



# The Effects of Graded Homework in a High School Chemistry Classroom

Summit High School, Breckenridge, CO

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## Homework Culture at Summit High School

With Summit High School moving away from the use of homework, as seen by many schools across the nation there has been a cultural shift amongst the students and their attitudes towards work outside of school. Chemistry requires students to understand intangible concepts which makes the content more difficult for students to learn. This means that students need to practice the content more often, especially when on a block schedule. Because of this shift in learning, homework quizzes were implemented as graded homework in Chemistry classes. Students were encouraged to complete their homework with “open homework” quizzes with each homework assignment to determine whether or not providing value to homework improves students tests score and long term retention of the content.

## Research Questions

### Primary Question:

How does graded science homework affect students' content mastery, study skills, and retention over a semester of chemistry?

### Sub-Question 1:

How will graded homework effect student study skills and independent learning skills outside of the classroom?

### Sub-Question 2:

What impact does graded homework have on students final semester assessment scores and long-term retention?

### Sub-Question 3:

How does graded homework impact the students ability to become more confident and accurate test takers?

### Sub-Question 4:

How does assigning graded homework influence me as a teacher?

## How to Test the Value of Homework

The treatment of this study included intentional use of graded homework with the use of homework quizzes versus non-graded homework over one semester (4 units) in three Chemistry classes. The student population consisted of three classes, totaling 72 students, including 10<sup>th</sup>, 11<sup>th</sup>, and 12<sup>th</sup> grade Chemistry students at Summit High School in Breckenridge, Colorado.

Homework was graded with the use of a homework quiz in two of the four units covered during the first semester and this homework was not graded, but collected and checked over, for the other two units. This treatment occurred from September 2017 to December 2017. The homework assignments did not change in style over the four units, the only addition was the use of homework quizzes that were given based off the homework assignment given.

A Likert-style survey, End of Unit Survey, was administered after each unit test to monitor students achievement, attitudes, and study skills based on whether homework was graded or not. Students unit test scores were compared for differences between graded homework units and non-graded homework units.

The semester final was broken down by units (standards) and was analyzed for long term retention based on score comparisons from units where homework was graded versus units where homework was not graded.

Pre-treatment and post-treatment questionnaires were given to monitor student attitudes during the modeling treatment.

## Effects of Homework on Students

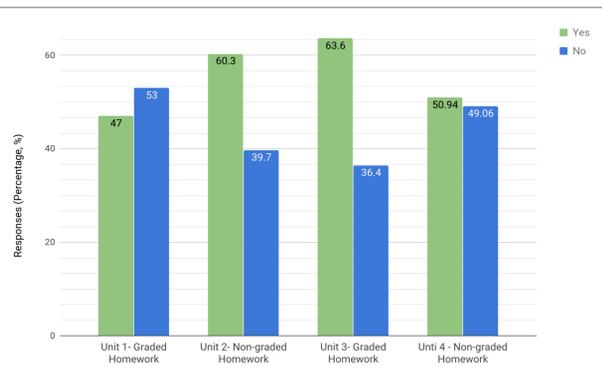


Figure 1. Overall average response in percentage to “Does homework help me become a more independent learner?”, (Unit 1 - N= 66, Unit 2 - N = 63, Unit 3 - N = 56, Unit 4 - N= 53)

The chart to the left compares students opinions on whether or not homework has an impact on their independent learning skills. The green bars represent “yes” responses while the blue represent “no” responses. It can be noted that in the first Graded Homework Unit students did not feel homework provided benefits but that changed over the next three units, explaining that homework does encourage them to become independent learners.

The chart to the right visualizes the responses from students regarding homework and its relationship to efficient test taking skills. The results show that during units when homework is graded students feel that they are more efficient test takers. This provides evidence that when students complete homework (more often when it is graded) they preform more confidently on tests. This data also provides evidence that when students complete homework and have had more practice with the content they don't struggle on exams as often. The content is more familiar to them and they feel comfortable with it on the test.

