

Math Makes Sense



Québec Teacher Companion

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ISBN 0-321-31515-4



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Following the legal requirements of Québec, the Student Book has been modified to ensure that no brand names appear on student book pages; your Teacher Guide may show brand names where they have been removed from the student resource.

Technology tools that are recommended for use with the Student Book are the TI-108 calculator, *Appleworks* software, and *Graphers* drawing software.

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ISBN 0-321-31515-4

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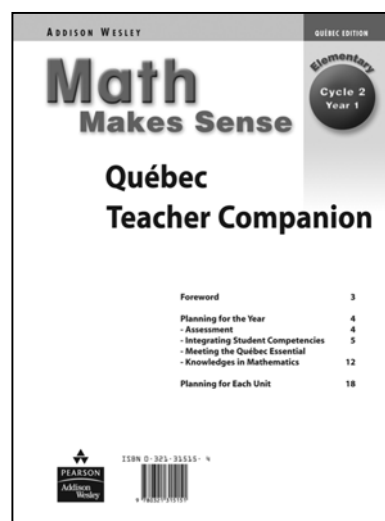
Printed and bound in Canada.

Foreword

Addison Wesley Mathematics Makes Sense is a comprehensive program designed to support teachers in delivering core mathematics instruction in a way that makes key mathematical concepts accessible to all students – letting you teach for conceptual understanding, and helping students make sense of the mathematics they learn.

Your Teacher Guide was developed for a national text, and can be adapted for use in English-language schools in Québec for support of the Québec Education Program (QEP).

This **Québec Teacher Companion** provides additional support so that you can tailor the *Math Makes Sense* program to your specific needs. In particular, this module provides support to demonstrate how *Math Makes Sense* will help you nurture the development of the core competencies identified for the Québec Education Program, released by le Ministère de l'Éducation, du Loisir et de Sport du Québec, and provides tools to help you assess those competencies. Teaching notes highlight how specific Unit Problems might be expanded to more fully address the broad areas of learning, and help you create situational problems for work with your students.



Planning for the Year

Assessment

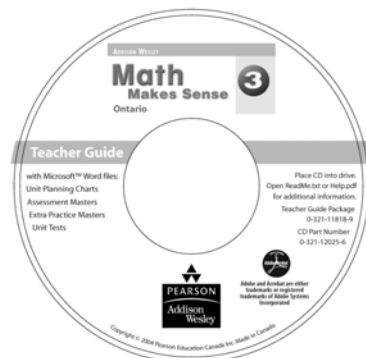
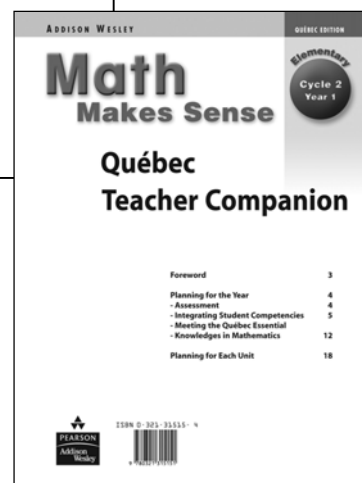
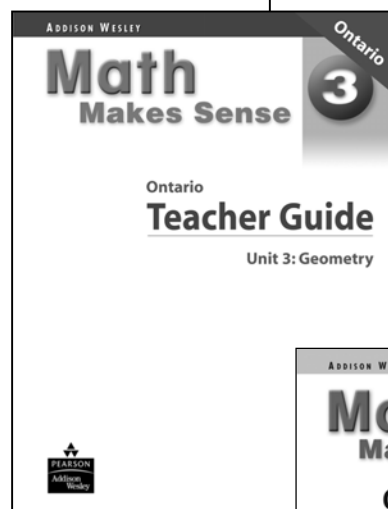
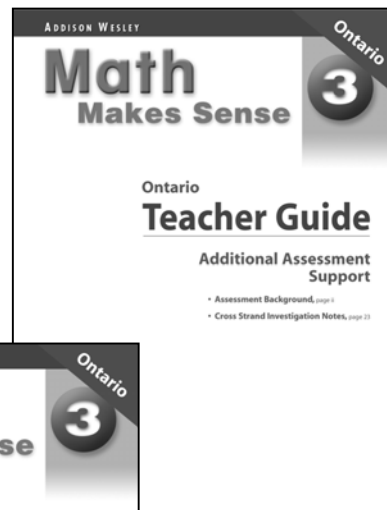
Your Teacher Guide includes a module entitled *Additional Assessment Support*.

This module includes a variety of general-use rubrics, checklists, and other assessment tools. Go to this module for these assessment tools, as well as teaching notes and assessment support for the **Cross-Strand Investigations**.

Each individual *Unit module* in your Teacher Guide includes a **Planning for Assessment** chart, and a variety of assessment tools that are written for specific assessment of the content of the unit, in reproducible master format.

Your *Québec Teacher Companion* includes additional assessment tools to support the QEP program and the core competencies, with reproducible assessment tools for each unit.

The CD-ROM that accompanies your Teacher Guide provides assessment tools from the original Teacher Guide. Assessment tools from this Québec Teacher Companion are available in digital form as well, on the Pearson website. All are available in editable files that let you tailor these tools to the needs of your classroom.



Integrating Student Competencies

The Québec Education Program (QEP) emphasizes a competency-based approach to teaching and learning. At Cycle Two, there are nine identified cross-curricular competencies, and three subject-specific competencies.

The following tables demonstrate how the core competencies of the QEP are integrated throughout *Addison Wesley Mathematics Makes Sense*, through a variety of key features that arise in every lesson, in every unit.

For detailed support that guides you in focusing on one competency in a particular unit, see the section in this module entitled **Planning for Each Unit**, starting on page 18.

Correlation of *Math Makes Sense* to QEP Cross-Curricular Competencies

QEP Competency	<i>Math Makes Sense</i> Cycle 2
Intellectual competencies <ul style="list-style-type: none"> to use information 	<ul style="list-style-type: none"> Explore activities are opportunities for students to use given information to solve meaningful problems. Students frequently have the freedom to select the materials that best suit their needs for solving the problem, which enhances their creative thinking. Students read for information before engaging in problem-solving opportunities that arise: in every lesson in Explore activities and in Practice questions; in every unit when approaching Strategies Toolkits, Show What You Know questions, or Unit Problems.
Intellectual competencies <ul style="list-style-type: none"> to solve problems 	<ul style="list-style-type: none"> The Teacher Guide module Building a Math Community provides practical suggestions for developing confident problem solvers in a positive, respectful classroom environment. Problem-solving opportunities arise in every lesson in Explore activities and in Practice questions. For more comprehensive problem-solving opportunities, Strategies Toolkits, Unit Problems, and Cross-Strand Investigations regularly promote students' critical and creative thinking as they approach a new problem. Self-Assessment opportunities, provided in the Teacher Guide, include such topics as I am a Problem Solver. The use of technology enriches students' learning experiences and allows them to extend critical thinking and problem-solving skills.
Intellectual competencies <ul style="list-style-type: none"> to exercise critical judgment 	<ul style="list-style-type: none"> Overall, the program promotes excellence, originality, and integrity in one's work, and supports appreciation for these qualities in the work of others. This comes through in the clarity of language, the accurate presentation of concepts, and the range of contexts and problems. Self-Assessment opportunities, provided in the Teacher Guide in the form of reproducible masters, promote students' critical judgment. The use of technology enriches students' learning experiences and allows them to extend critical thinking and problem-solving skills.

QEP Competency	<i>Math Makes Sense Cycle 2</i>
<p>Intellectual competencies</p> <ul style="list-style-type: none"> to use creativity 	<ul style="list-style-type: none"> The Teacher Guide module Building a Math Community provides practical suggestions for developing confident learners who know they can bring their own understanding, their own strategies, and their own ideas to any new problem situations. Overall, the program promotes excellence, originality, and integrity in one's own work, and supports an appreciation for these qualities in the work of others. This comes through in the clarity of language, the clear, accurate presentation of mathematical concepts, and the range of contexts and problems provided across every unit. In Explore activities, students frequently have the freedom to select the materials that best suit their needs for solving the problem, which enhances their creative thinking.
<p>Methodological competencies</p> <ul style="list-style-type: none"> to adopt effective work methods 	<ul style="list-style-type: none"> The Explore in each lesson engages students in working together productively, harmoniously, and responsibly. In each lesson, the Show and Share prompts regularly allow students to discuss how they worked with an Explore activity, whether they think they had an effective approach and why, and how they organized their work in ways that helped them to keep track of their results. Each Connect reinforces the importance of clear communication and organized work by modelling mathematical solutions in a clear and readable presentation, following the conventions of mathematics. For students who need support in organizing their work, the Teacher Guide provides a Step-by-Step master for each Assessment Focus question in each Practice set; this reproducible master provides greater structure for students who need it, and helps to build students' developing work habits.
<p>Methodological competencies</p> <ul style="list-style-type: none"> to use information and communications technologies (ICT) 	<ul style="list-style-type: none"> Technology lessons in the Student Book highlight opportunities for learning new mathematical concepts, or reinforce new concepts just developed, through the use of calculators or computers. When appropriate, activities in the Student Book suggest the use of a calculator or computer application to enrich the mathematics. The Numbers Every Day feature in every lesson regularly includes suggestions related to calculator skills, to ensure students develop an understanding of how to use technology as a meaningful tool. Addison Wesley Mathematics e-Tools software provides virtual manipulatives that help students develop mathematical concepts in the following ways: simultaneously connects the concrete with the symbolic; creates an interactive environment that is both open-ended and student controlled; and empowers students to build and observe dynamic mathematical representations and solutions. e-Tools is not required for success with the Math Makes Sense program, but it can help to enhance student achievement.

QEP Competency	Math Makes Sense Cycle 2
<p>Personal and social competencies</p> <ul style="list-style-type: none"> to construct his/her identity 	<ul style="list-style-type: none"> The Reflect prompt in each lesson, with its opportunity for individual reflection, encourages students to examine their personal understanding, values, and abilities. Contextual problems throughout the program showcase a variety of positive options for students' leisure and fitness pursuits – reading, hiking, swimming, healthy eating, and so on. Photographs of children in the Student Book are representative of many cultures, and allow for a variety of activities suited to any gender, ethnicity, appearance, or ability. Students experience the positive effect of “seeing themselves” reflected in the pages of their Math Makes Sense Student Book. The Teacher Guide module Building a Math Community provides practical suggestions for creating a respectful classroom environment in which students can be comfortable working within their own range of abilities, learning preferences, and strengths.
<p>Personal and social competencies</p> <ul style="list-style-type: none"> to cooperate with others 	<ul style="list-style-type: none"> Explore activities and Practice questions provide for a range of cooperative grouping arrangements. Not only do students have multiple opportunities to cooperate with others, they also have regular opportunities to work in their preferred mode, while still being exposed to other grouping options to develop their cooperative learning skills. The recommended grouping for each Explore is indicated using a graphic icon in the Explore heading in the Student book. The Teacher Guide module Building a Math Community provides practical suggestions for grouping students, and offers support for teachers as they incorporate cooperative learning in the classroom.
<p>Communication-related competency</p> <ul style="list-style-type: none"> to communicate appropriately 	<ul style="list-style-type: none"> Students' developing mathematical vocabulary is supported by the Key Words listed at the beginning of every unit, and connected to an illustrated Glossary at the back of the Student Book. In each Explore, the Show and Share discussion questions prompt students to listen and become dynamic learners, receptive to communication from other students. Each Connect models the correct use of mathematical language, codes, and conventions. Opportunities for students to communicate their self-analysis and evaluation occur in the lesson and unit Reflect features, as well as in Self-Assessment opportunities suggested in the Teacher Guide. As content allows, lessons feature the use of numbers and numeration in the media, arts, and the world of work. Technology lessons are included where appropriate for the students' level and the content at hand. This early exposure to media, arts, and technology, helps prepare students for future life in our increasingly complex world and the multi-media communication channels that it presents.

Correlation of *Math Makes Sense* to QEP Mathematics Competencies

QEP Competency	<i>Math Makes Sense</i> Cycle 2
<p>Competency 1: to solve a situational problem</p> <ul style="list-style-type: none"> to model the situational problem 	<ul style="list-style-type: none"> Concrete materials are referenced regularly in Explore activities and in Practice questions, where modelling of mathematical ideas is central to the conceptual development. Strategies Toolkit lessons provide explicit instruction in a variety of problem-solving strategies, by posing a problem that students investigate and solve on their own, then modelling a strategy with a new problem, and finally providing a selection of problems that can be solved in a variety of ways. Problems that arise in Unit Problem and Cross-Strand Investigation features lend themselves well to a variety of modelling opportunities.
<p>Competency 1: to solve a situational problem</p> <ul style="list-style-type: none"> to apply different strategies to work out a solution 	<ul style="list-style-type: none"> Show and Share in each lesson allows students to hear the possible solutions of other students. Each lesson has a consistent Explore/Connect/Practice structure, to provide situational problems for students that are relevant to content and concepts. The Connect regularly presents multiple solutions for a given problem. Strategies Toolkit lessons provide explicit instruction in a variety of problem-solving strategies, and present a selection of problems that can be solved in a variety of ways.
<p>Competency 1: to solve a situational problem</p> <ul style="list-style-type: none"> to validate the solution 	<ul style="list-style-type: none"> Show and Share, in each lesson, gives students an opportunity to voice their mathematical explanations, validate their solutions, and listen to the possible solutions of others. Students have regular opportunities to create and share problems with a friend, then validate work – in the Show and Share suggestions; in the Practice questions; in Reflect prompts; and in the closing part of many Unit Problems.
<p>Competency 1: to solve a situational problem</p> <ul style="list-style-type: none"> to share information related to the solution 	<ul style="list-style-type: none"> The Explore activity introduces new concepts by presenting a situational problem to solve. Explore activities include whole group, partner, and independent problem-solving activities. Show and Share occurs as part of the Explore in each lesson, to give students an opportunity to voice their mathematical explanations, validate their solutions, and listen to the possible solutions of others. Students have regular opportunities to create and solve problems, and to share problems with a friend – in the Show and Share suggestions; in the Practice questions; in Reflect prompts; and in the closing part of many Unit Problems.
<p>Competency 1: to solve a situational problem</p> <ul style="list-style-type: none"> to decode the elements of the situational problem 	<ul style="list-style-type: none"> Students working collaboratively in Explore or Practice sections will naturally decode problems as they work together to discuss their understanding. For students who need extra support in decoding problems, the Teacher Guide provides a Step-by-Step master for the Assessment Focus question in each Practice set; this reproducible master helps the student break a challenging problem down into manageable, smaller tasks.

