Grade Level: 4th and 5th grade combo


Content: Language Art and Math

4th Grade California Content Standard NS 1.4: Decide when a rounded solution is called for and explain why such a solution may be appropriate.

5th Grade California Content Standard NS 1.4: Students compute with very large and very small numbers, positive integers, decimals, and fractions and understand the relative magnitudes of fractions, and percents. They understand the relative magnitudes of numbers.

ELD Standard: Use more complex vocabulary and sentences appropriate for language arts and math.

Content Objectives:

4th Grade: SWEAT estimate quotients using compatible numbers and make use of math vocabulary to write a brief to a detailed explanation of the solution procedure.

5th Grade: SWEAT estimate quotients using compatible numbers and make use of math vocabulary to write a brief to a detailed explanation of the solution procedure.

Background Knowledge in Math: Students have learned the multiplication table, solved math problems where they have to find products of two or three factors, list the fact families, round off, and etc. Students have the basic understanding of the multiplication and division operations and how they relate to one another.

Math Vocabulary:

- **Estimating**: to form an approximate judgment of an amount (about, approximate)

- **Quotient**: the result of division, the number of times one quantity is contained in another

- **Compatible numbers**: numbers that are close to the numbers in the problem and that are easy to work with
1. Display and present the content and language objectives.

2. **Hook (3 minutes):** For warm up, have the whole class play *Drag Race Division* at [http://www.arcademicskillbuilders.com/](http://www.arcademicskillbuilders.com/)
   Make connection with the division game to teach the definition of **quotient**. On the worksheet, have students write the definition of the vocabulary in their words and provide an example.

3. **Modeling: Reasons Why We Need to Estimate Quotients (10 minutes)**
   - Post the following question on the document camera and allow students a minute to think: “If you don’t have any calculator with you and want to figure this out as quickly as possible, how would you do so?”

   *Estimate each quotient using compatible numbers.*
   
   1. \(366 \div 6\)
   2. \(1,220 \div 59\)

   - Emphasize that there is more than one way to figure out a problem and praise them for their creative strategies as they share how they solved the problem.
   - Direct students toward estimating as an effective strategy to quickly decide on an answer when you don’t need to be exact.
   - As students describe the concepts of **estimating** or **compatible numbers**, take the opportunity to connect the vocabulary with the concepts.
   - Model how to estimate quotients by using compatible numbers. Use vocabulary as much as possible while modeling.
4. Guided Practice: Estimating Quotients—How to Solve Word Problems: (5 minutes)
   Hook: An antique piece of paper showing tally marks of the number of lemonade cups sold and the how much money was made.

   Word Problem: When Mr. Dinh was young, he had a lemonade stand. He made $163 by selling 75 cups of lemonade. Each cup of lemonade costs the same. About how much did each cup of lemonade cost?

   - Take down ideas on how they would figure out the word problem.
   - Do think alouds to show how to analyze the word problem and determine which information is important, how to translate the English terms into an algebraic equation and vice versa. Show students how to use compatible numbers to divide and estimate the quotient for the word problem. Use math vocabulary while modeling steps.
   - Have students copy the steps on their worksheet (problem #1).

5. Modeling Writing to Explain (5 minutes):
   - Explain to students the scoring rubric will explain and establish expectations for how students' work is scored.
   - Provide each student with a writing rubric and show them sample answers for each score so that they understand what kind of answer will be expected of them.

6. Guided Practice: Problem #2 (5 minutes):
   - Give students 3 minutes to work with a partner to solve problem #2 (Walk around to assess and support. Encourage students to use the vocabulary they have learned).
   - Ask the students to instruct the teacher to solve the word problem. The teacher writes and asks questions while students volunteer to instruct the teacher the necessary steps to solve the word problem.
   - Work with students on writing examples of explanations for each score on the scoring rubric.

7. Independent Practice: (20 minutes)
   - 4th grade, pgs. 160-161 # 9-34
   - 5th grade, pgs. 80-81 # 9-34
   (Walk around the room to help and informally assess students)

8. Closure (2 minutes):
   - Review the importance of estimating quotients, content vocabulary, strategies to help comprehend word problems, steps on how to estimate quotients, and expectations of writing to explain an answer.

   Assign Homework:
   - 4th Grade Workbook: Reteaching and Practice 7-2 pages 160-161.
   - 5th Grade Workbook: Reteaching and Practice 4-2 pages 80-81.
9. Assessment:
   - Thumbs up, thumbs down, thumbs sideways.
   - Collect students’ independent practice work, homework, and the Quick Check. Assess students work to determine if they can find compatible numbers to estimate quotients.
   - Read students’ written responses and score their work based on the writing rubric to see any misconceptions that they may have.
   - 4th Grade Quick Check: 7-2 #1-3: 6 possible points.

