LITERACY LEARNER ANALYSIS

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I. Brief Background and Reason for Project Focus

For my LLA project I have chosen a student, Jessica Lane, who struggles with vocabulary knowledge. I am a 7th grade mathematics teacher therefore I will be focusing on mathematical vocabulary with her. Jessica struggles to read a mathematics problem and understand what it is asking. Originally I believed that her struggle was within text structures, but with the help of my professor and a little bit of a research, I have since changed my original thought and recognize her struggle to be with the vocabulary. Alvermann described mathematics vocabulary as this, "*In addition to symbols and numbers, general vocabulary terms take on specialized meanings in the language of mathematics….Because math text is so conceptually dense, must be read in several directions (sometimes left to right, sometimes top to bottom, sometimes diagonally), and has symbols and technical vocabulary terms that have multiple meanings and depend on context for that meaning, students must attend to math texts closely*" (Alvermann, 2002, p. 18). After encountering this information it opened my eyes to what my student is more likely to be struggling with. Mathematics vocabulary is very precise and can be ultimately confusing. Jessica struggles with understanding what the question is asking therefore we need to recognize what the mathematical vocabulary within the problem means and then we can begin to tackle the question that is being asked. Jessica is just one of many students who struggle with mathematical vocabulary and how to solve mathematical problems. The importance of differentiating instruction to students who struggle is vital to their growth. While differentiation can sometimes conjure up the thought of diminishing the curriculum for specific students that struggle it is actually intended for the complete opposite. *"In other words when teachers differentiate, they are meeting the individual needs of their students without diminishing expectations or sacrificing curricular rigor."* (Tomlinson & Allan, 2000)

I am currently a 7th grade mathematics teacher at Lincoln Park Middle school. This is my 5th year teaching at the middle school level. I have taught 3 years in a private school for grades 6-9, 1 year in an all girls charter school for 7th graders, and my current position now. I have recently attended a

professional development at U of M Dearborn that investigated how to integrate rich tasks within our mathematics curriculum. Rich tasks consist of a problem that has multiple dimensions and involve deeper level thinking. A common task is the candy jar problem (http://www.nctm.org/Conferences-and-Professional-Development/Principles-to-Actions-Toolkit/The-Case-of-Mr_-Donnelly-and-the-Candy-Jar-Task/). This was beneficial because the rich task is focused on low floor high ceiling, which allows students who struggle to be just as a much of a utensil to a group as a student who is way beyond 7th grade mathematics. As I am becoming more invested into this course I am noticing the benefits of what I am learning about literacy within the classroom. I am hoping by the end of this course I will have more tools specifically related to mathematics and literacy to integrate effectively in my classroom. With the information that I am acquiring from this course as well as the wisdom I have acquired from teaching over the past five years, I am hoping to help build my students confidence and ability to comprehend mathematical vocabulary and problem solving.

II. The Student, Home, and Family Literacy Practice

My student, Jessica Lane, is 11 years old, she is in 7th grade, and her reading level is 5th grade. Jessica is a Caucasian female whose primary language is English. Jessica is enrolled in Math Essentials, which is a supplementary math support that reviews basic mathematical concepts to help strengthen her overall ability in Mathematics. She also has a mathematics resource teacher within my teaching hour as well for additional support. Jessica has full support from both of her parents. They are actively involved in her education and are aware of her struggle in mathematics. Unfortunately Jessica is often absent, which creates gaps in her learning as she misses notes and assignments. Both of Jessica's parents are mathematically inclined and are eager for her to work on her mathematics and do well. They are able to help Jessica with basic problems but have vocalized that they struggle with common core strategies. Parents aid in homework but do not go beyond that because the struggle they face just to get Jessica

through the homework they feel is enough to handle each night. Therefore Jessica is left to strengthen her literacy skills on her own or within the classroom.

Jessica reads outside the classroom, but her main focus is on ELA texts that are assigned. The school provides texts for her to read for classroom assignments. Our school also has a full library for her to check out fiction and nonfiction books. She has access to books at home as well. Our school has a big push for literacy across all subject areas this year, therefore Jessica is encountering many opportunities to discuss texts that are being read within the classroom, as well as homework assignments. Jessica is discussing mathematics problems within my classroom; she is talking about novels in ELA, and shorter length texts in Social Studies. This gives her the opportunity to see many different types of texts as well as have many different discussions based on the content of the text.

III. Experiences with Literacy in Schools

In Jessica's 6th grade year she took Literature and Composition and she also was enrolled in literature essentials. Literature Essentials is similar to Mathematics Essentials, where Jessica receives basic literacy skills practice to strengthen her base knowledge of reading and writing. This year the 7th grade teachers decided to create a block schedule where students have a 90 minute ELA period every day. This has eliminated her ability to take literature essentials course but she does have a resource teacher within her class. Since she has received these supports in the past as well as currently it signifies to me that her struggle with literacy is already beginning to affect her overall performance within other subjects. Since this course has begun, I am beginning to become more aware of the struggling students and I am able to see how their literacy deficiencies affect their ability in other courses as well.

