Increasing Fluency through Games

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Please stand up if...

This is your first time to WMC

You have been a teacher for more than 10 years

You are an elementary teacher

You are a secondary teacher

You are a math interventionist, coach, or Title I teacher

You are an administrator

Your birthday is today
Agenda

What the research says
Dice Games
Card Games
Domino Games
How to access our materials
Research
<table>
<thead>
<tr>
<th>Issue/Concern: Why should I play games in my mathematics classroom?</th>
<th>1) My own thoughts</th>
<th>2) Find a partner: what else can you add to your answer</th>
<th>4) Find another group of 2: what else can you add to your answer.</th>
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<td>8) Find another group of 4: what else can you add to your answer.</td>
<td>Summary</td>
<td>Summarize your final thoughts here</td>
<td></td>
</tr>
</tbody>
</table>
“I think that incorporating games into math teaching is beneficial for:

● providing students practice with skills;
● giving students ways to apply mathematical ideas to problem-solving situations and develop strategic thinking, important aspects of mathematical thinking;
● building students’ interest in and appreciation for mathematics by engaging them in enjoyable activities and challenges;
● supporting the idea that learning can (and should) be as fun as possible;
● creating a class menu of choice activities that are educationally valuable and provide options for those students who complete assignments more quickly than others.”
Why Play Math Games?

- Playing games encourages strategic mathematical thinking as students find different strategies for solving problems and deepen their understanding of numbers.
- When played repeatedly, games support students’ development of computational fluency.
- Games present opportunities for practice, often without the need for teachers to provide the problems. Teachers can then observe or assess students and work with individuals or small groups of students.
- Games have the potential to allow students to develop familiarity with the number system and with “benchmark numbers” (such as 10s, 100s, and 1000s) and engage in computation practice, building a deeper understanding of operations.
- Games support a school-to-home connection. Parents can learn about their children’s mathematical thinking by playing games with them at home.
Enriching Addition and Subtraction Fact Mastery through Games

Jennifer M. Bay-Williams and Gina Kling

- Several research-based elementary curricula rely heavily on the use of games to provide engaging practice for their students, often replacing routine pencil-and-paper tasks.
- Children’s enthusiasm for such games cannot be overestimated; very often when working with first and second graders, we have found students reluctant to stop playing when time is up!
- Games may be designed for either targeted practice (on a particular group of facts) or general practice (all facts for a particular operation), and the strategic use of such games can help move students along the different phases of fluency.
- As children play games, you can observe and interview individuals to monitor their progress through the phases (Kling and Bay-Williams 2014). These forms of assessment provide better data, while replacing the need for timed tests, which potentially have a negative impact on children (Boaler 2014).
Playing Games in Classroom Helping Pupils Grasp Math

Sean Cavanagh

- Games offer math teachers a way of practicing and reinforcing arithmetic and other math skills, as well as supplementing a sole diet of drills and practice-problems. Not only do games engage students, they also present the opportunity to present “high level” math concepts in a colorful and simple way. - Andy Isaacs, the director of the third edition of Everyday Mathematics

- “There’s a huge amount of math in these board games and card games that is not on television and video games. Even if you played once or twice a week, it would probably have a real effect on kids.” - Douglas H. Clements, a professor of learning and instruction at the State University of New York at Buffalo.

- In the late 1980s, Ms. Griffin developed Number Worlds, a program that uses specially designed board and card games and other activities to promote math understanding among struggling pupils in early grades. - Sharon A. Griffin, a professor of education at Clark University in Worcester, Mass.

- “Young people learn a great deal about the world through play, and games are one source of play,” said Mr. Siegler, a professor of cognitive psychology at Carnegie Mellon University in Pittsburgh. And when it comes to learning math, he added, “the games that build understanding of numerical magnitudes are crucial.”
Playing and learning mathematics do not have to be mutually exclusive, especially in kindergarten classrooms.

The home numeracy environment is a significant contributor to children’s early math skills (Niklas & Schneider, 2014), and teachers can help parents find ways to engage children in playful math activities that complement the classroom curriculum. Teachers could include parents in a family game night at school and provide guidance for how parents can talk about math while playing games.
Dice Games
Shut the Box 9

- Addition facts: sums to 12 (6 + 6)

Shut the Box 12

- Addition facts: sums to 12 (6 + 6)
- Multiplication facts: products to 36 (6 x 6)
Exponent Ball

- Solve the value of a number with an exponent

Multiplication Baseball

- Multiplication facts - 1-12
**Bump Game**

- Adding 2 to 4 numbers to find a total, then decomposing that number to strategically cover as many numbers as possible and/or “bump”/remove opponent’s counter(s) off of the board
- Variation of adding a two-digit number to a single digit number or subtracting a single digit number from a two-digit number

**Three in a Row**

- Add and/or subtract 4 numbers to find a total
- Variation - multiply, add, subtract numbers for a total
Cards Games
Salute

- Addition or multiplication facts
- Missing addends or multiplicands

Garbage (Ten in a Row)

- Place on a number line
- Finding numbers (1-10) on a number line without having to count
Ninety-nine

- Add and subtract numbers up to 99

Speed

- Quickly recognize numbers that come before and after a number card
War Variations

Addition
- Single digit + single digit
- Double digit + single digit
- Double digit + double digit

Subtraction
- Single digit - single digit
- Double digit - single digit

Multiplication
- Single digit x single digit
- Double digit x double digit

Positive/Negative Integers
Fractions
7 Number
Dominoes
Domino Pick-Up

- Subitizing 0-9
Concentration Variations

- Matching numbers - different combinations of pips totaling the same number (ex. 3 and 5 = 6 and 2)
- Fact work - two dominoes have to add up to 10 (or a different target number) together (ex. one domino has 3 and 4, the other one has 2 and 1)
- Fraction or decimal - form a fraction or decimal on each domino turned over (6 and 2 could be 2/6 or 6/2 or 3, or 6.2 or 2.6); the two turned over have to equal 1 or less
Other Games
Factor Captor
Beat the Calculator
Broken Calculator
Cribbage
Set card game and app
Resources


Contact Us

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