

# Additional Strategies: Using Properties to Add

## Lessons for Grade 1

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### Overview of Lesson

*Students use the commutative and associative properties of addition flexibly in order to add two or more numbers efficiently.*

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### Prerequisites

Use this lesson when students have used ten-frames to add with sums to 20, know pairs of numbers that have a sum of 10, and can add on to 10 ( $10 + 2$ ,  $10 + 6$ , etc.).

### Mathematical Goals

Students will:

- Know that  $a + b = b + a$ .
- Use the commutative property to add more efficiently—choosing the greater addend first and adding or counting on the lesser addend. For example, with  $3 + 9$ , it is easier and more efficient to add  $9 + 3$  and they know that either way results in the same sum.
- Use the associative property to group addends to simplify addition of three addends. For example, with  $3 + 4 + 6$ , make it  $3 + (4 + 6)$  because it is more efficient to group the addends that make 10 and add those first .

### Materials

- Ten-frames
- Tiles in two colors

### Vocabulary

(To) Group

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Associative  
Property

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Commutative  
Property

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Addends

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Sum

# Addition Strategies: Using Properties to Add

## Lessons for Grade 1

### Teaching Directions

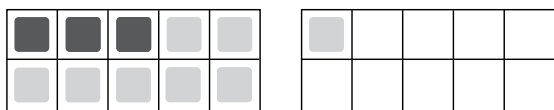
#### DAY 1

#### Using the Commutative Property

Provide ten-frames and two colors of tiles to students. Display  $3 + 8$  on the board.

$$3 + 8$$

Have students place 3 green (or whatever color tile you have provided) tiles on their ten-frames and then 8 yellow tiles.

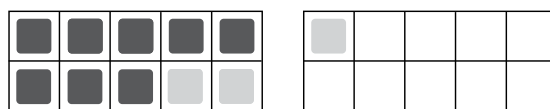


What is  $3 + 8$  as 10 plus a number?  
(10 + 1) What is 10 plus 1? (11)

Clear your ten-frame and add 8 plus 3.

Have students place 8 green tiles and then 3 yellow tiles on the ten-frames.

What is 8 plus 3? (10 + 1; 11)



What do you know about 3 plus 8 and 8 plus 3? (the sums are the same) That means that you can switch the numbers to make the adding easier for you. Let's add without the ten-frame and decide which is easier.

$$3 + 8 = 11 \quad 8 + 3 = 11$$

Now let's look at all of the ways to make 11. What other expressions make 11?

Choose one student at a time to name the sum for each addition expression.

$$3 + 8 = 11 \quad 8 + 3 = 11$$

$$2 + 9 = 11 \quad 9 + 2 = 11$$

$$4 + 7 = 11 \quad 7 + 4 = 11$$

$$5 + 6 = 11 \quad 6 + 5 = 11$$

Point to  $3 + 8$  and  $8 + 3$ . Which is easier for you to add—is it easier to start with 8 and add on 3 or start with 3 and add on 8? (Students will likely choose starting with 8 because there are fewer to add on to it.)

Point to 2 plus 9 and 9 plus 2. The sums are the same. Which way is it easier to add them? (Adding 2 onto 9 is easier than adding 9 onto 2.)

Follow this same process for 4 plus 7 and 5 plus 6.

Summarize by saying: *Starting with the number closer to 10 is a strategy you can use to make addition easier.*

Present an addition expression such as  $3 + 9$ . What other addition can we write with these numbers that will have the same sum? ( $9 + 3$ ) What is  $9 + 3$ ? (12) So then what is  $3 + 9$ ? (12) Why did we add 9 plus 3 first? (because 9 is closer to 10 and that makes it easier to add)

Have students verify that  $3 + 9 = 12$  and  $9 + 3 = 12$  with their ten-frames.

Do several more examples together with the class following the same process as with  $3 + 9$ . Use  $2 + 9$ ,  $4 + 8$ , and  $4 + 9$ . Have students verify the sums with their ten-frames and tiles.

**Vocabulary:** *Switching numbers that are being added has a name—it is called the commutative property.*

Have students say, “commutative property.”

*How does using the commutative property help to make addition easier?*

(You can switch the addition expression so that the first addend is closer to 10.)

