

CTWS2

Task 3: Student Assessment Analysis

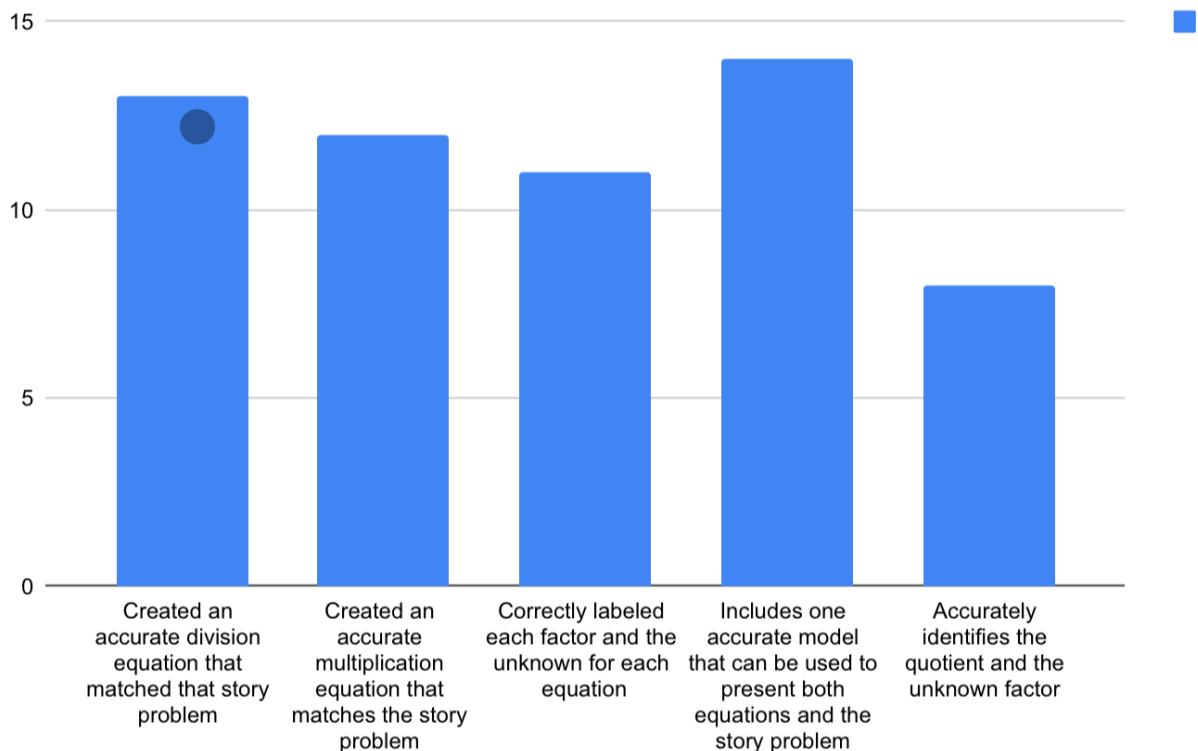
Analyzing Student Learning

1. Identify the specific learning objectives measured by the assessment you chose for analysis.

The objectives for this lesson were: students will be able to use math discussion in small groups to have students create both a missing factor multiplication equation and an unknown quotient division equation to discover the relationship between division and missing factor multiplication.

The assessment used to measure the objectives was a rubric in which students' written work after engaging in small group math discussion was analyzed and was required to include an accurate division equation that represents the story problem, a related, missing factor multiplication equation that also represents the story problem, an accurate model that represents both of their equations and the situation in the story problem, and finally, accurate labels that relate the factors in their equations to the factors described in the story problem.

2. Provide a graphic (table or chart) or narrative that summarizes student learning for your whole class. Be sure to summarize student learning for all evaluation criteria.



Rubric example:

Application Task

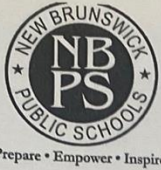
- Student included an array that shows $12/6 = 2$
- Student wrote a multiplication equation to solve for the unknown.
- Student wrote a division equation to solve for the unknown.
- Student accurately labels what the unknown factor represents.
- Student accurately labels what the quotient represents.

Total Points: 9 / 10 = 90 % Excellent!

