my first-year grading using SBG, but this was also my first time ever teaching high school physics. While overwhelming at times, I think learning the two in unison helped me understand both at a deeper level. SBG requires frequent assessments, which meant I needed to assess my own understanding multiple times in order to create the opportunities for students. In my teacher notebook, I recorded a thought from the beginning of the first quarter, “I can say with certainty that I have never understood the physics of circuits as well as I do now. I attribute this to SBG not allowing me to write a single test and move on. I have to understand the material well enough to ask multiple different types of questions.”

Due to the immense amount of feedback associated with SBG, I feel as though I was able to get a clearer understanding of the levels of the students. Throughout the semester I conferenced with students to discuss their grades, look at my assessment data, and determine a plan for the future. After these conferences, I recorded in my teaching notebook how it was, “much more accurate to assess students this way because their

grade represents their understanding.” I also have grade conferences in courses that I don’t use SBG in and I’ve found the experience to be very different. In my teacher notebook I note that, “typically when I do grading conferences, it turns into a laundry list of their missing assignments and how to get their grade up. With the physics conferences, the conversations flowed easier and both parties understood why they were earning their current grade.” It was much easier to identify struggling students and pinpoint exactly what standard was giving them trouble. I could then decide to spend more or less time on a topic because I all of the formative assessment data told me exactly where the class stood in terms of understanding. After grading conferences, I would tell students that if they felt they still didn’t understand a standard, they could request more opportunities to show their understanding. Throughout the year, 14 students took me up on my offer and were able to reflect on their past assessments and show me that they had mastered the material. At the end of first semester, I wrote in my teaching notebook that, “students should have the ability to reassess their understanding, even if it doesn’t fit smoothly with my timeline. At the end of the day, my goal is to teach students. If they are still willing to try and learn on their own timeline, I want to support them in this goal.”

The most impactful way I’ve grown as a result of this project is in the way that I listen and respond to my students. Education is furthered by relationships. For kids to learn, they need to feel safe, relaxed, and heard. This year has shown me that, more often than not, grades and points get in the way of that goal. I acknowledge that my classroom is a microcosm of all of the issues with public education such as the extreme expectations put on students by colleges, their parents, and, honestly, themselves. However, that does

not and should not stop me from asking the question, “how can I make this classroom somewhere that students want to be?” The follow-up question should always be, “well, have I asked the students what they think?” My recommendation to myself and to anyone in the profession is to be sure that we are not only developing our ability to speak, but also to listen. This year showed just how important it was to first understand my students before attempting to be understood. It isn’t about me. It never has been. The content that I teach will most likely become obsolete. Their grade forgotten. But they will not forget the feeling of being heard and valued. If it takes overhauling everything I’ve ever known about assessment to help my students feel that they are more than a letter, it will have been worth it.

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APPENDICES

APPENDIX A

IRB EXHEMPTION FORM



**INSTITUTIONAL REVIEW BOARD  
For the Protection of Human Subjects  
FWA 0000165**

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c/o Microbiology & Immunology  
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*Chair:* Mark Quinn  
406-994-4707  
mquinn@montana.edu  
*Administrator:*  
Cheryl Johnson  
406-994-4706  
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**MEMORANDUM**

**TO:** Sarah Davis and Walter Woolbaugh

**FROM:** Mark Quinn *Mark Quinn CJ*  
Chair, Institutional Review Board for the Protection of Human Subjects

**DATE:** October 13, 2020

**RE:** "The Impact of Standards Based Grading on the Development of Growth Mindset in a Physics Classroom"  
[SD101320-EX]

The above research, described in your submission of October 13, 2020, is exempt from the requirement of review by the Institutional Review Board in accordance with the Code of Federal regulations, Part 46, section 101. The specific paragraph which applies to your research is:

- (b) (1) Research conducted in established or commonly accepted educational settings, involving normal educational practices such as (i) research on regular and special education instructional strategies, or (ii) research on the effectiveness of or the comparison among instructional techniques, curricula, or classroom management methods.
- (b) (2) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless: (i) information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and (ii) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability, or be damaging to the subjects' financial standing, employability, or reputation; and (iii) the information obtained is recorded by the investigator in such a manner that the identity of the human subjects can readily be ascertained, directly or through identifiers linked to the subjects, and an IRB conducts a limited IRB review to make the determination required by section 16.111(a)(7).
- (b) (3) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior that is not exempt under paragraph (b)(2) of this section, if: (i) the human subjects are elected or appointed public officials or candidates for public office; or (ii) federal statute(s) without exception that the confidentiality of the personally identifiable information will be maintained throughout the research and thereafter.
- (b) (4) Research involving the collection or study of existing data, documents, records, pathological specimens, or diagnostic specimens, if these sources are publicly available, or if the information is recorded by the investigator in such a manner that the subjects cannot be identified, directly or through identifiers linked to the subjects.
- (b) (5) Research and demonstration projects, which are conducted by or subject to the approval of department or agency heads, and which are designed to study, evaluate, or otherwise examine: (i) public benefit or service programs; (ii) procedures for obtaining benefits or services under those programs; (iii) possible changes in or alternatives to those programs or procedures; or (iv) possible changes in methods or levels of payment for benefits or services under those programs.
- (b) (6) Taste and food quality evaluation and consumer acceptance studies, (i) if wholesome foods without additives are consumed, or (ii) if a food is consumed that contains a food ingredient at or below the level and for a use found to be safe, or agricultural chemical or environmental contaminant at or below the level found to be safe, by the FDA, or approved by the EPA, or the Food Safety and Inspection Service of the USDA.

