

Math Lesson – We Pay The Tax

Outcomes or Learning Goals

- Solve problems involving fractions and percentages in practical situations (9)
- Round money values to the nearest cent in applications drawn from everyday situations (9)
- Solve problems involving money drawn from everyday situations (9)
- Write money values, using correct units (9)
- Demonstrate the effective use of a calculator in operations with decimals and percentages (9/10)
- Communicate information about money sense (10)
- Verbalize their observations and reflections regarding money sense and ask questions to clarify their understanding (10)
- Explain their reasoning used in problem solving and in judging reasonableness (9/10)
- Develop, select, and apply problem-solving strategies while posing and solving problems (9/10)

Grade Levels 7 - 10

MAT1LZ – Locally Developed Math grade 9

MAT2LZ – Locally Developed Math grade 10

Context & Rationale

In the book *We Pay The Tax*, students read about two boys who enter a store in Canada for the first time and discover they have to pay HST on their order. This true story illustrates the need for newcomer students to learn how the final prices of many items and services are affected by the addition of a sales tax. With this knowledge, the student can determine exact prices and effectively manage their money. The concepts presented in this lesson directly relate to students' everyday shopping needs and are especially valuable for newly-arrived students as they acquire the financial literacy skills necessary for successful orientation in their new home.

Please note: Some students in the class currently may not be prepared with prerequisite studies of fractions, decimals, and percent. Although the teacher may choose to teach the calculator steps to find sales tax it is recommended that the teacher first provide students with opportunities to develop their conceptual knowledge of ratio, rate and percent first. Refer to the Ministry of Education document, *Gap Closing Resource* (www.edugains.ca) and the grade 4-6 math guides for Rate, Ratio and Percent. A diagnostic assessment is provided in the *Gap Closing Resource* to help teachers identify areas of need.

Related Topics/Units

As students use the related picture prompts to create their own problems, specific mathematical skills and financial concepts will emerge, such as the use of decimals and appropriate operations on a calculator; the relationship of decimals, fractions, and percentages; applications of multiplication and addition; rounding to the nearest cent; and the use of multi-step problems. The teacher can adapt these problems based on the differentiation needs within the class as well as use them to introduce, practise, review, or consolidate concepts.

Number Sense and Numeration Skills from the *Ontario Elementary Mathematics Curriculum* that link well to this lesson:

- Read and represent money amounts to \$100 (gr. 4)
- Represent, compare and order decimal numbers to tenths (gr. 4)
- Round decimal numbers to the nearest tenth, in problems arising from real-life situations (gr. 5)
- Read and write money amounts to \$1000 (e.g., \$455.35 ie. 455 dollars and 35 cents, or four hundred fifty-five dollars and thirty-five cents) (gr. 5)
- Add and subtract decimal numbers to hundredths, including money amount, using concrete materials, estimation, and algorithms (gr. 5)

By introducing the concept of taxation, the story *We Pay The Tax* opens many possibilities for inquiry-based studies that respond to the questions students bring. Opportunities to research, report, and debate issues of taxation can help to expand students' understanding of the life-long financial responsibilities of taxpayers and government. In addition, they will learn that by paying taxes, they are contributing to the many government services, supplies, and benefits provided for the people of the province.

Useful Resources

Ministry of Education Ontario: Guides to Effective Instruction in Mathematics, Grade 4-6:

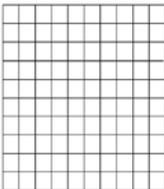
Volume 1: **Big Ideas** for an explanation of the key concepts in number sense and numeration across the junior grades, as well as appropriate models and tools that support students in understanding these concepts

Volume 5: **Fractions** for an explanation of the mathematical models and instructional strategies that support student understanding of fractions

Volume 6: **Decimals** for an explanation of the mathematical models and instructional strategies that support student understanding of decimals