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   5th Grade Quick Check: 4-2 #1-5: 8 possible points.

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<tr>
<td>8</td>
<td>Advanced</td>
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Enrichment (Optional):
   - 4th grade pg. 48 #1-4
   - 5th grade pg. 32 #1-10

Sources:


**Worksheet: Estimating Quotients**

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<td></td>
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<tr>
<td>Compatible numbers</td>
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**Estimate each quotient using compatible numbers.**

1. \( 366 \div 6 \)

2. \( 1,220 \div 59 \)
Estimating Quotients: Word Problems

1. **Writing to Explain:** When Mr. Dinh was young he had a lemonade stand. He made $156 by selling 75 cups of lemonade. Each cup of lemonade costs the same. About how much did each cup of lemonade cost? Explain how you found your answer.

2. **Writing to Explain:** Imagine Ms. Hoffman wants to throw a pizza party for the whole class because they have been working so hard. Ms. Hoffman has a budget of $64.65 and each pizza cost $7.75 after tax. About how many pizzas can she buy? Explain how you found your answer.
Lesson Rational

Why is the content of this lesson important for your particular students to learn now?

The students have learned estimating by rounding off, the fact families, the times tables, and the inverse of multiplication (which is division). With this knowledge, the students are now ready to learn estimating quotients by using compatible numbers. By being able to fluently compute an estimate, students can quickly validate the reasonableness of many math problems. Furthermore, estimating is an effective strategy to quickly comprehend the situation and make a real life decision when they don’t need to be exact.

Besides the need to learn the math content and the academic math vocabulary, students need to learn techniques and strategies to organize a math word problem in ways that they can comprehend. Every day in class, the students are struggling with the last word problem in the “quick check” section, which requires them to write to explain how they got the answer. Since this problem is worth up to 60% of the quiz, failing to answer this problem correctly would result in failing the quiz. The students are failing this portion of the test because they don’t know how to answer the problem. Therefore, it is important for students to learn how to articulate in writing to explain how they got their answer.

How does the lesson build on students’ prior knowledge, as well as their experiences, interest, and/or background?

The content of this lesson involves estimating quotients by finding compatible numbers and teaching the vocabulary of math. To find compatible numbers, students need to access their prior knowledge. Students may use: basic facts, fact families, rounding up and down, and various strategies to adjust the dividend, the divisor, or both to create a division problem that divides evenly. This allows students to swiftly compute an estimate mentally.

Since the students enjoy playing computer games, the lesson starts out with a whole class warm-up game, “Drag Race Division,” where they are required to recall basic division facts. Winning the game builds students’ confidence. Students then learn that basic facts are the key component of finding compatible numbers. The vocabulary taught will coincide with students’ responses—as they discover a concept, the teacher takes the opportunity to attach the appropriate vocabulary.

Another method of engaging students’ interest is to personalize the lesson. Both word problems are made personal by bringing them into the story. The word problems are also worded in a way that they can relate to. Furthermore, I tried to relate to the students on a personal level by sharing my struggle with word problems when I was younger so that they understand that the concept is difficult for most people—even their teacher. I then shared that it is possible to break down the word problem using the strategies that they will learn. This validates students’ feelings as well as helps them understand that it’s possible to make the struggle easier.
What evidence are you using to make this decision?

Three focus students were chosen: two 4th graders with the lowest score on the STAR Student Report and a 5th grader with a low reading level based on the assessment by Farnham Elementary School's reading specialist. The Solom Teacher Observation assessment shows that all three focus students orally performed at grade level. They are able to communicate in everyday conversation and classroom discussion fluently. Their grammar and word order usage are comparable to that of a native speaker. The Qualitative Reading Inventory (QRI) shows that they are good decoders but they are not good at organizing the events and details of the events in sequence. In retelling a story, all three students left out many main ideas and details. All three students’ grade equivalent reading level and the instructional reading level are between 2.0 and 3.0. The QRI indicates that all three students need additional support in reading comprehension. Moreover, their writing prompt also indicated that they need extra support in writing comprehension and how to address all parts of the writing task.

Additionally, students' homework indicated that the three focus students as well as most of the classmates have difficulty comprehending math word problems and addressing all parts of the question or questions. Furthermore, students struggle in articulating in writing to explain how they got the answer.

How do the instructional tasks or strategies you are using support the learning of your students (use relevant theories and special needs of your students)?

Listed below are the SIOP Features used to meet language demands.

