

Clark University Master of Arts in Teaching Program
Learning Activity Plan

Division w/ Remainders Unit: LAP 4
Casey Rothenberg

I. Content: Describe *what* it is you will teach. What is the content?

During this lesson students will continue to build upon their knowledge and understanding concerning remainders. The majority of the lesson will involve working with division word problems. Students will be responsible for solving the problems, finding the remainder, and determine what should be done with the remainder. Interpreting remainders will help develop student's problem solving skills. Students will logically reason if a remainder should be dropped, rounded up or shared (i.e. turned into a fraction or decimal) depending on the context.

II. Learning Goal(s): Describe what specifically students will *know* and *be able to do* after the experience of this class.

Students will be able to:

- Find the quotient and remainder in division problems with two digit dividends and one-two digit divisors.
- Determine what a division problem is asking for and locate the number required to find a solution.
- After finding a quotient and remainder, problem solve what to do with the remainder based on the context of the question.
- Work successfully in groups of four by listening and participating in an appropriate and respectful manner.

III. Rationale: Explain how the content and learning goal(s) relate to your Curriculum Unit Plan learning goals.

My second essential question for the unit asks: how do you find remainders and know what do you do with these leftovers? This lesson directly address the latter half of this questions, and helps students develop their ability to reason with real life problems. This process also requires students to have viable arguments to back up their reasoning and decision-making. In the real world, the answer to a division problem depends on the circumstances and the question being asked. This lesson is important because students will explore different situations and practice deciding whether the remainder should be ignored, rounded up or shared. Students will look beyond the numbers and think about what they represent. Once they grasp this concept they can determine if the parts can be broken into fractions, or if the situation does not allow any leftovers. The latter contexts can be solved by adding an extra whole part to the problem or by removing the leftovers because they are not needed. A decent amount of the problems students will be working with directly relates to the imaginary trip to Disney World we have been planning throughout the unit. This will encourage students engagement an hopefully make the material more meaningful.

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- IV. Assessment: Describe **how** you and your students will know they have reached your learning goals.

During the beginning of the lesson we will be working as a whole group to decipher different division problems and figure out what to do with the remainders. As a class we will decide whether the word problem requires students to drop the remainder, round the quotient up, share the remainder and look at the remainder only. Students will be informally assessed on their abilities to listen, ask questions and appropriately participate in the discussions and/or solving process. The eight questions will be:

Drop the Remainder

- 1) In Florida, Jehziah is making post-cards to mail to his family. He always puts 4 stickers on each card. If he has 23 stickers how many cards can he make?
- 2) At Disney World we will be eating in a cafeteria. Each table seats four people. How many tables will be full if there are 22 students?

Round the Quotient Up

- 1) There are fourteen students going to Disney World. A van can hold five children. How many vans are needed to take all of the children to Disney World?
- 2) In Disney World I am buying Mickey Mouse hats for the class. They sell hats in boxes that have 4 hats. How many boxes do I need to buy so all 22 students get a hat?

Share the Remainder

- 1) A ride, called Space Mountain, at Disney World is 100 ft long. The ride lasts for three minutes. If you travel the same distance each minute, how many feet do you travel in 1 minute?
- 2) At Disney World Mr. T buys everyone Mickey Mouse cookies for a snack. He bought 55 cookies. How many cookies does each student get?

Look at Only the Remainder

- 1) Carlos gives the oranges he collected in Florida to his four friends. He splits up 43 oranges evenly and keeps the remaining oranges for himself. How many oranges does Carlos keep?

During group work, students will be formally assessed on their output. Groups will remain on task and engaged during the allotted time. If this is achieved, every group should be able to solve and determine what category different division problems fall under. During the activity and after collecting student's posters, I will be able to determine if groups were able to solve the division problem, find the remainder and accurately decide what to do with the remainder based on the context.

- V. Personalization and equity: Describe how you will provide for individual student strengths and needs. How will you and your lesson consider the needs of each student and scaffold learning? How specifically will ELL students and students with learning disabilities gain access and be supported?

This lesson doesn't require any sustained independent work, which will be beneficial for ELL's, students on IEP's, and students who generally struggle remaining engaged. There will be numerous discussions about thought processes in solving problems and deciding

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what to do with remainders. This will help the students I previously mentioned, because it will scaffold the material and hopefully aid and develop their comprehension. Every student will have an opportunity to participate and contribute his or her thoughts and ideas in order to make sure every student is heard and their opinion is respected. The groups will be strategically selected so that students who struggle in math be able to work with high achieving mathematicians. As long as group members work together, the lower level students will be able to watch, learn and eventually help the other students find quotients and interpret remainders. Being able to watch the process of peers problem solve will encourage and assist lower level math students in replicating these skills. The lowest level ELL's in my classroom (1's & 2's) will work with Josh who will help break down the language of the problem and highlight what the students need to decipher.

