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# Delivery of Academic Vocabulary in Third Grade Mathematics Instruction

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# Delivery of Academic Vocabulary In Third Grade Mathematics Instruction

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## Abstract

The purpose of this study was to determine the effectiveness of vocabulary theorist R.J. Marzano's Six Step Process when teaching academic vocabulary words in mathematics. Academic Vocabulary is defined as vocabulary that is specific to the content being taught in the classroom in order for the students to be successful. Fifteen, third grade students (nine girls, six boys) in an inclusive classroom participated in the action research study. The effectiveness of Marzano's Six Step Process to teaching mathematical academic vocabulary instruction was measured with biweekly pre and post assessments of word definitions and content usage. The assessments were used to measure the students' understanding of the academic mathematic vocabulary words selected. From the findings, it was concluded that students did benefit from R.J. Marzano's Six Step Process to academic vocabulary instruction and demonstrated greater understanding of mathematical academic vocabulary words through assessments.

# Chapter One
# INTRODUCTION

## General Problem

When evaluating our current vocabulary instruction, I questioned what was expected by us as teachers and what was the best way for students to learn and understand vocabulary? Our school's current reading curriculum does not offer weekly vocabulary lists and our math curriculum has limited vocabulary words. Even when the words are presented from the math curriculum, what's the best way to introduce the words to my students so they can learn and apply them in language/content? In our reading curriculum we teach the students to come up with their own meanings of words based on its usage in the texts they are reading. Should we be breaking down words for them? How does figurative language, root words, suffixes, prefixes, and inflicted endings fit into vocabulary instruction? Additionally, our district does not have a list of vocabulary words to be instructed at any level.

After careful research into general and academic vocabulary, I have decided to focus my attention and instruction on mathematic academic vocabulary in my third grade classroom. Third grade is the first year students are required to participate in Minnesota Comprehension Assessments (MCA's) for Mathematics. Understanding academic language in mathematics is critical for success on these tests. Marilee Sprenger (2017), reinforces the idea that "the importance of expanding our students' Tier II vocabulary transcends these assessments: a strong academic vocabulary lays a solid foundation for success in life, just as a small vocabulary is a major disadvantage" (p. 6).

The best I can prepare my students for the Minnesota Comprehension Assessments in third grade mathematics and future attempts as they progress through school. By building a foundation in third grade with these academic terms, I will not only be preparing my students for success on the mathematics' section of the MCA's but also success in daily content application. I would like to focus my academic vocabulary instruction within my mathematics lessons. After careful research, I feel that my students will benefit and respond best to R. J. Marzano's Six Step Process to academic vocabulary instruction.

**Hypothesis**

I believe that by following Marzano's Six Step Process to teaching academic vocabulary, my students will have a better understanding of academic tier two and three vocabulary words instructed in the classroom as compared to no vocabulary instruction. With intentional instruction by the instructor and practice applying the academic vocabulary words, it will create a stronger comprehension and retaining of knowledge of the selected tier two mathematic words.

**Research Plan**

Five words were selected directly from the mathematics curriculum by the instructor and further expanded upon by using R. J. Marzano's Six Step Process to teaching academic vocabulary. Students organized their words and definitions in their vocabulary journals by using the Frayer's Model. The Frayer's Model uses boxes to identify, define, explore the characteristics of the mathematic term, and list non-examples for the chosen word. Marzano (2012) believes that vocabulary journals play a critical role in a comprehensive approach to vocabulary instruction (p. 34). Below Blachowicz and Ogle (2018) state the steps in Marzano's Six Step Process (p. 201):

1. Explain
2. Restate
3. Show
4. Discuss
5. Refine and Reflect
6. Application through Learning Games

The effectiveness of Marzano's Six Step Process to teaching academic vocabulary instruction was measured by biweekly assessments of word definitions and usage. This assessment measured the students' understanding of the academic vocabulary selected. Assessments were created by the instructor/researcher based upon the selection of Tier II and III academic vocabulary words in mathematics.

With Marzano and Sprenger's research and knowledge on academic vocabulary instruction, I chose Marzano's Six Step Process to instruct academic vocabulary as the most beneficial to my students. After continued and careful research regarding students' learning and comprehension of academic vocabulary skills, I have concluded these assessments and instruments to also be the most beneficial to the participants in the research.

## Subjects and Setting

**Description of subjects.** I was granted permission to collect data from 15 participants for this study, six boys and nine girls. Participants were from a third grade classroom in a Title One elementary school in rural Midwestern, Minnesota. The selected student population at this elementary school is multicultural with a wide range of socioeconomic status. 82% of the

classroom's students are Caucasian, 9% are Black, 5% are Hispanic, and 5% are Native American. 41% of these students receive free or reduced lunches.

The selected participants' academic level will ranged from Tier One students to Tier Three students. Three students received small group Title One services for reading and/or math interventions. Two students received Special Education services with small group, individualized instruction. Eleven students received only classroom instruction from the teacher.

**Selection criteria.** The students selected were from an inclusive third grade general education classroom for the 2018-2019 school year. Students were exposed to language in all subject areas including Science, Social Studies, Mathematics, and Language Arts. Through this inclusive classroom, these students were ideal for the current action research.

**Description of setting.** This study took place in an inclusive, general education, third grade classroom in rural Midwestern Minnesota. The school district consists of three small consolidated communities with a population fewer than 6,000 residents. The school district currently enrolls 1,648 students in grades k-12. The elementary school enrolls 486 students, kindergarten through fourth grade. 85.6% of the student population is Caucasian, 3.1% is Black, 6.2% is Hispanic, .2% Asian, and 1.9% is Native American. 31.3% of our students receive free or reduced lunches. 23.9% of students qualify for Special Education services. This school is a Title One school and is currently receiving state funding for programing. Open enrollment contributes to a large amount of the school's student population. Approximately one third of the student population is open enrolled.

## Research Ethics

**Permissions.** Permission was obtained from the Institutional Review Board at Minnesota State University Moorhead and from the principal at the school district which the study was conducted. Guidelines from the Instructional Review Board at Minnesota State University Moorhead were correctly followed. Students and families were notified to have the opportunity to withdraw from the study without penalty. Written consent to participate was given by parents and guardians prior to the start of research.

**Informed consent.** Since the subjects in this study were

minors, families were given a written consent to have the choice for their child to participate. Parents and guardians signed for permission to be granted to the researcher/instructor before the research could begin. Parents understood the opportunity and risk for their child prior to participation in the study. Subjects were notified verbally of their participation and purpose of the study, and given the opportunity to withdrawal without penalty. A sample Letter of Consent can be located in Appendix F.

