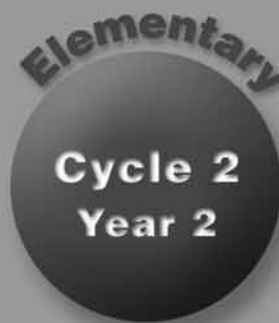


Math Makes Sense



Québec Teacher Companion

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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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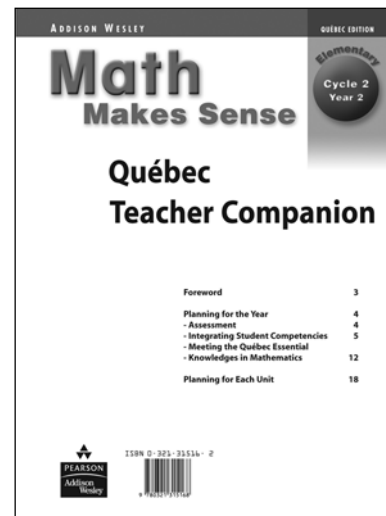
Québec Teacher Companion
Elementary Cycle 2, Year 2

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

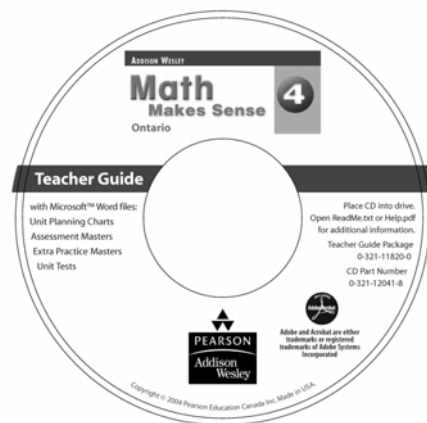
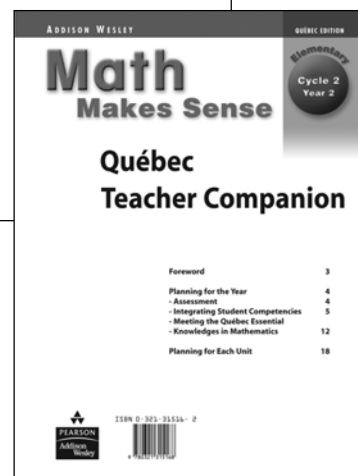
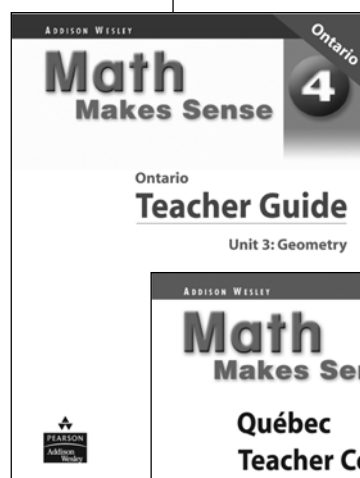
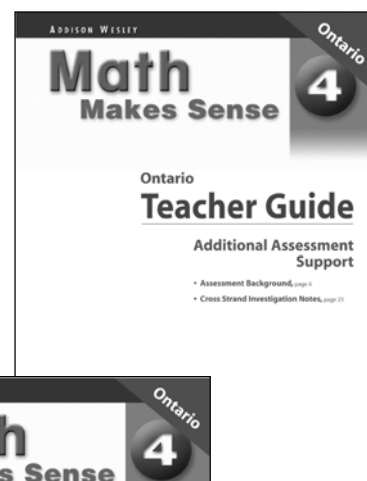
Your Teacher Guide includes a module entitled *Additional Assessment Support*.

