Mini Math edTPA **Name: Hillary Lehman**
Tasks 1-3
Fall 2013

T4ask 1: Planning for Instruction and Assessment

1. Lesson Background

- Teacher's Name: **Hillary Lehman**
- School: **Amanda Elementary School**
- Class: **5th grade Mathematics**
- Date: **November, 2013**

2. Standards / Objectives

- Topic or Essential Question: **What does it mean when one number does not evenly divide into another? What do we do with what is leftover?**

- Standard(s) Addressed:

  CCSS.Math.Content.5.NBT.B.6: "Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models."

- Instructional Content Objectives (Measurable):
  - **Successfully solve at least one of the "how many" questions.**
  - **Successfully create at least one correct equation to represent the word problem.**

- Assessment of content objectives: **The students will be given a CGI (Cognitively Guided Instruction) worksheet containing a division word problem. The worksheet includes breaking down the word problem, creating an equation(s) to represent the problem with correct dividend, divisor and quotient (or for multiplication: product and factors). Students will solve this problem and provide written representations and explanations for their work. Students will be given a formal assessment the day following the CGI lesson. Students will use a strategy of their choice to solve division problems, on the test. The test will consist of questions in the form of multiple choice, matching, short answer, true/false, fill in the blank and an essay question.**

3. Language

- Academic Language Functions and Forms (including key lesson vocabulary)
  (Retrieved from dictionary.com)

  Multiplication: "a mathematical operation performed on a pair of numbers (factors) in order to derive a third number called a product."

  Multiple: "a number that contains another number an integral number of times without a remainder; *a number that may be divided by another number with no remainder*."

  Division: "the operation inverse to multiplication; the finding of a quantity, the quotient, that when multiplied by a given quantity, the divisor, gives another given quantity, the dividend; the process of ascertaining how many times one number or quantity is contained in another."

Divided by: "The phrase used to denote division. The number preceding this phrase is typically called the "dividend." The number following this phrase is called the "divisor." For instance, in "3 divided by 4," 3 is the dividend and 4 is the divisor." (Extracted from Todd Edward's edtpa example template)

Factor pairs: "A factor pair is nothing more nor less than two numbers that when multiplied together yield a given number." (Extracted from a mathematical forum from http://mathforum.org/library/drmath/view/58565.html)

Equation: "an expression or a proposition, often algebraic, asserting the equality of two quantities." Example: 9 x 5 = 45.

Representation: "anything that represents, such as a verbal or pictorial portrait; expression." Example: a multiple tower used to solve a division problem.

Remainder: "the portion of the dividend that is not evenly divisible by the divisor."

- Language Objectives

  1. **Translate the word problem into two mathematical equations.**
  2. **Translate "parts of the problem" into their correct mathematical purpose (dividend, divisor, product and/or factors and their product).**
  3. **Understand that the remainder can relate to the division word problem and can be used to determine "what is leftover".**

- Assessment of language objectives
  Provide written explanations (e.g. standard algorithm, drawings, symbolic representation (multiple towers), sentence(s) explaining their answers/work) for the CGI division problem given by the instructor. Written explanations should include proper integration of mathematical terms/vocabulary.

4. Differentiation (including accommodations and modifications of content, materials, delivery, activity, assignment, assessment, etc.)

Content Differentiation:
The lesson begins with the teacher reading the "story" to the students. By reading the problem aloud, struggling readers are able to listen to the problem prior to reading it. After reading it aloud, students receive their worksheet that has the division word problem or "story" and their format that they must follow to solve it. Because there are many students with IEPs/504s, they will receive the same word problem with simpler numbers to work with. Also, the word problem will be shorter and will use simpler vocabulary to aid struggling readers. For the advanced students who may finish early, the teacher will ask them to turn their paper over and write their own CGI division problem. For struggling students, the teacher will walk around and help students think deeply about the problem/division; the teacher will be sure not to guide the learner.

Process Differentiation:
In the activity, students are encouraged to solve the division word problem using a method of their own choosing. Because students are allowed to choose their own strategy, there are many "tools" they can choose from. (Examples: multiples tower, drawings, standard algorithm) There is a problem solving guide for both versions of their worksheets (differentiated vs. non-differentiated); the differentiated version has more structure such as extra directions, to help students succeed.

4. Lesson Sequence:

Day 1:

A. Opening (Approximately 4-5 minutes total):

Source: BrainPOP- http://www.brainpop.com/math/numbersandoperations/division/preview.weml

The activity begins by activating student background knowledge, on division, through the use of a BrainPOP video. The video engages students in "solving the problem" of "divvying up the loot" between Tim, Moby and friends. The video defines mathematical language such as divisor and dividend, explains how to check your answer and introduces students to the basic principles behind division.

B. Discussion/Activity (45 minutes total):

Part 1: (The teacher will set a timer to ensure there is enough time to "wrap up" the lesson). The following problem is initially read aloud to students:

CGI Problem: The 3rd, 4th and 5th grade students from Amanda Elementary are going on a field trip to the Victoria Theatre. There is a total of 242 students that are allowed to go on the trip. If there are 15 seats on each bus, how many full buses will be used for the trip? How many leftover students will have to ride in Ms. Lehman's car?"

The teacher will read the CGI problem, as a story, without the numerical aspects so that students do not try to solve it while they are talking. Because the students are young (5th grade) the word problem is more "approachable" if introduced to them as a story. The "story approach" also allows the teacher to integrate language arts into their mathematics curriculum by asking students questions such as "What is the setting of the story?" or "Who are our characters, in the story?". The teacher will use a cooperative learning approach to this lesson by having students talk to their "neighbors" about the following:

- What is this story about?
- What is the "problem" that we need to solve?
- How can we solve it? (What kind of mathematical strategy/concept is this story wanting us to use?)

Part 2: After reading and discussing the "story", the teacher will hand out the CGI worksheet. Students will then work independently to solve the problem. For the advanced students who may finish early, the teacher will ask them to turn their paper over and write their own CGI division problem. For struggling students, the teacher will walk around and help students think deeply about the problem/division; the teacher will be sure not to guide the learner. To ensure that the teacher will not guide the learner, they will use strategies/questions to develop or further student understanding such as:

- How would you teach someone (another classmate) this?
- Is there another way you can represent your thinking (drawing, standard algorithm, etc.)
- How do you know that your answer is correct?
- What is the "problem" we are trying to solve?
- How did you reach this answer?

C. Wrap-up (20 minutes total):

Part 3: After the timer has went off, the teacher will give each student a colored pencil/marker to make corrections on their worksheets during discussion. The teacher will require students to make all corrections in colored

ink/pencil so that they can measure their understanding of division. The teacher will engage the class in a group discussion about the "story" problem. The teacher will follow the problem solving guide (PSG) while solving the problem on the white board. For the first part of the PSG, the teacher will ask students what important words and numbers they found in the story. The teacher will "box" important numbers and underline key words or phrases. Next, the teacher will ask students to help them fill out the "how many" question(s) section of the PSG. Then, the teacher will ask students about representing the problem as an equation. The teacher will ask students about a division and multiplication equation that could represent the problem; the teacher will also remind students that multiplication and division are inverse operations. The teacher will then ask students:

- What kind of procedures or steps did you use to solve this problem?
- How did you represent your thinking?
- What kind of "real world" situations would division be useful?

Lastly, the teacher will ask a student to come up to the white board to write out the "sentence" section of the worksheet. (The sentence section requires students to write a formal sentence derived from their "how many" questions that includes the answer(s)).

After solving the problem with the guidance of the students, the teacher will collect the CGI worksheets to measure student understanding. To meet the instructional content objectives, students will have to:

- **Successfully solve at least one of the "how many" questions.**
- **Successfully create at least one correct equation to represent the word problem.**

Part 4: The teacher will close the discussion by inviting students to ask questions and/or state any confusion they may have about division.

***(If there is extra time available, the teacher will ask an advanced student to show their division problem they have created on the document camera. The teacher and students will utilize the remaining time by solving the student created word problem).

Day 2:

A. Opening (5 minutes): The teacher will invite students to ask questions related to division/multiplication before testing begins.

B. Activity (60 minutes): The teacher will set a timer for 55 minutes remind them to give students a "5 minute warning" during the end of testing. The teacher will administer their test to the students. Students will be required to complete the test individually. For students with IEPs/504s, the students will be given a differentiated test and will be able to have appropriate accommodations for testing. If advanced students finish their test early, I will have them further their thinking about division by encouraging them to think about a problem where the remainder will need to be split evenly among groups. The teacher can refer back to the BrainPOP video shown on the previous day, and ask the student how Tim and Moby could split two leftover pieces of candy among four people, evenly. (fractional remainders)

C. Wrap-up (5 minutes): The teacher will announce a "five minute warning". If students are finished, the teacher will walk around and collect them; if there are students who need the remaining time, they will be allowed to use the last five minutes to complete their test.

6. Supporting Materials (include no more than 2 pages of additional materials needed to understand what you and the students will be doing) ***you allowed me to exceed my page limit so I could include the test I created and implemented.**

The 3rd, 4th and 5th grade students from Amanda Elementary are going on a field trip to the Victoria Theatre. There is a total of 242 students that are allowed to go on the trip. If there are 15 seats on each bus, how many full buses will be used for the trip? How many leftover students will have to ride in Ms. Lehman's car?

Be sure to follow the Problem Solving Guide while solving this problem!

"How Many" Question(s):

Important Words/Numbers:

Sentence:

Show your work and representations

Create two equations that represent this word problem:

_____

_____

<u>Differentiated Version</u>:

The 5th grade students from Amanda Elementary are going on a field trip to the Victoria Theatre. There is a total of 62 students. If there are 10 seats on each bus, how many **full** buses will be used for the trip? How many **leftover** students will have to ride in Ms. Lehman's car?

Be sure to follow the Problem Solving Guide while solving this problem!

"How Many" Questions:

1.

2.

Important Words/Numbers:

Sentence:

Show your work and representations used:

Create an equation that represent this word problem:

_____

***Differentiated test available upon request

Points Earned: /45

Name: **Date:**

Division Test

Directions: Follow all directions. Please read each question carefully. Use your time wisely; don't spend a significant amount of time on one problem. Good luck!

Multiple Tower (14 points total):

1. *Fill out the multiple tower shown on your right, for the number **12**. Stop when you get to 204. The first few have been done for you.*

Multiple Tower

204

24

12

Multiple choice (1 point each):

Please refer to your multiple tower for the following questions. Please circle your answers.

2. What is a multiple tower?

A. A representation that lists the multiples of a given number.

B. A tool used to list the factors of a given number.

C. A strategy used for subtraction and addition.

D. A tool used to follow the order of operations.

3. What is an easy way to determine the next multiple of 12 following 204?

A. Multiply 204 by 12 to get the next multiple.

B. Subtract 12 from 204 to get the next multiple.

C. Divide 204 by 12 to get the next multiple.

D. Add 12 to 204 to get the next multiple.

4. Why are multiple towers useful in division?

A. You can use a multiple tower to represent your thinking/showing your work.

B. You can skip count easily, using a multiple tower, to "get close" to a dividend.

C. It is a good strategy that can be used to solve division/word problems.

D. All of the above.

Matching (1 point each):

5. *For the mathematical terms below, match the definitions in the box to their correct term. Write the corresponding letter on the line next the term. (Some definitions will not be used)*

- **Divisor ___**
- **Dividend ___**
- **Quotient ___**
- **Remainder ___**
- **Division ___**

A. The act of sharing an amount of objects into groups.
B. The answer to a division problem; represents the "number in each group".
C. The inverse operation of subtraction.
D. The total "amount of objects".
E. The number of "groups".
F. What is leftover; this happens when an amount cannot be evenly divided.
G. The act of repeatedly adding objects or numbers.

Short answer (2 points each):

Please be sure to use mathematical language/terms when appropriate.

6. Create a question using this equation: 184 ÷ 4 = ?

_____
_____

7. When dividing, you can check your answer by: *(HINT: Use the inverse operation of division)*

_____
_____

8. Describe a "real life" scenario where you would need to use division:

_____
_____

True or False (1 point each):

9. *For the following statements, please circle whether the statement is true (T) or false (F). If the answer is false, use the space below the statement(s) to support your thinking.*

T F Division and multiplication are inverse operations (they are opposites of each other).

T F There is only one way or strategy, to solve a division problem.

T F All numbers divide evenly into one another.

Fill in the blank (2 points each):

10. _____ and _____ are inverse operations similar to how addition and subtraction are inverses.

11. In _____, the act of putting objects into groups, there can be a(n)_____ if the number of objects cannot divide evenly into groups.

Essay/Extended Response (10 points total):

12. *Please be sure to use mathematical language/terms when appropriate. Refer to your multiple tower for help!*

Solve the problem 182 ÷ 12. (Show your thinking clearly and circle your answer) (4 points)

Write your own division word problem that represents 182 ÷ 12. (2 points)

What is your answer to your division word problem? (Show your thinking clearly) (4 points)

Directions: Use the Context for Learning Information to supply information about your school/classroom context.

I. About the School Where You Are Teaching

1. In what type of school do you teach?
    a. Middle school:
    b. High school:
    c. Other (please describe): **Elementary School (K-5)**
2. In what type of community is the school located?
    a. **Urban**
    b. Suburban
    c. Rural
    d. Other (please describe):

3. List any special features of your school or classroom setting (e.g., charter, co- teaching, themed magnet, remedial course, honors course) that will affect your teaching in this learning segment.

    Amanda Elementary uses special education services to meet the needs of students in an inclusive classroom environment.

4. Describe any district, school, or cooperating teacher requirements or expectations that might affect your planning or delivery of instruction, such as required curricula, pacing plan, use of specific instructional strategies, or standardized tests.

    The school uses a required mathematical curricula; *Investigations* for mathematics classes (K-5). "*Investigations* is a complete K-5 mathematics curriculum, developed at TERC in Cambridge, Massachusetts. It is designed to help all children understand fundamental ideas of number and operations, geometry, data, measurement and early algebra." Source: http://investigations.terc.edu/

II. About the Class Featured in This Assessment

1. What is the name of this course?

    Mathematics 5th grade

2. What is the length of the course?
    a. One semester:
    b. **One year: five days a week**
    c. Other (please describe):

3. What is the class schedule (e.g., 50 minutes every day, 90 minutes every other day)?
    Five days a week for (approximately) 70 minute blocks (three blocks in all) including "Early Release Day". Times can vary depending on announcements, bus arrivals, safety patrol, breakfast, etc.

4. Is there any ability grouping or tracking in mathematics? If so, please describe how it affects your class.

    <u>Ability grouping:</u> During intervention block, students can get "extra help" when needed. Teachers pick students that need help in a specific area and have intervention with them, during that specified time.

