







# Differentiating Instruction without Differentiating Students

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## Notes

<p>Open Ended Problem Solving</p> 	
<p>Interventions as Previews</p> 	
<p>Visually Stimulating Work</p> 	
<p>Fact Practice</p> 	

## KenKen puzzles:

These puzzles practice important basic arithmetic while building strong logic and problem solving skills. *Introduce* the idea of solving the puzzle *with* another person, in a turn-taking way. Model the idea of looking around for an easy place to start or to go next, by doing that yourself, and waiting for student ideas. Feel free to contribute your own ideas—after all, that's part of turn-taking—but not much, and only the simplest ideas, so students have the chance to solve "harder" situations. It's hard to learn the rules all at once before trying the puzzle, so just the briefest introduction to the rules makes sense before diving in. Start with a 4x4 puzzle, like the one shown here.

1. The only numbers you may write are 1, 2, 3, or 4. (A 6x6 puzzle requires 1 through 6.)
2. No numbers may appear more than once in any row or column. (That is, all required numbers must appear in every row and column.)
3. Each "cage" (region bounded by a heavy border) contains a "target number." If there's more than one cell in the cage, the target is also accompanied by an arithmetic operation. You must fill that cage with numbers that produce the target number, using only the specified arithmetic operation. Numbers *may* be repeated within a cage, if necessary, as long as they do not repeat within a single row or column.
4. In a one-cell cage, just write the target number in that cell.

2, -		2, -	
3, +		9, +	4
9, ×			2, ÷
4			

Here is the same puzzle with some of the numbers filled in. The two 4s are "easy" so we do them first. The two 4s are "easy" so we do them first. The 3,+ is *sort of* easy—1 and 2 are the only numbers that will work—but we don't know what *order* they go, so we just write them lightly in the middle. Aha!! But that tells us the last number that goes in that row! Enjoy finishing this puzzle.

2, -		2, -	
3, +	1 2	9, +	4
9, ×			2, ÷
4	4		

4	2, ÷		1, -
6, +		12, ×	
1, -			
	5, +		2

Next to it is a fresh puzzle for you to work from scratch.

## Who Am I? puzzles:

These puzzles develop academic language and specific vocabulary connected with discussion of place value, and provides practice with place value ideas.

Here is one puzzle about a two digit number, from *Think Math!*, grade 3 (LAB book, page 73):

### Who am I?

- I am greater than  $24 \times 4$ .
- $u < t$  (My units digit is less than my tens digit.)
- I am odd.

<i>t</i>	<i>u</i>

And here is a puzzle made up Lena, a second grader:

### Who am I?

- I am a 4-digit number.
- In my number there are only two different digits.
- The sum of all my digits is 6.
- My hundreds digit is less than 2.
- My tens digit is even.
- The order of my digits is least to greatest.

Learn more about KenKen and Who-Am-I? puzzles, how to teach them and where to find more resources on line at <http://thinkmath.edc.org/index.php/Puzzles>.