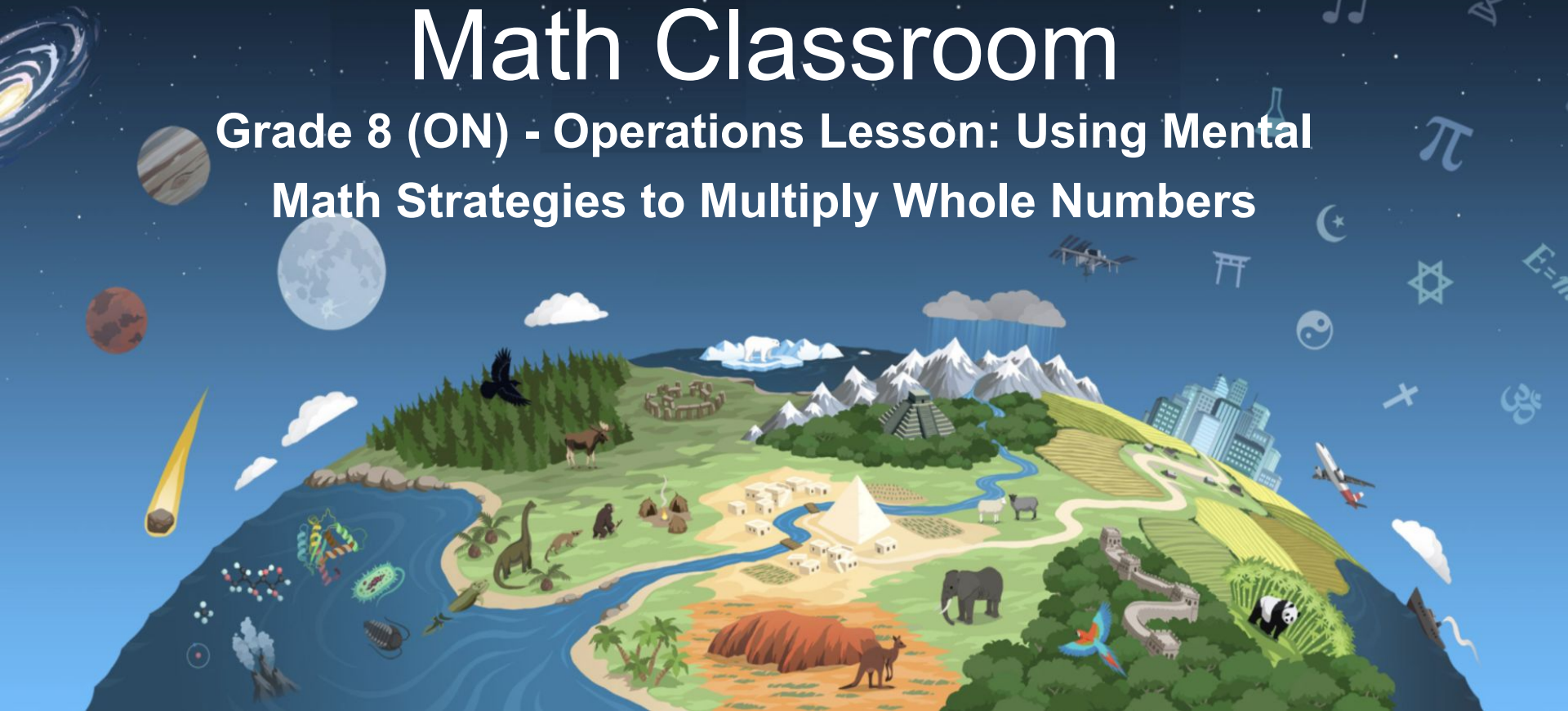


Binogi in Your Math Classroom

Grade 8 (ON) - Operations Lesson: Using Mental
Math Strategies to Multiply Whole Numbers



Supported by



Resource Guide for Teachers

© 2020

All rights reserved. This resource is intended for personal and classroom use only.

All of the materials in this guide may be downloaded and printed for non-commercial use in educational contexts.

No part of the guide may be copied, reproduced, distributed or transmitted in whole or in part for commercial uses without the prior written consent of Dr. Emmanuelle Le Pichon.

Please visit:

<https://escapeprojects.ca/> for additional resources and information

Prepared by:

Dr. Emmanuelle Le Pichon

Dr. Dania Wattar

Rosalia Cha

Bitá Correa

Jhonel Morvan

Mai Naji

Neha Kapileshwarker

Reviewed by:

Dr. Alexandre Cavalcante

Grade 8 - Operations

: Example of Learning Objectives and Big Ideas

Overall Expectation

B2. use knowledge of numbers and operations to solve mathematical problems encountered in everyday life

Specific Expectation

B2.3 use mental math strategies to multiply and divide whole numbers and decimal numbers up to thousandths by powers of ten, and explain the strategies used

Learning Objectives

To find efficient ways to mentally solve multiplying numbers

Big Ideas

I can communicate my thinking towards finding efficient ways to solve operations in my head.

Assessment

1. Assessment FOR

: Diagnostic questions, Minds On, Action, Consolidation

2. Assessment AS:

B1.1 Mathematical Terms and Resources/Materials

Vocabulary

efficient, mental

Pair/Group Activities

Please follow your school's Covid-19 safety protocols for any pair/group activities.