QEP Competency	<i>Math Makes Sense Cycle 2</i>
<p>Competency 2: to reason using mathematical concepts and processes</p> <ul style="list-style-type: none"> to define the elements of the mathematical situation 	<ul style="list-style-type: none"> In each Explore, students apply mathematical reasoning as they define the elements of a problem to solve. For students who need extra support, the Step-by-Step master in the Teacher Guide, provided for each Assessment Focus question, models for the student how she/he might isolate the defining elements of a mathematical situation. Connect sections model – for students, teachers, and parents – the mathematical reasoning involved in defining the elements of a situation, whether it be a real-world application or a mathematical context. Unit Problems and Cross-Strand Investigations provide rich opportunities for students to bring all of their reasoning abilities to bear on a specific open-ended problem.
<p>Competency 2: to reason using mathematical concepts and processes</p> <ul style="list-style-type: none"> to justify actions or statements by referring to mathematical concepts and processes 	<ul style="list-style-type: none"> In each Explore activity, students must select a suitable strategy to solve the problem, and then follow the Show and Share discussion prompts to justify their actions, exchange information, and arrive at conclusions. Each Assessment Focus question includes an opportunity for students to justify their ideas or explain their thinking. Connect sections model the reasoning that underlies new concept development: relating mathematical concepts and processes to create a chain of thought that leads students to new insights. By exemplifying sound mathematical reasoning without solving the original problem in the Explore, the Connect reinforces students’ reasoning abilities without detracting from the ideas that students themselves have brought to the problem.
<p>Competency 2: to reason using mathematical concepts and processes</p> <ul style="list-style-type: none"> to mobilize mathematical concepts and processes appropriate to the given situation 	<ul style="list-style-type: none"> In each Explore activity, students apply their mathematical reasoning as they define the elements of a problem, select a suitable strategy to solve the problem, make decisions about ways to model the problem and to record their work, and then arrive at their own solutions. Practice questions draw out student reasoning through thought-provoking problems that encourage students to model concepts, examine special cases, compare results, consider consequences, look for non-examples, and explain their thinking. Connect sections model – for students, teachers, and parents – the mathematical reasoning students can build as they work with problems to develop new concepts. Unit Problems and Cross-Strand Investigations provide rich opportunities for students to bring all of their mathematical understanding, and their reasoning abilities, to bear on a specific open-ended problem.

QEP Competency	<i>Math Makes Sense Cycle 2</i>
<p>Competency 2: to reason using mathematical concepts and processes</p> <ul style="list-style-type: none"> to apply mathematical processes appropriate to the given situation 	<ul style="list-style-type: none"> In each Explore activity, students apply their mathematical reasoning to select a suitable strategy to solve the problem, make decisions about ways to model the problem and to record their work, and then arrive at their own solutions. A range of meaningful Practice questions draws out student reasoning with thought-provoking problems in which students apply mathematical concepts and processes developed during the Explore and consolidated in the Connect section. Unit Problems and Cross-Strand Investigations provide rich opportunities for students to apply their reasoning abilities to solve an open-ended problem.

QEP Competency	<i>Math Makes Sense Cycle 2</i>
<p>Competency 3: to communicate by using mathematical language</p> <ul style="list-style-type: none"> to become familiar with mathematical vocabulary 	<ul style="list-style-type: none"> Each unit starts with a Key Words feature that teachers can use to create a word wall, and to reinforce important terminology. Key words are bold-faced the first time they appear in the unit and are defined in the illustrated Glossary at the back of the Student Book. Mathematical concepts are regularly connected to real world situations drawn from Canadian culture, Canadian geography, and Aboriginal culture, in core lessons and also in World of Work pages, Unit Problems, and Cross-Strand Investigations. Students have an opportunity to observe how this language promotes understanding of the world.
<p>Competency 3: to communicate by using mathematical language</p> <ul style="list-style-type: none"> to interpret or produce mathematical messages 	<ul style="list-style-type: none"> Each Connect section models the correct use of mathematical language, while providing explicit instruction in mathematics terms and concepts. The Teacher Guide provides background regarding mathematical terms and concepts, so that teachers can model appropriate mathematical language. Students' oral language is emphasized in Explore activities and in Show and Share prompts. These communication opportunities encourage students' use of everyday language to communicate their understanding, only introducing the formal terminology in the Connect, once students have grasped the underlying fundamental concepts of the lesson. Students' written language is emphasized in Assessment Focus questions and in Reflect opportunities. In addition to prompting students to explain their thinking in pictures, numbers, or words, each Unit Problem also includes a writing opportunity in a final Reflect on the Unit, in which students are prompted to think about and communicate their mathematical learning for the whole unit.
<p>Competency 3: to communicate by using mathematical language</p> <ul style="list-style-type: none"> to make connections between mathematical language and everyday language 	<ul style="list-style-type: none"> In Explore activities there are communication opportunities that typically encourage students' use of everyday language to communicate their understanding, leaving the formal terminology to be established in the Connect, only after students have themselves articulated the underlying fundamental concepts of the lesson. Mathematical concepts are regularly connected to real world situations drawn from Canadian culture, Canadian geography, and Aboriginal culture, in core lessons and also in World of Work pages, Unit Problems, and Cross-Strand Investigations. Students have an opportunity to observe how this language promotes understanding of the world. Math Link features in the Student Book highlight connections between mathematics concepts and other disciplines. The Teacher Guide supports these connections with further background on cross-curricular connections.

Meeting the Québec Essential Knowledges in Mathematics

Arithmetic: Understanding and Writing Numbers

Québec Essential Knowledges	<i>Math Makes Sense</i> Cycle 2, Year 1 Correlations	<i>Math Makes Sense</i> Cycle 2, Year 1 Optional Pages
Natural numbers <ul style="list-style-type: none"> natural numbers less than 100 000 (thousands, ten thousands): reading, writing, representation, comparison, classification, order, equivalent expressions, writing numbers in expanded form, patterns, properties (square, prime and compound numbers), number line 	4-46, 370-377	21-24 (prior knowledge) 28-30 (prior knowledge)
<ul style="list-style-type: none"> approximation 	18-20, 80-82	
Fractions <ul style="list-style-type: none"> fractions based on a whole or a collection of objects: reading, writing, numerator, denominator, various representations (using objects or pictures), equivalent parts, comparison with 0, $\frac{1}{2}$, and 1 	302-329	
Decimals <ul style="list-style-type: none"> up to two decimal places (tenths, hundredths): reading, writing, various representations, order, equivalent expressions, writing numbers in expanded form 		(covered in Cycle 2, Year 2)
<ul style="list-style-type: none"> approximation 		(covered in Cycle 2, Year 2)

Arithmetic: Meaning of Operations Involving Numbers

Québec Essential Knowledge	<i>Math Makes Sense</i> Cycle 2, Year 1 Correlation	<i>Math Makes Sense</i> Cycle 2, Year 1 Optional Pages
Natural numbers <ul style="list-style-type: none"> operation sense: multiplication (eg. repeated addition, Cartesian product), product, factor, multiples of a natural number, division (repeated subtraction, sharing number of times x goes into y), quotient, remainder, dividend, divisor, set of divisors of a natural number, properties of divisibility 	144-187	
<ul style="list-style-type: none"> choice of operation: multiplication, division 	178-180	
<ul style="list-style-type: none"> meaning of an equality relation (equation), meaning of an equivalence relation 	56-58, 65-67	
<ul style="list-style-type: none"> relationships between the operations 	146-148	
<ul style="list-style-type: none"> property of operations: associative law 		
Decimals <ul style="list-style-type: none"> operation sense: addition and subtraction 	252-257	(covered more in Cycle 2, Year 2)

Arithmetic: Operations Involving Numbers

Québec Essential Knowledge	<i>Math Makes Sense</i> Cycle 2, Year 1 Correlation	<i>Math Makes Sense</i> Cycle 2, Year 1 Optional Pages
Natural numbers <ul style="list-style-type: none"> approximating the result of an operation: addition, subtraction, multiplication, division 	80 82, 90-93, 247-249	
<ul style="list-style-type: none"> own processes for mental computation: addition, subtraction, multiplication, division 	74-77	56-64 (prior knowledge)
<ul style="list-style-type: none"> operations to be memorized: multiplications (0×0 to 10×10) related to the corresponding divisions 	152-165, 168-180	
<ul style="list-style-type: none"> own processes for written computation: multiplying a three-digit number by a one-digit number 		(covered in Cycle 2, Year 2)
<ul style="list-style-type: none"> own processes for written computation: dividing a three-digit number by a one-digit number 		(covered in Cycle 2, Year 2)
<ul style="list-style-type: none"> conventional processes for written computation: adding two four-digit numbers 		83-85 (prior knowledge) 90-93 (prior knowledge) (covered in Cycle 2, Year 2)
<ul style="list-style-type: none"> conventional processes for written computation: subtracting a four-digit number from a four-digit number such that the difference is greater than 0 		86-89 (prior knowledge) 94-97 (prior knowledge) (covered in Cycle 2, Year 2)
<ul style="list-style-type: none"> patterns: series of numbers, family of operations 	31-34, 56-58, 65-67, 181-183, 372-377	
<ul style="list-style-type: none"> finding prime factors 		
Decimals <ul style="list-style-type: none"> approximating the result of an operation 		(covered in Cycle 2, Year 2)
<ul style="list-style-type: none"> mental computation: addition, subtraction 		(covered in Cycle 2, Year 2)
<ul style="list-style-type: none"> written computation: addition, subtraction; the result must not go beyond the second decimal place 		(covered in Cycle 2, Year 2)

Geometry: Geometric Figures and Spatial Sense

Québec Essential Knowledge	<i>Math Makes Sense</i> Cycle 2, Year 1 Correlation	<i>Math Makes Sense</i> Cycle 2, Year 1 Optional Pages
Space		(covered in Cycle 2, Year 2)
<ul style="list-style-type: none"> locating objects on an axis 		
<ul style="list-style-type: none"> locating objects in a plane 	276-279	
<ul style="list-style-type: none"> locating objects in a Cartesian plane 		
Solids	124-127	128-131 (prior knowledge)
<ul style="list-style-type: none"> describing prisms and pyramids in terms of faces, vertices and edges 		
<ul style="list-style-type: none"> nets for prisms and pyramids 	132-134	
<ul style="list-style-type: none"> classification of prisms and pyramids 	124, 127 132-134	
Plane figures	104-118	
<ul style="list-style-type: none"> describing convex and non-convex polygons 		
<ul style="list-style-type: none"> describing quadrilaterals, including trapezoids and parallelograms: parallel segments, perpendicular segments, right angles, acute angles, obtuse angles 	104-123 192-199	
<ul style="list-style-type: none"> classifying quadrilaterals 	104-118, 192-199	
<ul style="list-style-type: none"> constructing parallel lines and perpendicular lines 		
Frieze patterns and tessellations	378-397	
<ul style="list-style-type: none"> observing and producing patterns using geometric figures 		
<ul style="list-style-type: none"> observing and producing (grids, tracing paper) frieze patterns by means of reflections: reflection, line of reflection 		(covered in Cycle 2, Year 2)
<ul style="list-style-type: none"> observing and producing tessellations by means of reflections 	290-293	

Measurement

Québec Essential Knowledge	<i>Math Makes Sense</i> Cycle 2, Year 1 Correlation	<i>Math Makes Sense</i> Cycle 2, Year 1 Optional Pages
Lengths: estimating and measuring <ul style="list-style-type: none"> conventional units (m, dm, cm, mm) 	334-341	342-344 (extension)
<ul style="list-style-type: none"> relationships between units of measure 	338-341	
<ul style="list-style-type: none"> perimeter, calculating the perimeter 	345-350	
Angles: estimating and measuring <ul style="list-style-type: none"> comparing angles (right, acute, obtuse) 	107-109, 116-118	
Surface areas: estimating and measuring <ul style="list-style-type: none"> unconventional units 	351-360	361-363 (extension)
Volumes: estimating and measuring <ul style="list-style-type: none"> unconventional units 		
Time: estimating and measuring <ul style="list-style-type: none"> conventional units, duration (day, hour, minute, second, daily cycle, weekly cycle, yearly cycle) 	228-239	

Statistics

Québec Essential Knowledge	<i>Math Makes Sense</i> Cycle 2, Year 1 Correlation	<i>Math Makes Sense</i> Cycle 2, Year 1 Optional Pages
<ul style="list-style-type: none"> formulating questions for a survey 	218-223	
<ul style="list-style-type: none"> collecting, describing and organizing data using tables 	218-220	
<ul style="list-style-type: none"> interpreting data using a broken-line graph 		200-203 (prior knowledge) 204-207 (extension)
<ul style="list-style-type: none"> displaying data using a broken-line graph 		208-215 (prior knowledge)

Probability

Québec Essential Knowledge	<i>Math Makes Sense</i> Cycle 2, Year 1 Correlation	<i>Math Makes Sense</i> Cycle 2, Year 1 Optional Pages
<ul style="list-style-type: none"> experimentation with activities involving chance 	402-421	
<ul style="list-style-type: none"> predicting the likelihood of an event (certainty, possibility, or impossibility) 	404-405	
<ul style="list-style-type: none"> probability that a simple event will occur (more likely, just as likely, less likely) 	404-405	
<ul style="list-style-type: none"> enumerating the possible outcomes of a random experiment using a table, a tree diagram 	410-415	
<ul style="list-style-type: none"> doing simulations with or without a computer 	416-419	

Planning for Each Unit

Unit 1: Patterning and Place Value

Supporting Cross-Curricular Competencies

Unit Focus: to use creativity

Materials

Master Q1.1:

Unit Rubric: Patterning and Place Value

Master Q1.2:

Performance Assessment Rubric: Come to the Fair!

Master Q1.3:

Peer and Self-Assessment: Unit Problem (Unit 1)

The Patterning and Place Value unit encourages students to bring their own understanding, their own strategies, and their own ideas to new problem situations. Make use of these Student Book features that promote creative thinking:

- Many of the **Explore** activities allow students to select materials that best suit their needs for solving each problem; ensure a variety of materials are available for student use to encourage creative solutions (for example, on pages 18 and 25).
- The **Reflect** activities (for example, on pages 14, 17, and 41) give students the opportunity to show originality in their thinking; in addition to students using words, pictures, and numbers to explain their thinking, encourage them to reflect on their learning in other ways (such as making a model or writing a poem).
- Encourage students to solve the Practice questions in the **Strategies Toolkit** lesson (Lesson 12) using a different strategy than the one highlighted.

Use Master Q1.1: Unit Rubric, to support your ongoing assessment during the unit, with a focus on the cross-curricular competency highlighted here.

Addressing Broad Areas of Learning: Citizenship and Community Life

Educational Aim: to ensure that students take part in the democratic life of the classroom or the school and develop a spirit of openness to the world and respect for diversity

The Unit Problem can be opened up mathematically, and extended.

Have students work as a classroom community to create their own fall fair with various booths. As background, they could select from the following activities, or pursue ideas of their own:

- Research how other communities or cultures celebrate fall. Include any customs, games, or activities. Write a math problem using some of the information you find.
- Interview family members and community members to find out about past fall celebrations in which they participated.
- Research the origins of Thanksgiving. Include why people celebrate and give thanks in fall.
- Compare how people celebrated fall in the past to your community today.
- Write about personal feelings and reactions to fall. Include what you are thankful for.

Use Master Q1.2: Performance Assessment Rubric and Master Q1.3: Peer and Self-Assessment to support the assessment of the unit problem.

This assessment tool is designed to record overall student performance as you accumulate evidence by reviewing portfolios, observation records, unit assessment activities, and other work. It can be used to guide feedback and help prepare for reporting. It should not be used for just one specific activity.