Teachers will group students based on abilities to scaffold their instruction and activities. Teachers also can request a student to stay after school for one-on-one instruction (if their guardian can pick up the student). There are also after school programs for enrichment for "above proficient" students.

5. Identify any textbook or instructional program you primarily use for mathematics instruction. If a textbook, please provide the title, publisher, and date of publication.

   Title: ***Investigations*** **Common Core Edition**
   Publisher(s): Pearson, Scott Foresman, and Pearson Scott Foresman and trademarks. Pearson Education inc.
   Publication Date: Original publication 2008. (Revised for Common Core in 2012)

6. List other resources (e.g., electronic white board, graphing calculators, online resources) you use for mathematics instruction in this class.

   - **Interactive/Electronic white board**
   - **Mesa Public Schools online resources/videos**
   - **Document Camera**
   - **Individual white boards/markers for each student**
   - **"Building blocks" Base ten squares, "sticks" of five, singular cubes, etc.**
   - **Digit cards**
   - **Marilyn Burns texts**
   - **Picture books**
   - **(teacher created) iMovie**
   - **Grid paper**
   - **Colored tiles**
   - **PSG- Problem Solving Guide (teacher created)**
   - **Word wall for English Language Learners**
   - **Learning Target "strips"**
   - **Robert Marzano's framework for effective instruction: (strategies, domains, design questions, etc.)**

III. About the Students in the Class Featured in This Assessment

1. Grade level composition (e.g., all seventh grade; 2 sophomores and 30 juniors):
All fifth grade students

2. Number of students in the class: **males __12___ females ___13__**

3. Complete the chart below to summarize required or needed supports, accommodations or modifications for your students that will affect your instruction in this learning segment. As needed, consult with your cooperating teacher to complete the chart. The first two rows have been completed in italics as examples. Use as many rows as you need.

Consider the variety of learners in your class who may require different strategies/supports or accommodations/modifications to instruction or assessment.

- English language learners
- Gifted students needing greater support or challenge
- Students with Individualized Education Programs (IEPs) or 504 plans Struggling readers
- Underperforming students or those with gaps in academic knowledge

Learning Needs Category	Number of Students	Supports, Accommodations, Modifications, and/or Pertinent IEP Goals
Example: Visual Processing	*2*	*Close monitoring, translating information in word problems into sketches*
Example: Struggling readers	*5*	*Provide oral explanations for directions and simplified text for word problems*
English Language Learners	1	Provides a traveling aid for directions and guidance. The child also has an interpreter on Tuesdays and Thursdays that travels with the child.
Gifted Students	**1**	**The child goes to the G.A.T.E. (gifted and talented education) program on Mondays, all day.**
Students with IEPs or 504s	**8; 4 are ED, 3 are SLD, 1 is CD**	**See below for specific accommodations for each student with a disability/ability.**
ED: Emotionally Disturbed	**4**	**The aid monitors positive and negative behaviors; the teacher gives them modified homework, tests, problems. Students are able to have extended testing**

		time and locations, are allowed "re-dos".
SLD: Specific Learning Disability	**3**	**Modified homework, tests, problems, extended time, allowed "re-dos", aid will read the problem for the child. Intervention specialist monitors and provides intervention for students so they can meet their IEP goals.**
CD: Cognitively Delayed	**1**	**Modified homework, tests, problems, extended time, aid will read the problems for the child if needed. The mathematical problems will be simpler. Intervention specialist monitors the student work to meet the IEP goals.**
Underperforming students	**2**	**Same as the IEP/504 students**
Over performing students	**1**	**Gives student brain teasers/harder problems that use logic to challenge the student, if their work has been completed.**

Appendix B: Planning Commentary (No more than 5 pages for the 5 sections)

Directions: Respond to the prompts below (no more than 9 single-spaced pages, including prompts).

I. Central Focus

1. Describe the central focus and purpose for the content you will teach in this learning segment.

   The central focus of this lesson is for students to construct a conceptual understanding of division with remainders. The purpose of the content is to provide students with a chance to create concrete strategies to solve division problems with an emphasis on representations used to explain/support their thinking.

2. Given the central focus, describe how the standards and learning objectives within your learning segment address

   a. conceptual understanding

   Conceptual understanding is found throughout the lesson in many ways. Students are asked open-ended questions while they are working on their CGI problem to help students think conceptually about division. For instance, the following questions can be posed throughout the lesson to deepen student understanding without "guiding" them to the solution:

   - What kind of procedures or steps did you use to solve this problem?
   - How did you represent your thinking?
   - How would you teach someone (another classmate) this?
   - Is there another way you can represent your thinking (drawing, standard algorithm, etc.)
   - How do you know that your answer is correct?
   - What is the "problem" we are trying to solve?
   - How did you reach this answer?
   - What kind of "real world" situations would division be useful?

   Students will also be asked to think about the relationship between multiplication and division and how to use it as a strategy for solving division problems. Students will be required to use representations (of their choice) to illustrate and explain the calculation by using equations, rectangular arrays, and/or area models, etc.

   b. procedural fluency

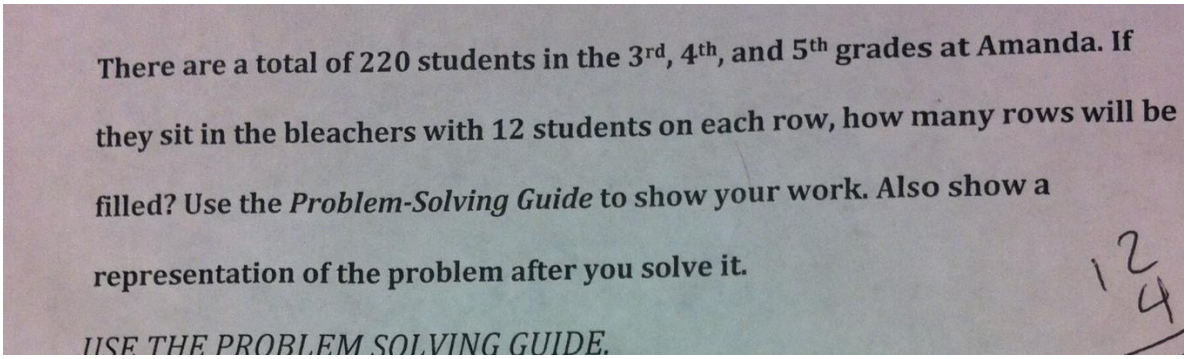
   The purpose of this lesson is to provide students with a solid conceptual base of understanding on which to construct and build procedural fluency. Although multiplication is not mentioned in the word problem, students are asked to show representations of their thinking (this includes the use of multiple towers and inverse operations). Students can use the standard algorithm to solve the division problem but must be able to explain their answer, conceptually, when prompted by the teacher. Students are also required to translate the word problem into mathematical equations and translate "parts of the problem" into their correct mathematical purpose (dividend, divisor, product and/or factors and their product). For example, in the CGI problem, students have to express "242 total students" and "15 seats on each bus" as mathematical terms.

   c. mathematical reasoning and/or problem solving skills

The lesson teaches students about the remainder (in division) through the use of problem-solving. Students will be required to relate the remainder or "what is leftover" to the division word problem. Students will use mathematical reasoning to solve the division word problem through the use of a strategy of their choice (multiples tower, factor pairs, inverse operation, arrays/models, etc.). Students will use problem-solving skills to translate contextual information (word problem) into representations that can be mathematically evaluated.

3. Explain how your plan builds on lessons that came before to help students make connections between facts, concepts, and procedures, and to develop their reasoning and/or problem solving skills to deepen their learning of mathematics.

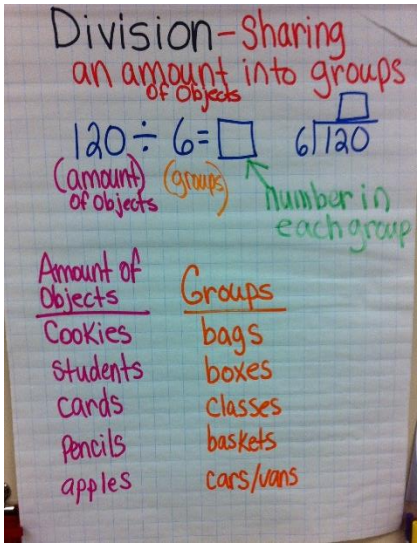
The Wednesday prior to field week, I taught the last two blocks of classes using the CGI problem below. This problem took most of the block time (70 minutes) for the students to complete. This division problem was difficult for them because it was the first time "dealing with" remainders. In this case, my host teacher did not want students to have to interpret the remainder. This was also the first time students had to solve a division word problem with the use the procedures within the problem solving guide. While teaching this CGI problem, I had students make connections between multiplication and division to help them solve the problem. While going over the problem, as a class, I asked students to give me a few strategies that I could use to solve the problem. Students had to use problem solving skills to interpret the word problem and use mathematical reasoning to choose an appropriate strategy to evaluate the problem. For example, students chose to use the standard algorithm and others used multiple towers/factor pairs to solve the problem.


There are a total of 220 students in the 3rd, 4th, and 5th grades at Amanda. If they sit in the bleachers with 12 students on each row, how many rows will be filled? Use the *Problem-Solving Guide* to show your work. Also show a representation of the problem after you solve it.

12
4

USE THE PROBLEM SOLVING GUIDE.

After this lesson, my host teacher continued to work with her students on the conceptual perspective of division. My host teacher used many examples to represent the dividend and divisors for division. Her division poster (shown below) is posted at the front of the room. This poster shows how my teacher "breaks down" division by explaining the meaning of the divisor (groups), dividend (amount of objects) and quotient (amount in each group). The lessons/explanations leading up to the day of my lesson help students become prepared for my lesson by building a strong foundation, both conceptual and procedural, for students to build upon.



II. Knowledge of Students to Inform Teaching

For each of the prompts below (II.1–3), describe what you know about your students with respect to the central focus of the learning segment.

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

1. Prior academic learning and prerequisite skills related to the central focus—What do students know, what can they do, and what are they learning to do?

   The students have little prior knowledge of division with remainders but have experienced division without remainders for a few weeks. The students are able to divide numbers through the use of a multiple tower. Some students only use the standard algorithm; this is fine except it is sometimes hard for them conceptually understand division problems, especially word problems. Mathematical terms (inverse, quotient, dividend, divisor, etc.) are not yet comfortable/familiar to the students. Students are learning to address "numbers" with their correct mathematical purpose. The students have prior knowledge about what the terms mean but in a different context. For example, in division, they know the divisor as "the number of groups" and the dividend as "the amount of objects". Students will be exposed to the proper mathematical terms in their *Investigations* workbook and on the test I have created. The test has a matching section that requires students to match the appropriate definition to the correct terms (the definitions are similar to what they are used to).

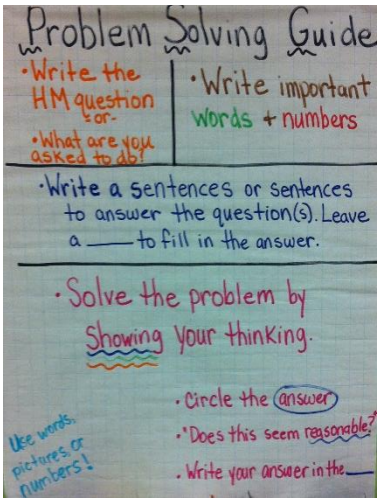
2. Personal/cultural/community assets related to the central focus—What do you know about your students' everyday experiences, cultural backgrounds and practices, and interests?

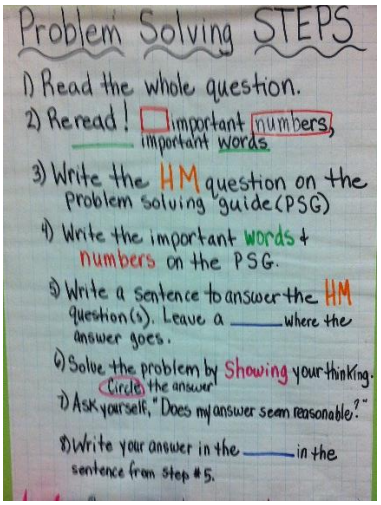
   The students are fifth graders at Amanda Elementary that resides in Middletown, OH. Middletown City Schools are "low-income" due to the fact that 80% of the student population come from a low socio-economic background. Most children at Amanda Elementary come from the surrounding neighborhood that is infected with poverty. At least half of the students, in my classroom, have parents or guardians that do not work. Most of the students seem to have an interest in learning but may not have all of the

tools necessary to succeed (books, supplies, home support, etc.). There are many students, in my classroom, that are struggling and/or on IEP/504s. There are four students in the 5th grade that attend G.A.T.E. twice a week. These students are outliers among their peers due to the overwhelming amount of struggling students.

3. Mathematical dispositions—What do you know about the extent to which your students
    a. perceive mathematics as "sensible, useful, and worthwhile"
    The students are exposed to "real-life" situations where division is needed through the use of their *Investigations* workbook and other problems my host teacher has presented to the class. This leads to students feeling that mathematics is "sensible, useful and worthwhile." My host teacher does not solely teach the standard algorithm, she teaches students using many different tools and strategies to help students conceptually understand the content. This helps students see that math is not only useful but worthwhile.

    b. persist in applying mathematics to solve problems
    Students spend a lot of time (both in class and at home) doing mathematical problems in their workbooks. In the classroom, my host teacher stresses the important of the process of solving a problem rather than the importance of "getting the right answer". She accomplishes this by teaching students to use a Problem Solving Guide (PSG) (pictured below). The PSG helps students create a process for solving a word problem. This guide helps students show their thinking rather than guessing or writing an answer down without any work shown.





    c. believe in their ability to learn mathematics
    Unfortunately, I have observed that there are very few students believe in their ability to learn mathematics during my field experience. The few students that do believe in their abilities are the gifted students who attend G.A.T.E. twice a week. These students are aware of their abilities and apply them in the classroom. These students are usually bored because they finish their work so fast. My host teacher will try to give them harder problems and "brain teasers" to keep them engaged in mathematics. The other students are mostly made up of struggling, "gap", and IEP/504s students. My host teacher does not believe she has any students who are at grade level, besides the gifted students. The struggling students do not have great self-esteem in mathematics; they "give up" or refuse to do their work. While I was teaching some lessons, I have noticed that the struggling students sometimes "give up" and sit quietly until we go over the problems. During the lesson described above, a student was trying to complete the differentiated

version of the worksheet and refused to participate. They claimed the problem was "too hard". The teacher's aide had to calm the child down and "make" them participate. This leads me to believe that the struggling students do not believe in their mathematical abilities.