From what I can see of Jessica's grades from last year, she struggled with her ELA classes, signaling to me that there was a disconnect with her overall literacy ability up to and in 6th grade. One of

the challenges that Jessica faces is her attendance. We have been in school for about a month and I would say she has missed 8 days already. There are times when she misses only certain classes but is here for others. Another challenge that she faces is lack of focus. There is not documentation of any medical reasoning, but from what I have seen it appears as lack of interest and inability to prioritize what is important. For example, Jessica will focus on organizing her binder rather than taking notes in her notebook. These are simple distractions that withdraw her from having to do the work or participate in the class work. Overall she appears to be a decent student. She does not excel but she is an average student who has supports that seem to help her in completing assignments and to fill the gap for any concepts she is missing.

IV. Classroom Emotional Climate

I always try to make my classroom as comfortable as possible for my students to learn. I emphasize boldness, courage, and praise a student when they share their work even if it is wrong. I try to talk through the importance of learning from our mistakes and how to collaborate with other students in the classroom. This year I was given the opportunity to start my year off by taking a few days to get to know my students on a personal level. This opened the opportunity to build relationships early and promote a safe and collaborative community. *"When teachers emphasize positive interpersonal relationships, student motivation increases. Believing that their teachers think they are important, students participate more socially in the classroom"* (Furrer & Skinner, 2003, p. 75-76). Since I started the year off with getting to know my students before introducing the mathematics for 7th grade, it has allowed my students to be more willing to share their thinking and work with their neighbors and partners when able to.

As Jessica is introduced to a literacy activity within my room she begins to underline and circle whatever she finds important. It appears that she underlines most of the problem, which devalues the

purpose of underlining the text. This seems to be her approach to all word problems that I have seen her solve. Since she underlines most of the problem and circles one or two words/numbers she only grasps what the problem is asking on a surface level. This limits her ability to make a deeper connection and solve multi-dimensional problems.

When a problem is longer than one sentence Jessica seems to let out a huff. She also will ask, if there are multiple questions, if she has to do them all. Which I always let out a little laugh and tell her that, "of course they are, it's excellent practice and will only increase your mathematical understanding". She usually rolls her eyes with a smile and returns to her seat to finish the problems. She does not appear to struggle to read the problems but she tends to struggle with comprehending the problem and answering it correctly.

Reading within my classroom is not rewarded, but I do make a big deal out of small accomplishments. Usually as a class I will help the students decode a problem and ask minor questions to see what they are grasping or what they need help in strengthening. When a student notices a piece of the problem that they were missing before I will cheer or praise them as much as I can so that they have that bit of confidence to try to master the next step.

Jessica works very well when she is not distracted or "tired". Since building a relationship with her she has been comfortable enough to vocalize when her seat is setting her up for failure, or when life is stressful and she is feeling exhausted. Being able to have that open line of communication has been beneficial to her learning. I have been able to adjust her seat which has led to her being more focused, driven, and has even allowed her to work with her partner in the leading role. While she still has her moments of telling me she is just too tired to do anything, more often then not she is participating and really taking her mathematics seriously.

V. Pre- and Post-Assessments Given and Summary of Test Results

The focus that I presented to my student was on Vocabulary Comprehension (See Appendix E). I believe that in mathematics vocabulary is one of the most common struggles for students. Specifically for my student, she struggles with understanding what she is actually asked to solve for. In my experience I have seen that if students struggle with vocabulary they generally struggle with understanding basic mathematical concepts and questions, which affects their problem solving skills, and overall affects their confidence. Therefore if I start at the base problem, vocabulary, and address it early students can begin to have a better understanding of the mathematical concepts that are being taught. This will help them process future mathematical problems and allow them to extend their knowledge from previous concepts more efficiently. Therefore in my pre- and post-test I decided to present two questions that were infused with an ample amount of words and also were aligned with specific mathematical vocabulary (See Appendix E). I also used mathematical vocabulary within my follow up questions to address Jessica's knowledge of the vocabulary in a different context. This allowed me to see if the strategies she was taught in the lessons extended beyond the questions presented in the notes. I was hoping this would show growth in her fluency of mathematical vocabulary overall.

