



Number Scramble

Math Concepts: Single-digits with all four operations

Materials: Dice or Playing cards for teacher

Players: Whole class

Set up: Have a place, such as a whiteboard, for the teacher to write things down. The students may want paper or some other surface for writing things down.

Play: Create random numbers with dice or playing cards. I'll assume you are using dice. Start by creating a two-digit **target** number. Roll a die once for the tens digit, and then roll it again for the ones digit. If you need to use smaller numbers, roll for the tens digit until you are within your range.

Next, create five one-digit numbers. You can either roll a group of five dice once, or you can roll one die five times. In either event, write the five digits on the board.

The challenge is to use any operation, including forming two-digit numbers, to use all five digits to get as close as possible to the **target** number. If your students are not comfortable with multiplication and division yet, then restrict the operations to addition and subtraction.

For example, suppose the roll is: 4, 4, 3, 1, 3 and 22. One player might get $4 + 4 + 3 + 1 + 3 = 15$. Another player might use $14 + 4 + 3 + 3 = 24$. Someone else might have $34 - 14 + 3 = 23$. If you allow multiplication, then $4 \times 4 + 3 \times 1 + 3 = 22$ or $(3 - 1) \times (4 + 4 + 3) = 22$ work out exactly.

Goal: Be the first to find the solution, or find the closest solution.

– DISCUSSION AND TIPS –

A fun aspect of this activity is the lively discussions you have for different ways of getting answers.

Discuss the students' strategies for finding solutions. Some will build up starting with the given numbers, and others will work backwards from the target. Work backwards by starting with the target and unraveling it (using the earlier example): Subtract 4 from 22 to get 18. Next, divide 18 by 3 to get 6. Now use 4, 3, and 1 to get 6 by doing $4 + 3 - 1 = 6$. In the end, we have $4 + 3 \times (4 + 3 - 1) = 22$.

– VARIATIONS –

Parentheses Puzzles: Parentheses puzzles are a variation on Number Scramble that are easy to create. Start with an equation, which is known only to you, such as $9 = (2 + 7) \times (5 - 2 \times 2)$. Next, remove the parentheses and write $9 = 2 + 7 \times 5 - 2 \times 2$ on the board. The challenge for your students is to take this and add back in the missing parentheses to make the statement true.

You can make this as hard as you like by having a mix of operations and making it longer and longer.

