

Mental Math Operations, Multiplicative Relationships and Equality

Overall Expectations

Students will:

- Solve problems involving the multiplication and division of multi-digit whole numbers, and involving the addition and subtraction of decimal numbers to hundredths, using a variety of strategies (5m10)
- Demonstrate an understanding of proportional reasoning by investigating whole-number rates (5m11)
- Demonstrate, through investigation, an understanding of the use of variables in equations (5m62)

Specific Expectations

Students will:

- Solve problems involving the addition, subtraction, and multiplication of whole numbers, using a variety of mental strategies (5m22)
- Demonstrate an understanding of simple multiplicative relationships involving whole-number rates, through investigation using concrete materials and drawings (5m30)
- Demonstrate, through investigation, an understanding of variables as unknown quantities represented by a letter or other symbol (5m69)
- Determine the missing number in equations involving addition, subtraction, multiplication, or division and one- or two-digit numbers, using a variety of tools and strategies (5m70)

Lesson	Learning Focus	Specific Expectations
Add Whole Numbers	<ul style="list-style-type: none"> • Use mental math strategies (friendly numbers, composing/ decomposing numbers, skip counting, place value, give and take (compensation), associative property, commutative property) to solve problems involving addition of whole numbers • Determine missing numbers in equations involving mental addition or subtraction and one-digit or two-digit numbers 	5m22
Subtract Whole Numbers	<ul style="list-style-type: none"> • Use mental math strategies (friendly numbers, composing/ decomposing numbers, skip counting, adding up, fact family, place value, give and take (compensation), associative property) to solve problems involving addition or subtraction of whole numbers • Connect addition and subtraction • Determine missing numbers in equations involving mental addition or subtraction and one-digit or two-digit numbers 	5m22

Mental Math Operations, Multiplicative Relationships and Equality (continued)

Lesson	Learning Focus	Specific Expectations
Multiply Whole Numbers	<ul style="list-style-type: none"> • Investigate simple multiplicative relationships involving whole-number rates • Use mental math strategies (friendly numbers, composing/ decomposing numbers, skip counting, adding up, fact family, place value, associative property, commutative property, distributive property) to solve problems involving the multiplication of whole numbers • Make connections between multiplication and division 	5m22 5m30
Variables as Unknown Quantities	<ul style="list-style-type: none"> • Investigate variables as unknown quantities represented by a letter or symbols • Explore the use of variables in equations and understand their purpose • Determine missing numbers in equations involving addition, subtraction or multiplication and one-digit or two-digit numbers 	5m69
Missing Number in Equations	<ul style="list-style-type: none"> • Determine the missing number in equations and problem solving activities involving addition, subtraction, multiplication and division that can be calculated mentally • Use a variety of tools and strategies to determine and verify a missing number 	5m22 5m69 5m70
Consolidation & Summative Tasks		

Add Whole Numbers

Specific Expectations: 5m22

	Learning Focus	Blended Learning	Other Resources
Minds On	<ul style="list-style-type: none"> Add one-digit whole numbers using a variety of mental strategies 		mathies <ul style="list-style-type: none"> Colour Tiles Money Number Line Rekenrek Set Tool Whole Number Rods Catch a Bouncing Ball – Operations
Action	<ul style="list-style-type: none"> Use mental math strategies (friendly numbers, composing/ decomposing numbers, skip counting, place value, give and take (compensation), associative property, commutative property) to solve problems involving addition of whole numbers Determine missing numbers in equations involving mental addition or subtraction and one-digit or two-digit numbers 		
Consolidation			

Subtract Whole Numbers

Specific Expectations: 5m22

	Learning Focus	Blended Learning	Other Resources
Minds On	<ul style="list-style-type: none"> Subtract one-digit numbers using a variety of mental strategies 		mathies <ul style="list-style-type: none"> Colour Tiles Money Number Line Rekenrek Set Tool Whole Number Rods Catch a Bouncing Ball – Operations
Action	<ul style="list-style-type: none"> Use mental math strategies (friendly numbers, composing/ decomposing numbers, skip counting, adding up, fact family, place value, give and take (compensation), associative property) to solve problems involving addition or subtraction of whole numbers Connect addition and subtraction Determine missing numbers in equations involving mental addition or subtraction and one-digit or two-digit numbers 		
Consolidation			