My students had already had an introduction to ratios and rates, but were introduced to proportional relationships in the two lessons that I presented. I chose to introduce proportional relationships using guided interactive notes because that is the process that my students are familiar with and seem to be most effective in completing (See Appendix B, D). I teach in an inner city school so I face multiple challenges such as students not having basic materials to complete schoolwork and they struggle to keep track of homework and notes. My students can be difficult to motivate and engage so by allowing them to have notes that are already written where they need to fill in the missing parts, this allows them more time to think through what is being taught and focus on the finding the solution rather than rushing to get the notes written. I do allow my students to keep their notebooks in my room, so that if they

struggle to keep track of their work they have a safe place to keep it. Students seem to appreciate having a space for their notes, and also have the ability to access notes that are clear and easy to use when working on their assignment. With the notes already being typed up it allows myself to address text structures, how to approach different problems, and vocabulary more often. I can refer to what is written and it opens the line for mathematical discussion much easier allowing us to move through the problems more efficiently.

In the Pre-Test Jessica's work appeared to show minimal understanding of using ratios in a proportional relationship. That was expected because my students had only just been introduced to ratios and rates. The pre-test that Jessica was presented with showed two word problems that dealt with ratios and proportions. Jessica's work showed that she was able to recognize the ratios in each problem but it appeared that she did not know what to do with the ratios. Based off of Jessica's work from the pre-test it appears that she had a misconception of how to read the problem and properly mark it up (See Appendix E). She underlined most of the problem and circled an insignificant word, 'and'. This shows that her ability to dissect text in the mathematical domain is limited. Since she circled the word 'and' this also signifies to me that she does not understand what vocabulary is important to a mathematical problem. Also, in her answers to the questions that followed each of the problems there seems to be a misrepresentation of the word rate as she talks about using it as a strategy to solve. It appears that reading the problem does not seem to be an issue, but understanding what the problem is asking and finding the answer is where she is lost.

In the Post-Test, after giving the two lessons that I had planned, Jessica showed a lot more strengths in her ability to dissect and understand the language being presented. She was able to successfully answer each question and her ability to dissect the text was much more proficient in what she showed in her work. She also added another strategy that we did not talk about before the post-test that I was impressed by. She drew a picture to try and help her understanding of what was being asked (See Appendix E). I believe this is a great step towards understanding what the question is asking by

understanding the vocabulary within the question. Her answers also reflected a better understanding of how to solve each problem. She did not misuse vocabulary and she was able to recognize that each problem had their own strategy. She also was able to recognize the vocabulary in the questions and answer them appropriately. By her being able to carry over what we talked about, language and vocabulary wise in the notes, and applying that information to the follow up questions shows major growth in her vocabulary and understanding just over these two days of lessons.

VI. Lesson Plan Matrix

Lesson Foci/Date	Objectives (include including performance, conditions, and criterion. State the *Common Core State Standard* (or standards used in your discipline) at the end of each objective.)	Instructional materials (what will use to deliver the main objectives of the lesson)	On-going assessment (to measure attainment of objectives)

| Day 1 October 16, 2017 Ratios, Rates, and Proportions. | **CCSS.MATH.CONTENT.7.RP.A.1** *Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units.* Students will be able to calculate the unit rate for real life situations by breaking down the ratio (fractions) by dividing to solve the problem to find the relationship between two units. **CCSS.MATH.CONTENT.7.RP.A.2** *Recognize and represent proportional relationships between quantities.* Students will be able to recognize and represent a proportion as a statement of equality between two ratios. | Interactive Notes · Students will complete guided notes and glue them into their interactive notebook. | · Warm-ups · Quizzes · Exit tickets · Unit Review |
| **Lesson Foci/Date** | **Objectives** (include including performance, conditions, and criterion. State the *Common Core State Standard* (or standards used in your discipline) at the end of each objective.) | **Instructional materials** (what will use to deliver the main objectives of the lesson) | **On-going assessment** (to measure attainment of objectives) |

Day 2	CCSS.MATH.CONTENT.7.RP.A.2	Interactive Notes	· Warm-ups
October 17, 2017	*Recognize and represent proportional relationships between quantities.* Students will be able to recognize and represent a proportion as a statement of equality between two ratios from a word problem..	· Students will fill in the blanks of the notes and glue them into their interactive notebook.	· Quizzes, · Exit tickets · Unit Review
Proportions in Word Problems			

VII. Reflections on Your Literacy Lesson Plans

The literacy area that I chose to focus on with my student, Jessica, was vocabulary knowledge. I chose this area of focus because early on in the year Jessica showed a few common misconceptions that correlate with a possible disconnect of mathematical vocabulary comprehension. Also, Jessica's parents shared their concern with Jessica's ability to comprehend mathematical problems and questioned if this had to do with the vocabulary or her ability to solve problems. After a week of interaction with Jessica in my classroom, I was able to infer that her struggle was not in the actual solving of the problem (the fluency part) but was actually within her ability to comprehend what the question was asking. Originally I thought this to be a struggle with structure within a mathematical question, but through closer examination and collaboration with my professor it seemed clearer that her struggle was her understanding of mathematical vocabulary. In order to begin to strengthen Jessica's vocabulary I decided to use the strategy, *"Teaching individual general academic and domain focused vocabulary."* (Gambrell 2015, p. 198) I believed that Jessica would need to be introduced to the mathematical word, given the definition of the word, and then taught how to apply this information into mathematical problems.

