THE EFFECTS OF GOAL SETTING ON STUDENT ENGAGEMENT FOR ALL DEMOGRAPHICS OF STUDENTS IN A SCIENCE CLASSROOM

by

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ABSTRACT

This study looked at the impact goal setting had on student engagement, self-efficacy, and academic achievement. The study included teacher observations, student self-surveys, study habits monitoring, and analysis of academic achievement. The goal was to see if having students set and monitor their progress towards achieving a goal would have an effect on their engagement, subsequently their achievement and self-efficacy. The study found that setting goals had a positive impact on student engagement in the classroom.

INTRODUCTION AND BACKGROUND

Grafton High School is a small rural school located in the town of Grafton, in the northeastern corner of North Dakota. The majority of Grafton's population work in an agricultural related field, be it farming or processing the crops. The entire school district is comprised of the elementary, middle, and high school in Grafton. There are about 254 students in the high school, however, this number fluctuates throughout the year (Grafton Public Schools, 2018). About seven percent of the families are classified as migrant families; these families relocate to Texas or Mexico around the end of October and they do not return until March, if at all. The school is about 30% Hispanic and 3% of the students qualify for special services because of their limited English proficiency, however, many more live in homes where English is not the primary language spoken (Statewide Longitudinal Data System, 2018). Twenty seven percent of our students have a learning disability and are on an individualized educational plan (IEP) or are designated 504 (Statewide Longitudinal Data System, 2018). More than 16% of the population of Grafton live below the poverty line, which is higher than the state average (U.S. Census Bureau, 2015). Resultantly, 41% of our students are on free and reduced lunches.

Many of our students that fall into the categories mentioned above struggle in school. These students lack some of the basic skills needed to achieve high marks on state assessments, such as basic reading, writing, and mathematics. Our district continually scores below the average on state assessments. As a result, Grafton Public Schools has been placed on several school improvement plans, and our elementary has been listed as needing targeted intervention (M. Kaiser, personal communication, March

7, 2017). Many of our students have struggled in school from a young age, and their confidence has been in a steady decline each year. Likewise, student engagement seems to drop as well.

Due to the enactment of the Every Student Succeeds Act (ESSA), North Dakota has a new accountability system that replaced the Annual Yearly Progress reports under No Child Left Behind. I kept this in mind when selecting my research topic, as I wanted a topic that could improve my classroom teaching relating to one of the indicators of successful high schools according to the ESSA plan. One of the main indicators of a successful school, for high school in the ESSA plan is student engagement. In further researching, I found that student engagement, self-efficacy, and academic achievement were all interconnected with one another. I am a firm believer that setting and monitoring goals can serve as a great way to keep individuals focused, invested, and involved in enormous, multi-faceted undertakings, such as education.

I decided to merge these two ideas and focused my research on how goal-setting and monitoring affects student engagement, self-efficacy, and academic achievement. My focus question was "Will setting and monitoring attainable academic goals improve student engagement?" Besides the main focus question these sub-questions were created as follows:

1. Will setting goals increase the student's academic achievement?
2. Will setting goals increase the student's self-efficacy?

Due to the low motivation to perform well in school that is typically seen with the students that fall into the demographics mentioned above; as well as the newly enacted ESSA plan, I designated these questions to be my focus for this study.

CONCEPTUAL FRAMEWORK

In schools all over the country students believe that learning is a passive process, and they have no control over their own learning (Curan & Rosen, 2006). Therefore, it is important for educators to promote student self-efficacy in the classroom. Self-efficacy can be described as the belief that one can succeed at something (Bandura, 1997). A student's self-efficacy is dependent on a myriad of factors. Self-efficacy can vary based on the class or content, and a student's past experiences and achievements will also have an impact. Some factors that influence a student's self-efficacy are within the teacher's control, but many factors lie outside the control for most classroom teachers, e.g., a student's past experiences (Curan & Rosen, 2006).

It is hard to have a conversation about self-efficacy that does not eventually cover the topic of mindsets. There are two mindsets regarding the way individuals view intelligence: fixed mindsets, and growth mindsets (Dweck, 2018). Fixed mindset individuals tend to view intelligence as an innate trait that cannot be modified, while growth mindset individuals view intelligence as an ability that they can cultivate over time (Dweck, 2018). These mindsets can lead students to approach a problem or a challenge in the classroom differently. A fixed mindset student tends to value looking smart above learning the material even if that means sacrificing an opportunity to learn (Dweck, 2018). In contrast, growth mindset students enjoy being challenged and view

mistakes as steps along the path to understanding (Dweck, 2018). Understanding a student's personal mindset can give an educator a behind the scenes look at what is driving the student's self-efficacy, and their motivation to keep trying even when they are facing adversity.

Student success will only happen when students accept they are responsible for whether they succeed or fail (Tannen, 2007). An important step towards students developing self-efficacy, besides fostering a growth mindset, is getting the student engaged in the course and the content. Research shows that students who are engaged in a class are more likely to exhibit the behaviors associated with academic success, such as strong attendance, and completing assignments and readings prior to class (Curan & Rosen, 2006). Research studies have shown goal setting and student engagement have a positive relationship; however, the research studying the effect goal setting has on student achievement has been rather lacking (Moeller, Theiler, & Wu, 2011).

Tannen (2007) found that goal setting changes the responsibility of student success from the instructor and puts it back on the student. It becomes harder to fail when a student is responsible for his or her own grade, as well as the amount of effort he or she put into achieving it (Tannen, 2007). In education there are two main types of goals: mastery goals, and performance goals. According to Dale Schunk (2008), mastery goals are derived from intrinsic sources, they revolve around learning a task completely, and mastering the task. The use of mastery goals also focuses on developing new skills to accomplish challenging tasks. The desire for a student to set and complete a mastery goals comes from a student's enjoyment of learning (Wilson & Kim, 2016).

Comparatively, performance goals are described as goals that are derived from extrinsic sources (Midgley, C., Kaplan, A., Middleton, M., Urdan, T., Maehr. M. L., Hicks, L., Roeser, R. W. 1998). Students perform a task because these extrinsic sources provide the student with a reward, such as a desired grade on a test. Performance goals work well in the short term, but motivation can begin to decline over time especially when the student feels the reward is not worth the effort required for accomplishing the task (Midgley et al. 1998). Each type of goal has benefits and drawbacks, but both types of goals result in increased motivation for students to learn and achieve. Therefore, either type of goal could be an effective method for increasing the student's engagement in the class, as well as their self-efficacy.

As previously mentioned, there has been some research investigating the relationship between goal setting and student engagement, but not as much research has been done on the correlation between goal setting and academic achievement. One such study conducted at the University of Nebraska examined the correlation between the goal setting process and student achievement. The study found that there was a significant correlation between the goal setting process and the achievement of the students (Moeller et al. 2011).

In other studies, goal setting has been shown to be an effective strategy to increase achievement and motivation. Many students believe goal setting to be a positive experience and attribute their high motivation and achievement to the goal setting process (Snyder, 2017). Not all goals are created equally, especially when considering student achievement and self-efficacy, indicating the importance of providing students the

opportunity to set their own goals. Often, achievement goals are set by a school or grade level. When students set their own goals, it can be guaranteed that the goal is understood by the student and is generally more concrete (Newman, 2012). According to Newman (2012), personal student goals can successfully enhance student investment in the learning process, and most students will believe they can be successful in completing a goal they have set themselves.

Goal setting has been shown to affect other areas in the learning process that may have a positive impact on a student's academic achievement. Student self-efficacy was shown to increase with the use of goal setting (Munoz, 2014). It is not surprising that a student's confidence in their ability to achieve would increase when he or she is striving for a goal that he or she has set. Another aspect of learning that was increased as a result of goal setting was the student's self-directed learning. Goal setting was shown to make the students more responsible and autonomous in their learning (Munoz, 2014). These studies indicate that classroom factors like goal setting, academic achievement, student engagement, and self-efficacy are all interconnected with one another. It is because of this, research that explores impact goal setting has on the learning process often delves into these three aspects.

Several studies had results that did not support and at times contradicted one another; however, this could possibly be explained due to the limitations of the studies themselves, which will be discussed in part below. The inconsistences at times varied on how much of an impact goal setting had on each of the interconnected parts of the learning process: student engagement, academic achievement and self-efficacy, and at

other times the data showed inconclusive results for one part or another. Several of the researchers included the limitations of their own studies. One limitation, which was evident in the Curan and Rosen (2006) study, is that the courses chosen to conduct the study were required courses, and the results may have been different had they chosen an elective class, or an upper level class in a student's chosen field of study. Most of the studies only focused on one age group of students which was specifically noted in the study conducted by Snyder (2017). Likewise, a majority of the studies only ran for a short period of time. In the study conducted by Snyder (2017), the scope of the research was to determine how the strategy of goal setting worked within the particular school being studied, consequently the results may not be applicable for other schools with a different population of students. A final limitation of this research study was any student identified as special needs was excluded from the study (Snyder, 2017).

