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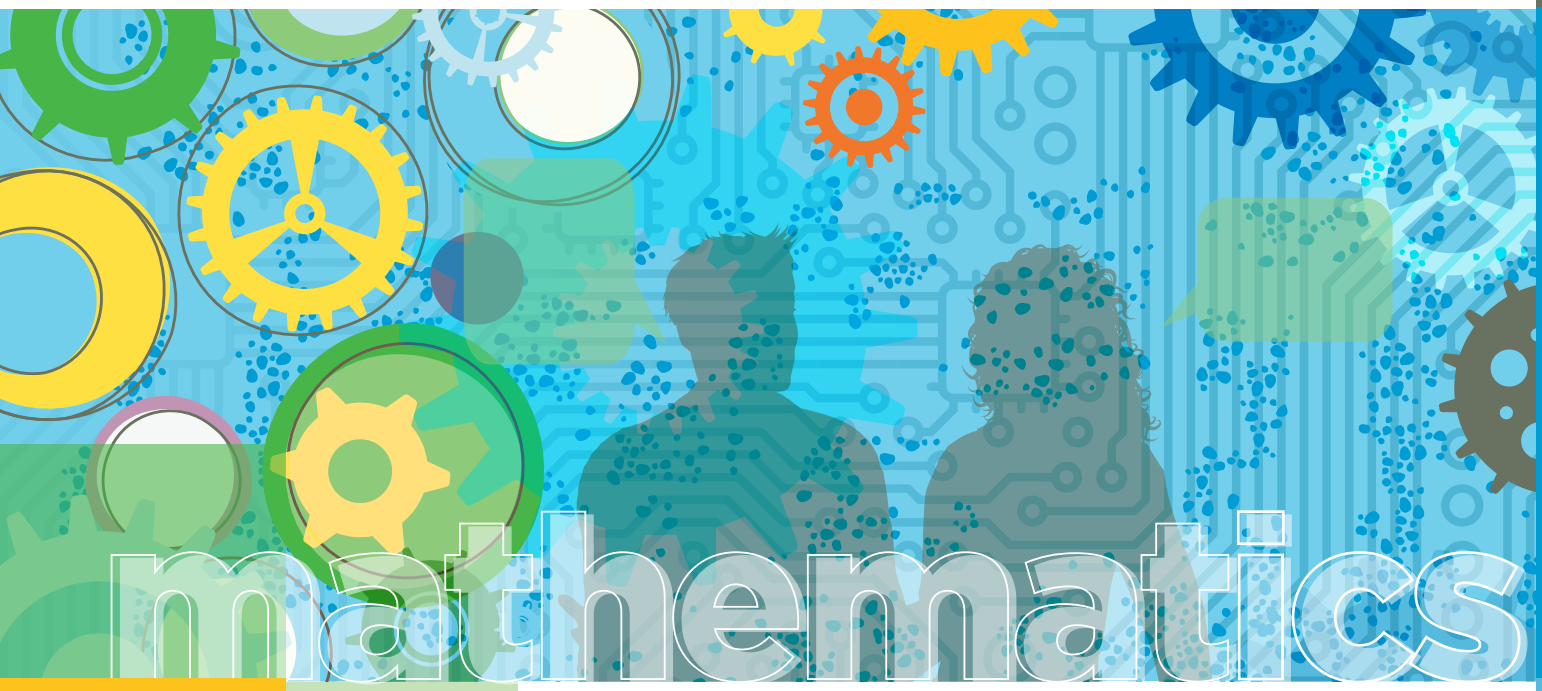

mathematics

Grade 1

Addition Strings Task

UNIVERSITY OF PITTSBURGH

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Addition Strings Task

Name_____Date_____

TASK

Addition Strings

Solve the set of addition expressions. Each time you solve a problem, try to use the previous problem to solve the next problem.

Solve each problem two different ways. Make a drawing or show your work on a number line. What pattern do you notice?

7 + 3 = _____

17 + 3 = _____

27 + 3 = _____

37 + 3 = _____

37 + 5 = _____

LESSON GUIDE

Addition Strings

Rationale for Lesson: Being fluent means that students are able to choose flexibly among methods and strategies to solve contextual mathematics problems, they understand and are able to explain their approaches, and they are able to produce accurate answers efficiently. (CCSS, 2009) Students will develop fluency by noticing patterns and relationships. They will learn to make a ten from the amounts in the ones place and then add the tens together.

Task: Addition Strings

Solve the set of addition expressions. Each time you solve a problem, try to use the previous problem to solve the next problem.

Solve each problem two different ways. Make a drawing or show your work on a number line.
What pattern do you notice?

7 + 3 = _____

17 + 3 = _____

27 + 3 = _____

37 + 3 = _____

37 + 5 = _____

Common Core State Standards for Mathematical Practice[1]	MP4 Model with mathematics. MP6 Attend to precision. MP7 Look for and make use of structure. MP8 Look for and express regularity in repeated reasoning.

