

Flossing Facts

Grade 3

Activity 317

Relevant Chapters in the *Digi-Block Comprehensive Teacher's Guide*
Book III, 3-2: Combining Equal Groups of Single Blocks, pages 80-83

Overview

Students explore the distributive property of multiplication by separating larger facts into smaller parts, partial products, then combining them.

Objectives

Thinking Skills: Students use the "break apart" strategy to help them name products up to 9×9 . Students explore the distributive property of multiplication. This is the basis of the conventional algorithm used for later multi digit multiplication.

Mastery Skills: Students name facts to 9×9 .

Materials

Each pair of students needs:

- 1 block-of-100 (Have students unpack the blocks they need for each problem.)
- 1 array mat

- 1 paper strip for separating arrays: (12" long by 1" wide strip of construction paper or tag board)
- 1 "Flossing Facts" Activity Sheet

Class Introduction

(20 minutes)

Display the fact: 6×7 . Say, **Show me what this array looks like.**

- Have students use blocks on the array mats to build the array.
- Most students will show 6 rows of 7, although some may also show 7 rows of 6. Discuss this, and help students understand that the order does not matter.

Say, **Without counting every single block, how can I figure out how many blocks I have in my array? Is there a shortcut way to count the blocks?**

- Give students a few minutes to discuss their ideas with neighbors then open up the discussion to the class.
- Students will likely suggest counting by sevens or sixes. This is a good strategy but ask, **Is there a way I can use the easy, "familiar facts" I know to help me figure out a harder one like 6×7 ? Is there a smaller array "inside" this large one that can help me figure out how many there are in all?**

Show students the paper strip and ask, **How can I use this to help me?**

- Distribute strips and have students experiment with them.
- Students will likely suggest breaking apart the fact.
- Have a volunteer model breaking apart the fact. He or she may place the paper strip vertically or horizontally to break the array into smaller parts, or more "familiar facts."

Have students model and discuss how to find the product using "familiar facts":

- For example, some students may suggest placing the paper horizontally to show 3×7 and 3×7 . If so, ask, **How can this help me find the product?**
 - Students may say, "I know that 3×7 is 21 and $21 + 21$ is 42."
 - If students are ready, show how this can be written: $6 \times 7 = (3 \times 7) + (3 \times 7) = 21 + 21 = 42$.

- Place the paper strip vertically to show two smaller arrays: 6×5 and 6×2 .
 - The fives table is easy for students to name, so 6×5 is 30.
 - And 6×2 is 12.
 - So this "break" can be recorded as: $(6 \times 5) + (6 \times 2) = 30 + 12 = 42$.
- Include other suggestions from students, and help them record their "break" in a number sentence.

Tell students that they will work with a partner to "floss" more facts. Students will take turns being the "Flosser" and the Recorder. Explain that they may break the fact apart in any way that makes it easier for them to find the product.

NOTE: For those students who may already know their facts, emphasize that this is an exploration and that what they are doing will help them understand multiplying larger numbers later. Give these students facts beyond 9×9 to "floss" as well.

Student Pair Activity

(20 minutes)

Distribute the "Flossing Facts" Activity Sheet. Have partners use their blocks on their array mats to begin working.

- Be sure they record their arrays by coloring in the grid on the activity sheet. Have them draw a line on the grid to show how they separated the fact into smaller, more familiar facts.
- Students will discover that there are many ways to "floss" a fact. Have them try more than one way to check their answers!
- Those students who finish ahead may model additional facts, such as 9×6 or 7×6 .

Closure

(10 minutes)

Discuss the activity with students. Ask,

- How did you separate each fact?
- Did "flossing" make it easier for you to find the product?

- What are some of the familiar facts you used? (Students find that the fives facts and twos facts are extremely helpful.)
- Did you and your partner "see" the same familiar facts?
- How did you record what you did?

Assessment

As students are working, observe and note:

Do they -

- Represent multiplication problems with an array?
- Identify smaller facts within a larger fact?
- Understand that the sum of the smaller products is the product of the larger fact?
- Separate a fact in different ways and conclude that the final product remains the same?
- Accurately record their "break apart" strategy?
- Find the final product?

Extension

- Present 2-digit by 1-digit multiplication problems to students, such as 14×6 . Have them build arrays and identify familiar facts within them. They will likely begin to discover the $(__ \times 10)$ or $(10 \times __)$ fact within each array. This is an excellent introduction to the next step of multiplying with larger numbers

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