The next step for researching goal setting affects the learning process would be to try to clarify the impact it has on all students. As identified in the limitations of several of the studies, the impact of goal setting may differ with the population of students. Conducting a study to explore the effects of goal setting with students with different levels of cognitive abilities, socio-economic status, ages, race, gender, and education levels is an area that requires more research. Goal setting influences the learning process in numerous ways. Further research is required to isolate the impacts on each of the other related areas of study: achievement, student engagement, and self-efficacy.

METHODOLOGY

As stated prior, the focus of this action research was to measure the effect of setting and monitoring goals on students' engagement across all demographics. Several sub questions were also researched. These questions consisted of looking at the effect of setting and monitoring goals on academic achievement, and their self-efficacy. The study was designed with two sections, a pre-treatment phase and a treatment phase. During the pre-treatment phase of the study, data was collected and used as a baseline for comparison after the treatment phase was conducted. Each phase of the study lasted nine weeks, or one academic quarter.

The data was analyzed and every student in the course was included in the analysis. Furthermore, I made sure to include demographics that were previously ignored in prior studies, throughout this study. The major demographics analyzed were, Hispanic students, Non-Hispanic students, students in the low socioeconomic status (SES) bracket, students not in the low SES bracket, students receiving academic assistance; these would be individualized education plans (IEPs), academic 504 plans, English Language Learners (ELL), and finally students not receiving academic assistance. The data from all the demographics were compiled and analyzed together. The data was also analyzed among the specific demographic groups individually and will only be mentioned if the data differs in a significant way from the whole group analysis.

During the treatment phase, students in my tenth grade physical science classes were asked to set academic goals pertaining to the physical science class. They had to fill out a document called My Goal (Appendix A). Along with setting their goal, they were

asked to monitor their progress towards reaching their goal. Students filled out a self-evaluation form Goal Monitoring (Appendix B) to check how they were progressing towards reaching their goal each week.

To test the impact goal setting had on student engagement, two different types of data were collected. First a Student Engagement Teacher Observation was run, wherein all students were observed for short time and marked as either being actively engaged, passively engaged, or not engaged. Each student was observed twice in a class period. The second form of data collected was a Student Engagement Self-Survey (Appendix C). Students were asked to rate their engagement with a numeric value on a scale one through five. Along with the numeric value they rated themselves, the students were asked to provide an explanation as to why they rated themselves at that level. This data was collected twice in each phase of the study. Each time they were collected on a review day, as a way to keep the daily activities the same for an accurate comparison. A Wilcoxon signed rank test was run on the numeric self-rating provided by the students. These two pieces of engagement data were administered both pre-treatment and during the treatment phases. Together, the Student Engagement Teacher Observation and Student Engagement Self-Survey will be used to address the student's overall engagement in the class.

To look at the effects of goal setting and monitoring on academic achievement, students were given the same content-based Chapter Test before and after explicit instruction on the content for the chapter. Chapter 15 Test (Appendix D) and Chapter 16 Test (Appendix E) were administered in the pre-treatment phase. Chapter 17 Test

(Appendix F) and Chapter 18 Test (Appendix G) were administered during the treatment phase of the study. The scores were analyzed using mean, median, and normalized gains, then presented with box and whisker plots to look for growth.

In order to study goal setting's effect on a student's self-efficacy, multiple sources of data were used. First, an Academic Achievement Survey (Appendix H) survey was administered pre and post treatment. Each of the possible choices was converted to a numeric value and a Wilcoxon Signed Rank Test was run to check for a significant difference between the students' beliefs of their ability to achieve. Second, the students were asked to complete Study Logs (Appendix I). Study Logs were administered during the pre-treatment and post-treatment phases. The students monitored and recorded when, where, length of time, and how effective they felt their study session had been. Third, students completed a Study Habits Survey (Appendix J) given pre and post treatment. The student responses were analyzed with a Wilcoxon Signed Rank Test. All these sources helped to deliver a complete picture of how much individualized effort a student was willing to put into their academic achievement. High levels of effort indicate that students believe that their efforts will be beneficial and aid in their academic achievement.

Finally, the last source of data collected was personal Interviews (Appendix K), which were conducted with a male and female student selected from each demographic at random when possible. The interview was conducted post-treatment and asked students to reflect on the entire process of setting their goals and then monitoring them throughout

the study. The interview was used to explain trends and observations the quantitative data could not.

In order to study the effect setting goals had on student engagement, achievement and self-efficacy, this study was conducted over several weeks with a variety of data sources used to help ensure validity. This study looked at how goal-setting affected each of these aspects of the learning process individually, which can be seen in Table 1. It also looked at the impact it had on the different demographics one could find within a school.

Table 1
Data Triangulation Matrix

Research Question	1	2	3
1. Does goal setting improve student engagement?	Student Engagement Teacher Observations	Student Engagement Self-Surveys	Interview Questions
2. Does goal setting improve student self-efficacy?	Study Logs	Confidence Surveys	Interview Questions
3. Does goal setting improve academic achievement?	Pre/Post Test Scores	Confidence Surveys	Interview Questions

DATA ANALYSIS

The Student Engagement Teacher Observation and Student Engagement Self-Survey for both the pre-treatment and treatment phases were administered during a test review day. Selecting a review day allowed for many of the day specific activities to remain consistent. The observation sessions were conducted and recorded by the teacher throughout the entire lesson. A total of 55 students were observed twice ($N = 110$).

During the observation, if a student was actively off task, they were mark as being disengaged. Disengagement presents itself differently for each learning task, but an example could be actively performing a task other than the desired task. A student was recorded as being passively engaged if they were not actively off task, but also not actively on task. Examples of this may include watching a video, looking at the teacher during a lecture, or reading silently. An actively engaged student, was considered to be a student performing an observable activity related to the learning task. Examples of this may include students answering a question, or taking notes, or reading a selection of text aloud to the class or a group of students. It was this set of criteria used to determine if a student was recorded as actively engaged, passively engaged, or disengaged. The results of the Student Engagement Teacher Observation for the pre-treatment phase showed that 20% of the students were marked as actively engaged, 72.73% of students were marked as passively engaged and 7.27% were disengaged, as seen in Figure 1.

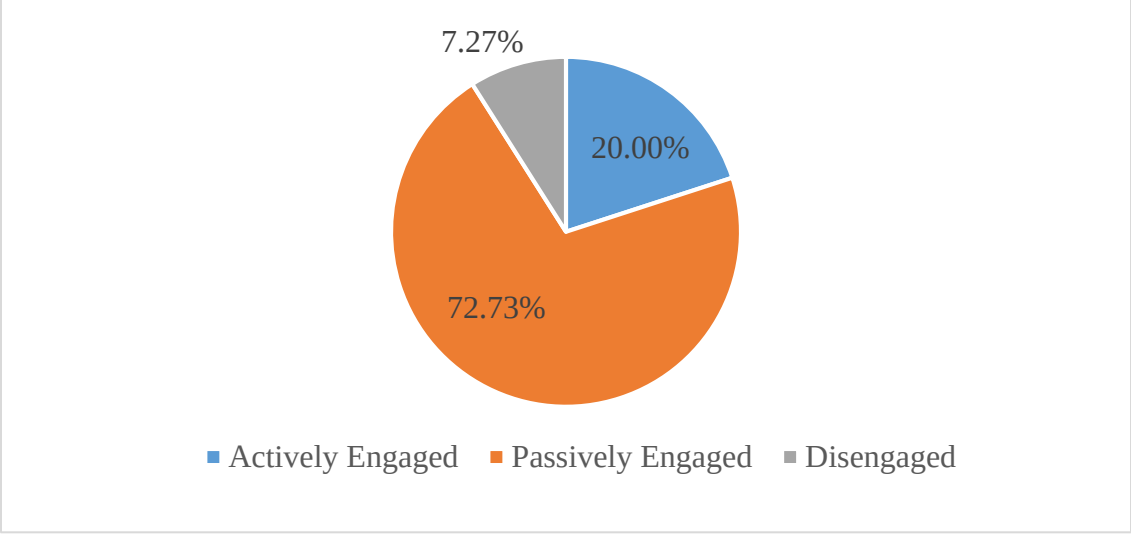

Figure 1. Student engagement teacher observation pre-treatment phase, (N = 110).

