

Division with Remainders: Problem Strings

Teacher Guide

Duration: 20 minutes

Standards for Mathematics

TEKS.4.4.H.ii

Solve with fluency one-step problems involving division, including interpreting remainders.

Focus Strategies

Think Aloud: The teacher models a process of thinking by speaking aloud what is thought. As an example, 'I think I need more color here in my drawing.' This strategy models for students the type of thinking they can use in an upcoming activity.

Think-Pair-Share: Students are prompted to think about an idea on their own. Students then share their idea with a partner and have a quick discussion. Selected students are asked to share their ideas with the whole group.

Materials

whiteboard, markers, problem string cards (with division problems), paper pencils

Key Vocabulary

divide, quotient, remainder, equal groups, share

Warm-Up

Begin with a quick review of division. Ask students to share what they remember about dividing numbers and what a remainder is. Write a division problem on the board (e.g., $12 \div 3$) and ask for the answer.

Introduction

Explain to students that today they will be working with division problems in a connected way. They will solve a series of problems that build on each other, helping them to see patterns and develop strategies for solving division problems with remainders.

Exploration & Whole Class Discussion

Present the first problem: ' $15 \div 4$ '. Have students solve it individually. After a minute, ask for volunteers to share their strategies. Discuss the quotient and the remainder, emphasizing how to interpret the remainder in this context. Continue with the next problem: ' $30 \div 4$ ', following the same process. Encourage students to explain their reasoning. Repeat this process with ' $60 \div 4$ ', ' $61 \div 4$ ', and ' $62 \div 4$ '.

Application & Reflection

For the final problem, present ' $122 \div 4$ '. Students will solve this independently, then discuss their strategies with a partner. Afterward, select a few students to share their strategies with the class. Highlight any different interpretations of the remainder.

Assessment

As a formative assessment, students will write a brief reflection on what they learned about division and remainders. They will share their reflections with a partner, and then a few will share with the whole class. This will help gauge their understanding and ability to articulate their thought processes.

Strategies to Support Emergent Bilingual Students

To support emergent bilingual students, we recommend the following:

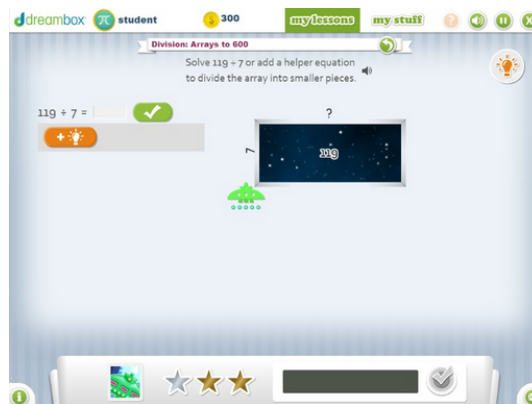
1. Provide independent think time after asking questions or posing prompts.
2. Have students pair up with a partner to generate responses together.
3. Have students restate each other's reasoning in classroom discussions.
4. Create a public record of classroom discussions.
5. Use color and annotation to help learners make connections for concepts.
6. Introduce academic vocabulary as needed.
7. Use iconic and semantic gestures to help students understand.

Additional Support Resources

If your students need additional support, you can click on one of the lessons below and present it to your whole class. You can use the interactive manipulatives and built in feedback to support students in a whole class discussion. Good questions to ask are 'What do you see?', 'What do you think?' 'What do you wonder?'



Division by Modeling Partial Quotients: Dividends to 600 and Divisors to 10



Division by Creating Partial Quotient Equations: Dividends to 600 and Divisors to 10

Sample Lesson Flow

- TEACHER SAY** *Today, we are going to dive into division with remainders! Let's start with a quick review. Can anyone remind me what division is and what a remainder means?*
- STUDENTS DO** Raise hands to share their thoughts on division and remainders.
- TEACHER DO** Write a division problem on the board, like $12 \div 3$, and ask for the answer.
- STUDENTS SAY** *The answer is 4.*
- TEACHER SAY** *Great! Now, let's get started with our first problem string. The first problem is $15 \div 4$. I want you to solve this on your own for a minute, then share your strategy with a partner.*
- STUDENTS DO** Solve the problem $15 \div 4$ individually, then quickly share their strategy with a partner.
- TEACHER SAY** *Who would like to share their strategy for solving $15 \div 4$?*
- STUDENTS DO** Raise hands to volunteer. Selected students share their strategies.
- TEACHER SAY** *Excellent! So, what is the quotient and the remainder for $15 \div 4$?*
- STUDENTS SAY** *The quotient is 3 and the remainder is 3.*
- TEACHER SAY** *Correct! Now, let's discuss how we can interpret that remainder. What does it mean in this context?*
- STUDENTS DO** Discuss interpretations of the remainder with their partners.
- TEACHER SAY** *Let's move on to the next problem: $30 \div 4$. Solve this one independently, and then share your strategy with a partner.*
- STUDENTS DO** Solve the problem $30 \div 4$ individually, then quickly share their strategy with a partner.
- TEACHER DO** Circulates around the room and listens into students, then selects a pair of students to share their strategy.
- TEACHER SAY** *Interesting! Does anyone see a relationship between the quotients (answers) and remainders for $15 \div 4$ and $30 \div 4$?*
- STUDENTS DO** Raise hands to volunteer. Selected students share their ideas.
- TEACHER SAY** *Great job! Let's look at few more problems. Let's try $60 \div 4$ first. Solve this one independently, and then share your strategy with a partner.*
- STUDENTS DO** Solve the problem $60 \div 4$ individually, then quickly share their strategy with a partner.
- TEACHER DO** Circulates around the room and listens into students, then selects a pair of students to share their strategy.
- TEACHER SAY** *Oh hmmm. Why doesn't this problem have a remainder? Turn to your shoulder partner and discuss why with your partner.*
- TEACHER DO** Have a couple of students share their ideas.

- TEACHER SAY** *Let's try $61 \div 4$ next. What do we predict the answer (quotient) will be?*
- STUDENTS DO** Share some of their ideas on what the answer and remainder will be.
- TEACHER SAY** *Okay, let's double-check. Solve this one independently, and then share your strategy with a partner.*
- STUDENTS DO** Solve the problem $61 \div 4$ individually, then quickly share their strategy with a partner.
- TEACHER DO** Circulates around the room and listens into students, then selects a pair of students to share their strategy.
- TEACHER SAY** *Thank you for sharing! Let's try another one to see if we can find a pattern. Solve $62 \div 4$, then share your thinking with your shoulder partner.*
- STUDENTS DO** Solve the problem $62 \div 4$ individually, then quickly share their strategy with a partner.
- TEACHER DO** Circulates around the room and listens into students, then selects a pair of students to share their strategy.
- TEACHER SAY** *Let's try one more and see if we can apply all of the strategies we used today for this one. Solve $123 \div 4$, then share your reasoning with your shoulder partner.*
- STUDENTS DO** Solve the problem $123 \div 4$ individually, then share their reasoning with a partner.
- TEACHER SAY** *Excellent work! Now, let's reflect on what we learned today about division and remainders. Write a brief reflection in your notebooks with this prompt. What strategies can we use to make solving division problems with remainders easier?*
- STUDENTS DO** Write reflections on what they learned about division and remainders.
- TEACHER SAY** *Once you are done, share your reflections with a partner, and then I will ask a few of you to share with the whole class.*