III. Supporting Students' Mathematics Learning

Directions: Respond to prompts below (III. 1–3). As needed, refer to the instructional materials and the lesson plan you have included to support your explanations. Use principles from research and/or theory to support your explanations, where appropriate.

1. Explain how your understanding of your students' prior academic learning, personal/cultural/community assets, and mathematical dispositions (from prompts II. 1–3 above) guided your choice or adaptation of learning tasks and materials.
   The choice of teaching strategies and materials or this lesson was developed based on students' person, cultural and community assets. Because the classroom is made up of students that mostly come from a low-income "home life" the students community assets are limited. Because my students are lacking in personal, cultural and community assets, I used different scenarios, materials and tools that they have been exposed to/experienced. In my lesson, I created a CGI problem that students could relate to:

   "The 3rd, 4th and 5th grade students from Amanda Elementary are going on a field trip to the Victoria Theatre. There is a total of 242 students that are allowed to go on the trip. If there are 15 seats on each bus, how many full buses will be used for the trip? How many leftover students will have to ride in Ms. Lehman's car?"

   In the second week of field, the entire 5th grade went on a field trip to the Victoria Theatre. The students rode school buses to get to the theatre. I created the CGI problem based on this student experience. This allows students to comprehend the "story" or CGI problem.

   The students' prior knowledge played a prominent role in developing my lesson. Students are used to the style of problem used in the lesson because of the *Investigations* text that they have been using. The *Investigations* text focuses on cooperative style of learning where students can collaborate with their "neighbors" to help deepen their understanding. In my lesson, I had students discuss their thoughts about the "story" with their neighbors.

   In previous lessons, students used representations such as multiple towers, standard algorithm and drawings to help them solve division problems. Instead of teaching solely the standard algorithm, students are encouraged to choose their own strategy to solve division problems. This allows for students to build conceptual knowledge of division. This is a constructivist approach (Piaget) because the learners are self-directed and are engaged in problem based learning activities that integrate new and prior knowledge, challenges, and allows creation of authentic student work.

2. Describe and justify why your instructional strategies and planned supports are appropriate for the whole class and students with similar or specific learning needs.
   There are many students, in my classroom, that have IEPs/504s and are considered to be struggling or "gap" students. In the lesson, efforts have been made to engage all learners through multiple ways (class discussion, partner discussion, independent work, etc.). There are teacher aides that help students on IEPS/504s during mathematics. The aides help students by providing one-on-one attention; this helps students concentrate and succeed in an inclusion environment.

The students are engaged in a least restrictive environment (LRE); "an educational setting that provides the greatest exposure to an interaction with the general education students and person without disabilities" Source: (http://inclusion-in-mathematics.blogspot.com/). This type of environment motivates students and increases their self-esteem and academic achievement by allowing them to be exposed to a general education classroom.

The students who are labeled as "gifted" are easily bored in the general education classroom. These students always finish their in-class activities a lot faster than their peers and are not engaged in the learning process because the content is usually not challenging enough. I chose to create a more difficult CGI problem to challenge my students. The students have not yet been exposed to a word problem that has more than one question in it. The students are also not familiar with including the remainder as part of the solution. I purposely created a task that is above the students' current level of understanding (i.e. Vygotsky's Zone of Proximal Development) to interest and engage all learners.

3. Describe common mathematical preconceptions, errors, or misunderstandings within your content focus and how you will address them.
Students have difficulty with word problems because they can be intimidating. To alleviate some of this stress, I will treat the word problem as a "story" that I will read to them, multiple times. I will ask students to discuss what they think the "story is about and how we should solve it. The students are directed to use their problem solving guide to help them "breakdown" the word problem. Students can also lack in knowledge about remainders and how they can relate to problems. The students might have trouble relating the numbers in the division to the word problem or "story". The problem solving guide makes them to write down the question(s) being asked and to write a sentence(s) to interpret the numerical answer into the word problem. The PSG helps students interpret the numerical answer and helps students make connections to the word problem.

IV. Supporting Mathematics Development Through Language

1. **Language Demand:** Language Function. Identify **one** language function essential for students to learn the mathematics within your central focus (e.g., compare/contrast, conjecture, describe, explain, prove). You may choose one of these or another more appropriate for your learning segment.
   a. Compare/contrast
   b. Conjecture
   c. Describe
   d. Explain
   e. Prove
   Explaining the mathematical concept of division with remainders is a key component of this lesson plan. The students are asked to explain or "show their thinking" while solving their division word problem. Students are also required to use representations to explain their thinking on their problem solving guide.

2. Identify a key learning task from your plan that provides students with opportunities to practice using the language function.

   1. From the test: "*Please be sure to use mathematical language/terms when appropriate.*"

   This statement is part of a set of directions that students are required to follow on their test. This sentence is within directions for a set of questions where students will need to show/explain their

thinking. This prompts students to incorporate proper mathematical language into their explanation of their work. Students will need to use key language terms such as dividend, divisor, quotient, inverse operations, etc.

2. From the worksheet: "Show your work and representations"

This statement is located on the CGI worksheet. This statement directs students during the "solving" stage of problem solving guide. Students are able to express their thinking through the use of proper mathematical language/terms. Students can choose their own strategy to solve the problem but must use a representation to explain/show their thinking as well as an explanation using key language.

3. **Additional Language Demands.** Given the language function and task identified above, describe the following associated language demands (written or oral) students need to understand and/or use.

   a. Vocabulary and/or symbols
   In order to fully comprehend division, students need a firm understanding of the symbols and key vocabulary. For example, on their tests, students are exposed to mathematical terms such as dividend, divisor, quotient, inverses, etc. Students also see these word within their *Investigations* text and workbooks. Students must also understand the symbols that represent division. Almost all students are comfortable with the division sign (÷) because they have been exposed to it for long periods of time. The "long division" setup is unfamiliar to most of the students, in my classroom. This symbol or setup (⟌) can be difficult for some students to fathom because they have not been exposed to this representation of division. Students need to be able to use both representations of divisions, fluidly, in order to solve division using multiple strategies. These can include the standard algorithm, multiple towers, skip counting, etc.

   b. Mathematical precision (e.g., using clear definitions, labeling axes, specifying units of measure, stating meaning of symbols), appropriate to your students' mathematical and language development
   When explaining the concept of division with remainders, students need to solve their problems using a strategy of their choice. Once they have chosen their strategy, students must carefully complete their calculations with precision. Students must realize when the dividend is not evenly divided by the divisor, the result includes a remainder. They must also be careful when using multiple towers to not "go over" the dividend but get as close as possible without "going over". Then, the number of digits away from the dividend gives them the remainder. Students must also be precise when interpreting numerical data in a word problem into their proper mathematical purpose. For example, in the lesson I have created the number 242 represents the "total number of students" or the dividend and 15 represents the "number of seats open" or the divisor.

   c. Syntax
   The syntax of division with remainders include the division sign (÷) or (⟌) and the multiplication sign (x) for the inverse operation. Students must correctly display their use of syntax on their CGI worksheets. On the worksheets, students are required two create two equations that represent the word problem; one division and inverse multiplication version. Students must understand that the two division "set ups" mean the same thing and that they can write an inverse operation equation (multiplication).

4. **Language Supports.** Refer to your lesson plan and instructional materials as needed in your response to the prompt. Describe the instructional supports (during and/or prior to the learning task) that help students understand and successfully use the language function and additional language identified in prompts IV 1–3.

Students are able to show their understanding of mathematical precision, syntax and vocabulary/symbols through the use of the CGI worksheet.

To support student mathematical precision with divisions and remainders, the lesson provides students with a structured worksheet to guide them through the CGI problem. The students begin the guide by "boxing" important numbers and underlining important words/phrases within the word problem. Students will then write out the important numbers and words Next, the students will write down the "how many" question (what the problem wants them to solve). Students will then write out a sentence that gives the solution to the problem (leaving a "blank" where the answer will go) prior to completing the mathematical calculations. This helps students understand what is being asked of them in the word problem. Students will then show/explain their thinking through the use of mathematical calculations and representations. After the student evaluates the problem, they must write their answer in the "blank" in the sentence they have written.

Students express their understanding of mathematical symbols through creating equations based on the given word problem. Students must correctly use the division symbol and "equals sign" (=) to show their understanding of a division equation. Students who took the non-modified test also have to create a multiplication equation using the correct mathematical symbol for a multiplication equation (x) and (=). Students use their mathematical language/vocabulary on the CGI worksheet through translating numbers into their correct mathematical purpose (242 students are the "amount of objects" or the divisor).

V. Monitoring Student Learning. Refer to the assessments you will submit as part of the materials for Task 1.

1. Describe how your planned formal and informal assessments will provide direct evidence of students' conceptual understanding, procedural fluency, and mathematical reasoning and/or problem solving skills throughout the learning segment.

   Conceptual Understanding: Informal assessment of student conceptual understanding is present during the CGI class activity. First, I engaged students in open-ended questions to have students explain the meaning or concept of division, with remainders. This open-ended questioning allows for students to think deeply about division and what it "means" as opposed to teaching only the mechanics of the standard algorithm. The formative or informal assessment of students' conceptual understanding is done through the following questions:

   - What kind of procedures or steps did you use to solve this problem?
   - How did you represent your thinking?
   - What kind of "real world" situations would division be useful?
   - How would you teach someone (another classmate) this?
   - Is there another way you can represent your thinking (drawing, standard algorithm, etc.)
   - How do you know that your answer is correct?
   - What is the "problem" we are trying to solve?
   - How did you reach this answer?

   Secondly, I created a summative (formal) assessment for the second day of the lesson. This assessment formally measures student knowledge about division with remainders. Students were required to think conceptually about division by creating their own division word problems and solving/interpreting them. Another conceptual understanding question, from the assessment, is where I asked my students to *"describe a "real life" scenario where you would need to use division".* This question makes students create a connection to division, in the classroom, to "real life" applications of division. Students are able to describe their understanding of how to solve real life applications of division.

Procedural Understanding: The purpose of my lesson is to provide students with a firm conceptual base on which to construct procedural fluency. Students are asked to show procedural fluency on their assessment when asked to "show their work clearly with the use of a representation(s)" on division problems. Students are required to properly represent their division problem; using correct mathematical symbols while showing their work. In their assessment, question number twelve asks students to *"solve the problem 182 ÷ 12. (Show your thinking clearly and circle your answer)".* This questions makes students use procedures to solve the problem. Students express procedural fluency when they show each step of their "thinking" with their chosen method (standard algorithm, multiple tower, etc.). Students should follow their problem solving guide to structure their procedural methods of solving word problems.

Problem Solving: The lesson teaches students about division with remainders through the means of problem solving. The lesson begins with the teach reading the students a "story". In the story, there is a problem that the students have to solve. The CGI word problem will require students to use problem solving skills to find a solution. Students will have to choose a strategy, of their choice, to solve the problem. Students were asked to use their problem solving guide to help them "problem solve". On the second day of the lesson, (test day) students will also have to use problem solving skills to interpret and solve many division problems that have remainders. For example, for question number ten, students had to solve the problems "*Write your own division word problem that represents 182 ÷ 12 and what is your answer to your division word problem? (Show your thinking clearly)".* Students had to create their own division problem for the first question and then solve it for the next question. To solve their own division word problem, students had to problem solve or could use their problem solving guide to find a solution.

2. Explain how the design or adaptation of your planned assessments allows students with specific needs to demonstrate their learning.

In informal (formative) discussions, students express their thinking in a variety of ways depending on their specials needs and/or learning styles. Students can explain/show their thinking using representations such as drawings, multiple towers, the standard algorithm, etc. The summative (formal) assessment is in the form of two different assessments to meet the needs of all learners. The summative (formal) assessment that I have developed to support students with special needs and different learning styles is modified; the other test is not modified. For students with special needs and/or learning styles, the modified test will have simpler language/text and smaller numbers (divisors, dividends and quotients) used for division. Also, the modified test will have less "options" for test items such as multiple choice or matching questions. For example, the non-modified has seven definitions to match with five terms (two definitions will not be used). For the modified test, there will only be the definitions for the given terms (all definitions will be used). For gifted/grade level students, an extra credit question was written on the board, for them to solve, after they are finished.

***Students who have specific needs (IEPs, 504s, struggling readers, etc.) were accommodated. For example, the English Language Learners had a translator that read the test to them. The IEP, 504s, and struggling readers were accommodated by taking the test in a different room, with the help of an aide specialist. Students who do not have specific accommodations for testing ("gap" students, struggling students, etc.) were allowed to sit at a different part of the classroom and the host teacher read the test aloud to them.

Consider all students, including students with IEPs, English Language learners, struggling readers, underperforming students or those with gaps in academic knowledge, and/or gifted students.

Task 2: Instructing and Engaging Students in Learning

I. Video

Directions: Include link to 1 or 2 YouTube videos HERE. Total time of all video should not exceed 2 minutes. Provide the link(s) to the video directly within this Google Document. The sharing settings of the video should be set to "unlisted" to protect student privacy. Use the "blur all faces" feature (under enhancements) to further protect identities of participants.

Video Link: http://youtu.be/xPiaWmF8bh8

II. Instruction Commentary

Directions: Write the Instruction Commentary (no more than 3 single-spaced pages, including prompts) by providing your response to each of the prompts below.

1. **Promoting a Positive Learning Environment**

   Refer to scenes in the video clip where you provided a positive learning environment (include reference to exact times within the video).

   a. How did you demonstrate mutual respect for, rapport with, and responsiveness to students with varied needs and backgrounds, and challenge students to engage in learning?

   I demonstrated mutual respect, responsiveness and rapport with the students during the video clip. Students were invited to come up to the board and show their thinking. (1:58) I also welcomed multiple ideas to solving division problems by letting students share their own strategy by raising their hand. (.7) When a student would answer a question wrong (aloud) I would not "shoot them down" or even say "no". When students answered questions wrong I would respond in a respectful manner and thank them for their response and then ask the class to adjust their answer to the correct solution. I try to invite all learners to answer questions (including coming to the board) (1:58) so that they feel part of the learning process and part of their classroom community.

2. **Engaging Students in Learning**

   Refer to examples from the clip in your explanations (include reference to exact times within the video).

   a. Explain how your instruction engaged students in developing

      i. conceptual understanding:

      By posing questions while students "helped" me solve the CGI problem, students were able to develop a deeper conceptual understanding of division with remainders. (.10) (1:20) I asked questions that made students critically think and interpret the word problem into a mathematical problem that we could solve.

      ii. procedural fluency:

      I had the students "help me" solve the CGI problem on the "show your thinking" portion of the problem solving guide. (.7) I posed questions that had students explain their procedures that they had followed to solve the CGI problem. Students showed procedural fluency by coming up to the board and solve the CGI problem using the strategy of their choice. (1:58)

      iii. mathematical reasoning and/or problem solving skills:

I had students "help me" solve the CGI problem through the use of class discussion (.1-.12) and having students come up to the board (1:58) to help the class and I solve the problem. Students used problem solving skills to interpret the word problem into a mathematical problem that we could solve.

b. Describe how your instruction linked students' prior academic learning and personal, cultural, and community assets with new learning.

