

Always, sometimes, never true

Multiples of 5 are also multiples of 10.

Multiplying numbers makes them bigger.

Adding any three consecutive numbers is the same as multiplying the middle number by 3.

To promote reasoning, mathematical argumentation, and the importance of justifying answers, we can use *always*, *sometimes*, *never true* statements, which can span a range of age groups, abilities, and mathematical topics.

What to do

Prepare a number of statements that are based on common misconceptions or beliefs and are likely to promote discussion and argumentation. Write them on index cards. The figures above show three statements discussed by fifth-grade students in relation to multiplication.

Divide the class into small groups and give each member a card. Groups can have the same, similar, or different cards. The cards can all be related to one topic or can vary according to students' needs. Provide students with the following instructions:

Consider each statement in turn and decide whether the statement is always true, sometimes true, or never true. Then give reasons why.

Be prepared to challenge and extend students' responses, asking them to think of examples and counterexamples:

Student: If I multiply a number by another number, it has to be bigger, like six times three is eighteen, which is bigger than six.

Teacher: What if you multiplied six by one or by one-half? Is that going to be a bigger number?

This idea was adapted from Malcolm Swan (<http://www.nottingham.ac.uk/education/people/malcolm.swan>). For more statements related to different grade levels, see the more4U box below.

Tracey Muir, Tracey.Muir@utas.edu.au, lectures in mathematics education at the University of Tasmania in Australia. She is interested in students' thinking, and she conducts regular professional learning with in-service teachers. Edited by Martha Hildebrandt, mhildebrandt@chatham.edu, who teaches graduate and undergraduate mathematics education and mathematics courses at Chatham University in Pittsburgh, Pennsylvania; and by Cathery Yeh, catheryy@uci.edu, a graduate student in the School of Education at the University of California–Irvine. Submit your quick game, puzzle, activity, or instructional strategy along with suggestions for how teachers of different grade bands (K–1, 2–3, 4–6) might use the idea. Send submissions of no more than 250 words to this department by accessing tcm.msubmit.net.

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Download one of the free apps for your smartphone to scan this code for additional task cards or go to www.nctm.org/tcm074.



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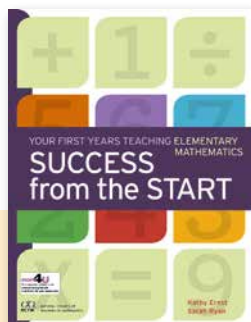
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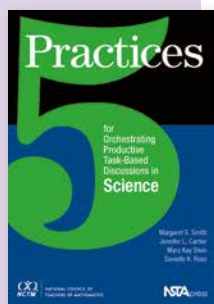
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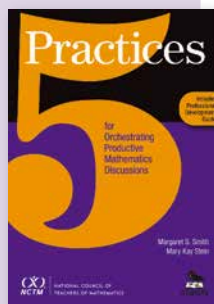


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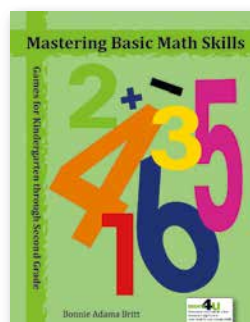
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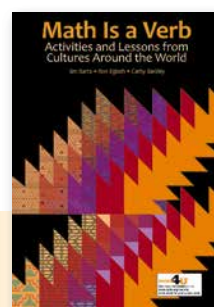


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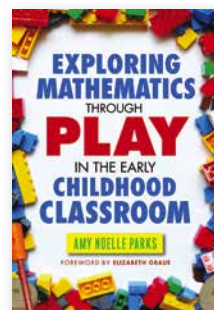
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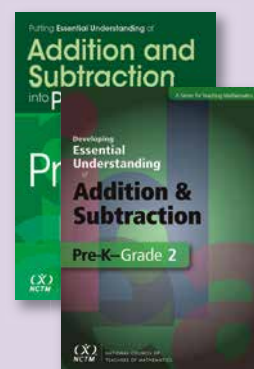
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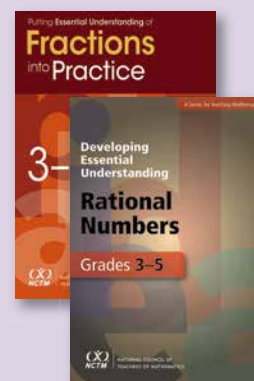
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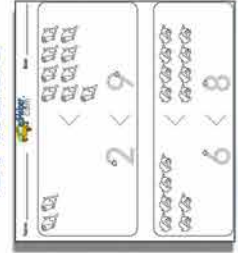


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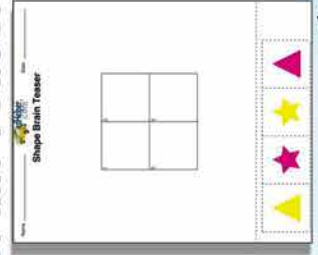
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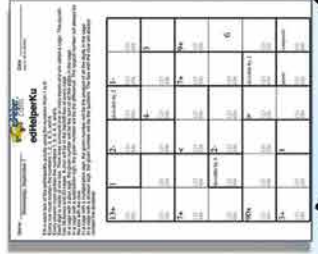
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