**International review board approval.** The researcher followed the guidelines from the Instructional Review Board at Minnesota State University Moorhead. Protection of human subjects was assured. Confidentiality was assured by using acronyms to protect the identity of the subjects in the study. No identifying information was used to identify the subjects in the study.

## Definition of Terms

The following terms are defined from the study:

*Academic Vocabulary* – Tier II academic words found in the English language that are directly related to the content being instructed in the classroom. These words are often multi-meaning words that are found within the academic context. At times, referred to as content vocabulary.

*Marzano* - R. J. Marzano is a highly respected researcher in active classroom instruction of vocabulary words, speaker, and cofounder of the Marzano Research Laboratory and created the Six Step Process to improve vocabulary instruction.

*General Vocabulary* – Tier II words that can be found in common texts or conversations.

*Frayer Model*- A four component box model used to organize the understanding of new vocabulary words. Students write their own definition of the words, model/drawing, synonyms, and antonyms. An example can be located in Appendix A.

*Six Step Process* – A process created by R. J. Marzano to correctly introduce and instruct academic vocabulary words to students in a classroom.

*Vocabulary Journals* – Composition notebooks that students use to record their vocabulary words while using the framework of the Frayer Model.

# Chapter Two
# LITERATURE REVIEW

Vocabulary instruction is of upmost importance in a literacy rich classroom. In order for students to succeed in reading to learn and reading comprehension, they need a comprehensive vocabulary bank to retrieve words from. According to Marilee Sprenger (2017), a student's vocabulary is affected by many factors including home environment, quality usage of words, language spoken in the home, number of books read to the child, and the amount of time spent in quality conversation (p. 1). It is important for educators to provide many rich opportunities for students to gain word knowledge throughout all academic areas. "Academic vocabulary encompasses a set of terms often found among expository texts and formal presentations or speeches but which is not unique to any content or academic discipline" (Richardson, Morgan, Fleener, 2012, p. 169). Academic vocabulary is sometimes referred to as content vocabulary.

It is estimated that students will gain approximately 50,000 new words from the time they enter elementary school until they graduate high school (Sprenger, 2017, p. 2). A quality approach to the instructional strategy used while introducing, instructing, and applying academic vocabulary is very important. Where Marzano (2009) reminds us that using an instructional strategy does not always guarantee a result but rather *how* one uses the strategy to fidelity (p. 83). The first place to start is by researching what academic vocabulary instruction would best fit and benefit a third grade classroom.

## Academic Vocabulary Instruction

When looking at improving an instructor's academic vocabulary instruction, it is important to consider the types and levels of words your students know and need to know.

According to Marzano (2012), “the importance of vocabulary knowledge to all students is almost self-evident, the specific vocabulary words students should be taught are not” (p. 31). Teachers do their best to make students knowledgeable on all words within the English language. This task can be overwhelming considering the large amount of words within the English language. Therefore, understanding the vocabulary tiers is important for choosing the best words for direct instruction.

**Tiers of Academic Vocabulary**

The words within the English Language are divided into three tiers of vocabulary: Tier I, Tier II, and Tier III. The words in each tier are categorized based upon their frequency and use within the English language. R. J. Marzano (2012) has identified 15,000 unique words found within the three tiers of vocabulary that are important to a child’s understanding of general English language and vocabulary necessary for the success within the major K-12 subject areas (p. 33).

**Tier I.** Tier I words, at times called “basic Words” (Tompkins, 2017, p. 221), are words that are used most frequently in the English language. These words are generally not taught because they are often understood by most students when they reach kindergarten (Sprenger, 2014, p 3). Although *most* students have a basic understanding of Tier I terms, that is not always true. Students who come from homes that are low income or English Language Learners (ELL) will need more direct instruction from this tier (Marzano, 2012, p. 32). Some examples of Tier I words are *baby, ball, stick,* and *cat*. Marzano states that, “36-month-old children from welfare families have only 45 percent of the vocabulary of children from professional families and the gaps between the groups widen over time” (p.32).

Rather than teaching Tier I words individually Marzano (2012) recommends clustering the words to provide a scaffold infrastructure for instruction ( p. 32). By using this strategy the teacher can instruct more than one word at a time. Example of word clusters would be "Bodies of Water" and "Cause/Effect Relationship Markers" (p. 32). These clusters can then be combined into larger groups called *Super-clusters*. "Super-clusters are topical categories that include two or more clusters" (p. 32). An example of a Super-cluster is "Animals" which could include birds, baby animals, cats/dogs, land animals, and more (p. 32).

**Tier II.** Marzano (2012) explains Tier II words as, "important to a general understanding of the English language but are not used frequently enough that teachers can assume they are known to most students from English speaking homes" (p. 33). Sprenger (2017) simply explains Tier II words as "high frequency academic vocabulary" (p. 3). Examples of Tier II words are *feeble, accordingly,* and *tributary.* Words such as *parallel, perpendicular,* and *adjacent* are examples of academic Tier II words. Examples of these words need to be directly instructed to students in order for them to truly understand and be successful with geometry application.

Often words that have clusters identified in Tier I will also have words found in the Tier II category. For example "Bodies of Water" has such words as *lake, puddle,* and *river* where Tier II words under the "Bodies of Water" cluster would include *brook, gulf, inlet, strait,* and *lagoon* (Marzano, 2012, p.33). Having an understanding of the Tier I words will help students' understanding when being instructed the Tier II words.

Additionally, Tier II words "often have multiple meanings in different contexts, appear frequently in written sources across the content areas, but are not discipline-specific, and are considered academic words" (Sprenger, 2017, p. 3). An example of a multiple meaning word is

*consumer*. *Consumer* could refer to the economic term, buyer of goods; where *consumer* could also refer to an organism who hunts and eats other organisms. An example of a word that is used across the content areas is *evaluate*. Students could be asked to *evaluate* information in reading, math, social studies, and science. Sprenger (2017) explains that Tier II words are often found within the classroom curriculum and generally not within the students' daily conversations (p. 3).

**Tier III.** The remaining words in the English language belong in Tier III. Words that fall into this category are too infrequent to justify direct instruction to their meaning (Marzano, 2012, p. 33). These words are domain-specific and are used for a short amount of time when studying a specific topic (Sprenger, 2013, p. 12). Examples of Tier III words are *antagonist, protagonist,* and *alliteration*. Some states have gone as far as to publish leveled lists that are specific to their state's standards. Marzano (2012) recommends "a school or district should have a well-crafted, efficient, and comprehensive plan for instruction regarding these 15,000 terms" (p. 33).