For my pretest and posttest I chose two word problems that each presented my student with content vocabulary (Appendix E). Each problem also had vocabulary knowledge embedded within the process of finding the solution. For example each problem had the word ratio and had actual ratios within the context but in order to find the solution the student had to have the knowledge to compare ratios using proportions. Therefore the student needed know the term proportion and how to apply it properly to each problem. The first problem was presented to the student with a ratio written in word form, "5 to 2". The student was then introduced to the word, ratio, as well within the context of the problem. The second problem took on a more in depth method of solving. The student was presented with a multi-step problem and again presented with the word, ratio, and given two ratios in colon form, "3:1" and "4:1". Since we were beginning the year with ratios, rates, and unit rates, I wanted to ensure Jessica had the

implementation of ratios in many different forms, so that she would have a broader understanding of the term and how to apply ratios in different scenarios.

In lesson 1 I began by introducing Jessica to the term ratio, rate, and unit rate. I also taught her about proportions and the role that they can play when comparing ratios. By using interactive notes and example problems, I was able to re-enforce with my student the definition of each term as well as how they apply these terms to fluency problems and word problems (Appendix B). *"When teachers use effective vocabulary and comprehension strategies in the content areas, student learning of subject matter information increases."* (Hattie 2009, p. 21) For the lesson I decided to teach each term separately and present the definition as well as go through examples. Then I had my student work through a problem independently to see what she retained. I then took time to review the questions and was able to clear up any misconceptions that she may have had. Once we finished with one term we were able to move on to the next term and went through the same process. Finally we ended with proportions. This was the first time that she had been introduced to this term, and these types of problems, so we moved slowly through the notes and completed several example problems before she was sent out on her own to complete problems independently. *"Cambourne suggests that authentic engagement accompanied by immersion and demonstration result in learning."* (Cambourne 1988, p. 290) Her pre-test showed that she lacked the knowledge to work beyond writing a ratio (Appendix E). She clearly understood what a ratio is, but she did not know how to solve the problems in the pre-test using information from rates and proportions.

In the second lesson we focused more critically on proportions but moved from fluency to word problems. I used focused instruction, *"This type of instruction involves both definitional and contextual information, multiple exposures, and deep levels of processing so that students develop a rich base for word meaning."* (Gambrell 2015, p. 200) We talked about how to properly set up proportions with missing values and how to identify different values as a comparison of ratios. For this lesson we used interactive notes (Appendix D) where I went through the steps of setting up and solving a word problem

using proportions as well as an ample amount of example problems. In Jessica's post-test it shows very clearly the skills that she picked up from the interactive notes. Her process to solve and her ability to pick out important information was vital to showing improvement in the post test.

In the post-test Jessica's work shows a better understanding of the questions being asked (Appendix E). She was able to show appropriate work and was able to come up with an answer that accurately reflects what is being asked. In the second problem of her post-test she was confused with what it was asking, but I was still pleased to see her use a strategy, that we did not discuss, in order to work towards a solution. While she was verbally discouraged and wanted to quit, I was pleased that she continued with the problem and tried to make sense of what was being presented to her. Overall her post-test did show growth from her pre-test and she was able to show comprehension of the vocabulary we covered in the lesson 1 and lesson 2.

I was pleased with the post-test results from Jessica. She clearly showed growth from her pre-test to her post-test and used strategies that she was taught from the lessons. One thing that I would change would be question two from the post-test. While I believe it is a good question, I don't feel it measured Jessica's comprehension of the vocabulary she was presented in the lessons. While the question challenged Jessica I wish I had chosen a different problem with the same level of complexity. Overall I am pleased with my assessment and the results the Jessica showed.

VIII. Recommendations to Teachers and Parents/Caregivers

Dear Teachers and Parents of Jessica,

Over the course of this semester I was given the opportunity to work with Jessica to help strengthen her vocabulary knowledge in mathematics. Jessica is a student who is independent and strong willed. She is intelligent in many ways but tends to struggle in mathematics. By implementing specific literacy strategies within two separate lessons, I was able to take steps towards improving Jessica's

understanding of mathematical vocabulary. Through these lessons I was able to recognize that Jessica possesses an ability to read complex problems fluently. She is able to recognize key words and phrases. Something that Jessica will need help with is her lack of perseverance. She lacks confidence in her abilities, which causes one of two reactions. She will shut down and stop solving the problem altogether, or she would verbally discuss her frustration (complain) to avoid having to solve the problem. *"Believing in yourself is more closely linked to achievement than any other motivation throughout school."* (Gambrell 2015, p. 63) When you are encouraging, Jessica is more motivated and feels safer when sharing her frustration which in turn will give her the confidence to tackle a difficult problem. Overall I was able to see tremendous growth within Jessica's vocabulary comprehension of mathematical terminology. I would suggest repetition with Jessica and encouragement. I use anchor charts in my room and they seem to help Jessica immensely with recall and gives her a reminder that she has seen the terms before; she just needs to be reminded that she has the knowledge and can solve the problems. I recommend Jessica work through the program IXL, which can be found through Google. You are able to purchase a membership but, IXL allows 20 free problems a day, on any topic. This will help Jessica have more exposure to mathematical vocabulary within mathematical problems.