**SIOP Feature 1 and 2: Content and Language Objectives Clearly Defined, Displayed, and Reviewed with Students.**

I wrote the content and language objectives simply and clearly to focus on ELLs and all learners' language needs. Otherwise, the importance of incorporating language components while teaching content can be easily neglected. The objectives are to be communicated to the students orally and in writing at the beginning of the lesson. According to Echevarria, Vogt and Short, “As with content objectives, language objectives should be stated clearly and simply, and students should be informed of them, both orally and in writing.” (2008, p. 25) Providing the content and language objectives orally and in writing clarify for students what they will be learning in the lesson.

**SIOP Feature 8: Links Explicitly Made Between Past Learning and New Concepts.**

By reminding students of what they have learned in previous math units, I explicitly connect past learning with the new lesson and activate prior knowledge. Tiemey & Pearson (1994) points out that most students don't automatically make these connections and need teachers to explicitly show them how the content they've learned in the past is related to the information at hand. This
makes them feel more confident because the lesson seems to not be overwhelming and that they know a lot already. This would benefit all ELs because it will help them consciously connect what they are learning so that they can focus on the “bigger picture” rather than just the “small details”.

**SIOP Feature 9: Key Vocabulary Emphasized.**

The key vocabulary are heavily emphasized in all parts of the lesson, in the way the teacher gives instructions and explains in front of the entire class to when students are working with a partner or by themselves. During these times, teacher uses the opportunity to provide students with key vocabulary words to communicate, encourage more usage, and praise students for using the key vocabulary. Vocabulary development will benefit all ELs.

Saville-Troike (1984), Hart and Risley (2003), Biemiller (2005), Manzo, Manzo, and Thomas (2005) all concluded that vocabulary development is strongly connected to academic achievement and is critical for English Learners. Echevarria et al. emphasize, "The more exposures students have to new words, especially if a vocabulary is reinforced through multiple modalities, the more they are likely to remember and use them." (2008, p. 169) Thus, awareness of which key vocabulary words students need to learn motivates a teacher to provide more opportunities for students to be immersed in them and to encourage students to use more of these vocabulary.

**SIOP Feature 11: Clear Explanation of Academic Tasks**

This function is revealed throughout my lesson plan. Before any task, oral instruction, teacher modeling and written instructions are provided to accommodate different learning styles. For example, before the writing to explain, written instructions and a rubric in the form of a graphic organizer accompany teacher modeling clearly explain what they are expected to do and will be assessed on. This feature will help all EL levels and even native English speakers understand their assignments clearly.

According at Echevarria et al. (2008), “English learners at all levels (and native English speakers) perform better in academic situations when the teacher gives clear instructions for assignments and activities... It is critical for ELs to have instructions presented in a step-by-step manner, preferably modeled or demonstrated for them... Oral instructions should always be accompanied by written ones...” When students clearly grasp what is expected, they will spend less time off-task and more time focused on the learning activity.

**SIOP Feature 16: Frequent Opportunities for Interaction and Discussion.**

Student interaction is encouraged in lesson because they had opportunities to collaborate with a partner or in a small group. Furthermore, throughout the lesson, students are encouraged to share their ideas with the class. Students' ideas are then woven into the lesson, giving them ownership of the lesson. Not only that, they are asked to instruct the teacher to solve the word problem. The teacher writes and asks questions while students volunteer to instruct the teacher on the
necessary steps to solve the word problem. This will benefit all ELs because they will have opportunities to practice communicating in English.

**SIOP Feature 29: Regular Feedback Provided to Students on their Output**

During the time when students collaborate to solve the word problem, teachers can use this time to provide students feedback through encouraging students, correcting misconceptions/misunderstandings/mispununciations, and paraphrasing to help students clarify their ideas. Students can also provide feedback for one another when given the opportunity to communicate with one another. This feature is effective for all students because it helps students learn language in their ZPD. Echevarria et al. notes, 'Feedback also helps develop students' proficiency in English when it is supportive and validating.' (2008, p. 171). While students are collaborating, teachers can take this opportunity to model correct English usage and give specific praises that will encourage students to communicate using the key vocabulary.