**Six Steps to Academic Vocabulary Instruction**

R. J. Marzano is a highly respected researcher in active classroom instruction of vocabulary words, speaker, and cofounder of the Marzano Research Laboratory. R. J. Marzano created *The Six Step Process* to enhance academic vocabulary instruction in the classroom. *The Six Step Process* can be used in all classrooms, K-12, and has been used in more than 50 studies (Marzano, 2009, P. 84). Below Blachowicz and Ogle (2018) name and explain Marzano's six step process (p. 201):

1. Explain – Provide a student-friendly description, explanation, or example of a new term.
2. Restate – Ask students to restate the description, explanation, or example in their own words.

3. Show – Ask students to construct a picture, symbol, or graphic representation of the term.
4. Discuss – Engage students periodically in structured vocabulary discussions that help them asses their knowledge of the terms in their vocabulary notebooks.
5. Refine and Reflect – Periodically ask students to return to their notebooks to discuss and refine entries.
6. Apply in Learning Games – involve students periodically in games that allow them to play with terms.

Marzano (2009) recommends the first three steps be used when introducing new academic vocabulary words to the students (p. 84). Introducing and restating definitions is not enough for students to remember and retain these words. Karen Wood (2011) believes that "when vocabulary is taught using a surface, definitional approach, students leave the experience with an inadequate understanding and no long-term retention of key terms" (p. 57). More practice and application is needed for students to understand academic vocabulary for the long-term. Marzano (2009) also goes on to say that steps 4, 5, and 6, should be used to review the words a few days later (p. 85).

Furthermore, while Marzano (2009) completed his vocabulary research with his six step process, he learned there were certain activities/steps that were not beneficial. The first unbeneficial activity was having students copy definitions from the board rather than generating their own definition (p. 84). "The third step in the process is crucial – having students represent their understanding of a new term by drawing a picture, pictograph, or symbolic representation. When students do this step well, achievement soars" (p. 84). Finally, Marzano recommends students play games for application, clarification, and enjoyment. Although games are important,

research shows that bringing the students back together following the activity to discuss difficult terms and crucial aspects of those terms is equally as important (p. 84). When completing the six step process, it is important to use it to fidelity or the students will not benefit.

Students need to have a clear understanding of academic vocabulary to apply them successfully within the classroom. Marilee Sprenger (2017) reminds us that "The link among vocabulary, reading, writing, speaking, and listening is becoming increasingly clear, and academic vocabulary is frequently referenced as a critical element in reading comprehension and academic achievement (p. 4)." It is up to the teacher to find the best possible tools for introducing and instructing academic vocabulary. R. J. Marzano's Six Step Process will have the teacher introducing, instructing, and applying academic vocabulary in an engaging approach.

# Chapter Three
# METHODOLOGY

## Research Questions

How does intentional instruction of academic vocabulary affect students' understanding of these words? R. J. Marzano has established a Six Step Process to teaching academic vocabulary. What impact will this approach have on third graders' understanding of Tier II words?

## Data Collection

Qualitative data was collected from an inclusive classroom of 15 third grade students in rural Midwestern Minnesota. The researcher identified academic vocabulary words from Tier II that are directly related to the Everyday Mathematics' curriculum being taught within the classroom. The researcher is also the instructor in this action research. The participants are those 15 third graders within her classroom. A pretest (Appendix B) of the chosen academic vocabulary words was administered prior to the two week's instruction informing the researcher of the participants' prior knowledge of the chosen Tier II and Tier III, academic word meanings. The instructor then used Marzano's Six Step Process to instruct academic vocabulary by introducing and instructing the academic vocabulary words least known to the participants. Instruction was delivered through whole group instruction. Students recorded the chosen academic vocabulary words in their vocabulary journals using the Frayer Model (Appendix A). During the two week process, students applied, refined, and discussed the chosen words (Appendix D). At the end of the two weeks, a post assessment (Appendix C) was administered to continue gathering data on the participants' academic vocabulary growth or lack of. Other

qualitative data was collected when the researcher observed participants' behaviors, comments, level of engagement, participation, and other outside distractions.

Once data had been collected, the researcher reviewed the gains or losses of knowledge to determine the next direction of instruction. If 80% or more of the students scored above a 75% on the post-assessment, no additional instruction was required. If less than 80% of the students score below a 75% of the post assessment, continued instruction would have proceeded. The students would have been assessed the following week if needed. If there was still no improvement in students' understanding of the words, data would have been collected and the instructor would have moved onto the next set of academic vocabulary words.

Qualitative data collected through observation will be considered when evaluating the post assessments and possibility of continued instruction of the academic vocabulary words. The researcher collected data on the participants for seven continuous weeks of instruction. To ensure confidentiality, students' names and identifying descriptions were not used. Instead, the researcher used pseudonyms to identify individual students and record individual results.

**Ethical Issues**

Some ethical issues that did arise when completing the study were when students were absent. Their method of instructional delivery was the same, but given on an individualized basis. When a student missed an activity they were asked to complete the activity at home verses in school. Students enrolled in an Individualized Education Plan (IEP) had accommodations that allowed their assessments to be read aloud to them in a small group setting. There were two students enrolled in the study with such accommodations.

Throughout the time of the research, weather affected the amount of student teacher contact days and hours. Throughout the research, there were two days of school cancelled, one early release, and one two hour late start. There were four additional planned days off thus extending the six weeks of research to seven weeks.

**Research bias.** A full research on academic vocabulary is limited based on the precise steps of academic vocabulary instruction. The researcher/instructor strictly followed the procedures of Marzano's Six Step Process with each academic vocabulary word introduced in mathematics in order to reduce all potential bias.

# Chapter 4
# DATA ANALYSIS AND INTERPRETATION

## Description of Data

The purpose of my research was to determine if explicit vocabulary instruction for Tier II academic vocabulary words was beneficial to students' understanding and application of the chosen words within a third grade classroom. I used R. J. Marzano's Six Step Process to academic vocabulary as a model of instruction. Fifteen students participated within the study. Baseline data was collected from a pretest assessing the students understanding of selected fraction words. These words were chosen as participants began their fraction unit in mathematics. I wanted my students to understand the words and be able to apply them to instruction. A timeline of five weeks were used to administer instruction and collect the data on fraction vocabulary. An additional two weeks were used to administer and collect data on graphing vocabulary words since the instructor was preparing a graphing unit in mathematics next.

Vocabulary instruction was delivered, practiced, and monitored within a two week time frame. On the first day of the two week time period, a pretest was administered to measure the students' knowledge of the selected vocabulary words. The first week was spent introducing and instructing the chosen academic vocabulary words using R. J. Marzano's Six Step Process to academic vocabulary. Steps 1-3 were used the first day to introduce the word while the students recorded their understanding using a Frayer Model in their vocabulary journals. Through the first week of instruction, I used chart paper to record the words, their characteristics, examples, and

nonexamples. While recording on the chart paper, I would not include the definition as it was stressed by Marzano that students need to be able to create their own definition and be able to modify it later with further instruction. Throughout the first week of introducing the vocabulary words we would continue with step 4 (discussion) and discuss the words. Often conversations would include comparing and contrasting the words and share in group or table discussions. The students were asked to go back to their vocabulary journals and revise/modify their understanding of the word (step 5). I found this step to be the most difficult for students to participate in as they often feel their answers are accurate and changing/modifying them means they were inaccurate. The second week was spent engaging the students in Marzano's sixth and final step, application in learning games. At the end of the two weeks, students were administered a post assessment, measuring their understanding of the chosen academic vocabulary words.