- 3. Use evidence found in 3 student work samples and the whole class summary to analyze the patterns of learning for the whole class and differences for groups or individual learners relative to the strategy AND related skills. Consider what students understand and do well, and where they continue to struggle (e.g., common errors, confusions, need for greater challenge).**

Given the chart and rubric shown above, most students were able to create an accurate model (equal groups, array, or number line) to depict total number of children being decomposed into smaller equal groups with only 2-3 students of the 15 student sample set not meeting those criteria.

Student A:



New Brunswick Public Schools

Brianna

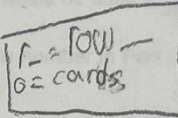
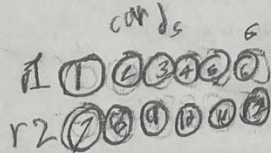
11-13-23

Grade 3 Math Task
Unit 1 SubUnit 2 Task 1

Application Task:

Cesar arranges ^{total cards} 12 note cards into rows of 6 for his presentation.

- Draw an array to represent the problem.



- Write a multiplication and division equation that can be used to solve for the unknown.

Multiplication

cards in rows # of rows total cards

$$6 \times ? = 12$$

Division

$$12 \div 6 = ?$$

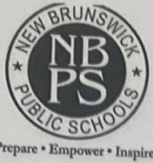
total cards cards in rows # of rows

The quotient is ~~the answer to our division problem~~
the answer to our division problem is the # of rows for this problem.

- What does the unknown factor and quotient represent?

The unknown factor represents the number of rows. And the quotient represents the total number of cards.

Student B:



New Brunswick Public Schools

Grade 3 Math Task
Unit 1 SubUnit 2 Task 1

Santiago

11-13-23

Application Task:

Cesar arranges 12 note cards into rows of 6 for his presentation.

- Draw an array to represent the problem.

row \rightarrow X X X X X X - 6
row \rightarrow X X X X X X - 6 $\neq 12$ X = rows and columns
x = 2

- Write a multiplication and division equation that can be used to solve for the unknown.

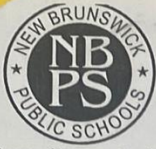
$2 \times 6 = 12$ $12 \div 2 = 6$
how many groups each group total Total how many groups each group

- What does the unknown factor and quotient represent?

it represent how many groups and the rows there are. Also the quotient represent my total for my dish each time.

The quotient is not the total.

Student C:



Prepare • Empower • Inspire

New Brunswick Public Schools

Grade 3 Math Task
Unit 1 SubUnit 2 Task 1

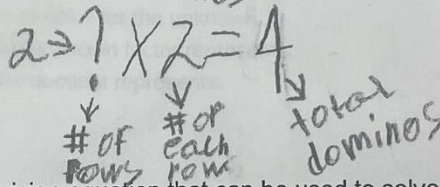
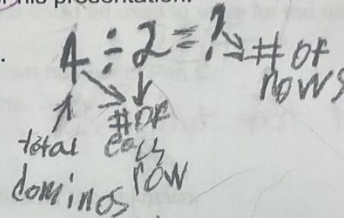
11-13-23

Application Task:

Cesar arranges 12 ^{total of notes} note cards into rows of 6 for his presentation.

Where are your rows of 6?

- Draw an array to represent the problem.



- Write a multiplication and division equation that can be used to solve for the unknown.

$$12 \div 6 = ?$$

$$6 \times ? = 12$$

$$12 \times 6 = ?$$

- What does the unknown factor and quotient represent?

? the unknown number means the # of rows

Student A (Brianna) exemplifies a group of students who demonstrated a high level of proficiency in their ability to create an accurate array that clearly shows her understanding of the language depicted in the story problem: she used that information she knew (the total note cards and the number of notecards that should be placed in each row) to first create her model. She then was able to accurately create a division equation and a related missing factor multiplication equation in which the unknown (“?”) was accurately labeled as the number of rows that the notecards in the story problem were placed in. Brianna demonstrates her understanding of the relationship between multiplication and division as her labels for each factor were consistent across both of her equations. She also included a single model to represent both equations that demonstrates she understands that the same model can be used to represent 12 total notecards placed into 2 groups with 6 in each group.