Although review by the Institutional Review Board is not required for the above research, the Committee will be glad to review it. If you wish a review and committee approval, please submit 3 copies of the usual application form and it will be processed by expedited review.

APPENDIX B

INITIAL MINDSET SURVEY

# Mindset Assessment

## World View

The simple fact of the matter is that some people are born lucky, right? You know the type. They're just good at everything. Do you think that...

You're born with a certain amount of intelligence/athletic ability. Can't change that.

OR

With enough time and effort, can you rewrite your natural abilities to become whatever you want to be?

Hard work or natural talent...which one wins?

See yourself as unchanging. You are who you are.	Change and growth are very limited. There are just some things you aren't cut out for	Capable of growth in a few different domains, but not all	Capable of significant growth in most domains	Capable of changing their most basic characteristics. Life is about deciding what you want to be and working towards those goals
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Your Perspective

Explain your Answer!

Your answer

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## Challenges!

Time to choose your classes for next year! You have your choice of electives. You could take photography. You've been taking pictures for years and it's sure to be an easy A.

OR there's cooking class. You normally burn everything in the kitchen. You don't know how to tell salt from sugar. You know that's going to be a difficult class for you!

Do you go outside your comfort zone when it comes to learning new things?

You avoid challenges. It's embarrassing to not succeed!

You take on easy challenges, as long as you already know you can succeed.

You prefer challenges that aren't far out of reach or in an area you already like

You enjoy challenges or open-ended tasks. Even if you aren't always immediately successful

You embrace challenges, even knowing that it will take a long time to master or achieve your goal

Your Perspective:

Explain your Answer!

Your answer

---

## Encountering Challenges & Obstacles

You're playing a video game and you just died for the sixth time against the same boss. Do you load the game up again? Do you throw the controller against the wall?

How long do you work on a difficult task?

How long can it hold your attention before it gets to be too much?

Give up immediately	Try for a while but if not making progress easily, will give up. Maybe tries a few alternatives when encountering obstacles	Persists when seeing progress. Working on strategies for getting past obstacles.	Expects eventual mastery knowing that new learning is difficult. Will stick to a task for a while	Persists for LONG periods. Even with setbacks and when new skills are needed to achieve mastery
------------------------	---	--	--	--

Your  
Perspective






Explain your Answer!

Your answer

---



## Effort

You're the last one out on the soccer field. Everyone else has finished learning a new move except you. You feel dumb. Why doesn't anyone else have to work as hard as you do? Maybe just shrug it off and head home. It wasn't really worth it anyway.

If something doesn't come naturally to you, do you quickly lose interest?

## Effort

Having to put in any effort is bad	Sometimes a little effort is ok. But sustained effort is bad. I want to understand immediately.	Effort is necessary to learn but is not enjoyable. Would prefer if everything was easy.	Effort is a good thing. Effective effort will lead to growth and success	Effort is a path to mastery. Actively working on developing ways for more effective effort
------------------------------------	---	---	--	--

Your Perspective






Explain your Answer!

Your answer

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## Feedback & Criticism

You've worked for HOURS on a piece of art. You think it's some of your best work. Everyone comes over to say how good it looks. One person points out that you could have utilized a different technique.

Ugh.

That comment sticks in your head for DAYS. You really respect this person's opinion and you know they're a fantastic artist. Doesn't mean you want to hear it.

How well do you respond to feedback?

From your parents? Coaches? Friends?

	Ignores useful negative feedback.	Accepts feedback when corrections are quick and easy. Focus on POSITIVE Feedback	Feedback is useful as long as it's achievable	Accepts and learns from feedback.	REQUESTS critical feedback. Even if it isn't pleasant to hear because it will improve the outcome
--	--	---	--	---	--

Your  
Perspective






Explain your Answer!

Your answer

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APPENDIX C

SAMPLE OF ASSESSMENT OPPORTUNITY

## Physics

Name: \_\_\_\_\_

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

Teacher Use Only

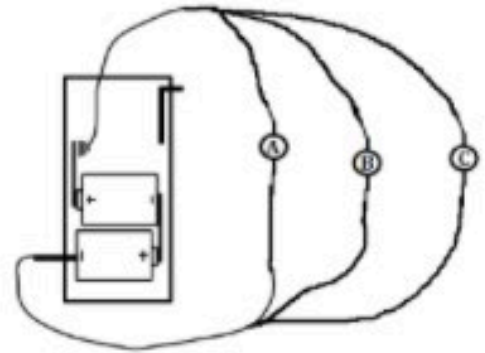
EC1 Needs Work ----- Still Learning ----- Refining ----- Proficient