Throughout the study notes were taken on student engagement and participation. From the observations students enjoyed having a journal to organize their thinking about the vocabulary words. They also found the journals to be a great resource when engaging in discussions and games about the words. Some students (BC, HI, LM) did not use their journals to the best of their capacity and used them to just "get by" or do the minimal work. These students recorded the necessary information in their journals, but would not go beyond that by revising their words. Because of this minimal effort, these students often struggled more in discussions with peers and engaging in activities.

## Results

**Data set one.** At the start of the first two weeks, five words were chosen based on the fraction unit the instructor was beginning. A pretest was administered to all students to determine their prior understanding of the words. A sample of the pretest can be found in Appendix B. Table 1 below shows the students' performance on the pretest and growth after the first two weeks of instruction and practice. Table 1 below explains individual participants' performance on the pre and post assessments.

Table 1

*Set 1 Data Collected (2 weeks)*

| Students | Accuracy of Pretest #1 | Accuracy of posttest #1 | % Change |
|---|---|---|---|
| AB | 80% | 100% | +20 |
| BC | 80% | 100% | +20 |
| CD | 60% | 100% | +40 |
| DE | 80% | 80% | +0 |
| EF | 100% | 100% | +0 |
| GH | 100% | 100% | +0 |
| HI | 40% | 60% | +20 |
| IJ | 100% | 100% | +0 |
| JK | 80% | 100% | +20 |
| KL | 100% | 100% | +0 |
| LM | 80% | 100% | +20 |
| MN | 80% | 100% | +20 |
| NO | 80% | 60% | -20 |
| OP | 80% | 100% | +20 |
| PQ | 80% | 100% | +20 |
| Class Average | 81.3% | 93.3% | + 12 |

The data from the first set of academic vocabulary words above supports the research of R. J. Marzano. Students do comprehend academic vocabulary words more effectively when

following his Six Step Process to academic vocabulary words. Only one student, NO, showed regression in understanding of the first set of academic vocabulary words. This student missed four instructional days within the first two week period due to a family vacation. This absence in instruction proved to affect her understanding of the words and consistent instruction. This student also needed more support in her daily mathematics work to keep pace with the rest of her peers as a result of her absence.

Aside from direct instruction within the first week, the students spent the second week engaged in games through crossword puzzles, creative sentences, charades, and group presentations on a word. Crossword puzzles and creative sentences were completed independently, while charades and group presentations were completed in small groups. A sample of the crossword puzzle can be found in Appendix D.

**Data set two.** The second set of data was collected during weeks three, four, and five immediately following the first set of data due to inclement weather and spring break minimalizing student teacher contact time. An additional week was needed to allow for more instruction, engagement, and word play. I believe an extended spring break due to inclement weather limited the students' understand of fluid practice and consistent instruction which will be shown in the data below.

Five academic vocabulary words were selected from the fraction unit the students were currently engaged in. A sample of the pre assessment can be found in Appendix B and a sample of the post assessment can be found in Appendix C. Table 2 below explains the participants' performance on the pre and post assessments.

Table 2

*Set 2 Data Collected (3 weeks)*

| Students | Accuracy of Pretest #2 | Accuracy of posttest #2 | % Change |
|---|---|---|---|
| AB | 60% | 100% | +40 |
| BC | 60% | 100% | +40 |
| CD | 40% | 60% | +20 |
| DE | 40% | 60% | +20 |
| EF | 80% | 60% | -20 |
| GH | 60% | 100% | +40 |
| HI | 0% | 60% | +60 |
| IJ | 80% | 100% | +20 |
| JK | 80% | 100% | +20 |
| KL | 20% | 100% | +80 |
| LM | 40% | 60% | +20 |
| MN | 100% | 100% | +0 |
| NO | 20% | 60% | +40 |
| OP | 40% | 80% | +40 |
| PQ | 60% | 100% | +40 |
| Class Average | 52% | 82.7% | +30.7 |

Again, my data set 2 is in line with Marzano's theory that explicit instruction for Tier II and Tier III words do increase students' comprehension of academic vocabulary. When collecting the post assessment data from set 1 to set 2, there is a larger percent change in student understanding even though the accuracy is more than ten percentage points below set 1. Following of my research plan, I continued to move forward with my data and a new set of words for weeks six and seven.

Student EF showed regression in his understanding of words from set 2. There was no reason or indication of adverse stress, absence, behavior, or anything else that would affect his lack of comprehension. He has shown understanding of the content in daily mathematics and

upon review of his vocabulary journal, he engaged in and completed all components of the Frayer Model for all the words within the set. Moving forward, I closely monitored his engagement and compression. In the following weeks student EF adapted to the new words without incident.

With Marzano's final step, students completed a crossword puzzle, group presentations, compare & contrast charts, and Pictionary. When completing activities such as crossword puzzles, Pictionary, and compare and contrast charts, students used words from sets 1 and 2. The students also utilized and modeled understanding of the words in daily mathematics instruction. Some students even made connections with "compare" and "contrast" and additionally explained how we also use these words often in Language Arts. Thus far, these students' favorite activities and most engaging were crossword puzzles and group activities such as charades and Pictionary.

**Data set three**. The third set of data was collected within a two week time during weeks six and seven. Four words were selected based upon graphing, the upcoming mathematics unit. A sample of the pre assessment can be found in Appendix B and a sample of the post assessment can be found in Appendix C. Table 3 below explains the participants' performance on the pre and post assessments.

Table 3

*Set 3 Data Collected (2 weeks)*

| Students | Accuracy of Pretest #3 | Accuracy of posttest #3 | % Change |
|---|---|---|---|
| AB | 75% | 100% | +25 |
| BC | 75% | 100% | +25 |
| CD | 75% | 100% | +25 |
| DE | 75% | 100% | +25 |
| EF | 50% | 100% | +50 |
| GH | 100% | 100% | +0 |
| HI | 0% | 75% | +75 |
| IJ | 100% | 100% | +0 |
| JK | 50% | 75% | +25 |
| KL | 50% | 100% | +50 |
| LM | 75% | 100% | +25 |
| MN | 50% | 100% | +50 |
| NO | 100% | 100% | +0 |
| OP | 50% | 75% | +25 |
| PQ | 50% | 100% | +50 |
| Class Average | 65% | 95% | +30 |

My third set of data also agrees with Marzano's theory that instructional support does improve students' understanding of Tier II and Tier III academic vocabulary words. All participants showed growth in understanding of the chosen vocabulary words within the third and final set. On average, the class gained 30 percentage points in understanding from the pre assessment to the post assessment.