However, although Brianna was able to accurately label the unknown factor in her equations, she inaccurately described the quotient of the division problem as the total number of note cards: according to the division equation she wrote, her quotient, or the answer to her division equation would be the unknown (the number of rows of notecards). Brianna's, like Student B, Santiago's, misconception of the quotient represents a larger sample set where most students inaccurately identified the quotient, as the total because the students are more familiar with the product (answer to a multiplication equation) being the total or sum of small equal groups being added together.

Student C (Anahi) represents a set of students who did not create an array that accurately shows the equal groups depicted in the story problem.: this student's total is 12, but she drew three rows of notecards with four in each row. Anahi wrote the example problem we did on the board as a class before the class was asked to start their independent work application task so, it appears she may have gotten some of her factors confused from the story problem with ones for the class example. Anahi writes an accurate division equation but does not indicate that she understands what each factor represents because she did not label them: Her related multiplication equation uses the correct factors but includes the unknown (“?”) as the product of (12×6) . This indicates that she may not yet understand the quotient as the result of dividing one number by another and that the quotient is the missing factor in the related multiplication equation that is multiplied to give a product (the total). With this, Anahi does correctly identify what the unknown (“?”) represents in her division equation but does not indicate that she understands that both unknown factor and the quotient should represent that same meaning (the # of rows of notecards)

Altogether, the data collected indicates that students need a better understanding of the definition of the quotient as the result of dividing one number by another: even those (like students A and B) who correctly labeled each factor in both their multiplication and division equations, most students (like A, B, and C) still confuse that the quotient and the missing factor in the related multiplication equation are the same value and should be labeled the same.

Feedback to Guide Further Learning

Refer to specific evidence of submitted feedback to support your explanations.

- 4. Identify the feedback given to the 3 focus students (i.e. written and/or verbal). (If a video or audio work sample occurs in a group context (e.g., discussion), provide a transcription and clearly identify the teacher's and students' (using pseudonyms) comments.)**

Brianna and Santiago feedback; what does is the definition of a quotient? Because you have previously explained to me that you understand division as breaking apart a total number into smaller equal groups, can the quotient be the total number we started with? No! Because the total is the number, we are decomposing so our quotient will always represent equal groups that are smaller than our total.

Anahi feedback: does your array match what's happening in the story problem? I count that you have rows of 4, how can we change this array so that the total notecards is still 12, but it also matches the story problem and has rows **of 6** instead. How can we label these factors in your equations so that the factors represent the story problem? What does the 12 represent? What does the 6 represent and what does the unknown represent (what is the story problem asking us to find?). Based on how we labeled the factors, does the unknown in each equation represent the same thing? Yes! The unknown is still the number of rows of notecards. Next time, be sure to check that both your model and equations have labels that match the story problem situation.

- 5. Explain how feedback provided to the 3 focus students addresses their individual strengths AND needs relative to the learning objectives measured.**

The objectives for this lesson were: students will be able to use math discussion in small groups to have students create both a missing factor multiplication equation and an unknown quotient division equation to discover the relationship between division and missing factor multiplication. Students were expected to use the small group and whole group math discussion to apply hat they learned about multiplication and division as inverse operations.

The feedback given to both student A and B shows that they were able to effectively apply the discoveries they found during their small group math discussion to the individual application task but may still need clarification about the definition of a quotient and how that related to both division and the related multiplication equations made for a given story problem.

The feedback given to student C shows that they were able to recognize the 12 notecards as the total number in her model but needs to make sure that the number of notecards in each row needs to match the story problem. Anahi also clearly drew from the group math discussion as she wrote the class example to help her references as she did her independent work. She is able to create an accurate division equation but is lacking the labels to prove her understanding of what each factor represents and how we are using each factor in put related equations to represent the situation occurring in the story problem. These understandings will ensure that students that represent the group that Anahi's work represents will meet the objectives in the future.

Evidence of Language Understanding and Use

When responding to the prompt below, use concrete examples from the video clip(s) (which must be transcribed) and/or student work samples as evidence. Evidence from the transcription may focus on one or more students.