**REFERENCES:**


# Analysis of Students' Work: Notes

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<thead>
<tr>
<th>Understanding Well</th>
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<th>Sean 4th Grade</th>
<th>Victoria: 5th Grade</th>
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<tbody>
<tr>
<td></td>
<td>ELD:</td>
<td>ELD:</td>
<td>Math:</td>
</tr>
<tr>
<td></td>
<td>- Use “close to” (a synonym) for compatible numbers in “Writing to Explain” in Quick Check.</td>
<td>- Use the vocabulary “compatible numbers” in Writing to Explain.</td>
<td>- Know to find compatible numbers using multiplication (as shown in #1 work on Quick Check).</td>
</tr>
<tr>
<td></td>
<td>- Understand vocabulary but didn’t use it.</td>
<td>- Can find compatible numbers to estimate quotients.</td>
<td></td>
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<tr>
<td></td>
<td>- Detailed explanation.</td>
<td>- Use “about” in answer.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Math:</td>
<td>- Use compatible numbers.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Got correct answers (5/6) on 2 word problems and 1 Writing to Explain problem in quick check.</td>
<td>Math:</td>
<td></td>
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<tr>
<td></td>
<td>- Got subtracted 1 point for not using content vocabulary in her Writing to Explain answer.</td>
<td>- Did not find compatible numbers for BOTH the dividend and divisor. Only tried to find compatible numbers for the dividend, which still makes it hard to estimate the quotient.</td>
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<tr>
<td></td>
<td>- Highlight “about” and other clue words in word problems, which shows that she knows to estimate.</td>
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</table>

<table>
<thead>
<tr>
<th>Misconception/Confusion/Needs</th>
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<th>Sean 4th Grade</th>
<th>Victoria: 5th Grade</th>
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<tr>
<td></td>
<td>ELD:</td>
<td>ELD:</td>
<td>ELD:</td>
</tr>
<tr>
<td></td>
<td>- Need to use vocab in her explanation in “Writing to Explain”. Only used the definition.</td>
<td>- Provided a brief explanation. Need to write a more detailed sentences to explain thought process.</td>
<td>- Couldn’t write to explain. Only used numbers to show work. Need to work on writing down thought process.</td>
</tr>
<tr>
<td></td>
<td>Math:</td>
<td>Math:</td>
<td>Math:</td>
</tr>
<tr>
<td></td>
<td>- Although she got a good score on the “Quick Check”, further analysis of her Independent Practice work shows that she did not use fact families for find compatible numbers. She tends to use the “round off” method, which is another form of estimating, but doesn’t help her find a good estimate.</td>
<td>- Did not find compatible numbers for BOTH the dividend and divisor. Only tried to find compatible numbers for the dividend, which still makes it hard to estimate the quotient.</td>
<td>- Did not find compatible numbers for BOTH the dividend and divisor. Only tried to find compatible numbers for the dividend, which still makes it hard to estimate the quotient.</td>
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<tr>
<th>Conclusion with Evidence</th>
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<th>Sean 4th Grade</th>
<th>Victoria: 5th Grade</th>
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<tr>
<td></td>
<td>ELA:</td>
<td>ELA:</td>
<td>ELA:</td>
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<tr>
<td></td>
<td>Met objective according to Quick Check. Can write a detailed explanation of her thought process. Next steps: help her use content vocabulary in her explanation.</td>
<td>Met objective by providing a brief explanation with vocabulary. Next steps: help student write a more detailed explanation.</td>
<td>Did not meet objective. Didn’t know basic facts to help her find compatible numbers.</td>
</tr>
<tr>
<td></td>
<td>Math:</td>
<td>Math:</td>
<td>Math:</td>
</tr>
<tr>
<td></td>
<td>Met objective according to quick check. Need to work on using compatible numbers instead of rounding off.</td>
<td>Met objective.</td>
<td>Did not meet objective. Didn’t know basic facts to help her find compatible numbers.</td>
</tr>
</tbody>
</table>
Analysis of Students’ Work

The California ELD Standard for this lesson is to use more complex vocabulary and sentences appropriate for language arts and math. At the end of the lesson, SWBAT estimate quotients using compatible numbers and make use of math vocabulary to write a brief to a detailed explanation of the solution procedure. Students’ Quick Check is collected for assessment. The 4th grade Quick Check has 3 word problems with a possible score of 6 points. Problem number 1 and 2 are worth one point each and problem number 3 is worth 4 points. Problem number 3 asks students to write to explain how they got the answer. The 5th grade Quick Check has a total of 5 word problems with a possible score of 8 points. Problems number 1, 2, 3, and 4 are worth 1 point each and problem number 5 is worth 4 points. Problem number 5 asks students to write to explain how they got the answer. The “Writing to Explain” problem is scored based on the writing rubric. Please refer to the rubric below.

<table>
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<tr>
<th>4th Grade Quick Check: 7-2 #1-3: 6 possible points.</th>
<th>5th Grade Quick Check: 4-2 #1-5: 8 possible points.</th>
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<tbody>
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<td>Points</td>
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<tr>
<td>0-4</td>
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<td>5</td>
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</tr>
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<td>Advanced</td>
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</table>

On the 4th Grade Quick Check, five students scored 6 points, placing them at Advanced and seven students scored 5 points, placing them as On-level. Tina and Sean both scored 5 points.