To create a profile of a student’s achievement, use a highlighter to identify behaviours you have observed.

	Level 1	Level 2	Level 3	Level 4
Uses mathematical concepts and processes				
<p>Concepts</p> <ul style="list-style-type: none"> shows understanding of number concepts and patterns by: <ul style="list-style-type: none"> exploring, extending, and explaining number patterns estimating objects in a set and counting to confirm building, comparing, and ordering sets to 100 demonstrating place value concepts representing and describing 2-digit and 3-digit numbers 	<p>may be unable to apply number concepts and patterning to:</p> <ul style="list-style-type: none"> explore, extend, and explain number patterns estimate objects in a set and count to confirm build, compare, and order sets to 100 demonstrate place value concepts represent and describe 2-digit and 3-digit numbers 	<p>partially able to apply number concepts of patterning to:</p> <ul style="list-style-type: none"> explore, extend, and explain number patterns estimate objects in a set and count to confirm build, compare, and order sets to 100 demonstrate place value concepts represent and describe 2-digit and 3-digit numbers 	<p>able to apply number concepts and patterning to:</p> <ul style="list-style-type: none"> explore, extend, and explain number patterns estimate objects in a set and count to confirm build, compare, and order sets to 100 demonstrate place value concepts represent and describe 2-digit and 3-digit numbers 	<p>in various contexts, appropriately applies number concepts and patterning to:</p> <ul style="list-style-type: none"> explore, extend, and explain number patterns estimate objects in a set and count to confirm build, compare, and order sets to 100 demonstrate place value concepts represent and describe 2-digit and 3-digit numbers
<p>Processes</p> <ul style="list-style-type: none"> accurately skip counts (forward and backward); uses ordinal numbers; compares and orders numbers and sets; rounds numbers; reads and writes number words to 100, and numerals to 1000 	<p>limited accuracy; often makes major errors or omissions in:</p> <ul style="list-style-type: none"> skip counting ordinal numbers comparing and ordering numbers and sets rounding numbers reading and writing numerals to 1000 and number words to 100 	<p>partially accurate; makes frequent minor errors or omissions in:</p> <ul style="list-style-type: none"> skip counting ordinal numbers comparing and ordering numbers and sets rounding numbers reading and writing numerals to 1000 and number words to 100 	<p>generally accurate; makes few errors or omissions in:</p> <ul style="list-style-type: none"> skip counting ordinal numbers comparing and ordering numbers and sets rounding numbers reading and writing numerals to 1000 and number words to 100 	<p>accurate; rarely make errors or omissions in:</p> <ul style="list-style-type: none"> skip counting ordinal numbers comparing and ordering numbers and sets rounding numbers reading and writing numerals to 1000 and number words to 100
Solves situational problems				
<ul style="list-style-type: none"> chooses and carries out a range of strategies (e.g., concrete objects, pictures, 100s chart, number lines, lists and tables, calculators) to solve and create problems involving patterning and place value 	<p>may be unable to use appropriate strategies to solve and create problems involving patterning and place value</p>	<p>with limited help, uses some appropriate strategies to solve and create problems involving patterning and place value; partially successful</p>	<p>uses appropriate strategies to solve and create problems involving patterning and place value successfully</p>	<p>uses appropriate, often innovative, strategies to solve and create problems involving patterning and place value successfully</p>
Communicates using mathematical language				
<ul style="list-style-type: none"> interprets and produces messages about patterning and place value, using appropriate mathematical language 	<p>has difficulty interpreting and producing mathematical messages about patterning and place value</p>	<p>partially able to interpret and produce mathematical messages about patterning and place value</p>	<p>interprets and produces mathematical messages about patterning and place value</p>	<p>interprets and produces mathematical messages about patterning and place value with precision</p>
Cross-curricular competency: to use creativity				
<ul style="list-style-type: none"> shows flexibility by considering and exploring various ways of solving a problem and representing ideas 	<p>little flexibility; unable to suggest or explore options</p>	<p>with prompting, may suggest or explore an optional process or representation</p>	<p>when asked, suggests and explores at least one optional process or representation</p>	<p>independently suggests and explores optional processes or representations; may offer several possibilities</p>

Master Q1.2

**Performance Assessment Rubric:
Come to the Fair!**

	Level 1	Level 2	Level 3	Level 4
Uses mathematical concepts and processes				
<p>Concepts</p> <ul style="list-style-type: none"> • shows understanding by applying the required concepts of number patterns and place value to: <ul style="list-style-type: none"> - solve the word problems (Step 1) - create a story problem (Step 2) - design a booth (Step 3) 	<p>does not apply required concepts (e.g., number patterns, counting, ordering, grouping, comparing, and estimating) appropriately; may be incomplete or indicate misconceptions</p>	<p>applies some of the required concepts (e.g., number patterns, counting, ordering, grouping, comparing, and estimating) appropriately; may indicate some misconceptions</p>	<p>applies the required concepts (e.g., number patterns, counting, ordering, grouping, comparing, and estimating) appropriately; explanations may show minor flaws in reasoning</p>	<p>applies the required concepts (e.g., number patterns, counting, ordering, grouping, comparing, and estimating) effectively throughout; indicates thorough understanding</p>
<p>Processes</p> <ul style="list-style-type: none"> • provides complete and accurate answers to the five word problems (Part 1) • solves own problem accurately (Part 2) • uses numbers accurately in designing own booth (Part 3) 	<p>limited accuracy; makes major errors or omissions in: <ul style="list-style-type: none"> - calculating answers to the word problems - solving own problem - using numbers in own booth </p>	<p>somewhat accurate; some minor errors or omissions in: <ul style="list-style-type: none"> - calculating answers to the word problems - solving own problem - using numbers in own booth </p>	<p>generally accurate; few minor errors or omissions in: <ul style="list-style-type: none"> - calculating answers to the word problems - solving own problem - using numbers in own booth </p>	<p>accurate and precise; few, if any, errors in: <ul style="list-style-type: none"> - calculating answers to the word problems - solving own problem - using numbers in own booth </p>
Solves situational problems				
<ul style="list-style-type: none"> • uses appropriate strategies to: <ul style="list-style-type: none"> - create and solve a story problem about the Fall Fair (Part 2) - design a Fall Fair booth that uses numbers (Part 3) 	<p>uses few appropriate strategies; does not adequately: <ul style="list-style-type: none"> - create a reasonable problem - design an appropriate booth </p>	<p>uses some appropriate strategies, with partial success, to: <ul style="list-style-type: none"> - create and solve a relatively simple problem - design a booth with at least one partially appropriate activity; may be very simple or have some flaws </p>	<p>uses appropriate and successful strategies to: <ul style="list-style-type: none"> - create and solve an appropriate problem - design a booth with at least one appropriate activity involving numbers </p>	<p>uses innovative and effective strategies to: <ul style="list-style-type: none"> - create and solve a problem with some complexity - design a booth with at least one appropriate and innovative activity involving numbers </p>
Communicates using mathematical language				
<ul style="list-style-type: none"> • uses mathematical terminology correctly (e.g., pattern, ones, tens, estimate, round, order) • presents solutions, story problem, and description of booth clearly 	<p>uses few appropriate mathematical terms</p> <p>does not present solutions, story problem, or booth clearly</p>	<p>uses some appropriate mathematical terms</p> <p>presents solutions, story problem, and booth with some clarity; may be hard to follow in places</p>	<p>uses appropriate mathematical terms</p> <p>presents solutions, story problem, and booth clearly</p>	<p>uses a range of appropriate mathematical terms with precision</p> <p>presents solutions, story problem, and booth clearly and precisely</p>

Master Q1.3**Peer and Self-Assessment: Unit Problem (Unit 1)**

Names: _____

4=Excellent/Always

3=Very satisfactory/Most of the time

2=Satisfactory/Sometimes

1=Needs further work/Rarely or never

	Self-assessment		Peer assessment	
	Rating	Explain	Rating	Explain
The answers to the problems are correct.				
The new story problem is clear and creative. The solution is correct and makes sense.				
Numbers are used in an interesting way to design a new booth.				
There is a clear explanation of the procedures, using mathematical language.				

Planning for Each Unit

Unit 2: Patterns in Addition and Subtraction

Supporting Cross-Curricular Competencies

Unit Focus: to cooperate with others

Materials

Master Q2.1:

Unit Rubric: Patterns in Addition and Subtraction

Master Q2.2:

Performance Assessment Rubric: National Read-A-Thon

Master Q2.3:

Peer and Self-Assessment: Unit Problem (Unit 2)

The Patterns in Addition and Subtraction unit provides students with many opportunities to engage in group activities. Here are some of the Student Book features that promote teamwork:

- The **Explore** section in each lesson encourages students to work collaboratively to complete each activity (for example, on pages 65, 68, and 74); different groupings are recommended.
- The **Show and Share** section in each lesson (for example, on pages 56, 62, and 83) gives students a chance to share what they learned in the **Explore** activity.
- Encourage students to re-read the **Connect** in each lesson, in pairs or in a group, to reinforce understanding of new concepts (for example, on pages 81 and 83).
- Allow time for students to share answers to the **Reflect** activities to foster discussion and appreciation of their peers' ideas and opinions (for example, on pages 58 and 61).

Use Master Q2.1: Unit Rubric, to support your ongoing assessment during the unit, with a focus on the cross-curricular competency highlighted here.

Addressing Broad Areas of Learning: **Personal and Career Planning**

Educational Aim: to enable students to undertake and complete projects that develop their potential and help them integrate into society

The Unit Problem can be opened up mathematically, and extended.

Have students create their own personal “read-a-thon” where they set individual goals for reading, and compare their individual progress from one week to another. Students could:

- Find a way to record reading categories such as reading for pleasure, reading for schoolwork, and reading for life’s necessities (such as recipes and rules). Estimate the number of pages or the amount of time you read in a week for each category; then record actual results and compare them with your estimates. Draw conclusions from looking at the results.
- Set a goal for leisure reading, in terms of time, pages, and/or books over a period of time (such as a month.). Create a plan to accomplish your goal. Record actual reading and compare your plans with the results.
- Interview family members about the ways reading is used in their daily lives.

Use Master Q2.2: Performance Assessment Rubric and Master Q2.3: Peer and Self-Assessment to support the assessment of the unit problem.

This assessment tool is designed to record overall student performance as you accumulate evidence by reviewing portfolios, observation records, unit assessment activities, and other work. It can be used to guide feedback and help prepare for reporting. It should not be used for just one specific activity.

To create a profile of a student’s achievement, use a highlighter to identify behaviours you have observed.

	Level 1	Level 2	Level 3	Level 4
Uses mathematical concepts and processes				
<p>Concepts</p> <ul style="list-style-type: none"> shows understanding by applying and explaining: <ul style="list-style-type: none"> processes of addition and subtraction patterns and relationships between addition and subtraction place value estimation strategies for sums and differences which operation(s) can be used to solve a problem justifies choice of operations, and choice of method for addition and subtraction 	<p>may be unable to demonstrate, apply or explain:</p> <ul style="list-style-type: none"> patterns and relationships between addition and subtraction strategies for addition and subtraction place value estimation strategies choice of operations choice of method for adding or subtracting 	<p>partially able to demonstrate, apply, or explain:</p> <ul style="list-style-type: none"> patterns and relationships between addition and subtraction strategies for addition and subtraction place value estimation strategies choice of operations choice of method for adding or subtracting 	<p>able to demonstrate, apply, and explain:</p> <ul style="list-style-type: none"> patterns and relationships between addition and subtraction strategies for addition and subtraction place value estimation strategies choice of operations choice of method for adding or subtracting 	<p>in various contexts, appropriately demonstrates, applies, and explains:</p> <ul style="list-style-type: none"> patterns and relationships between addition and subtraction strategies for addition and subtraction place value estimation strategies choice of operations choice of method for adding or subtracting
<p>Processes</p> <ul style="list-style-type: none"> accurately: <ul style="list-style-type: none"> adds and subtracts recalls addition and subtraction facts verifies solutions to addition and subtraction problems using estimation, calculators, and inverse operations 	<p>limited accuracy; often makes major errors or omissions in:</p> <ul style="list-style-type: none"> addition and subtraction recalling addition and subtraction facts verifying solutions 	<p>partially accurate; makes frequent minor errors or omissions in:</p> <ul style="list-style-type: none"> addition and subtraction recalling addition and subtraction facts verifying solutions 	<p>generally accurate; makes few errors or omissions in:</p> <ul style="list-style-type: none"> addition and subtraction recalling addition and subtraction facts verifying solutions 	<p>accurate; rarely make errors or omissions in:</p> <ul style="list-style-type: none"> addition and subtraction recalling addition and subtraction facts verifying solutions
Solves situational problems				
<ul style="list-style-type: none"> chooses and carries out a range of strategies (e.g., estimation, using manipulatives to model, drawing pictures, making place value charts, creating organized lists, guess and check, using patterns, calculators) to create and solve problems involving addition and subtraction of whole numbers 	<p>may be unable to use appropriate strategies to solve and create problems involving addition and subtraction of whole numbers</p>	<p>with limited help, uses some appropriate strategies to solve and create problems involving addition and subtraction of whole numbers; partially successful</p>	<p>uses appropriate strategies to solve and create problems involving addition and subtraction of whole numbers successfully</p>	<p>uses appropriate, often innovative, strategies to solve and create problems involving addition and subtraction of whole numbers successfully</p>
Communicates using mathematical language				
<ul style="list-style-type: none"> interprets and produces messages about addition and subtraction, using appropriate mathematical language 	<p>has difficulty interpreting and producing mathematical messages about addition and subtraction</p>	<p>partially able to interpret and produce mathematical messages about addition and subtraction</p>	<p>interprets and produces mathematical messages about addition and subtraction</p>	<p>interprets and produces mathematical messages about addition and subtraction with precision</p>
Cross-curricular competency: to cooperate with others				
<ul style="list-style-type: none"> shows commitment when working with a partner or group by participating actively and contributing appropriately 	<p>little commitment to teamwork; does not participate actively and appropriately</p>	<p>some commitment to teamwork; participates actively and contributes appropriately to some parts of the task</p>	<p>shows commitment to teamwork; participates actively and contributes appropriately</p>	<p>shows strong commitment to teamwork; participates and contributes effectively</p>

**Performance Assessment Rubric:
National Read-A-Thon**

	Level 1	Level 2	Level 3	Level 4
Uses mathematical concepts and processes				
Concepts <ul style="list-style-type: none"> shows understanding by applying the required concepts of addition, subtraction, and estimation to: <ul style="list-style-type: none"> - solve the word problems (Part 1) - decide who should win the prizes (Part 2) - design a new prize (Part 3) 	does not apply required concepts of addition, subtraction, and estimation appropriately; may be incomplete or indicate misconceptions	applies some of the required concepts of addition, subtraction, and estimation appropriately; may indicate some misconceptions	applies the required concepts of addition, subtraction, and estimation appropriately; explanations may show minor flaws in reasoning	applies the required concepts of addition, subtraction, and estimation effectively throughout; indicates thorough understanding
Processes <ul style="list-style-type: none"> adds, subtracts, and compares correctly 	limited accuracy; makes major errors or omissions in adding, subtracting, and comparing	somewhat accurate; some minor errors or omissions in adding, subtracting, and comparing	generally accurate; few minor errors or omissions in adding, subtracting, and comparing	accurate and precise; few, if any, errors in adding, subtracting, and comparing
Solves situational problems				
<ul style="list-style-type: none"> uses appropriate strategies to create another prize and decide who would get it (Part 3) 	uses few appropriate strategies; does not adequately create a prize or determine who would get it	uses some appropriate strategies, with partial success, to create a very simple prize and determine who would get it; may be some flaws	uses appropriate and successful strategies to create an appropriate prize and determine who would get it	uses innovative and effective strategies to create a prize, with some complexity, and determines who would get it
Communicates using mathematical language				
<ul style="list-style-type: none"> explains solutions clearly as required, using mathematical terminology correctly (e.g., sum, difference, estimate) 	unclear and incomplete explanation; uses few appropriate mathematical terms	gives partial explanations; may be unclear or incomplete; uses some appropriate mathematical terms	explains answers as required; uses appropriate mathematical terms	explains answers clearly and precisely, using a range of appropriate mathematical terms
<ul style="list-style-type: none"> work is clearly presented 	does not present work clearly	presents work with some clarity; may be hard to follow in places	presents work clearly	presents work clearly and precisely

Master Q2.3

Peer and Self-Assessment: Unit Problem (Unit 2)

Names: _____

- 4=Excellent/Always
- 3=Very satisfactory/Most of the time
- 2=Satisfactory/Sometimes
- 1=Needs further work/Rarely or never

	Self-assessment		Peer assessment	
	Rating	Explain	Rating	Explain
Answers are correct and complete. They show estimating, comparing, adding, and subtracting.				
Explanations show understanding of numbers. They explain who gets each prize.				
Numbers are used in an interesting way to describe another way to award a prize at the Read-A-Thon. (Part 3)				
There is a clear explanation of the procedures, using mathematical language.				

