

*Contextual Factors Analysis*

Messalonskee High School

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According to Merriam-Webster a student is “one who attends school.” (Merriam-Webster, 2012). A majority of people only see students in this light; as those people who sit inside the four walls of a classroom all the time. However, the individual sitting behind each desk cannot be defined by how they are perceived at school. Many aspects affect students’ success in the classroom; how they learn is a huge part of the formula, but the classroom dynamics, their home lives, and communities they grew up in all must be included to ensure the best possible outcome. In order to be the greatest teacher I can be, and help my students succeed, I need to add in all the right pieces of the formula and not neglect any part that makes my students their unique selves.

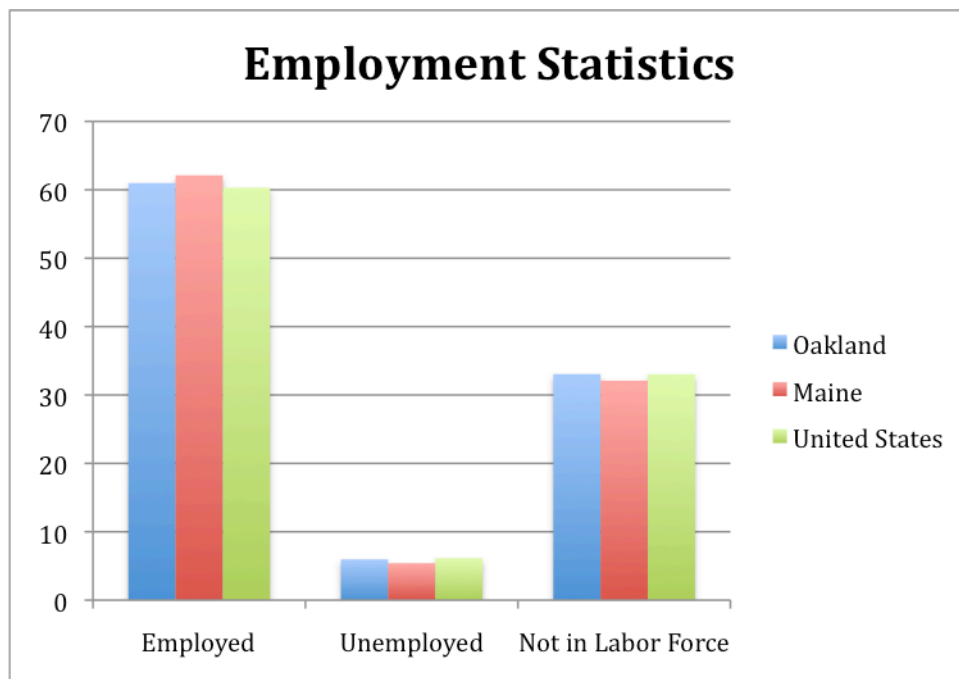
This semester I will be working with students in every grade level, 9<sup>th</sup>, 10<sup>th</sup>, 11<sup>th</sup>, and 12<sup>th</sup> grades, at Messalonskee High School. I will be teaching two sections of algebra I and one section of pre-calculus. Since the algebra I class is the first level of math classes at Messalonskee, it is mandatory and therefore mostly composed of freshman students (90%). The pre-calculus class is an optional class and is usually taken after algebra II, and therefore composed of upperclassmen (23.5% sophomores, 64.7% juniors, and 11.8% seniors). Since one of these courses are obligatory, it is necessary for me to keep in mind the students’ lives outside of the classroom, if I am going to get the best results from them. This means I must pay particular attention to their community, district, and school lives.

### **The Community**

Messalonskee High School is located in Oakland, Maine, a town with a population of approximately 6,349 in Kennebec county (Maine West Business Technology, 2005). With its easy accessibility to both Waterville and Augusta, and its four major waterways,

McGrath Pond, Salmon Lake, East Pond, and Messalonskee Lake, Oakland is a great town for both locals and visitors to benefit from (Oakland jobs, 2012). A primarily white rural community (96.83%) (*Oakland, ME demographics*, 2012), Oakland has the small town feel, with the bigger town advantages an easy eighteen miles away (Oakland jobs, 2012). This best of both worlds scenario has kept Oakland the thriving, quaint society that it is.

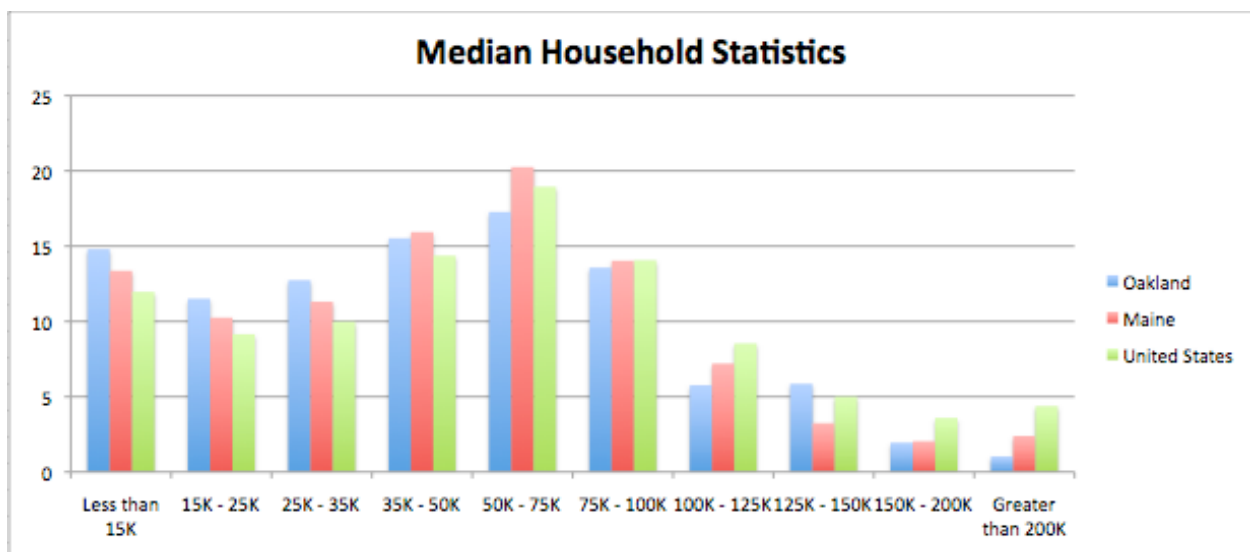
Being a smaller town, one may assume that the employment rate is not as wonderful as it should be. Thankfully for Oakland, the employment statistics are on par with the rest of the state and the country, with 60.98% of its population being employed compared to 62.11% and 60.3% of the state and nation's average respectively (*Oakland, ME demographics*, 2012). By viewing Figure 1 below, the employment statistics of Oakland can clearly be seen as being about the same as Maine and the United States.



**Figure 1**

*Source: Microsoft Excel Grapher*

With the higher employment rate, it is not a surprise that the residents of Oakland hold a variety of occupations. Everything from teachers and health care providers to factory workers and self employed business people can be seen in this town (City data, 2012). However, there is still some cause for concern in the financial department of Oakland. The unemployment rate might be low, but with the men's median income coming in at \$30,675 and the women's tallying at \$19,336 (*Oakland, ME income and careers*, 2012), Oakland actually has over fifty percent (54.57%) of its residents' households earning less than \$50,000 (*Oakland, ME demographics*, 2012). This puts Oakland's average household income at about \$45,579, lower than both that of Maine's average (\$49,193) and the United State's average (\$55,970) (*Oakland, ME demographics*, 2012). Figure 2 below shows the distribution of the household incomes of Oakland, Maine, and the United States.



**Figure 2**

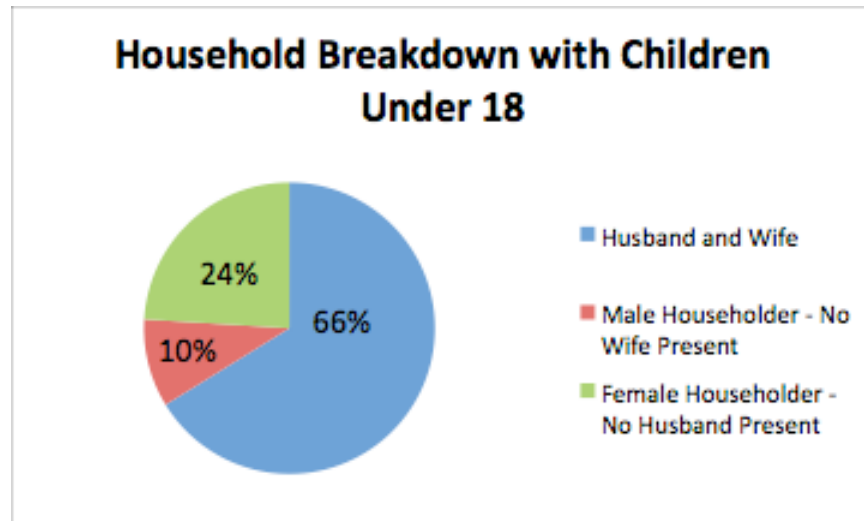
*Source: Microsoft Excel Grapher*

This lower household income is causing a ripple effect right into the RSU 18's school budget. Because people are struggling financially, they do not want their income taxes to

increase due to the budget and they are, therefore, rejecting the proposed budget (Hongoltz-Hetling, 2012). This brings about some potential problems for the schools. If the community is unwilling to support the budget, the schools will get less funding. This means less resources for the classrooms, a higher student to teacher ratio, and less availability for extra curricular activities.

Not only does the lower incomes affect the district as a whole, but also each individual student. I cannot just assume that every student will have access to materials and resources outside of the classroom. By being aware of this, I can plan my homework and lessons accordingly so that every student is getting the same opportunities and not missing out on something because their family does not have the funds available.

Financial support is not the only type of assistance that students need outside of the classroom. It is also very important that they receive emotional support as well. With the higher employment rates also comes the burden of parents not being around as much as their student might necessarily need. Then throw into account the variety of household compositions in today's society. There are two parent homes and single parent homes. Some students only have a mother around while others might only have a father. This household makeup plays a huge role in the emotional well being of the student. In today's society, this emotional piece is tied almost directly to the marital status of the parents. The breakdown of the marital status of those families with children under eighteen years of age is shown below in Figure 3.



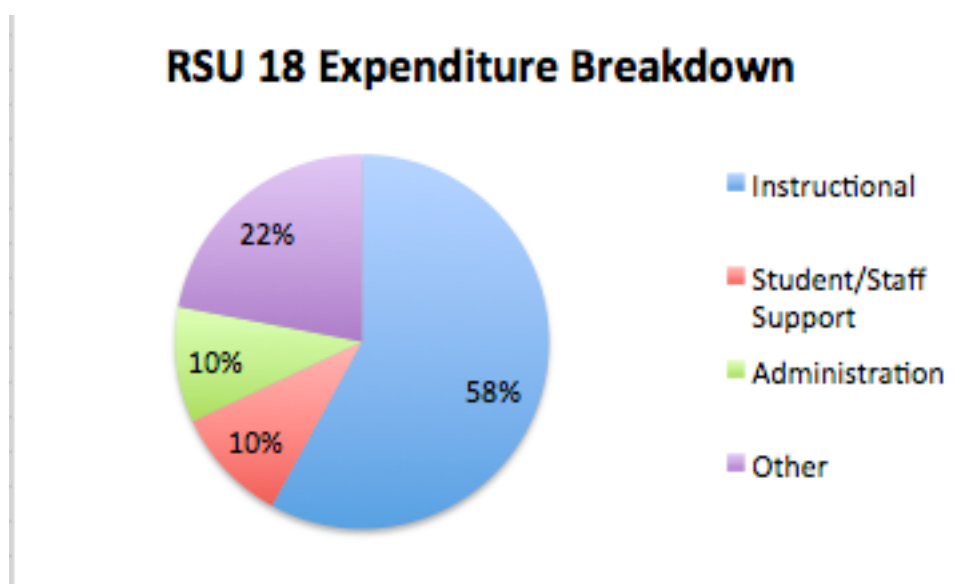
**Figure 3**

*Source: Microsoft Excel Grapher*

As Figure 3 shows, well over half of the population of families with children under eighteen years of age have a husband and a wife (66%) (*Oakland, Maine neighborhood profile, 2012*). Meanwhile, in those families that do not have a married couple, 24% have a mother and no father and a mere 10% have a father, but no mother (*Oakland, Maine neighborhood profile, 2012*). Since marital status is correlated to the students' stress levels, a lot of the students are in pretty good shape. However, I must remember these statistics while I observe those students who are struggling to those who are succeeding. The household breakdown also plays a role in the parental involvement. Those single parent homes may not be as involved with their student due to the fact that the parent must work more than one job to support the household. This might mean that the student has to also work a part time job to help make ends meet, meaning he or she will not have the sufficient amount of time to complete assignments. All of this must be taken into account when I assign homework and due dates.

## The District

RSU 18 is composed of eight different schools accommodating 3,314 students from pre-kindergarten to the twelfth grade (CCD Public School Data, 2010). With schools in Belgrade, Oakland, and South China, the district was receiving about \$30,601,000 in revenue (*Messalonskee high school*, 2012). However, this year's budget is still undecided because twice the community members have rejected the proposed budget (Hongoltz-Hetling, 2012). With the expenditure numbers still up in the air, knowing what resources the district will be spending what funds on is near impossible. Based off previous statistics, RSU 18 spent approximately \$10,504 per pupil compared to the state average of \$11,553 (Maine Department of Education, 2010). The lower expenditure amount makes sense since this is a smaller district with community members who are struggling during this difficult recession. However, per student spending does not necessarily mean that each student is getting the best education possible. The best way to know whether the students are getting the most for their parent's buck is to look at where the money is actually being spent in the district. The breakdown of the expenditures can be viewed below in Figure 4.



**Figure 4**

*Source: Microsoft Excel Grapher*

With 58% of the district's budget set aside for instructional purposes, such as teacher salaries, supplies, curriculum development, and teacher training, this would be an ideal placement for any teacher (Maine Department of Education, 2010). It is obvious that RSU 18 places a lot of importance on the students' learning by making sure they have the funds to have supplies and highly qualified and trained teachers to give them the best education possible. If the budget looks anything like this when it is finally passed, I will be able to provide students with some of the most up to date ideas and technologies so that they get the most information out of my classes as is possible.