On the 5th Grade Quick Check, five students scored 8 points, placing them at Advanced, seven students scored 6-7 points, placing them at On-level, four students scored 4-5, placing them at intervention, and two students scored 1 point, which also places them at intervention. Victoria scored 1 point.

<table>
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<th>Estimating Quotients: Writing Rubric</th>
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<td>Example of Writing to Explain</td>
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</table>
Tina: 4th Grade-

ELD: Tina scored 5 out of 6 points on the Quick Check. In the “Writing to Explain” portion of the Quick Check, Tina wrote a detailed explanation of how she got the answer. However, she got subtracted 1 point for not using math content vocabulary in her explanation of the answer. Tina wrote “close to” (a synonym) for compatible numbers, which shows that she does understand vocabulary but didn’t use it. She also highlighted the word “about” in the word problem and wrote “about” in her explanation, which is another clue that shows that she knows to estimate. Besides using the definition, she needs to use the content vocabulary to explain in “Writing to Explain.” Tina met the content and ELD objective. She can write a detailed explanation of her thought process. The next step is to help her use content vocabulary in her explanation.

Sean: 4th Grader

ELD: Sean scored a 5 out of 6 points on the Quick Check. In the “Writing to Explain” portion of the Quick Check, Sean uses the vocabulary “compatible numbers” in his explanation. His arithmetic shows that he can find compatible numbers using fact families. He also uses the word “about” in his explanation, showing that he knows the concept of estimating. However, he got subtracted 1 point for providing a brief explanation of how he got the answer. Sean needs to write more detailed sentences to explain his thought process. Sean met the content and ELD objective by providing a correct answer and making use of correct math vocabulary in his brief explanation. The next step is to help Sean write a more detailed explanation of his thought process.

Although Tina and Sean both scored at On-level on the “Quick Check”, further analysis of their independent practice work shows that they did not use fact families to find compatible numbers. They tend to use the “round off” method, which is another form of estimating, but this doesn’t help them find a good estimate. They need to work on using fact families to find compatible numbers instead of rounding off.

Victoria: 5th Grade

Victoria scored a 1 out of 8 on her Quick Check. In the “Writing to Explain” portion of the Quick Check, Victoria did not write to explain how she got the answer. She only used numbers to show her work. There is no evidence that shows she had learned the content vocabulary. She needs support in learning the content vocabulary and support on writing down her thought process.
In number 1 of the Quick Check, Victoria did not find compatible numbers for BOTH the dividend and divisor. She only tried to find compatible numbers for the dividend, which still makes it hard to estimate the quotient. Before she can estimate quotients using compatible numbers, she needs to learn the fact families to help her find compatible numbers.

Victoria did not meet the math or ELD objective. She couldn’t write any explanations in words. She didn’t know basic facts to help her find compatible numbers. These concepts need to be retaught for her.
Teaching Language Art through the Content of Math:

Second Lesson- Estimating Quotients

Grade Level: 4th and 5th grade combo

Materials: Worksheets (Vocabulary Note Taking Guide, Example of Final Product, Writing to Explain Rubric), and Document Camera.

Content: Language Art and Math

4th Grade California Content Standard NS 1.4: Decide when a rounded solution is called for and explain why such a solution may be appropriate.

5th Grade California Content Standard NS 1.4: Students compute with very large and very small numbers, positive integers, decimals, and fractions and understand the relative magnitudes of fractions, and percents. They understand the relative magnitudes of numbers.

ELD Standard: Use more complex vocabulary and sentences appropriate for language arts and math.

Content Objectives:

4th and 5th Grade Intermediate/Advanced Learners (who understand the math concept): SWBAT create a meaningful “Writing to Explain” word problem on estimating quotients. They will solve their own word problem using compatible numbers and make use of math vocabulary to write a detailed explanation of the solution procedure.

4th and 5th Grade Struggling Learners (who don’t understand the math concept): SWBAT estimate quotients using compatible numbers and make use of math vocabulary to write a brief to a detailed explanation of the solution procedure.

Background Knowledge:

In the previous lesson, 7 out of 30 students did not fully understand the concept of using compatible numbers to estimate quotients. Of these 7 students, 4 are not able to write a brief to detailed explanation of the concept. The other 23 students understand the math concept and can write a brief to detailed explanation. Out of 30 students, 10 students did not use content vocabulary in their explanation.