1 National Governors Association Center for Best Practices (NGA Center) and Council of Chief State School Officers (CCSSO). (2014). Mathematics. *Common core state standards for mathematics*. Retrieved from http://www.corestandards.org/Math

Common Core State Standards for Mathematical Content[1]	1.NBT.C.4	Add within 100, including adding a two-digit number and a one-digit number, and adding a two-digit number and a multiple of 10, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used. Understand that in adding two-digit numbers, one adds tens and tens, ones and ones; and sometimes it is necessary to compose a ten.
	1.NBT.C.5	Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count; explain the reasoning used.
Essential Understandings	• Problems can be solved by counting all, counting on from a quantity, counting on from the largest set, or using derived facts when solving for the whole amount or the missing part of the whole. • A quantity in a set can be moved to the other set and the sets can be combined, but the whole amount will remain the same because no additional items were added or taken away (e.g. 9 + 6 = 10 + 5).	
Materials Needed	• Student reproducible task sheet • Open number line • Hundreds chart • Base ten blocks	

1 National Governors Association Center for Best Practices (NGA Center) and Council of Chief State School Officers (CCSSO). (2014). Mathematics. *Common core state standards for mathematics.* Retrieved from http://www.corestandards.org/Math

LESSON GUIDE

SET-UP PHASE

We are going to solve equations today. The goal is to use one equation to help solve another equation. Let's give it a try. Solve 7 + 3 in your head or write it down. (Call on a few students to hear their thinking.) Now, use what you know about 7 + 3 to solve 17 + 3. Go ahead and get started. Work on your own for a bit, and then you will get a chance to talk with a partner.

EXPLORE PHASE

Possible Student Pathways	Assessing Questions	Advancing Questions
Has not yet started.	How did you solve 7 + 3?	Now you are solving 17 + 3. How can you figure out the sum of 17 + 3?
Solves each problem by counting on three more. **7 + 3 = 10** **17 + 3 = 20** **27 + 3 = 30**	Show me how you solved 7 + 3, 17 + 3 and 27 + 3.	7 + 3 = 10 17 + 3 = 20 27 + 3 = 30 How are the equations similar to each other? What is changing from 17 + 3 to 27 + 3?
Makes calculation error. (Students write 17 + 3 and say 110.)	Show me how you determined the sum of 17 + 3.	Listen to your partner and see if you agree with how she solved 17 + 3. I'll be back. Let me know if you can describe her way of solving the problem.

SHARE, DISCUSS, AND ANALYZE PHASE

LESSON GUIDE

EU: Problems can be solved by counting all, counting on from a quantity, counting on from the largest set, or using derived facts when solving for the whole amount or the missing part of the whole.

- How many students just knew the sum of 7 + 3? How did you know what the sum was?
- What is the sum of 17 + 3? *(20)* How did you determine the sum was 20? *(I start at 17 on the number line and counted on 3 more.)*
- How can we use the hundreds chart to solve 17 + 3? *(I started at 17 and counted on three more.)*
- Let's use your thinking, but with a number line instead of a hundreds chart. Everyone listen because I am going to have someone explain how we can use the numberline. You held 17 in your head. (Teacher draws an open number line and places 17 on the number line.) Then, you jumped three more. (Teacher makes three jumps on the number line each time writing the next consecutive number.) What is the sum?
- Someone explain what the number line shows in your own words.
- Let's use a number line to solve 27 + 3. (Teacher draws an open number line and places 27 on the number line.) Then, you jumped three more. (Teacher makes three jumps on the number line each time writing the next consecutive number.) What is the sum?
- Can you use this method to solve 37 + 3? *(Turn 7 + 3 into 10 and then add 30 + 10 to make 40.)* (Teacher draws an open number line.) What should I places on the number line? *(37)* What should I do next and how do you know? *(Take three jumps because it says plus three.)* (Teacher makes three jumps on the number line each time writing the next consecutive number.) What is the sum?

EU: A quantity in a set can be moved to the other set and the sets can be combined, but the whole amount will remain the same because no additional items were added or taken away (e.g. 9 + 6 = 10 + 5).

- What is the sum of 17 + 3?
- Did anyone use what they knew about 7 + 3 to solve 17 + 3? *(I knew that 7 + 3 was 10 and then I added this 10 to the 10 from 17 so this makes 20.)*
- Can you use this method to solve 27 + 3? *(Add 7 + 3 = 10 and then add 20 + 10 to make 30.)*
- Can you use this method to solve 37 + 3? *(Add 7 + 3 = 10 and then add 10 to the 30 and get 40.)*
- If you know 37 + 3 then what is 37 + 5? *(I added two more to 40 and got 42.) (I did 37 + 5 more and counted 37, 38, 39, 40, 41, and 42.) (I did 37 + 3 and then added two more.)* (Teacher writes 37 + 3 + 2.)

- After you solve all of the equations, describe a pattern that you notice.
- What pattern did you notice? *(I see 7 + 3 in each problem. I see 10, 20, and 30.)*
- Who can tell us about what else happens when we see the 7 + 3 in the ones place? *(Every time we add 7 + 3 we get another ten in the tens place.)*
- If you know 27 + 3 is 30, then how does this help you solve 37 + 3? *(It's 40 because the last one was 30 and you only got 10 more in the tens place.)*

LESSON GUIDE

Application	Solve the addition expressions. Make a number line to help you solve each problem. Each time you solve a problem, try to use what you know about the other problems to solve the problems. 16 + 5 = _____ 26 + 5 = _____ 36 + 5 = _____ 46 + 5 = _____ 56 + 6 = _____
Summary	What pattern do you notice from one equation to the next? *(When the number in the tens place increases by 10 so does the sum increase by ten. For example, 17 + 3 = 20 and 27 + 3 = 30.)*
Quick Write	Write about how knowing 27 + 3 = 30 can be used to solve 37 + 3 = _____.

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