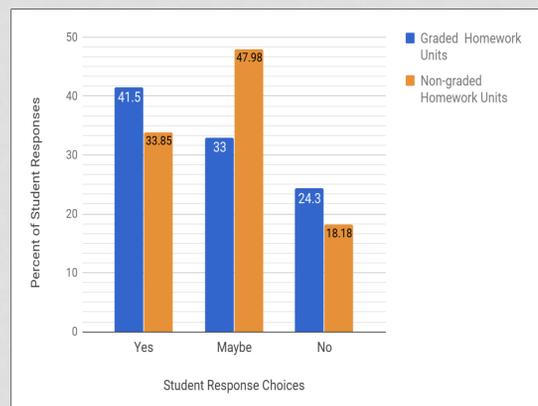


Figure 2. Overall average response in percentage to “Does homework make me a more efficient test taker?”(N=62)

## Student Thoughts on Homework

“If I didn't understand what was happening in class I now have the opportunity to do it and better understand it at home.”

“If I do homework then I don't have to study as much when the test comes because I have practiced a bunch already.”

In reference to test taking: “It's cause you know how to do everything faster and quicker, you're also pretty certain you know how to do it right so you don't take time to doubt yourself.”

“I think homework is good if it is going over skills we worked on in class so I can perfect them and better understand what I am doing.”

“The homework quizzes help me realize what I need to practice and what I have down.”

“Using my notes and problems, like examples, from class I can usually use those to teach myself at home. When I get the general idea it helps a ton to build my own ideas and teach myself.”

## Grading Homework Vs. Not Grading Homework: What Works Best?

Graded Homework Units- The units when homework quizzes were used to hold students accountable for completing their homework were:

Unit 1- The Atom

Unit 3- Ionic and Covalent Bonding

Units where homework was assigned but never graded (only graded for recording purposes) were:

Unit 2- The Periodic Table

Unit 4- Chemical Reaction and Balancing Equations.

It is clear that when homework was graded and students were held accountable for their learning, and the average scores rose 0.5 to 1 point higher (on the 0-4 grade scale). These increases in test scores were more prominent in the “average” student. The students who consistently score high on unit tests, 3.5's or 4's, while students who tend to score low continue to score low. It was the 1.5 – 2.5 range students that gained the most out of graded homework. Though the content taught within graded units versus the non-graded was different, the difficulty levels were similar. The graphs show that these scores increased, closing the gap between the second and third quartile significantly.

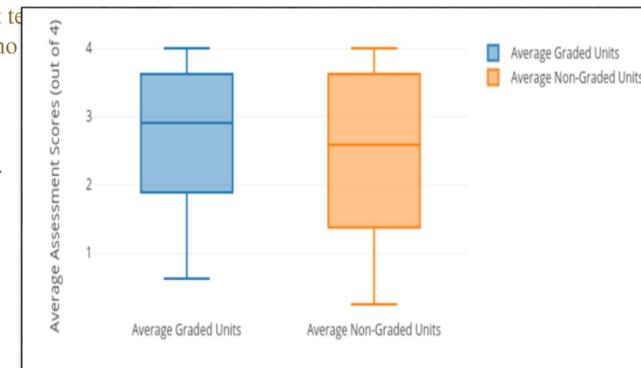


Figure 3 – The Disbursement of Student Assessment Scores by Graded vs. Non-graded Homework Units, (Unit 1 - N= 70, Unit 2 - N = 70, Unit 3 - N = 71, Unit 4 - N= 71)

## Does Graded Homework Benefit the Students?

This study provided evidence that grading homework in a high school science classroom positively affected student achievement and attitudes. According to the data, students were given graded and non-graded homework over four units. Student achievement in chemistry deviated over the four units showing impacts of holding students accountable for their homework. The data showed that 41.5% (N=71) of students agreed to the statement “Homework helps me become a more confident test taker” during units when homework was graded compared to only 33.8% who agreed during non-graded homework units. It was seen that not only did grades improve but confidence levels in the content and test taking skills improved as well. Students expressed that when they had practiced the content more they were no longer second guessing themselves during the test. When first implementing graded homework, my students did not have a great attitude about it. They were not happy that I was the only teacher grading their homework, 56,06% of students stated that they did not believe homework would help increase their chemistry grade. By the time the fourth unit was started students were doing their homework more consistently even though it was not graded and their attitudes towards graded homework changed. The post-questionnaire responses revealed that only 26.41% of students still believed graded homework did not help improve their grade. When comparing scores on graded versus non-graded units, students unit test grades were 0.5 – 1 point higher on average. The achievement of my students during graded homework units provides evidence that the more students use what they are taught, the more confident they will and, therefore, will preform higher on exams.