Lesson Sequence

Part 1 Minds on/Prior Learning (15 - 20 minutes)	What to Prepare
<p style="text-align: center;">Activity</p> <p>Remind students of the book they read, <i>We Pay the Tax</i>. Tell them they will be making and solving math problems by using some ideas from the story.</p> <p>Display a receipt using a projector or distribute examples to partners among the group. Ask what they notice about the receipts – What is included? What are the characteristics of receipts? Why are receipts important?</p> <p>Ask – If you buy a piece of pizza, how much is the price on the sign? Is that what you pay? (<i>No, they add HST.</i>) How much is the HST?</p> <p>Can they estimate 10% of the slice price? 20% of the slice price? Do they know HST is 13% - between 10 and 20%?</p> <p>Begin the “<i>We Pay The Tax Math Prompts</i>” Powerpoint to activate prior knowledge and to facilitate the creation of the math problems for the lesson. If desired, the teacher may use the following prompts with the slides.</p> <p>Slide #2 Ask a student to briefly review the story of the two boys and their trip to the store.</p> <p>Slide #3 What information do we have about the menu?</p> <p>Slide #4 Remind students of the cashier’s explanation of HST.</p> <p>Slide #5 Briefly ask what they notice on the receipt.</p> <p>Slide #6 <i>What math questions come to mind when looking at the receipt and menu?</i> Sample responses to anticipate: (varying levels of difficulty) How much would I pay for _____? <i>How much would I pay for _____ + _____?</i> <i>What would my receipt look like if I bought _____?</i></p>	<ul style="list-style-type: none">• Bring a few purchase receipts to show examples of subtotals, HST, and totals• Ability to show large calculator display on computer, overhead calculator, etc.• Calculators for partners• Math manipulatives and models such fraction/decimal/percent comparison cube towers and circles• Accompanying Powerpoint “<i>We Pay The Tax Math Prompts</i>”• Display board and/or chart paper and markers• Students seated with an elbow partner <p>Prior Knowledge Needed:</p> <ul style="list-style-type: none">• Writing money with \$ and decimal points• Understanding of addition and multiplication• Understanding of 10% of an amount• Concepts of estimation and rounding to nearest hundredth• Adding and multiplying decimals on a calculator

Part 1 Minds on/Prior Learning (15 - 20 minutes)	What to Prepare
<p>To provide more challenge, Slide #7 can be added. The questions that might be anticipated here:</p> <p><i>If I have \$10, what could I buy?</i> <i>Do I have enough money to buy ____ and ____?</i></p> <p>Slide #8 <i>As a class, co-create the question(s) to be solved and post in an accessible location or record on Slide #8 to remain displayed.</i></p> <p>Differentiation needs: For students who are struggling or requiring a more challenging question, the teacher can have the students use fewer or more slides to create a question.</p> <p>Consider choosing an alternate, easier parallel question for some students to explore.</p>	
<p style="text-align: center;">Assessment For Learning</p> <p>Observe student remarks and questions during the Minds On discussion of the slides and creation of questions:</p> <ul style="list-style-type: none"> • Do students understand 10%? Use a 100's grid with portions shaded to demonstrate. • Do students use the calculator keys for operations, numbers, and % correctly? • During the question creation discussion, which students created an easy question or more challenging question? What might have been the factors influencing the students who created the easy questions? • What vocabulary strengths/needs are evident during the class discussion and partner talk? 	<p>Make a note of any students who will need additional support or would benefit from a more challenging problem.</p> <p>100's Grid: Have students shade in 10 boxes to represent 10%.</p>  <p>Vocabulary/concepts:</p> <p>10% ten percent</p> <p>10 per hundred</p> <p>% is a rate where the total is set at 100 units</p>