I based my lesson on previous lessons that my host teacher had implemented prior to field week. The week before my lesson, I taught a CGI lesson that my host teacher had created, to help students "get ready" for future CGI problems. For linking students' prior academic learning and personal, cultural, and community assets with new learning, I created a CGI problem that students could comprehend and solve. Students had previously took a field trip to the Victoria Theatre and rode on buses to get there. I chose to use this experience to create my CGI problem so that students have a personal connection to the math problem and are able to fully understand the "story".

3. Deepening Student Learning during Instruction

Refer to examples from the clip in your explanations (provide references to specific times within the video in your responses).

a. Explain how you elicited and responded to student responses to promote thinking and develop conceptual understanding, procedural fluency, and mathematical reasoning and/or problem solving skills.

To promote thinking and further develop student conceptual understanding, procedural fluency, and problem solving I allowed them to "help me" fill out the CGI worksheet on the white board (whole video). By allowing students to help me solve the CGI problem, I was able to pose questions that promoted conceptual and procedural thinking (.7). In my responses, I tried to not guide the learner if they were slightly off with their answers. Instead, I posed more questions to help the student gain a conceptual understand and fluid procedural fluency for division problems. For problem solving, I asked questions about what the word problem wanted us to solve and how we should tackle the problem by using mathematics.

b. Explain how you used representations to support students' understanding and use of mathematical concepts and procedures.

To help deepen student understanding of division, I asked students to explain more than one strategy/representation to solve the CGI problem. Most students either used a multiples tower or the standard algorithm to solve the CGI problem. I believe that showing students that there is more than one strategy/representation to show their thinking while solving division problems would benefit all learners (.7). Students need to fathom that there is more than one "tool" that they can use to solve division problems to expand their conceptual understanding and procedural fluency on division.

4. Analyzing Teaching

a. How did your instruction support learning for the whole class and students who need greater support or challenge?

By creating two different CGI worksheets (differentiated vs. non-differentiated), all learners were able to participate and contribute to the division lesson. I was able to have a teacher aid in the classroom to help students that needed greater support than I or my host teacher could provide. For students that are "gap" or struggling, I provide additional instruction and scaffolding during the independent activity.

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

b. What changes would you make to your instruction to better support student learning of the central focus (e.g., missed opportunities)?

The purpose of the content provided students with a chance to create concrete strategies to solve division problems with an emphasis on representations used to explain/support their thinking. After the lesson, I reflected and realized some changes or missed opportunities to better support student thinking. The follow changes are what I would make to enhance my instruction:

- Emphasize more than two strategies to solve a division problem
- Allow more time for questions at the end of the lesson
- Give students a chance to apply their strategy, many times, so that it becomes concrete
- Ask students to create more than one representation to display/show their thinking

c. Why do you think these changes would improve student learning? Support your explanation with evidence of student learning and principles from theory and/or research as appropriate.

- Emphasize more than two strategies to solve a division problem
    - **This enhancement would improve student learning by expanding student knowledge of strategies they can use to solve division problems. Some students believe there is only one way to solve math problems but this enhancement will "open their eyes" so that they see that math problems can have multiple strategies that can be used. Students will be able to build or construct upon their background knowledge by creating another strategy to show their thinking. This models a constructivist approach to learning (Piaget).**
- Allow more time for questions at the end of the lesson
    - **This enhancement would give students the chance to reflect upon their knowledge gained (or not gained) from the lesson. Students need to have time to reflect over what they have learned and be able to ask questions if they are confused. To challenge student "thinking", I could use higher-level words from the Bloom's Taxonomy Wheel, in questions, to further student learning.**
- Give students a chance to apply their strategy, many times, so that it becomes concrete
    - **This enhancement would allow students to be able to practice the strategy that they can use to solve division problems. In mathematics, I believe that students**

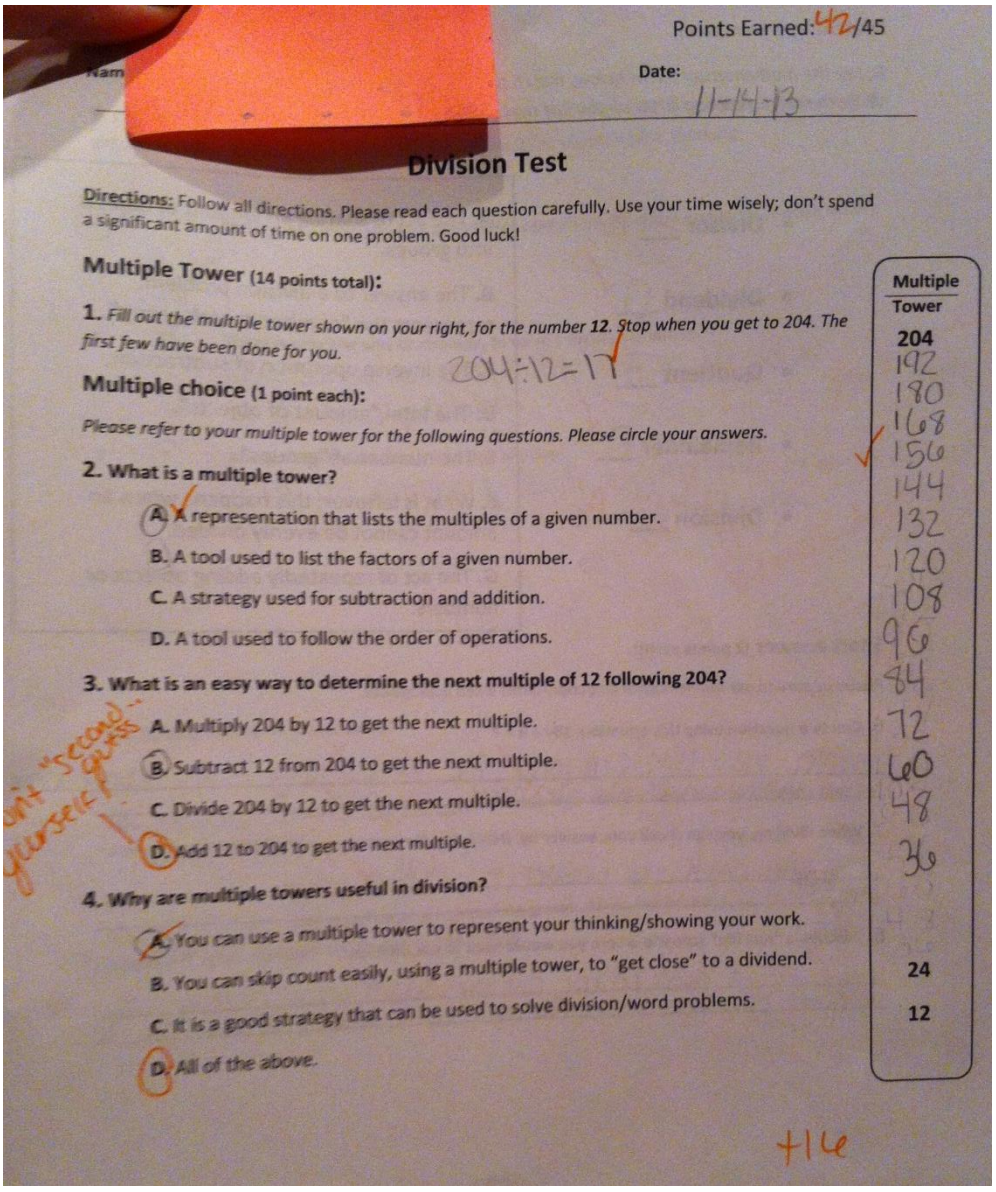
need to have a lot of practice to master a strategy or tool to solve problems. I could apply Bruner's theory to allow students to build abstract thinking into concrete strategies and tools.

- Ask students to create more than one representation to display/show their thinking
    - **This enhancement would give students a chance to show their thinking in multiple ways**. **By having students make more than one representation, students will expand their conceptual understanding of division and other mathematical concepts. Students will build upon their background knowledge by creating another representation to display their thinking. This models a constructivist approach to student learning (Piaget).**

Task 3: Assessing Student Learning

I. Student Work Samples with Feedback You Provided (3 samples inserted as images directly within this Google Doc) Each assessment is four page long; (The one with feedback in blue is the modified test).

Non-Modified test: High-achieving student



Points Earned: 42/45

Date: 11-14-13

Division Test

Directions: Follow all directions. Please read each question carefully. Use your time wisely; don't spend a significant amount of time on one problem. Good luck!

Multiple Tower (14 points total):

1. *Fill out the multiple tower shown on your right, for the number 12. Stop when you get to 204. The first few have been done for you.* 204÷12=17

Multiple choice (1 point each):

Please refer to your multiple tower for the following questions. Please circle your answers.

2. **What is a multiple tower?**
   - A. A representation that lists the multiples of a given number.
   - B. A tool used to list the factors of a given number.
   - C. A strategy used for subtraction and addition.
   - D. A tool used to follow the order of operations.

3. **What is an easy way to determine the next multiple of 12 following 204?**
   - A. Multiply 204 by 12 to get the next multiple.
   - B. Subtract 12 from 204 to get the next multiple.
   - C. Divide 204 by 12 to get the next multiple.
   - D. Add 12 to 204 to get the next multiple.

4. **Why are multiple towers useful in division?**
   - A. You can use a multiple tower to represent your thinking/showing your work.
   - B. You can skip count easily, using a multiple tower, to "get close" to a dividend.
   - C. It is a good strategy that can be used to solve division/word problems.
   - D. All of the above.

Multiple Tower
204
192
180
168
156
144
132
120
108
96
84
72
60
48
36
24
12

+16

Lehman, HS | Middle Childhood Education | Division: 5th Grade

Matching (1 point each):

5. *For the mathematical terms below, match the definitions in the box to their correct term. Write the corresponding letter on the line next the term. (Some definitions will not be used)*

- **Divisor** A E
- **Dividend** D ✓
- **Quotient** B ✓
- **Remainder** F ✓
- **Division** C A

A. The act of sharing an amount of objects into groups.

B. The answer to a division problem; represents the "number in each group".

C. The inverse operation of subtraction.

D. The total "amount of objects".

E. The number of "groups".

F. What is leftover; this happens when an amount cannot be evenly divided.

G. The act of repeatedly adding objects or numbers.

Short answer (2 points each):

Please be sure to use mathematical language/terms when appropriate.

6. Create a question using this equation: 184 ÷ 4 = ?

Kahlin has 184 crayons she is putting 4 in each box how many boxes will she need.

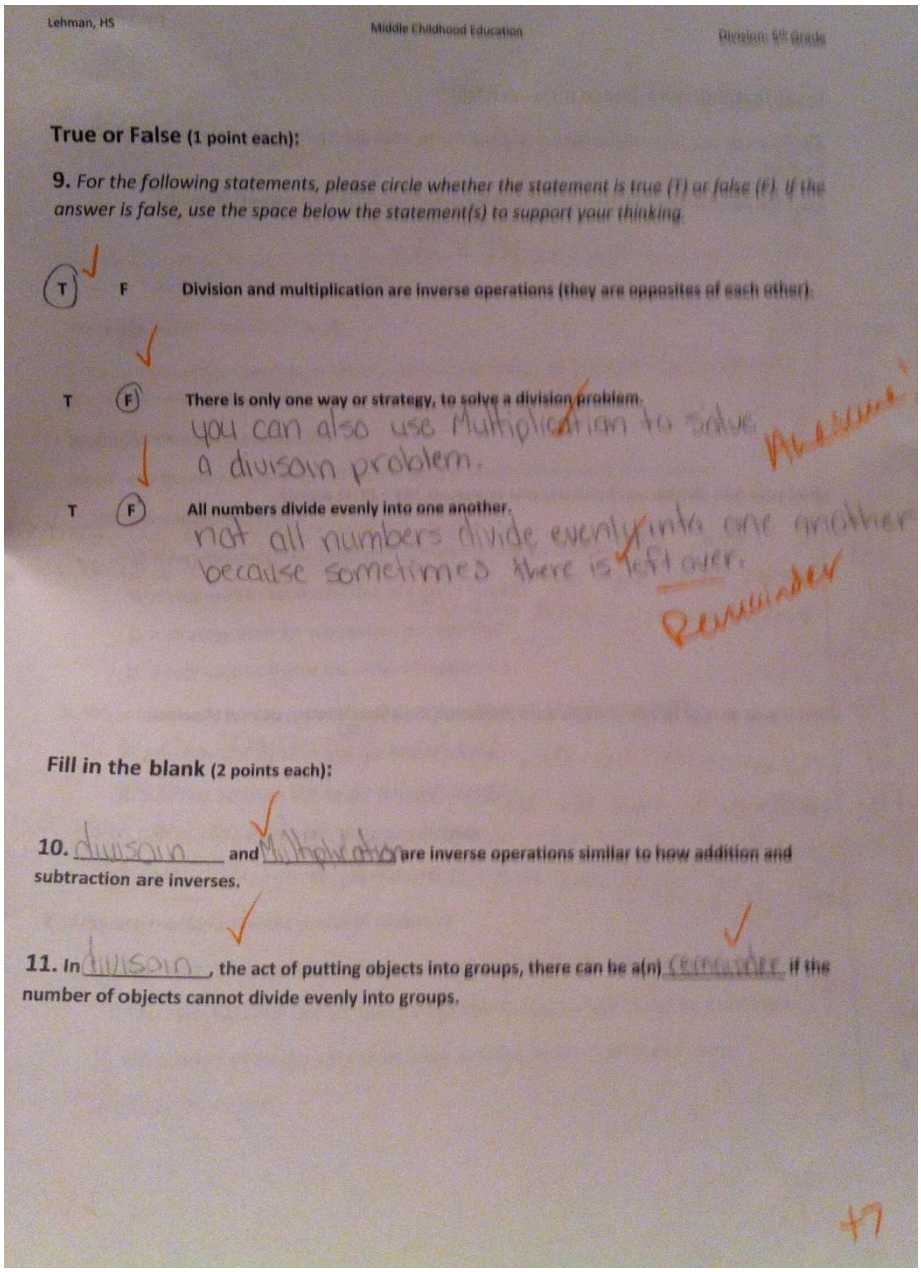
7. When dividing, you can check your answer by: *(HINT: Use the inverse operation of division)*

you can check your answer by Multiplying. ✓

8. Describe a "real life" scenario where you would need to use division:

you would need to use divisaon when your putting crayons in boxes and you want to see how many boxes you need. ✓

+9



Lehman, HS Middle Childhood Education Division: 6th Grade

True or False (1 point each):

9. *For the following statements, please circle whether the statement is true (T) or false (F). If the answer is false, use the space below the statement(s) to support your thinking.*

(T) F Division and multiplication are inverse operations (they are opposites of each other).