This lesson seeks to challenge students who understand the math concept and to advance their learning by asking them to create their own word problem and answer with a detailed explanation. Intermediate learners (students who are weaker in writing a detailed explanation with content vocabulary) will be strategically paired with a partner who is advanced so that they can improve in writing a detailed explanation through collaborative learning.
As for the students who don’t understand the math concept yet (struggling learners), the teacher will pull them aside to reteach the concept of using fact families to find compatible numbers instead of rounding off. Furthermore, students will be taught to use content vocabulary to explain their math reasoning.

Math Vocabulary:

**Estimating**: to form an approximate judgment of an amount (about, approximate)

**Quotient**: the result of division; the number of times one quantity is contained in another

**Compatible numbers**: numbers that are close to the numbers in the problem and that are easy to work with.

**SIOP Features**

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<td>___ Oral</td>
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**DAY 1**

10. Display and present the following student-friendly content and language objective:

- Today, I will be able to write a Writing to Explain word problem about estimating quotients and create answers for the writing scoring rubric that include the content vocabulary.

11. Review and reteach content vocabulary using the revised note-taking guide. Work with students to fill in the blank and sentence frame. This will help students practice using the content vocabulary in a sentence so that they can later apply this learning to writing their explanation for the word problem that they will create.

12. Differentiate instruction:

- Advanced learners:
Challenge these students to become a teacher by writing a Writing to Explain word problem that other students will have to solve. Model how to write a word problem and a writing scoring rubric. Have them work with a partner to write their own word problem and answers for each score on the rubric. Announce that later on, they will do a gallery walk and other students will try to answer their word problem on a large post-it note. They will then use their rubric to score other students’ answers to their word problem.

- **Intermediate learners:**
  Pair these students with an advanced learner so that they can develop their skill in writing a detailed explanation for a word problem.

- **Struggling learners:**
  Work with the teacher to review fact families and how to apply fact families to find compatible numbers instead of rounding off. Reteach how to use compatible numbers to estimate quotients. Emphasize content vocabulary during the process of estimating quotients. Guided teaching on how to estimate quotients using compatible numbers and make use of math vocabulary to write a detailed explanation of the solution procedure. Allow time to answer one Writing to Explain problem independently and address any misconceptions and provide feedback right away to help students learn from their mistakes or improve in their writing.

13. **Closure:** Review content and language objectives. Ask some students to share the word problems that they came up with. Collect student work to provide feedback and assess.

**DAY 2**

1. Display and present the following student-friendly content and language objective:
   - Today, I will be able use compatible numbers to solve word problems about estimating quotients and write a detailed explanation using content vocabulary.

2. Give students time to look over the feedback on the word problem they have written the previous day and write their revised word problem on a poster with a marker. Use this time to have struggling learners do another Quick Check assessment to determine their understanding of the content and whether they can write a detailed explanation.

3. **Gallery Walk:**
   - Display posters of word problems around the classroom. Give ALL students large post-it notes to go around and try to answer other students’ word problems. Encourage students to answer with a detailed explanation. Have students hold onto their post-it note till the end.
   - At the end of the gallery walk, allow students to post the answer to the math problems on the poster.
4. Model how to take a student’s answer on the post-it note and score it using the writing scoring rubric. Have students take their posters and other answers to score them according to the writing scoring rubric. This will help students understand how a teacher grades so that in the future, they can assess their own writing and understand what a detailed explanation entails. Integrate the struggling learners into groups so that they can do this grading process with the other students.

5. Closure: As a class, analyze and evaluate one group’s work to see if it meets the lesson objectives.

6. Assessment: Collect posters, writing scoring rubric, and post-it-notes to assess whether students can write a word problem about estimating quotients and write a detail explanation to answer the word problem using the content vocabulary.
<table>
<thead>
<tr>
<th><strong>Word</strong></th>
<th><strong>Meaning</strong></th>
<th><strong>Examples</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimating</td>
<td>To form an approximate judgment of an amount (about, approximate)</td>
<td>When I go shopping, compare which is the better bargain by <strong>estimating</strong> the price per quantity. Estimating is important because</td>
</tr>
<tr>
<td>(verb)</td>
<td></td>
<td>(The students copy the definition, read the meaning of the word and discuss it. Then the students write the definition in their own words.)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(The students are asked to finish the sentence starter.)</td>
</tr>
<tr>
<td>Quotient</td>
<td>The result of division, the number of times one quantity is contained in another.</td>
<td>9 is the <strong>quotient</strong> of 81 ÷ 9.</td>
</tr>
<tr>
<td>(noun)</td>
<td></td>
<td>A quotient is ____________</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compatible numbers</td>
<td>Numbers that are close to the numbers in the problem and that are easy to work with.</td>
<td>Using <strong>compatible numbers</strong> to estimate quotient will give me a close number to the actual answer.</td>
</tr>
<tr>
<td>(noun)</td>
<td></td>
<td><strong>Compatible numbers are</strong></td>
</tr>
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<td></td>
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</tr>
</tbody>
</table>
## Estimating Quotients: Writing Rubric