At the end of class students were asked to complete a Student Engagement Self-Survey (N = 55). The students assigned themselves a numeric value of one through five describing how engaged they felt they were during the lesson. A definition and example of a possible student behavior associated with each of the possible scores a student could select in the Student Engagement Self-Survey can be seen in Table 2. The breakdown of how the students rated themselves can be seen in Table 3.

Table 2
Student Engagement Self-Survey Explanation

Self-Survey Score	Definition	Example
1	Actively avoiding the learning task.	A student doing homework for another class.
2	Not focusing on the learning task.	A student daydreaming and not able to repeat an answer previously stated.
3	Somewhat focusing on the learning task.	A student watching a video, but unable to answer specific questions about the video.
4	Focusing a great deal on the learning task.	A student listening to a lecture and later can answer specific questions about the information discussed.
5	Actively engaged on the learning task	A student who is taking notes while watching a video.

Note: A brief description and example of what types of behaviors would be scored 1-5.

Table 3
Student Engagement Self-Survey

Learning Activity	1	2	3	4	5
Review Activity	1.9%	1.9%	19.2%	36.6%	40.4%

Note: Students self-evaluated their engagement on a scale of one to five for the pre-treatment phase ($N = 55$).

When comparing the information from the two sources, a student rating themselves as a one would have been considered disengaged when observed. A student who is rating themselves as a two may be marked as either disengaged, or passively engaged, depended on their action and the learning task. A student self-rating of a three will always be marked as passively engaged. A four rating by a student much like the two rating can be marked as either passively engaged or actively engaged depending upon the activities being performed. The five rating by a student would have been recorded as being actively engaged. The treatment phase engagement data was analyzed in the same manner as the pre-treatment data.

The Student Engagement Teacher Observation for the treatment phase indicated 64.54% of students were marked as actively engaged, 28.18% were marked as passively engaged, and 7.27% of students were marked as disengaged which can be seen in Figure 2.

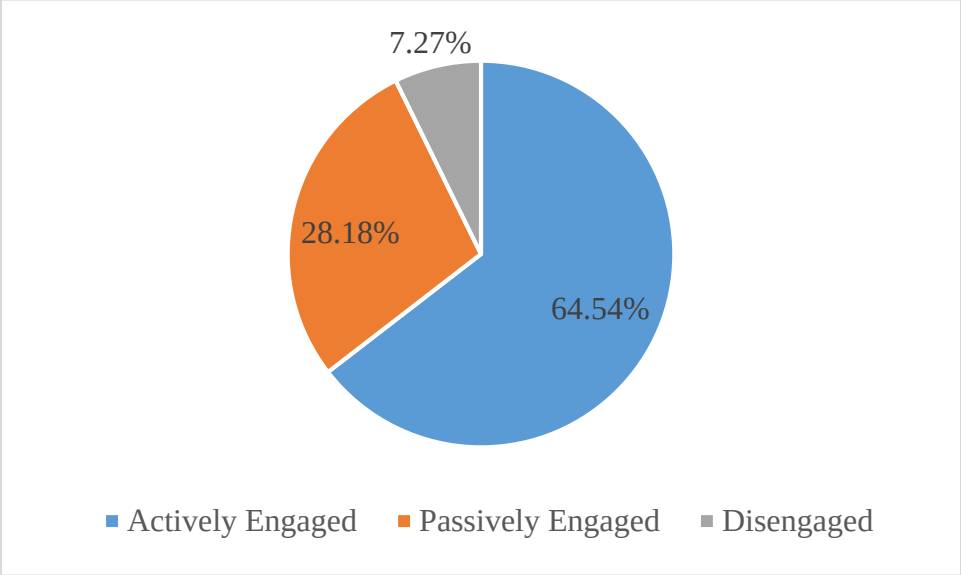

Figure 2. Student Engagement Teacher Observation treatment phase, (*N* = 110).

At the end of class again students were asked to complete a Student Engagement Self-Survey (*N* = 55). Again, students assigned themselves a numeric value for their preserved level of engagement which was explained to them according to Table 2.

Table 4
Student Engagement Self-Survey

Learning Activity	1	2	3	4	5
Review Activity	N/A	1.8%	18.2%	21.8%	58.2%

Note: Students self-evaluated their engagement on a scale of one to five for the treatment phase (*N* = 55).

The next stage in the study was to collect academic achievement data of the students. The data collected from the chapter test included two tests for each phase of the study. The pre-treatment phase included the Chapter 15 Test and Chapter 16 Test. The treatment phase consisted of the Chapter 17 Test and Chapter 18 Test. All tests saw an increase in scores from the pre-test to the post-test as seen in Table 5.

Table 5
Chapter Test Data

	Pre-Test		Post-Test		Normalized Gains
Pre-Treatment Phase	Mean	Median	Mean	Median	
Chapter 15 Test	59.5%	60%	88.8%	92%	72.7
Chapter 16 Test	45%	50%	89.3%	92%	81.1
Treatment Phase					
Chapter 17 Test	45.5%	50%	90.3%	93%	81.4
Chapter 18 Test	46.3%	50%	90.8%	93%	82.4

Note: Test data for the chapter tests administered for this study ($N = 60$).

The chapter 15 pre-test had a mean of 59.5% and a median of 60%. The post-test mean increased to 88.8% and the median score also increased to 92% as seen in Figure 3. When calculating the normalized gains, the Chapter 15 Test saw an increase of 72.7. The mean score for the pre-test of chapter 16 was 45% and the median was 50%, while the post-tests scores, were 89.3% and 92% respectively as seen in Figure 4.

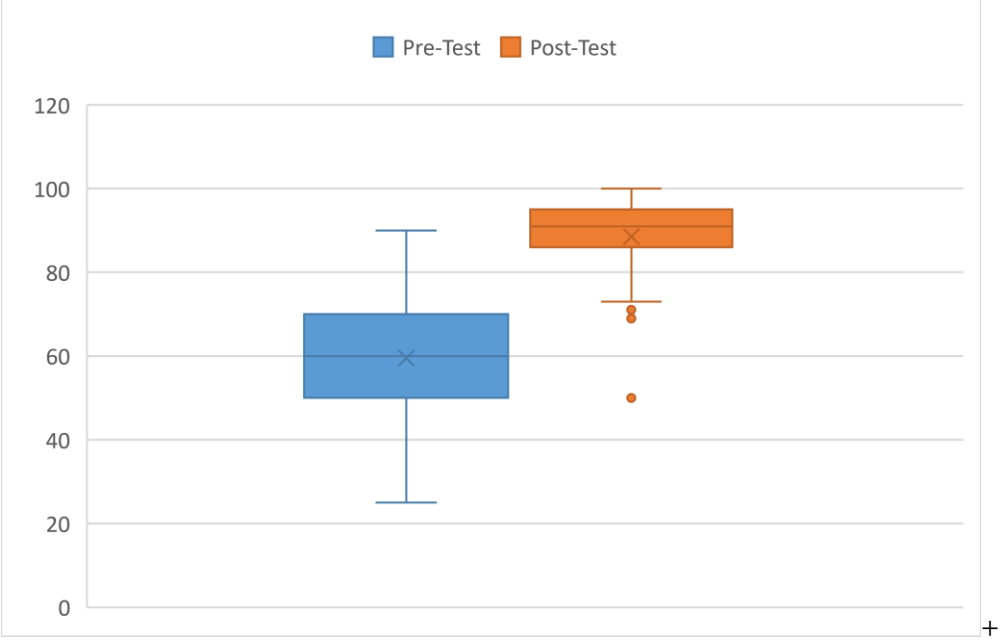

Figure 3. Results of the pre and post-test scores for the Chapter 15 test, (*N* = 60).

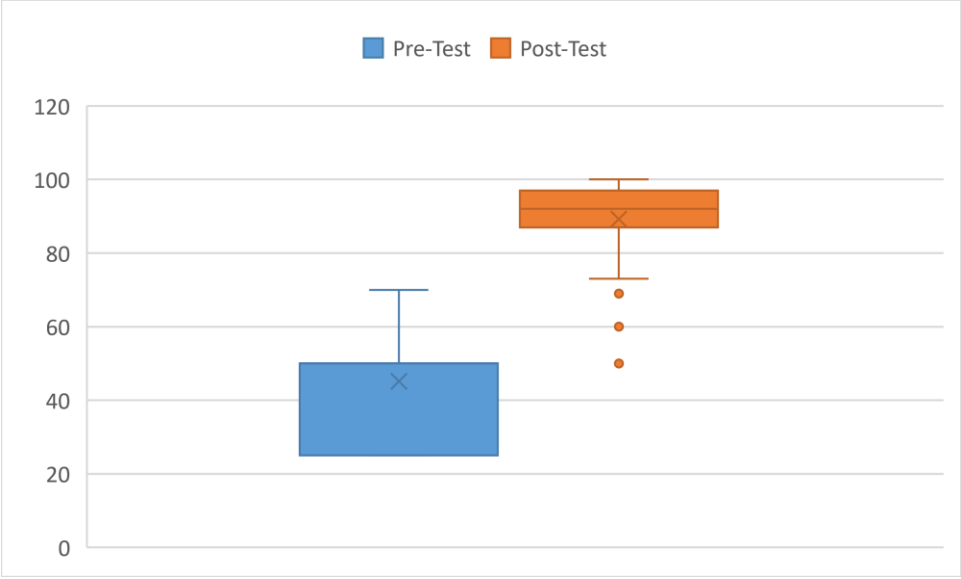

Figure 4. Results of the pre and post-test scores for the Chapter 16 test, (*N* = 60).

