SESSION 3.5A

Using What You Know

Math Focus Points

- Identifying and learning multiplication combinations not yet known
- Using known multiplication combinations to determine the product of more difficult combinations
- Using arrays, and rectangles made from square tiles, to illustrate the distributive property

Today's Plan		Materials
1 DISCUSSION **Using Known Multiplication Combinations**	20 MIN, CLASS	• *Student Activity Book,* p. 31 (from Session 3.4) • **Chart paper** Prepare a vertical 2-column table labeled "Combinations We're Working On" and "Start With." • Transparent Array Cards (from Session 3.2) • Array Cards (1 set per pair; from Session 3.2) • Color tiles; transparency pens
2 ACTIVITY ***Factor Pairs***	25 MIN, PAIRS	• *Student Activity Book,* p. 31 (from Session 3.4) • Array Cards (1 set per pair; from Session 3.2) • Color tiles (as needed)
3 DISCUSSION **Practicing Using Known Multiplication Combinations**	15 MIN, CLASS	• Materials from Discussion 1
4 SESSION FOLLOW-UP **Daily Practice**		• *Student Activity Book,* p. 35A or **C31, What's the Area?** Make copies. (as needed)

Ten-Minute Math

Counting Around the Class **Ask students questions about an imaginary class that is counting by 10s.**

When the class had finished counting, the last number was 90.

How many students are in the class?

What number did the 5th person say?

What number did the 10th person say?

What number would they get to if they counted around again?

For each question, collect answers as well as explanations about how students found their answer.

DISCUSSION

1 Using Known Multiplication Combinations

20 MIN CLASS

Math Focus Points for Discussion

- Using known multiplication combinations to determine the product of more difficult combinations
- Using arrays, and rectangles made from square tiles, to illustrate the distributive property

Our goal is for all of you to know the product of each multiplication combination in your Array Card set. Let's make a list of some of the pairs that are hard to remember and think about ways we can help one another learn them.

On the prepared chart paper, under the heading "Combinations We're Working On," list students' responses. Then, choose one of the combinations suggested by several students. For example:

One combination several people said that is hard to remember is 9×4.

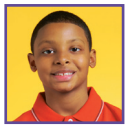
Display a transparent Array Card that shows $4 \times 9/9 \times 4$. Ask a student to use tiles to build a 9 by 4 rectangle.

Do you know another combination with 4 or 9 as a factor that can help you figure out the product of 9×4?

Students might say:

"I thought about 9×4 as an array. I know that 2 rows of 9 equals 18. Another 9×2 is 18, and 18 plus 18 is 36."

"I first solved $5 \times 4 = 20$ because I knew that in my head. Then I solved $4 \times 4 = 16$. $20 + 16 = 36$."

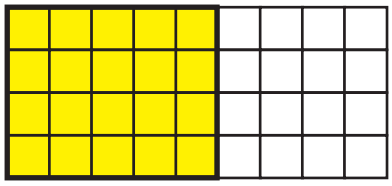


"I think of 9×4 as $(10 \times 4) - 4$. I know that 10×4 is 40. If I take away one 4, then 9×4 is 36."

For each suggestion, record the known combination on chart paper under the "Start With" heading across from the 9×4 combination.

Then, ask students to help you highlight the known combination on the transparency of the Array Card.

[Gina] said that she would start with 5×4. Can someone come up and show us the part of the array that shows 5×4?



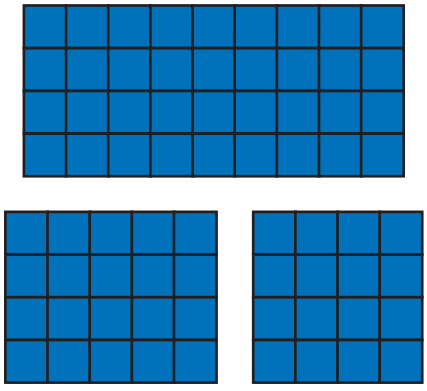
What part of the problem does [Gina] have left to solve? *(4×4)*

Record this on the chart paper.

So [Gina] thought of 9×4 as 5×4 plus 4×4. ❶ She found the area of this rectangle, and then she found the area of what was left, and added them together. Can she do that? Let's look at it with the tiles.

Follow the same process with the rectangle made from color tiles.

How would you break the 9×4 rectangle into two parts so that one of the parts shows 5×4?



Encourage students to think about stories or contexts that show why $9 \times 4 = (5 \times 4) + (4 \times 4)$.

What is a story that shows that 5×4 plus 4×4 equals 9×4? ❷

Follow this process for each of the strategies students have for solving 9×4. If time permits, discuss one more combination that students find difficult to remember.