T (F) There is only one way or strategy, to solve a division problem.
you can also use Multiplication to solve a divisoin problem.

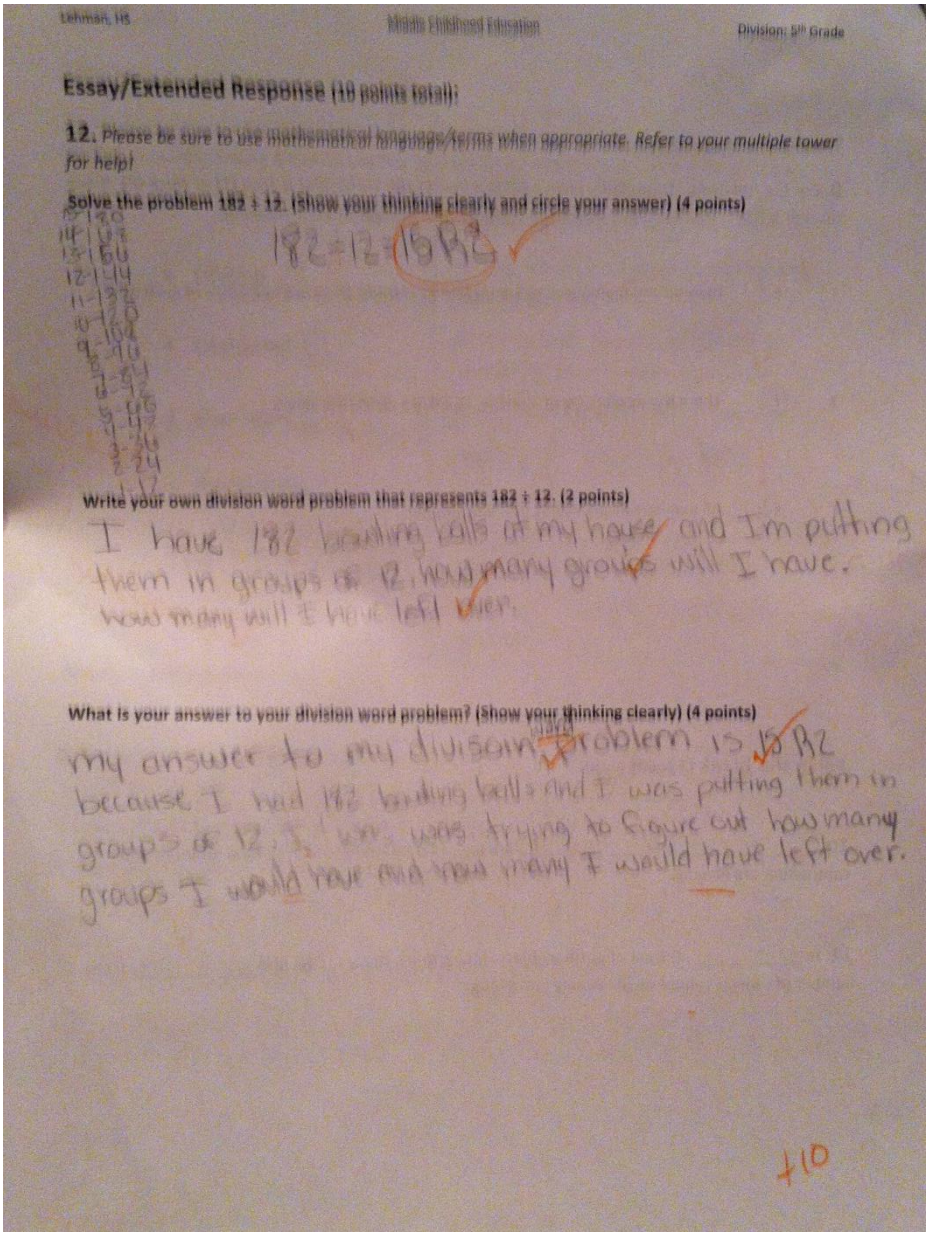
T (F) All numbers divide evenly into one another.
not all numbers divide evenly into one another because sometimes there is left over. Remainder

Fill in the blank (2 points each):

10. divisoin and Multiplication are inverse operations similar to how addition and subtraction are inverses.

11. In divisoin, the act of putting objects into groups, there can be a(n) remainder if the number of objects cannot divide evenly into groups.

+7



Lehman, HS — Middle Childhood Education — Division: 5th Grade

Essay/Extended Response (10 points total):

12. *Please be sure to use mathematical language/terms when appropriate. Refer to your multiple tower for help!*

Solve the problem 182 ÷ 12. (show your thinking clearly and circle your answer) (4 points)

15 R2

Write your own division word problem that represents 182 ÷ 12. (2 points)

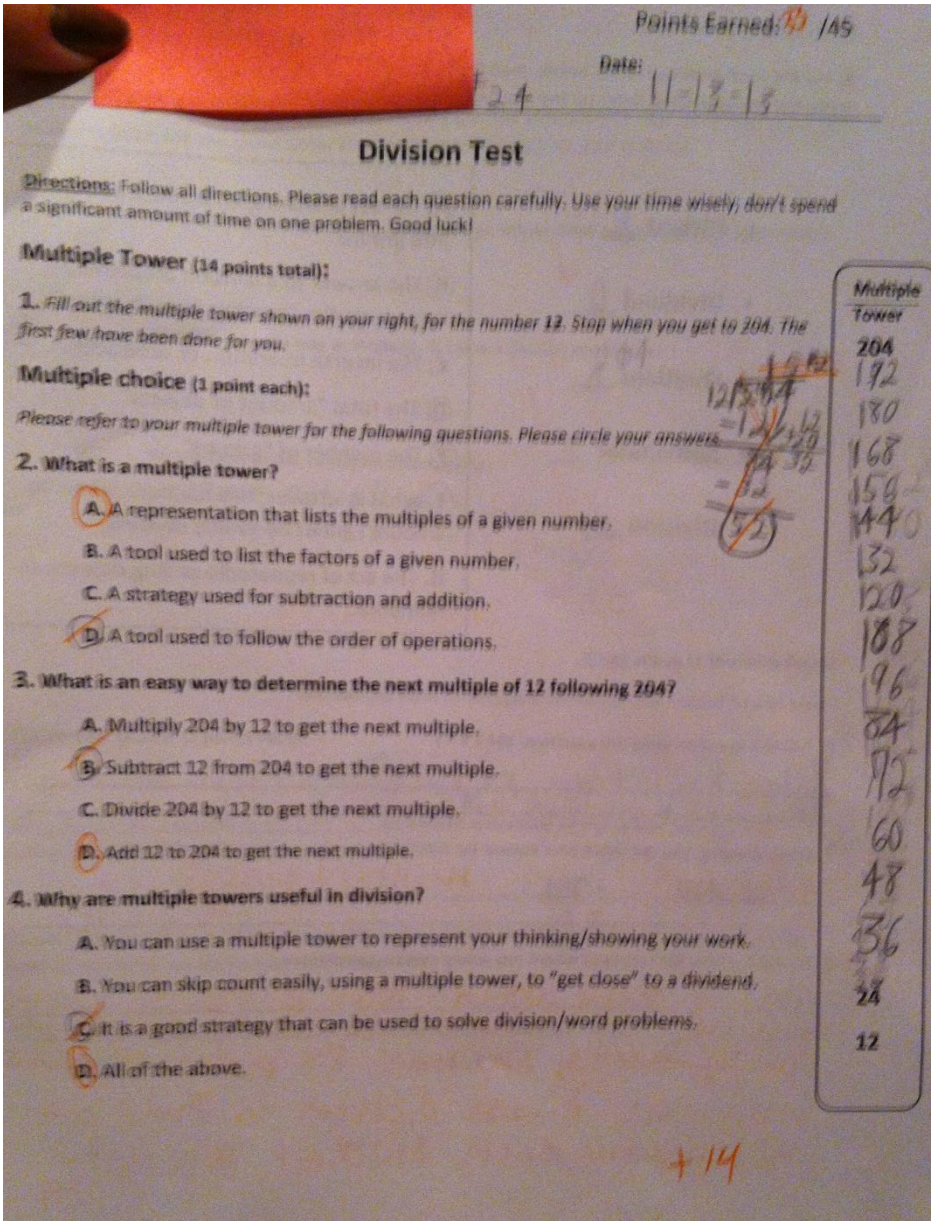
I have 182 bowling balls at my house and Im putting them in groups of 12. how many groups will I have. how many will I have left over.

What is your answer to your division word problem? (Show your thinking clearly) (4 points)

my answer to my division problem is 15 R2 because I had 182 bowling balls and I was putting them in groups of 12. I was trying to figure out how many groups I would have and how many I would have left over.

+10

Non-modified test: Middle-achieving student



Points Earned: 39 /45

Date: 11-13-15

124

Division Test

Directions: Follow all directions. Please read each question carefully. Use your time wisely, don't spend a significant amount of time on one problem. Good luck!

Multiple Tower (14 points total):

1. *Fill out the multiple tower shown on your right, for the number 12. Stop when you get to 204. The first few have been done for you.*

Multiple Tower
204
192
180
168
156
144
132
120
108
96
84
72
60
48
36
24
12

Multiple choice (1 point each):

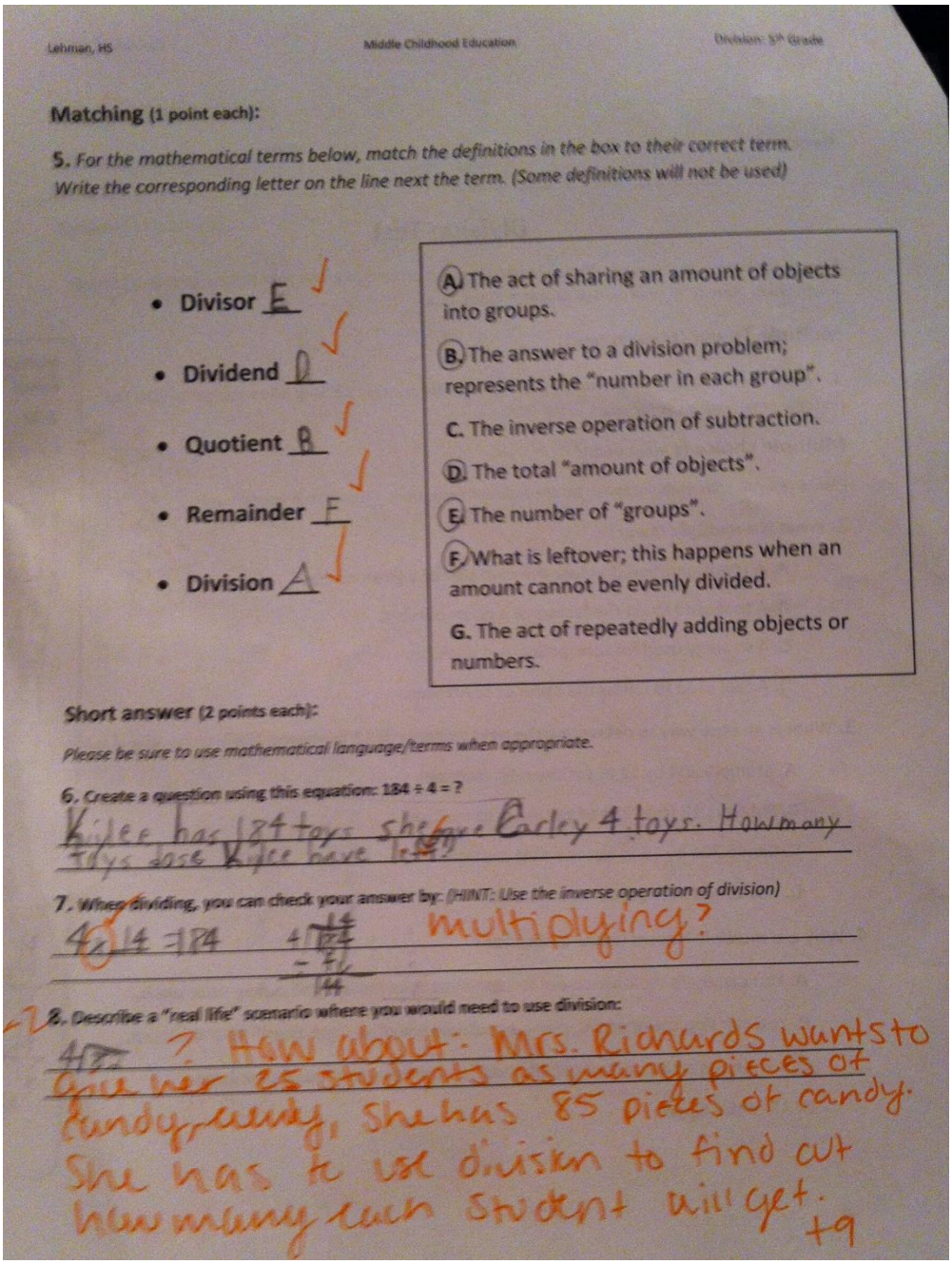
Please refer to your multiple tower for the following questions. Please circle your answers.

2. **What is a multiple tower?**
   - A. A representation that lists the multiples of a given number.
   - B. A tool used to list the factors of a given number.
   - C. A strategy used for subtraction and addition.
   - D. A tool used to follow the order of operations.

3. **What is an easy way to determine the next multiple of 12 following 204?**
   - A. Multiply 204 by 12 to get the next multiple.
   - B. Subtract 12 from 204 to get the next multiple.
   - C. Divide 204 by 12 to get the next multiple.
   - D. Add 12 to 204 to get the next multiple.

4. **Why are multiple towers useful in division?**
   - A. You can use a multiple tower to represent your thinking/showing your work.
   - B. You can skip count easily, using a multiple tower, to "get close" to a dividend.
   - C. It is a good strategy that can be used to solve division/word problems.
   - D. All of the above.

+14



Lehman, HS Middle Childhood Education Division: 5th Grade

Matching (1 point each):

5. *For the mathematical terms below, match the definitions in the box to their correct term. Write the corresponding letter on the line next the term. (Some definitions will not be used)*

- **Divisor** E
- **Dividend** D
- **Quotient** B
- **Remainder** F
- **Division** A

A. The act of sharing an amount of objects into groups.

B. The answer to a division problem; represents the "number in each group".

C. The inverse operation of subtraction.

D. The total "amount of objects".

E. The number of "groups".

F. What is leftover; this happens when an amount cannot be evenly divided.

G. The act of repeatedly adding objects or numbers.

Short answer (2 points each):

Please be sure to use mathematical language/terms when appropriate.