Normalized gains for the Chapter 16 Test showed a gain of 81.1. In the treatment phase the Chapter 17 Test mean score increased from 45.5% on the pre-test to 90.3% on the post-test, while the median increased from 50% to 93% as seen in Figure 5. The normalized gains on the Chapter 17 Test were 81.4. The Chapter 18 Test saw the biggest

increase in mean averages starting with 46.3% on the pre-test and 90.8% on the post-test as seen in Figure 6. The median scores of the Chapter 18 Test increased from 50% to 93% on the pre-test to the post-test and saw a normalized gain score of 82.4.

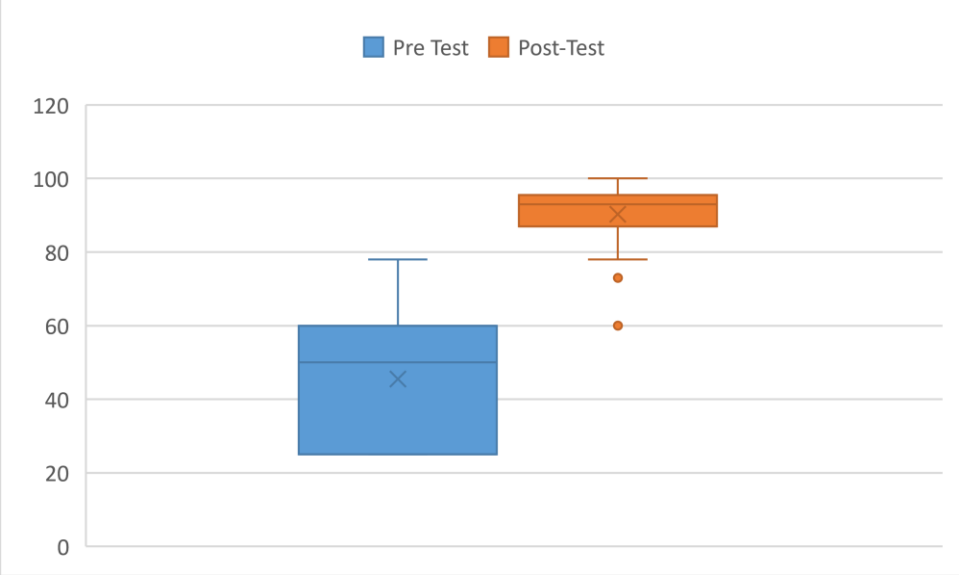

Figure 5. Results of the pre and post-test scores for the Chapter 17 test, (N = 60).

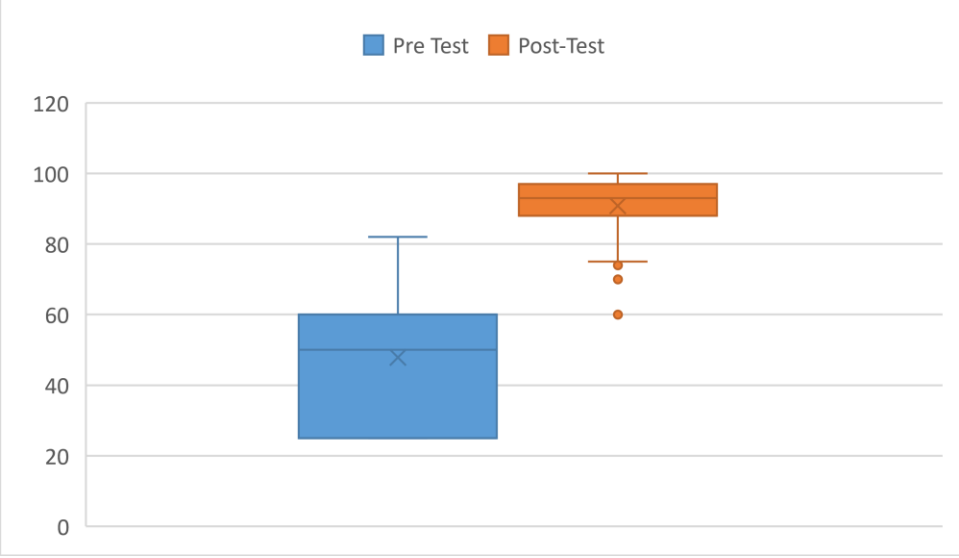

Figure 6. Results of the pre and post-test scores for the Chapter 18 test, (N = 60).

When analyzing test data for the various subgroups individually, there were only slight differences of two to three percent between the mean and normalized gains as

compared to the entire sample group. Two subgroups I did not account for which will be discussed further in the sections to follow, was the group of students already have academic goals set for themselves, and the group of students that did not. One student in the interview stated, “Doing these goals didn’t change anything because I already set goals for myself, I just don’t write them down.” When looking at this student’s data individually I saw that their average test scores only varied a percent or two. I also had two students who stated they never set goals for themselves. One student said, “I think this helped me a lot, usually I just do what I do and I get the grade I get.” Both of these students expressed that they believed setting goals helped them achieve higher marks in the class. Again, when analyzing these two student’s test averages their averages increased by more than ten percent. Interview data indicated that these two groups are affecting the achievement data.

The first self-efficacy data collected was the Academic Achievement survey. After the survey was administered pre and post-treatment, a Wilcoxon Rank Sign Test was run on the responses, looking for a p-value of $p < .05$ in order to reject the null hypothesis. When looking at the class as a whole, all demographics included, both questions one and two had a p-value greater than .05, indicating that the results of the survey showed no significant change in the responses. This trend continued when looking at the different sub-sets of demographics in this study.

The second self-efficacy data that was collected was the information obtained from the Study Logs. In the Study Logs, students were asked to record the amount of time they spent studying or working on material for class outside of class time. They

were also asked to record how effective they felt the study session had been. An example can be found in Table 6.

Table 6
Study Log Perceived Effectiveness Explanation

Study Log Score	Definition	Example
1	The student did not learn anything new or did not make progress on the assignment.	The student watching tv with their notes open, but not really working on anything.
2	The student made progress towards understanding the learning task.	The student memorizing terms or completing some problems but still unsure how to do some.
3	The student learned and understands the material.	The student understands the material and can answer all questions relating to it.
4	The student learned how to apply the material to abstract topics.	The student can apply what they learned to areas of their life other than academics.

There was a decrease in the amount of time spent studying per week from the pre-treatment to the treatment phase; however, the perceived level of effectiveness of the study session remained similar for both phases. During the pre-treatment phase the students studied an average of .93 hours per week, with a perceived effectiveness average score of 2.85. During the treatment phase the amount of time for each student spent studying fell to .19 hours per week, with a perceived level of effectiveness of 2.88. There were several oddities that arose when analyzing the Study Log data which will be discussed further in the paper.

Finally, the last piece of data collected pertaining to the students' self-efficacy was a Study Habits survey. Students were given Likert style questions and asked to answer questions related to their personal study habits. For these questions I analyzed them as whole group data as well as looked at the individual demographics. When running the Wilcoxon Rank Signed Test for the whole group data, every question came back as non-significant with p-value scores of $p > .05$. When I looked at the data within the specific demographics, I saw much of the same with only one exception. In the Hispanic subgroup there was one question that came back as having a statistically significant increase from the pre-treatment to treatment phase. Question 4 asked how likely a student was to ask a friend for help if they were struggling, within the Hispanic subgroup this question had a p-value of $p < .05$.

