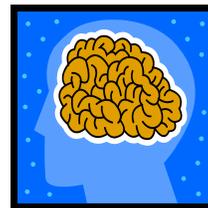# SCAFFOLDING TASK: Use What You Know
1 Day to complete

STANDARDS FOR MATHEMATCIAL CONTENT

MCC.3.OA.6. Understand division as an unknown-factor problem.
For example, find 32 ÷ 8 by finding the number that makes 32 when multiplied by 8.
Conversations should also include connections between division and subtraction.

STANDARDS FOR MATHEMATCIAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

***Mathematical Practices 1 and 6 should be evident in EVERY lesson. ***

BACKGROUND KNOWLEDGE
(Information quoted from Van de Walle and Lovin, Teaching Student-Centered Mathematics: Grades 3-5, page 123)

This missing-factor approach is likely to be invented by some students if they are solving measurement problems such as the following: "Grace can put 6 pictures on one page of her photo album. If she has 82 pictures, how many pages will she need?" Alternatively, you can simply pose a task such as 82 ÷ 6 and ask students, "What number times 6 would be close to 82?" and continue from there.

ESSENTIAL QUESTIONS

- How are multiplication and division related?
- How is division an unknown factor problem?
- What are the parts of a division problem?

MATERIALS

- Unknown Factor Record sheet
- Counters

- Index cards

GROUPING

Partner/Independent

TASK DESCRIPTION, DEVELOPMENT AND DISCUSSION

Using multiplication facts students either know or can solve using a practiced strategy, students will identify the unknown factor in a division problem, record and label parts of a division problem in both formats. Students will then answer the provided problems as well as create two of their own.

To begin, distribute one index card to each student. Ask them to write one multiplication problem, including the product on the card. (You may want to assign tables, rows, groups etc different numbers. For example one group writes different 4s facts, another writes different 6s facts.) Collect the cards. Choose one card from the stack. Reserve the rest of the stack for partner/independent practice.

Part I:
Write the known fact on the board/overhead/smart board. Discuss the fact and how it can be solved. (Check retention of strategies). Create a story problem from the fact. For example if the fact is 4 x 7 = 28, the story problem could be "28 people are riding the roller coaster. There are four people in each row. How many rows are in the roller coaster?" Provide students (individually or at work groups) counters and blank index cards. Ask them to count out 28 counters (Great opportunity to discuss different strategies to count out 28 counters using counting by twos, threes, fours). Next, ask the students to identify the other given number in the problem. Discuss what has to happen next. Ask for suggestions on how to divide 28 into groups of four. Will they need four index cards to be the roller coaster rows? Will they need to count out four roller coaster riders and put them on an index card to represent each row? Discuss with the class which model would correctly show the problem? Ask if there are any other strategies the students could have used to solve this problem. Ask, what multiplication problem that we already know or are working on would have helped us with the story problem? Discuss, "Well, if we know 4 x 7 = 28, how can we use this fact to find the answer to the problem? Write the division equation and discuss the reasoning.

After the division equation has been written, introduce or reintroduce the parts of a division equation; divisor, dividend and quotient. Label the correct parts.

$$28 \div 4 = 7$$

Dividend is 28
Divisor is 4
Quotient is 7

$$4\overline{)28}^{\,7}$$

Repeat, using the student-made multiplication problems from the beginning of the lesson. You, the teacher, can make up the story problems for the first few and then challenge the class to create a few. Always give the product and one factor to create the story problem. Work it through with volunteers using the counters and index cards to group. Make sure to discuss what known multiplication problem would have helped to solve the story problem. Write the division sentence and label the parts. Allow time and encourage students to share how they solved the story problem.

Part II:
Same day or on the second day, distribute the Unknown Factor Record Sheet. The students can be in partners, working groups or individual. Complete the first problem as a class. Let the students use the counters and index cards to model their math thinking. Allow time for them to explain. Discuss methods used to solve the unknown factor. Label the parts of the problem together. Complete the second as a class or allow students to complete on their own or with partners. After enough time for the students to come up with an answer, call the class back and discuss strategies used to find the unknown factor. Check student work and labeling. Continue as partners to solve the final problems.

Part III:
On the second or third day, hang or place the student written multiplication facts around the room. On the back of the Unknown Factor Recording sheet, have the students divide it into four sections. Each pair (or individual) will tip toe to a multiplication problem somewhere in the room. They must write their own unknown factor problem using the format the class practiced. Instruct them to write the multiplication problem. Write the unknown factor story problem. Write the division equation that solves the problem and label the parts of the division equation. Repeat until the partners or individual has four different unknown factor problems written. Have counters and index cards available if students would like to use them.
Finally, ask for students to share the unknown factor problem they have created and how they solved it. Discuss strategies used. Students can also challenge a class mate to solve their unknown factor problem and model it using the counters and index cards.
Extension: collect student record sheets and create a follow up task or station using the student created unknown factor problems.

FORMATIVE ASSESSMENT QUESTIONS

- What strategy can you use to solve an unknown factor problem?
- Describe how multiplication and division are alike.
- What are the parts of a division problem?

DIFFERENTIATION

Extension:
- Students can create story problems that have a two step process.

Intervention:
- Students may use manipulatives or multiplication chart

Georgia Department of Education
Common Core Georgia Performance Standards Framework
Third Grade Mathematics • Unit 3

Name _____   Date _____

Unknown Factor Stories
Student Record Sheet

Directions:
1. Use the known multiplication facts to solve the unknown factor problem.
2. Write a division equation that solves the problem.
3. Label the parts of the division equation (Dividend, Divisor, Quotient)
Bonus: Write and label both ways to write a division equation

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I know 10 x 7 = 70. How can I use that fact to find the answer to this problem?

Mr. Adams bought 70 new notebooks for the class. There were 10 notebooks in each package. How many packages did Mr. Adams buy?

I know 4 x 6 = 24. How can I use that fact to find the answer to this problem?

Janey would like to put 24 pictures of her friends in a photo album. She can put 4 pictures on each page. How many pages in the photo album will have pictures of her friends on them?

I know 2 x 4 = 8. How can I use that fact to find the answer to this problem?

PetSmart has 8 hamsters. How many hamsters will fit in 4 cages?

I know 5 x 7 = 35. How can I use that fact to find the answer to this problem?

It took Sam 35 minutes to run each lap. If Sam ran 7 laps, how long did each lap take?

I know 6 x 8 = 48. How can I use that fact to find the answer to this problem?

Tanya spent $48 at Old Navy. She bought eight new shirts at the same price. What was the price of each shirt?

I know 3 x 9 = 27. How can I use that fact to find the answer to this problem?

Kim spent $27 on candy for her nine friends. How much did Kim spend on each friend?