## DAY 2

### Using the Associative Property

*We learned to switch the numbers when we added to make it easier to add without the ten-frames. Today we'll look at adding more than two numbers and grouping the ones we want to add first.*

Record  $3 + 4 + 6$ .

Say, *I know that 4 plus 6 is 10. So I will add those first. To show that we want to add 4 plus 6 first, we put parentheses around them.*

*I add 4 plus 6 and get 10 and then add 3 and 10 to get 13. When two of the addends make a sum of 10, I group them and add them first because adding on to 10 is easy.*

$$3 + (4 + 6)$$

$$3 + 10 = 13$$

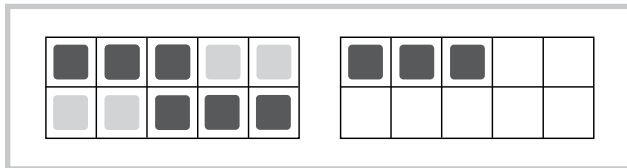
$$3 + 4 + 6 = 13$$

Verify the sum using a ten-frame.

Let's check to see if we add the numbers in order from left to right—that is  $3 + 4$  an then add on 6—would we get the same answer?

Use your ten-frames to first add 3 plus 4. Then add on 6 more.

Give time for students to do this.



$$3 + 4 + 6 = 13$$

What sum did you get? (13) So grouping the 4 plus 6 made it easier and you get the same sum either way.

Present another addition expression with three addends.

$$3 + (4 + 6)$$

$$3 + 10 = 13$$

$$3 + 4 + 6 = 13$$

$$8 + 2 + 4$$

First, I like to look for numbers that make 10. Do any of these numbers make a 10?

Have students Think-Pair-Share.

(yes,  $8 + 2 = 10$ )

So we will add 8 plus 2 first. To show that I am adding them first I will put parentheses around them to group them together. The parentheses tell me that I will be adding those two numbers first.

Place parentheses around 8 plus 2.

What is 10 plus 4? (14)

$$3 + (4 + 6)$$

$$3 + 10 = 13$$

$$3 + 4 + 6 = 13$$

$$8 + 2 + 4$$

$$(8 + 2) + 4$$

$$10 + 4 = 14$$

$$8 + 2 + 4 = 14$$

Continue presenting problems—have student pairs work together—first deciding what to add first and then, after recording the sum, checking it with their ten-frames. (Use addition problems in which two of the addends have a sum of 10:  $5 + 3 + 7$ ;  $1 + 9 + 6$ ;  $5 + 4 + 6$ ,  $5 + 5 + 7$ .) Choose students to show what they added first and then what they added on.

Explain that when we add with more than two addends, we always choose what two numbers to add first.

*We can choose to add them in order or we can look for two that have a sum of 10, because it is easier to group the numbers that add to 10.*

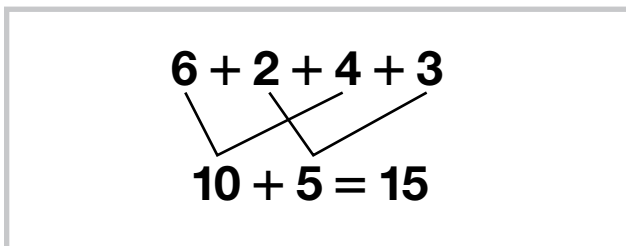
**DAY 3**

**Using More Addition Strategies.**

*Today we'll add more than three numbers, and I will show you a way to keep track of what you added so you don't have to write the numbers in a different order.*

Demonstrate adding  $6 + 2 + 4 + 3$  using branching lines as you add. Say the following:

*I know that 6 plus 4 is 10 so I'll draw lines from 6 and 4 and write 10. Then I can add 2 and 3. I know 2 plus 3 is 5, so I'll draw two lines from 2 and 3 and write 5. Then I can add 10 plus 5 to get 15.*



*Why did I add 6 plus 4 first?* (because it is easy to add to 10)

Show several more examples, asking students what they would add first. Have students draw the lines on the board to show the numbers they chose to add first. ( $2 + 4 + 3 + 8$ ;  $5 + 4 + 2 + 5$ ;  $1 + 4 + 9 + 2$ )

**Extensions**

Read the book *Out For the Count* by Katherine Cave and Chris Riddell to students. Then have students find how many things Tom gets before he is tucked in. Have students use their addition strategies to add  $3 + 6 + 4 + 1$ .