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	<i>Math Makes Sense Cycle 2</i>
<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	Math Makes Sense Cycle 2
<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 2 Correlations	<i>Math Makes Sense</i> Cycle 2, Year 2 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 	6-13, 30-39	
<ul style="list-style-type: none"> approximation 	33-36	
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 	272-279, 282-284	285-290 (extension)
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 	291-300	
<ul style="list-style-type: none"> approximation 	301-307	

Arithmetic: Meaning of Operations Involving Numbers

Québec Essential Knowledge	<i>Math Makes Sense</i> Cycle 2, Year 2 Correlation	<i>Math Makes Sense</i> Cycle 2, Year 2 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 	120-130, 142-161	
<ul style="list-style-type: none"> choice of operation: multiplication, division 	158-159	
<ul style="list-style-type: none"> meaning of an equality relation (equation), meaning of an equivalence relation 	17-23, 137-139, 142-147	
<ul style="list-style-type: none"> relationships between the operations 	17-21, 142-147	
<ul style="list-style-type: none"> property of operations: associative law 		
Decimals <ul style="list-style-type: none"> operation sense: addition and subtraction 	301-311	

Arithmetic: Operations Involving Numbers

Québec Essential Knowledge	<i>Math Makes Sense</i> Cycle 2, Year 2 Correlation	<i>Math Makes Sense</i> Cycle 2, Year 2 Optional Pages
Natural numbers <ul style="list-style-type: none"> approximating the result of an operation: addition, subtraction, multiplication, division 	40-42, 45-47, 51-52, 15-136	
<ul style="list-style-type: none"> own processes for mental computation: addition, subtraction, multiplication, division 	43-44, 53-54	55-58 (prior knowledge)
<ul style="list-style-type: none"> operations to be memorized: multiplications (0×0 to 10×10) related to the corresponding divisions 	120-126, 145-147, 382-383	
<ul style="list-style-type: none"> own processes for written computation: multiplying a three-digit number by a one-digit number 	131-134, 369-371	
<ul style="list-style-type: none"> own processes for written computation: dividing a three-digit number by a one-digit number 	384-386	
<ul style="list-style-type: none"> conventional processes for written computation: adding two four-digit numbers 	48-50	
<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 	59-61	
<ul style="list-style-type: none"> patterns: series of numbers, family of operations 	364-368, 372-379	
<ul style="list-style-type: none"> finding prime factors 		
Decimals <ul style="list-style-type: none"> approximating the result of an operation 	301-307	
<ul style="list-style-type: none"> mental computation: addition, subtraction 	301-307	
<ul style="list-style-type: none"> written computation: addition, subtraction; the result must not go beyond the second decimal place 	301-311	

Geometry: Geometric Figures and Spatial Sense

Québec Essential Knowledge	<i>Math Makes Sense</i> Cycle 2, Year 2 Correlation	<i>Math Makes Sense</i> Cycle 2, Year 2 Optional Pages
Space		
<ul style="list-style-type: none"> locating objects on an axis 	170-173, 177-180	
<ul style="list-style-type: none"> locating objects in a plane 	236-239	
<ul style="list-style-type: none"> locating objects in a Cartesian plane 		
Solids		
<ul style="list-style-type: none"> describing prisms and pyramids in terms of faces, vertices and edges 	99-106	
<ul style="list-style-type: none"> nets for prisms and pyramids 		107-109 (extension)
<ul style="list-style-type: none"> classification of prisms and pyramids 	99-106	
Plane figures		
<ul style="list-style-type: none"> describing convex and non-convex polygons 		70-72 (extension) 93-95 (extension)
<ul style="list-style-type: none"> describing quadrilaterals, including trapezoids and parallelograms: parallel segments, perpendicular segments, right angles, acute angles, obtuse angles 	77-84	
<ul style="list-style-type: none"> classifying quadrilaterals 	85-92	
<ul style="list-style-type: none"> constructing parallel lines and perpendicular lines 		
Frieze patterns and tessellations		
<ul style="list-style-type: none"> observing and producing patterns using geometric figures 	258-261, 364-366	
<ul style="list-style-type: none"> observing and producing (grids, tracing paper) frieze patterns by means of reflections: reflection, line of reflection 	244-250	
<ul style="list-style-type: none"> observing and producing tessellations by means of reflections 		240-243 (extension) 251-254 (extension)

