



From the TCDSB
Mathematics Dept

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MENTAL MATH

Addition using Digits of Same Units

thinkMATH@home

What is Mental Math?

- Mental math is often used as a way to calculate, estimate and/or visualize mathematical computations and relationships in one's head.
- Mental strategies were previously learned conceptually with and without the use of paper/pencil calculations and math tools.

How would you determine the sum of these four 4 digit whole numbers (or 4 addends)?

$$3411 + 2324 + 4142 + 1233$$

- Would you add the first 2 numbers, then add on the 3rd number, followed by the 4th number? Or would you add the thousands, then hundreds, tens and ones?
- If you know $3411 + 2324 + 4142 + 1233$, does it help you to determine the sum for $34.11 + 23.24 + 41.42 + 12.33$?
- If you know $3411 + 2324 + 4142 + 1233$, does it help you to determine the sum of $34.11 + .2324 + 414.2 + 1.233$?

Key Mathematical Idea

- Whole number units for digits include ones, tens, hundreds, thousands, ten thousands ...
- Decimal number units for digits include tenths, hundredths, thousandths ...
- Addends are the number of numerals in an addition expression or equation.

If you know that $1+2+3+4=10$, then you know:

- $1 + 2 + 3 + 4 = 10$ ones = 10
- $10+20+30+40 = (1+2+3+4)$ tens = 10 tens = 100 ones
- $100+200+300+400 = (1+2+3+4)$ hundreds = 10 hundreds = 100 tens = 1000 ones = 1000
- $1000+2000+3000+4000 = (1+2+3+4)$ thousands = 10 thousands = 100 hundreds = 1000 tens = 10 000 ones = 10 000

Sample - Grade 2 Learning Goal and Success Criteria

Add 1 digit whole numbers, with 4 or more addends by using the commutative property for addition to make compatible numbers ($2+3=5$; 2, 3 are compatible numbers).

- $1+3+4+2=1+4+3+2=5+5=10$ ones
- $1+2+3+4+1+3+4+2 = 10$ ones+10 ones
 $= 1+1+2+2+3+3+4+4 = \text{double ten ones}$
 $= 2+3+2+3+1+4+1+4 = 4$ groups of 5
 $= 20$ ones

Possible Sequence of Mental Math Questions for 2 Digit

- $1+2+3+4$ (change order then double addends (e.g., $1+2+3+4+1+2+3+4$))
- $10+20+30+40$ (change order, then double addends)
- $11+22+33+44$ (change order, then double addends)
- $12+23+34+41$ (change order of numeral, then change digits within numeral, then double addends)

Create Mental Math Practise Questions

Create addition questions, using (1 digit (ones); 2 digit (tens, ones), 3 digit (hundreds, tens, ones), 4 digit (thousands, hundreds, tens, ones) and so on.

Numbers to use for:

- grade 2 (1-digit; sum to 18)
- grade 3 (2-digit or less)
- grade 4 (3 digit or less)
- grade 5 (4 digit or less)
- grades 6 to 9 (any size digit number)

As the next set of mental math challenges, start with $6+7+8+9 = 15+15 = 30$ in place of $1+2+3+4 = 5+5 = 10$

Helping Your Child Learn Mathematics AT HOME

Developing a Growth Mindset for Loving and Learning Mathematics

Jo Boaler identifies several norms that contribute to a positive and productive mathematics learning environment. Consider ways that these norms can be established in your home, a mathematics learning environment for your child.

- **Everyone can learn math to the highest levels.** Students who have a growth mindset believe “that they can learn anything, and the more work they do the smarter they will get.” Students need to know that they can learn math and there is no such thing as a math person.
- **Mistakes are valuable.** “Mistakes grow your brain! It is good to struggle and make mistakes.”
- **Questions are really important.** Encourage your child to ask questions. (e.g., Why does that work? How does one strategy relate to another strategy?)
- **Math class is about learning not performing.** “Math is a growth subject, it takes time to learn and it is all about effort.”

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NEW!!! TCDSB Family Math site for information and math learning resources

Helping Your Child Learn and Love Mathematics

Parents, school and the local community have the shared task of nurturing our students' confidence in learning mathematics and in applying their mathematical knowledge to solve real-life problems. The disposition of appreciating and enjoying mathematics is necessary for our students to persevere in learning mathematics with depth and precision and to continuously improve the clarity of their mathematical communication. It is common knowledge that parent's/guardian's attitudes toward mathematics has an impact on children's attitudes towards mathematics. In fact, students whose parents/guardians show an interest in and enthusiasm for mathematics around the home will be more likely to develop that enthusiasm themselves and persevere to learn and succeed in Mathematics.

Participate in your child's learning of mathematics by:

- demonstrating a positive attitude towards mathematics learning
- expecting your child to do and solve mathematical activities and problems
- encouraging your child to persevere when the mathematical work becomes difficult
- appreciating different ways to calculate and solve math problems
- listening carefully to your child's explanation of a solution to a lesson problem
- estimate and count everything and anything in different ways (forwards, backwards, by 2s, 5s, 10s, 100s)
- playing board and card games
- solving jigsaw puzzles, number puzzles and logic puzzles
- building models with different materials (e.g., lego™, stacking blocks, rolled newspaper tubes, popsicle sticks)
- involving your child in household activities that involve math. (e.g. measuring in the kitchen, making patterns in the garden)
- looking for and describing mathematics in the books you read with your child. (e.g. find patterns, count objects, find shapes, identify probability)
- support homework completion by being a co-learner and providing encouragement to persevere to think mathematically

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Resources for Mathematics Learning

About Ontario Mathematics Education
EQAO: Parent Resources
Ministry of Education Parent Publications (from the Ontario Ministry of Education)

Activities
Fun 4 The Brain
Illuminations (National Council for Teachers of Mathematics)

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