The students were ready to move on from fraction to graphing words for the next set of academic vocabulary. The participants continued to be eager to fill in their vocabulary journals and were much more efficient with their time in completing the Frayer Model.

Activities completed for the set of graphing vocabulary were crossword puzzles, Pictionary, sorting words based upon similarities, and jigsaw presentations. The crossword puzzle and outline for the jigsaw presentation can be found in Appendix D. When completing/engaging in crossword puzzles, Pictionary, and word sorts, the students practiced using the vocabulary words in set three as well as words from set one and two.

Students HI and OP always had all their pre and post assessments read to them based on their IEP accommodation requirements. They also needed more support with independent and small group activities with clarifying instructions, reading directions, and reassurance. Other students needed minimal support with these tasks and could complete them independently or in small groups.

**Research Questions**

After evaluating the data collected above, I reflect back upon my two research questions. First, did my data prove that: intentional instruction of academic vocabulary affect students' understanding of these words? Yes, the majority participants in this study showed growth from the pre assessment to the post assessment. Their engagement and understanding with the words increased with practice, revising, and application of the academic vocabulary words to increase their understanding. I must also consider my second research question: Secondly, will Marzano's Six Step Process to academic instruction have the greatest impact on third grade students' understanding of tier two and three words? It was proven that the systematic approach to delivering academic instruction through Marzano's Six Step Process is what leads to the greatest student success. If not given a systematic approach to delivering academic instruction, the students' understanding of the word would not have changed. As Karen Wood (2011) reinforced,

students need to be engaged with words in order to understand them and not just a surface level of stating and restating a definition (p. 57). That is not enough for long term success and understanding of the word.

Some limitations teachers may encounter, as I did, while completing my research was the uncertainty of following Marzano's Six Step Process to its true fidelity. It is important for teachers to have proper training or professional learning community (PLC) time dedicated to supporting this process. If there are ever questions teachers may have, it is important that they have a support system or coach they can access for support.

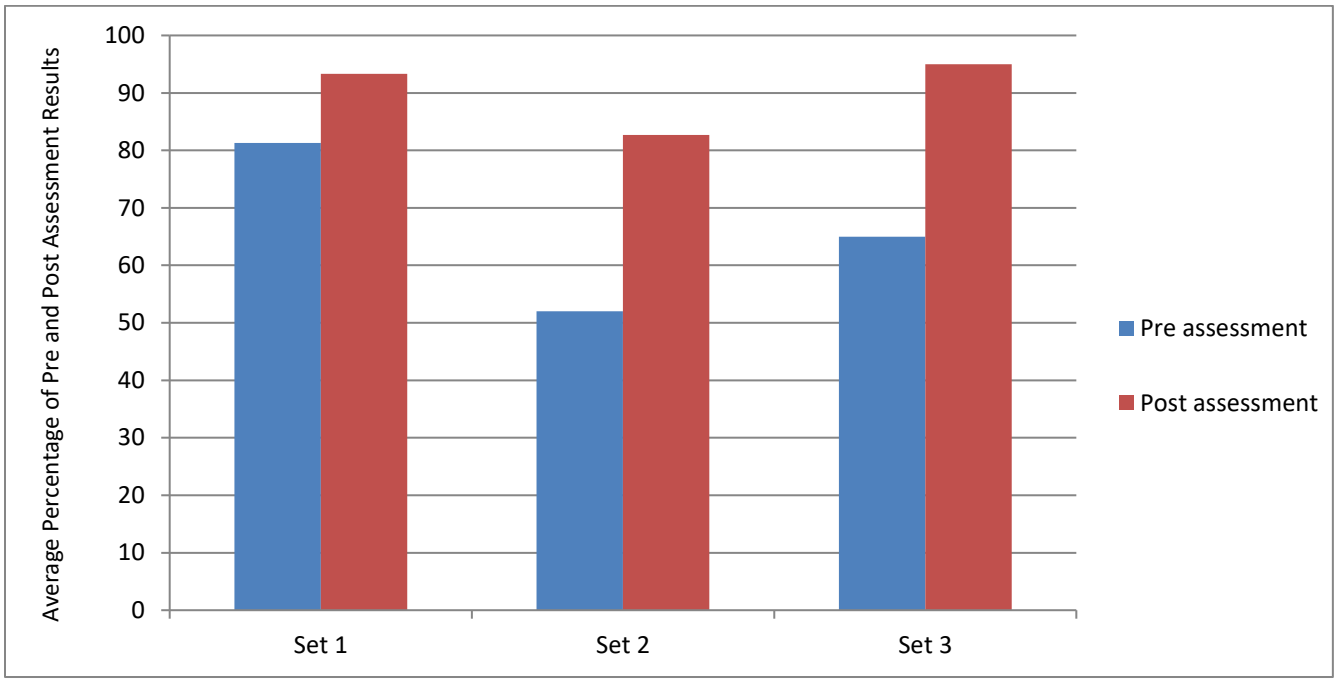
**Conclusion**

When I first considered interest in academic vocabulary, I had many questions. I wondered what was expected of us as teachers. What academic vocabulary instruction had the greatest impact? What academic vocabulary words should be chosen and why? Throughout my research and study, I learned the importance of intentional vocabulary instruction for II and Tier III academic words. The majority of my students never experienced any explicit vocabulary instruction in Mathematics or Language Arts. The students enjoyed working with words and understood how they fit into their academic success. I enjoyed watching them make connections between the words and the content they were studying.

The majority of all students made gains in their understanding of academic vocabulary from the pre assessment to the post assessment using the Frayer Model to record their data and instruction guided by Marzano's Six Step Process to academic vocabulary. Figure 1 below summarizes the growth students made from the pre assessment to the post assessment.

Figure 1

*Student Achievement for Pre and Post Assessments*




Marzano (2009) noted that the most important step of his process was to have students illustrate the definitions of the words. Through this process students are able to show that they were able to apply the words. The students loved this process and enjoyed drawing the definitions in games. Marzano also recommended the importance of students being engaged in games and activities that practiced utilizing the words. The students enjoyed this step of his process most.

Through this process I learned the importance of creating a list of tier two and tier three words that need to be instructed in order for students to be successful. The academic vocabulary words chosen where decided based upon the curriculum and usage of the word. While instructing

the students on the new academic vocabulary words was completed outside of math instruction, it reinforced math skills and understanding through a different approach. There was less time taken out of math instruction to review and comprehend words such as “refer,” “demonstrate,” “compare,” and “represent.” I know that the understanding of these words will also help with their performance on the Minnesota Comprehensive Assessments (MCA’s) in both mathematics and reading.