Measurement

Québec Essential Knowledge	<i>Math Makes Sense</i> Cycle 2, Year 2 Correlation	<i>Math Makes Sense</i> Cycle 2, Year 2 Optional Pages
Lengths: estimating and measuring <ul style="list-style-type: none"> conventional units (m, dm, cm, mm) 	320-329	
<ul style="list-style-type: none"> relationships between units of measure 	332-334	
<ul style="list-style-type: none"> perimeter, calculating the perimeter 	335-341	
Angles: estimating and measuring <ul style="list-style-type: none"> comparing angles (right, acute, obtuse) 	73-80	
Surface areas: estimating and measuring <ul style="list-style-type: none"> unconventional units 	342-344, 387-389	345-357 (extension)
Volumes: estimating and measuring <ul style="list-style-type: none"> unconventional units 	110-111	
Time: estimating and measuring <ul style="list-style-type: none"> conventional units, duration (day, hour, minute, second, daily cycle, weekly cycle, yearly cycle) 	200-212	213-219 (extension) 222-228 (extension)

Statistics

Québec Essential Knowledge	<i>Math Makes Sense</i> Cycle 2, Year 2 Correlation	<i>Math Makes Sense</i> Cycle 2, Year 2 Optional Pages
<ul style="list-style-type: none"> formulating questions for a survey 	190-191	
<ul style="list-style-type: none"> collecting, describing and organizing data using tables 	166-169	
<ul style="list-style-type: none"> interpreting data using a broken-line graph 		170-180
<ul style="list-style-type: none"> displaying data using a broken-line graph 		

Probability

Québec Essential Knowledge	<i>Math Makes Sense</i> Cycle 2, Year 2 Correlation	<i>Math Makes Sense</i> Cycle 2, Year 2 Optional Pages
<ul style="list-style-type: none"> experimentation with activities involving chance 	400-419	
<ul style="list-style-type: none"> predicting the likelihood of an event (certainty, possibility, or impossibility) 	400-407	
<ul style="list-style-type: none"> probability that a simple event will occur (more likely, just as likely, less likely) 	400-407	
<ul style="list-style-type: none"> enumerating the possible outcomes of a random experiment using a table, a tree diagram 	408-409	
<ul style="list-style-type: none"> doing simulations with or without a computer 	413-415	

Planning for Each Unit

Unit 1: Number Patterns

Supporting Cross-Curricular Competencies

Unit Focus: to use creativity

Materials

Master Q1.1:

Unit Rubric: Number Patterns

Master Q1.2:

Performance Assessment Rubric: Calendar Patterns

Master Q1.3:

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

The Number Patterns 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:

- **Games** enhance the creative process and motivate students to take risks; observe students as they play *Number the Blocks* (page 24).
- 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 6 and 17).
- The **Reflect** activities 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.

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: 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 people use calendars to support their plans and goals, then design and use a personal calendar. Activities might include:

- Collect and examine a variety of calendars. Compare and contrast two of the calendars that you find most interesting.
- Examine yearly calendars and the pattern of change from year to year.
- Identify ways you might use a personal calendar to take greater responsibility for your school work (such as to plan and carry out projects, to work toward a personal goal).
- Develop criteria for a personal calendar (such as size of spaces for writing; length of time to be included; whether or not calendar should include weekends; what kinds of pictures or images to include). Use your criteria to create a personal calendar.

Include goals on the calendar. Monitor progress toward completion of each goal.