INTERPRETATION AND CONCLUSION

This study had three focus areas: how did setting and monitoring goals impact a student's engagement, academic achievement, and self-efficacy. The study analyzed the effects on all demographics of students within a population. The first piece to this study analyzed was the student engagement. As I mentioned before, I conducted the engagement studies on review days for chapter tests. This was done to try and keep the two separate days as similar as possible. There were, however, two major differences between the two days they surveys were conducted. First, the content of the tests were different, but they both were related to the field of chemistry. Secondly, as it was part of the study, the students started the class by monitoring their progress towards reaching their goal before the review activities began for the treatment data. The data shows that

there was a major increase, 44.54%, in actively engaged students from the pre-treatment to the treatment phase for the Student Engagement Teacher Observation. I attribute this increase to goal setting process, because most of the students had listed studying for tests and asking questions when they were confused as ways to help them reach their goal. Many of the reasons why students were marked as actively engaged was because they were completing the review activities or asking questions. Another observation to note was that during each phase, there were eight times students were marked as disengaged in this observation. As a reminder each student was observed twice, and these eight observations were not the same four students marked disengaged twice. As for the Student Engagement Self-Survey, there was not as dramatic of a shift but there still was an increase in levels of engagement noted by the students. Again, as for the same reasons mentions above, I would attribute this increase in student engagement to the goal setting process that the students were involved with in the treatment phase of this study.

These results were consistent and supported by some of the students' own opinions of the goal setting process. When asked, "What kind of impact did setting goals and the monitoring those goals have on you?" One student responded with, "I pay attention more, and try to participate in the activities more, and I try to ask questions too." Another student said, "I actually do the labs and stuff to try and understand them, rather than just to get them done for a grade now." The data suggests that the goal setting process administered in this study had a positive relationship with the number of students actively engaged in the class.

The next focus area of the study was the impact on the student's academic achievement. According to the data there did not seem to a correlation between students setting goals and their overall achievement when monitoring the class as a whole. The achievement data was analyzed by class average and normalized gains. With both methods of analysis, there was a small but continual improvement on each of the four tests administered during the study. Since there was no drastic increase between the pre-treatment and treatment phase, I feel that the steady improvement was the result of something other than setting and monitoring their goals.

When looking at some of the students individually you can see a pattern start to emerge, but as this was not part of the study there is not enough data to draw a conclusion from. However, I do feel it had an effect on the study, so I will mention it here. During the interviews two students made the comment that that their grades had improved and gave credit to the fact that they set goals. After further probing they had stated that they do not set academic goals for themselves in their classes. In contrast four students stated that their grade did not change much, and that setting the goals did not do anything for them, because they already held the expectation of themselves to earn good grades in their classes. It appears that the results of the study would change significantly if I were to only include students who did not already have an expectation to have a high level of academic achievement set for themselves.

Finally, the last focus area of the study was investigating the effect goal setting had on a student's self-efficacy. There were multiple metrics used to collect data of the effects on self-efficacy, all of which suggested the same, there was no effect. All the data

suggested that the students did not believe they had a larger role in their learning than before. There were a few oddities that were present in the self-efficacy data. The first oddity comes from the Study Logs. The amount of time spent studying actually decreased from the pre-treatment phase to the treatment phase. When looking at the data and the time of the year that the study was conducted a possible answer presents itself. The pre-treatment phase of the study began at the beginning of the school year. If you remove the first third of the pre-treatment phase and average the study times again, the average becomes much closer to the treatment phase average. This suggests to me that the decrease in study time may have more to do with the time of the school year than anything else. The other piece of data that stands out comes from when I analyzed the results of the Study Habits Survey, and separated out the answers by the different demographics within the study. There is one question that had a significant increase from the pre-treatment phase to the treatment phase. For the Hispanic demographic, the students were much more likely to ask a friend to help them understand during the treatment phase than they were during the pre-treatment phase. This data is supported again by the interviews. A student from the Hispanic demographic stated, "I didn't wanna look dumb to my friends, so I never used to ask them for help, but now if I am doing homework in study hall I will ask my friend to help me."

To surmise, for the three focus questions of this study, "Will setting and monitoring attainable academic goals improve student engagement?", "Will setting goals increase the student's academic achievement?", "Will setting goals increase the student's self-efficacy?" The data suggests a positive relationship between goal setting and student

engagement, while suggesting no relationship between goal setting and academic achievement, or self-efficacy.

VALUE

The study set out to investigate the effects goal setting had on an entire student population among a variety of demographics. It supports previous findings that goal setting has a positive relationship with the learning process. Student engagement and self-efficacy have a complicated and intertwined effect on a student's academic achievement. This study helps to clarify how goal setting impacts these two parts of the learning process. This study also leads to further questions and possible more research to fully understand goal settings role. It was revealed in the study that some students set goals for themselves, while others do not. In order to gain a clearer picture of what effects goal setting has on a student population, a study needs to be conducted examining solely the group of students who do not already set academic goals for themselves.

One major outcome of this study was that I can support the claim that no two students are the same, and there is no one size fits all answer to education. While goal setting helped some, it did not help others. Some students saw that what they were doing was not effective or helping them achieve their goal and they changed their habits, while others saw the same thing and made no such changes. Which leads to another major outcome, learning is an individual and personal endeavor, that requires time and practice to learn how one learns best. Several students that were part of this study saw improvements in all their classes, because they took advantage of resources they never used to use, or they applied the things that made them successful in the science class to

all of their other classes as well. As educators, we need to spend time helping students find out how they learn best, and help them accumulate a variety of techniques to be successful learners.

As I have mentioned previously, I believe that the results of this action research project would change drastically if I focused solely on those students, who prior to treatment did not set academic goals for themselves. This idea is supported by the interview process, in which I found, I had to reassure several students that believing and saying setting goals did not help them was fine. Most of those students still felt they needed to explain further and mentioned they already set goals for themselves, they just do not write them down. The most logical next steps to take would be to focus on the students that do already have academic goals and see how setting goals helps them as a specific subgroup. Another possible next step would be to incorporate time to teach the students different strategies needed for being a successful student. Many students stated that in order to reach their academic goal they set, they would need to take good notes, study and review more. Conducting this study again, but teach various note taking strategies, or study habits may give students more tactics to use to reach their goals.

This process has taught me much about myself as an educator and shown me several areas in which I can grow. One such area is the assumptions I bring with me into my classroom. For this action research project, I assumed that every student understood goals and could set good, measurable goals for themselves. I found out quickly that I was wrong. What I thought would take about 15 minutes ended up taking the entire class. Some students have never set a goal for themselves, and others did not know how to state

their goals in a measurable way. There were many goals that read, “I want to do better…”, or “I want a good grade...”

I also learned that some students did not know how to be studious students. I briefly touched on this topic above, in mentioning possible next steps. It is not uncommon that students do not know how to take notes or how to study. They think simply reading the vocab terms for the chapter is studying for a test. I learned this lesson about halfway through this project through discussion with the students when they monitored their goals and some of them were not on track to reach their goal some would say, “But I’m taking notes…” or “But I studied…” to which I would reply, “Did you take good notes?” or “Did you study enough, or the right material?” Another assumption of mine, was by the time they reached high school they would have been taught how to take notes, and how to study, as I was taught. That through these insights gained I feel, this project has impacted me as an educator in a variety of ways, and I do know that I am better off because of it.

As a result of this study, I will continue to have students set and monitor goals in my class. It was valuable experience for many of my students. It was an extremely valuable tool for those students who do not already set academic goals for themselves. It would require further study and analysis, but from the information gathered in this study, I believe there is evidence supporting that goal setting helps to lessen the achievement gap between high performing students and low performing students. I believe that having students set goals and monitor their progress in reaching them is an effective way to

remind the students that they are in school for a purpose, and they are fundamental in their learning process.

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APPENDICES

APPENDIX A

MY GOAL

	A	B
1		
2	**My Goal**	
3		
4		
5	**It will be completed by**	
6		
7		
8	**These are the steps I will take to reach my goal.**	1)
9		2)
10		3)
11		4)
12		5)
13		
14	**These things will help me reach my goal.**	1)
15		2)
16		3)
17		
18	**I know I will have met my goal because...**	
19		
20		
21		

APPENDIX B

GOAL MONITORING SURVEY

Goal Monitoring

1. Do you think you are on track to complete your goal? Why or Why not?

2. Have you completed any of your steps to reach your goal this week? Explain why or why not.

3. Are you doing the things you identified to help you reach your goal? If yes what are you doing, if not what should you be doing?

4. Do you think the things you identified to help you reach your goal are working? Why or why not? If not, what do you think you should do instead.