6. Create a question using this equation: 184 ÷ 4 = ?

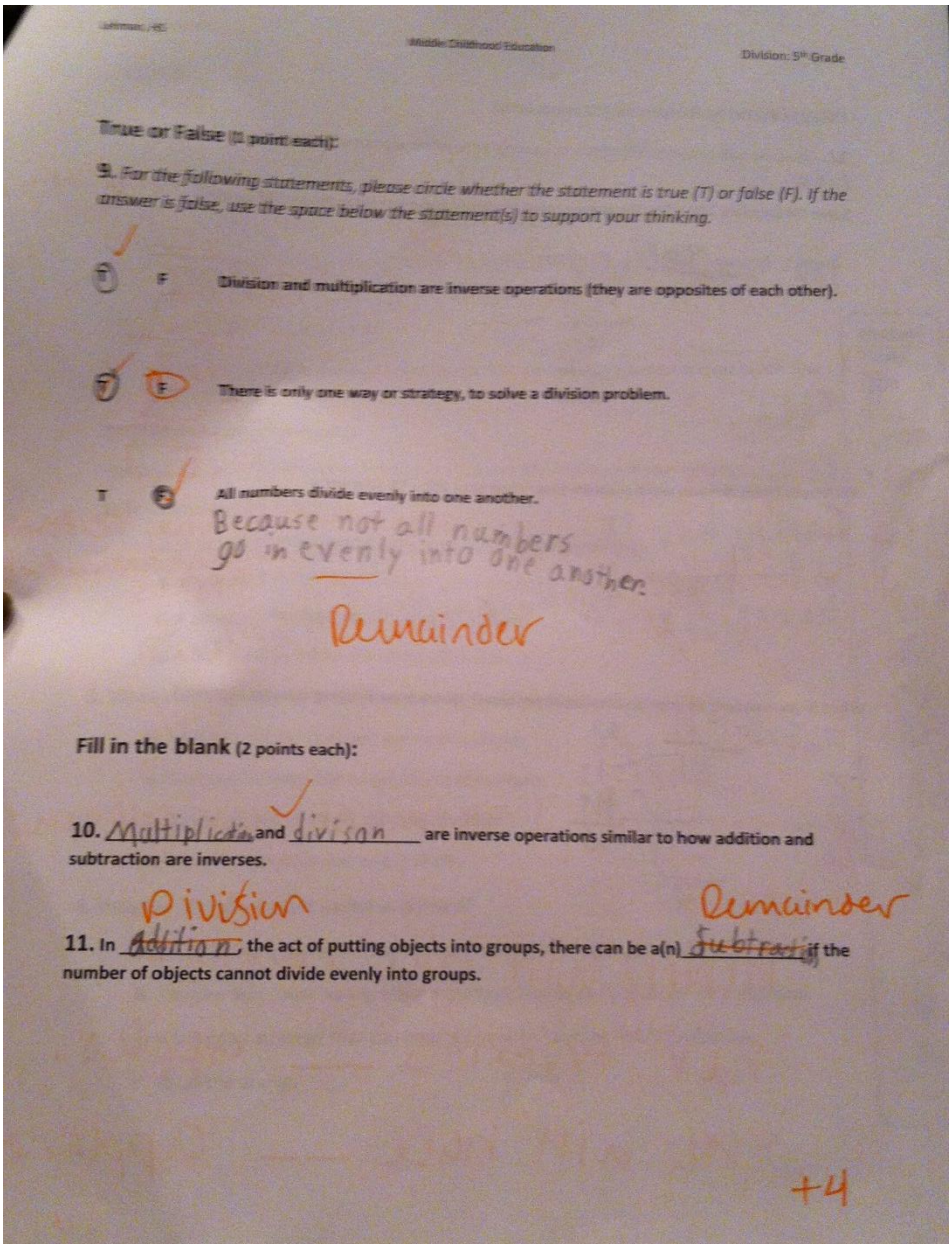
Kylee has 184 toys she gave Carley 4 toys. How many toys does Kylee have left?

7. When dividing, you can check your answer by: (HINT: Use the inverse operation of division)

4 x 46 = 184 multiplying?

8. Describe a "real life" scenario where you would need to use division:

? How about: Mrs. Richards wants to give her 25 students as many pieces of candy as possible. She has 85 pieces of candy. She has to use division to find out how many each student will get. +9



Middle Childhood Education

Division: 5th Grade

True or False (1 point each):

9. *For the following statements, please circle whether the statement is true (T) or false (F). If the answer is false, use the space below the statement(s) to support your thinking.*

T F Division and multiplication are inverse operations (they are opposites of each other).

T F There is only one way or strategy, to solve a division problem.

T F All numbers divide evenly into one another.

Because not all numbers go in evenly into one another.

Remainder

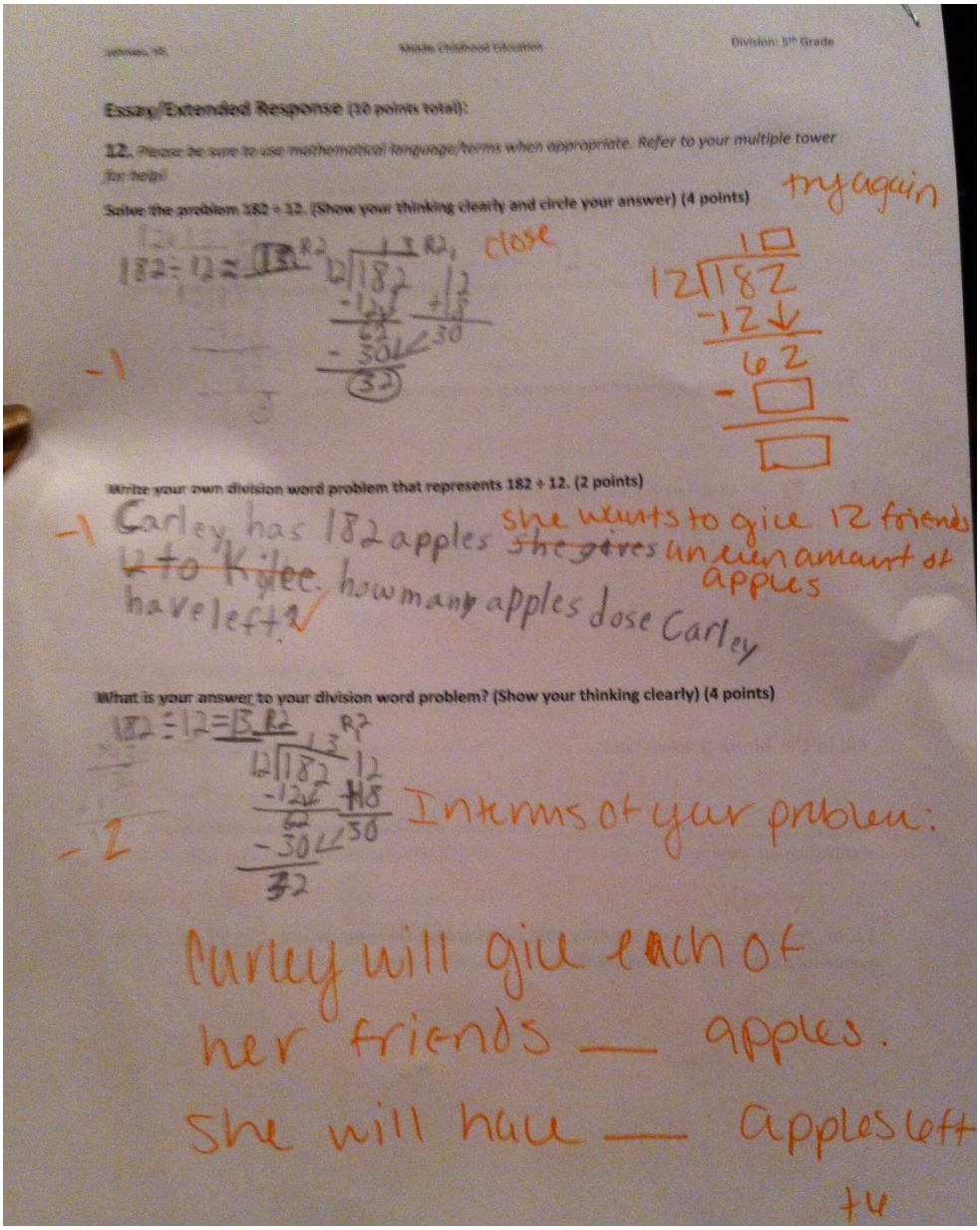
Fill in the blank (2 points each):

10. Multiplication and divison are inverse operations similar to how addition and subtraction are inverses.

Pivision Remainder

11. In Addition, the act of putting objects into groups, there can be a(n) Subtraction if the number of objects cannot divide evenly into groups.

+4



Division: 5th Grade

Essay/Extended Response (10 points total):

12. *Please be sure to use mathematical language/terms when appropriate. Refer to your multiple tower for help!*

Solve the problem 182 ÷ 12. (Show your thinking clearly and circle your answer) (4 points)

try again

close

Write your own division word problem that represents 182 ÷ 12. (2 points)

-1 Carley has 182 apples she wants to give 12 friends ~~the gives~~ an even amount of apples ~~to Kylee~~. how many apples does Carley have left?

What is your answer to your division word problem? (Show your thinking clearly) (4 points)

-2

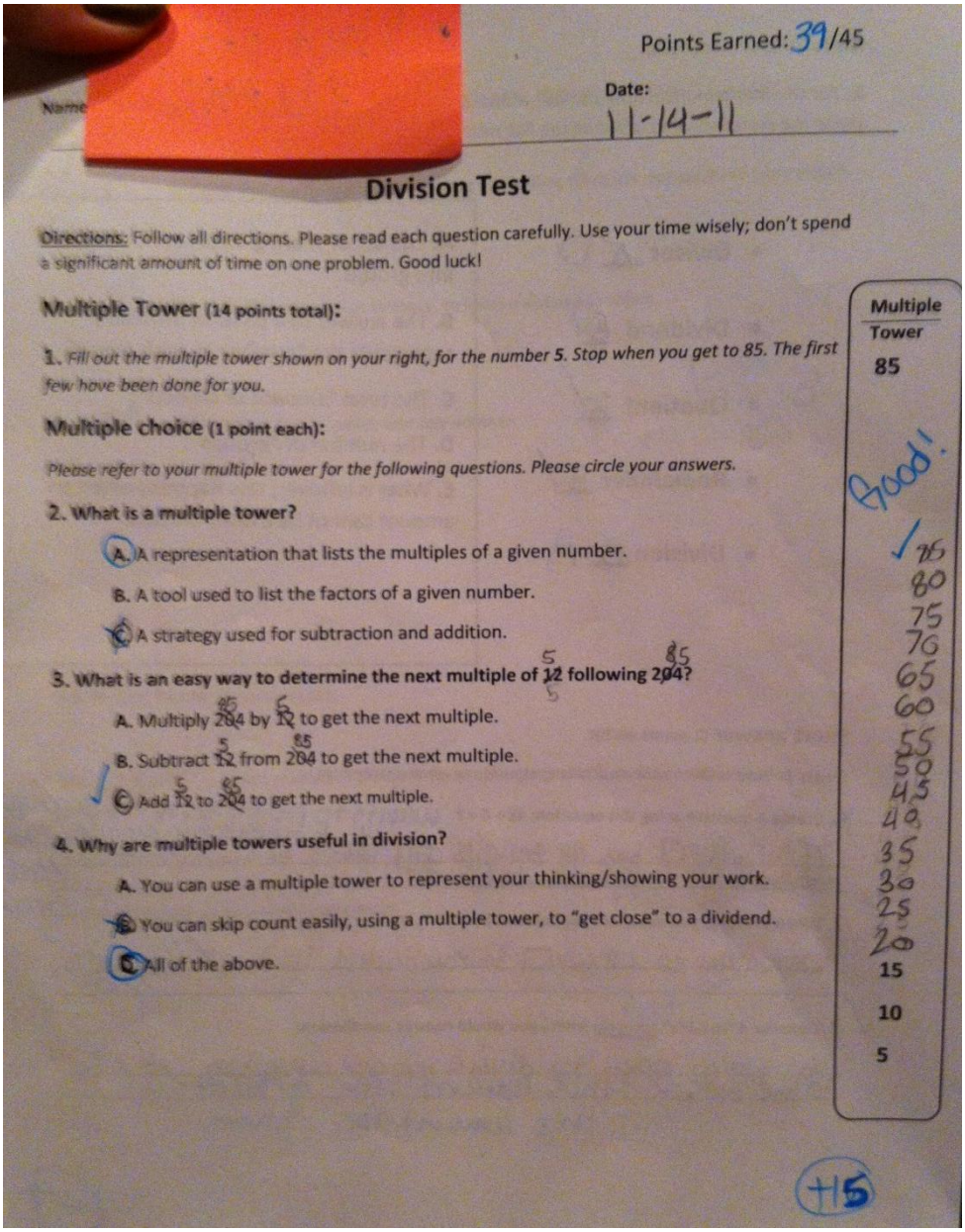
In terms of your problem:

Carley will give each of her friends ___ apples.

She will have ___ apples left

+4

Modified Test: Low-achieving student (Unidentified IEP student)



Points Earned: 39/45

Name

Date: 11-14-11

Division Test

Directions: Follow all directions. Please read each question carefully. Use your time wisely; don't spend a significant amount of time on one problem. Good luck!

Multiple Tower (14 points total):

1. *Fill out the multiple tower shown on your right, for the number 5. Stop when you get to 85. The first few have been done for you.*

Multiple choice (1 point each):

Please refer to your multiple tower for the following questions. Please circle your answers.

2. **What is a multiple tower?**
   - A. A representation that lists the multiples of a given number.
   - B. A tool used to list the factors of a given number.
   - C. A strategy used for subtraction and addition.

3. **What is an easy way to determine the next multiple of 12 following 204?**
   - A. Multiply 204 by 12 to get the next multiple.
   - B. Subtract 12 from 204 to get the next multiple.
   - C. Add 12 to 204 to get the next multiple.