Part 1 Minds on/Prior Learning (15 - 20 minutes)	What to Prepare
<p style="text-align: center;">Part 2 – Work on it (25 – 30 minutes)</p>	<p>Before beginning work:</p> <ul style="list-style-type: none"> • Read/review/co-create appropriate terms for the math word wall. (<i>total, tax, subtotal, HST, change, etc.</i>) • Show class various materials they might choose to use when solving their problem: <i>calculator, BLM#1, BLM#2 in multiple copies for receipt draft attempts</i> <p>Keep recorded question on chart paper or Slide #8 displayed for student reference during the work period.</p>
<p style="text-align: center;">Activities During Work Period</p> <ul style="list-style-type: none"> • If it relates to the questions created by students, provide BLM#1 (two smaller copies for drafts of receipts) or BLM#2 (one large copy to support students' organization of work). • Students work with partners – possibly they are making receipts based on the question they created, or they are using grid chart paper. • Have students work in pairs to calculate the HST. Students should be encouraged to use a variety of strategies; mental math, ratio table or calculator • Prompt students to check the reasonableness of their answer: can they use benchmarks such as 10% and 20% to help them check? • Observe for opportunities to assist with rounding the tax to the nearest cent. • Teacher visits partners to clarify the question they are answering and remind students of the picture and information in the ad. • The teacher may choose to have the students work with a partner or in small groups, depending upon the composition of the class. 	<p>Supply a Variety of Tools:</p> <ul style="list-style-type: none"> • Large grid chart paper and markers <p>Ratio Table example:</p> <p>Total: \$4.20</p> <p>10% is .042</p> <p>1% is 0.042</p> <p>3% is 0.126</p> <p>So 13% is 0.546 or \$0.55</p>

Part 1 Minds on/Prior Learning (15 - 20 minutes)	What to Prepare
<p style="text-align: center;">Assessment</p> <p>Allow students time to get started and then move around the room to observe each group. Listen to the discussions.</p> <ul style="list-style-type: none"> • Are they using math vocabulary? (<i>total, subtotal, tax, HST, change, etc.</i>) • Note when the students estimate the taxes to judge reasonableness of their answer the teacher can use this opportunity to check for understanding. • Can students use the correct number, operation, and % keys? • Are any students checking to see if answers are reasonable (i.e., the total is more than the item's price, the HST is between benchmarks of 10% and 20%)? 	
Part 3 – Conclude and Share Solutions (15 - 20 minutes)	
<p style="text-align: center;">Activity</p> <p>Bring the class back together.</p> <ul style="list-style-type: none"> • Have each group share their receipts. The rest of the class can check the accuracy and provide feedback. • Discuss with groups what their final answer is and the receipts they created, if that is what they chose to do for their problem. How do they know it is right? Does it seem reasonable? • Ask students what was easy, what was difficult, and what they learned from the activity. Ask how they could tell if their answer was reasonable. Was there difficulty with rounding? • Discuss the different ways students organized their work and the different strategies they used to determine the tax. Do they think they can try next time without the poster or the BLM? 	
<p style="text-align: center;">Follow up</p> <p>Exit Ticket –Have each student choose:</p> <ul style="list-style-type: none"> • An item • Its price • Show how to calculate the HST and round if necessary • Show how to calculate the total 	<p>Exit Ticket:</p> <ul style="list-style-type: none"> • Blank piece of paper, calculator

Part 3 – Conclude and Share Solutions (15 - 20 minutes)

Assessment

Check student results for Exit Ticket.

- Did the students demonstrate understanding of tax using proportional reasoning?
- Did they use the calculator confidently and accurately?
- Did students use the steps in order and use the correct numbers?
Could they round the HST to the nearest cent?
- Did their organization of their work show understanding, or would they benefit from an organizer?
- Are students able to label the total and HST correctly?

Resources

- Accompanying Powerpoint: “*We Pay The Tax Math Prompts*”
- From *We Pay the Tax Materials*: BLM#1,#2
- For further information on taxes, student might enjoy *Fast Track: Taxation*, by Nicholas Brasch, Scholastic, 2013

Cozy Corner Store

Customer #467

11:15

_____ _____

_____ _____

SUBTOTAL ----- _____

We Pay The Tax BLM #1

Cozy Corner Store

Customer #467

11:15

_____

_____

SUBTOTAL -----

Cozy Corner Store

Customer #467

11:15

_____

_____

SUBTOTAL -----