5. What are your next steps going forward to reach your goal?

APPENDIX C

STUDENT ENGAGEMENT SELF-SURVEY

Engagement Survey

Form description

1. How engaged were you while watching the video? *

- 1 - Not engage at all, actively doing something else
- 2 - Engaged very little, not actively doing something else, thinking about other things
- 3 - Somewhat engaged, not thinking about anything else but also not focusing on the task
- 4 - Engaged, focusing on the task
- 5 - Extremely engaged, actively working towards the task, fully focusing on it

2. Why did you score yourself this way? (What were you doing?) *

Long answer text

3. If any, what would have kept you more engaged? *

4. How engaged were you during the discussion? *

- 1 - Not engage at all, actively doing something else
- 2 - Engaged very little, not actively doing something else, thinking about other things
- 3 - Somewhat engaged, not thinking about anything else but also not focusing on the task
- 4 - Engaged, focusing on the task
- 5 - Extremely engaged, actively working towards the task, fully focusing on it

5. Why did you score yourself this way? (What were you doing?) *

Long answer text

6. If any, what would have kept you more engaged? *

7. How engaged were you during the notes? *

- 1 - Not engage at all, actively doing something else
- 2 - Engaged very little, not actively doing something else, thinking about other things
- 3 - Somewhat engaged, not thinking about anything else but also not focusing on the task
- 4 - Engaged, focusing on the task
- 5 - Extremely engaged, actively working towards the task, fully focusing on it

8. Why did you score yourself this way? (What were you doing?) *

Long answer text

9. If any, what would have kept you more engaged? *

APPENDIX D

CHAPTER 15 TEST

Physical Science Chapter 15 Test

Name:_____

I CAN Explain the kinetic theory of matter

_____1. The kinetic theory states that the higher the temperature, the faster the (L2)
A. particles that make up a substance move
B. bonds between atoms break down
C. molecules of gas rush together
D. lighter particles within a substance clump together

_____2. Temperature is a measure of the average _____ energy of the particles in the object. (L2)
A. thermal C. potential
B. kinetic D. chemical

I CAN Describe how particles move in the different states of matter

_____3. Which state of matter has definite volume, but not shape? (L1)
A. plasma C. liquid
B. gas D. solid

_____4. The only state of matter that is *not* a fluid is (L2)
A. water C. liquid
B. gas D. solid

I CAN Describe how energy is involved in state changes

_____5. The process of a liquid becoming a gas is called (L1)
A. sublimation C. evaporation
B. condensation D. freezing

For the following state changes write whether energy is <u>Required</u> or <u>Released</u>

_____6. Melting (L2)
_____7. Evaporation (L2)
_____8. Freezing (L2)

I CAN Determine the differences between substances and mixtures

_____9. The science of what matter is made of, its properties and how it interacts and changes is called (L1)
A. chemistry C. kinetics
B. physics D. engineering

_____10. Matter can be defined as anything that (L1)
A. can be seen and touched C. can be weighed
B. has mass and takes up space D. contains kinetic energy

_____11. When two or more substances are combined so each substance can be separated by physical means, the result is a(n) _____. (L2)

A. chemical change C. element
B. compound D. mixture

12. Why are light and sound not forms of matter? (L4)

I CAN Identify elements and compounds

_____13. The smallest unit of an element that maintains the properties of the element is a(n) (L1)
A. element C. atom
B. molecule D. compound

_____14. A substance made of atoms of 2 or more different elements that are chemically combined is (L1)
A. an element C. a mixture
B. a compound D. a solution

_____15. Which of the following is an element? (L2)
A. steel C. nitrogen
B. bronze D. brass

_____16. Which of the following is a compound? (L2)
A. O C. milk
B. Ag D. water

I CAN Identify and describe properties of mixtures

_____17. A(n) _____ is a homogeneous mixture of particles so small they cannot be seen without microscopes and will never settle to the bottom of their container (L1)
A. solution C. colloid
B. element D. suspension

_____18. A(n) _____ is a mixture that settles upon standing (L1)
A. solution C. suspension
B. colloid D. element

_____19. A type of heterogeneous mixture is a _____. (L2)
A. liquid C. substance
B. solution D. suspension

20. Give 1 example of a heterogeneous mixture and 1 example of a homogeneous mixture (L3)

21. What type of mixture is a pop? Explain your answer. (L3)

I CAN Determine what physical and chemical properties are

_____22. Any characteristic of a material that you can observe without changing the identity of the substance is a(n) (L1)
A. invisible property C. identifying property

B. physical property D. chemical property

_____23. The shape of an apple is a _____. (L2)
A. chemical change C. physical property
B. chemical property D. physical change

24. What is a chemical property of a banana? (L4)

I CAN Explain similarities and differences of physical and chemical changes
_____25. The process for separating substances in a mixture by evaporating a liquid and recondensing its vapor is called (L1)
A. precipitation C. distribution
B. sifting D. distillation

_____26. Which of the following is an example of a physical change? (L2)
A. evaporation in a swamp C. digestion of a hamburger
B. electricity produced by a battery D. rusting of a car body

_____27. Which of the following is an example of a chemical change? (L3)
A. painting a house C. bending steel
B. freezing water D. baking soda producing bubbles in water

28. You are given a piece of paper, how can you cause a physical change? (L2)

Classify the following as either a chemical, C, or physical, P, change. (L3)
_____29. Dissolving salt in water
_____30. Burning wood into charcoal
_____31. Breaking a piece of celery
_____32. Melting copper
I CAN Apply the law of conservation of mass
33. When methane reacts with oxygen, the products are carbon dioxide and water. How many grams of carbon dioxide are formed if 30 g of methane react completely with 75 g of oxygen to form 50 g of water? (L3)

34. When a firecracker explodes, mass is lost. Explain why this statement is true or false (L4)

APPENDIX E

CHAPTER 16 TEST

Physical Science Chapter 16 Test

Name:_____

I CAN Determine names and symbols of common elements

_____1. A chemical symbol represents the _____ of an element (L1)

A. name
B. reaction
C. group
D. structure

2. What is the symbol for calcium? (L2)

3. What is the name of the element with the symbol N? (L2)

4. What is the name of the element with the symbol P? (L2)

I CAN Describe the structure of an atom

_____5. The smallest piece of an element that still has the properties of the element is a(n) (L1)

A. molecule
B. atom
C. compound
D. plasma

_____6. Neutrons have _____ charge (L1)

A. positive
B. no
C. variable
D. negative

_____7. Electrons have _____ charge (L1)

A. positive
B. variable
C. negative
D. no

_____8. Protons have _____ charge (L1)

A. positive
B. negative
C. variable
D. no

_____9. The nucleus of an atom contains (L1)

A. protons
B. neutrons
C. protons and neutrons
D. electrons

_____10. Most of the mass of an atom is found in its _____ (L2)

A. nucleus
B. electron cloud
C. atomic number
D. mass number

_____11. A particle that moves around the nucleus is a(n) (L1)

A. proton
B. electron
C. neutron
D. quark

I CAN Describe and model the electron cloud model of the atom

_____12. A region where electrons are likely to be found is a(n) (L1)

A. atom
C. nucleus

B. orbital D. isotopes

_____13. Valence electrons determine an atom's (L2)
A. mass C. electric charge
B. chemical properties D. period

14. Draw a model of an atom with 10 electrons (L3)

15.Draw a model of at atom with 15 electrons (L3)

16. How many valence electrons does the atom in question 15 have? (L3)

17. Where do electrons have the least energy and where do electrons have the most energy? (L3)

18. The lowest energy level of an atom is filled. Its second energy level is also filled. The third energy level has 4 electrons. What class of atom is it? Why? (L4)

I CAN Identify isotopes
_____19. Atoms of the same element with different numbers of neutrons are called (L1)
A. isotopes C. metalloids
B. metals D. radioactive elements

20. Compare and contrast isotopes of oxygen? (L2)

I CAN Determine the atomic mass and mass number of an atom
_____21. The atomic number of Re is 75. The atomic mass of one of its isotopes is 186. How many neutrons are in an atom of this isotope? (L2)
A. 75 C. 186
B. 111 D. 261

_____22. An atom has 26 protons, 26 electrons and 30 neutrons. Its mass number is (L2)
A. 26 C. 56
B. 52 D. 82

23. A common radioactive isotope of carbon is carbon-14. How many protons and neutrons does it have? (L2)

I CAN Calculate the average atomic mass of an element
24. Copper has two isotopes common in nature: copper-63 and copper-65. The average atomic mass for copper is 63.546 amu. Which isotope of copper is more common and why? (L2)

25. Suppose that you have just discovered a new element and have named it neptunite. While studying your new element, you find that it has two isotopes: neptunite-220 and neptunite-250.