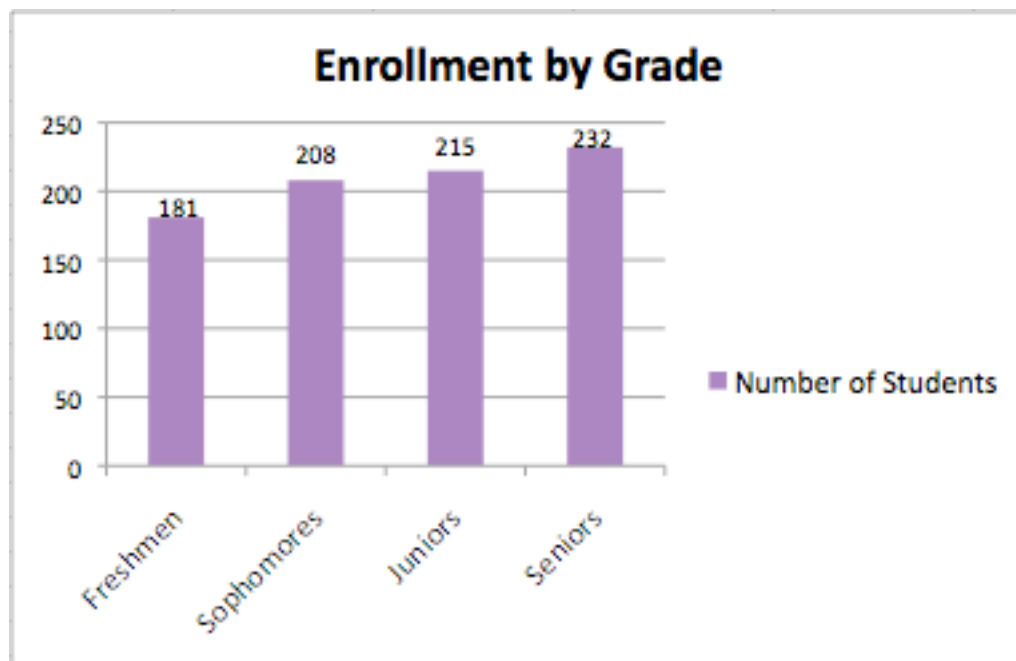
A unique characteristic about this district is that it is one of the first few in the state to adopt the new proficiency based learning (McMillan, 2012). Instead of placing students based on their age 99% of the time, RSU 18 is trying to place students according to their abilities (Laughlin, 2012). Not all students learn the same way or at the same pace, so I love the new approach that the district is using. It would be great to allow students to show us their knowledge in a way that is the most effective for them. However, this system is causing some tension in the district because not everything is set in stone with the "grading" or with the funds available to proceed with the implementation. So walking into the classroom on the first teacher workshop day, I will not necessarily know what system I will be walking into. I will not know exactly what type of classroom I will be observing or practicing in. This will affect the atmosphere of the school, which I will have to keep in mind as I enter Messalonskee High School.



## The School

Messalonskee High School sits back away from the road, surrounded by its athletic fields and parking lots. It is the epitome of a small rural school in Maine. The large front entrance is inviting one in to its gymnasium, front office, and performing arts department. Messalonskee High School has a very welcoming, friendly feeling just by stepping through the front doors.

As the only high school in the district, Messalonskee educates students in grades ninth through twelfth, with a student population of 836 (CCD Public School Data, 2010). This is a rather large size school for its rural location. Referring to Figure 5 below, seniors have the largest class in the school with 232 students and then the class sizes get progressively smaller with the freshmen tallying at only 181 students (CCD Public School Data, 2010).



**Figure 5**

*Source: Microsoft Excel Grapher*

Class size is a huge factor that I must consider when planning my lessons. Two of my classes are the first step in the Messalonskee High School's math program, meaning I will have a majority of freshmen and some sporadic sophomores and juniors. My third class is a voluntary class that students can take upon completion of algebra II. With the semester scheduling I can have sophomores through seniors in this course. With a three year age and maturity gap that I need to be aware of, I am going to have to really focus on the individual students and their preferred learning styles if I am to teach them to the best of my abilities.

The district itself has a great student to teacher ratio 15.65 : 1, but Messalonskee High School's ratio is even better at 13.46 : 1 (CCD Public School Data, 2010). This provides teachers a great occasion to really get to know their students and figure out exactly how they each learn best. With these smaller class sizes, I will be able to really hone in on each student's learning style and plan my lessons accordingly. With only 13 or 14 students per class, it is also easier to provide a safe, encouraging learning environment for the pupils so that they can fulfill their potential.

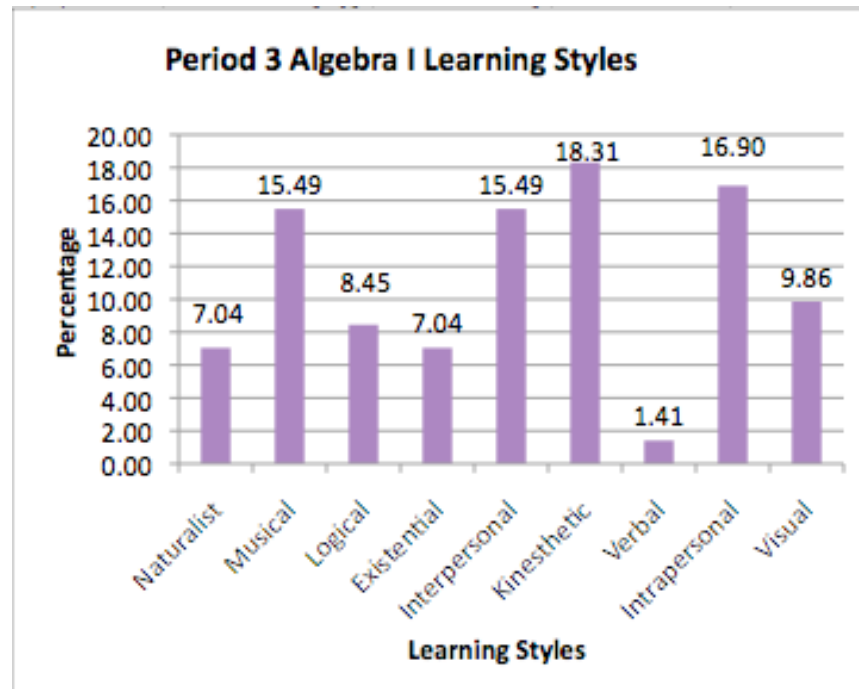
### **The Classroom and Students**

Room 319 is the epitome of a typical, traditional classroom; chalkboards up front, teachers' desks in the back, and student desks in rows filling the gap in between. A row of windows provide a view of the field hockey field and allows there to be constant fresh air in the room. Small pieces of scrap paper for Quickie Quizzes are kept on my desk right by the door for students to grab when they enter the room. These quizzes provide us with an idea of how much information they have obtained from the previous day's lesson and

homework. This instant feedback allows me to reiterate the problem areas as well as skip over the understood parts.

Students do not get to use their laptops very often, if ever in this classroom for a variety of reasons. The lack of projectors makes it difficult to demonstrate what we want done on the computers, and therefore they tend to be avoided. Even without the lack of technology, it would be very hard to incorporate laptops due to the time restraint. Semester long classes mean that we have to make it through a lot of material in a rather short amount of time. We are sacrificing technology based projects and assessments to ensure that students get the adequate amount of time to learn the necessary material.

Because of the lack of motivation from fun projects and technology assessments, it is super important that I appeal to the students in a different way. The most efficient way to accomplish this is to make the learning fun by using a variety of learning styles. Each student has a more dominate learning style, so I had them all take a learning styles survey so I could see their top three. All three of the classes were pretty similar in their results, but I am going to be focusing on my period 3 algebra I class because those are the students I will be working with the most. In Figure 6 below, one can see the results from the period 3 class.



**Figure 6**

*Source: Microsoft Excel Grapher*

As the graph above shows, the students in period 3 algebra I have a strong inclination towards kinesthetic learning. I need to make sure that I incorporate movement into my lessons through hands on activities and even just simple standing and stretching sessions so students can learn to their fullest potential. The students also have a high intrapersonal intelligence. The current system of having them complete their homework and classwork assignments on their own will definitely help them learn the material well. However, they also show a high intelligence in the interpersonal category meaning I will definitely have to figure out some way to incorporate group or partner work so they can bounce ideas off of each other and truly get the most out of the lesson. Finally, tied for third is the musical intelligence. If I can find any song that goes with a concept, it would not hurt me to play it since a majority of the students tend to learn through rhythm and beats.

This period 3 class is also unique because of its makeup of students' ages. A majority of the twenty four students are freshmen (twenty students), but I do have three juniors and one sophomore. Since algebra I is the first step in the math program at Messalonskee, when there are upper classmen, it can be assumed that they were in a full year algebra class or haven't taken a math class in quite some time. I will have to pay special attention to ensure that these students are understanding the material and are engaged so they can move on with their mathematics education.

This class is also special because it has two students with IEPs and four with 504s. This means I will have to make special accommodations that adhere to their IEPs and 504s and I might also have to come up with special strategies on my own when I figure out how exactly they are struggling and what can help them succeed the most.

Between the IEPs, 504s, learning styles, and age differences, I have enough on my plate while planning my lessons. However, there is one more important factor that must be considered; the students' individuality. Each student brings a unique perspective to the classroom and if I truly want to engage them and help them succeed to their fullest, I have to know something about them personally. My mentor gave all the students an interest survey the very first day of class. The period 3 students gave a wide variety of honest answers. A majority admitted they were not that great at division or fractions, but they excelled at multiplication. Knowing this information allows me to spend extra time when our new studies involve their weaknesses so that they are not tripped up on that. One other important piece of information I gathered from these interest surveys were the students' advice to themselves. Almost all of them said they would advise themselves to try harder in school. Trying harder in school would not be an issue in my class if I made the

math fun and engaging. That way students would actually want to learn and do the work, which means they would be trying!

By looking at the context of where I will be teaching this semester, I was able to gain a better perspective of the students that I will be working with. I plan on using this knowledge and other observations of my students to adjust my instruction so that they can learn to their fullest potential. By actually knowing who my students are on a personal level, instead of just as those people sitting in the desks, I will be able to improve myself professionally so I can help my students succeed.

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## September 2012

Monday	Tuesday	Wednesday	Thursday	Friday
			20	21
			<b>Pre-assessment:</b> Pre-test for homework	<b>Content:</b> Proportions, solving percent problems with proportions and equations, solving percent of change problems. <b>Formative:</b> Quickie Quiz, homework <b>LG 1:</b> Obj 1 <b>LG 2:</b> Obj 1, 2, 3
24	25	26		
<b>Content:</b> Easy probability <b>Activity:</b> Dice rolling probability <b>Formative:</b> Quickie Quiz, homework, dice rolling activity, class results of activity <b>LG 3:</b> Obj 1	<b>Content:</b> Compound probability <b>Activity:</b> M&M activity <b>Formative:</b> Quickie Quiz, homework, M&M activity, class work, Pre-test <b>Review:</b> Pre-test <b>LG 3:</b> Obj 2, 3	<b>Test #5:</b> Percent problems, easy probability, compound probability <b>Formative:</b> Quickie Quiz, homework review of Pre-test, review session <b>Summative:</b> Unit Test <b>LG 1:</b> Obj 1, 2 <b>LG 2:</b> Obj 1, 2, 3 <b>LG 3:</b> Obj 1, 2, 3		

This unit is for an algebra 1 class. I will be teaching about proportions, percents, and probability to high school aged students (mainly freshmen). This is only a four day unit because of the semester class time constraint, but it still contains five different lessons (two are on day one of the unit).

<b>Learning Goal</b>	<b>Objectives</b>	<b>Common Core State Standard</b>	<b>Levels of Bloom's Taxonomy</b>
<b>LG 1:</b> Students will understand what proportions are and the solving process.	<b>Obj 1:</b> Students will be able to set up and solve proportions.	<b>Content Area:</b> Algebra <b>Grade Level:</b> High School <b>Domain:</b> Reasoning with Equations and Inequalities <b>Standard:</b> Solve equations and inequalities in one variable <b>Cluster:</b> 3. Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.	Comprehension
<b>LG 2:</b> Students will understand the various percent problems and the ways in which they can be solved.	<b>Obj 1:</b> Students will be able to utilize proportions to solve percent problems.  <b>Obj 2:</b> Students will be able to formulate solvable equations from percent word problems.  <b>Obj 3:</b> Students will be able to solve percent of change problems.	<b>Content Area:</b> Algebra <b>Grade Level:</b> High School <b>Domain:</b> Reasoning with Equations and Inequalities <b>Standard:</b> Solve equations and inequalities in one variable <b>Cluster:</b> 3. Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.	Application  Synthesis
<b>LG 3:</b> Students will understand how to find the probability of compound events.	<b>Obj 1:</b> Students will be able to find theoretical and experimental probabilities.  <b>Obj 2:</b> Students will be able to calculate the probability of independent compound events.  <b>Obj 3:</b> Students will be about to solve for the probabilities of dependent compound events.	<b>Content Area:</b> Statistics and Probability <b>Grade Level:</b> High School <b>Domain:</b> Conditional Probability and the Rules of Probability <b>Standard:</b> Understand independence and conditional probability and use them to interpret data. <b>Cluster:</b> 2. Understand that two events A and B are independent if the probability of A and B occurring together is the product of their probabilities, and use this characterization to determine if they are independent.	Knowledge  Application

## **Learning Goals**

### **LG 1: Students will understand what proportions are and the solving process.**

For learning goal 1, students have already been taught how to solve proportions in a later unit. However, they need to be able to have a firm understanding on solving proportions so I decided to do a review session with the material to make sure students completely understood. After looking at the pre-tests that my students took, I realized that it was important to review this material since they need it in order to master learning goal 2.

#### **Bloom's Taxonomy for LG 1**

For this learning goal students are aligning with the comprehension level of Bloom's Taxonomy. They will be simply solving proportions but are not expected to apply it to any other content.

### **LG 2: Students will understand the various percent problems and the ways in which they can be solved.**

I decided on learning goal 2 based on the curriculum guidelines that my mentor has been following. Students have to learn how to solve the various percent problems (percent of change and percent problems). There are a couple ways to solve them, which I felt was important to show since all students do not learn the same. After the pre-test, I noticed I was probably going to have to spend more time on this subject since students did not show much knowledge of the topic. Since this learning goal was being taught on the same day as learning goal 1, I decided it was going to be more important to spend more time on this goal.

#### **Bloom's Taxonomy for LG 2**

Students will be using the synthesis level of Bloom's Taxonomy by being able to solve percent problems by applying their knowledge of proportions. They will also be using the application level by translating percent word problems into equations by substituting the correct information.

### **LG 3: Students will understand how to find the probability of compound events.**

I chose this learning goal for the students based on the old curriculum that my mentor has been following and the new curriculum goals that the district has decided on. After analyzing the students' pre-tests, I came to the conclusion that my students did not need as long of instruction for the easy probability that is needed to find the compound events, so I designed an activity to save from boring them on something they already knew. For the information they didn't know, I also decided to use an activity to introduce the material so it was easier to see and understand.

#### **Bloom's Taxonomy for LG 3**

For this learning goal students are aligning with the knowledge and application levels of Bloom's Taxonomy. Students need to know what probability is and be able to recognize the correct pieces of the situation so they can find probabilities. Students are then going to apply their knowledge of easy probability to find the probabilities of compound events.