Thank you for allowing me to work with Jessica, she has really done an excellent job, and I am excited for the growth that I am seeing within her as a student.

Sincerely,

Margaret Timmis

IX. References

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*Note: The questions are designed based on the *Common Core State Standards*
**Note: The second question on the post-test is adapted from the pre-test

X. Appendices of Work

APPENDIX A

Outline for a Daily Lesson Plan

Date: October 16, 2017

Objective(s) for today's lesson: Students will be able to recognize and represent a proportion as a statement of equality between two ratios.

CCSS (or other standards) addressed:

CCSS.MATH.CONTENT.7.RP.A.1

Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units.

CCSS.MATH.CONTENT.7.RP.A.2

Recognize and represent proportional relationships between quantities.

Rationale It is important for students to be able to comprehend ratios, rates, and proportional relationships because they will encounter them on a daily basis. Using rates and proportions to find unit rates and to compare prices of snacks, pop, and clothing is something that they already do, they are just now given a vocabulary word that explains what they are doing. By presenting students with these types of problems, comparing items that they use or buy often, creates a sense of ownership in the problem and creates a better understanding of the answer they find. They are typically able to see if what they found is a good deal or a bad deal, and they vocalize it fairly openly.

Materials & supplies needed: Interactive notebooks, glue, pen, pencil

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Procedures and approximate time allocated for each event	*Academic, Social and Linguistic Support during each event*
Introduction to the lesson	
For this lesson I will briefly be reviewing ratios, rates, and unit rates. I will reiterate the importance of each of these mathematical concepts and through the classwork problems we will have discussion about what we are finding and how that applies to what they encounter everyday. With rates and unit rates it is easier to talk about the relevancy because we solve problems that compare snack prices, apple products, and basic grocery products. Students often connect with these items because they can make sense of whether our answer is a good deal for the product or if it's incredibly expensive. Motivation for rates and unit rates is fairly easy to come by because they can relate to what they are finding. The review of ratios, rates, and unit rates will then lead right into my introduction into proportional reasoning since each of these concepts are all intertwined. (20 minutes)	I have one ELL student, who speaks no English, that has an aid that comes and helps her to translate and work through the mathematical problems.
OUTLINE of key events during the lesson	I have a co-teacher in two of my 6 classes who also is academic support to all of my students, but is specifically there for my IEP and 504 students. She is able to walk around and answer questions for students who are struggling.
I will start with giving students the notes outline with the definitions and example problems for ratios, rates, and proportions. I will first review ratios with them and then distribute the ratio worksheet, to see what the students can recall. I will then collect the ratio worksheet and we will go back to the notes and talk about rates. We will discuss the difference between a ratio and a rate and talk about the importance of a rate and how to turn it into a unit rate. I will then distribute another review worksheet for rates/unit rates, we will review it and then I will collect it. Once we get through those two pieces of information then I will address the new vocabulary of proportions. We will talk about what a proportion is and how to solve using cross products. We will complete a couple example problems together then students will complete an assignment that will be due the following day. Students will glue their notes into their interactive notebook and complete as much of the worksheet in class as they can. (15 min).	Each student is given a guided section of notes and buckets are provided with pens/pencils/markers/scissors/glue.

Students are given the opportunity to work in partners on the worksheets.

Students are able to use their notes to help them on their worksheets.

I will also be walking around helping students with any problems they are still having. |
| **_Closing summary for the lesson_** | |
| At the end of the lesson I will discuss with them about the difference between ratios, rates, and proportions. I also want to discuss with them the similarities that they have seen and how they may have solved equivalent ratios before | |

compared to the new strategy they have learned through proportions. I want to hear their thinking of what they notice to be the same and different and I want to walk around the room and see how they are progressing in their work. I hope to see in their work the strategy of cross multiplication and solving for the missing variable. (13 min) ***Transition to next learning activity***	
Assessment I will be looking at the work they complete at the end of the class period. I will also be doing a warmup the following day the reflects what we talked about today. The notes from today will also be used in a reflection for the following day before we begin proportional word problems. Based on what I see from my students work that will inform me if I need to spend a little extra time on the front end of class the next day reminding them how to solve for the missing variable in proportional relationships.	*Academic, Social, and Linguistic Support during assessment*

Appendix B - Day 1 Notes

A **RATIO** is a

_____

of _____ or more

numbers.