# Chapter 5
# ACTION PLAN

## Plan for Taking Action

After studying the effect of R. J. Marzano's Six Step Process to academic vocabulary instruction and completing my action research, I plan to continue this instructional process for my next year's third graders as it has proven successful. Before I can continuing this instruction for next year, I will create a master list of Tier II and Tier III academic vocabulary words for each of our ten mathematics units that are necessary for success. There would also be an advantage to creating a list for our six units in Language Arts. Furthermore I plan to vertically align the words and identify any overlap thereby creating one list for all of third grade Tier II and Tier III academic vocabulary words.

Once a full comprehensive list of Tier II and Tier III academic words have been established for third grade, it is important to plan more of the procedural and itemized necessities. What I most appreciate about this instructional process is that it requires a small amount of preparation time, upkeep, and can be done with minimal resources. Each student will need a vocabulary journal, chart paper to record and display academic vocabulary words, and mass printouts of the Frayer Model. Even without the Frayer model printed out, students can easily draw it into their vocabulary journals. Having the students engage in games and word play makes the learning fun, engaging, and memorable for the students and instructor. Moving forward I do not believe administering pre and post assessments is a valuable use of my academic instructional time. It would be more beneficial to use this time to engage students in instruction and word play. I will use my student monitoring skills to observe my students and their progress to determine if additional practice or re teaching would be necessary.

Within the realm of education, students and instruction are always changing with more and more research. Continuing to research on how to better meet the needs of students who have learning disabilities in reading and how academic vocabulary instruction benefits them. I had two participants with learning disabilities in reading that needed extra support with understanding the definitions, comprehension of activities, and struggled with 100% comprehension of the vocabulary words. I am curious if this academic vocabulary instruction is worth their time or would they benefit from another form of instructional delivery? I plan to constantly revisit and revise our list of grade three academic words based upon our changing curriculums and addition of technology.

The first time I became interested in academic vocabulary, I was attending a presentation from a local teacher and how explicit vocabulary instruction using the Frayer Model improved her classroom instruction. After experiencing the positive impact it had on my students' performance, I understood the power of sharing. I will continue to share my knowledge with the success of academic vocabulary instruction with my colleagues through Professional Learning Communities (PLC's). I will seek out opportunities to attend workshops expanding upon these ideas and how I can continue to include more and diverse practice with academic vocabulary instruction within my own classroom.

**Plan for Sharing**

With the knowledge gained from completing my action research, I look forward to sharing it with my third grade teaching team and building principal at one of our monthly or summer PLC sessions. I will demonstrate the success my students had while following Marzano's Six Step Process to academic vocabulary instruction. Many of the teachers have

similar concerns for their students and the lack of direct academic vocabulary instruction. By sharing my students' success and questions I had, my colleagues will benefit from this knowledge and procedure. By investing in academic vocabulary instruction with my third grade teaching team, we will have a network of teachers willing to support, problem solve and address any concerns we may have moving forward. As the old saying goes, "two (or more) brains are better than one."

Additional support would be to print out posters explaining Marzano's Six Step Process and give demonstrations of each of the six steps. I will promote how easily it can fit into a daily schedule. Finally, I'll share resources I created and accumulated within my seven weeks of research with my third grade team for future instruction.

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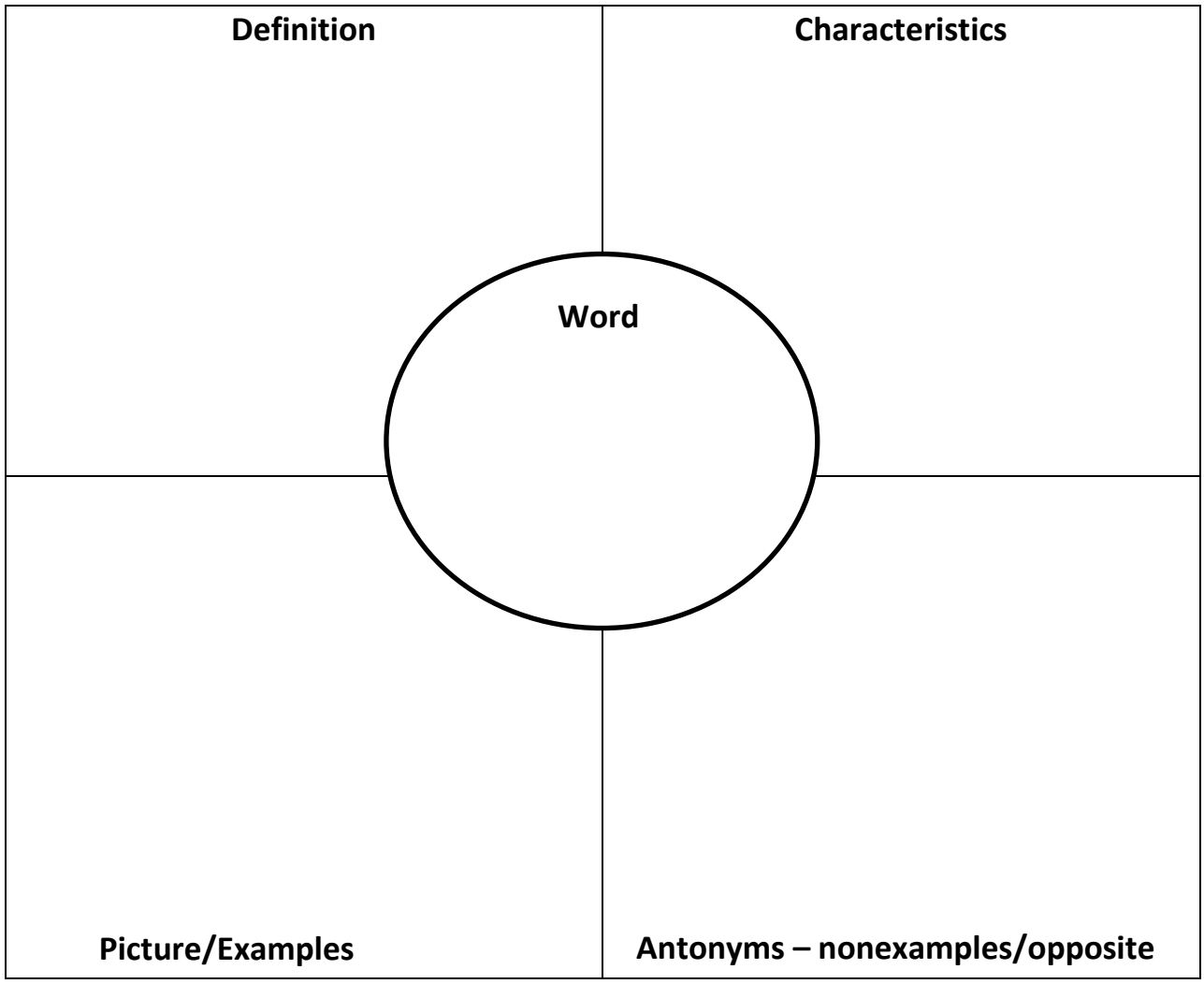
# Appendix A