Learning Goal	Assessment	Format of Assessment	Adaptations for all Learning Goals
<b>LG 1:</b> Students will understand what proportions are and the solving process.	Pre-Assessment	Pre-test	<p>1. Students will have the time that they need to complete Quickie Quizzes and the test.</p> <p>2. Students can listen to their Ipods while working on class work and homework.</p> <p>3. Instructional videos will be provided to those students who are absent so they can attempt the homework on their own.</p>
	Formative Assessment	1. Quickie Quiz over proportions and previous unit's material	
		2. Quickie Quiz review	
		3. Proportions and Percent Equations/Percent of Change handout	
		4. Homework review over proportions and percent equations/percent of change handout	
		5. Observation of students as they work on handout	
		6. Quickie Quiz over solving percent problems	
		7. Quickie Quiz review	
		8. Pre-test	
		9. Pre-test review	
		10. Test review session	
	Summative Assessment	Unit Test	

Learning Goal	Assessment	Format of Assessment	Adaptations
<b>LG 2:</b> Students will understand the various percent problems and the ways in which they can be solved.	Pre-Assessment	Pre-test	4. I will check in with students to make sure they are on task and understand the directions.  5. If a student needs a shorter assignment, I can alter the handouts so they are practicing the content without the bulk.  6. I can rearrange the seating to make sure all students can read the board and hear me.
	Formative Assessment	1. Quickie Quiz over solving percent problems and percent of change	
		2. Quickie Quiz review	
		3. Proportions and Percent Equations/Percent of Change handout	
		4. Homework review over proportions and percent equations/percent of change handout	
		5. Observation of students as they work on handout	
		6. Pre-test	
		7. Pre-test review	
	Summative Assessment	8. Test review session	
		Unit Test	

Learning Goal	Assessment	Format of Assessment	Adaptations
<b>LG 3:</b> Students will understand how to find the probability of compound events.	Pre-Assessment	Pre-test	7. I will give both oral and written directions so all students know what is expected.  8. I will format as many assignments and tests so that students can do the work right on the handout.
	Formative Assessment	1. Quickie quiz over easy probability 2. Quickie Quiz over probability of compound events 3. Quickie Quiz reviews 4. Dice activity for experimental probability 5. Whole class data for dice activity 5. Pizzazz #111 handout over easy probability 6. Homework review over Pizzazz #111 7. M&M activity 8. Observation of students as they work on M&M activity 7. Probability of compound events class work 8. Pre-test 9. Pre-test review 10. Test review session	
	Summative Assessment	Unit Test	

## Design for Instruction

Before I started my unit on percent problems and probability, I assigned a homework assignment to my students so I had an idea of their base levels of understanding of the upcoming material. I asked students to do a pre-test of the material that consisted of questions about each learning goal objective. This pre-test gave me a great understanding of the students' knowledge so I knew how to teach the upcoming lessons.

A big part of assessing these pre-tests is determining how to "grade" every question. I decided to look at each problem and see if students did one of four things: got the problem completely right, meaning they got the right answer with the correct work, got the correct answer with no work or the incorrect work, got the problem completely wrong, or didn't answer the question. This key gives me a better idea of students' level of understanding because I am not simply saying they got a right or wrong answer.

### LG 1: Students will understand what proportions are and the solving process.

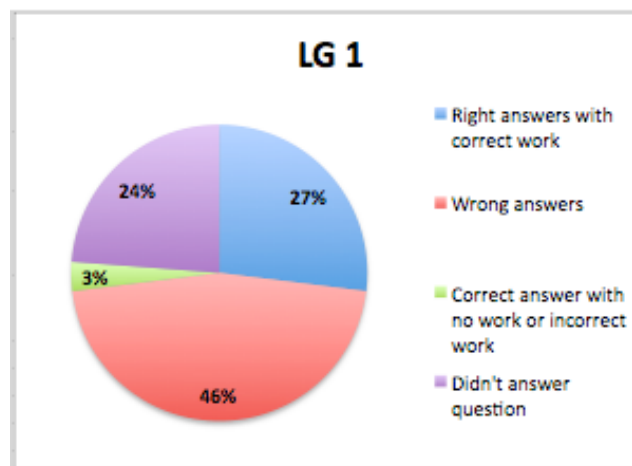
Below are the individual results for each student on those questions that pertained to learning goal 1 and the key that I used.

LG 1			
ID #	1. a	1. b	1. c
1	✓	✓	✗
2	✗	✗	✓
3	✓	✗	✗
4	✓	✗	✓
5	✗	✗	✗
6	✓	✗	✗
7	✓	✗	✓
8	✗	DA	CA
9	✗	✗	DA
10	✗	DA	✗
11	✓	✓	✗

12	✓	✗	DA
13	✓	✗	✗
14	✗	DA	DA
15	DA	DA	DA
16	✗	DA	✗
17	✓	✗	✗
18	✓	✗	✓
19	DA	DA	✓
20			
21	DA	DA	DA
22	✗	✗	CA

Key	
Correct answer with correct work	✓
Correct answer with wrong work or no work	CA
Wrong answer	✗
Didn't answer	DA

I was really surprised that every student got at least one of these proportion questions wrong or didn't answer because my mentor and I have already taught them and assessed them on these type of problems. I then took all the answers for the three questions for this learning goal (63 individual answers since one student did not hand in their packet). Below is a pie chart that shows the breakdown of right, wrong, and correct answers and non-answers.



As the chart shows, 70% of the students' answers were either wrong or left blank. Because of this, I had to readjust my planned schedule. I was only going to do a quick review session on solving proportions because I had thought they understood it. Instead I decided to do the review session and stress the process for solving proportions as we use them to solve percent problems. The repetition of saying each step for solving proportions will reiterate the process so students will remember it.

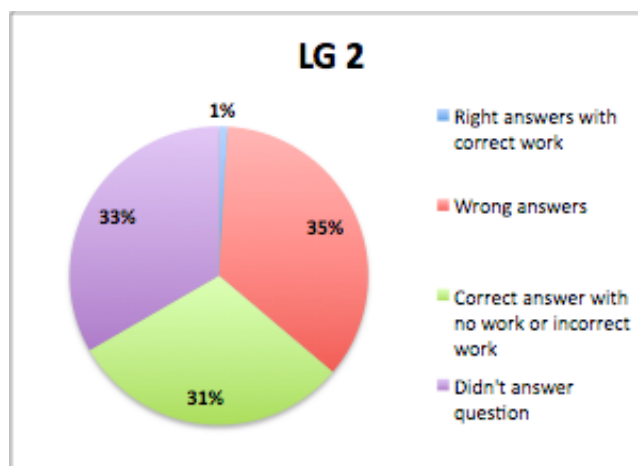
**LG 2: Students will understand the various percent problems and the ways in which they can be solved.**

Like for learning goal 1, I tracked the students' answers for every question that pertained to learning goal 2. Below are each individual student's results.



ID #	LG 2											Key	
	2. a	2. b	3. a	3. b	4								
1	CA	X	X	X	X	12	✓	X	X	CA	X	Correct answer with correct work	✓
2	CA	DA	X	CA	X	13	X	CA	CA	CA	X		
3	X	X	X	CA	X	14	CA	X	X	X	DA	Correct answer with wrong work or no work	CA
4	CA	DA	DA	CA	X	15	CA	X	CA	CA	DA		
5	CA	X	DA	X	DA	16	CA	DA	DA	CA	DA	Wrong answer	X
6	CA	CA	DA	DA	DA	17	X	X	X	CA	X		
7	CA	X	X	X	DA	18	CA	CA	X	CA	DA	Didn't answer	DA
8	CA	X	DA	DA	DA	19	CA	X	X	DA	DA		
9	X	DA	DA	DA	DA	20							
10	DA	DA	DA	DA	DA	21	CA	DA	X	CA	CA		
11	DA	DA	DA	DA	DA	22	X	CA	CA	CA	X		

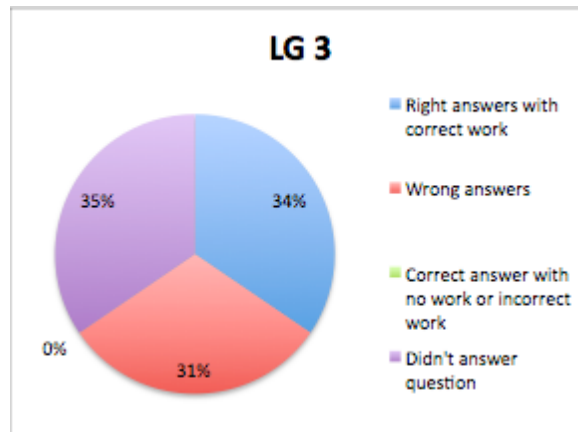
These results were less surprising to me. To my knowledge the students have not seen the process for solving percent problems before. However, they have seen and know about percents so the correct answers with wrong or no work are expected. All the not answered questions was pretty predictable as well. As soon as the students saw the pre-test they told me they didn't know how to do the problem and I told them to do their best and if they literally had no clue to leave it blank. Below is the breakdown of the answers by right, wrong, correct or blank for the five problems that pertained to learning goal 2 (105 individual answers).



### LG 3

		LG 3																	
ID	#	5. a	5. b	5. c	5. d	6	7	8	9										
1		✓	✓	✓	✗	✗	✗	✗	✗	12	✓	✓	✓	✓	✗	✗	✗	✗	
2		✓	✓	✓	✓	DA	DA	DA	DA	13	✓	✓	✓	✓	✗	✗	✗	✗	
3		✓	✓	✓	✓	✗	✗	✗	✗	14	✓	✓	✓	✓	✗	✗	✗	✗	
4		✗	✗	✓	✗	✗	✗	✗	✗	15	✓	✓	✓	✓	DA	DA	DA	DA	
5		✗	✗	✗	✗	✗	✗	✗	✗	16	✗	✓	✓	DA	DA	DA	DA	DA	
6		DA	DA	DA	DA	DA	DA	DA	DA	17	✓	✓	✓	✓	DA	DA	DA	DA	
7		✗	✓	✓	✗	DA	DA	DA	DA	18	✓	✓	✓	✓	✗	✗	✗	DA	
8		DA	DA	DA	DA	DA	DA	DA	DA	19	✓	✓	✓	✓	✗	✗	✗	✗	
9		DA	DA	DA	DA	DA	DA	DA	DA	20									
10		✓	✓	✓	✗	DA	DA	DA	DA	21	✓	✓	✓	✓	✗	✗	✗	✗	
11		✓	✓	✓	✓	DA	DA	DA	DA	22	✓	✓	✓	✗	DA	DA	DA	DA	

The breakdown by type of answer can also be seen below.



I found the individual student statistics more beneficial when planning for this learning goal because of the two different topics that are encompassed in the learning goal. The data for the first four questions was pretty on par for what I guessed. Students have seen easy probability before in their middle school math class. Since the first four questions were about this probability, I assumed that a majority of the students would know this topic. The data proves this true for the most part. However, it is obvious that not all the students understood the material before the lesson. So, I decided to not only do an activity with the students, but also do a mini lecture so those who seemed to have forgotten the material could be reminded of the basics. I then planned on using the Dice Rolling Activity for students to practice finding probability without having to do a worksheet.

The last four problems associated with learning goal 3 deal with probability of compound events. The blank answers and wrong answers were expected. Students may have seen the easy probability, but the more complex compound probabilities are a totally new concept to them. However, instead of planning a lecture to teach the students the material, I decided to use their knowledge of easy probability and help them discover the more difficult stuff on their own. I chose to use an M&M activity to get students physically

manipulating a probability situation so they can see where the formulas are coming from. I also plan on using a class work assignment to get them working with theoretical situations so that they know how to do both.

## **LESSON PLAN FORMAT**

**Teacher's name:** Ms. Mykayla Stoutamyer

**Grade Level:** Algebra 1 (mainly freshmen)

**Date of lesson:** September 21, 2012

**Topic:** Proportions Review

**Learning Objectives:**

- ◆ Students will understand what proportions are.
- ◆ Students will be able to solve proportions.

**Common Core State Standards Alignment:**

**Content Area:** Algebra

**Grade Level:** High School

**Domain:** Reasoning with Equations and Inequalities

**Standard:** Solve equations and inequalities in one variable

**Cluster:** 3. Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.

**Rationale:** The curriculum requires that students learn how to solve percent problems by using proportions and percent equations. Both of these solving methods involve students knowing how to solve for a single variable. This lesson is emphasizing the work that students have done with this standard thus far.

**Assessment Plan:**

**Formative:**

Students will be completing a Quickie Quiz at the beginning of the period that has some review proportions problems as well as questions regarding the material they just learned. The Quickie Quiz review that we do on the board as a whole class will help me determine how much review needs to be spent on proportions depending on their fluency with the problems that were on the quiz. Monday's Quickie Quiz will also serve as an assessment tool because it will be covering the material we went over today.

Students will also be completing a homework assignment with a few proportion problems on it. Depending on the mastery of this skill, students will be assigned a moderate amount to a few proportion problems on the homework, since this is a review topic.

**Summative:**

The Quickie Quizzes and homework are both summative assessments to the point that they are graded. However, the Quickie Quiz is a simple right or wrong answer type only worth 5 points. The homework is graded on completeness and not on right or wrong answers. However, I plan on marking the right or wrong answers so that students can see the mistakes they are making and get better feedback for the future.

The main summative assessment for this lesson is the summative assessment for the entire unit: the unit test. Because of the time restraint of being a semester class that has to cover a whole book worth of material, projects that require days to complete are unrealistic. However, this test is not a right or wrong type test. We do provide partial credit if the work is all correct, but they messed up the arithmetic somewhere. This way a student is not completely penalized for a mistake they made that they are not being tested on.

**Integration:**

For this lesson there is no integration among content areas because it is a review lesson for the students. The integration comes later on during this same class period while we are discussing percent problems.

There is no technology integration in this lesson because my classroom does not have ready access to a computer projector. I feel like asking students to use new technology without showing them how is awful, and with the lack of a computer projector, I cannot adequately show the students how to use the technology.

### **Differentiated Instruction:** **Strategies**

Throughout this mini review lesson I will be using a couple of instructional strategies to meet the needs of my students. During the review session I plan on writing out how to do a proportion problem as well as say the steps out loud so that all my students can understand what I am doing. I also am going to make a conscientious effort to my pacing so that students have an adequate amount of time to process the procedure and formulate any questions they might have.

In addition I also looked into how I am meeting some of Howard Gardner's Multiple Intelligences: **Logical:** Students will be applying their prior knowledge of solving multi-step equations to the process of solving proportion problems.

**Verbal:** Students who need to talk their way through a problem will like being able to say the solving procedure out loud as we do examples as a class.

**Visual:** Students will be able to see each step done out in the proportion equations so they can visualize what they have to do.

**Intrapersonal:** Students will be completing the Quickie Quiz individually. Students will also have the option to work individually on their class work and homework assignments.

**Interpersonal:** We will be working on examples as a class so those students who need to talk to someone can do so. Students will also have the option to confer with a partner on the class work and homework.

### **Modifications/Accommodations**

Between the two algebra 1 classes that I will be doing this lesson with, there are a variety of different 504s and IEPs that have to be accounted for. A few of the students need extra time to complete tests and quizzes, which is already accommodated for. Students have all the time that they need to complete these assessments. They can even come in during another period to finish if they did not have time during their class period. I also will provide all the students with ample time to write down the examples and notes from the board and process time during lectures so they do not miss any information.

Organization is a common theme in my students' accommodations. Concrete due dates and outlines are requested. Since every homework assignment is due the next class period, the due dates are as concrete as they can get. I just have to be aware of when I mention the date of the test and make sure it is repeated so that every student is aware of the date. Outlines are not necessary for this lesson because the students have already seen the material and will only be doing practice problems. However, if I decide to have a lot of written notes and not examples, I will have to provide outlines so students are not missing information because they are writing something down.

If a student is absent, a couple of students might need extra time to complete the missed assignments or a modified assignment so they can finish it on their own. This is not an issue because I would provide time for students to make up the work so they are not just completing the assignment without the proper understanding of the content.