A **RATE** is a

_____ comparing

two numbers with

different _____.

A **PROPORTION** is an

_____

showing two ratios are

_____.

Example:

The ratio of triangle to circles is

_____ : _____

Example:

A car travels 100 miles in 2
hours

$$\frac{100 \ miles}{2 \ hours}$$

Example:

$$\frac{10}{25} = \frac{40}{100}$$

**There are _____ ways
to write a ratio.**

    1) _____

    2) _____

    3) _____

**A _____ tells
the rate in the lowest
terms, or the amount
for _____.**

EX:

$$\frac{100 \ miles}{2 \ hours} = \underline{\quad}$$

**In a proportion, if the
ratios are equivalent
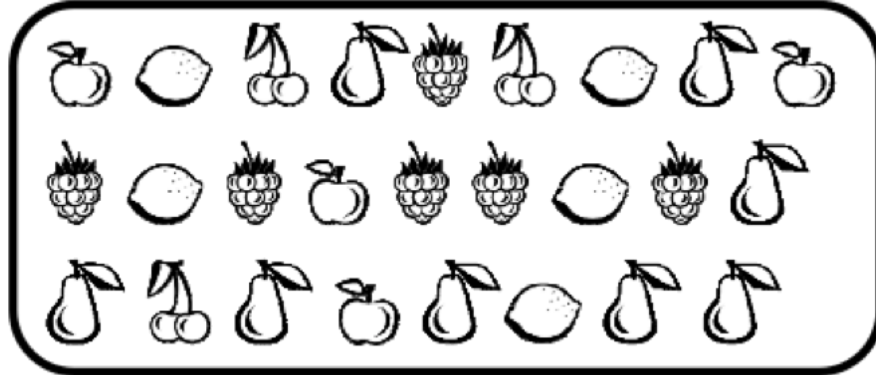then the _____**

_____

are equal.

Name _____   Date _____

Fruit Stand Ratios

At the end of the day Mrs. Davis's local farmers' market stand had all the left over fruit that you see below. At the beginning of the day Mrs. Davis had 50 pieces of each type of fruit (apples, lemons, cherries, pears, and grapes.)

1. Which is the least popular (in sales) fruit for the day?

_____

2. What is the ratio of left over cherries to grapes? (Simplest form)

_____

3. What is the ratio of leftover (in simplest form):

A) apples to pears =   B) lemons to grapes =

4. If the same exact amount of fruit was sold every day, how many pieces of each type of fruit should Mrs. Davis have in stock daily?

Apples = _____   Lemons = _____   Pears = _____

Cherries = _____   Grapes = _____

Name _____   Date _____

Shopping with Proportions

You go shopping and find all the items below. In each case, circle which set of items is a better deal (has the best unit price).

12 bags of pork rinds for $1.25   OR   8 sticks of gum for $0.75

4 DVDs for $12.25   OR   3 Blue Rays for $8.50

2 iPods for $310   OR   1 iPad for $212

15 iTunes songs for $11.50   OR   20 iTunes songs for $14.85

11 apples for $4.25   OR   6 pears for $2.10

3 tires for $180   OR   5 tires for $350

15 packs of cards for $32   OR   30 packs of cars for $65

3 car washes for $25   OR   5 car washes for $40

6 hockey tickets for $45 OR   9 hockey tickets for $123

22 rolls of towels for $9.65   OR   40 rolls of towels for $15.25

24 pens for $11.25   OR   50 pens for $19.99

Name _____   Date _____

Solving for the Missing Proportions Version 1

1    $$\frac{4}{10} = \frac{32}{x}$$

Answer: _____

2    $$\frac{k}{3} = \frac{90}{10}$$

Answer: _____

3    $$\frac{q}{3} = \frac{2}{6}$$

Answer: _____

4    $$\frac{15}{5} = \frac{y}{4}$$

Answer: _____

5    $$\frac{20}{5} = \frac{4}{z}$$

Answer: _____

6    $$\frac{6}{12} = \frac{b}{6}$$

Answer: _____

7    $$\frac{c}{3} = \frac{126}{18}$$

Answer: _____

8    $$\frac{8}{5} = \frac{w}{15}$$

Answer: _____

9    $$\frac{35}{7} = \frac{25}{x}$$

Answer: _____

10   $$\frac{2}{6} = \frac{7}{d}$$

Answer: _____

Appendix C

Outline for a Daily Lesson Plan

Date: **October 17, 2017**

Objective(s) for today's lesson: **Students will be able to recognize and represent a proportion as a statement of equality between two ratios from a word problem..**

CCSS (or other standards) addressed:

CCSS.MATH.CONTENT.7.RP.A.2

Recognize and represent proportional relationships between quantities.