VI. Activity description and agenda

- a. Describe the activities that will help your students understand the content of your class lesson by creating an agenda with time frames for your class. Be prepared to explain why you think each activity will help students on the path toward understanding.

Time	Teacher will...	Student will...	Materials
5 min.	-Refresh student's memory on what a remainder represents. -Discuss what remainders would look like in a real life example.	-Continue thinking about remainders and how to find them within a division problem. -Start thinking about what a remainder looks like in real life and how it could be dealt with.	
30 min.	-Introduce the main content of today's lesson, emphasizing how there are four different ways we can interpret our remainders depending on the context. -Put the four categories on the board: Drop the Remainder, Share the Remainder, Round the Quotient Up and Use the Remainder Only. Briefly discuss what each one would mean. -One by one go over the different word problems on the posters. Have students guide me to circling and underlining the important numbers and words. I don't	-Listen, ask questions about the different remainder strategies, participate appropriate thoughts and ideas about what makes the most sense to do with a remainder depending on the context.	-Posters with word problems that involve dividing, finding remainders and interpreting remainders. -Four labels: Drop the Remainder, Share the Remainder, Round the Quotient Up and Use the Remainder Only.

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	expect that I will be able to get through all 8 problems due to time constraints. (see assessment for the word problems)		
40 min.	<ul style="list-style-type: none"> -Split students up into small groups of 3 or 4. -Hand out plastic bag with word problems to each group. Hand out the four different category headings to each group. -Instruct students that their job is to keep replicating the process we just did as a whole group. They must first find out what the problem is asking. Next they have to solve the problem. Finally they have to discuss and decide what category they think the problem falls under. -Students glue the word problems underneath the correct category on their poster. 	<ul style="list-style-type: none"> -Work appropriately and effectively in groups to solve division problems, find quotients, find remainders and determine what makes the most sense to do with the remainder. 	<ul style="list-style-type: none"> -7 sets of word problems -7 posters with remainder categories for students to glue the problems underneath.
12-15 min.	<ul style="list-style-type: none"> -Reconvene as a whole class and go through each problem asking one group to provide an answer and their reasoning for why the remainder has to be interpreted in that specific way. Open it up to the whole class to see if they agree or thought the problem should be classified under a different category, and why. 	<ul style="list-style-type: none"> -Listen, ask questions about why and how other groups did what they did, participate and share what their own group did and provide reasoning for their answers. 	

- a. What particular challenges, in terms of student learning or implementing planned activity, do you anticipate and how will you address them?

I anticipate that some students may struggle working in groups for such a long period of time. From observing my class I know that some of them have a hard time following

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peers instructions and criticism, even if it is provided in a respectful way. Some students will frequently shut down when they are working in groups, and refuse to participate and pull their weight. A few students also have a tendency to take over and do the all work without involving the other group members. Hopefully I will be able to limit these occurrences by circulating around the classroom making sure everyone is fulfilling their responsibilities and that students are acting respectful to one another. If students can't handle working in groups they will receive a warning and then be removed and required to do similar work independently.

VII. List the Massachusetts Learning Standards this lesson addresses.

4.NBT.B6

Find whole number quotients and remainders with up to four-digit dividends and one-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.

4.OA.A.3

Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.

VIII. Reflection

- a. In light of all areas of planning, but especially in terms of your stated purpose and learning goals, in what ways was the activity(ies) successful? How do you know? In what ways was it not successful? How might the activity be planned differently another time?
- b. What did you learn from the experience of this lesson that will inform your next LAP?

This lesson involved two extended periods of time where students were listening, participating and working quietly and appropriately. For the most part, I was very pleased with my student's abilities to remain engaged and control their bodies throughout both of these activities. From the majority of my observations, students were working hard and trying their best, despite working with a concept they were just introduced to. Throughout the year we have been working hard to get our students to think beyond the numbers and actually evaluate and process what is occurring in a word problem. It can be very difficult for young students to visually comprehend what a question is asking for. Based on previous observations, I thought my students were doing a competent job trying to figure out what is going on in the problem, how to solve it, and what should happen to the remainder. I did my best to solve the problems in a clear and explicit way that made sure to keep the context in mind, instead of simply pulling out numbers and solving without any explanation. At times I definitely struggled with this and didn't explain what I was

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doing in the clearest way that kept it in perspective of what the problem was talking about. However, this was only my fourth lesson-teaching math to students, so I am confident my math language and ability to effectively communicate strategies/meanings will continue to develop.