<table>
<thead>
<tr>
<th>Content</th>
<th>4 Points</th>
<th>3 Points</th>
<th>2 Points</th>
<th>1 Point</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Writing to Explain</strong></td>
<td>The student solves the problem correctly and makes use of correct math vocabulary in a detailed explanation.</td>
<td>The students solve the problem correctly but provide a brief explanation.</td>
<td>The students solve the problem correctly but provide an explanation that is unclear, disconnected, or inaccurate.</td>
<td>The students solve the problem correctly but provide a very poor explanation or no explanation at all.</td>
</tr>
<tr>
<td><strong>Example of Writing to Explain</strong></td>
<td>$156 + 75 = ?$ I used the basic fact to help me find compatible numbers. The basic fact $16 + 8 = 2$. This means that $160/80 = 2$. Since $160/80$ is close to $156 + 75$, that means that each cup of lemonade costs $2$.</td>
<td>$160 - 8 = 2$, so each cup of lemonade cost about $2$.</td>
<td>$156 - 75$ is about $2$.</td>
<td>$2$</td>
</tr>
</tbody>
</table>
Part D: Final Reflection

What is working in this lesson? For whom? Why?

The strategy of the lesson was to make learning content vocabulary and estimating quotients fun, engaging, and relevant for all students. Beginning of the lesson, I successfully captured the students’ attention with a computer game, “Drag Race Division.” This quickly got all the students to tune in. Their verbal and body language showed that they were excited. They even felt successful after winning the race. After establishing a positive mental attitude with the students, I took the opportunity to make connections between the game and the academic language by introducing the concept of “quotient.” I pointed out that they had no problem solving for the quotients to the division problems during the game. This made the word “quotient” relevant because it was taught and used in context. To make further connections, I pointed out that division problems are basic facts and they will use basic facts to find compatible numbers to estimate quotients. By reminding students of what they have already known from previous math units, I explicitly connected past learning with the new lesson and activated prior knowledge. Most students don’t automatically make these connections and need teachers to explicitly show them how the content they’ve learned in the past is related to the information at hand. This makes them feel more confident because the lesson seems to be less overwhelming and that they know a lot already. This would benefit all ELs because it will help them consciously connect what they are learning so that they can focus on the “bigger picture” rather than just the “small details.”

To make the lesson relevant for all students, I asked and elicited students’ response throughout the lesson. I led the group through the steps by using student input to guide the process. I then had the class practice using the terms: quotient, estimate, and compatible numbers. Students shared their views verbally and further instruction was built based on their feedback. This allows students to make self-to-content connections through the process. I believe that it is empowering for students when they discover new concepts or ideas on their own. They feel that they have ownership of their learning.

To further motivate students by making the content real and relevant, the word problems were about themselves and things that they were interested in. In the first word problem, students were captivated by the personal narrative. I told a story of when I was their age and how I made lots of money selling lemonade. Immediately, students tune in because their sense of curiosity was aroused. To make the personal narrative more authentic, students were shown an artifact of the lemonade business venture, a rustic and worn out piece of paper that had tally marks of how many cups were sold and the dollars earned. In the second word problem, I used their classroom as the scenario. Their teacher’s (Mrs. Hoffman) name was used. A pizza party was included in the word problem, which they were thrilled about. This scenario is imaginable and all students can easily associate with it. Connecting content to students’ lives helps motivate them to learn.

Finally, I tried to connect to students by sharing my own weaknesses and frustrations. We shared our personal experience of frustration in doing word problems. I asked them to share their
strategies for solving word problems and they came up with terrific strategies. I listened carefully to student input. By doing so, this made me more accessible to students.

Other components that were successful in the lesson were good classroom management and lesson organization. During the lesson, I used a variety of signals to recapture the students’ attention. The students immediately responded to the signals and I was able to transition quickly from one task to another task. I had a number system to call students to come to get their materials. Furthermore, a graphic organizer was provided for students, which served as a scaffold for academic language.

What is not working? For whom? Why?