Lastly, I have students in my classes that have medical conditions that make sitting for long periods of time difficult and very uncomfortable so they need to have the freedom to leave their seats and stretch. The class rules accommodate to this need because students can get up and go the bathroom,

sharpen their pencil, etc. whenever they need to so these students have the freedom to get up out of their seats and relieve the discomfort.

### **Extensions**

Students will later in this class period, during the percents lesson, be asked to apply their knowledge of proportions to the percent problems we will be working on. This connection will challenge those students who have mastered the solving of proportions to see where they can actually apply the knowledge, while letting those students who need more practice have the additional time with it. I will be encouraging students to try the more difficult problems on the homework if they believe they have the process really down pact.

### **Materials, Resources and Technology:**

These materials and resources are what I will need for the whole class period, which means it is also including materials and resources from the percent lesson since they are being done on the same day.

- ◆ Quickie Quiz overhead or handout
- ◆ Quickie Quiz key
- ◆ Projector
- ◆ Chalk
- ◆ Erasers
- ◆ *Algebra 1*. (2003). Upper Saddle River, New Jersey: Pearson Prentice Hall
- ◆ Notes and examples from textbook for lecture
- ◆ Class work and/or homework examples from Practice 4.3, Practice 4.4, and Kuta Software worksheet
- ◆ Key for homework problems

### **Source for lesson plan and research:**

These sources are for both this lesson and the lesson on percents because both lessons will be taught on the same day.

- ◆ *Algebra 1*. (2003). Upper Saddle River, New Jersey: Pearson Prentice Hall.: This text is used to gather examples, definitions, and other content notes for developing the review session on proportions.
- ◆ *Algebra 1* workbook: This is where I will gather some homework problems for the students over proportions.
- ◆ *Kuta Software Worksheets*: These worksheets provide examples of proportions, percent problems, and percent of change problems that I can use for lecture notes and/or homework problems.

### **Maine Standards for Initial Teacher Certification and rationale:**

#### **Teaching and Learning Sequence: (please include the relevant items from the list below)**

The teaching and learning sequence for this lesson is also including the teaching and learning sequence from the lesson on percents because they are being taught on the same day. The teaching and learning sequence for this specific lesson is only up to the providing examples of proportions. Everything after that is for the percent lesson.

**9-21-12:**

**Time**

As students are entering before the tardy bell I will hand back any graded homework.

### Check for Understanding

Quickie Quiz over proportions and solving inequalities

**5-8 minutes**

Quickie Quiz review on board

**3-5 minutes**

\* I will do the problems on the board with the whole class so they can see their mistakes and ask any questions that they might have.

Hand back tests and go over any problems that the students have questions on. **3-5 minutes**

Collect Probability Pre-Test and ensure students that it is not going to be graded and they will learn what they did not know in the next few days.

### Instruction/Guided Practice

I will provide examples of proportions on the board.

**5-8 minutes**

\*Ask students what it is.

\*Ask how would we go about solving.

\*Solve the proportions as a class and/or ask for volunteers.

Ask students on their prior knowledge of  $\frac{\%}{100} = \frac{\text{part}}{\text{whole}}$  or  $\frac{\%}{100} = \frac{\text{is}}{\text{of}}$

**3-5 minutes**

\*Have students do the thumbs up/down check in about comfort with it.

Provide examples on board for solving percent problems with proportions **8-12 minutes**

\*\*Make sure students can pinpoint what we are trying to find.

- Finding the percent examples

- Finding the part examples

- Finding the whole examples

Show students the general rules for percents and proportions

**3-5 minutes**

<u>Finding the %</u>	<u>Finding the part</u>	<u>Finding the whole</u>
What % of 45 is 10?	What is 16% of 261?	71% of what # is 87?
$\frac{x}{100} = \frac{10}{45}$	$\frac{16}{100} = \frac{x}{261}$	$\frac{71}{100} = \frac{87}{x}$

I will explain how to write equations based on percent equations **12-15 minutes**

\* What percent of 170 is 68?

$$x \quad * \quad 170 = 68$$

\* of is multiplication, is is equal sign and missing piece is variable.

**\* When using equation, must remember that percent has to be/will be a decimal! Will have to convert back and forth.**

Provide examples of percent of change problems

**7-10 minutes**

\* percent of change =  $\frac{\text{amount of change}}{\text{original amount}}$

\* If the value increases from the original, it is a percent increase. If the value decreases from the original, it is a percent decrease.

### Guided Practice/Independent Practice/Homework

Hand out homework. Any extra time will be for working on some homework problems as a class and/or time for students to work independently on the homework.



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## **LESSON PLAN FORMAT**

**Teacher's name:** Ms. Mykayla Stoutamyer

**Grade Level:** Algebra 1 (mainly freshmen)

**Date of lesson:** September 21, 2012

**Topic:** Solving percent problems and percent of change

**Learning Objectives:**

- ◆ Students will understand the ways in which percent problems can be solved.
- ◆ Students will be able to utilize proportions to solve percent problems.
- ◆ Students will be able to formulate solvable equations from percent word problems.

**Common Core State Standards (CCSS) Alignment:**

**Content Area:** Algebra

**Grade Level:** High School

**Domain:** Reasoning with Equations and Inequalities

**Standard:** Solve equations and inequalities in one variable

**Cluster:** 3. Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.

**Rationale:** Students have to learn how to solve percent problems by using proportions and equations. Both of these solving techniques require students to solve equations in one variable. Students will be working on developing mastery of this skill by applying their previous knowledge to a new setting.

**Assessment Plan:**

**Formative:**

Students will be completing a Quickie Quiz Monday over solving percent problems and percent of change. This will give me a good understanding of their knowledge of this material. Though the Quickie Quiz will be graded out of 5 points, it is more of a formative assessment because I can quickly spot the common errors and adjust for them before the test and the grade is more for the grade book than actual content knowledge.

Along with the Quickie Quiz, students will be doing a homework assignment, and depending on class time, a class work assignment that is covering this material. Again, homework and class work is graded out of 10 points, but it is more for the grade book and an incentive to do the homework. It is not graded right or wrong, so this practice will help me judge which areas of the content need to be revisited, what misconceptions need to be corrected, and how well the students have mastered the skill of solving these problems.

**Summative:**

The Quickie Quizzes and homework are both summative assessments to the point that they are graded. However, the Quickie Quiz is a simple right or wrong answer type only worth 5 points. The homework is graded on completeness and not on right or wrong answers. However, I plan on marking the right or wrong answers so that students can see the mistakes they are making and get better feedback for the future.

The main summative assessment for this lesson is the summative assessment for the entire unit: the unit test. Because of the time restraint of being a semester class that has to cover a whole book worth of material, projects that require days to complete are unrealistic. However, this test is not a right or wrong type test. We do provide partial credit if the work is all correct, but they messed up the arithmetic

somewhere. This way a student is not completely penalized for a mistake they made that they are not being tested on.

### **Integration:**

**English:** Students will be reading percent word problems and converting them into equations and proportions. This is combining their English reading skills with their mathematics skills.

**Real World:** This lesson has a lot of real world integration because of the percent of change problems. Every student has seen a sale on some item and this relates directly to percent of change problems. Students will learn how to find the percent decrease of their favorite item.

There is no technology integration in this lesson because my classroom does not have ready access to a computer projector. I feel like asking students to use new technology without showing them how is awful, and with the lack of a computer projector, I cannot adequately show the students how to use the technology.

### **Differentiated Instruction:**

#### **Strategies**

Throughout this lesson I plan on using a variety of instructional strategies to help my students learn the most from this lecture lesson. Along with writing the examples on the board, I will verbally explain each step in solving the problems so all my students will be able to take in the information. I will also make sure my pacing allows students to write down all the examples and process the material. I will use quick check in strategies like hand-raising and yes or no questions so I can make sure every student understands the steps that I am doing and are not getting lost before I move on.

In addition I also looked into how I am meeting some of Howard Gardner's Multiple Intelligences:

**Logical:** Students will be applying their knowledge of proportions to the solving process for percent problems. Students will also be converting percent word problems into equations and using their knowledge of solving equations to figure out the answers.

**Verbal:** Students who need to talk their way through a problem will like being able to say the solving procedure out loud as we do examples as a class. Verbal learning students will also be able to see the connection between the percent word problems and the percent equations.

**Visual:** Students will be able to see each step done out in the percent proportion problems and the percent equations problems.

**Intrapersonal:** Students will be completing the Quickie Quiz individually. Students will also have the option to work individually on their class work and homework assignments.

**Interpersonal:** We will be working on examples as a class so those students who need to talk to someone can do so. Students will also have the option to confer with a partner on the class work and homework.

#### **Modifications/Accommodations**

Between the two algebra 1 classes that I will be doing this lesson with, there are a variety of different 504s and IEPs that have to be accounted for. A few of the students need extra time to complete tests and quizzes, which is already accommodated for. Students have all the time that they need to complete these assessments. They can even come in during another period to finish if they did not have time during their class period. I also will provide all the students with ample time to write down the examples and notes from the board and process time during lectures so they do not miss any information.

Organization is a common theme in my students' accommodations. Concrete due dates and outlines are requested. Since every homework assignment is due the next class period, the due dates are as concrete as they can get. I just have to be aware of when I mention the date of the test and make sure it is repeated so that every student is aware of the date. Outlines are not necessary for this lesson because the students have already seen the material and will only be doing practice problems. However, if I

decide to have a lot of written notes and not examples, I will have to provide outlines so students are not missing information because they are writing something down.

If a student is absent, a couple of students might need extra time to complete the missed assignments or a modified assignment so they can finish it on their own. This is not an issue because I would provide time for students to make up the work so they are not just completing the assignment without the proper understanding of the content.

Lastly, I have students in my classes that have medical conditions that make sitting for long periods of time difficult and very uncomfortable so they need to have the freedom to leave their seats and stretch. The class rules accommodate to this need because students can get up and go the bathroom, sharpen their pencil, etc. whenever they need to so these students have the freedom to get up out of their seats and relieve the discomfort.

### **Extensions**

Students will be asked to apply their knowledge of proportions to the percent problems we will be working on. This connection will challenge those students who have mastered the solving of proportions to see where they can actually apply the knowledge, while letting those students who need more practice have the additional time with it. I will be encouraging students to try the more complicated word problems on the homework if they think they really have mastered the solving process.

### **Materials, Resources and Technology:**

These materials and resources are what I will need for the whole class period, which means it is also including materials and resources from the proportions review lesson since they are being done on the same day.

- ◆ Quickie Quiz overhead or handout
- ◆ Quickie Quiz key
- ◆ Projector
- ◆ Chalk
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- ◆ Class work and/or homework examples from Practice 4.3, Practice 4.4, and Kuta Software worksheet
- ◆ Key for homework problems

### **Source for lesson plan and research:**

These sources are for both this lesson and the lesson on reviewing proportions because both lessons will be taught on the same day.

- ◆ *Algebra 1*. (2003). Upper Saddle River, New Jersey: Pearson Prentice Hall.: This text is used to gather examples, definitions, and other content notes for developing the lecture on solving percent problems and percent of change.
- ◆ *Algebra 1* workbook: This is where I will gather some homework problems for the students over solving percent problems and percent of change.
- ◆ *Kuta Software Worksheets*: These worksheets provide examples of proportions, percent problems, and percent of change problems that I can use for lecture notes and/or homework problems.

### **Maine Standards for Initial Teacher Certification and rationale:**

**Teaching and Learning Sequence:** (please include the relevant items from the list below)

The teaching and learning sequence for this lesson is also including the teaching and learning sequence from the lesson on reviewing proportions because they are being taught on the same day. The teaching and learning sequence for this specific lesson is everything after the proportions on the board.

**9-21-12:**

**Time**

As students are entering before the tardy bell I will hand back any graded homework.

Check for Understanding

Quickie Quiz over proportions and solving inequalities

**5-8 minutes**

Quickie Quiz review on board

**3-5 minutes**

\* I will do the problems on the board with the whole class so they can see their mistakes and ask any questions that they might have.

Hand back tests and go over any problems that the students have questions on. **3-5 minutes**

Collect Probability Pre-Test and ensure students that it is not going to be graded and they will learn what they did not know in the next few days.

Instruction/Guided Practice

I will provide examples of proportions on the board.

**5-8 minutes**

\*Ask students what it is.

\*Ask how would we go about solving.

\*Solve the proportions as a class and/or ask for volunteers.

Ask students on their prior knowledge of  $\frac{\%}{100} = \frac{\text{part}}{\text{whole}}$  or  $\frac{\%}{100} = \frac{\text{is}}{\text{of}}$

**3-5 minutes**

\*Have students do the thumbs up/down check in about comfort with it.

Provide examples on board for solving percent problems with proportions **8-12 minutes**

\*\*Make sure students can pinpoint what we are trying to find.

- Finding the percent examples

- Finding the part examples

- Finding the whole examples

Show students the general rules for percents and proportions

**3-5 minutes**

<u>Finding the %</u>	<u>Finding the part</u>	<u>Finding the whole</u>
What % of 45 is 10?	What is 16% of 261?	71% of what # is 87?
$\frac{x}{100} = \frac{10}{45}$	$\frac{16}{100} = \frac{x}{261}$	$\frac{71}{100} = \frac{87}{x}$

I will explain how to write equations based on percent equations **12-15 minutes**

\* What percent of 170 is 68?

x                      \* 170 = 68

\* of is multiplication, is is equal sign and missing piece is variable.

\* **When using equation, must remember that percent has to be/will be a decimal! Will have to convert back and forth.**

Provide examples of percent of change problems

**7-10 minutes**

\* percent of change =  $\frac{\text{amount of change}}{\text{original amount}}$

\* If the value increases from the original, it is a percent increase. If the value decreases from the original, it is a percent decrease.

Guided Practice/Independent Practice/Homework

Hand out homework. Any extra time will be for working on some homework problems as a class and/or time for students to work independently on the homework.

Rev. 12/11

## **Proportions and Percent Equation/Percent of Change**

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

**Date:** \_\_\_\_\_

Solve each of the problems using a proportion. **SHOW ALL WORK!!**

1.) 25% of what is 28?

2.) What is 39% of 1500?

3.) What percent of 72 is 18?

4.) 60% of what is 45?

5.) What is 60% of 12?

6.) What percent of 20 is 36?

7.) 45% of what is 99?

8.) What is 38% of 60?

Solve each of the problems with an equation. **SHOW ALL WORK!!**

9.) What is 7% of 480?

10.) 75% of what is 90?

11.) What percent of 80 is 48?

12.) What is 39% of 800?

13.) 125% of what is 175?

14.) What percent of 36 is 9?

15.) What is 35% of 360?

16.) 45% of what is 36?

Find each percent of change and say whether it is a percent increase or decrease. Round your answer to the nearest whole number. **SHOW ALL WORK!!**

17.) 280m to 320m

18.) 290yd to 261yd

19.) \$15 to \$5.50

20.) 500lb to 1500lb



## **LESSON PLAN FORMAT**

**Teacher's name:** Ms. Mykayla Stoutamyer  
**Grade Level:** Algebra 1 (mainly freshmen)

**Date of lesson:** September 24, 2012  
**Topic:** Easy Probability

### **Learning Objectives:**

- ◆ Students will understand theoretical probability's role in finding the probability of compound events.
- ◆ Students will be able to differentiate between and find theoretical and experimental probabilities.