Language Friendly Pedagogy

At the beginning of the lesson, students will be invited to add key terms in their Concept Detective and add any new words that they come across throughout the lesson.

Binogi Related Resources

Video: [Calculation Methods for Multiplication](#)

Additional Binogi Videos Connected to this Unit

[Multiplication and division by 10](#)

At the beginning of class... (5 ~ 10 min)

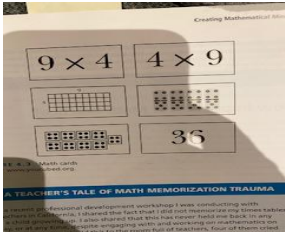
1. Share learning objectives - *To find efficient ways to mentally solve multiplying numbers.*
2. Co-create success criteria
 - Sample :
 - *I can think of at least 2 ways to come up with the answer in my head.*
3. Ask the students to add the following words in their Concept Detective which they will fill out throughout the lesson:
4. Diagnostic Questions: Teachers should systematically start with 2 or 3 diagnostic questions by

a) using the previous year's specific expectation

: Use mental math strategies to increase 75 by 10% and decrease 80 by 5%. Explain your strategies.

Grade 6	Grade 7	Grade 8
B2.3 use mental math strategies to calculate percents of whole numbers, including 1%, 5%, 10%, 15%, 25%, and 50%, and explain the strategies used	B2.3 use mental math strategies to increase and decrease a whole number by 1%, 5%, 10%, 25%, 50%, and 100%, and explain the strategies used	B2.3 use mental math strategies to multiply and divide whole numbers and decimal numbers up to thousandths by powers of ten, and explain the strategies used

Minds On

Task Component	Instruction	Assessment Focus Look Fors	Notes
<p>Before (Activation/ Review) ~5-10 mins</p> <p>Resources: match cards</p> 	<p>Teacher lays all the cards down on a table and ask students to take turns picking them. Students pick as many as they find with the same answer. For example, 9 and 4 can be shown with an area model, set of objects such as dominoes, and a number sentence. When students match the cards, they should explain how they know the different cards are equivalent.</p> <p><i>Retrieved from: Jo Boaler's Mathematical Mindsets, Math Cards can be found at youcubed.org</i></p>	<p>How do students represent their understandings and linkages between concepts?</p> <p>How does the activity connect to, and help prepare students for problem solving?</p> <p>How are you interacting with your students?</p>	<p>Teacher records answer / wonderings / understandings. Asks students to elaborate/explain their responses with the class.</p>

Action

Task Component	Instruction	Assessment Focus Look Fors	Notes
<p>During (Working on it) ~15-20 mins</p> <p>Resources:</p>	<p>Individual:</p> <ul style="list-style-type: none"><li>● Ask students to think about how they would solve 18×15 in their head.<li>● Ask them to come up with at least 2 different ways to solve the question and raise their fist quietly by their chest when they are done.	<p>What role do I and my students play during the problem solving process?</p> <p>What strategies do we predict students will use to do the math?</p> <p>What strategies are students using to do the math?</p>	<p>Have your students watch the videos in the language of their choice.</p> <p>Record students' thoughts.</p> <p>Think-pair-share: student think on their own first, then share with their partner, then with the class.</p>

Consolidation

Task Component	Instruction	Assessment Focus Look Fors
<p>After (Reflecting/ Connecting/ Consolidating)~ 20- 25 mins</p> <p>Resources: - Bank websites (refer to the instruction) - jamboard or poster</p> <p>- Exit Ticket: <i>Jo Boaler's Mathematical Mindsets</i></p>	<p>Class Discussion ~20 min: Have students share their strategies with the whole class while teacher records their descriptions or have students come up to the front and do it themselves.</p> <p>Exit Ticket. <i>Before students leave, consider asking them (some of) these questions:</i></p> <ol style="list-style-type: none">1. How did someone else in class solve the problem? How is their strategy same or different than yours?2. What new vocabulary words or terms were introduced today? What do you believe each new word means? Give an example or picture of each word.3. What was the big mathematical debate about in class today?4. What were some of your strengths and weaknesses in this unit? What is your plan to improve in your areas of weakness?	<p>How are you consolidating student learning? Which strategy was used (Congress, Gallery Walk, Bansho, etc.) and why?</p> <p>How do you determine what should be highlighted? How is it connected to the learning goal/expectations? How is student thinking annotated?</p> <p>What roles do you and your students take on during the consolidation?</p>

Extension/Differentiation/Modification

	Instruction	Assessment Focus Look Fors:	Notes
- Individual Practice: A question(s) for extension that students can do independently to assess understanding of the concept(s)	Ask students to work individually and come up with their own question and solution using mental math strategies. Once they have the answer, they can write, or use any kinaesthetic tools to demonstrate their thinking.		<p>How does the individual practice question relate to the problem, skills or strategies?</p> <p>Why is the individual practice question important for teachers and students?</p>
- Differentiation (Modifications/ extensions)			<p>Are there any other strategies that can be used to differentiate instruction?</p>

Parents and Community Connection

Home Assignment

: [Concept Detective](#) - students can complete any terms they did not complete and add any mathematical terms they wish to include in their glossary with their parents

: Students watch the [Binogi video](#) they watched in class at home with their parents either in English or in one of the provided languages (there is an option for subtitles). Discuss.

: After the video, have students and family members brainstorm their own question and ways to answer the question