There were many components of the lesson that did not work well. First, the vocabulary note taking guide was a good graphic organizer, but it was not effectively utilized. After eliciting students’ responses, they wrote their own definition. I then rushed through the content vocabulary and did not check for understanding. This resulted in a few problems. There were little to no control of what the students wrote on the note taking guide. Their interpretation of the academic vocabulary was not concise and/or was completely wrong. Based on the assessment of their note taking guide, the advanced learners was able to write the definitions and give examples of the academic vocabulary easily. The intermediate learners did not provide a complete definition and good examples. A few struggling learners left the space blank or they attempted to write but couldn’t finish the definitions. Furthermore, they couldn’t give concrete examples of the academic vocabulary. I should have modeled what to write on the note-taking guide so that they all write down the correct definitions and good examples. Afterwards, I then could allow them to compose their own definitions.

During some parts of the lesson, I did not demonstrate a command of subject matter. Potential misconceptions were not addressed. In the previous lessons, students used rounding off to estimate products and quotients. Therefore, they applied rounding off to this lesson. Based on the homework, a third of the students used rounding off and rounded the dividend and divisor to the nearest tens, hundreds, or thousands and then divided to find the quotients. By doing so, the answers are far from a good estimate. Instead, they should have used fact families to help find compatible numbers to estimate quotients. Students were confused between concepts of rounding vs. compatible numbers. This indicated that they missed the objectives of the lesson. I should have clearly indicated the importance of using fact families to find compatible numbers to help estimate quotients. By not explicitly emphasizing the usage of fact families to help find compatible numbers, advanced learners and struggling learners were left confused.

However, some advanced learners found compatible numbers to be an easy concept. They immediately made the connection of using fact families to find compatible numbers. They also easily integrated the content vocabulary into their writing. This lesson did not differentiate to challenge the more advanced learners.
During the quick assessment using thumbs up/thumbs down/ and thumbs sideways, I had students closed their eyes. They were asked to display their thumbs to show their understanding of the math and academic content. All the students had their thumbs up. This does not reflect my assessment when I walked the room to help them. Some students had difficulty finding compatible numbers or even misunderstood the concept. Additionally, students were not using the content vocabulary in their writing to explain. A better method to check for understanding is needed. I need to be aware of my instructions. I must ask, “Was my instruction effective or not effective?” In this case, students seem to pay attention, but the information has not been successfully transferred to the students. This quick assessment did not provide an honest response. Psychologically, students do want to be the only one having their thumbs down.

If I had to reteach this lesson, I would break this lesson into 2 smaller chunks because studies show that students retain material better in small chunks and when the content material is not overwhelming. The first lesson would be on the academic vocabulary and how to estimate quotients and the second lesson would be on how to solve word problems and how to write to explain how they got the answer. This huge lesson was overwhelming for most students to learn all the content. Toward the second half of the lesson, there were signs of students being tired and restless in trying to apply everything they learned.

I believe that there are many ways to teach a lesson and that I will always have to assess, change, and adapt to my students' needs. After watching my lesson video, reflecting upon my teaching and thinking through my lesson, I learned a great deal. One thing that I learned was to prepare for the class as much as I can and expect the unexpected.

**Lesson 2:**

**Explain how and why the second lesson plan addresses next steps for learning for the whole class, and individualized next steps for the students whose individual learning you analyzed.**

In the previous lesson, 7 out of 30 students did not fully understand the concept of using compatible numbers to estimate quotients. Of these 7 students, 4 are not able to write a brief to detailed explanation of the concept. The other 23 students understand the math concept and can write a brief to detailed explanation. Out of 30 students, 10 students did not use content vocabulary in their explanation.

Tina met the content and ELD objective. She can write a detailed explanation of her thought process. The next step is to help her use content vocabulary in her explanation. Sean met the content and ELD objective by providing a correct answer and making use of correct math vocabulary in his brief explanation. The next step is to help Sean write a more detailed explanation of his thought process. Victoria did not meet the math or ELD objective. She couldn't write any explanations in words. She didn't know basic facts to help her find compatible numbers. These concepts need to be retaught for her.
This second lesson seeks to challenge students who understand the math concept and to advance their learning by asking them to create their own word problem and answer with a detailed explanation. Intermediate learners (students who are weaker in writing a detailed explanation with content vocabulary) will be strategically paired with a partner who is advanced so that they can improve in writing a detailed explanation through collaborative learning. Sean and Tina will be placed in the intermediate learners group. Advanced learners can help Sean write a more detailed explanation of his thought process and can support Tina in using content vocabulary in her explanation.

As for the students who don’t understand the math concept yet (struggling learners), the teacher will use pull them aside to reteach the concept of using fact families to find compatible numbers instead of rounding off. Furthermore, students will be taught to use content vocabulary to explain their math reasoning. Victoria will be placed in this group. She did not meet the math or ELD objective. She couldn’t write any explanations in words. She didn’t know basic facts to help her find compatible numbers. The teacher can reteach these concepts during this lesson.