Emphasize that, although there are many starting places for solving each multiplication combination, students should think about ones that they can use easily because the idea is to find the solution quickly. Record a few starting places for each combination you discuss, and then post the chart where students can return to it, both for reference and to record clues for other combinations as they review and practice over the next few sessions.

Math Note

❶ **Distributive Property** Strategies like these are based on the *distributive property,* which relates the operations of multiplication and addition. Applying this property, the product of a multiplication expression such as 9×4 can be found by breaking up one of the factors. For example, $9 \times 4 = (5 \times 4) + (4 \times 4)$ or $9 \times 4 = (10 \times 4) - (1 \times 4)$. It is not important for students to name this property. They will, however, be applying it as they develop strategies to solve the problems in this unit and in later grades. For more information about the distributive property, read "Algebra Connections in This Unit" on page 16 in Unit 5.

Teaching Note

❷ **Multiplication Stories** Students' stories are often grounded in a context where things come in groups of one of the numbers in the problem. For example: "This is like having to find out how many wheels are on nine cars. You can do a few cars at a time. Five cars have 20 wheels. Now use four more cars to make nine cars. Four cars have 16 wheels. 20 plus 16 is 36, so 9 times 4 equals 36."

2 ACTIVITY
Factor Pairs

25 MIN PAIRS

Partners play *Factor Pairs.* Students continue to keep track of combinations they know and are still working on (*Student Activity Book* page 31). Encourage students to pause when they come across a fact they don't yet know and, as you did in the opening discussion, think about what they know and how it might help them.

For complete details about this activity, see Session 3.4, page 99.

DIFFERENTIATION: Supporting the Range of Learners

Intervention Work with students who are mainly counting to find the total number of squares in each array. Acknowledge that counting works, but also talk with students about what they know that could help them find the total another way. So the problem is 5 × 7. One thing we know we can do is count by 5s. [Do this together.] But I'm also curious if there's another way to find the total. I'm wondering if you "just know" any of the 5s times tables. I see on your list that you "just know" 5 × 5. Can you show me on the Array Card where we can see 5 × 5? You might also use rectangles to build the array so you can physically separate the known fact from the part of the problem that is left to solve.

3 DISCUSSION
Practicing Using Known Multiplication Combinations

15 MIN CLASS

Math Focus Points for Discussion

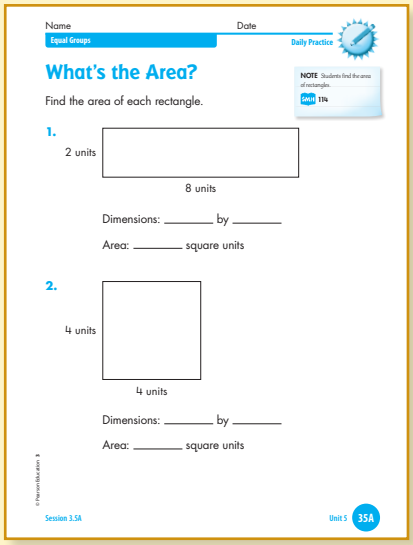
- Using known multiplication combinations to determine the product of more difficult combinations
- Using arrays, and rectangles made from square tiles, to illustrate the distributive property

End this session by looking closely at another of the easier combinations on the list of combinations students agreed were difficult to remember. As you did in Activity 1, gather known combinations that can help solve the harder combination. For each, highlight the known combination on a transparent Array Card and in a tile arrangement, and work together to figure out the part of the problem that's left to solve.

4 SESSION FOLLOW-UP

Daily Practice

Daily Practice: For reinforcement of this unit's content, have students complete *Student Activity Book* page 35A or C31.



Name Date

Equal Groups Daily Practice

What's the Area?

NOTE Students find the area of rectangles.

SMP 1 7 8

Find the area of each rectangle.

1.

2 units

8 units

Dimensions: _____ by _____

Area: _____ square units

2.

4 units

4 units

Dimensions: _____ by _____

Area: _____ square units

Session 3.5A Unit 5 35A

▲ **Student Activity Book, Unit 5, p. 35A; Resource Masters, C31**

What's the Area?

Find the area of each rectangle.

NOTE Students find the area of rectangles.

SMH 114

1.

2 units

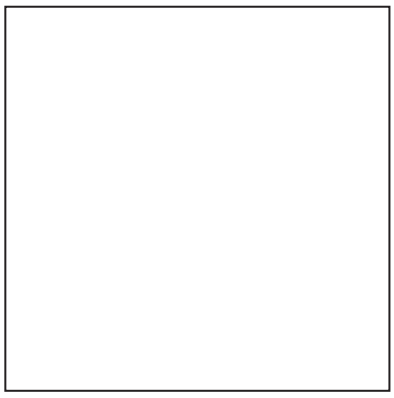
8 units

Dimensions: _____ by _____

Area: _____ square units

2.

4 units



4 units

Dimensions: _____ by _____

Area: _____ square units