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MATH

ONTARIO ASSOCIATION FOR MATHEMATICS EDUCATION

Abacus

Volume 61 • Number 4 • June 2023

MATH AT HOME: HOMEWORK AND OTHER CONSIDERATIONS TO SUPPORT PARENTS

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A Publication of the OAME/AOEM

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IN THIS ISSUE

With summer almost upon us in Canada, and knowing the multiple benefits of having a strong relationship between home and school, we decided that this issue will focus on math in the home. We have suggestions for the classroom and some nice, easy-to-use ideas and resources teachers can provide caregivers.

Our guest author (Dr. **Carolyn Clarke**) shares her findings about homework and math. She highlights very important parent perspectives and has many helpful questions that all math teachers should ask themselves when assigning homework.

For the first time ever in the history of the *Abacus*, we also include a free printable section that teachers can share with caregivers. Yes, that's right! Just print off the last three pages of this issue and send it home with students so that they can keep up their math skills at home over the summer. Specifically, we highlight all the math that can be drawn out from giving children allowance, and include easy tips that any adult can use when giving children allowance to expand and elevate mathematics learning at home.

Our lesson insert is about decimals. In line with giving an allowance, we make recommendations about how thinking about money can help students solve arithmetic problems. In other words, when students are struggling with computing problems involving decimals, caregivers and teachers can suggest that students think about the problem in terms of money.

MATHEMATICS: A HOMEWORK STRUGGLE

By Carolyn Clarke

This article documents the findings of a study about homework carried out with families of Grade 3 students in two different communities in Newfoundland, Canada. During one school year, I interviewed ten families on three separate occasions. All of the families identified mathematics homework as an area of concern. Data analysis revealed three tensions related to mathematics homework: a) mathematics has moved from memorization to process, b) parents (including guardians) are unfamiliar with the changed language, and c) mothers are providing the primary support, despite having poor previous relationships with mathematics. Based on the findings from this study, I will conclude with how teachers can reframe homework in mathematics.

a) Mathematics has moved from memorization to process.



Many parents were unfamiliar with mathematics as a subject that focuses on processes such as problem solving, communication, and strategies. This is a move away from the "drill and kill" approach that most parents experienced as students—doing hundreds of practice questions. Many curricular changes in mathematics have led to misunderstandings around aspects of children's mathematics homework. Mathematics curricula being far removed from what parents were familiar with while they were in school caused tension.

> *One mother explained:*
>
> *"When we were in school, we did our multiplication, and it was all memorization, but it's not like that now. Like division, for example, I showed her [daughter] an easier way to do it, but she did not like that."*

Parents are inclined to "teach" children the "old" way of doing long division or multiplication, and as a result, children often become upset with parents because they insist on using a different method from what they learned at school.

b) Parents Unfamiliar with Changed Language

Some of the struggles encountered with mathematics homework happened when parents were not familiar with the language of mathematics. For example, their children no longer talked about "borrowing and carrying" in subtraction and addition. Instead, they used language like "trading" to describe borrowing because their understanding grew from regrouping blocks. This change in mathematical language was captured in one of the parents' comments: "We used to carry and borrow, and they trade [now]… so I have to watch the terms so I don't confuse him [son]." Not being familiar with the language of mathematics can influence parents' confidence. As Lee and Bowen (2006) note, some parents feel less confident because of their "lack of familiarity with educational jargon" (p. 198).

> *"I am not very smart at this [mathematics]."*
>
> *"I didn't have a clue how to do it… and I knows (know) I done [did] it wrong, but it's just that I couldn't remember."*
>
> *"I'm not a lover of math… I stay away from the math."*
>
> *"But these kids, they're like their father for math… thank goodness."*
>
> *"I'm thinking I have a Grade 3 child and I can't help her? It's almost that far out there you'd never think [it's possible]."*

c) Mothers as the Primary Support and Negative Narratives of Girls and Math

Although the literature about homework and schooling often refers to parents and families, the reality is that homework is largely the responsibility of mothers (Doherty & Dooley, 2018; Reay, 1998). This is particularly problematic for homework in mathematics because mothers tend to lack confidence in their ability to help their children with mathematics (Walkerdine, 1998). In this study, mothers' lack of confidence was apparent in their comments regarding mathematics.