Multiply Whole Numbers

Specific Expectations: 5m22, 5m30

	Learning Focus	Blended Learning	Other Resources
		Teacher Guide Unit 1 Activity 8: Operations-Multiplication OERB ID : ELO1476790	Guide to Effective Instruction: Number Sense and Numeration Grades 4 – 6 Vol.3 <ul style="list-style-type: none"> pp 47 – 59: Grade 5 Learning Activity: Finding the Cost of a Field Trip
Minds On	<ul style="list-style-type: none"> Practise multiplication to 9×9 	Unit 1 Activity 8: Minds On <ul style="list-style-type: none"> Multiplication Table <ul style="list-style-type: none"> Single-digit multiplication Calculation Nation – Times Square Game <ul style="list-style-type: none"> log in as guest Arrays <ul style="list-style-type: none"> investigate arrays and factors <p><i>Note: supplementation required for further drill of basic multiplication facts and strategies for multiplication</i></p>	mathies <ul style="list-style-type: none"> Colour Tiles Money Number Line Rekenrek Set Tool Whole Number Rods Catch a Bouncing Ball – Operations
Action	<ul style="list-style-type: none"> Investigate simple multiplicative relationships involving whole-number rates Use mental math strategies (friendly numbers, composing/ decomposing numbers, skip counting, adding up, fact family, place value, associative property, commutative property, distributive property) to solve problems involving the multiplication of whole numbers Make connections between multiplication and division 		Gap Closing J/I Student Book: Multiplying and Dividing pp 8 - 20 Gap Closing J/I Facilitator’s Guide: Multiplying and Dividing pp 8 - 16
Consolidation			

Variables as Unknown Quantities

Specific Expectations: 5m69

	Learning Focus	Blended Learning	Other Resources
		Teacher Guide Unit 4 Activity 2: Variables, Expressions and Equations OERB ID: ELO1476840	Guide to Effective Instruction: Patterning and Algebra Grades 4 – 6 <ul style="list-style-type: none"> pp 77 – 87: Grade 5 Learning Activity: Balancing Act
Minds On	<ul style="list-style-type: none"> Review missing numbers in addition equations 	Unit 4 Activity 2: Minds On OERB ID: ELO1476720 <ul style="list-style-type: none"> Number cube activity, missing addend Discussion <ul style="list-style-type: none"> commutative property of addition 	mathies <ul style="list-style-type: none"> Colour Tiles Money Number Line Rekenrek Set Tool Whole Number Rods Catch a Bouncing Ball – Operations
Action	<ul style="list-style-type: none"> Investigate variables as unknown quantities represented by a letter or symbols Explore the use of variables in equations and understand their purpose Determine missing numbers in equations involving addition, subtraction or multiplication and one-digit or two-digit numbers 	Unit 4 Activity 2: Action <ul style="list-style-type: none"> The Value of the Variables – Part 1 OERB ID: ELO1411270 The Value of the Variables – Part 2 OERB ID: ELO1411300 Purposeful Practice – Equations with Variables Using Relational Rods Assignment 1 – Variables, Expressions and Equations Math Playground – Algebra Puzzle <p><i>Note: Supplementation required for practice using larger numbers and modelling</i></p>	
Consolidation		Unit 4 Activity 2: Consolidation <ul style="list-style-type: none"> Discussion <ul style="list-style-type: none"> variable and number sentences Assignment 2 – Algebra Fruit Problem 	

Missing Numbers in Equations

Specific Expectations: 5m22, 5m69, 5m70

	Learning Focus	Blended Learning	Other Resources
Minds On	<ul style="list-style-type: none"> Verify the value of missing numbers in equations 		mathies <ul style="list-style-type: none"> Colour Tiles Money Number Line Rekenrek Set Tool Whole Number Rods Catch a Bouncing Ball – Operations
Action	<ul style="list-style-type: none"> Determine the missing number in equations and problem solving activities involving addition, subtraction, multiplication and division that can be calculated mentally Use a variety of tools and strategies to determine and verify a missing number 		
Consolidation			

Consolidation & Summative Tasks

Specific Expectations: 5m22, 5m30, 5m69, 5m70

Blended Learning	Other Resources

Add Whole Numbers

Resource	URL
mathies : Colour Tiles	http://mathies.ca/learningTools.php
mathies : Money	http://mathies.ca/learningTools.php#Mm0
mathies : Number Line	http://mathies.ca/learningTools.php#Nn0
mathies : Rekenrek	http://mathies.ca/learningTools.php#Rr0
mathies : Set Tool	http://mathies.ca/learningTools.php#Ss1
mathies : Whole Number Rods	http://mathies.ca/learningTools.php#Ww0
mathies : Catch a Bouncing Ball – Operations	http://mathies.ca/games.php#Cc0

Subtract Whole Numbers

Resource	URL
mathies : Colour Tiles	http://mathies.ca/learningTools.php
mathies : Money	http://mathies.ca/learningTools.php#Mm0
mathies : Number Line	http://mathies.ca/learningTools.php#Nn0
mathies : Rekenrek	http://mathies.ca/learningTools.php#Rr0
mathies : Set Tool	http://mathies.ca/learningTools.php#Ss1
mathies : Whole Number Rods	http://mathies.ca/learningTools.php#Ww0
mathies : Catch a Bouncing Ball – Operations	http://mathies.ca/games.php#Cc0