- 6. Explain and provide concrete examples for the extent to which your students were able to use OR struggled to use the main language function in the learning task. Provide evidence of students' language use.**

The main language function of this lesson was for students to engage in multiple discussions (both in whole group and small group settings) with peers where they practice using discipline-specific discourse (* See High Level Task Discussion Rubric detailed about (assessment #1)) Students were required to utilize target vocabulary in these discussions:

- Equal groups
- Number line
- Array
- Multiplication
- Division
- Product
- Quotient
- Factor
- Equation
- Equal groups
- Product
- Label
- Represent

Students were also asked to verbally explain to their peers and teacher (subordinating conjunction) adding BECAUSE preceding justification for why and how the equations they chose to represent their model are related to each other.

As a result of these high level math task discussion using target vocabulary, students were expected to apply their understandings to the individual application task: to include an accurate division equation that represents the story problem, a related, missing factor multiplication equation that also represents the story problem, an accurate model that represents both of their equations and the situation in the story problem, and finally, accurate labels that relate the factors in their equations to the factors described in the story problem.

As seen in the graph above, most students were able to create an accurate model, and at least one accurate equation with proper labels that match how the factors are represented within the context of the story problem but, most struggled with identifying the quotient and the unknown factor as the same value although in different locations of their related multiplication and division equations (see last question in students work samples A, B, and C).

Using Assessment to Inform Instruction

7. Based on your analysis of student learning presented in prompts 1 & 2 describe next steps for instruction to impact student learning:

- **For the whole class**
- **For the 3 focus students and other individuals/groups with specific needs**

Consider the variety of learners in your class who may require different strategies/support (e.g., students with IEPs or 504 plans, English language learners, struggling readers, underperforming students or those with gaps in academic knowledge, and/or gifted students needing greater support or challenge).

Based on my analysis of the students' performance on the assessment with only 50% (8/15) accurately identifying the quotient in a division problem and recognizing the quotient and missing factor in the related multiplication equation should represent the same value, next steps for the whole class include:

- Going over the clear definition of math vocabulary as a whole class: a mini lesson on what the quotient represents in a division problem, going over the meaning of an unknown factor in an unknown factor multiplication equation, and showing examples of how the quotient and unknown factor in these contexts are related.

- Future whole group, mini-lesson instruction with further examples of division and related missing factor multiplication equations will be followed by independent practice.

For students represented by student A and B's work: further practice will ensure that students in this group will be able to effectively apply the discoveries they found during whole group math discussion to the individual application task but may still need clarification about the definition of a quotient and how that related to both division and the related multiplication equations made for a given story problem.

For students represented by student C's work: small groups will be pulled during independent work time to have small group instruction from me to ensure students that are represented by student C's work are first accurately representing the story problem with a model and then accurately labeling related equations first, which will then lead in to more individualized assessing and advancing questions for these students to answer about what they notice about the relationship between the model, the equations and their labels for both of these as it relates back to the story problem.

8. Explain how these next steps follow from your analysis of student learning. Support your explanation with principles from research and/or theory.

Given the objective of this lesson were: students will be able to use math discussion in small groups to have students create both a missing factor multiplication equation and an unknown quotient division equation to discover the relationship between division and missing factor multiplication. Students were expected to use the small group and whole group math discussion to apply hat they learned about multiplication and division as inverse operations. Based on these expectations, my students' performances was **approaching expectations** overall. The next steps I have planned are appropriate because it will provide further and clearer support as the teacher will be modeling how to move through the thinking process to solve example problems related to ones the students will be solving on their own, applying the modeled approach form the whole group work.

In conjunction with my planned next steps, research suggests that the "I Do We Do You Do" model is scaffolding tasks as your gradually release responsibility to your students. Yet, many of the strategies listed above are grounded in research that fits nicely with, but is separate from, the I Do We Do You do model, particularly cognitive load theory and retrieval practice. Further erase arch indicates that gradually shifting the responsibility for learning from the teacher to the students can build student skills and confidence over time by starting with

explicit instruction and modeling, moving to guided practice, and finally to independent practice.