Attempts to Reframe Homework

Many teachers have attempted to reframe "homework," using games and activities. For example:

- *Snakes and Ladders, Dominoes, Lego®*
- *Using literature to launch investigations for counting, shapes, patterns, numbers, etc.*
- *Going for a geometry walk in the community*
- *Focusing on communication: explaining, reasoning, justifying, etc.*

What the Study Means for Practice

Results from this study highlight the importance of: a) carefully considering what gets sent home, and b) how families will be impacted by what gets sent home. Prior to assigning mathematics homework, teachers should ask themselves the following questions:



- What is the purpose of the homework?
- Will the student require support? If so, what will you be asking parents to do?
- Does the homework elicit parents' funds of knowledge, or will the homework position the family at a disadvantage?

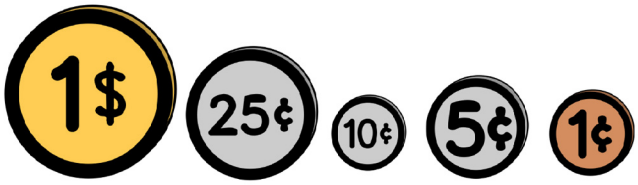


LESSON IDEA FOR SOLVING PROBLEMS INVOLVING THE ADDITION OF NUMBERS WITH DECIMALS, USING MONEY

Problem: How can you solve 1.55 + 0.61?

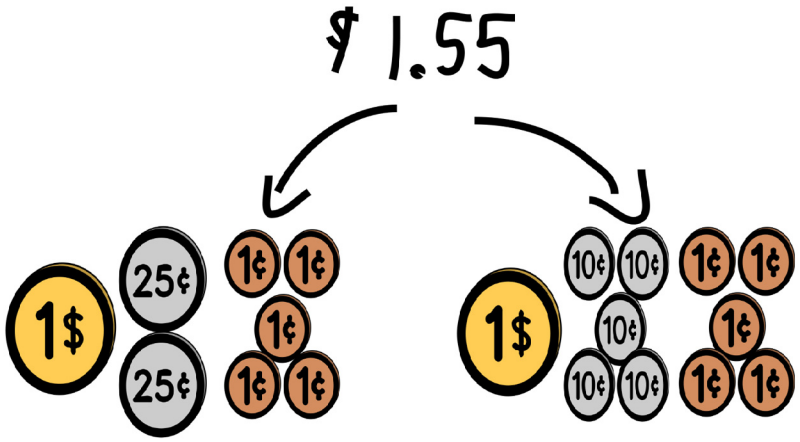
Curriculum Expectations:

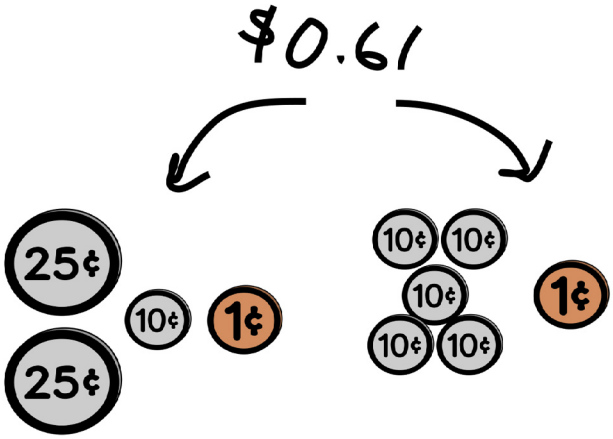
Grade 4:	Grade 5:	Grade 6:
B2.4 represent and solve problems involving the addition and subtraction of whole numbers that add up to no more than 10 000 and of decimal tenths, using appropriate tools and strategies, including algorithms	B2.4 represent and solve problems involving the addition and subtraction of whole numbers that add up to no more than 100 000, and of decimal numbers up to hundredths, using appropriate tools, strategies, and algorithms	B2.4 represent and solve problems involving the addition and subtraction of whole numbers and decimal numbers, using estimation and algorithms



Quick Tip

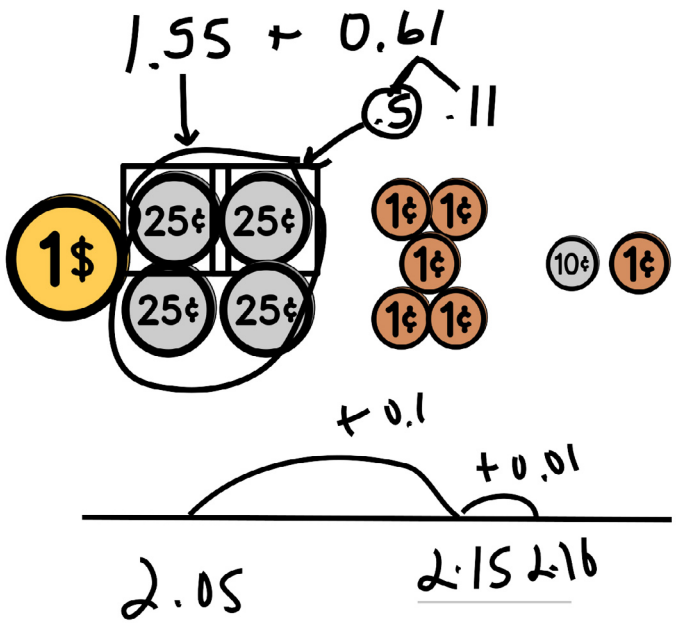
Use coins or paper cut-outs of coins and make different arrangements to show the same amount.