Planning for Each Unit

Unit 3: Geometry

Materials

Master Q3.1:

Unit Rubric: Geometry

Master Q3.2:

Performance Assessment Rubric: At the Beach

Master Q3.3:

Peer and Self-Assessment: Unit Problem (Unit 3)

Supporting Cross-Curricular Competencies

Unit Focus: to communicate appropriately

Geometry is a suitable topic for highlighting correct terminology and appropriate communication in the mathematics classroom. Employ these Student Book features to support students' developing vocabularies:

- From **Key Words** on page 103, create a word wall for students' reference.
- Develop students' textbook skills by showing how key words are highlighted the first time they appear in a lesson in the Student Book (pages 105, 107, 108, and so on).
- Encourage students to create their own glossaries of key words – both new words and those learned in previous grades – by recording mathematical words they encounter in the unit, and referring to the **Glossary** starting on page 428 if they need support.
- The **Connect** section in each lesson models appropriate mathematical language (for example, on pages 105, 107, and 110); students can reference the **Connect** as they complete the **Reflect** activity at the close of each lesson (for example, on pages 106, 109, and 112). Note these

Reflect suggestions frequently ask students to use words and pictures to explain their thinking.

Use Master Q3.1: Unit Rubric, to support your ongoing assessment during the unit, with a focus on the cross-curricular competency highlighted here.

Addressing Broad Areas of Learning: Environmental Awareness

Educational Aim: to encourage students to develop an active relationship with their environment while maintaining a critical attitude towards exploitation of the environment

The Unit Problem can be extended.

After students design and sketch their sand castles, have them imagine that they are going to live in them. Invite students to design and map an ideal environment for their sandcastles, and consider the relationship between their activities and the environment. Students could:

- List characteristics of an ideal environment.
- Discuss how people's activities are connected to the environments in which they live. How does the environment affect people's activities? How do people's activities affect the natural environment?
- Make a list of guidelines for living responsibly in your sand castle environment.
- Write a letter to a friend, describing the environment you created. Explain how you will protect and conserve it.

Use Master Q3.2: Performance Assessment Rubric and Master Q3.3: Peer and Self-Assessment to support the assessment of the unit problem.

Master Q3.1

Unit Rubric: Geometry

This assessment tool is designed to record overall student performance as you accumulate evidence by reviewing portfolios, observation records, unit assessment activities, and other work. It can be used to guide feedback and help prepare for reporting. It should not be used for just one specific activity.

To create a profile of a student's achievement, use a highlighter to identify behaviours you have observed.

	Level 1	Level 2	Level 3	Level 4
Uses mathematical concepts and processes				
Concepts <ul style="list-style-type: none"> shows understanding of solids and their characteristics by: <ul style="list-style-type: none"> demonstrating and explaining relationships between solids and figures (faces) comparing and contrasting two solids constructing figures, solids, and nets 	may be unable to demonstrate and explain: <ul style="list-style-type: none"> relationships between solids and figures (faces) similarities and differences between two solids construction of figures, solids, and nets 	partially able to demonstrate and explain: <ul style="list-style-type: none"> relationships between solids and figures (faces) similarities and differences between two solids construction of figures, solids, and nets 	able to demonstrate, apply, and explain: <ul style="list-style-type: none"> relationships between solids and figures (faces) similarities and differences between two solids construction of figures, solids, and nets 	in various contexts, appropriately demonstrates and explains: <ul style="list-style-type: none"> relationships between solids and figures (faces) similarities and differences between two solids construction of figures, solids, and nets
Processes <ul style="list-style-type: none"> accurately: <ul style="list-style-type: none"> identifies attributes (sides, angles, faces, vertices, edges) names and classifies solids and figures (names prisms and pyramids by bases) identifies congruent solids and figures 	limited accuracy; often makes major errors or omissions in: <ul style="list-style-type: none"> identifying attributes (sides, angles, faces, vertices, edges) naming and classifying solids and figures identifying congruent solids and figures 	partially accurate; makes frequent minor errors or omissions in: <ul style="list-style-type: none"> identifying attributes (sides, angles, faces, vertices, edges) naming and classifying solids and figures identifying congruent solids and figures 	generally accurate; makes few errors or omissions in: <ul style="list-style-type: none"> identifying attributes (sides, angles, faces, vertices, edges) naming and classifying solids and figures identifying congruent solids and figures 	accurate; rarely make errors or omissions in: <ul style="list-style-type: none"> identifying attributes (sides, angles, faces, vertices, edges) naming and classifying solids and figures identifying congruent solids and figures
Solves situational problems				
<ul style="list-style-type: none"> chooses and carries out appropriate strategies (e.g., drawing; creating models, constructions, and nets; skeletons) to solve geometric problems 	may be unable to use appropriate strategies to solve geometric problems	with limited help, uses some appropriate strategies to solve geometric problems; partially successful	uses appropriate strategies to solve geometric problems successfully	uses appropriate, often innovative, strategies to solve geometric problems successfully
Communicates using mathematical language				
<ul style="list-style-type: none"> interprets and produces messages and presentations about figures and solids, using appropriate mathematical language 	has difficulty interpreting and producing mathematical messages and presentations about figures and solids	partially able to interpret and produce mathematical messages and presentations about figures and solids	interprets and produces mathematical messages and presentations about figures and solids	interprets and produces mathematical messages and presentations about figures and solids with precision
Cross-curricular competency: to communicate appropriately				
<ul style="list-style-type: none"> identifies success factors and ways to improve communications 	unable to identify success factors and/or ways to improve communications	with support, can identify some simple success factors and ways to improve communications	identifies some simple success factors and ways to improve communications	shows increasing understanding of a variety of success factors and ways to improve communications

Performance Assessment Rubric: At the Beach

	Level 1	Level 2	Level 3	Level 4
Uses mathematical concepts and processes				
<p>Concepts</p> <ul style="list-style-type: none"> provides a description of the construction and the decisions made, showing understanding of attributes of solids 	does not describe the construction or explain decisions appropriately; may be incomplete or offer misconceptions	partially describes the construction and explains decisions; may be vague or include some flawed reasoning	adequately describes the construction and explains decisions	thoroughly and effectively describes the construction and explains decisions; may offer predictions or generalizations that make connections to other situations
<p>Processes</p> <ul style="list-style-type: none"> represents the model accurately by sketching identifies solids and describes their attributes correctly when writing about the model 	<p>makes major errors or omissions in:</p> <ul style="list-style-type: none"> representing the model (sketching) identifying the solids used and their attributes (writing) 	<p>some minor errors or omissions in:</p> <ul style="list-style-type: none"> representing the model (sketching) identifying the solids used and their attributes (writing) 	<p>few minor errors or omissions in:</p> <ul style="list-style-type: none"> representing the model (sketching) identifying the solids used and their attributes (writing) 	<p>accurate and precise; few, if any, errors in:</p> <ul style="list-style-type: none"> representing the model (sketching) identifying the solids used and their attributes (writing)
Solves situational problems				
<ul style="list-style-type: none"> uses appropriate strategies to design a sandcastle and create a model 	uses few effective strategies; does not adequately design a sandcastle and create a model OR creates an extremely simple design using few solids	uses some appropriate strategies, with partial success, to design a sandcastle and create a model; may be relatively simple	uses appropriate and successful strategies to design a sandcastle and create a model	uses innovative and effective strategies to design a sandcastle and create a model with some complexity
Communicates using mathematical language				
<ul style="list-style-type: none"> uses mathematical terminology correctly (e.g., names and characteristics of solids and their faces) explains the model clearly 	<p>uses few appropriate mathematical terms</p> <p>does not explain the model clearly</p>	<p>uses some appropriate mathematical terms</p> <p>partially explains the model; may be vague and somewhat unclear</p>	<p>uses appropriate mathematical terms</p> <p>explains the model clearly</p>	<p>uses a range of appropriate mathematical terms with precision</p> <p>explains the model clearly, precisely, and confidently</p>

Master Q3.3

Peer and Self-Assessment: Unit Problem (Unit 3)

Names: _____

- 4=Excellent/Always
- 3=Very satisfactory/Most of the time
- 2=Satisfactory/Sometimes
- 1=Needs further work/Rarely or never

	Self-assessment		Peer assessment	
	Rating	Explain	Rating	Explain
The model of the sand castle is made from solids.				
The picture matches the model.				
The explanation tells how the model was made, and how the solids were chosen.				
Correct mathematical language is used to describe the model.				

Planning for Each Unit

Unit 4: Multiplication and Division

Supporting Cross-Curricular Competencies

Unit Focus: to adopt effective work methods

Materials

Master Q4.1:

Unit Rubric: Multiplication and Division

Master Q4.2:

Performance Assessment Rubric: Here Comes the Band!

Master Q4.3:

Peer and Self-Assessment: Unit Problem (Unit 4)

Multiplication and Division is a fitting topic for emphasizing the importance of working effectively. Use these Student Book and Teacher Guide features to support students' development of effective work and management habits:

- The **Show and Share** section in each lesson (for example, on pages 146 and 149) prompts students to discuss how they worked in the **Explore** activity; encourage students to talk about whether they think they had an effective approach and why, and how they organized their work to keep track of their results.
- Each **Connect** activity (for example, on pages 150 and 153) models an effective method for solving a problem.
- In each module of the Teacher Guide, a **Step-by-Step** master for each Assessment Focus question in each Practice set is provided; use these reproducible masters to provide greater structure to students who need it, and to help foster effective solution methods.

Use Master Q4.1: Unit Rubric, to support your ongoing assessment during the unit, with a focus on the cross-curricular competency highlighted here.

Addressing Broad Areas of Learning: **Citizenship and Community Life**

Educational Aim: to ensure that students take part in the democratic life of the classroom or the school and develop a spirit of openness to the world and respect for diversity

The Unit Problem can be opened up mathematically, and extended.

Have students investigate, represent, and share information about the role of music in their own and other communities. For example, students could:

- Work in groups to find out about various music groups in the community. Create a collaborative chart identifying who and how many people belong to each group; what kind of special training or skill they need; how often they meet to practice and/or perform; and the community events in which they participate.
- Write about a personal experience watching a live music performance in your school and community. Include how it made you feel, and what parts were most memorable and why.
- Research the types of music performances that are important in other communities or among various cultural groups. Present your results using words, pictures, and numbers.

Use Master Q4.2: Performance Assessment Rubric and Master Q4.3: Peer and Self-Assessment to support the assessment of the unit problem.

Master Q4.1

Unit Rubric: Multiplication and Division

This assessment tool is designed to record overall student performance as you accumulate evidence by reviewing portfolios, observation records, unit assessment activities, and other work. It can be used to guide feedback and help prepare for reporting. It should not be used for just one specific activity.

To create a profile of a student's achievement, use a highlighter to identify behaviours you have observed.

	Level 1	Level 2	Level 3	Level 4
Uses mathematical concepts and processes				
Concepts <ul style="list-style-type: none"> shows understanding by applying and explaining: <ul style="list-style-type: none"> divisibility by 2, 5, and 10 processes of multiplication and division, using manipulatives, diagrams, and symbols estimation strategies for products and quotients which operation(s) can be used to solve a particular problem 	may be unable to demonstrate, apply, or explain: <ul style="list-style-type: none"> divisibility by 2, 5, and 10 processes of multiplication and division estimation strategies for products and quotients choice of operations 	partially able to demonstrate, apply, or explain: <ul style="list-style-type: none"> divisibility by 2, 5, and 10 processes of multiplication and division estimation strategies for products and quotients choice of operations 	able to demonstrate, apply, and explain: <ul style="list-style-type: none"> divisibility by 2, 5, and 10 processes of multiplication and division estimation strategies for products and quotients choice of operations 	in various contexts, appropriately demonstrates, applies, and explains: <ul style="list-style-type: none"> divisibility by 2, 5, and 10 processes of multiplication and division estimation strategies for products and quotients choice of operations
Processes <ul style="list-style-type: none"> accurately: <ul style="list-style-type: none"> multiplies and divides (calculates products and quotients) recalls multiplication facts counts by 2s, 5s, and 10s recognizes which numbers are divisible by 2, 5, and 10 writes multiplication and division sentences 	limited accuracy; often makes major errors or omissions in: <ul style="list-style-type: none"> multiplying and dividing recalling multiplication facts skip counting recognizing which numbers are divisible by 2, 5, and 10 writing multiplication and division sentences 	partially accurate; makes frequent minor errors or omissions in: <ul style="list-style-type: none"> multiplying and dividing recalling multiplication facts skip counting recognizing which numbers are divisible by 2, 5, and 10 writing multiplication and division sentences 	generally accurate; makes few errors or omissions in: <ul style="list-style-type: none"> multiplying and dividing recalling multiplication facts skip counting recognizing which numbers are divisible by 2, 5, and 10 writing multiplication and division sentences 	accurate; rarely make errors or omissions in: <ul style="list-style-type: none"> multiplying and dividing recalling multiplication facts skip counting recognizing which numbers are divisible by 2, 5, and 10 writing multiplication and division sentences
Solves situational problems				
<ul style="list-style-type: none"> chooses and carries out a range of strategies (e.g., estimation, using manipulatives, pictures, diagrams, arrays, number lines, patterns, charts, tables calculators) to create and solve problems involving multiplication and division 	may be unable to use appropriate strategies to solve and create problems involving multiplication and division of whole numbers	with limited help, uses some appropriate strategies to solve and create problems involving multiplication and division of whole numbers; partially successful	uses appropriate strategies to solve and create problems involving multiplication and division of whole numbers successfully	uses appropriate, often innovative, strategies to solve and create problems involving multiplication and division of whole numbers successfully
Communicates using mathematical language				
<ul style="list-style-type: none"> interprets and produces messages about multiplication and division, using appropriate mathematical language 	has difficulty interpreting and producing mathematical messages about multiplication and division	partially able to interpret and produce mathematical messages about multiplication and division	interprets and produces mathematical messages about multiplication and division	interprets and produces mathematical messages about multiplication and division with precision
Cross-curricular competency: to adopt effective work methods				
<ul style="list-style-type: none"> uses materials and time appropriately, adjusting procedures as needed to complete tasks 	does not make appropriate use of materials or time; frequently does not complete tasks	some appropriate use of materials and time; may have difficulty adjusting procedures to complete tasks	uses materials and time appropriately; tries to adjust procedures as needed; completes most tasks	uses materials and time efficiently and effectively, often finding improved procedures or shortcuts; completes all tasks