## Frayer Model



# Appendix B

Pretest #1

Name_____ #_____

1. What is a fraction?
    a. the same
    b. unequal
    c. Equal parts of a whole
    d. A polygon

2. What is a numerator?
    a. The number of parts being represented in a whole or set
    b. The total
    c. Another word for number
    d. A fraction

3. Circle the denominator?

$$\frac{3}{8}$$

4. What does it mean to describe?
    a. To find the answer
    b. Add two numbers together
    c. Tell in your own words
    d. Choose

5. What does it mean to locate?
    a. Another word for map
    b. To find
    c. Misplace
    d. Do something twice

You did it!

Pretest #2

Name_____ #_____

1. What does it mean to compare 2 fractions?
    a. Describe the numerator and denominator of a fraction
    b. Describe how 2 fractions are different
    c. Describe where a fraction is on the number line
    d. Describe how the 2 fractions are the same

2. What is an example of demonstrate?
    a. Looking for a fraction on a number line
    b. Showing and explaining with examples where a fraction is on a number line
    c. Telling a friend what you learned about fractions in school on your way home
    d. Making a connection between fractions and decimals

3. What does it mean to contrast 2 fractions?
    a. Describe the numerator and denominator of a fraction
    b. Describe how 2 fractions are different
    c. Describe where a fraction is on the number line
    d. Describe how the 2 fractions are the same

4. What does it mean to represent in math?
    a. To show as the image
    b. The numerator of a fraction
    c. The denominator of a fraction
    d. Discussing a math problem together

5. What does it mean to order the numbers?
    a. Put numbers into their correct place
    b. Always greatest to least
    c. Always least to greatest
    d. Random placement of numbers

You did it!

Pretest #3

Name_____ #_____

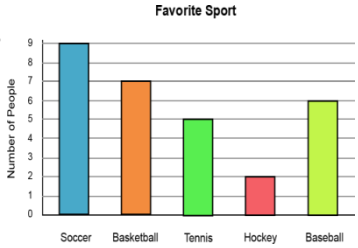
1. What does it mean to <u>summarize</u> in math?
    a. Share all details
    b. Give a brief idea of the main points
    c. Only say what you want
    d. A presentation

2. Which one of these is a <u>graph</u>?

    a.

| Title: How Do We Get to School? | | |
|---|---|---|
| Categories | Tallies | Total |
| Walk | 𝍸 \|\| | 7 |
| Bike | \|\|\| | 3 |
| Car | \|\|\|\| | 4 |
| Bus | 𝍸 𝍸 \|\| | 12 |

    b.




    c. both  d. none

3. What does it mean to <u>refer</u>?
    a. To mention, or make a connection to
    b. To avoid
    c. Cross out
    d. Multiply

4. What does it mean to <u>interpret</u>?
    a. Give a brief idea of the main idea
    b. To avoid
    c. To mention
    d. To explain the meaning of

You did it!

## Appendix C

Test #1

Name_____ #_____

1. Write an example of a fraction on the line below

   _____

2. Write a fraction that has a numerator of 1

   _____

   Can you create an example below?

3. Write a fraction that has a denominator of 6

   _____

   What does the 6 mean?

   _____

   _____

4. What does it mean to describe?
   a. To find the answer of a word problem
   b. The sum of two numbers
   c. To draw or tell in your own words with lots of detail
   d. To cross out an answer that is not correct

5. What does it mean to locate?
   a. Creating a number line
   b. To find
   c. To place a fraction in the wrong spot
   d. Do something twice

You did it!

Test #2

Name_____ #_____

1. What word means to tell how two fractions are alike?
    a. Represent
    b. Contrast
    c. Compare
    d. Demonstrate
    e. Order
2. What word means to tell how two fractions are different?
    a. Represent
    b. Contrast
    c. Compare
    d. Demonstrate
    e. Order
3. What word means “to show”?
    a. Represent
    b. Contrast
    c. Compare
    d. Demonstrate
    e. Order
4. What word means to put numbers into the correct place based on their value?
    a. Represent
    b. Contrast
    c. Compare
    d. Demonstrate
    e. Order
5. What word means to show how to do a math problem with examples and words?
    a. Represent
    b. Contrast
    c. Compare
    d. Demonstrate
    e. Order

You did it!

Test #3

Name_____ #_____

1. Create an example of a graph below

2. What word means to mention or make a connection to?
    a. Summarize
    b. Interpret
    c. Refer

3. What does it mean when you tell the main ideas of a graph in your own words
    a. Summarize
    b. Interpret
    c. Refer

4. What word means to give your own meaning to?
    a. Summarize
    b. Interpret
    c. Refer

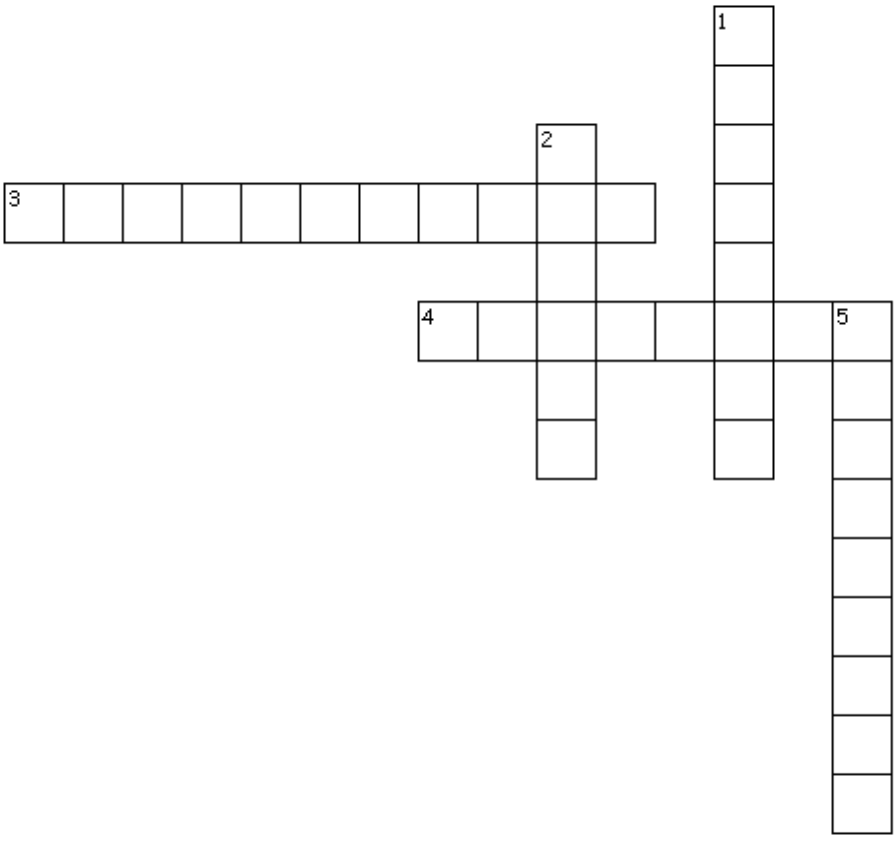
You did it!