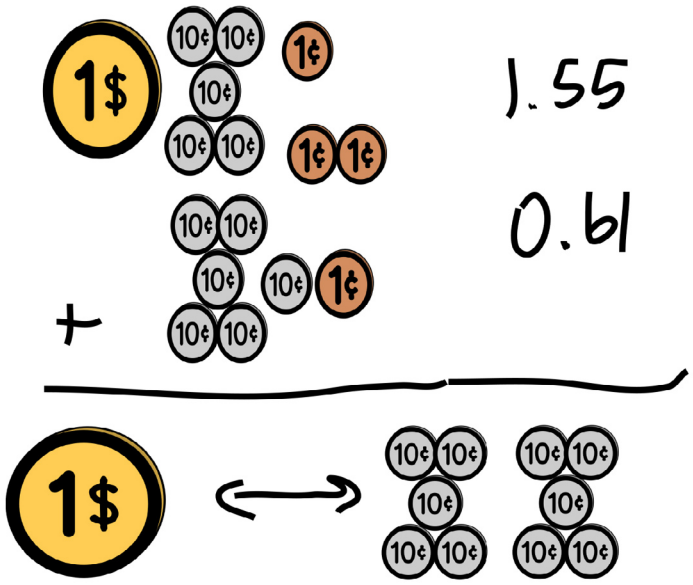


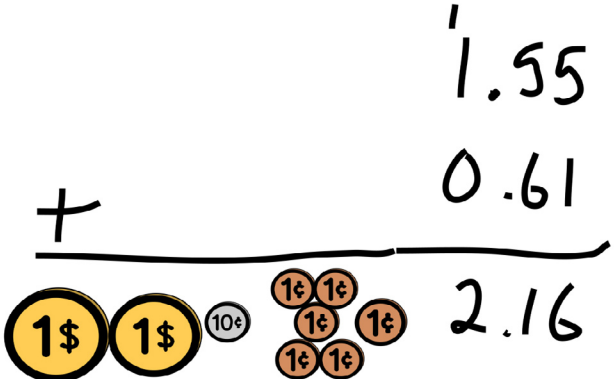
Anticipated Solution Strategies

Splitting 0.61



Adding 1's, then 10's





Quick Tips

- *Look for similarities and differences between solution strategies.*
- *Ask questions that provoke students to look for numbers produced in one solution in another (e.g., compare the way 25 is represented).*

ENDING (Consolidation)

Have students analyze and compare solutions:

- "How are these solutions different or the same?"
- "If your solution was not talked about, which of the solutions was most similar to yours?" "Which one was it most like?" OR "Which one was most different from your solution?"

AFTER (Next steps and practice)

- If appropriate, the teacher can challenge students to pose their own questions to classmates who would use the same strategy to solve a problem.
- Students create their own written document of the strategies shared.
- Students can make their own word problems for the question.

Ages 3-6



- Start off with a jar full of $1 bills (or the equivalent based on your currency).
  - In Canada, start with a jar full of loonies.
- Encourage children to make piles of fives.
  - If using coins, you can start to spatially place them based on how numbers appear on dice.
    - For example, four loonies can be placed like:



    - Five loonies can be placed like:



- Slowly add quarters.
- Slowly add in $5 bills and take them away too.

TOP TIPS BY Age



Many parents give around $1 for each year of their child's age. For example, a 5-year-old could get $5 per week.

Ages 10+



- At this age, children can start to think of percents. Remember that percent literally means "per cent" or "per hundred."
- Many financial experts suggest that 10% be saved and 5% be donated.
- At this point, you can strategically start to fill up the jar with bills. For example, if children are 15 years old, make sure to only have $20 bills. When they get their allowance, they will need to give $5 and take a $20 bill.