What is the average atomic mass of your new element? Assume that these two isotopes are present in equal amounts. (L4)

I CAN Describe how the periodic table is organized

_____26. Horizontal rows of the periodic table are called (L1)

A. periods
B. families
C. groups
D. clusters

_____27. Vertical columns of the periodic table are called (L1)

A. families
B. clusters
C. periods
D. groups

28. Name one element in the same group as calcium, Ca (L2)

29. Name one element in the same period as aluminum, Al (L2)

30. Name one element that has similar chemical properties to sulfur, S (L3)

_____31. Dot diagrams are used to represent (L2)

A. atomic numbers
B. valence electrons
C. isotopes
D. atomic mass

_____32. How many valence electrons does lithium have? (L2)

A. 1
B. 2
C. 3
D. 4

33. Draw the electron dot diagram for Potassium, K (L2)

34. Draw the electron dot diagram for Sulfur, S (L2)

I CAN Identify trends on the periodic table

_____35. Which term describes sodium? (L2)

A. metal
B. metalloid
C. noble gas
D. nonmetal

_____36. Which term describes nitrogen? (L2)

A. metal
B. metalloid
C. noble gas
D. nonmetal

_____37. If 2 different elements have similar chemical properties they must be (L3)

A. in the same group
C. the same element

B. in the same family
D. in the same period

_____38. Which element has properties that are similar to neon? (L3)
A. aluminum
C. arsenic
B. argon
D. silver

_____39. Each row in the periodic table ends with a _____. (L2)
A. metal
C. metalloid
B. nonmetal
D. liquid

I CAN Determine properties of metals, nonmetals and metalloids

_____40. In general, nonmetals are (L3)
A. poor conductors of electricity
C. good conductors of heat
B. malleable and ductile
D. solids at room temperature

_____41. In general, metals are (L3)
A. poor conductors of heat
C. poor conductors of electricity
B. solids at room temperature
D. brittle

_____42. Which of the elements below is a shiny element that conducts heat and electricity? (L3)
A. chlorine
C. hydrogen
B. sulfur
D. magnesium

43. Suppose you find a sample of an element with the following properties: it is a dim yellow solid at room temperature, it shatters when hit with a hammer, and it doesn't conduct heat. Predict if the element a metal or a nonmetal and where would you expect to find it on the periodic table? (L4)

APPENDIX F

CHAPTER 17 TEST

Physical Science Chapter 17 Test

Name:_____

I CAN Identify properties and uses of metals

_____1. In general, metals are (L1)

A. not shiny
B. good conductors
C. poor conductors of electricity
D. brittle

_____2. What group of elements has the properties of being **NOT** malleable or ductile? (L2)

A. gases
B. metalloids
C. metals
D. nonmetals

_____3. Metals can be used to make wires because they are (L2)

A. alloys
B. ductile
C. metallic
D. shiny

4. Why don't sodium and potassium occur naturally in their elemental form? (L4)

I CAN Describe how metals bond

_____5. In this type of bond, positively charged metallic ions are surrounded by a sea of electrons (L2)

A. synthetic
B. ionic
C. metallic
D. covalent

_____6. When metals bond with nonmetals, the metal tends to (L2)

A. lose electrons
B. gain electrons
C. become a negative ion
D. not change

7. Explain why metallic bonding makes metals good conductors of heat and electricity (L3)

_____8. Elements in which the valence electrons are easily lost are most likely to form ____ bonds. (L4)

A. covalent
B. hydrogen
C. ionic
D. radioactive

I CAN Identify groups of metals

_____9. Groups 3-12 in the periodic table are known as the (L1)

A. transition metals
B. alkali metals
C. inner transition metals
D. halogen metals

_____10. The group of elements that contains the most reactive metals is the (L2)

A. noble gases
B. alkaline earth metals
C. alkali metals
D. transition elements

_____11. What is the name of the elements in group 2A? (L2)

A. alkali metals
B. alkali earth metals
C. transition metals
D. metals

_____12. What is the name of the elements in group 1A? (L2)
A. primary metals
B. alkali earth metals
C. alkali metals
D. noble metals

_____13. The alkaline earth metals have how many valence electrons? (L2)
A. 2
B. 1
C. 8
D. 7

I CAN Describe how nonmetals bond

_____14. When nonmetals bond with nonmetals they (L3)
A. take electrons
B. share electrons
C. give electrons
D. don't bond with each other

_____15. When nonmetals bond with metals they (L3)
A. accept electrons
B. overlap orbitals
C. give electrons
D. share electrons

_____16. Nonmetals become _____ ions when they bond with metals (L3)
A. negative
B. positive
C. shared
D. metal

I CAN Identify properties of hydrogen

_____17. The most abundant element in the universe is (L1)
A. carbon
B. oxygen
C. iron
D. hydrogen

_____18. When hydrogen reacts with a metal, it will (L3)
A. gain one electron
B. lose one electron
C. lose two electrons
D. share electrons

I CAN Identify properties of halogens

_____19. In general, halogens are (L2)
a. good conductors of electricity
B. malleable and ductile
C. good conductors of heat
D. gases at room temperature

_____20. What is the name of the elements in group 17 or 7A? (L1)
A. halogens
B. transition nonmetals
C. noble gases
D. alkali earth metals

_____21. The group of the periodic table whose elements exist as reactive diatomic molecules is the (L2)

A. actinide series
B. alkali metals
C. halogens
D. lanthanide series

_____22. The halogens have how many valence electrons? (L1)
A. 1
B. 8
C. 7
D. 2

I CAN Describe why noble gases are unreactive
____23. The most unreactive group of elements is the (L1)
A. halogens
B. noble gases
C. alkali metals
D. transition elements

_____24. When electricity is passed through some of these elements, they glow (L2)
A. transuranium elements
B. actinides
C. noble gases
D. transition metals

25. Why are the noble gases stable? (L3)

I CAN Determine differences between metals, nonmetals, and metalloids
_____26. Elements that conduct electric current only under certain conditions are (L2)
A. metalloids
B. metals
C. noble gases
D. nonmetals

_____27. These elements can form covalent & ionic bonds because of their number of valence electrons (L4)
A. noble gases
B. metalloids
C. carbon group
D. nitrogen group

28. Using the periodic table, give an example of an element that is a (L2)

A) metal

B) nonmetal

C) metalloid

29. Suppose you found a sample of an element with the following properties: it is a shiny silver solid at room temperature that bends when hit with a hammer. How would you classify the element and why? (L3)

30. Explain why aluminum is a metal and carbon is not. (L4)

I CAN Describe differences between natural and synthetic elements
_____31. All synthetic elements are (L1)

A. liquids
B. needed by the human body
C. gases
D. radioactive

_____32. Any element with an atomic number greater than that of uranium is a(n) (L2)
A. transuranium element
B. halogen
C. transition element
D. lanthanide

APPENDIX G

CHAPTER 18 TEST

Physical Science Chapter 18 Test

Name:_____

I Can recognize a chemical formula

_____1. The elements that make up a compound and the exact number of atoms of each element can be shown in a _____ (L1)

A. chemical formula
B. chemical symbol
C. subscript
D. superscript

_____2. Which element is written first in a chemical formula? (L1)

A. the element with a negative oxidation number
B. the element with a positive oxidation number
C. the element that is a nonmetal
D. the polyatomic ion

I can use an electron dot diagram to predict chemical bonding

_____3. Dot diagrams are used to represent _____. (L1)

A. protons
B. valence electrons
C. atomic mass
D. the structure of the nucleus

_____4. What is the group number for elements that have a stable number of electrons in their outer energy level? (L2)

A. 18
B. 17
C. 2
D. 1

_____5. What kind of bond connects two nitrogen atoms? (L2)

A. ionic bond
B. triple covalent bond
C. polar covalent bond
D. double covalent bond

I Can describe why chemical bonds form

_____6. The forces that hold atoms or ions together are (L1)

A. electric currents
B. chemical bonds
C. physical bonds
D. nuclear forces

_____7. Atoms join together and form compounds so that each atom will have (L2)

A. an even number of electrons
B. full valence electrons
C. an equal number of protons and electrons
D. more electrons than protons

_____8. The _____ tells you how many electrons an atom must gain, lose, or share to become stable (L2)

A. atomic mass
B. atomic number
C. ionic number
D. oxidation number

_____9. How many electrons are needed in the outer energy levels of most atoms for the atom to be chemically stable? (L2)

A. 8 C. 6
B. 4 D. 2

10. What type of bond would the compound Li_3P have? (L4)

I Can determine what an ionic bond is

_____11. What kind of chemical bond is formed when electrons are given/taken? (L2)
A. covalent C. ionic
B. hydrate D. nonpolar

_____12. Which of the following compounds is likely to have ionic bonds? (L3)
A. CH_4 C. O_2
B. CO_2 D. LiF

_____13. An ionic bond is a bond that forms between (L2)
A. metals and nonmetals C. one atom's nucleus and another's electrons
B. atoms with neutral charges D. nonmetals and nonmetals