### **Common Core State Standards (CCSS) Alignment:**

**Content Area:** Statistics and Probability

**Grade Level:** High School

**Domain:** Conditional Probability and the Rules of Probability

**Standard:** Understand independence and conditional probability and use them to interpret data.

**Cluster:** 2. Understand that two events A and B are independent if the probability of A and B occurring together is the product of their probabilities, and use this characterization to determine if they are independent.

### **Rationale:**

This lesson does not directly relate to this standard. However, in order to be able to find the compound probability of independent events like this standard is referring to, students must be able to find the probability of one event. So this lesson is preparing students with the basics that they will need in order to meet this standard in the next lesson.

### **Assessment Plan:**

#### **Formative**

The Quickie Quiz that the students will be taking on Tuesday will provide a very good formative assessment for the students' mastery of this content. If students do not understand the material, this quiz will show the common problem areas so I can address the problem before the test.

Another formative assessment of this lesson is the experimental probability activity. Students will be rolling a virtual dice and keeping track how many times they roll each number. They will also be answering questions about their individual probabilities. Throughout this process I will be circling the room, answering any questions, and correct any mistakes I see. As part of the activity, we will combine the whole class data and find the experimental probabilities. This way I can correct any misconceptions and give the students more practice.

Finally, students will be completing a homework assignment with both theoretical and experimental probability. This practice will give me an idea of how well the students have mastered this content. The in class question and answer session we have on Tuesday will give me an even better idea of the students' knowledge and problem areas so I can help correct them before moving on.

#### **Summative**

The main summative assessment for this lesson is the summative assessment for the entire unit: the unit test. Because of the time restraint of being a semester class that has to cover a whole book worth of material, projects that require days to complete are unrealistic. However, this test is not a right or wrong type test. We do provide partial credit if the work is all correct, but they messed up the arithmetic

somewhere. This way a student is not completely penalized for a mistake they made that they are not being tested on.

### **Integration:**

**Technology:** Though it is not a huge use of technology, students will be using a virtual die to conduct an experiment. This will introduce students to the world of interactives and allow them to quickly and efficiently finish the activity.

### **Differentiated Instruction:**

#### **Strategies**

This lesson, along with using the everyday strategies of proper pacing so the students can process all the information and written and verbal explanations of examples, I will also be using an activity to guide students into finding experimental probability on their own. This activity will hopefully grab the interest of students because they will be using their laptops, something that is not usually done in a math class.

In addition I also looked into how I am meeting some of Howard Gardner's Multiple Intelligences:

**Logical:** Students will be finding theoretical and experimental probabilities of various situations.

**Verbal:** Students who need to talk their way through a problem will like being able to say the solving procedure out loud as we do examples as a class.

**Visual:** Students will be able to see exactly where each part of the ratio comes from for each probability, as I will be writing down the sample space and favorable outcomes on the board.

**Intrapersonal:** Students will be completing the Quickie Quiz individually. Students will also have the option to work individually on their class work and homework assignments.

**Interpersonal:** We will be working on examples as a class so those students who need to talk to someone can do so. Students will also have the option to confer with a partner on the class work and homework.

**Kinesthetic:** Students will be conducting their own experiments and finding their individual experimental probabilities. Though they are rolling a virtual die, the students will be doing hands-on learning to help them grasp the skills for this lesson. Students will also be able to get out of their seats and write their results on the board.

#### **Modifications/Accommodations**

Between the two algebra 1 classes that I will be doing this lesson with, there are a variety of different 504s and IEPs that have to be accounted for. A few of the students need extra time to complete tests and quizzes, which is already accommodated for. Students have all the time that they need to complete these assessments. They can even come in during another period to finish if they did not have time during their class period. I also will provide all the students with ample time to write down the examples and notes from the board and process time during lectures so they do not miss any information.

Organization is a common theme in my students' accommodations. Concrete due dates and outlines are requested. Since every homework assignment is due the next class period, the due dates are as concrete as they can get. I just have to be aware of when I mention the date of the test and make sure it is repeated so that every student is aware of the date. Outlines are not necessary for this lesson because the students have already seen the material and will only be doing practice problems. However, if I decide to have a lot of written notes and not examples, I will have to provide outlines so students are not missing information because they are writing something down.

If a student is absent, a couple of students might need extra time to complete the missed assignments or a modified assignment so they can finish it on their own. This is not an issue because I would provide time for students to make up the work so they are not just completing the assignment without the proper understanding of the content. However, if any student is absent for this lesson they will need a slightly modified assignment. They can complete the activity on their own if they would like

and/or just complete the homework assignment. I will also have to find some sort of instructional video and/or type up my notes so the absent student knows what he or she is doing.

Lastly, I have students in my classes that have medical conditions that make sitting for long periods of time difficult and very uncomfortable so they need to have the freedom to leave their seats and stretch. The class rules accommodate to this need because students can get up and go the bathroom, sharpen their pencil, etc. whenever they need to so these students have the freedom to get up out of their seats and relieve the discomfort.

### **Extensions**

Since this lesson leads directly into the next lesson, if students seem to find the material easy or they show mastery of the skills, I can challenge them by asking how they think they could solve the probability of two events happening. For example; what is the probability when you roll the dice only twice of rolling a 6 then a 3. This will not only challenge them, but also get them thinking about the content for the next class.

### **Materials, Resources and Technology:**

- ◆ Chalk
- ◆ Eraser
- ◆ Projector
- ◆ Quickie Quiz over percent problems and percent of change
- ◆ Website for online dice
- ◆ *Algebra 1*. (2003). Upper Saddle River, New Jersey: Pearson Prentice Hall
- ◆ Notes and examples from textbook for lecture
- ◆ Tally chart with questions for experimental probability activity
- ◆ Class work for theoretical probability
- ◆ Pizzazz homework for theoretical and experimental probability
- ◆ Key for homework

### **Source for lesson plan and research:**

- ◆ Online dice (<http://tinyurl.com/nvoy5>): This site provides a virtual dice roller that students will be using to do trial runs and get data to find experimental probability with.
- ◆ *Algebra 1*. (2003). Upper Saddle River, New Jersey: Pearson Prentice Hall.: This text is used to gather examples, definitions, and other content notes for developing the lecture notes on theoretical and experimental probability.
- ◆ *Algebra 1* workbook: This is where I will gather some homework problems for the students over theoretical and experimental probability.
- ◆ *Pre-Algebra Pizzazz 111*(Michelle Frigon): This worksheet provides a great variety of probability examples and because students are solving for a riddle, they get instant feedback on if their answer is right or wrong.

### **~~Maine Standards for Initial Teacher Certification and rationale:~~**

### **Teaching and Learning Sequence: (please include the relevant items from the list below)**

9-24-12

Time

As students enter before the tardy bell I will hand back any graded work.

### Check for Understanding

Quickie Quiz over solving percent problems and percent of change.

**5-8 minutes**

Quickie Quiz review on board

**3-5 minutes**

\* I will do the problems on the board with the class so students can see their mistakes and ask any questions.

Go over homework (Proportions and Percent Equations/Percent of Change Handout). **5-8 minutes**

\* Ask if students have any specific questions and do those problems on the board.

### Instruction/Guided Practice

Introduce the vocabulary that goes with this lesson and give examples of each word.

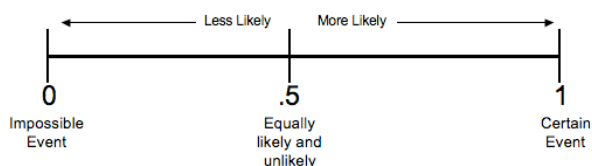
**3-5 minutes**

\* Probability, event, outcome, sample space, favorable outcome

Explain how to find theoretical probability and do examples.

**5-8 minutes**

Explain that probabilities range from 0 to 1 and what the scale looks like. **3-5 minutes**



Ask for examples of events that happen at all 3 areas.

**3-5 minutes**

### Activity/Guided Practice

I will give students the instructions to the die rolling activity.

**2-3 minutes**

Students will complete the activity by rolling the virtual die 20 times apiece and recording how many times they roll each number. They will answer questions about their experiment.

**10-15 minutes**

As students finish individually, they will put their results on the board and we will find the probabilities of the whole class data.

**8-12 minutes**

### Instruction

I will explain the difference between theoretical and experimental probability and the rule of large numbers.

**2-3 minutes**

### Independent Practice/Homework

Any extra class time will be for students to start on their homework about theoretical and experimental probability.

### Dice Rolling Probability Activity

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

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

For this activity you will be rolling a virtual die **20 TIMES** and recording your results on the chart below. Use simple tally marks to keep track then add them up and put the total in the total column. When you finishing tallying your rolls, put your totals on the board so we can get a class total. Then answer the probability questions below about your results.

<b>Number Rolled</b>	<b>Tally Marks of Rolls</b>	<b>Total Number Rolled</b>
<b>1</b>		
<b>2</b>		
<b>3</b>		
<b>4</b>		
<b>5</b>		
<b>6</b>		

Find the following probabilities using your results.

1.)  $P(3)$

2.)  $P(4)$

3.)  $P(\text{even})$

4.)  $P(3 \text{ or } 4)$

5.)  $P(1 \text{ or } 2)$

6.)  $P(\text{not } 5)$

## **LESSON PLAN FORMAT**

**Teacher's name:** Ms. Mykayla Stoutamyer

**Grade Level:** Algebra 1 (mainly freshmen)

**Date of lesson:** 9-25-12

**Topic:** Probability of Compound Events

### **Learning Objectives:**

- ◆ Students will understand theoretical probability's role in finding the probability of compound events.
- ◆ Students will be able to calculate the probability of independent compound events.
- ◆ Students will be able to solve for the probabilities of dependent compound events.

### **Common Core State Standards (CCSS) Alignment:**

**Content Area:** Statistics and Probability

**Grade Level:** High School

**Domain:** Conditional Probability and the Rules of Probability

**Standard:** Understand independence and conditional probability and use them to interpret data.

**Cluster:** 2. Understand that two events A and B are independent if the probability of A and B occurring together is the product of their probabilities, and use this characterization to determine if they are independent.

### **Rationale:**

Students will be learning how to find the probabilities of independent and dependent compound events in this lesson. In order to find these probabilities, students will have to know the process, which is multiplying the probabilities of the two events together, which ties directly to this standard.

### **Assessment Plan:**

#### **Formative:**

Like all previous lessons, the Quickie Quiz the day after this lesson will serve as a formative assessment to show me how much the students gathered from this lesson before the test. This lesson also has an activity that will allow the students to physically see where their calculations are coming from, as well as allow me to see how well they understand the material. This activity will also enable me to fix any common misconceptions before the test based on the type of questions the students ask during the activity.

The homework over finding the probability of compound events will also serve as a formative assessment. I will be able to see the types of problems that students struggle with as we go over the homework as a whole class and do problems on the board. This is another time for me to correct problem areas before the test as well as reiterate important steps and parts.

Finally, the pre-test that the students will complete again will be a great formative assessment. Since this is completely not graded and showing how much the students have learned from the beginning of the unit until the end, I will really get to see what the problem areas are as well as what concepts the students have a great understanding for.

#### **Summative**

The main summative assessment for this lesson is the summative assessment for the entire unit: the unit test. Because of the time restraint of being a semester class that has to cover a whole book worth of material, projects that require days to complete are unrealistic. However, this test is not a right or wrong type test. We do provide partial credit if the work is all correct, but they messed up the arithmetic

somewhere. This way a student is not completely penalized for a mistake they made that they are not being tested on.

### **Integration:**

This lesson does not really integrate among any other disciplines. However, it does involve an activity that gets students physically manipulating their probability object so they can see where the formula for finding the probability of compound events comes from.

There is no technology integration in this lesson because my classroom does not have ready access to a computer projector. I feel like asking students to use new technology without showing them how is awful, and with the lack of a computer projector, I cannot adequately show the students how to use the technology.

### **Differentiated Instruction:**

#### **Strategies**

This lesson, along with using the everyday strategies of proper pacing so the students can process all the information and written and verbal explanations of examples, I will also be using an activity to show students where the formula for the probability of compound events comes from. This activity will hopefully grab the interest of students because they will get to play with M&Ms and actually see what is going on.

In addition I also looked into how I am meeting some of Howard Gardner's Multiple Intelligences:

**Logical:** Students will be finding the probabilities of both independent and dependent compound events.

**Verbal:** Students who need to talk their way through a problem will like being able to say the solving procedure out loud as we do examples as a class.

**Visual:** Students will be able to see exactly where the formula comes from as they complete the M&M activity. Students will also get to see each step done out for various problems.

**Intrapersonal:** Students will be completing the Quickie Quiz individually. Students will also have the option to work individually on their class work and homework assignments.

**Interpersonal:** We will be working on examples as a class so those students who need to talk to someone can do so. Students will also have the option to confer with a partner on the class work and homework.

**Kinesthetic:** Students will be physically manipulating their probability environment as they find the independent and dependent probabilities of compound events.

#### **Modifications/Accommodations**

Between the two algebra 1 classes that I will be doing this lesson with, there are a variety of different 504s and IEPs that have to be accounted for. A few of the students need extra time to complete tests and quizzes, which is already accommodated for. Students have all the time that they need to complete these assessments. They can even come in during another period to finish if they did not have time during their class period. I also will provide all the students with ample time to write down the examples and notes from the board and process time during lectures so they do not miss any information.

Organization is a common theme in my students' accommodations. Concrete due dates and outlines are requested. Since every homework assignment is due the next class period, the due dates are as concrete as they can get. I just have to be aware of when I mention the date of the test and make sure it is repeated so that every student is aware of the date. Outlines are not necessary for this lesson because the students have already seen the material and will only be doing practice problems. However, if I decide to have a lot of written notes and not examples, I will have to provide outlines so students are not missing information because they are writing something down.

If a student is absent, a couple of students might need extra time to complete the missed assignments or a modified assignment so they can finish it on their own. This is not an issue because I would provide time for students to make up the work so they are not just completing the assignment

without the proper understanding of the content. However, if any student is absent for this lesson they will need a slightly modified assignment. They can complete the activity on their own if they would like and/or just complete the homework assignment. I will also have to find some sort of instructional video and/or type up my notes so the absent student knows what he or she is doing.

Lastly, I have students in my classes that have medical conditions that make sitting for long periods of time difficult and very uncomfortable so they need to have the freedom to leave their seats and stretch. The class rules accommodate to this need because students can get up and go the bathroom, sharpen their pencil, etc. whenever they need to so these students have the freedom to get up out of their seats and relieve the discomfort.

### **Extensions**

Since this is the last learning lesson of the unit, students who have mastered the material can simply practice more for the test, which is Wednesday or they can challenge themselves by looking at some more complicated probabilities. Like, they can look at the probabilities of more than two compound events.

### **Materials, Resources and Technology:**

- ◆ Chalk
- ◆ Eraser
- ◆ Projector
- ◆ Quickie Quiz over theoretical and experimental probability (.doc)
- ◆ *Algebra 1*. (2003). Upper Saddle River, New Jersey: Pearson Prentice Hall
- ◆ Notes and examples from textbook for lecture
- ◆ M&Ms for activity
- ◆ Handout for M&M activity
- ◆ Class work for probability of compound events
- ◆ Key for class work
- ◆ Pre-test for homework
- ◆ Pre-test answer key

### **Source for lesson plan and research:**

- ◆ *Algebra 1*. (2003). Upper Saddle River, New Jersey: Pearson Prentice Hall.: This text is used to gather examples, definitions, and other content notes for developing the lecture notes on theoretical and experimental probability.
- ◆ *Algebra 1* workbook: This is where I will gather some homework problems for the students over theoretical and experimental probability.