Master Q4.2

**Performance Assessment Rubric:
Here Comes the Band!**

	Level 1	Level 2	Level 3	Level 4
Uses mathematical concepts and processes				
<p>Concepts</p> <ul style="list-style-type: none"> shows understanding by applying the required concepts of multiplication and division to each step, and explaining why arranging 31 band members would be a problem 	<p>does not apply the required concepts of multiplication and division appropriately; may be incomplete or indicate misconceptions</p>	<p>applies some of the required concepts of multiplication and division; may indicate some misconceptions, particularly in explaining why 31 would be difficult</p>	<p>applies the required concepts of multiplication and division appropriately; may be minor flaws in reasoning apparent in explanation of why 31 would be difficult</p>	<p>applies the required concepts of multiplication and division effectively throughout; indicates thorough understanding</p>
<p>Processes</p> <ul style="list-style-type: none"> writes accurate multiplication sentences for 48 (Part 1) writes accurate division sentences for 30 (Part 2) writes accurate multiplication and division sentences for the number chosen (Part 3) 	<p>makes major errors or omissions in:</p> <ul style="list-style-type: none"> multiplication sentences for 48 division sentences for 30 multiplication and division sentences for chosen number 	<p>some minor errors or omissions in:</p> <ul style="list-style-type: none"> multiplication sentences for 48 division sentences for 30 multiplication and division sentences for chosen number 	<p>few minor errors or omissions in:</p> <ul style="list-style-type: none"> multiplication sentences for 48 division sentences for 30 multiplication and division sentences for chosen number 	<p>accurate and precise; few, if any, errors in:</p> <ul style="list-style-type: none"> multiplication sentences for 48 division sentences for 30 multiplication and division sentences for chosen number
Solves situational problems				
<ul style="list-style-type: none"> uses appropriate strategies (e.g., drawing, making a table) to identify all possible ways to: <ul style="list-style-type: none"> arrange 48 band members in equal rows (arrays) arrange 30 band members in equal rows (arrays) arrange chosen number of band members in equal rows (arrays) 	<p>uses few effective strategies; does not adequately find all possible arrangements for:</p> <ul style="list-style-type: none"> 48 band members 30 band members chosen number of band members 	<p>uses some appropriate strategies, with partial success, to find all possible arrangements for:</p> <ul style="list-style-type: none"> 48 band members 30 band members chosen number of band members 	<p>uses appropriate and successful strategies to find all possible arrangements for:</p> <ul style="list-style-type: none"> 48 band members 30 band members chosen number of band members 	<p>uses innovative and effective strategies to find all possible arrangements for:</p> <ul style="list-style-type: none"> 48 band members 30 band members chosen number of band members
Communicates using mathematical language				
<ul style="list-style-type: none"> uses mathematical terminology correctly (e.g., multiply, divide, times, array, factor, product) explains the need for band members to be divided into equal rows/columns clearly 	<p>uses few appropriate mathematical terms</p> <p>does not explain reasoning clearly</p>	<p>uses some appropriate mathematical terms</p> <p>partially explains reasoning; may be vague and somewhat unclear</p>	<p>uses appropriate mathematical terms</p> <p>explains reasoning clearly</p>	<p>uses a range of appropriate mathematical terms with precision</p> <p>explains reasoning clearly, precisely, and confidently</p>

Master Q4.3

Peer and Self-Assessment: Unit Problem (Unit 4)

Names: _____

- 4=Excellent/Always
- 3=Very satisfactory/Most of the time
- 2=Satisfactory/Sometimes
- 1=Needs further work/Rarely or never

	Self-assessment		Peer assessment	
	Rating	Explain	Rating	Explain
All the ways to arrange the marching band, the stage band, and the new band are shown using equal rows.				
The multiplication and division sentences are correct.				
There is a reasonable explanation of why 31 band members might be a problem.				
The work is explained clearly using mathematical language.				

Planning for Each Unit

Unit 5: Sorting and Data Management

Supporting Cross-Curricular Competencies

Unit Focus: to use information

Materials

Master Q5.1:

Unit Rubric: Sorting and Data Management

Master Q5.2:

Performance Assessment Rubric: Using Data to Answer Questions

Master Q5.3:

Peer and Self-Assessment: Unit Problem (Unit 5)

The Sorting and Data Management unit provides students with opportunities to use information in meaningful contexts. The following Student Book features support students as they learn how to compare, group, organize, display, and question information:

- Lesson introductions (pages 192, 208, and 221) prompt students to assess prior knowledge and make connections to new concepts; read and discuss lesson introductions with students.
- The **Explore** activities, **Practice** questions, and the **Strategies Toolkits** give students the chance to use given information to solve relevant problems; support students in selecting materials that best suit their needs for solving each problem.
- The **Connect** section in each lesson (for example, on pages 201, 205, and 209) allows for students to make connections between what they already know and new information; encourage students to share any connections they make with the class.

Use Master Q5.1: Unit Rubric, to support your ongoing assessment during the unit, with a focus on the cross-curricular competency highlighted here.

Addressing Broad Areas of Learning: Media Literacy

Educational Aim: to develop students' critical and ethical judgment with respect to media

The Unit Problem can be opened up mathematically, and extended.

Have students pose questions about age-appropriate media issues, and work in groups or as a class to collect and interpret data. For example, students could:

- Survey students in the class to determine how much time they spend watching television, and what kinds of programs (or which specific programs) they enjoy the most. Record and present your data. Then, ask questions, such as: Why are these programs popular? What messages do they give about how people should live and behave? What groups of people are represented in these programs? What groups are left out?
- Observe and record the types of advertisements used in your favourite television programs. Present your data. Talk about why these advertisers are associated with children's programs. Ask questions, such as: What do the advertisers want children to learn, think, or do? What parts of the advertisements are factual? What parts are not? What strategies do the advertisers use to appeal to children? Conduct similar investigations with children's magazines or websites.

Use Master Q5.2: Performance Assessment Rubric and Master Q5.3: Peer and Self-Assessment to support the assessment of the unit problem.

Master Q5.1

Unit Rubric: Sorting and Data Management

This assessment tool is designed to record overall student performance as you accumulate evidence by reviewing portfolios, observation records, unit assessment activities, and other work. It can be used to guide feedback and help prepare for reporting. It should not be used for just one specific activity.

To create a profile of a student's achievement, use a highlighter to identify behaviours you have observed.

	Level 1	Level 2	Level 3	Level 4
Uses mathematical concepts and processes				
Concepts <ul style="list-style-type: none"> selects, applies, and explains concepts associated with: <ul style="list-style-type: none"> collecting and organizing data displaying the same data in more than one way interpreting data to make predictions and inferences 	may be unable to apply or explain concepts associated with: <ul style="list-style-type: none"> collecting and organizing data displaying the same data in more than one way interpreting data to make predictions and inferences 	partially able to apply and explain concepts associated with: <ul style="list-style-type: none"> collecting and organizing data displaying the same data in more than one way interpreting data to make predictions and inferences 	able to apply and explain concepts associated with: <ul style="list-style-type: none"> collecting and organizing data displaying the same data in more than one way interpreting data to make predictions and inferences 	in various contexts, appropriately applies and explains concepts associated with: <ul style="list-style-type: none"> collecting and organizing data displaying the same data in more than one way interpreting data to make predictions and inferences
Processes <ul style="list-style-type: none"> accurately <ul style="list-style-type: none"> collects and records data displays data using rank ordering transfers data to graphs constructs graphs, including labels and titles 	makes major errors or omissions in: <ul style="list-style-type: none"> collecting and recording data rank ordering transferring data to graphs constructing graphs 	some minor errors or omissions in: <ul style="list-style-type: none"> collecting and recording data rank ordering transferring data to graphs constructing graphs 	few minor errors or omissions in: <ul style="list-style-type: none"> collecting and recording data rank ordering transferring data to graphs constructing graphs 	accurate and precise; few, if any, errors in: <ul style="list-style-type: none"> collecting and recording data rank ordering transferring data to graphs constructing graphs
Solves situational problems				
<ul style="list-style-type: none"> chooses and carries out a range of data strategies (e.g., tally charts, graphic organizers, grids, arithmetic operations, surveying, measuring) to solve problems and conduct inquiries 	may be unable to use data appropriately to solve simple problems and conduct simple inquiries	with limited help, uses some appropriate data strategies to solve simple problems and conduct simple inquiries; partially successful	uses appropriate data strategies to solve simple problems and conduct simple inquiries successfully	uses appropriate, often innovative, data strategies to solve simple problems and conduct simple inquiries successfully
Communicates using mathematical language				
<ul style="list-style-type: none"> interprets and produces messages and presentations about data, using appropriate mathematical language and displays 	has difficulty interpreting and producing mathematical messages and presentations about data	partially able to interpret and produce mathematical messages and presentations about data	interprets and produces mathematical messages and presentations about data	interprets and produces mathematical messages and presentations about data with precision
Cross-curricular competency: to use information				
<ul style="list-style-type: none"> collects and organizes information to answer questions 	has difficulty determining how to collect information to answer questions	with support, can collect and organize information to answer simple questions; may have some difficulty	collects and organizes information to answer simple questions	collects and organizes information to answer questions, showing initiative and resourcefulness

Master Q5.2

**Performance Assessment Rubric:
Using Data to Answer Questions**

	Level 1	Level 2	Level 3	Level 4
Uses mathematical concepts and processes				
<p>Concepts</p> <ul style="list-style-type: none"> offers an appropriate explanation of the graph and what he/she learned, may incorporate arithmetic operations to make comparisons (e.g., combine two or more categories) 	unable to explain results; may be incomplete or offer misconceptions	partially explains the results; may be vague or include some flawed reasoning	adequately explains the results	thoroughly and effectively explains the results; may show insights; offer predictions or generalizations
<p>Processes</p> <ul style="list-style-type: none"> accurately: <ul style="list-style-type: none"> records data transfers data to graph constructs graph, including labels and titles 	makes major errors or omissions in: <ul style="list-style-type: none"> recording data transferring data to graph constructing graph 	some minor errors or omissions in: <ul style="list-style-type: none"> recording data transferring data to graph constructing graph 	few minor errors or omissions in: <ul style="list-style-type: none"> recording data transferring data to graph constructing graph 	accurate and precise; few, if any, errors in: <ul style="list-style-type: none"> recording data transferring data to graph constructing graph
Solves situational problems				
<ul style="list-style-type: none"> develops and presents a survey that includes an appropriate question, and strategies for collecting, recording, and graphing results 	inappropriate strategies; does not include: <ul style="list-style-type: none"> an appropriate question a practical method for collecting and recording data an appropriate choice of graph or display 	partially appropriate strategies; has flaws in planning for one or more of the following: <ul style="list-style-type: none"> an appropriate question a practical method for collecting and recording data an appropriate choice of graph or display 	practical, appropriate strategies that include: <ul style="list-style-type: none"> an appropriate question a practical method for collecting and recording data an appropriate choice of graph or display 	effective strategies, with some innovation or complexity, that include: <ul style="list-style-type: none"> an effective question an efficient method for collecting and recording data a highly effective choice of graph or display
Communicates using mathematical language				
<ul style="list-style-type: none"> uses appropriate mathematical terminology explains interpretation of graph clearly 	uses few appropriate mathematical terms does not explain graph clearly	uses some appropriate mathematical terms partially explains graph; may be vague and somewhat unclear	uses appropriate mathematical terms explains graph clearly	uses a range of appropriate mathematical terms with precision explains graph clearly, precisely, and confidently

Names: _____

4=Excellent/Always

3=Very satisfactory/Most of the time

2=Satisfactory/Sometimes

1=Needs further work/Rarely or never

	Self-assessment		Peer assessment	
	Rating	Explain	Rating	Explain
The survey question and the possible answers are appropriate.				
Data is recorded accurately.				
The graph shows the results clearly, and has a title and labels.				
The explanation tells what was learned from the graph.				

Planning for Each Unit

Unit 6: Measurement

Materials

Master Q6.1:

Unit Rubric: Measurement

Master Q6.2:

Performance Assessment Rubric: Bake Sale

Master Q6.3:

Peer and Self-Assessment: Unit Problem
(Unit 6)

Supporting Cross-Curricular Competencies

Unit Focus: to adopt effective work methods

Measurement is a fitting topic for emphasizing the importance of working effectively. Use these Student Book and Teacher Guide features to support students' development of effective work and management habits:

- The **Show and Share** section in each lesson (for example, on pages 230 and 237) prompts students to discuss how they worked in the **Explore** activity; encourage students to talk about whether they think they had an effective approach and why, and how they organized their work to keep track of their results.
- Each **Connect** activity (for example, on pages 231 and 234) models an effective method for solving a problem.
- In each module of the Teacher Guide, a **Step-by-Step** master for each Assessment Focus question in each Practice set is provided; use these reproducible masters to provide greater structure to students who need it, and to help foster effective solution methods.

Use Master Q6.1: Unit Rubric, to support your ongoing assessment during the unit, with a focus on the cross-curricular competency highlighted here.

Addressing Broad Areas of Learning: Health and Well-Being

Educational Aim: to ensure that students adopt a self-monitoring procedure concerning the development of good living habits related to health and well-being

The Unit Problem can be opened up mathematically, and extended.

Have students pose and discuss questions about healthy eating choices, and how diet affects well-being. For example, students could:

- Brainstorm a list of foods that are sold at bake sales, and determine which ones are healthy choices. Examine food guidelines to determine which bake sale items fall into various categories. Consider how often it is acceptable to eat “sweet” treats. Make lists of alternatives and strategies for choosing healthy foods.
- Design and conduct a “snack sale” for the school. Work as a class to make a list of healthy snacks, create a price list, and estimate how much of each food will be needed. Work with parent volunteers to set up and conduct the sale. Consider donating the money raised by the sale to a charity or specific cause.

Use Master Q6.2: Performance Assessment Rubric and Master Q6.3: Peer and Self-Assessment to support the assessment of the unit problem.