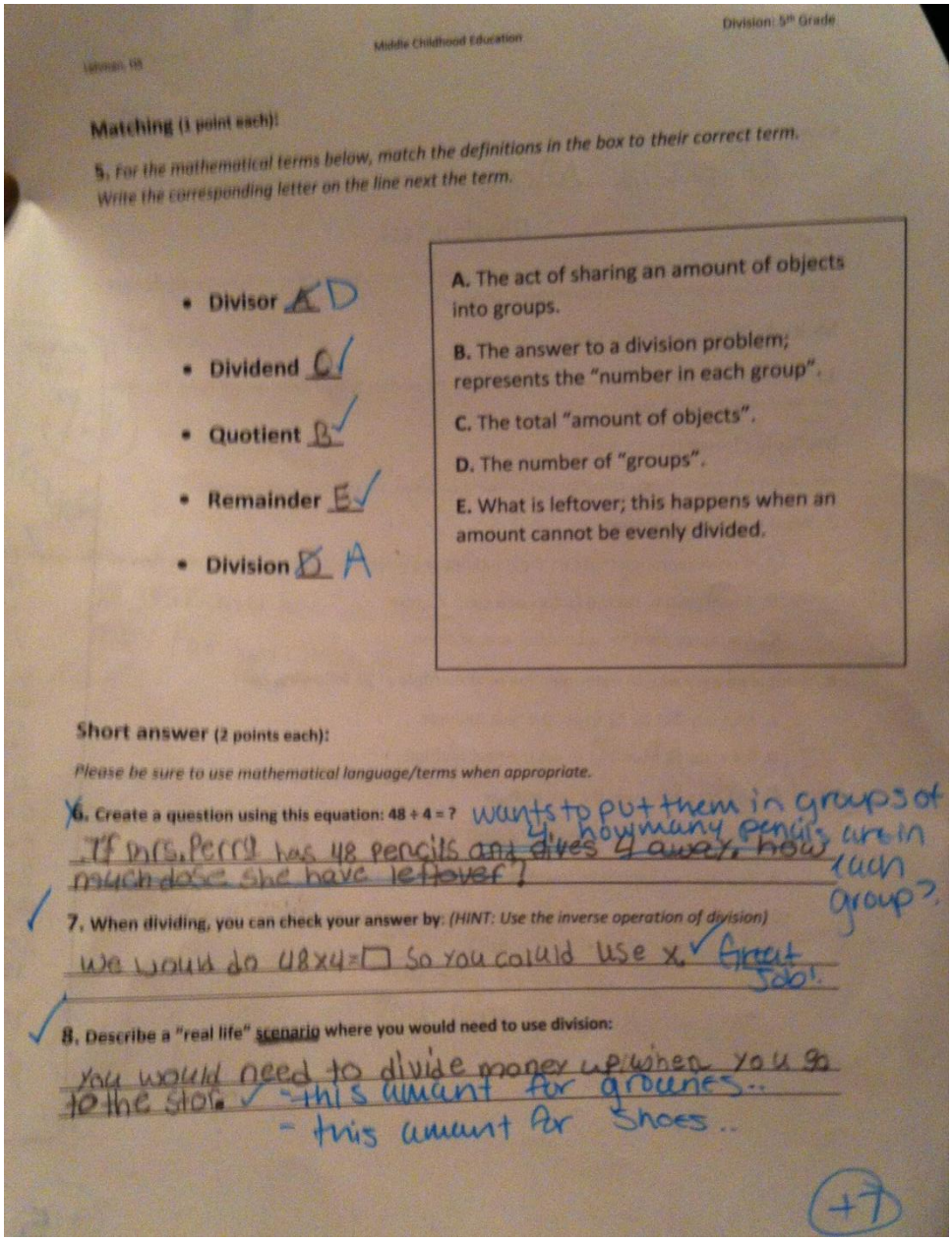
4. **Why are multiple towers useful in division?**
   - A. You can use a multiple tower to represent your thinking/showing your work.
   - B. You can skip count easily, using a multiple tower, to "get close" to a dividend.
   - C. All of the above.

Multiple Tower

85
80
75
70
65
60
55
50
45
40
35
30
25
20
15
10
5

Good!

+5



Middle Childhood Education

Division: 5th Grade

Matching (1 point each):

5. For the mathematical terms below, match the definitions in the box to their correct term. Write the corresponding letter on the line next the term.

- **Divisor** A D
- **Dividend** C ✓
- **Quotient** B ✓
- **Remainder** E ✓
- **Division** D A

A. The act of sharing an amount of objects into groups.

B. The answer to a division problem; represents the "number in each group".

C. The total "amount of objects".

D. The number of "groups".

E. What is leftover; this happens when an amount cannot be evenly divided.

Short answer (2 points each):

Please be sure to use mathematical language/terms when appropriate.

6. **Create a question using this equation: 48 ÷ 4 = ?** wants to put them in groups of 4 how many pencils are in each group?

If Mrs. Perry has 48 pencils and gives 4 away, how much does she have leftover?

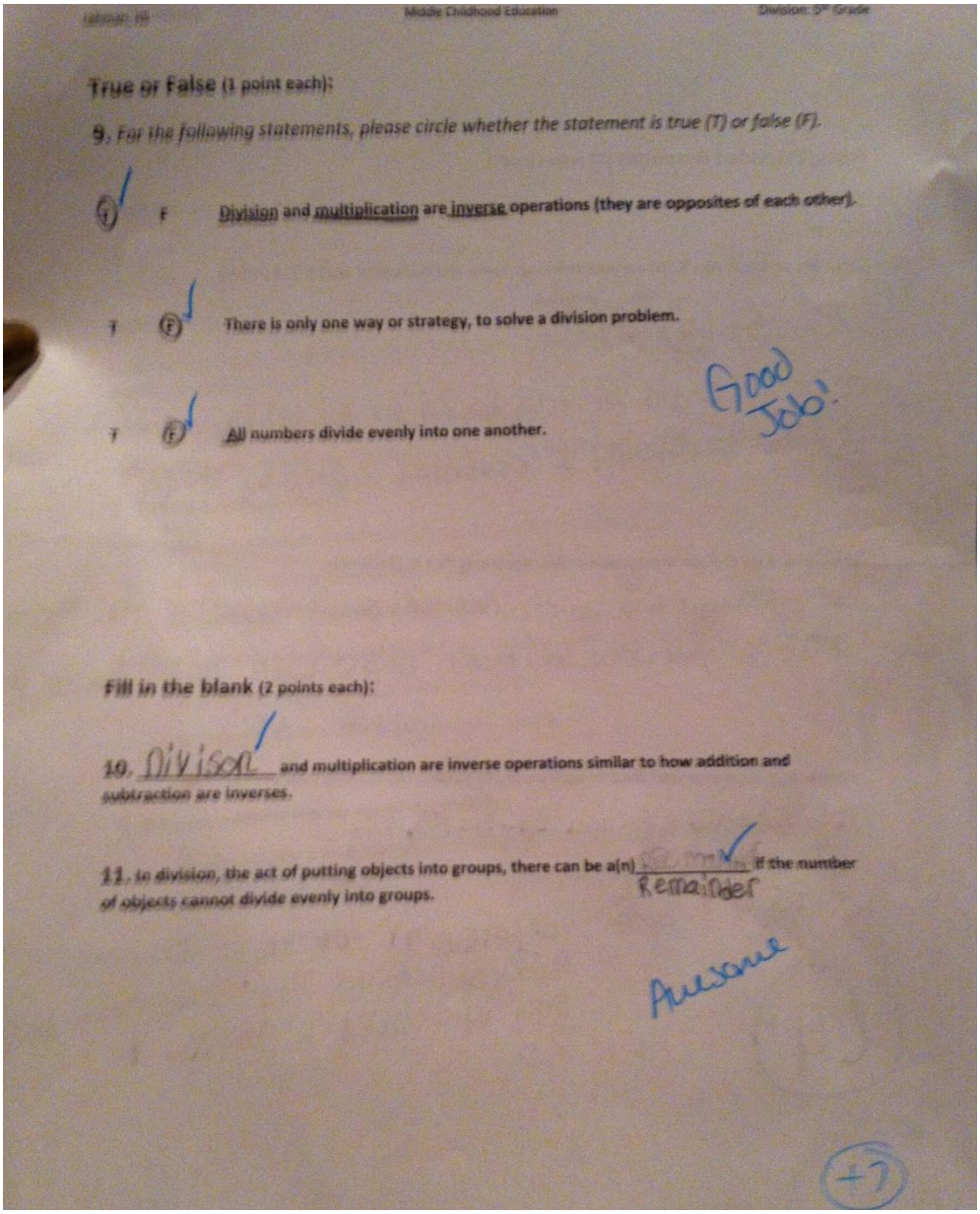
7. **When dividing, you can check your answer by:** *(HINT: Use the inverse operation of division)*

We would do 48x4=□ So you could use x. ✓ Great job!

8. **Describe a "real life" scenario where you would need to use division:**

You would need to divide money up when you go to the store. ✓ - this amount for groceries..
- this amount for shoes..

+7



Middle Childhood Education

Division: 5th Grade

True or False (1 point each):

9. *For the following statements, please circle whether the statement is true (T) or false (F).*

(T) F Division and multiplication are inverse operations (they are opposites of each other).

T (F) There is only one way or strategy, to solve a division problem.

Good Job!

T (F) All numbers divide evenly into one another.

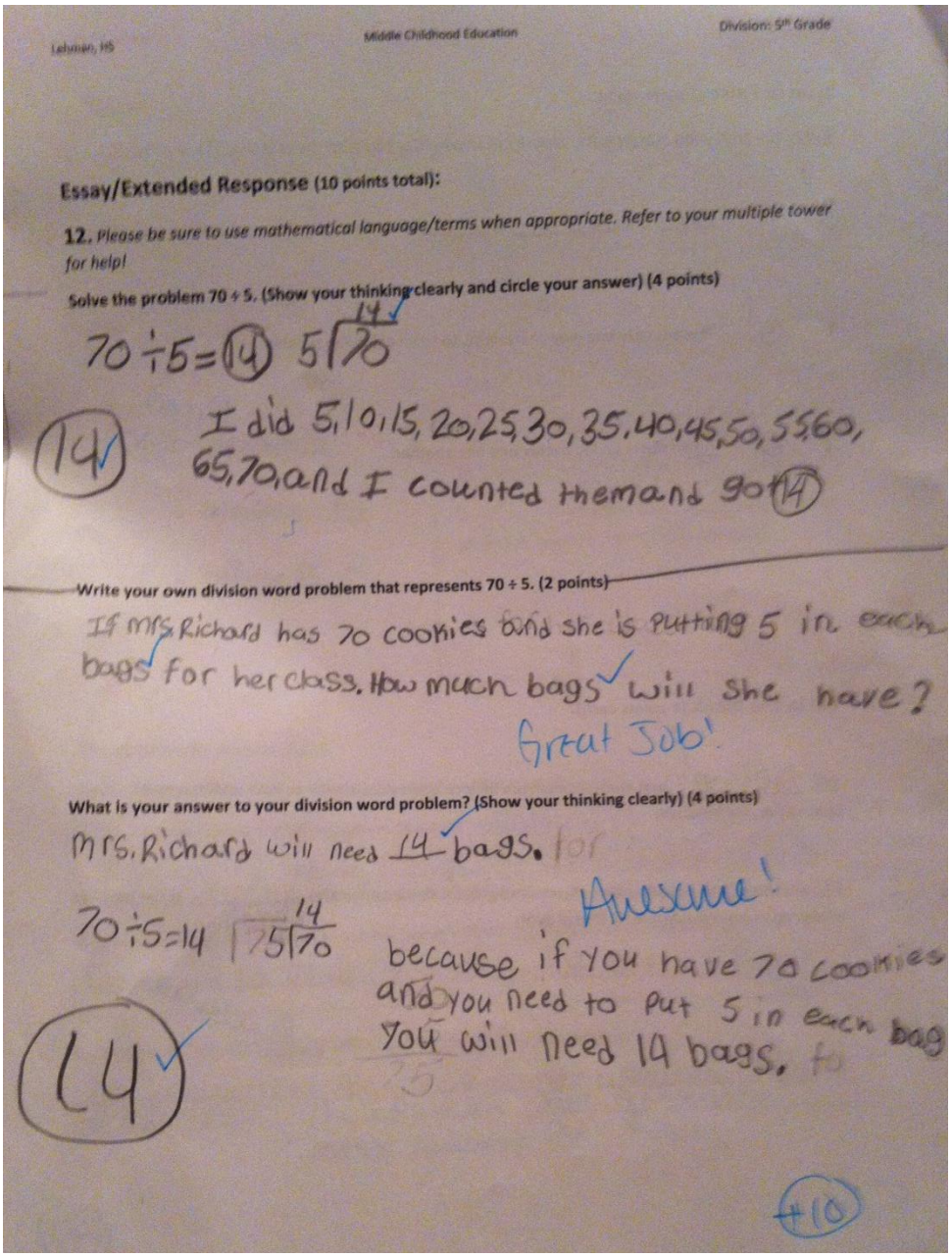
Fill in the blank (2 points each):

10. Division and multiplication are inverse operations similar to how addition and subtraction are inverses.

11. In division, the act of putting objects into groups, there can be a(n) Remainder if the number of objects cannot divide evenly into groups.

Awesome

+7



Lehman, HS

Middle Childhood Education

Division: 5th Grade

Essay/Extended Response (10 points total):

12. *Please be sure to use mathematical language/terms when appropriate. Refer to your multiple tower for help!*

Solve the problem 70 ÷ 5. (Show your thinking clearly and circle your answer) (4 points)

$70 \div 5 = 14$ $5\overline{)70}$ 14

14 I did 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, and I counted them and got 14

Write your own division word problem that represents 70 ÷ 5. (2 points)

If Mrs. Richard has 70 cookies and she is putting 5 in each bags for her class. How much bags will she have?

Great Job!

What is your answer to your division word problem? (Show your thinking clearly) (4 points)

Mrs. Richard will need 14 bags. for

$70 \div 5 = 14$ $5\overline{)70}$ 14

Awesome!

because if you have 70 cookies and you need to put 5 in each bag you will need 14 bags. to

14

+10

II. Assessment Commentary (no more than 3 single-spaced pages)
Directions: Write the Assessment Commentary by providing your response to each of the prompts below.

1. **Analyzing Student Learning**
   a. Identify the specific standards/objectives from the lesson plan measured by the assessment chosen for analysis.

Common core standard(s): On the formal assessment students are able to solve problems through the use of the relationship between multiplication and division. The division problems require students to find whole-number quotients of whole numbers with up to three-digit dividends and two-digit divisors, using strategies based on place value, the properties of operations. Students will also solve division problems that includes a remainder. Students will illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.

Assessment of content objectives: From the assessment chosen for analysis (formal) students expressed their knowledge of the content of division with remainders. On the formal assessment, students used a strategy of their choice to solve division problems with remainders. The formal assessment consisted of questions in the form of multiple choice, matching, short answer, true/false, fill in the blank and an essay question. Students "showed their thinking" on the formal assessment through the use of the strategy that they chose. The content within the assessment mirrored the CGI problems that they had solved in past lessons.