### **Maine Standards for Initial Teacher Certification and rationale:**

***Standard 1- “Demonstrates knowledge of the central concepts, tools of inquiry, and structures of discipline(s) she teaches and can create learning experiences that make these aspects of subject matter meaningful to students.”***

#### **Rationale:**

In this lesson I designed a M&M activity that allows students to physically see the difference between dependent and independent compound events and their probabilities. When I supplement this learning with notes on how to actually find the probabilities of these events, students can connect to the formula because they saw why the probabilities are that way.



***Standard 3- “Demonstrates knowledge of the diverse ways in which students learn and develop by providing learning opportunities that support their intellectual, physical, emotional, social and cultural development.”***

**Rationale:**

This lesson uses a variety of learning strategies like, the activity, the lecture, guided practice with me doing the problems on the board, and individual practice with the class work and activity. This variety will help ensure that I find a way to teach every single student the material in the way that most appeals to them. Also, because of how the activity is set up, students will be able to either confer with their peers and compare results or work individually and internalize the learning, meaning they will get the necessary peer interaction that they need or want to help learn the content better.

***Standard 5- “Understands and uses a variety of instructional strategies and appropriate technology to meet students’ needs.”***

**Rationale:**

I met this standard by making sure I incorporated a majority of the multiple intelligences that Howard Gardner talks about. By having a learning strategy to meet those learning styles, I am meeting all my students’ learning needs. Below are the learning styles I used and how that are incorporated into my lesson:

**Logical:** Students will be finding the probabilities of both independent and dependent compound events.

**Verbal:** Students who need to talk their way through a problem will like being able to say the solving procedure out loud as we do examples as a class.

**Visual:** Students will be able to see exactly where the formula comes from as they complete the M&M activity. Students will also get to see each step done out for various problems.

**Intrapersonal:** Students will be completing the Quickie Quiz individually. Students will also have the option to work individually on their class work and homework assignments.

**Interpersonal:** We will be working on examples as a class so those students who need to talk to someone can do so. Students will also have the option to confer with a partner on the class work and homework.

**Kinesthetic:** Students will be physically manipulating their probability environment as they find the independent and dependent probabilities of compound events.

***Standard 6- “Creates and maintains a classroom environment which supports and encourages learning.”***

**Rationale:**

In this lesson I show that I meet Standard 6 by outlining the class period in the Teaching and Learning Sequence. The routine of a Quickie Quiz, Quickie Quiz review, and homework review at the beginning of the period gets students ready to learn at the start of every period. The structure also helps ensure that everything is getting accomplished so students can learn effectively. This lesson also has more than just a lecture so students are encouraged to discover concepts on their own instead of listening to me talk. All of this adds up to an environment that is conducive to learning.

**Teaching and Learning Sequence: (please include the relevant items from the list below)**

**9-25-12**

**Time**

As the students enter before the tardy bell, I will hand back any graded work.

### Check for Understanding

Quickie Quiz over theoretical and experimental probability (.doc).

**5-8 minutes**

Quickie Quiz review on board

**3-5 minutes**

\* I will go over the problems on the board so students can see their mistakes and ask any questions.

Go over homework (Pizzazz #111)

**5-8 minutes**

\* Have students say what they got for answers and do specific problems on the board at the students' request.

### Hook/Activity/Instruction

I will hand out M&Ms and activity sheet.

**1-2 minutes**

Students will find a couple of simple probabilities using their M&Ms

**2-3 minutes**

I will have students choose a random M&M, find its probability, put it back, then choose another random M&M and find its probability.

**3-5 minutes**

\* I will explain that to find the probability of getting M&M 1 then M&M 2 you simply multiply the probabilities together. Also explain that since we replaced M&M 1, the events are independent.

Students will find the independent probabilities of some compound events using their M&Ms

**5-8 minutes**

I will have students again choose two M&Ms, but instead of replacing the first one, they eat it.

**3-5 minutes**

\* Ask how this changes the probability.

\* Explain dependent compound events are found the same way, except the probability of the second pick changes.

Students will find the dependent probabilities of some compound events using their M&Ms.

**5-8 minutes**

### Guided Practice/Independent Practice

I will hand out the class work over finding the probability of compound events and do some problems on the board to solidify the solving process.

**5-8 minutes**

Students will complete some examples for class work

**10-15 minutes**

### Independent Practice/Homework

Students will complete the Pre-Test for homework.

### Quickie Quiz 9-25

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

Using the spinner at the right, find the following probabilities. Reduce the fractions if necessary.

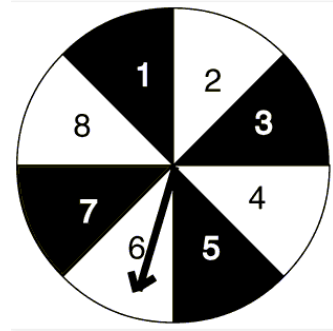
1.)  $P(\text{white})$

2.)  $P(\text{even})$

3.)  $P(3 \text{ or a black})$

5.)  $P(\text{white and a multiple of 4})$

4.)  $P(\text{even or a 5})$



### Quickie Quiz 9-24

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

Using the spinner at the right, find the following probabilities. Reduce the fractions if necessary.

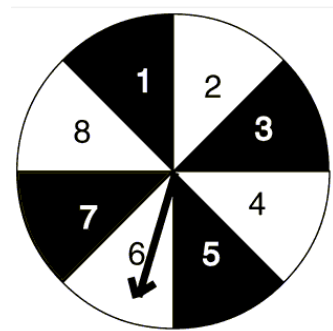
1.)  $P(\text{white})$

2.)  $P(\text{even})$

3.)  $P(3 \text{ or a black})$

5.)  $P(\text{white and a multiple of 4})$

4.)  $P(\text{even or a 5})$



### M&M Activity

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

Step 1: Using the number of M&Ms in your specific bag, find the following probabilities.

**DO NOT EAT THE M&Ms YET!!!**

1.) P(orange)

2.) P(green or yellow)

Step 2: Find the following probabilities using the number of M&Ms in your bag. **DO**

**NOT EAT THE M&Ms YET!!!**

5.) P(red then yellow) with replacing

6.) P(yellow then red) with replacing

7.) P(blue then green) with replacing

8.) P(green then orange) with replacing

9.) P(brown then brown) with replacing

Step 3: Find the following probabilities using the number of M&Ms in your bag. **After**  
you are done finding your probabilities, you can eat the M&Ms if you want ☺

10.) P(yellow then red) without replacing

11.) P(red then yellow) without replacing

12.) P(green then green) without replacing

13.) P(blue then brown) without replacing

14.) P(orange then blue) without replacing

### Probability of Compound Events

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

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

You have a dark closet containing 7 blue shirts, five yellow shirts, and eight white shirts. You pick two shirts from the closet at random. Find the following probabilities.

1.) P(blue then yellow) with replacing

2.) P(blue then yellow) without replacing

3.) P(yellow then yellow) with replacing

4.) P(yellow then yellow) without replacing

5.) P(white then blue) with replacing

6.) P(white then blue) without replacing

7.) P(blue then blue) with replacing

8.) P(blue then blue) without replacing

A and B are independent events. Find the missing probability.

9.)  $P(A) = \frac{3}{4}$ ,  $P(A \text{ and } B) = \frac{1}{2}$ . Find  $P(B)$ .

10.)  $P(B) = \frac{1}{4}$ ,  $P(A \text{ and } B) = \frac{3}{20}$ . Find  $P(A)$ .

## **LESSON PLAN FORMAT**

**Teacher's name:** Ms. Mykayla Stoutamyer

**Grade Level:** Algebra 1 (mainly freshmen)

**Date of lesson:** September 26, 2012

**Topic:** Test (percents, percent of change, easy probability, probability of compound events)

### **Learning Objectives:**

- ◆ Students will understand what proportions are.
- ◆ Students will be able to solve proportions.
- ◆ Students will understand the ways in which percent problems can be solved.
- ◆ Students will be able to utilize proportions to solve percent problems.
- ◆ Students will be able to formulate solvable equations from percent word problems.
- ◆ Students will understand theoretical probability's role in finding the probability of compound events.
- ◆ Students will be able to differentiate between and find theoretical and experimental probabilities.
- ◆ Students will be able to calculate the probability of independent compound events.
- ◆ Students will be able to solve for the probabilities of dependent compound events.

### **Common Core State Standards (CCSS) Alignment:**

**Content Area:** Algebra

**Grade Level:** High School

**Domain:** Reasoning with Equations and Inequalities

**Standard:** Solve equations and inequalities in one variable

**Cluster:** 3. Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.

**Content Area:** Statistics and Probability

**Grade Level:** High School

**Domain:** Conditional Probability and the Rules of Probability

**Standard:** Understand independence and conditional probability and use them to interpret data.

**Cluster:** 2. Understand that two events A and B are independent if the probability of A and B occurring together is the product of their probabilities, and use this characterization to determine if they are independent.

### **Rationale:**

Students will be tested on both of the standards above in this lesson. Students will be meeting the first standard on solving equations when they solve for percent problems. Percent problems can be solved both using a proportion or an equation and then solving for the missing variable. Students are being asked to use both solving processes on the test, therefore really showing mastery of being able to solve equations with one variable.

On this test students will also be asked to find the probability of one event and compound events. They will have to be able to distinguish between independent and dependent events to know how to solve them correctly as well as know to multiply the probabilities together.

### **Assessment Plan:**

## **Formative**

Students will be completing a Quickie Quiz over all of the unit's content. This Quickie Quiz will be a great self-assessment for students on what they need help with during the review before the test. The review of the quiz will be a great indication of the student's knowledge for me before the test because they will not be as forth coming with answers.

Another great assessment for both the students and myself is the review session I will be doing before the test. Students will get to work on problems that are similar to those they will see on the test and be able to ask questions about their confusions. I will be able to gauge students' understanding as I walk around while they complete the problems individually and then on the board.

## **Summative**

The main summative assessment for this lesson is the summative assessment for the entire unit: the unit test. Because of the time restraint of being a semester class that has to cover a whole book worth of material, projects that require days to complete are unrealistic. However, this test is not a right or wrong type test. We do provide partial credit if the work is all correct, but they messed up the arithmetic somewhere. This way a student is not completely penalized for a mistake they made that they are not being tested on.

## **Integration:**

There is no integration in this lesson because it is an assessment day with the students taking a test.

## **Differentiated Instruction:**

### **Strategies**

Like every other lesson, for this lesson I will use proper pacing with written and verbal explanations of solving processes so that every student can keep up with the notes and problems. Another strategy I am using this lesson is a review session before the test. I am going to take types of problems that students will be seeing on the test and having the students solve at their seats, then walk through the process on the board. This will hopefully refresh the students memories on the content that they are being tested on so they can recall the information.

In addition I also looked into how I am meeting some of Howard Gardner's Multiple Intelligences:

**Logical:** Students will be finding the probabilities of single events and independent and dependent compound events, solving for percent problems using equations and proportions, and finding percent of change.

**Verbal:** Students who need to talk their way through a problem will like being able to say the solving procedure out loud as we do examples as a class.

**Visual:** Students will also get to see each step done out for various problems.

**Intrapersonal:** Students will be completing the Quickie Quiz and test individually. Students will be working individually on the homework after they complete the test.

**Interpersonal:** We will be working on examples as a class so those students who need to talk to someone can do so.

## **Modifications/Accommodations**

The biggest accommodation for this lesson is the extra time that some students need on tests and quizzes. Students get all the time that they need to complete these assessments all ready so that is not an issue. If students do not finish this lesson's test during the class period, they can make arrangements with my mentor or I and come finish during their study hall and/or homeroom and/or after school.

## **Extensions**

The extension for this lesson comes from the homework. Students are being asked to complete a Pizzazz worksheet introducing them to word problems. They have very little experience with word problems thus far in this course so this is asking students to go above and beyond what they know yet.

### Materials, Resources and Technology:

- ◆ Chalk
- ◆ Eraser
- ◆ Projector
- ◆ Quickie Quiz over compound events (2), easy probability (1), percent of change (1), and percent (2). (.doc)
- ◆ Key to Quickie Quiz
- ◆ *Algebra 1*. (2003). Upper Saddle River, New Jersey: Pearson Prentice Hall
- ◆ Notes and examples from textbook for review
- ◆ Test #4 (percents, percent of change, easy probability, and compound events)
- ◆ Key to Test #4
- ◆ Word Problem Pizzazz #37 for homework
- ◆ Key to Pizzazz #37

### Source for lesson plan and research:

- ◆ *Algebra 1*. (2003). Upper Saddle River, New Jersey: Pearson Prentice Hall.: This text is used to gather examples, definitions, and other content notes for developing the lecture notes on theoretical and experimental probability.
- ◆ *Algebra 1* workbook: This is where I will gather some homework problems for the students over theoretical and experimental probability.
- ◆ *Pizzazz # (Michelle Frigon)*: This Pizzazz # will be used as a homework assignment to introduce students into word problems for the upcoming lessons.

### ~~Maine Standards for Initial Teacher Certification and rationale:~~

### Teaching and Learning Sequence: (please include the relevant items from the list below)

9-26

Time

I will hand back any graded work as the students enter before the bell.

#### Check for Understanding

Quickie Quiz over easy probability, probabilities of compound events, percent problems, and percent of change problems. **5-8 minutes**

Quickie Quiz review on board **3-5 minutes**

\* I will go over the problems on the board so students can see their mistakes and ask any questions.

Go over homework (Pre-Test)

**5-8 minutes**

\* Go over problems that students ask to see done.

#### Review

I will present students with a variety of problems like those that they will see on the test

\* Students will solve the problems at their seats and I will ask for volunteers/do the problems on the board.



Students will complete Test #4 over percents, percent of change, easy probability, and probabilities of compound events.

Homework

Students will work on Pizzazz #37 after they finish the test and complete the handout for homework.

### Quickie Quiz 9-26

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

You have a bag of Skittles containing 6 red, 2 purple, 4 green, and 3 yellow. Find the following probabilities. **REDUCE THE FRACTIONS IF NECESSARY!**

1.)  $P(\text{red})$  3.)  $P(\text{yellow then yellow})$  without replacing

2.)  $P(\text{green then purple})$  with replacing

Solve using an **EQUATION!**

4.) What percent of 320 is 16?

Solve using a **PROPORTION!**

5.) 21 is 30% of what number?

Find the percent of change and say whether it is an increase or decrease.

6.) \$28 to \$49

### Quickie Quiz 9-26

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Solve using an **EQUATION!**

4.) What percent of 320 is 16?

Solve using a **PROPORTION!**

5.) 21 is 30% of what number?

Find the percent of change and say whether it is an increase or decrease.

6.) \$28 to \$49

NAME \_\_\_\_\_ DATE \_\_\_\_\_

**Algebra 1 – Test**

**Percent and Probability**

**Write an EQUATION and solve.**

1. 15 is what percent of 45?

2. 30% of 70 is what number?

**Write a PROPORTION and solve.**

3. 60% of what number is 42?

4. What percent of 50 is 10?

**Write a proportion or equation and solve.**

5. What is 40% of 20?

6. What is 150% of 14?

7. 3 is 75% of what number?

8. 8% of 125 is what number?