Rationale **It is important for students to understand proportional relationships and to help them understand ratio equivalency. I believe that the word problems they will be presented with will show them how they will be able to use proportional reasoning to solve for real life situations. I will be using the notes from the previous day to remind them of what a proportion is and how to solve for the missing value.**

Materials & supplies needed: **Interactive notebooks, glue, pen, pencil**

Procedures and approximate time allocated for each event	Academic, Social and Linguistic Support during each event
Introduction to the lesson **Students will begin with a warm up of simply solving for the missing variable. This will open up the dialogue of the previous day's lesson and we will have a brief discussion about what we talked about when we compared ratios, rates, and proportions. (15 min)** *OUTLINE of key events during the lesson* **Students will be given a guided note worksheet covering proportions in word problems. I will start by talking about how to approach these types of problems and go through the steps listed at the beginning. Once we go through these steps we will begin with the first problem. We will talk about how when solving for word problems we must always mark up the problems and dissect what is important to the problem. Once we have gone through reading and marking up the problem we can talk about how to set up the problem and how to label it properly. I will walk through the steps and talk about key words and what they should be looking for. I will go through the following problems and then students will be given the homework assignment to begin and complete as much as they can before they leave. Students will glue their notes in their notebook before they begin their homework.(20 min)** *Closing summary for the lesson* **I will talk with the students about the different types of word problems that they solved and how they are able to recognize the type of problem they are solving for. I will also be walking around as they are working to see their progression and how they are adapting to solving the word problems.(13 min)** *Transition to next learning activity*	**I have one ELL student, who speaks no English, that has an aid that comes and helps her to translate and work through the mathematical problems.** **I have a co-teacher in two of my 6 classes who also is academic support to all of my students, but is specifically there for my IEP and 504 students. She is able to walk around and answer questions for students who are struggling.** **Each student is given a guided section of notes and buckets are provided with pens/pencils/markers/scissors/glue.** **Students are given the opportunity to work in partners on the worksheets.** **Students are able to use their notes to help them on their worksheets.** **I will also be walking around helping students with any problems they are still having.**
Assessment **I will be looking at the work they complete at the end of the class period. I will also be doing a warmup the following day the reflects what we talked about today. The notes from today will also be used in a reflection for the following day before we begin to review for our quiz on Thursday.**	*Academic, Social, and Linguistic Support during assessment*

Appendix D
Day 2 Notes

Solving Word Problems with Ratios and Proportions

$$\frac{\square}{\square} = \frac{\square}{\square}$$

- Set one ratio up with information about the sample. Set the other ratio up with information about the total. Label these to avoid later confusion.

- The numerators on each side of the proportion should describe the same thing. One should describe the sample and the other should describe the total.

- The denominators on each side of the proportion should describe the same thing. One should describe the sample and the other should describe the total.

- If your variable is in the denominator, take the reciprocal of both sides before solving.

- Solve for the variable.

- Substitute to verify your solution.

Antonio read the first 60 pages of his book in 40 minutes. At this rate, how long should it take Antonio to read the rest of his 210 page book?

$$\frac{\square}{\square} = \frac{\square}{\square}$$

Nikki ate 15 grapes in one minute and twenty seconds. At this rate, how long should it take her to eat 85 grapes?

$$\frac{\square}{\square} = \frac{\square}{\square}$$

The ratio of boys to girls in Ms. Hagan's classes is 4 to 5. Ms. Hagan has 90 students. How many students are girls?

$$\frac{\square}{\square} = \frac{\square}{\square}$$

Dave typed the first 8 pages of his report in 24 minutes. At this rate, how long should it take Dave to finish typing the rest of his 60 page report?

$$\frac{\square}{\square} = \frac{\square}{\square}$$

Word Problem Homework Worksheet

Using Proportions to Solve Word Problems

1.   The ratio of number of boys to girls in a classroom is 6 to 5. If there are a total of 48 boys in the classroom, find the number of girls in the classroom?

2.   The ratio of the number of bar magnet to horseshoe magnet is 2 to 5. If there are 10 bar magnets, find the number of horseshoe magnets?

3.   On a desk, the ratio of HB pencils to 6B pencils is 3 to 4. If there are a total of 12 HB pencils, find the number of 6B pencils on the desk?

4.   The ratio of neutrons in the nucleus of atom A to atom B is 4 to 7. If there are 55 neutrons total, find the number of neutrons in the atom A and atom B?

5.   The ratio of vowels to consonants that is present in a word is 2 to 3. If the word contains 10 letters, find the number of vowels and consonants in the word?

6.   The ratio of the number of cats to dog is 5 to 8. If there are 26 total animals, then find the number of cats to dogs present?

Appendix E

Pre-Test/Post Test

Pre-Test – Vocabulary Comprehension

1)   Tim's shoe store just stocked 104 pairs of new shoes. The ratio of black shoes and brown shoes is 5 to 3. How many pairs of black shoes and brown shoes did the store stock?