Master Q6.1

Unit Rubric: Measurement

This assessment tool is designed to record overall student performance as you accumulate evidence by reviewing portfolios, observation records, unit assessment activities, and other work. It can be used to guide feedback and help prepare for reporting. It should not be used for just one specific activity.

To create a profile of a student's achievement, use a highlighter to identify behaviours you have observed.

	Level 1	Level 2	Level 3	Level 4
Uses mathematical concepts and processes				
Concepts <ul style="list-style-type: none"> selects and applies relevant processes for estimating and measuring passage of time; temperature describes relationships among standard units, and relates size of unit to number of units needed 	needs one-to-one support; may be unable to: <ul style="list-style-type: none"> select and apply relevant processes and strategies describe relationships among standard units relate size of unit to number of units needed 	shows some understanding; partially able to: <ul style="list-style-type: none"> select and apply relevant processes and strategies describe relationships among standard units relate size of unit to number of units needed 	shows understanding; able to appropriately: <ul style="list-style-type: none"> select and apply relevant processes and strategies describe relationships among standard units relate size of unit to number of units needed 	shows thorough understanding; in various contexts, able to appropriately: <ul style="list-style-type: none"> select and apply relevant processes and strategies describe relationships among standard units relate size of unit to number of units needed
Processes <ul style="list-style-type: none"> accurately: <ul style="list-style-type: none"> measures passage of time (standard units) counts and records money; makes change to \$10 measures and records capacity (non-standard units) compares and orders containers by capacity 	limited accuracy; often makes major errors or omissions in: <ul style="list-style-type: none"> measuring passage of time, temperature, money to \$10, capacity comparing containers by capacity 	partially accurate; makes frequent minor errors or omissions in: <ul style="list-style-type: none"> measuring passage of time, temperature, money to \$10, capacity comparing containers by capacity 	generally accurate; makes few errors or omissions in: <ul style="list-style-type: none"> measuring passage of time, temperature, money to \$10, capacity comparing containers by capacity 	accurate; rarely makes errors or omissions in: <ul style="list-style-type: none"> measuring passage of time, temperature, money to \$10, capacity comparing containers by capacity
Solves situational problems				
<ul style="list-style-type: none"> chooses and carries out a range of strategies (e.g., estimation, diagrams, charts, manipulatives, estimating, guess and check) to solve and create problems involving measurement 	may be unable to use appropriate strategies to solve and create problems involving measurement	with limited help, uses some appropriate strategies to solve and create problems involving measurement; partially successful	uses appropriate strategies to solve and create problems involving measurement successfully	uses appropriate, often innovative, strategies to solve and create problems involving measurement successfully
Communicates using mathematical language				
<ul style="list-style-type: none"> interprets and produces messages and presentations about measurement, using appropriate mathematical language and displays 	has difficulty interpreting and producing mathematical messages and presentations about measurement	partially able to interpret and produce mathematical messages and presentations about measurement	interprets and produces mathematical messages and presentations about measurement	interprets and produces mathematical messages and presentations about measurement with precision
Cross-curricular competency: to adopt effective work methods				
<ul style="list-style-type: none"> analyses and evaluates own procedures for estimating and measuring (what was effective and what didn't work as well) 	has difficulty analysing procedures to determine what was effective and what didn't work as well	with support, can draw some conclusions about what was effective and what didn't work as well; may have difficulty explaining or offering evidence	draws appropriate conclusions about what was effective and what didn't work as well; offers simple explanations and evidence	draws insightful conclusions about what was effective and what didn't work as well; offers supporting explanations and evidence

**Performance Assessment Rubric:
Bake Sale**

	Level 1	Level 2	Level 3	Level 4
Uses mathematical concepts and processes				
<p>Concepts</p> <ul style="list-style-type: none"> • shows understanding by applying the required concepts of measurement 	<p>does not apply the required concepts of measurement appropriately; may be incomplete or indicate misconceptions</p>	<p>applies some of the required concepts of measurement; may indicate some misconceptions</p>	<p>applies the required concepts of measurement appropriately; may be minor flaws in reasoning</p>	<p>applies the required concepts of measurement effectively; indicates thorough understanding</p>
<p>Processes</p> <ul style="list-style-type: none"> • correctly identifies 2 ingredients that are sold by mass; 2 by capacity • accurately calculates: <ul style="list-style-type: none"> - time the bannock was taken out - correct change - 3 ways to pay for popcorn balls - answer to own story problem 	<p>makes major errors or omissions in:</p> <ul style="list-style-type: none"> - identifying items sold by mass and capacity - time bannock was taken out - correct change - 3 ways to pay for popcorn balls 	<p>some minor errors or omissions in:</p> <ul style="list-style-type: none"> - identifying items sold by mass and capacity - time bannock was taken out - correct change - 3 ways to pay for popcorn balls 	<p>few minor errors or omissions in:</p> <ul style="list-style-type: none"> - identifying items sold by mass and capacity - time bannock was taken out - correct change - 3 ways to pay for popcorn balls 	<p>accurate and precise; few, if any, errors in:</p> <ul style="list-style-type: none"> - identifying items sold by mass and capacity - time bannock was taken out - correct change - 3 ways to pay for popcorn balls
Solves situational problems				
<ul style="list-style-type: none"> • creates and solves an appropriate story problem using concepts of measurement in the context of a bake sale • makes an appropriate plan for the bake sale, including reasonable costs for items 	<p>uses few effective strategies; does not adequately:</p> <ul style="list-style-type: none"> - create and solve an appropriate story problem (may be incomplete or very simple) - make a reasonable plan for the bake sale 	<p>uses some appropriate strategies, with partial success, to:</p> <ul style="list-style-type: none"> - create and solve a relatively simple story problem - make a partially appropriate plan; may have minor flaws or omissions 	<p>uses appropriate and successful strategies to:</p> <ul style="list-style-type: none"> - create and solve an appropriate story problem - develop an appropriate, workable plan for the bake sale 	<p>uses innovative and effective strategies to:</p> <ul style="list-style-type: none"> - create and solve an appropriate story problem with some complexity - develop a detailed, effective plan for the bake sale
Communicates using mathematical language				
<ul style="list-style-type: none"> • uses mathematical terminology correctly • explains story problem and plan for the bake sale clearly 	<p>uses few appropriate mathematical terms</p> <p>does not explain the story problem and plan clearly</p>	<p>uses some appropriate mathematical terms</p> <p>partially explains the story problem and plan; may be vague and somewhat unclear</p>	<p>uses appropriate mathematical terms</p> <p>explains the story problem and plan clearly</p>	<p>uses a range of appropriate mathematical terms with precision</p> <p>explains the story problem and plan clearly, precisely, and confidently</p>

Names: _____

4=Excellent/Always

3=Very satisfactory/Most of the time

2=Satisfactory/Sometimes

1=Needs further work/Rarely or never

	Self-assessment		Peer assessment	
	Rating	Explain	Rating	Explain
All work is shown, including how the answers were found.				
The questions are answered correctly.				
The story problem about the bake sale uses measurement. It is interesting.				
The plan for the bake sale is clear and reasonable, and includes a price list.				

Planning for Each Unit

Unit 7: Motion Geometry

Supporting Cross-Curricular Competencies

Unit Focus: to construct his/her identity

Materials

Master Q7.1:

Unit Rubric: Motion Geometry

Master Q7.2:

Performance Assessment Rubric: At the Amusement Park

Master Q7.3:

Peer and Self-Assessment: Unit Problem (Unit 7)

The Motion Geometry unit provides students with many opportunities to make decisions, express their thoughts and feelings, and take responsibility for their actions. Employ these Student Book and Teacher Guide features to support students as they develop their own identities:

- In each lesson, the **Reflect** prompt (for example, on pages 279 and 283) allows for individual reflection; encourage students to examine their personal understanding, thoughts, and opinions, and to share them with others in the class.
- The **Explore** activities and **Practice** questions include contextual problems that promote responsibility to one's self, peers, and community; highlight these positive options for students (such as healthy eating, active living, participating in fundraising events, and so on).
- The Teacher Guide module **Building a Math Community** provides practical suggestions for creating a respectful classroom environment; revisit these ideas throughout the year.

Use Master Q7.1: Unit Rubric, to support your ongoing assessment during the unit, with a focus on the cross-curricular competency highlighted here.

Addressing Broad Areas of Learning: Health and Well-Being

Educational Aim: to ensure that students adopt a self-monitoring procedure concerning the development of good living habits related to health and well-being

The Unit Problem can be opened up mathematically, and extended.

Have students consider safety issues in amusement park rides and other leisure activities that involve some risk (such as motocross or BMX racing). For example, students could:

- List different amusement park rides. Group them according to the number of different ways they move people. Display your findings in a graph of your choice.
- Choose an activity. Research to find out potential risks and precautions that help to minimize the risks. Make a brochure or poster to inform others about safety.
- Research to compile a list of leisure activities related to a particular environment or activity (such as water, mountain sports/activities, contact sports, and so on). Develop a set of safety guidelines.
- Conduct an informal classroom debate about whether or not some sports or leisure activities that pose risks should be banned, or restricted to adult participation.

Use Master Q7.2: Performance Assessment Rubric and Master Q7.3: Peer and Self-Assessment to support the assessment of the unit problem.

Master Q7.1

Unit Rubric: Motion Geometry

This assessment tool is designed to record overall student performance as you accumulate evidence by reviewing portfolios, observation records, unit assessment activities, and other work. It can be used to guide feedback and help prepare for reporting. It should not be used for just one specific activity.

To create a profile of a student's achievement, use a highlighter to identify behaviours you have observed.

	Level 1	Level 2	Level 3	Level 4
Uses mathematical concepts and processes				
Concepts <ul style="list-style-type: none"> shows understanding by: <ul style="list-style-type: none"> - explaining relative position and applying terms of direction - exploring reflections 	shows limited understanding; may be unable to: <ul style="list-style-type: none"> - explain position or apply terms of direction - describe or perform reflections 	shows some understanding; partially able to: <ul style="list-style-type: none"> - explain position and apply terms of direction - describe and perform reflections 	shows understanding by: <ul style="list-style-type: none"> - explaining position and applying terms of direction - describing and performing reflections 	shows thorough understanding in various contexts by: <ul style="list-style-type: none"> - explaining position and applying terms of direction - describing and performing reflections
Processes <ul style="list-style-type: none"> accurately: <ul style="list-style-type: none"> - locates objects on a map or grid - describes relative position - graphs points on a number line - traces a path 	limited accuracy; often makes major errors or omissions in: <ul style="list-style-type: none"> - locating objects on a map or grid - describing relative position - tracing a path 	partially accurate; makes frequent minor errors or omissions in: <ul style="list-style-type: none"> - locating objects on a map or grid - describing relative position - tracing a path 	generally accurate; makes few errors or omissions in: <ul style="list-style-type: none"> - locating objects on a map or grid - describing relative position - tracing a path 	accurate; rarely makes errors or omissions in: <ul style="list-style-type: none"> - locating objects on a map or grid - describing relative position - tracing a path
Solves situational problems				
<ul style="list-style-type: none"> uses appropriate strategies to investigate and describe position in everyday contexts (maps, grids, objects, drawings, number lines) 	may be unable to investigate and describe position in everyday contexts	with limited help, investigates and describes position in everyday contexts; partially successful	successfully investigates and describes position in everyday contexts	successfully investigates and describes position in an increasing range of everyday contexts; often innovative
Communicates using mathematical language				
<ul style="list-style-type: none"> interprets and produces messages and presentations about space and location, using appropriate mathematical language and displays 	has difficulty interpreting and producing mathematical messages and presentations about space and location	partially able to interpret and produce mathematical messages and presentations about space and location	interprets and produces mathematical messages and presentations about space and location	interprets and produces mathematical messages and presentations about space and location with precision
Cross-curricular competency: to construct his/her identity				
<ul style="list-style-type: none"> identifies and uses personal strengths and preferences to choose tasks and strategies, and to overcome difficulties in tasks they do not like 	unable to distinguish between tasks that draw on their personal strengths and preferences and those that pose difficulties	with support, can identify some personal strengths and preferences, and sometimes sees how these can help them with tasks that are difficult for them	identifies some personal strengths and preferences, and recognizes how these can help them with tasks that are difficult for them	identifies personal strengths and preferences, and recognizes how they can use these to create engagement and overcome limitations or difficulties

**Performance Assessment Rubric:
At the Amusement Park**

	Level 1	Level 2	Level 3	Level 4
Uses mathematical concepts and processes				
Concepts <ul style="list-style-type: none"> • presentation of ride and explanation of how it moves shows spatial sense and understanding of direction and relative position 	does not present or explain ride appropriately; may be incomplete or offer misconceptions	presentation and explanation of how the ride moves may be incomplete; may include some flawed reasoning related to position and direction	presentation and explanation of how the ride moves adequately incorporates relevant concepts of position and direction	presentation and explanation of how the ride moves thoroughly and effectively incorporates concepts of position and direction; may offer generalizations or make connections to other situations/rides
Processes <ul style="list-style-type: none"> • correctly identifies and describes movements, relative position, and direction of ride 	makes major errors or omissions in describing movement, position, and direction	some minor errors or omissions in describing movement, position, and direction	few minor errors or omissions in describing movement, position, and direction	accurate and precise; few, if any, errors in describing movement, position, and direction
Solves situational problems				
<ul style="list-style-type: none"> • uses appropriate strategies to successfully design a ride that moves people in at least two different ways 	uses few effective strategies; does not adequately design a ride that meets criteria (may move in one way or repeat the same movement twice)	uses some appropriate strategies, with partial success, to design a ride; may be relatively simple, very similar to an existing ride	uses appropriate and successful strategies to design a ride that moves in two different ways	uses innovative and effective strategies to design a ride that moves in two or more different ways
Communicates using mathematical language				
<ul style="list-style-type: none"> • explains ride clearly using appropriate mathematical terminology 	does not explain ride clearly; uses few or no mathematical terms	partially explains ride; may be vague and somewhat unclear; uses some appropriate mathematical terms	explains ride clearly using appropriate mathematical terms	explains ride clearly, precisely, and confidently, using a range of appropriate mathematical terms with precision

Names: _____

- 4=Excellent/Always
- 3=Very satisfactory/Most of the time
- 2=Satisfactory/Sometimes
- 1=Needs further work/Rarely or never

	Self-assessment		Peer assessment	
	Rating	Explain	Rating	Explain
The ride moves in at least two different ways.				
The ride is presented clearly.				
There is a clear explanation about how the ride works.				
Mathematical language is used to describe the ride and how it works.				

Planning for Each Unit

Unit 8: Exploring Fractions

Supporting Cross-Curricular Competencies

Unit Focus: to solve problems

Materials

Master Q8.1:

Unit Rubric: Exploring Fractions

Master Q8.2:

Performance Assessment Rubric: Pizza Lunch

Master Q8.3:

Peer and Self-Assessment: Unit Problem (Unit 8)

In the Exploring Fractions unit, students solve problems in various contexts. Utilize these Student Book and Teacher Guide features to support students' development of effective problem-solving skills:

- In all of the **Explore** activities and in **Practice** questions, problem-solving opportunities are presented in relevant contexts; encourage students to share their problem-solving strategies with the class.
- In the **Strategies Toolkit** lesson (Lesson 6), students approach new problems involving critical and creative thinking; review the given list of strategies and encourage students to solve the Practice questions using more than one strategy.
- In the Teacher Guide module **Grade 3 Planning and Program Masters**, Program Master 3 (Self-Assessment: Problem Solving) promotes individual reflection about the problem-solving process; use this assessment tool with any problem throughout the unit.