9. 20 is 80% of what number?

10. 28 is what percent of 14?

11. 18 is what percent of 90?

12. 20% of what number is 48?

**Find each percent of change. Describe the percent of change as an increase or decrease. If necessary, round to the nearest tenth.**

13. \$2 to \$3

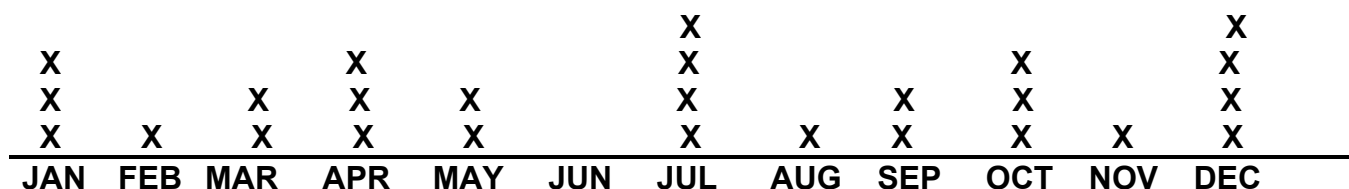
14. 12 cm to 9 cm

15. 15 lb to 18 lb

16. 4.5 cm to 8.3 cm

Use the data in the line plot to find each probability.

Student Birth Months



17. P(April)
18. P(December)
19. P(last 3 months)
20. P(not July)
21. P(June)
22. P(March or August)
23. Janet has a 30% chance of making a free throw. What is the probability that she will miss the free throw?

You have a bag of 4 red marbles, 5 blue marbles, 1 yellow marbles, and 5 green marbles. You pick two marbles from the bag. Find each probability.

24. P(red then yellow) with replacing
25. P(red then yellow) without replacing
26. P(red then green) with replacing
27. P(red then green) without replacing
28. P(blue then blue) with replacing
29. P(blue then blue) without replacing
30. P(yellow then yellow) with replacing
31. P(yellow then yellow) without replacing

A and B are independent events. Find the missing probability.

32.  $P(A) = \frac{2}{3}$ ,  $P(A \text{ and } B) = \frac{4}{7}$ . Find  $P(B)$ .

## **Instructional Decision Making**

### *Situation #1:*

During my lesson on probability of compound events, I had my students work on an M&M activity. This activity was meant to physically show students where the formulas for the probability of independent and dependent events came from. I used a student's M&M count and showed the students how to find the probabilities. As students worked on finding the probabilities of their independent events, they had no trouble. However, when they moved onto the probabilities of dependent events, I had a lot of students raising their hands for help. My mentor and I walked around answering questions, but after the first few students I helped I noticed a pattern; all the students who had questions were not finding the correct probability for the second event.

To help correct the situation before it got too out of hand and I had to re-teach the entire concept, I immediately stopped the individual work and got the class's attention back to the front of the room. I then did another example with the students and stressed exactly how they were going to find the probability of the first and second event. I asked if this made more sense to the students and I got some no's and confused looks. So, I did yet another example and explained the content in a different way. This seemed to work! The students started to work on the M&M probabilities and then moved on to more theoretical examples and they all appeared to understand what to do. This intervention early ensured that the students did not work and learn a wrong process that would hinder them from meeting the learning goal. I just had to make sure that I keep stressing the correct process so students did not regress to the incorrect ways.

### Situation #2:

The second situation where I had to alter my lesson plan slightly came after the second lesson. During lesson one I taught students how to solve percent problems using equations and proportions and thought that they understood the concept. However, after having a whole weekend to forget the material, my students came into lesson two and seemed to remember nothing. The confusion with the Quickie Quiz and homework clearly showed me they were confused and not grasping the material. However, because of the time constraint caused by a semester long class, I could not spend another class period explaining the material. I did the best that I could to reiterate the important facts and processes while reviewing the Quickie Quiz and answering homework questions, but I could tell by their expressions that they did not completely understand this learning goal.

Since the next two class periods were booked with new material that I had to get through, I had to devise another way to re-teach the content before the test on day number four. I decided that since the percent and probability test that they would be taking on the fourth day would only take them about a half hour to complete, I would use the extra class time to do an in-depth review session so the students could succeed. I started the review session by reiterating the important facts and processes for solving percent problems. However, me simply doing the problems on the board with them was getting us nowhere. So I switched tactics and had the students do the problems individually. I then asked for volunteers to go to the board and show me the work that they did. After I got the first volunteer up to the board, I had two to four students volunteering per problem. I had all the students who wanted to go to the board with their answers. When they were all done I asked the whole class if the answers on the board were correct. This forced them to not

only answer the problem, but also analyze the process and spot any mistakes. I think this really solidified the concept for students. After the review examples, I then asked the students to tell me the process for solving so I could ensure they had it down for the test. This verbal task forced students to think about the process even more. The confused looks about this topic disappeared and I knew they were ready for the test.

## **Analysis of Student Learning**

For this unit the summative assessment was a test. I would have preferred some other assessment that did not stress students out, but due to the time constraint I was under, the quickest summative assessment that I could think of was a test. However, because the test is graded differently than the pre-test that I used as pre-assessment, I also used the same pre-test to get a better idea of the students' progress towards the learning goals.

The second round of the pre-test was "graded" the same way; students either got the problem completely right, meaning they got the right answer with the correct work, got the correct answer with no work or the incorrect work, got the problem completely wrong, or didn't answer the question. The unit test was scored differently; students could get the problem completely correct, meaning they had the correct setup and correct answer, could have the correct setup with the wrong answer and/or incomplete solving process, could have gotten the problem completely wrong, could have not attempted the problem, or had the right answer with the wrong setup or no setup. Both of these keys for the post assessments will help me judge students understanding of the content for this unit.

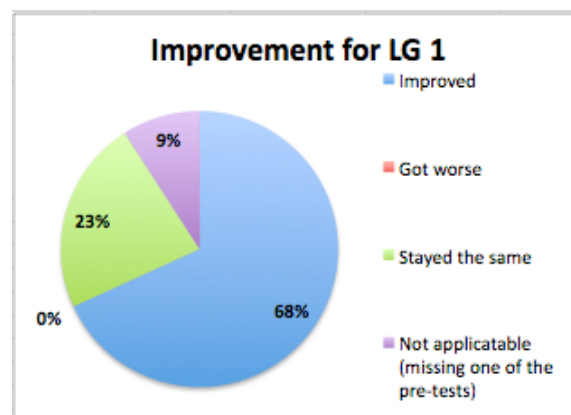
### **LG 1: Students will understand what proportions are and the solving process.**

The first data that I am going to look at is that of both pre-tests, the first time that the students took it as a pre-assessment and the second time they took it as a review for their test.



	1st Pre-test results			2nd Pre-test results					
	LG 1			LG 1			Improvement (Yes, No, Same, N/A)		
ID #	1. a	1. b	1. c	1. a	1. b	1. c			
1	✓	✓	X	✓	✓	✓	Y		
2	X	X	✓	✓	✓	✓	Y		
3	✓	X	X				NA		
4	✓	X	✓	✓	✓	X	S		
5	X	X	X	✓	✓	✓	Y		
6	✓	X	X	✓	✓	X	Y		
7	✓	X	✓	✓	✓	✓	Y		
8	X	DA	CA	✓	✓	X	Y		
9	X	X	DA	✓	X	X	Y		
10	X	DA	X	✓	✓	X	Y		
11	✓	✓	X	✓	X	✓	S		
12	✓	X	DA	✓	✓	✓	Y		
13	✓	X	X	✓	✓	✓	Y		
14	X	DA	DA	✓	X	✓	Y		
15	DA	DA	DA	✓	X	X	Y		
16	X	DA	X	CA	X	DA	Y		
17	✓	X	X	✓	X	X	S		
18	✓	X	✓	✓	X	✓	S		
19	DA	DA	✓	✓	✓	✓	Y		
20				✓	X	X	NA		
21	DA	DA	DA	✓	✓	✓	Y		
22	X	X	CA	X	DA	CA	S		

Since the students answered the exact same questions in both pre-tests it is easy to see if they have improved or not by just seeing if they have gotten more questions right the second time than the first time. From pre-test to pre-test, none of the students' answers got worse; they either improved or stayed the same. The pie chart below shows the breakdown of improvements compared to those students who stayed the same or not applicable.

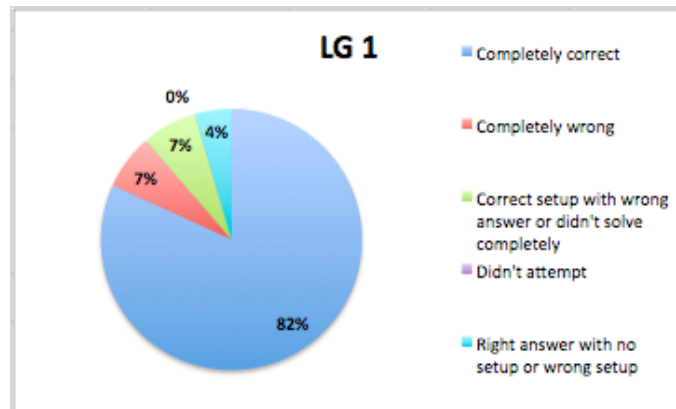


When comparing the pre-tests 68% of my twenty-two students (15) improved from the first pre-test to the second. So looking at this data, a majority of my students met learning goal 1. However, the pre-test was not the summative assessment, so I also have data from the unit test that they took. This information does not compare directly to the pre-assessment, but it is possible to see how well the students did on those questions that aligned with learning goal 1. Below are the individual results for the tests with the key.

ID #	LG 1	
	3	4
1	✓	✓
2	✓	✓
3	✗	✗
4	✓	✓
5	✓	✓
6	✓	✓
7	✓	CS
8	✗	✓
9	✓	✓
10	✓	✓
11	✓	✓
12	✓	✓
13	✓	CS
14	✓	✓
15	✓	✓
16	✓	✓
17	✓	✓
18	CS	✓
19	✓	✓
20	✓	✓
21	✓	✓
22	RA	RA

Key	
Correct answer with the correct work	✓
Correct setup with wrong answer and/or not solved completely	CS
Completely wrong answer	✗
Didn't attempt	DA
Right answer with wrong or no setup	RA

I loved seeing these results on the test. Out of all forty-four responses to the two questions, only three students got one of the problems completely wrong or did not setup the problem correctly, which is not meeting the learning goal. The other nineteen students got both problems completely right or setup the problem correctly, which stills shows me the know the material and just did some calculations wrong. Below is the pie chart breaking down the forty-four responses into how many correct answers, wrong answers, etc.



With 82% of the responses being completely correct and another 7% having the correct setup, the statistics from the test match those of the second pre-assessment. A majority of students do understand what proportions are and how to solve them. However, I cannot place much value in the test as a way to show me this information because there were only two questions that dealt with solving proportions because they have already been tested on it.

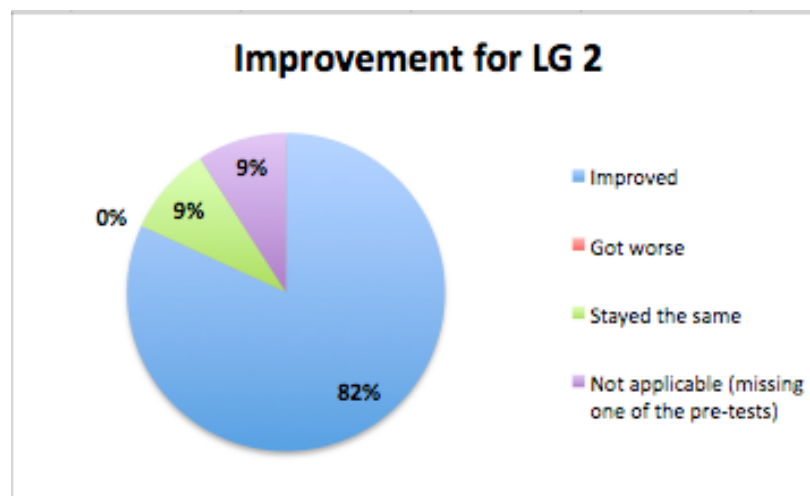
**LG 2: Students will understand the various percent problems and the ways in which they can be solved.**

Like learning goal 1, I first looked at the pre-assessment and post assessment that I could compare directly to one another; the pre-test. I took students' results from both pre-tests and looked at whether they improved from the first one to the second one. Below are the individual results of that comparison.

		1st Pre-test results					2nd Pre-test results						
		LG 2					LG 2						
ID #		2. a	2. b	3. a	3. b	4	2. a	2. b	3. a	3. b	4	Improvement (Yes, No, Same, N/A)	
1		CA	X	X	X	X	X	CA	✓	✓	X	Y	
2		CA	DA	X	CA	X	X	✓	✓	✓	✓	Y	
3		X	X	X	CA	X						NA	
4		CA	DA	DA	CA	X	✓	✓	✓	✓	X	Y	
5		CA	X	DA	X	DA	CA	CA	✓	✓	✓	Y	
6		CA	CA	DA	DA	DA	✓	✓	✓	✓	✓	Y	
7		CA	X	X	X	DA	✓	✓	✓	✓	✓	Y	
8		CA	X	DA	DA	DA	✓	✓	✓	✓	✓	Y	
9		X	DA	DA	DA	DA	✓	✓	✓	✓	✓	Y	
10		DA	DA	DA	DA	DA	X	CA	CA	CA	X	Y	
11		DA	DA	DA	DA	DA	✓	✓	✓	✓	✓	Y	
12		✓	X	X	CA	X	✓	✓	✓	✓	X	Y	
13		X	CA	CA	CA	X	X	✓	✓	✓	✓	Y	
14		CA	X	X	X	DA	✓	✓	CA	CA	✓	Y	
15		CA	X	CA	CA	DA	CA	X	✓	✓	✓	Y	
16		CA	DA	DA	CA	DA	CA	✓	CA	CA	X	Y	
17		X	X	X	CA	X	✓	✓	✓	✓	X	Y	
18		CA	CA	X	CA	DA	X	CA	✓	✓	X	Y	
19		CA	X	X	DA	DA	✓	✓	X	✓	X	Y	
20							✓	✓	CA	CA	X	NA	
21		CA	DA	X	CA	CA	CA	X	CA	CA	DA	S	
22		X	CA	CA	CA	X	CA	X	CA	CA	X	S	

Key	
Correct answer with the correct work	✓
Correct setup with wrong answer and/or not solved completely	CS
Completely wrong answer	X
Didn't attempt	DA
Right answer with wrong or no setup	RA

Also like learning goal 1, by being able to compare directly from one pre-test to another, I can easily see that not a single student got worse results during the post pre-test than they received during the pre-assessment. The pie chart below shows the breakdown of how many students improved compared to staying the same.