2)   Ed and Alysa make 1 gallon of lemonade each. Ed's lemonade has a water to lemon juice ratio of 3:1. Alyssa's lemonade has a water to lemon juice ratio of 4:1. They decide to mix the 2 gallons of lemonade together in a larger container. What is the water and lemon juice ratio at the end?

Vocabulary comprehension questions:

1)   What is a ratio?

2)   Explain in your own words what question number one is asking.

3)   What operation(s) will you need to make in order to solve the problem?

4)   What strategy did you use to answer question number one?

5)   How is problem number two similar to problem number one?

6) **How is problem number two different to problem number one?**

7) **Explain in your own words what question number two is asking.**

8) **What strategy did you use to solve problem number two?**

Pre-Test – Vocabulary Comprehension

1) Tim's shoe store just stocked 104 pairs of new shoes. The ratio of black shoes and brown shoes is 5 to 3 How many pairs of black shoes and brown shoes did the store stock?

$5:3$ $5+3=8$ (8 Shoes)

2) Ed and Alysa make 1 gallon of lemonade each. Ed's lemonade has a water to lemon juice ratio of 3:1. Alyssa's lemonade has a water to lemon juice ratio of 4:1. They decide to mix the 2 gallons of lemonade together in a larger container. What is the water and lemon juice ratio at the end?

Ed   Alyssa's $4:1$ $7:2$
$3:1$ $4:1$ $+ 3:1$
                              $\overline{7:2}$

Vocabulary comprehension question:

1) What is a ratio?

A comparosion of two quantities

2) Explain in your own words what question number one is asking.

to find how many black and brown Sho did they stock total

3) What operation(s) will you need to make in order to solve the problem?

① find a rate   (Pre) Read the Problem and
② Solve   your information .
③ mark your Answer

4) What strategy did you use to answer question number one?

Addition

5) How is problem number two similar to problem number one?

you do the same strategy you add.

6) How is problem number two different to problem number one?

for Problem number 2 you are comparing two diffrent rates.

7) Explain in your own words what question number two is asking.

What is the rate if we combind both of the two rates.

8) What strategy did you use to solve problem number two?

① read the Problem

② found the rates.

③ Solved

④ marked my answer

Post-Test – Vocabulary Comprehension

1)   Washington Junior High School has 270 students. The ratio of female and male students is 5 to 4. How many female and male students are there?

2)   Ethan and Amanda make 1 gallon of Kool-Aid each. Ethan's Kool-Aid has a water to Kool-Aid sugar ratio of 2:1. Amanda's Kool-Aid has a water to Kool-Aid sugar ratio of 3:1. They decide to mix the 2 gallons of Kool-Aid together in a larger container. What is the water and Kool-Aid sugar ratio at the end?

Vocabulary comprehension questions:

1)   What is a ratio?

2)   Explain in your own words what question number one is asking.

3)   What operation(s) will you need to make in order to solve the problem?

4)   What strategy did you use to answer question number one?

5)   How is problem number two similar to problem number one?

6)   How is problem number two different to problem number one?

7)   Explain in your own words what question number two is asking.

8)   What strategy did you use to solve problem number two?

1) Washington Junior High School has 270 students. The ratio of female and male students is 5 to 4. How many female and male students are there?

mAle

tolal

Students

Students

male {female 5

$9 \cdot x = 5 \cdot 270$

$\dfrac{9x}{9} = \dfrac{1350}{9}$

Students

$X = 150$ femal Students total

total

270 Students

female

2) Ethan and Amanda make 1 gallon of Kool-Aid each. Ethan's Kool-Aid has a water to Kool-Aid sugar ratio of 2:1. Amanda's Kool-Aid has a water to Kool-Aid sugar ratio of 3:1. They decide to mix the 2 gallons of Kool-Aid together in a larger container. What is the water and Kool-Aid sugar ratio at the end?

Amandas

3:1

5:3

ethans

2:1

3:1
+2:1
5:2

5:2

1. $4 \cdot x = 4 \cdot 270$

$\dfrac{9x}{9} = \dfrac{1080}{9}$

$X = 120$ male Students total

  120
+ 150
  270 Students total

Vocabulary comprehension question:

1) What is a ratio?

A comparason of two quantities

2) Explain in your own words what question number one is asking.

to find the number of girl students and male Students

3) What operation(s) will you need to make in order to solve problem 1?

multiplycation
divide

4) What strategy did you use to answer question number one?

mutiply
divide

5) How is problem number two similar to problem number one?

they both are word problems.

6) How is problem number two different to problem number one?

I used diffrent strategies

7) Explain in your own words what question number two is asking.

to find the new ratio

8) What strategy did you use to solve problem number two?

addition