Criteria	Level 1	Level 2	Level 3	Level 4	Level 5
Analysis of Student Learning <i>How does the candidate analyze evidence of student learning related to the strategy and related skills?</i>	<input type="checkbox"/> The analysis is superficial or not supported by either student work samples or the summary of student learning. OR The evaluation criteria are not aligned with the learning objectives and/or analysis. OR The analysis is not aligned with the learning objectives.	<input type="checkbox"/> The analysis focuses on what students did right OR wrong.	<input type="checkbox"/> The analysis focuses on what students did right AND wrong. AND Analysis includes some differences in whole class learning.	<input type="checkbox"/> Analysis uses specific examples from work samples to demonstrate patterns of learning consistent with the summary. AND Patterns of learning are described for whole class.	<input type="checkbox"/> Analysis uses specific evidence from work samples to demonstrate the connections between quantitative and qualitative patterns of learning for individuals or groups.
Providing Feedback to Guide Further Learning <i>What type of feedback does the candidate provide to focus students?</i>	<input type="checkbox"/> Feedback is unrelated to the learning objectives OR is developmentally inappropriate. OR Feedback contains significant content inaccuracies. OR No feedback is provided to one or more focus students.	<input type="checkbox"/> Feedback is general and addresses needs AND/OR strengths related to the learning objectives.	<input type="checkbox"/> Feedback is specific and addresses either needs OR strengths related to the learning objectives.	<input type="checkbox"/> Feedback is specific and addresses both strengths AND needs related to the learning objectives.	<input type="checkbox"/> Feedback for one or more focus students <ul style="list-style-type: none"> • provides a strategy to address an individual learning need OR • makes connections to prior learning or experience to improve learning.
Student Use of Feedback <i>How does the candidate support focus students to understand and use the feedback to guide their further learning?</i>	<input type="checkbox"/> Opportunities for using feedback are not described. OR Candidate provides limited or no feedback to inform student learning.	<input type="checkbox"/> Candidate provides vague description of how focus students will understand or use feedback.	<input type="checkbox"/> Candidate describes how focus students will understand or use feedback related to the learning objectives.	<input type="checkbox"/> Candidate describes how s/he will support focus students to understand and use feedback on their strengths OR weaknesses related to the learning objectives.	<input type="checkbox"/> Candidate describes how s/he will support focus students to understand and use feedback on their strengths AND weaknesses related to the learning objectives.
Analyzing Students' Language Use and Subject Area Learning <i>How does the candidate analyze students' use of language to develop content understanding?</i>	<input type="checkbox"/> Candidate identifies student language use that is superficially related or unrelated to the language demands OR Candidate's description or explanation of language use is not consistent with the evidence submitted.	<input type="checkbox"/> Candidate generally describes how students use language to communicate understanding.	<input type="checkbox"/> Candidate explains and provides evidence of students' use of the language function with some detail.	<input type="checkbox"/> Candidate explains and provides evidence of students' use of <ul style="list-style-type: none"> • the language function, • vocabulary, AND <ul style="list-style-type: none"> • discourse/conceptual understanding 	<input type="checkbox"/> Candidate explains and provides evidence of language use and content learning for students with varied needs.
Using Assessment to Inform Instruction <i>How does the candidate use the analysis of what students know and are able to do to plan next steps in instruction?</i>	<input type="checkbox"/> Next steps do not follow from the analysis. OR Next steps are not relevant to the learning objectives assessed. OR Next steps are not described in sufficient detail to understand them.	<input type="checkbox"/> Next steps primarily focus on changes to teaching practice that are superficially related to student learning needs, for example, repeating instruction, pacing, or classroom management issues.	<input type="checkbox"/> Next steps propose general support that improves student learning related to assessed learning objectives. Next steps are loosely connected with research and/or theory.	<input type="checkbox"/> Next steps provide targeted support to individuals or groups to improve their learning relative to <ul style="list-style-type: none"> • the strategy OR <ul style="list-style-type: none"> • related skills. Next steps are connected with research and/or theory. 	<input type="checkbox"/> Next steps provide targeted support to individuals AND groups to improve their learning relative to <ul style="list-style-type: none"> • the strategy AND • related skills. Next steps are justified with principles from research and/or theory.

Rubric Points	Letter Grade	Grade out of 20%
18 - 20	A	20
15 - 17	A-	18
13 - 14	B+	16
10 - 12	B	14
7 - 9	C+	12
5 - 6	C	10