During the whole group activity I was pleasantly surprised at how quick students were able to circle, underline and box out the question. This seemed to help the students get rid of unnecessary words without losing the context, which is crucial for interpreting what to do with the remainder. Drawing visuals that represented students or other groups worked well in catalyzing students problem solving and reasoning abilities. Often I would need to explain what would happen to the remainder if we shared it, dropped it, or rounded it up for students to understand what made the most sense. However, since this was the introduction to remainder interpretation, I expected this type of scaffolding to be needed.

Group work was partially successful and partially unsuccessful. As I anticipated, some students had a hard time remaining on task while working with their peers. I think there was a lack of motivation for solving the maximum amount of questions within the allotted time. In the future I would make this into a competition, seeing which groups could correctly answer the most questions. Another factor for the inconsistent engagement was the novelty of the concepts and strategies. Students would get to a point in the question they didn't think they could answer and then would disengage and act helpless. Three groups, including Josh's table, were able to avoid these road bumps and were able to answer a fair amount of the questions. Luckily, I was able to bounce back and forth between the two groups who were having a harder time and actually help them get back on track. Normally they only needed a gentle push in the right direction, and from there they were able to get through the rest of the problem. Unfortunately, there seemed to be at least one student in each group who was not pulling their weight and maintained disengagement throughout most of the activity.

At the end of the lesson, when groups were sharing out solutions for a problem they solved, students had an opportunity to verbalize their reasoning to back up their argument. I thought most of the participants did a good job explaining what they chose to do with the remainder, and why this choice made the most sense within the context of the problem. However, some students who were not sharing had a hard time listening to and double-checking their peer's work. I think that if this activity had been turned into a competition, students might have had more interest in paying attention to what peer's were sharing to make sure they solved the problem correctly and weren't being wrongfully awarded.

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Remainder Strategy:
Sharing is Caring

Josh and his sister are sharing their Halloween chocolate bars evenly. Altogether, they have 67 chocolate bars. How many chocolate bars will Josh get?



Dung

Remainder Strategy:
Just Drop It

There are 78 blocks and five kindergarteners. If the blocks are shared equally among the kindergarteners, how many blocks does each kindergartener get to play with?



Sabrina wants to make 12 beaded bracelets of exactly the same length. She has 243 beads. How many beads long will each bracelet be?

Rowan needs to earn \$87 to buy a new skateboard. He earns \$9 each time he washes one of his neighbors' cars. How many cars does Rowan need to wash to earn enough money to buy his skateboard?



Wilson, J. and P. and J. J. J.

Remainder Strategy:
Remainder Only

Elijah gives the shells he collected at the beach to each of his four teachers. He gives away the 86 shells evenly, and keeps the remaining shells for himself. How many shells does Eli plan on keeping?



LYON M

Remainder Strategy:
Round Up

Ms. Morales bought canned food to donate to a soup kitchen. She can fit 6 cans into each paper bag. If she bought 50 cans of food, how many bags will she need in order to bring all of the cans to the soup kitchen?



Twenty-three friends are headed to the beach. Each car can hold five people. How many cars do the friends need to bring the

Darby expects 25 people to attend her birthday picnic. She needs to set up benches that seat seven people each. How many benches does Darby need?



Natalia M.

Remainder Strategy:
Sharing is Caring

Josh and his sister are sharing their Halloween chocolate bars evenly. Altogether, they have 67 chocolate bars. How many chocolate bars will Josh get?



Janet Rebecca Taylor

Remainder Strategy:
Remainder Only

Remainder Strategy:
Just Drop It

Marco has 95 erasers that he wants to split evenly into 4 bags. How many extra erasers will Marco have leftover if he places the same number of erasers into each bag?



The track team bought their coach a \$33.00 plaque. The six teammates split the bill evenly. How much did each track member pay?



Jigsaw puzzles are on sale for \$12.00 including tax. How many can you buy with \$90.00?



Remainder Strategy:
Round Up

Ms. Morales bought canned food to donate to a soup kitchen. She can fit 6 cans into each paper bag. If she bought 60 cans of food, how many bags will she need in order to bring all of the cans to the soup kitchen?



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Use Remainder Only
Carlos gives oranges he collate to 14 of his friends. He gets up 43 oranges evenly and keeps the remaining oranges. How many does Carlos keep?

Round Quotient Up
There are 14 students going to Disney World. A van can hold 5 children. How many vans do we need so all students can go?

Share The Remainder
At Disney World Mr. T buys everyone Mickey Mouse cookies. He bought 55 cookies. How many cookies does each student get? $11 \frac{2}{3}$

Drop The Remainder
In Florida Jehziah makes post-cards to mail to his family. He always puts 4 stickers on each card. If he has 23 stickers, how many cards can he make?

At Disney World we will be eating at the cafe. Each table seats 4 people. How many tables will be full if there are 22 students?

WORDS

UNIT

40A.1 to 40A.5

VOCABULARY

Quotient
Remainder

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