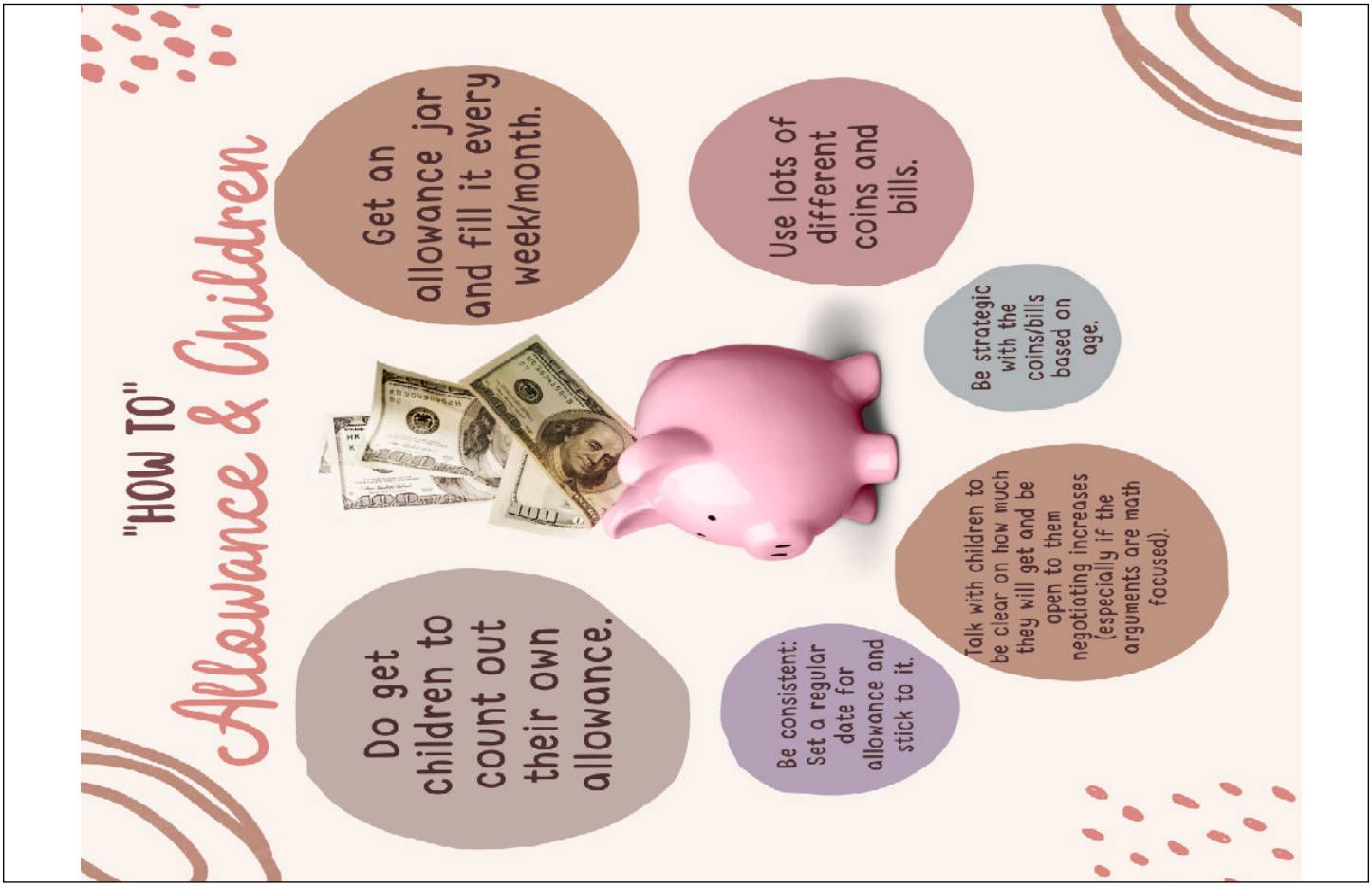
Ages 6-9



- Start off with just a few loonies/dollar bills and have lots of quarters.
- Encourage children to make piles that add up to $1 (e.g., a stack of 4 quarters could make up a pile).
- Ask children to spatially place coins so that you can easily see the total amount at a glance.
    - For example, $6 worth of coins can be placed in a group of five dollars (4 loonies and 4 quarters) and one pile of 4 quarters:



- Once your child is comfortable with quarters, start to add dimes.
- Once your child is comfortable with dimes, start to add nickles.
- Children often struggle with coming up with different ways of making amounts like 35 cents and 45 cents. Show them that 35 cents can be made with a quarter and a dime or three dimes and a nickle.



MOVING FORWARD: PARENT FRIENDLY ABOUT MATH AT HOME

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