EC2 Needs Work ----- Still Learning ----- Refining ----- Proficient

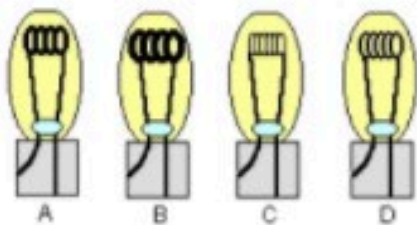
## Opportunity to Demonstrate Understanding

Circle true (T) or false (F) for the following situations:

- T or F** 1. The circuit shown is a series circuit.
- T or F** 2. The resistance of this circuit is greater than a circuit where bulbs A, B, and C are all on one path.
- T or F** 3. If light bulb A is unscrewed, light bulb B will go out.
- T or F** 4. When more bulbs are added to a circuit, there is always more resistance as a result.
- T or F** 5. The batteries are the source of the charge in the circuit.



6. The light bulbs to the right have filaments with varying thicknesses. When each bulb is individually in a circuit with a 2-cell battery, which of the light bulbs would have the **smallest** flow rate of charge?



7. Draw wires on the circuit below so that light bulb 2 will **light** and light bulb 1 will **NOT** light. Then **trace the continuous conducting path** through the circuit.



APPENDIX D

PROFICIENCY SPREADSHEET SAMPLE

9/3	9/8	9/10			9/3	9/8				9/3	9/8	9/10			9/3	9/8				Help Requested/TLC
L	R	R			L	R				R	P	P			L	N				
L	P	P			P	P				P	P	P			R	P				
R	P	P			P	P				P	P	P			R	P				
R	P	P			P	P				P	R	P			L	P				
R	P	R			P	P				P	P	R			P	P				
R	R	P			R	P				P	P	P			R	R				
R	P	P			P	P				P	P	P			R	P				
L	P	P			L	P				P	P	P			R	R				
P	P	P			P	P				P	P	P			P	P				

APPENDIX E

MIDPOINT STUDENT SURVEY

Name: \*

Short answer text  
.....

How do you feel when you begin your Daily Opportunity? \*

1 2 3 4 5

I do not believe I am going to  
succeed, but I guess I'll do it.

This may be difficult, but I believe I  
can accomplish it

Explain your Answer Above \*

Long answer text  
.....

In general, how do you feel about the Daily Opportunities? Are they helpful to you as a learner? \*

Long answer text  
.....

When we go over the Opportunity from the Class before, do you look at my feedback? (Be Honest) \*

Yes

No

Do you find the feedback to be useful? Why or why not? \*

Long answer text  
.....



When we go over the Opportunity from the Class before, are you making corrections to your original document? (Be Honest) \*

- Yes, but only when there's something to correct.
- Sometimes, not with any real consistency.
- No, Never

Reflect on this quarter so far: Do you feel as though Standards Based Grading (SBG) has improved your acceptance of academic mistakes? \*

	1	2	3	4	5	
Not at all.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Absolutely Yes!

Reflect on this quarter so far: Do you feel as though Standards Based Grading (SBG) has improved your perception of critical feedback? \*

	1	2	3	4	5	
Not at all.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Absolutely Yes!

Reflect on this quarter so far: Do you feel as though the Standards Based Grading system has impacted your views on learning in general? Why or why not? \*

Long answer text

.....

In general, how is class going? How are you? Any concerns? \*

Long answer text

.....

APPENDIX F

FINAL MINDSET SURVEY

Look at the Growth Mindset Characteristics above. Do you feel you have grown in these areas as a result of the class? \*

Not at all.      1      2      3      4      5      Absolutely. I'm a different person!

Why did you give yourself that rating? \*

Long answer text  
.....

Review the Goals of Standards Based-Grading Above. Do you find this is helpful or harmful to you as a student and why? \*

Long answer text  
.....

Knowing my goal was to help you improve in your growth mindset, do you feel that our grading methods have done that? Why or why not? \*

Long answer text  
.....

What are your observations about our grading system compared to the traditional (point-based, single assessment) grading system? \*

Long answer text  
.....

In general, how is class going? Any way that I can be improving? \*

Long answer text  
.....

Would you be willing to do a short interview over the next few weeks to expand on your answers? \*

- Sure! I've got things to say!
- Nah, I'm not much of a talker! But I'm happy to write down my thoughts some other time if you want them!
- Not interested in either one of those options, sorry! Good luck on your project, though!

## Your Perspective on: Constructive Feedback \*

- Honestly, I ignore all feedback.
- I accept feedback when corrections are quick and easy. I focus on only POSITIVE Feedback
- Feedback is useful as long as it's achievable
- I accept and learn from feedback.
- I REQUEST critical feedback. Even if it isn't pleasant to hear because it will improve my understanding.

## Your Perspective on: Making Mistakes \*

- I actively hide or ignore mistakes
- I make excuses for mistakes. Honestly, I might blame others
- I do expect to make mistakes knowing they can be corrected and I accept when they happen
- I recognize that mistakes are learning opportunities
- I deliberately do difficult tasks knowing that mistakes will happen because it will help me grow.