82% of my twenty-two students (18) improved their results, while another 9% (2 students) stayed the same. The direct comparison tells me that a large proportion of my students have met this learning goal. Again, I have to look at the summative assessment I used for the unit and see if this data agrees with the statistics I gleamed from the two pre-

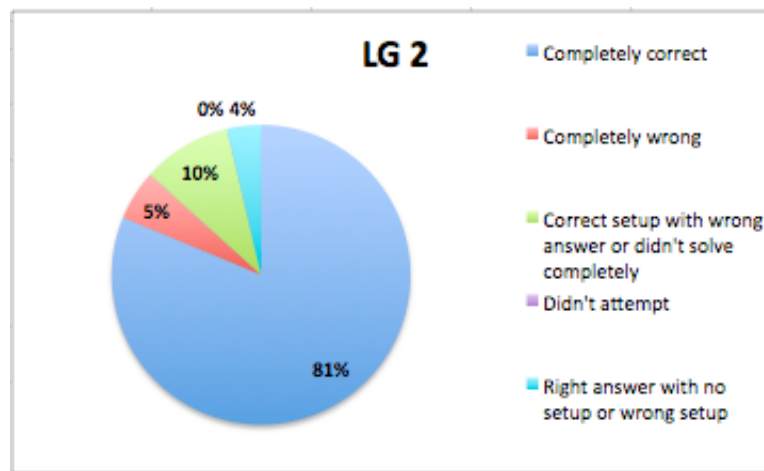
tests. Below are the individual results and the key that I used while assessing my students' tests.

LG 2									LG 2								
ID #	1	2	3	4	13	14	15	16	ID #	5	6	7	8	9	10	11	12
1	CS	✓	✓	✓	✓	✓	✓	✓	1	✓	✗	✓	✗	✓	CS	✓	✓
2	✓	✗	✓	✓	✓	✓	✓	✓	2	✓	✓	✓	✓	✓	✓	✓	✓
3	CS	✓	✗	✗	CS	CS	CS	CS	3	✓	✓	✗	✓	✗	CS	CS	✓
4	✓	✓	✓	✓	✓	✓	✓	✓	4	✓	✓	✓	✓	✓	✓	✓	✓
5	✓	✓	✓	✓	✓	✓	✓	✓	5	CS	✓	✓	✓	✓	CS	✓	✓
6	✓	✓	✓	✓	✓	✓	✓	✓	6	✓	✓	✓	✓	✓	✓	✓	✓
7	✓	✓	✓	CS	✓	✓	✓	✓	7	✓	✓	✓	✓	✓	✓	✓	✓
8	✓	✓	✗	✓	✓	✓	✓	✓	8	✓	✓	✓	✓	✓	✓	✓	✓
9	✓	✓	✓	✓	✓	✓	✓	✓	9	CS	✓	✓	✓	CS	✓	✓	✓
10	✗	✓	✓	✓	CS	✓	✓	✓	10	✓	✓	✓	✓	✓	✓	✓	✓
11	✓	✓	✓	✓	✓	✓	✓	CS	11	✓	✓	✓	✓	✓	CS	✓	✓
12	✗	✓	✓	✓	✓	✓	✓	✓	12	✓	✓	✓	✓	✗	✗	✓	✓
13	✓	✓	✓	CS	✓	✓	✓	✓	13	✓	✓	✓	✓	✓	CS	✓	✓
14	✓	✓	✓	✓	✓	✓	✓	CS	14	✓	✓	✓	✓	✓	✓	✓	✓
15	CS	✓	✓	✓	✓	✓	✓	✓	15	✓	✓	✓	✓	✓	✓	✓	✓
16	✓	✓	✓	✓	✗	✓	✗	✗	16	✓	✓	✓	✓	✓	✓	✓	✓
17	CS	CS	✓	✓	✓	✓	✓	CS	17	✓	✓	✓	✓	✗	✓	✓	✓
18	✓	✓	CS	✓	CS	✓	✓	CS	18	✓	✓	✓	✓	✓	✓	✓	✓
19	CS	✓	✓	✓	✓	✓	✓	CS	19	✓	✓	✓	✓	✓	✓	✓	✓
20	✓	✓	✓	✓	CS	CS	CS	CS	20	✓	✓	✓	✓	✓	✓	✓	✓
21	CS	✓	✓	✓	✓	✓	✓	✓	21	✓	✓	✓	✓	✓	✓	✓	✓
22	RA	RA	RA	RA	✗	RA	✗	✗	22	RA	RA	RA	RA	RA	RA	RA	RA

Key	
Correct answer with the correct work	✓
Correct setup with wrong answer and/or not solved completely	CS
Completely wrong answer	✗
Didn't attempt	DA
Right answer with wrong or no setup	RA

As the results show, huge majority of my students got a lot of the questions completely correct. One student did not get any questions completely right, but he/she got the right answer. However, for this learning goal, the setup process was the biggest part and not the answer, so student 22 did not really meet the goal. However, overall the other students have correct setups, which is the entire objective of the learning goal, so according to this data the other students have met this learning goal. Below is a pie chart that shows

the breakdown of the three hundred fifty two answers to really show that a majority of the students understand the material.



As the chart depicts, 91% of the answers were either completely correct or setup correctly with the wrong answer. These two options are the ones that show that students know how to solve percent problems and with such a high percentage, it is obvious that the test results agree with the data from both pre-tests. Students can solve the various percent problems.

### **LG 3: Students will understand how to find the probability of compound events.**

From the pre-test, the questions from this learning goal were split down the middle; the easy probability problems were really good, while the compound event probabilities were mostly left blank. So as I compared the two pre-tests and looked at the tests, a huge thing I was looking for was whether or not the students could setup the last four questions correctly because that would show that they learned the concept (a lot of the solving mistakes are not usually setup problems but mathematical errors due to typing the problem into the calculator wrong). However, the comparison of the two pre-tests does not show whether the student setup the problem correctly, so I am actually only looking at improvement of right answers. This will not

be a totally accurate measure of their learning since they could have messed up with the calculator. However, when I look at the test data later, I will have a better understanding. So below are the students' individual results from both pre-tests and whether they improved from the first pre-test to the second.

	1st Pre-test results								2nd Pre-test results								
	LG 3								LG 3								
ID #	5. a	5. b	5. c	5. d	6	7	8	9	5. a	5. b	5. c	5. d	6	7	8	9	Improvement (Yes, No, Same, N/A)
1	✓	✓	✓	✗	✗	✗	✗	✗	✓	✓	✓	✓	✓	✓	✓	✗	Y
2	✓	✓	✓	✓	DA	DA	DA	DA	✓	✓	✓	✓	✓	✓	✓	✓	Y
3	✓	✓	✓	✓	✗	✗	✗	✗									NA
4	✗	✗	✓	✗	✗	✗	✗	✗	✓	✓	✓	✓	✓	✗	✗	✗	Y
5	✗	✗	✗	✗	✗	✗	✗	✗	✓	✓	✓	✓	✓	✓	✓	✓	Y
6	DA	DA	DA	DA	DA	DA	DA	DA	✓	✓	✓	✓	✓	✓	✓	✓	Y
7	✗	✓	✓	✗	DA	DA	DA	DA	✗	✓	✓	✓	✓	✓	✓	✓	Y
8	DA	DA	DA	DA	DA	DA	DA	DA	✓	✓	✓	✗	✓	✓	DA	DA	Y
9	DA	DA	DA	DA	DA	DA	DA	DA	✗	✓	✓	✓	✓	✓	✓	✓	Y
10	✓	✓	✓	✗	DA	DA	DA	DA	✓	✓	✓	✓	✗	✗	✓	✗	Y
11	✓	✓	✓	✓	DA	DA	DA	DA	✓	✓	✓	✓	✓	✓	✓	✓	Y
12	✓	✓	✓	✓	✗	✗	✗	✗	✓	✓	✓	✗	✓	✓	✗	✓	Y
13	✓	✓	✓	✓	✗	✗	✗	✗	✓	✗	✓	✓	✓	✓	✓	✓	Y
14	✓	✓	✓	✓	✗	✗	✗	✗	✓	✓	✓	✓	✓	✓	✗	✗	Y
15	✓	✓	✓	✓	DA	DA	DA	DA	✗	✓	✓	✓	✓	✓	✓	✓	Y
16	✗	✓	✓	DA	DA	DA	DA	DA	✗	✓	✓	✓	✓	✓	✓	✓	Y
17	✓	✓	✓	✓	DA	DA	DA	DA	✓	✓	✓	✓	✓	✓	✓	✓	Y
18	✓	✓	✓	✓	✗	✗	✗	DA	✓	✓	✓	✓	✓	✓	✗	✓	Y
19	✓	✓	✓	✓	✗	✗	✗	✗	✓	✗	✓	✓	✗	✗	✗	✗	N
20									✓	✓	✓	✗	✓	✓	✗	✓	NA
21	✓	✓	✓	✓	✗	✗	✗	✗	✓	✓	✓	✓	✓	✗	✓	✓	Y
22	✓	✓	✓	✗	DA	DA	DA	DA	✓	✓	✓	✓	✓	✓	✗	✓	Y

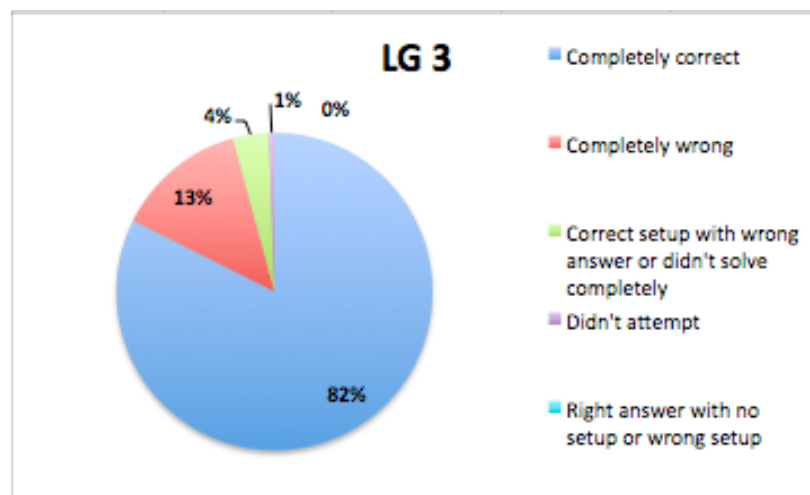
By just looking at the massive difference between the number of questions left blank from the first pre-tests to the second, it is clear that the students at least knew enough to attempt the problem. However, like I said earlier, this comparison is not super accurate because of the lack of information on the correct setup. Overall, only one student did worse the second time around, while everyone else did better. Below is a the breakdown of the improvements.





Key	
Correct answer with the correct work	✓
Correct setup with wrong answer and/or not solved completely	CS
Completely wrong answer	X
Didn't attempt	DA
Right answer with wrong or no setup	RA

These results were definitely not what I was hoping for. There are a lot more completely wrong answers than I would like, but there are also a lot of correct answers and correct setups, which shows me that they can do the problems. Three of the students showed that they did not seem to understand the probability content because they got at least seven out of the sixteen questions completely wrong. However, the other nineteen students seemed to have met the learning goal. Below is a pie chart that gives me a better understanding of the number of questions the students got right or wrong out of the three hundred fifty two answers.



From looking at this chart it is clear that a majority of the answers were either completely right or at least setup correctly (86%). This shows me that my hypothesis of a

majority of the students being proficient with this learning goal is correct. However, the 13% wrong answers and number of wrong answers in the second pre-assessment tell me this was not one of the better learning goals for the students.

## **Reflection and Self Evaluation**

Overall, I believe that this unit on percent problems and probability was successful. As a teacher, I provided activities that engaged students and taught them the material without having to listen to me lecture. I provided opportunities for practice and instant feedback every class, as well as tried to make the material fun and entertaining. I also thought I did a respectable job of not dwelling on the information that they already knew, but instead using that knowledge to help them learn the concepts they have never seen before.

However, with all of this careful planning and thought, a large downfall of this unit was the time constraint I was under. Students were expected to learn a whole unit worth of content in three days and then be tested on it during the fourth day. Because of this, my lessons were not as engaging as I would have liked. There were time chunks in every lesson where I had to lecture, which I know is boring for students. Had I not been under this constraint, I would have used activities and student-centered learning to have the students discover the content on their own and make it more meaningful for them. I would have also used more of a station setup so every student was getting the attention and help they needed. Those students who were struggling could have gotten more one-on-one help, while those that were excelling could have gone deeper into the material and not have been bored. Finally, had time not been such a huge factor, I would have designed a more fun summative assessment. The constraint forced me to use the quicker assessment of a test, but had I had more time, I would have had students design their own game that involved probability and had a class carnival. This way, students could have shown me their

knowledge of the content in a way that made sense to them, instead of being forced into the mold of the test.

Throughout this unit, I used two activities to help students understand the material; a dice rolling activity for simple probability and an M&M activity for the compound probabilities. The dice rolling activity was intended to get students interacting with the easy probability concepts that they have already seen and showed on the pre-test to already know. However, it ended up being a busy work activity that did not really help any students. I attribute this to the fact that I did not have time to do the whole class portion of the activity that I really wanted to do. Instead, the students simply rolled a virtual dice twenty times and found their probabilities. This was the same as their practice problems so it provided no new insight or way of looking at the material as I intended. However, the M&M activity that I used was a huge success with the students and me. Compound probability is very tricky concept because it is hard to see how independent and dependent events work. But, the M&Ms that I provided students allowed them to physically act out the situation so they could exactly see where the probabilities of the formula came from. This physical manipulation stuck with the students much better than any lecture I could have provided. They also had a memory to look back on when doing the theoretical problems on their homework and test.

I consider LG 2 to be the most successful learning goal of the unit. This is apparent through the improvement of students' answers from pre-test one to pre-test two and the amount of correct answers on the test. I attribute this success to the fact that this learning goal was taught during the first day of the unit and was able to be reviewed more days than the other learning goals. I noticed that because this learning goal had a concrete way of

doing it and had hints to work with, students grasped the idea much more quickly and with the extra days of practice the content was really solidified. My students have shown the need to have lots of practice with new material and because of the placement of this lesson students got that required practice.

LG 1 was the least successful learning goal of the unit. I determined this to be the most ineffective based on the low percentage of students improving from pre-test one to pre-test two and the fact that there were only two questions on the test that actually evaluated this content. I believe this learning goal was so unsuccessful because I technically did not teach the material during this unit. Proportions and how to solve them were taught a couple of units before, but were needed in this unit as well. So instead of wasting valuable time on information that I was under the notion that they already knew, I only did a review of the material instead of re-teaching the entire process. Looking back, this was not the smartest decision I made during this unit and I should have reviewed the material and gave practice with it as well. Another reason for the lack of achievement is the lack of practice the students got with just proportions. Students used proportions to solve percent problems in learning goal 2, but they did not get straight practice with just solving proportions. Again, this was an oversight on my part because I assumed that students already knew this process and did not need to be bored with more practice.

Throughout this entire experience with this unit, it became clear that I did not do enough informal formative assessments to gauge student understanding. I relied on Quickie Quizzes and homework to show me students' knowledge and this proved to be fatal in certain areas. I need to look into quick, simple formative assessments that tell me which students need more help with the content and which ones just need the practice problems

to continue using the skills. I have already started looking into ideas such as colored index cards to represent confusion level, stickers and colored paper for students to say where they are on the comfort scale with the material, and capacity matrices where students are also thinking about what they know and don't know so they can help me help them get the required assistance and practice that they need. This unit also showed me how much time affects student achievement. Because of the time constraint, I lectured more than I would have liked, which overall did not help my students. I now know that I need to be really creative and search for activities that can be done quickly and effectively that still teach the material, but also get the students working directly with the concepts instead of listening to me talk. I need to look into learning stations and find ways to organize them effectively so that all students will learn all of the material, but will not be listening to me talk for the entire period.