Use Master Q8.1: Unit Rubric, to support your ongoing assessment during the unit, with a focus on the cross-curricular competency highlighted here.

Addressing Broad Areas of Learning: Media Literacy

Educational Aim: to develop students' critical and ethical judgment with respect to media

The Unit Problem can be opened up mathematically, and extended.

Have students analyse advertisements for popular fast-food products. For example, students could engage in the following activities:

- Look at advertisements in a magazine for fast-food products (such as pizza and hamburgers). Record how often each fast-food item appears. Display the results.
- Examine fast-food advertisements to determine what techniques and strategies advertisers use to make their products appealing. Create a list of advertising techniques and strategies.
- Analyse specific advertisements to determine who the target audience might be.
- Create an advertisement using some of the strategies learned. Aim your advertisement at a particular target audience. Share advertisements and analyse the techniques and strategies peers have used.
- Choose a positive behaviour or issue and create "public service" advertisements to post in the classroom, school, or community (such as healthy eating, safety, or setting goals).

Use Master Q8.2: Performance Assessment Rubric and Master Q8.3: Peer and Self-Assessment to support the assessment of the unit problem.

Master Q8.1

Unit Rubric: Exploring Fractions

This assessment tool is designed to record overall student performance as you accumulate evidence by reviewing portfolios, observation records, unit assessment activities, and other work. It can be used to guide feedback and help prepare for reporting. It should not be used for just one specific activity.

To create a profile of a student's achievement, use a highlighter to identify behaviours you have observed.

	Level 1	Level 2	Level 3	Level 4
Uses mathematical concepts and processes				
Concepts <ul style="list-style-type: none"> shows understanding by illustrating and explaining fractions as part of a region or set 	may be unable to illustrate and explain fractions as part of a region or set	partially able to illustrate and explain fractions as part of a region or set	appropriately illustrates and explains fractions as part of a region or set	in various contexts, appropriately illustrates and explains fraction as part of a region or set
Processes <ul style="list-style-type: none"> accurately: <ul style="list-style-type: none"> recognizes equal parts identifies fractional parts solves simple problems involving fractions names fractions 	often makes major errors or omissions in: <ul style="list-style-type: none"> recognizing equal parts identifying fractional parts solving simple problems involving fractions naming fractions 	partially accurate; makes frequent minor errors or omissions in: <ul style="list-style-type: none"> recognizing equal parts identifying fractional parts solving simple problems involving fractions naming fractions 	generally accurate; makes few errors or omissions in: <ul style="list-style-type: none"> recognizing equal parts identifying fractional parts solving simple problems involving fractions naming fractions 	accurate; rarely make errors or omissions in: <ul style="list-style-type: none"> recognizing equal parts identifying fractional parts solving simple problems involving fractions naming fractions
Solves situational problems				
<ul style="list-style-type: none"> chooses and carries out a range of strategies (e.g., estimation, diagrams, drawing, grid paper, manipulatives, grouping) to solve and create problems involving fractions 	may be unable to use appropriate strategies to solve and create problems involving fractions	with limited help, uses some appropriate strategies to solve and create problems involving fractions; partially successful	uses appropriate strategies to solve and create problems involving fractions successfully	uses appropriate, often innovative, strategies to solve and create problems involving fractions successfully
Communicates using mathematical language				
<ul style="list-style-type: none"> interprets and produces messages and presentations about fractions, using appropriate mathematical language and displays 	has difficulty interpreting and producing mathematical messages and presentations about fractions	partially able to interpret and produce mathematical messages and presentations about fractions	interprets and produces mathematical messages and presentations about fractions	interprets and produces mathematical messages and presentations about fractions with precision
Cross-curricular competency: to solve problems				
<ul style="list-style-type: none"> evaluates own procedures, identifying successful strategies and analysing difficulties 	unable to evaluate own procedures; does not provide reasonable analyses of successes and difficulties	with support, evaluates parts of own procedures, providing some reasonable analysis of successes and difficulties	when asked, evaluates own procedures, providing a simple, reasonable analysis of successes and difficulties	evaluates own procedures independently, providing reasonable and insightful analysis of successes and difficulties

**Performance Assessment Rubric:
Pizza Lunch**

	Level 1	Level 2	Level 3	Level 4
Uses mathematical concepts and processes				
Concepts <ul style="list-style-type: none"> • shows understanding of fractions as parts of a region or set by choosing and explaining appropriate procedures for each task 	shows little understanding of fractions; may be unable to choose or explain appropriate procedures for most tasks	shows partial understanding of fractions by choosing and partially explaining appropriate procedures for some tasks	shows understanding of fractions by choosing and explaining appropriate procedures for most tasks	shows thorough understanding of fractions by choosing appropriate procedures for all tasks and offering complete and effective explanations
Processes <ul style="list-style-type: none"> • accurately determines: <ul style="list-style-type: none"> - the amount of each food required for 10 children - how much food to order - how much of each food would be left over 	makes frequent major errors or omissions in: <ul style="list-style-type: none"> - the amount of each food required for 10 children - how much food to order - how much of each food would be left over 	makes frequent minor errors or omissions in: <ul style="list-style-type: none"> - the amount of each food required for 10 children - how much food to order - how much of each food would be left over 	generally accurate; few errors or omissions in: <ul style="list-style-type: none"> - the amount of each food required for 10 children - how much food to order - how much of each food would be left over 	accurate; rarely makes errors or omissions in: <ul style="list-style-type: none"> - the amount of each food required for 10 children - how much food to order - how much of each food would be left over
Solves situational problems				
<ul style="list-style-type: none"> • uses appropriate strategies to solve problems involving fractions (e.g., drawing, creating sets, using manipulatives) 	unable to use appropriate strategies to solve most problems involving fractions	uses appropriate strategies to successfully solve some problems involving fractions	uses appropriate strategies to successfully solve most problems involving fractions	uses appropriate, efficient, and often innovative strategies to successfully solve and create problems involving fractions
Communicates using mathematical language				
<ul style="list-style-type: none"> • uses mathematical terminology, numbers, and symbols correctly • explains reasoning clearly 	uses few appropriate mathematical terms and symbols unable to explain reasoning and procedures clearly	uses some appropriate mathematical terms and symbols partially explains reasoning and procedures	uses appropriate mathematical terms and symbols explains reasoning and procedures clearly	uses a range of appropriate mathematical terms and symbols clearly and precisely explains reasoning and procedures clearly, precisely, and confidently

Names: _____

4=Excellent/Always

3=Very satisfactory/Most of the time

2=Satisfactory/Sometimes

1=Needs further work/Rarely or never

	Self-assessment		Peer assessment	
	Rating	Explain	Rating	Explain
Work is clear and easy to follow (for example, in charts or lists).				
Answers and solutions are correct.				
Answers are explained and justified (how you know they are correct).				
Correct mathematical language is used.				

Planning for Each Unit

Unit 9: Length, Perimeter, and Area

Supporting Cross-Curricular Competencies

Unit Focus: to adopt effective work methods

Materials

Master Q9.1:

Unit Rubric: Length, Perimeter, and Area

Master Q9.2:

Performance Assessment Rubric: Design a Playground

Master Q9.3:

Peer and Self-Assessment: Unit Problem (Unit 9)

Length, Perimeter, and Area is an appropriate topic to emphasize the value of working effectively. Use these Student Book and Teacher Guide features to support students' development of effective work and management habits:

- The **Show and Share** section in each lesson (for example, on pages 335 and 338) prompts students to discuss how they worked in the **Explore** activity; encourage students to talk about whether they think they had an effective approach and why, and how they organized their work to keep track of their results.
- Each **Connect** activity (for example, on pages 349 and 356) models an effective method for solving a problem.
- In each module of the Teacher Guide, a **Step-by-Step** master for each Assessment Focus question in each Practice set is provided; use these reproducible masters to provide greater structure to students who need it, and to help foster effective solution methods.

Use Master Q9.1: Unit Rubric, to support your ongoing assessment during the unit, with a focus on the cross-curricular competency highlighted here.

Addressing Broad Areas of Learning: Environmental Awareness

Educational Aim: to encourage students to develop an active relationship with their environment

The Unit Problem can be opened up mathematically, and extended.

Have students investigate human-created shared outdoor environments in your community, such as playgrounds, parks, school grounds, and/or public gardens. For example, students could:

- Create an inventory of public spaces in the community, including location, purpose, and a spatial representation (such as a map or sketch).
- Choose specific spaces or environments, and speculate about how and why they were created. Research to find out what existed in that space before the human-created environment.
- Choose a specific space or environment and design a plan for improving it. Present the plan to a group of students, a parent group, the local council, and so on.
- Write a personal response to a favourite community space, explaining why it is important. Include experiences and pastimes spent at the community space, and what makes it special to you.

Use Master Q9.2: Performance Assessment Rubric and Master Q9.3: Peer and Self-Assessment to support the assessment of the unit problem.

Master Q9.1

Unit Rubric: Length, Perimeter, and Area

This assessment tool is designed to record overall student performance as you accumulate evidence by reviewing portfolios, observation records, unit assessment activities, and other work. It can be used to guide feedback and help prepare for reporting. It should not be used for just one specific activity.

To create a profile of a student's achievement, use a highlighter to identify behaviours you have observed.

	Level 1	Level 2	Level 3	Level 4
Uses mathematical concepts and processes				
Concepts <ul style="list-style-type: none"> recognizes measurement situations in everyday problems (length, perimeter, area) selects and applies relevant processes, including units, for estimating and measuring length, perimeter and area describes relationships among standard units, and relates size of unit to number of units needed 	needs one-to-one support; may be unable to: <ul style="list-style-type: none"> recognize linear measurement situations in everyday problems select and apply relevant processes and strategies describe relationships among standard units relate size of unit to number of units needed 	partially able to: <ul style="list-style-type: none"> recognize linear measurement situations in everyday problems select and apply relevant processes and strategies describe relationships among standard units relate size of unit to number of units needed 	able to appropriately: <ul style="list-style-type: none"> recognize linear measurement situations in everyday problems select and apply relevant processes and strategies describe relationships among standard units relate size of unit to number of units needed 	in various contexts, able to appropriately: <ul style="list-style-type: none"> recognize linear measurement situations in everyday problems select and apply relevant processes and strategies describe relationships among standard units relate size of unit to number of units needed
Processes <ul style="list-style-type: none"> accurately: <ul style="list-style-type: none"> measures, records, compares, and orders length, perimeter, and area constructs figures and lengths using standard units converts units of length (cm, m, km) 	limited accuracy; often makes major errors or omissions in: <ul style="list-style-type: none"> measuring length (cm, m), perimeter (cm, m), and area (square units) constructing figures and lengths converting units of length 	partially accurate; makes frequent minor errors or omissions in: <ul style="list-style-type: none"> measuring length (cm, m), perimeter (cm, m), and area (square units) constructing figures and lengths converting units of length 	generally accurate; makes few errors or omissions in: <ul style="list-style-type: none"> measuring length (cm, m), perimeter (cm, m), and area (square units) constructing figures and lengths converting units of length 	accurate; rarely makes errors or omissions in: <ul style="list-style-type: none"> measuring length (cm, m), perimeter (cm, m), and area (square units) constructing figures and lengths converting units of length
Solves situational problems				
<ul style="list-style-type: none"> chooses and carries out a range of strategies (e.g., estimation, diagrams, drawing, grid paper, manipulatives, grouping) to solve and create problems involving linear measurement 	may be unable to use appropriate strategies to solve and create problems involving linear measurement	with limited help, uses some appropriate strategies to solve and create problems involving linear measurement; partially successful	uses appropriate strategies to solve and create problems involving linear measurement successfully	uses appropriate, often innovative, strategies to solve and create problems involving linear measurement successfully
Communicates using mathematical language				
<ul style="list-style-type: none"> interprets and produces messages and presentations about measurement, using appropriate mathematical language and displays 	has difficulty interpreting and producing mathematical messages and presentations about measurement	partially able to interpret and produce mathematical messages and presentations about measurement	interprets and produces mathematical messages and presentations about measurement	interprets and produces mathematical messages and presentations about measurement with precision
Cross-curricular competency: to adopt effective work methods				
<ul style="list-style-type: none"> analyses tasks to be performed, understanding the instructions and visualizing elements of the task 	has difficulty analysing more than one aspect of a task and following instructions	with step-by-step support, can analyse a task and follow instructions	able to analyse most tasks and follow instructions	independently analyses complex tasks and follows instructions (can deal with complexity and ambiguity)

Master Q9.2

**Performance Assessment Rubric:
Design a Playground**

	Level 1	Level 2	Level 3	Level 4
Uses mathematical processes and concepts				
<p>Concepts</p> <ul style="list-style-type: none"> applies understanding of linear measurement and area to construct a plan for a playground, including: <ul style="list-style-type: none"> choosing a reasonable overall area and sections selecting appropriate units explaining choices 	<p>does not apply the required concepts of linear measurement; may be incomplete or indicate misconceptions</p>	<p>applies and explains relevant concepts of linear measurement to construct and explain the playground; may indicate some misconceptions</p>	<p>applies relevant concepts of linear measurement to construct and explain the playground; may be minor flaws in reasoning</p>	<p>applies relevant concepts of linear measurement to effectively construct and explain the playground; shows thorough understanding</p>
<p>Processes</p> <ul style="list-style-type: none"> accurately: <ul style="list-style-type: none"> calculates and records perimeter and area of each feature draws dimensions on grid paper 	<p>limited accuracy; makes major errors or omissions in: <ul style="list-style-type: none"> calculating and recording area and perimeter drawing dimensions on grid paper </p>	<p>somewhat accurate; some minor errors or omissions in: <ul style="list-style-type: none"> calculating and recording area and perimeter drawing dimensions on grid paper </p>	<p>generally accurate; few minor errors or omissions in: <ul style="list-style-type: none"> calculating and recording area and perimeter drawing dimensions on grid paper </p>	<p>accurate and precise; few, if any, errors in: <ul style="list-style-type: none"> calculating and recording area and perimeter drawing dimensions on grid paper </p>
Solves situational problems				
<ul style="list-style-type: none"> uses appropriate estimating, measuring, and problem-solving strategies (e.g., grid, table) to devise a plan that could work for a real playground 	<p>uses few effective strategies; does not adequately design a playground that meets requirements</p>	<p>uses some appropriate strategies, with partial success, to design a playground that meets some of the requirements</p>	<p>uses appropriate and successful strategies to design a playground that meets most of the requirements (may be somewhat unrealistic)</p>	<p>uses innovative and effective strategies to design a playground that meets all requirements and is realistic</p>
Communicates using mathematical language				
<ul style="list-style-type: none"> explains plans clearly, using appropriate mathematical terminology correctly (e.g., perimeter, area, square units) presents plans clearly, including labels and units 	<p>may be unable to explain the plan; uses few appropriate mathematical terms</p> <p>presents plans clearly, including labels and units</p>	<p>explains the plan, but explanation is unclear or incomplete; uses some appropriate mathematical terms</p> <p>partially explains the plans; including some labels and units</p>	<p>explains the plan clearly, using appropriate mathematical terms</p> <p>presents plans clearly, including labels and units</p>	<p>explains the plan clearly, precisely, and confidently, using a range of appropriate mathematical terms</p> <p>presents plans clearly and precisely including labels and units</p>

Names: _____

4=Excellent/Always

3=Very satisfactory/Most of the time

2=Satisfactory/Sometimes

1=Needs further work/Rarely or never

	Self-assessment		Peer assessment	
	Rating	Explain	Rating	Explain
The plan is realistic, safe, and enjoyable for children.				
The answers show understanding of how to find perimeter and area correctly.				
The plan and table are clearly organized and include correct labels and symbols.				
The explanation is reasonable and easy to understand, including correct mathematical language.				