**Appendix D**

Week 1

Name: _____

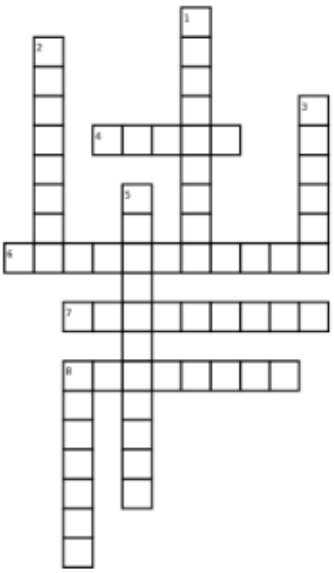
## Word Review




Across
3. The number of equal parts
4. part of a whole
Down
1. use your own words with detail
2. to find
5. How much of the fraction is represented

Week 2

# Math Vocabulary



Down:

1. to show as the image
2. to explain in your own words
3. point to where something is
5. how many equal parts there are in a fraction
8. describe how things are the same

Across:

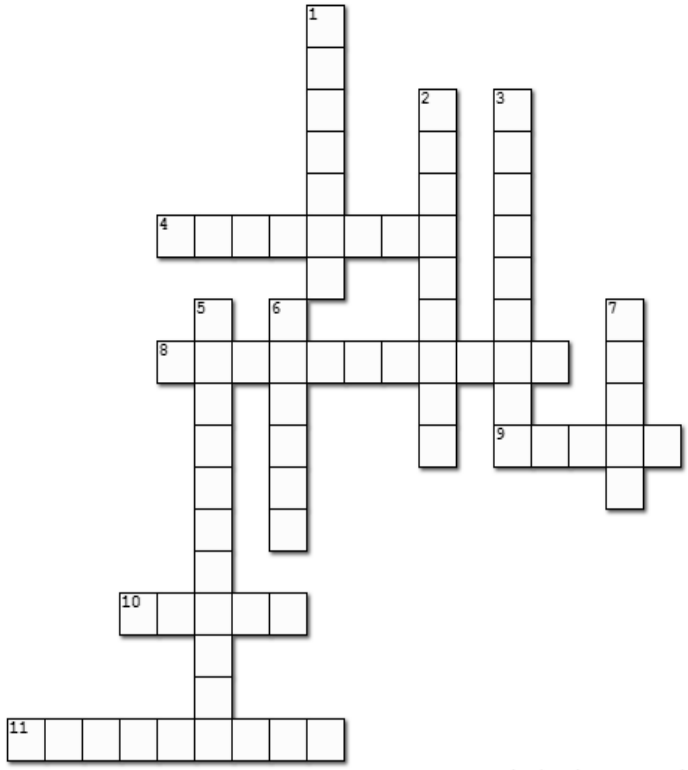
4. put numbers into the correct place
6. show and explain with examples how to do something
7. how many parts are being represented in a fraction
8. describe how things are different

Week 3

Name:_____

# Vocabulary Words

Complete the crossword below



Created using the Crossword Maker on TheTeachersCorner.net

**Across**

**4.** use your own words to explain what something is
**8.** to show how to do something using words , actions, and images
**9.** to mention or make a connection to
**10.** an image used to represent data
**11.** the main ideas put into your own words

**Down**

**1.** how two things are alike
**2.** What it means to you
**3.** the number of pieces being represented in a fraction
**5.** number of equal pieces in a fraction
**6.** to point to
**7.** to put into the correct place, Example: Greater than to less than

Week 3

Name:_____

Word:_____

| | |
|---|---|
| Explain what your word mean. Remember to use your own words. | Use your word in a quality 8 word sentence. |
| How is your word used in math? How can knowing this word help you to be a better math student? | Draw a picture illustrating what your word means and describe the illustration |

**Appendix E**

**DILWORTH-GLYNDON-FELTON SCHOOLS**
***"HOME OF THE REBELS"***

**Dilworth Site**
PO Box 188
Dilworth, MN 56529-0188

Dilworth Elem. School (Pre K-4)
218-287-2100
DGF Middle School (5-8)
218-287-2148
Comm. Ed Office
218-287-2732

**Glyndon Site**
513 Parke Ave.
Glyndon, MN 56547

G-F Elem. School (Pre K-5)
218-498-2285
DGF High School (9-12)
218-498-2283
Transp. Office
218-498-2281

Bryan Thygeson, Superintendent
218-287-2371

Dear Parents,

You are invited to participate in a study measuring the effectiveness of delivery of academic vocabulary instruction. I hope to learn what method of vocabulary instruction is best for instructing third graders within my classroom. I will be using theorist, R. J. Marzano's research on vocabulary instruction to guide my delivery and instruction of academic vocabulary words. Your child was selected as a possible participant in this study because he/she is a member of our third grade classroom.

If you decide to have your child participate, I will be evaluating their prior and post knowledge of the academic vocabulary words presented. I will determine their prior level of understanding by presenting them with an assessment of chosen academic words needed within the classroom curriculum. A post assessment will be administered to measure the amount of growth the students showed. The study will take place over a span of six weeks within the daily instruction.

Any information that is obtained in connection with this study and that can be identified with you will remain confidential and will not be disclosed.

Your decision whether or not to participate will not affect your future relationships with Dilworth Elementary or the classroom teacher. If you decide to participate, you have the right to withdrawal your child from the study at any point without consequences or retaliation from myself.

The purpose and nature of this research have been sufficiently explained and I agree to participate in this study. I understand that I am free to withdraw at any time and my withdrawal will not affect any future relationship with Dilworth Elementary.

**In signing this agreement, I also affirm that I am at least 18 years of age or older.**

Signature: _____ Date: _____

Name of student (print): _____

**Contacts:**

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