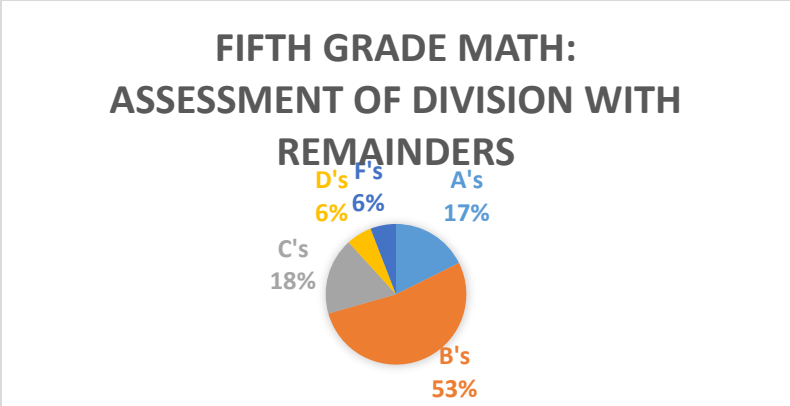
   b. Provide the evaluation criteria you are using to analyze the student learning (insert scoring guidelines here).

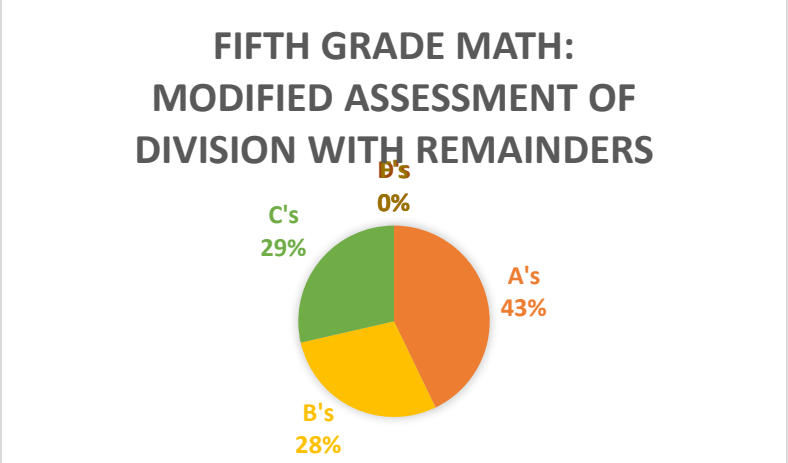
Multiple Tower (14 total points)	There are three multiple "done for" the students on the multiple tower. To receive full credit, students must fill in the other fourteen multiples, in correct order. If a student skips a multiple, partial credit will be given depending on how many multiples they skipped, not on how it messed up the rest of the tower. If a student accidentally added incorrectly for one multiple but continues to add 12 to the incorrect multiple, the student will only be deducted points for the addition mistake made. The student will not be deducted for all missed multiples because they have shown that they comprehend the mathematical operation of filling in a multiple tower.
Multiple Choice (3 total points)	Students will be given 1 point for the correct answer for each question.
Matching (5 total points)	Students will be given 1 point for each term that is matched to its correct definition.
Short Answer (6 total points)	Students must create a logical division word problem using the equation given. For full points for question:

	#6: Must be a division word problem with proper translation of the dividend and divisor given. For partial credit, (1 point) students will have to create a division word problem. **#7**: Students will have to show or explain their knowledge of how to check their answer, to a division problem, using the inverse operation of division (multiplication). To receive full credit, students will have to state "times" or "multiplication" (students can also "show" a multiplication "checking" problem). There is no partial credit awarded for this problem. **#8**: Students will have to describe a "real life" scenario where they would have to use division. To receive full credit, students will have to describe a situation where they would need division. Students must be specific. For example: "At my birthday party, I have 80 cupcakes to give out to my guests. Including myself, there are 24 guests at the party. I want every guest to get an even amount of cupcakes and I want to keep the leftovers for later. I would need to use division to determine how many cupcakes each guest can take." For partial credit (1 point), students will need to state a real life scenario where division could be used. For example, "When bringing cupcakes to a class."
True or False (3 total points)	Students will receive full credit by correctly answering "true or false". If a question is false, students must explain why it is false. Partial credit (1/2 point) will be given to students who cannot properly explain why an answer is false.
Fill in the Blank(s) (4 total points)	To receive full credit, students must correctly fill in the blank with the proper mathematical term. Partial credit (1 point) will be given to students who can correctly fill in one blank out of two.
Essay/Extended Response (10 total points)	To receive full credit, students must answer the following correctly: **<u>Part 1</u>**: Students must solve the given division problem and show their work clearly. Students can use a strategy of their choice. Based on the following criteria, students will be awarded: **4 points**: if the student correctly solves the division problem with a representation or

	explanation of their procedures they followed to get the answer. **3 points**: if the student shows/explains correct steps/procedures to solve the division problem and made a small mechanical error. **2 points**: if the student shows/explains correct steps/procedures to solve a division problem but have major error in applying the steps. **1 point**: if the student uses wrong numbers for divisors and dividends but correctly shows/explains how to solve a division problem. **Part 2**: Students must write their own division problem that represents the equation given. Based on the following criteria, students will be awarded: **2 points**: if the student correctly creates a division word problem. The students also needs to correctly translate the numbers (dividend, divisor, quotient) into their word problem. **1 point**: if the student correctly creates a division word problem but does not properly translate the numbers into the context of the problem and/or the problem does not make sense. **Part 3**: Students must answer their own questions to the word problem that they have created. Based on the following criteria, students will be awarded: **4 points**: if the student correctly wrote their answer to their word problem and showed their thinking clearly. Students will have to include their numbers (dividend, divisor, quotient) in their answer. **3 points**: if the student did not clearly state their answer in terms of their word problem that they have created. **2 points**: if the student restated the division problem/solution from part 1 and wrote small details from their problem. **1 point**: The student simply restated the division problem/solution from part 1.

c. Provide a graphic (table or chart) or narrative summary of student learning for your whole class.
The following graphs represent the data collected from the formal assessment given the day after the CGI worksheet lesson.





d. Use evidence found in the 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 conceptual understanding, procedural fluency, and problem solving.

Conceptual understanding:

Assessment: Students expressed conceptual understanding of division word problems, on their assessment, by creating their own word problems using proper mathematical language and translation of numbers into the context of the problem.

CGI worksheet: Students showed conceptual understanding of division on the CGI worksheets by interpreting the word problem into a division problem with proper translation of the text into a mathematical equation.

Procedural fluency:

Assessment: Students presented evidence of procedural fluency, on the assessment, by solving division problems. Students were allowed to use a strategy of their choice (standard algorithm, multiple tower, etc.) to solve the division problem(s).

CGI worksheet: Students expressed procedural fluency on their CGI worksheets by using steps or procedures to solve the division word problem. Students were allowed to use a strategy of their choice and were required to use proper procedures to solve the problem.

Problem solving:

Assessment & CGI worksheet: Students were required to express their problem solving skills by correctly solving a division word problem with remainders. Students had to interpret the word problem and create two mathematical equations to represent the problem. Students then chose a strategy to solve the problem and applied it, correctly.

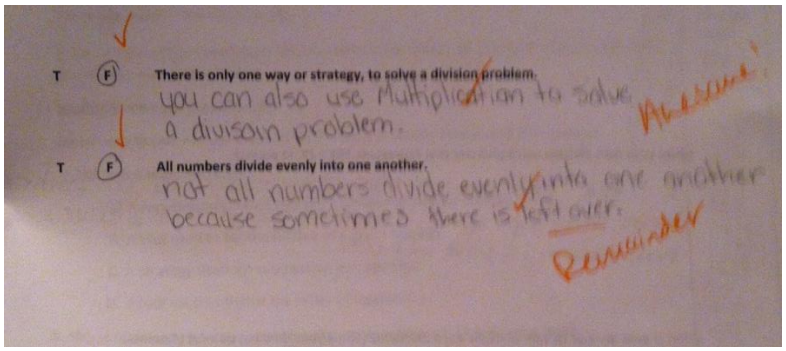
2. **Feedback to Guide Further Learning**

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

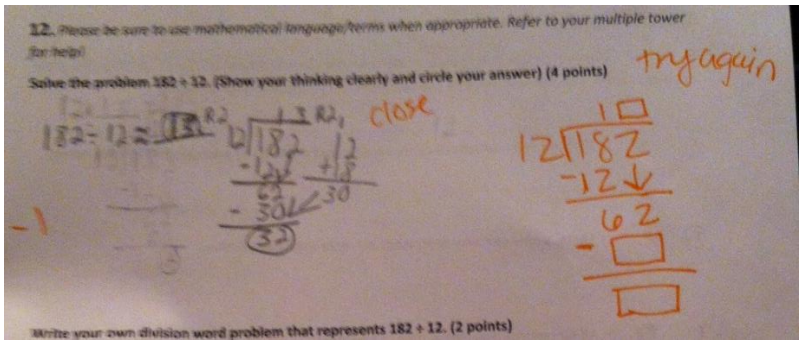
Explain how feedback provided to the three focus students addresses their individual strengths and needs relative to the standards/objectives measured.

For the assessments, I used my scoring guideline, while grading, to guarantee that all student work was graded equally. I also graded the assessments question by question to make sure that each question was graded with the same critical perspective. In the three student work samples, positive and constructive feedback is present. While grading each question, I gave students positive feedback if they had expressed understanding and fluency on division. I gave constructive criticism/feedback when students did not fully show conceptual understanding and procedural fluency about division; this includes setting up the problem, for the student, and writing "try again" on that problem area. If students failed to answer the question and showed little, to no knowledge of division (both procedurally and conceptually), I gave students an example of what I wanted and tried to give valuable feedback that would help the student to understand the concept(s).

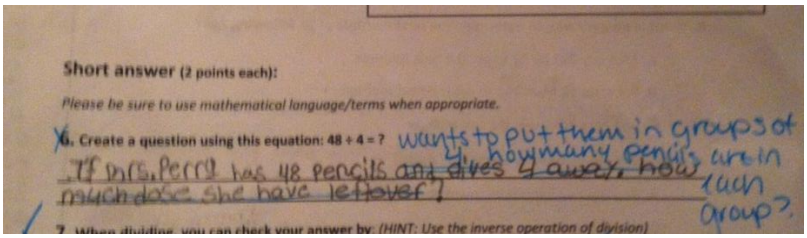
High performing: Positive feedback



Mid-performing: Constructive feedback



Low performing: Valuable feedback



3. Evidence of Language Understanding and Use

Directions: Refer to examples from the clip(s) (with time stamps) and/or student work samples as evidence.

Explain the extent to which your students were able to use language (targeted function, vocabulary, and additional identified demands) to develop content understandings.

Targeted function: Division is the targeted function in my CGI lesson. Students were able to use the language of the targeted function to guide their understanding, throughout the lesson. Students are able to do this by first, understand what division means (sharing of objects into equal parts) and second, applying the concept to words problems and other open and closed forms of questions.

Vocabulary: Students use/interpret mathematical language on the "matching" section of the assessment. Students must correctly match the definitions to their mathematical term. Students also use mathematical language on the "fill in the blank" portion of the assessment by filling in the blanks with the proper math terms. Both of these sections show student content understanding of these language terms.

Additional identified demands: Students were also required to know and comprehend language terms such as multiplication facts, subtracting, factor pairs, and inverse operations, throughout the lesson. Students use these language terms to help them solve division problems. I tried to use mathematical language throughout my instruction to help students make connections between the language terms and the targeted function (division).

4. Using Assessment to Inform Instruction

a. Based on your analysis of student learning presented in prompts 1c–d, describe next steps for instruction for the whole class and for the 3 focus students and other individuals/groups with specific needs.

Based on my analysis of student learning, the following steps for instruction could be used for the whole class, 3 focus students and other individuals/groups with specific needs:

- Giving students more in-depth word problems because of the high success rate of comprehension.

- Giving students more difficult numbers (dividend, divisors, and quotients) to work with (including students with IEPs/504s/etc.) due to the high success rate of comprehension and application.
- Giving students more practice with "matching" sections of assessments; integrating matching definitions to correct terms within a lesson.
- Giving students more practice with creating their own division problems and continue to implement the activity with mathematics concepts later in the year.
- For groups with specific needs, I will create a better differentiated test that would challenge them more and make sure that there is a teacher to read it out loud for them.
- For future assessment, I will make sure that the questions are very specific and what I expect from the students is clearly stated.

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

- Giving students more in-depth word problems because of the high success rate of comprehension.
    - **By giving students more in-depth word problems because of the high success rate of comprehension allows for further analysis of student learning. This step allows for further analysis of student learning by challenging students to expand their conceptual and procedural understanding of division. This models a constructivist approach (Piaget) to learning by allowing students to grow and construct or build upon their previous background knowledge.**
- Giving students more difficult numbers (dividend, divisors, and quotients) to work with (including students with IEPs/504s/etc.) due to the high success rate of comprehension and application.
    - **By giving students more difficult numbers to work with due to the high success rate, allows for further analysis of student learning. This step allows for further analysis of student learning by challenging the students' mathematical comprehension and allows the teacher to measure the students' abilities. This approach also mirrors a constructivist model (Piaget) by having students (including specific needs groups) build upon their previous knowledge to further their learning.**
- Giving students more practice with "matching" sections of assessments; integrating matching definitions to correct terms within a lesson.
    - **By giving students more practice with "matching" section of assessments, this allows for the analysis of student learning. By integrating this type of practice, students will be more familiar with this type of question that they may be exposed to on future standardized testing and in class assessments. I would research previous matching portions from the past on standardized testing and give them as practice, for students.**
- Giving students more practice with creating their own division problems and continue to implement the activity with mathematics concepts later in the year.
    - **By giving students more practice with creating their own division problems, it allows for the further analysis of student learning. Students will be able to have a deep conceptual understanding of division with extra practice of creating their own problems.**
- For groups with specific needs, I will create a better differentiated test that would challenge them more and make sure that there is a teacher to read it out loud for them.
    - **By creating a better differentiated test that would challenge the specific group of students, would allow for the further analysis of student learning. The future**

differentiated tests would challenge students and "push them to their limits" so that the teacher could measure how far students can reach mathematical benchmarks/goals/objectives. These questions would include higher-order thinking by integrating high level words from the Bloom's Taxonomy Wheel. Words such as apply and analyze should be used to promote higher-level thinking.

- For future assessment, I will make sure that the questions are very specific and what I expect from the students is clearly stated.
    - **By creating a more specific and clearly stated expectations in future assessments, I would be able to further analyze student learning. The refinement would allow for the proper measurement of student learning due to students being able to know exactly what is expected of them.**