Planning for Each Unit

Unit 10: Patterns in Number and Geometry

Recommended Software: *Appleworks*

Supporting Cross-Curricular Competencies

Unit Focus: to use information and communications technologies

Materials

Master Q10.1:

Unit Rubric: Patterns in Number and Geometry

Master Q10.2:

Performance Assessment Rubric: Indoor Recess!

Master Q10.3:

Peer and Self-Assessment: Unit Problem (Unit 10)

In the Patterns in Number and Geometry unit, opportunities exist for students to use various technologies (e.g., computers, calculators) to reinforce new concepts. Employ these Student Book and Teacher Guide features to support students' development of technology-based skills:

- The **Technology** lesson (pages 395-397) gives students a chance to create patterns on a computer; review the steps with students before they begin their patterns.
- In some of the **Explore** activities or **Practice** questions, it is recommended that a calculator be used to enrich the mathematics; make calculators available in these situations (for example, on page 374, **Practice** question 5).
- The **Numbers Every Day** feature regularly includes suggestions related to calculator skills; encourage students to check their solutions using a calculator (for example, on page 375, students can check their sums with a calculator).
- The **e-Tools** software provides virtual manipulatives that help students develop mathematical concepts and enhance student success; the **e-Tools** appropriate for this unit include Geometry Shapes and Place-Value Blocks.

Use Master Q10.1: Unit Rubric, to support your ongoing assessment during the unit, with a focus on the cross-curricular competency highlighted here.

Addressing Broad Areas of Learning: Citizenship and Community Life

Educational Aim: to ensure that students take part in the democratic life of the classroom or the school and develop a spirit of openness to the world and respect for diversity

The Unit Problem can be opened up mathematically, and extended.

Have students investigate indoor games played by children their age in various cultures or at other times. For example, students could:

- Interview family members about indoor games and activities they enjoyed as children. Learn one of the games and teach it to a small group.
- Have children with various cultural backgrounds share games and activities they know. Encourage them to teach the activities to small groups. Conduct a class survey to investigate which games are most popular. Display the results.
- Invite other teachers, parents, or community members to visit the classroom and teach children games or activities from various cultures or historical times.

Use Master Q10.2: Performance Assessment Rubric and Master Q10.3: Peer and Self-Assessment to support the assessment of the unit problem.

Master Q10.1
Unit Rubric: Patterns in Number and Geometry

This assessment tool is designed to record overall student performance as you accumulate evidence by reviewing portfolios, observation records, unit assessment activities, and other work. It can be used to guide feedback and help prepare for reporting. It should not be used for just one specific activity.

To create a profile of a student's achievement, use a highlighter to identify behaviours you have observed.

	Level 1	Level 2	Level 3	Level 4
Uses mathematical concepts and processes				
Concepts <ul style="list-style-type: none"> shows understanding by: <ul style="list-style-type: none"> explaining and using models to explain pattern rules making predictions based on patterns recognizing patterns in the environment 	may be unable to apply concepts of patterning to: <ul style="list-style-type: none"> explain pattern rules make predictions based on patterns recognize patterns in the environment 	partially able to apply concepts of patterning to: <ul style="list-style-type: none"> explain pattern rules make predictions based on patterns recognize patterns in the environment 	able to apply concepts of patterning to: <ul style="list-style-type: none"> explain pattern rules make predictions based on patterns recognize patterns in the environment 	in various contexts, appropriately applies concepts of patterning to: <ul style="list-style-type: none"> explain pattern rules make predictions based on patterns recognize patterns in the environment
Processes <ul style="list-style-type: none"> accurately identifies and extends repeating and growing patterns 	often makes major errors or omissions in identifying or extending patterns	partially accurate; makes frequent minor errors or omissions in identifying or extending patterns	generally accurate; makes few errors or omissions in identifying or extending patterns	accurate; rarely make errors or omissions in identifying or extending patterns
Solves situational problems				
<ul style="list-style-type: none"> chooses and carries out a range of strategies (e.g., using objects, drawing, using a grid, creating a chart or table, using a computer or calculator) to solve and create problems involving patterns 	may be unable to use appropriate strategies to solve and create problems involving patterns	with limited help, uses some appropriate strategies to solve and create problems involving patterns; partially successful	uses appropriate strategies to solve and create problems involving fractions successfully	uses appropriate, often innovative, strategies to solve and create problems involving patterns successfully
Communicates using mathematical language				
<ul style="list-style-type: none"> interprets and produces messages and presentations about patterns, using appropriate mathematical language 	has difficulty interpreting and producing mathematical messages and presentations about patterns	partially able to interpret and produce mathematical messages and presentations about patterns	interprets and produces mathematical messages and presentations about patterns	interprets and produces mathematical messages and presentations about patterns with precision
Cross-curricular competency: to use information and communications technologies (ICT)				
<ul style="list-style-type: none"> uses computer tools to create patterns 	unable to use computer tools to create patterns	with step-by-step support, can use computer tools to make simple patterns	uses computer tools to make simple patterns	uses computer tools effectively to make a range of patterns

**Performance Assessment Rubric:
Indoor Recess!**

	Level 1	Level 2	Level 3	Level 4
Uses mathematical concepts and processes				
Concepts <ul style="list-style-type: none"> shows understanding of attributes and patterning by: <ul style="list-style-type: none"> - explaining patterns and pattern rules (using concrete objects and drawings) 	does not apply the required concepts of patterning; may be incomplete or indicate misconceptions	applies relevant concepts to partially explain or demonstrate patterns; may indicate some misconceptions	applies relevant concepts to explain or demonstrate patterns; may be minor flaws in reasoning	applies relevant concepts of patterning to effectively explain or demonstrate their patterns; shows thorough understanding
Processes <ul style="list-style-type: none"> accurately follows patterning rules to create and record: <ul style="list-style-type: none"> - a repeating pattern with 2 variables changing - a growing pattern and its extension 	limited accuracy; makes major errors or omissions in: <ul style="list-style-type: none"> - repeating pattern - growing pattern 	somewhat accurate; some minor errors or omissions in: <ul style="list-style-type: none"> - repeating pattern - growing pattern 	generally accurate; few minor errors or omissions in: <ul style="list-style-type: none"> - repeating pattern - growing pattern 	accurate and precise; few, if any, errors in: <ul style="list-style-type: none"> - repeating pattern - growing pattern
Solves situational problems				
<ul style="list-style-type: none"> uses effective strategies (e.g., concrete objects, sketches, tables, grids) to design an activity that uses a pattern on a grid 	uses few effective strategies; does not adequately design an activity that uses a pattern on a grid	uses some appropriate strategies, with partial success, to design an activity that uses a pattern on a grid	uses appropriate and successful strategies to design an activity that uses a pattern on a grid	uses innovative and effective strategies to design an activity that uses a pattern on a grid
Communicates using mathematical language				
<ul style="list-style-type: none"> uses appropriate mathematical terminology correctly explains patterns clearly 	uses few appropriate mathematical terms does not explain the patterns	uses some appropriate mathematical terms partially explains the patterns; may be vague and somewhat unclear	uses appropriate mathematical terms explains the patterns clearly	uses a range of appropriate mathematical terms with precision explains the patterns clearly, precisely, and confidently

Names: _____

4=Excellent/Always

3=Very satisfactory/Most of the time

2=Satisfactory/Sometimes

1=Needs further work/Rarely or never

	Self-assessment		Peer assessment	
	Rating	Explain	Rating	Explain
A repeating pattern with two attributes that change is shown and explained.				
A growing pattern is shown. A picture is included showing how the pattern changes.				
Patterns are explained clearly using mathematical language.				
An interesting activity is shown that uses a pattern on a grid.				

Planning for Each Unit

Unit 11: Probability

Supporting Cross-Curricular Competencies

Unit Focus: to exercise critical judgment

Materials

Master Q11.1:

Unit Rubric: Probability

Master Q11.2:

Performance Assessment Rubric: Games

Day

Master Q11.3:

Peer and Self-Assessment: Unit Problem

(Unit 11)

Probability concepts support the use of critical judgement by encouraging students to show logic and intuition, while taking different contexts into account. Highlighted below are some of the Student Book and Teacher Guide features that support students' development of well-thought-out opinions:

- The **Explore** activities present students with a range of contexts and problems that aim to extend critical thinking and problem-solving skills; encourage students to formulate questions and make connections between the information presented and their existing knowledge.
- Each **Connect** section uses language that is clear, and communicates concepts in a logical, organized manner (for example, on page 407); discuss new concepts presented, encouraging students to express their judgments.
- In the Teacher Guide, there are various assessment tools that promote Self-Assessment (for example, Program Master 2: Self Assessment); utilize these tools to help develop students' critical judgment skills.

Use Master Q11.1: Unit Rubric, to support your ongoing assessment during the unit, with a focus on the cross-curricular competency highlighted here.

Addressing Broad Areas of Learning: Personal and Career Planning

Educational Aim: to enable students to undertake and complete projects that develop their potential and help them integrate into society

The Unit Problem can be opened up mathematically, and extended.

Have students consider how games are created. For example, students could:

- List games that students in the class play. Sort the games into 2 categories: games of skill and games of luck or chance. Write about which type of games you like most and why.
- Analyse games played at home or at school. Determine how game designers try to make games fair.
- Choose a board game where chance is very important. Work as a “design team” to change the game so that a player’s chance of winning involves skill. Play the new version of the game. Discuss the different versions of the game. Include what version is fair and why.
- Imagine you are a game board designer. Make a list of characteristics that you should have to design a fair game. Express these in a “Help Wanted” advertisement.

Use Master Q11.2: Performance Assessment Rubric and Master Q11.3: Peer and Self-Assessment to support the assessment of the unit problem.

Master Q11.1

Unit Rubric: Probability

This assessment tool is designed to record overall student performance as you accumulate evidence by reviewing portfolios, observation records, unit assessment activities, and other work. It can be used to guide feedback and help prepare for reporting. It should not be used for just one specific activity.

To create a profile of a student's achievement, use a highlighter to identify behaviours you have observed.

	Level 1	Level 2	Level 3	Level 4
Uses mathematical concepts and processes				
Concepts ● shows understanding by drawing appropriate conclusions from simple probability experiments	may be unable to draw reasonable conclusions from probability experiments	partially able to draw reasonable conclusions from probability experiments	draws reasonable conclusions from probability experiments	in various contexts, draws reasonable conclusions from probability experiments
Processes ● accurately: - records results of probability experiments - predicts the likelihood of an outcome (more/less likely; chance)	limited accuracy; often makes major errors or omissions in: - recording results - predicting likelihood of an outcome	partially accurate; makes frequent minor errors or omissions in: - recording results - predicting likelihood of an outcome	generally accurate; makes few errors or omissions in: - recording results - predicting likelihood of an outcome	accurate; rarely make errors or omissions in: - recording results - predicting likelihood of an outcome
Solves situational problems				
● conducts simple probability experiments	may be unable to conduct probability experiments and choose an appropriate method to record the results	with limited help, conducts probability experiments and chooses an appropriate method to record the results; partially successful	successfully conducts probability experiments and chooses an appropriate method to record the results	successfully conducts probability experiments and chooses an appropriate method to record the results; often innovative
Communicates using mathematical language				
● interprets and produces messages and presentations about chance and probability, using appropriate mathematical language	has difficulty interpreting and producing mathematical messages and presentations about chance and probability	partially able to interpret and produce mathematical messages and presentations about chance and probability	interprets and produces mathematical messages and presentations about chance and probability	interprets and produces mathematical messages and presentations about chance and probability with precision
Cross-curricular competency: to exercise critical judgment				
● offers logical reasons and arguments to support a prediction or opinion	unable to offer logical reasons and arguments to support a prediction or opinion	with support, offers a logical reason or argument to support a prediction or argument	offers one or more logical reasons or arguments to support a prediction or argument	offers convincing, logical reasons or arguments to support a prediction or argument; shows some sophistication in reasoning

**Performance Assessment Rubric:
Games Day**

	Level 1	Level 2	Level 3	Level 4
Uses mathematical processes and concepts				
Concepts <ul style="list-style-type: none"> explains or demonstrates how the game is fair, using concepts of probability including, the likelihood of an outcome 	unable to explain reasoning about why the game is fair	partially explains reasoning about why the game is fair; may be vague or include some flawed reasoning	explains reasoning about why the game is fair	thoroughly and effectively explains reasoning about why the game is fair
Processes <ul style="list-style-type: none"> accurately: <ul style="list-style-type: none"> determines that each player has an equal chance reports and interprets results of playing the game 	limited accuracy; makes major errors or omissions in: <ul style="list-style-type: none"> determining that each player has an equal chance reporting results 	somewhat accurate; some minor errors or omissions in: <ul style="list-style-type: none"> determining that each player has an equal chance reporting results 	generally accurate; few minor errors or omissions in: <ul style="list-style-type: none"> determining that each player has an equal chance reporting results 	accurate and precise; few, if any, errors in: <ul style="list-style-type: none"> determining that each player has an equal chance reporting results
Solves situational problems				
<ul style="list-style-type: none"> uses appropriate strategies to design a fair game 	does not design a workable, fair game	designs a workable game that is not entirely fair OR is very simple	designs a fair game that works	designs a fair game, with some innovation or complexity
Communicates using mathematical language				
<ul style="list-style-type: none"> presents the rules and explains the game clearly uses appropriate mathematical terminology (e.g., more likely, less likely, chance) 	does not explain the game or present the rules clearly uses few appropriate mathematical terms	partially explains the game and presents the rules; may be vague and somewhat unclear uses some appropriate mathematical terms	explains the game and presents the rules clearly uses appropriate mathematical terms	explains the game and presents the rules clearly, precisely, and confidently uses a range of appropriate mathematical terms with precision

Names: _____

- 4=Excellent/Always
- 3=Very satisfactory/Most of the time
- 2=Satisfactory/Sometimes
- 1=Needs further work/Rarely or never

	Self-assessment		Peer assessment	
	Rating	Explain	Rating	Explain
The game is fair.				
The rules are clear and easy to understand.				
There is a clear explanation telling what makes the game fair.				



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Printed and bound in Canada

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