I Can determine what a covalent bond is

_____14. A chemical bond that occurs when atoms share electrons is (L1)
A a covalent bond C. a magnetic bond
B. an ionic bond D. a polyatomic bond

_____15. The neutral particle that is formed when atoms share electrons is (L2)
A. a cation C. a covalent molecule
B. an ionic compound D. a nucleus

____16. Covalent bonds are formed between (L2)
A. ions C. nonmetals and nonmetals
B. metals D. metals and nonmetals

_____17. In carbon dioxide, each oxygen atom shares 4 electrons with the carbon atom. What is this type of bond called? (L2)
A. triple covalent C. polar covalent
B. double covalent D. ionic

_____18. Which of the following is the chemical formula for a covalent molecule? (L3)
A. NaCl C. PF_3
B. He D. LiBr

I Can write formulas of ionic compounds

_____19. What is the correct formula for the compound potassium oxide? (L3)
A. K_2O_2 C. K_2O
B. KO D. K_1O_6

_____20. Which of the following is the correct formula for magnesium nitrate? (L3)
A. $MgNO_3$ C. $Mg_2(NO_3)_2$
B. Mg_2NO_3 D. $Mg(NO_3)_2$

_____21. What is the correct formula for calcium oxide? (L3)
A. CaO C. Ca_2O_2
B. CaO_2 D. Ca_2O

22. What is the correct formula for silver(III) bromide? (L4)

I Can name ionic compounds
_____22. What is the name of the compound with the formula NaCl? (L2)
A. chlorine sodiate C. sodium chlorate
B. sodium chloride D. sodium dichloride

_____23. What is the name of the compound with the formula LiCl? (L2)
A. lithium chloride C. chlorine lithiate
B. chlorine lithium D. lithium chlorate

_____24. What is the name of the compound with the formula CuO? (L3)
A. copper oxide C. copper(II) oxide
B. copper monoxide D. copper(I) oxide

25. What is the name of the compound with the formula Al_2S_3? (L2)

I Can recognize polyatomic ions
_____26. A group of covalently bonded atoms that acts together as one charged atom is a _____ (L1)
A. crystal C. negative ion
B. molecule D. polyatomic ion

_____27. What is the charge of phosphate in K_3PO_4? (L2)
A. 7- C. 1+
B. 3- D. 4+

_____28. Which of the following is a polyatomic ion? (L2)
A. H^+ C. Cl^-
B. NO_3^- D. H_2SO_4

29. Write the chemical formula for the compound magnesium acetate. (L4)

I Can name covalent compounds
_____30. What is the name of the compound with the formula CCl_4? (L3)

A. carbon monochloride
B. carbon trichloride
C. tetrachlorine carbide
D. carbon tetrachloride

_____31. What is the name of the compound with the formula N_2S_3? (L3)
A. dinitrogen trisulfide
B. nitrogen sulfide
C. trisulfur dinitride
D. nitrogen(II) sulfide

_____32. What is the name of the compound with the formula O_4F_2? (L3)
A. oxygen fluoride
B. tetroxygen difluoride
C. oxygen(IV) difluoride
D. difluorine tetroxide

33. What is the name of the compound with the formula F_3I_6? (L3)

I Can write formulas of covalent compounds

_____34. Which is the formula for the compound dinitrogen tetroxide? (L3)
A. N_2O_4
B. NO_2
C. O_4N_2
D. N_3O_5

_____35. What is the formula for the compound diphosphorus hexachloride? (L3)
A. Cl_7P_2
B. P_6Cl_2
C. P_2Cl_6
D. Cl_6P_2

_____36. What is the formula for the compound tricarbon octabromide? (L3)
A. C_8Br_3
B. Br_8C_3
C. C_2O_7
D. C_3Br_8

37. What is the formula for the compound sulfur pentiodide? (L4)

APPENDIX H

ACADEMIC ACHIEVEMENT SURVEY

Academic Achievement Survey

Form description

This form is automatically collecting email addresses for Grafton Public Schools users. Change settings

What percentage of student's ability to learn is the responsibility of the teacher and the responsibility to the student? *

- 0% Teacher & 100% Student
- 25% Teacher & 75% Student
- 50% Teacher & 50% Student
- 75% Teacher & 25% Student
- 100% Teacher & 0% Student
- Other...

What percentage of a student's academic achievement is the responsibility of the teacher and the responsibility of the student? *

- 0% Teacher & 100% Student
- 25% Teacher & 75% Student
- 50% Teacher & 50% Student
- 75% Teacher & 25% Student
- 100% Teacher & 0% Student
- Other...

APPENDIX I

STUDY LOGS

	A	B	C	D	E	F	G
1	**Productivity Rating**						
2	1 = Not Productive	Exterely little to no learning happening					
3	2 = Low Productivity	Some learning but not much					
4	3 = Average Productivity	Learning a fair amount					
5	4 = High Productivity	Learning a great deal					
6	**Example:**						
7	**Productivity Rating**	**Place**	**Date**	**Time**	**Reasoning**		
8	2	Living Room	8/6	6:30 - 7	My brother was watching TV while I was studying.		
9	1,4	Study hall, Kitchen	8/8	2-3, 5-8	Study Hall was loud, I was studying with a partner, making flash cards		
10	**Productivity Rating**	**Place**	**Date**	**Time**	**Reasoning**		
11			10/27			Hours at 1	
12			10/28			Hours at 2	
13			10/29			Hours at 3	
14			10/30			Hours at 4	
15			10/31			Total Hours	0
16			11/1				
17			11/2				
18			11/3			Hours at 1	
19			11/4			Hours at 2	
20			11/5			Hours at 3	
21			11/6			Hours at 4	
22			11/7			Total Hours	0

APPENDIX J

STUDY HABITS SURVEY

Study Habits Survey

Participation in this survey is voluntary.

1. How likely are you to do an assignment outside of the class it was assigned? *

- 1. Not Likely
- 2. Somewhat Likely
- 3. Likely
- 4. Very Likely

2. How likely are you to lose an assignment, or forget to turn it in? *

- 1. Not Likely
- 2. Somewhat Likely
- 3. Likely
- 4. Very Likely

3. How likely are you to start an assignment and not finish it? *

- 1. Not Likely
- 2. Somewhat Likely
- 3. Likely
- 4. Very Likely

4. When you are struggling with an assignment how likely are you to ask a friend for help? *

- 1. Not Likely
- 2. Somewhat Likely
- 3. Likely
- 4. Very Likely

5. When you are struggling with an assignment how likely are you to ask a teacher for help? *

- 1. Not Likely
- 2. Somewhat Likely
- 3. Likely
- 4. Very Likely

6. When you are struggling with an assignment how likely are you to look up the answer? (Ex. Googling the answer.)

- ◯ 1. Not Likely
- ◯ 2. Somewhat Likely
- ◯ 3. Likely
- ◯ 4. Very Likely

7. How likely are you to study a little bit every night? *

- ◯ 1. Not Likely
- ◯ 2. Somewhat Likely
- ◯ 3. Likely
- ◯ 4. Very Likely

8. How likely are you to study when you have free time? *

- 1. Not Likely
- 2. Somewhat Likely
- 3. Likely
- 4. Very Likely

9. How likely are you to study only when you have a test coming up? *

- 1. Not Likely
- 2. Somewhat Likely
- 3. Likely
- 4. Very Likely

10. How likely are you to set a designated time to study? *

- 1. Not Likely
- 2. Somewhat Likely
- 3. Likely
- 4. Very Likely

APPENDIX K

INTERVIEW

INTERVIEW QUESTIONS

1. What kind of impact did setting goals and then monitoring those goals have on you?

2. Do you think setting and monitoring goals resulted in you being more engaged in the class?

Follow-up if yes: Do you think you were more actively engaged?

3. What type of impact do you think setting and monitoring goals had on your overall performance in class? *(Doing the assignments, studying, etc.)*

4. What type of impact do you think setting and monitoring goals had on your overall achievement in class? *(Grade)*

6. Is there anything else you would like me to know at this time?

APPENDIX L

IRB EXEMPTION

CITI PROGRAM

Completion Date 27-Feb-2018
Expiration Date 26-Feb-2021
Record ID 26340101

This is to certify that:

Joseph Koteles

Has completed the following CITI Program course:

Social and Behavioral Research Investigators/ Faculty (Curriculum Group)
Social & Behavioral Research - Basic/Refresher (Course Learner Group)
1 - Basic Course (Stage)

Under requirements set by:

Montana State University

CITI
Collaborative Institutional Training Initiative

Verify at www.citiprogram.org/verify/?w0bdcb9c1-58ef-4e4f-b3eb-3a606d1c79e4-26340101