Multiply Whole Numbers

Resource	URL
Teacher Guide: Unit 1 Activity 8: Operations-Multiplication	https://download.elearningontario.ca/repository/14/1476790000/GRD5MTHEU06A02/content_8.html
Multiplication Table	http://illuminations.nctm.org/Activity.aspx?id=4196
Calculation Nation – Times Square Game	http://calculationnation.nctm.org/Login.aspx?ReturnUrl=%2fGames%2fGame.aspx%3fGameId%3dC80CC5F0-624D-4CDD-B761-7E0B364404E1&GameId=C-80CC5F0-624D-4CDD-B761-7E0B364404E1
Arrays	http://illuminations.nctm.org/Activity.aspx?id=3511
Guide to Effective Instruction: Number Sense and Numeration Grades 4 – 6 Vol.3	http://oame.on.ca/eduproject/ontariomathedresources/files/Number%20Sense%20and%20Numeration%20Vol%203%20Multiplication%204-6.pdf
mathies : Colour Tiles	http://mathies.ca/learningTools.php
mathies : Money	http://mathies.ca/learningTools.php#Mm0
mathies : Number Line	http://mathies.ca/learningTools.php#Nn0
mathies : Rekenrek	http://mathies.ca/learningTools.php#Rr0
mathies : Set Tool	http://mathies.ca/learningTools.php#Ss1
mathies : Whole Number Rods	http://mathies.ca/learningTools.php#Ww0
mathies : Catch a Bouncing Ball – Operations	http://mathies.ca/games.php#Cc0
Gap Closing J/I Student Book: Multiplying and Dividing	http://www.edugains.ca/resources/LearningMaterials/GapClosing/Grade6/GCU5_SB_MultiDividing.pdf
Gap Closing J/I Facilitator’s Guide: Multiplying and Dividing	http://www.edugains.ca/resources/LearningMaterials/GapClosing/Grade6/GCU5_FG_Multiplying-Dividing.pdf

Variables as Unknown Quantities

Resource	URL
Teacher Guide: Unit 4 Activity 2: Variables, Expressions and Equations	https://download.elearningontario.ca/repository/14/1476840000/GRD5MTHEU06A07/content_2.html
Unit 4 Activity 2: Minds On	https://download.elearningontario.ca/repository/14/1476700000/GRD5MTHEU04/GRD5MTHEU04/GRD5MTHEU04A02/content.html
The Value of the Variables – Part 1	https://download.elearningontario.ca/repository/14/1476700000/GRD5MTHEU04/GRD5MTHEU04/GRD5MTHEU04A02/mme/Gr5_Math_PA_VlaueofVariables/LO1188/LO1188.html
The Value of the Variables – Part 2	https://download.elearningontario.ca/repository/14/1476700000/GRD5MTHEU04/GRD5MTHEU04/GRD5MTHEU04A02/mme/Gr5_Math_PA_CrackingtheCode/LO1186-VariablesPart2/LO1186-Vari-ablesPart2.html
Unit 4 Activity 2: Action	https://download.elearningontario.ca/repository/14/1476700000/GRD5MTHEU04/GRD5MTHEU04/GRD5MTHEU04A02/content_2.html
Assignment 1 – Variables, Expressions and Equations	https://download.elearningontario.ca/repository/14/1476700000/GRD5MTHEU04/GRD5MTHEU04/GRD5MTHEU04A02/assignment.html
Math Playground – Algebra Puzzle	http://www.mathplayground.com/algebra_puzzle.html
Unit 4 Activity 2: Consolidation	https://download.elearningontario.ca/repository/14/1476700000/GRD5MTHEU04/GRD5MTHEU04/GRD5MTHEU04A02/content_3.html
Assignment 2 – Algebra Fruit Problem	https://download.elearningontario.ca/repository/14/1476700000/GRD5MTHEU04/GRD5MTHEU04/GRD5MTHEU04A02/assignment.html
Guide to Effective Instruction: Patterning and Algebra Grades 4 – 6	http://oame.on.ca/eduproject/ontariomathedresources/files/Patterning%20and%20Algebra%204-6.pdf
mathies : Colour Tiles	http://mathies.ca/learningTools.php
mathies : Money	http://mathies.ca/learningTools.php#Mm0
mathies : Number Line	http://mathies.ca/learningTools.php#Nn0
mathies : Rekenrek	http://mathies.ca/learningTools.php#Rr0

Variables as Unknown Quantities (continued)

Resource	URL
mathies : Set Tool	http://mathies.ca/learningTools.php#Ss1
mathies : Whole Number Rods	http://mathies.ca/learningTools.php#Ww0
mathies : Catch a Bouncing Ball – Operations	http://mathies.ca/games.php#Cc0

Missing Numbers in Equations

Resource	URL
mathies : Colour Tiles	http://mathies.ca/learningTools.php
mathies : Money	http://mathies.ca/learningTools.php#Mm0
mathies : Number Line	http://mathies.ca/learningTools.php#Nn0
mathies : Rekenrek	http://mathies.ca/learningTools.php#Rr0
mathies : Set Tool	http://mathies.ca/learningTools.php#Ss1
mathies : Whole Number Rods	http://mathies.ca/learningTools.php#Ww0
mathies : Catch a Bouncing Ball – Operations	http://mathies.ca/games.php#Cc0