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

Master Q1.1

Unit Rubric: Number Patterns

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 and ability to apply concepts by describing and explaining pattern rules 	shows little understanding; may be unable to describe or explain pattern rules	gives a partially appropriate description and explanation of pattern rules; may be vague or incomplete	gives an appropriate and complete description and explanation of pattern rules	gives clear, appropriate, and detailed descriptions and explanations of pattern rules
Processes <ul style="list-style-type: none"> identifies and describes patterns accurately 	makes major errors or omissions in identifying and describing patterns	makes frequent minor errors or omissions in identifying and describing patterns	makes few errors or omissions in identifying and describing patterns	rarely makes errors or omissions in identifying and describing patterns
Solves situational problems				
<ul style="list-style-type: none"> shows understanding and ability to apply concepts by describing and explaining pattern rules 	shows little understanding; may be unable to describe or explain pattern rules	gives a partially appropriate description and explanation of pattern rules; may be vague or incomplete	gives an appropriate and complete description and explanation of pattern rules	gives clear, appropriate, and detailed descriptions and explanations of pattern rules
Communicates using mathematical language				
<ul style="list-style-type: none"> uses appropriate mathematical terminology (e.g., pattern rule, core, growing pattern, repeating pattern) shows thinking clearly 	uses few appropriate mathematical terms unable to show thinking clearly	uses some appropriate mathematical terms shows thinking with some clarity	uses appropriate mathematical terms shows thinking clearly	uses a range of appropriate mathematical terms clearly and precisely shows thinking clearly, precisely, and confidently
Cross-curricular competency: to use creativity				
<ul style="list-style-type: none"> shows originality by exploring various ways of creating and representing patterns 	little originality; tends to rely on ideas shown by others	with prompting, attempts some originality by making at least some variation in the way a pattern is created or represented	shows some originality; explores new ways of creating and representing patterns	shows originality; independently explores new and innovative ways of creating and representing patterns

Master Q1.2

**Performance Assessment Rubric:
Calendar Patterns**

	Level 1	Level 2	Level 3	Level 4
Uses mathematical concepts and processes				
Concepts <ul style="list-style-type: none"> shows understanding and ability to apply concepts by describing and explaining pattern rules 	shows little understanding; may be unable to describe or explain pattern rules	gives a partially appropriate description and explanation of pattern rules; may be vague or incomplete	gives an appropriate and complete description and explanation of pattern rules	gives clear, appropriate, and detailed descriptions and explanations of pattern rules
Processes <ul style="list-style-type: none"> identifies and describes patterns accurately 	makes major errors or omissions in identifying and describing patterns	makes frequent minor errors or omissions in identifying and describing patterns	makes few errors or omissions in identifying and describing patterns	rarely makes errors or omissions in identifying and describing patterns
Solves situational problems				
<ul style="list-style-type: none"> uses appropriate strategies to identify and investigate number patterns on a calendar 	uses very limited strategies for investigating number patterns on a calendar; may rely only on those described in Steps 1 and 2	uses some appropriate strategies for investigating number patterns on a calendar, including one that is not described (Step 3)	uses appropriate and effective strategies for investigating number patterns on a calendar, including at least two that are not described (Step 3)	uses innovative and effective strategies for investigating number patterns on a calendar, including at least two or more that are not described (Step 3)
Communicates using mathematical language				
<ul style="list-style-type: none"> interprets and produces messages about number patterns, using appropriate mathematical language 	has difficulty interpreting and producing mathematical messages about number patterns	partially able to interpret and produce mathematical messages about number patterns	interprets and produces mathematical messages about number patterns	interprets and produces mathematical messages about number patterns with precision

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
Part 1: A rule for the pattern is described. There is an explanation telling why the rule makes sense.				
Part 2: One or more patterns are described. At least one pattern uses subtraction.				
Part 3: Other ways of finding patterns on a calendar are shown and described.				
Descriptions are clear and easy to understand.				

Planning for Each Unit

Unit 2: Whole Numbers

Supporting Cross-Curricular Competencies

Unit Focus: to cooperate with others

Materials

Master Q2.1:

Unit Rubric: Whole Numbers

Master Q2.2:

Performance Assessment Rubric: Where Shall We Go?

Master Q2.3:

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

The Whole Numbers 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 30, 37, and 40); different groupings are recommended.
- The **Show and Share** section in each lesson (for example, on pages 43, 45, and 48) 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 48 and 55).
- 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 61 and 63).

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: ***Environmental Awareness and Consumer Rights and Responsibilities***

Educational Aim: to encourage students to develop an active relationship with their environment, while maintaining a critical attitude towards exploitation of the environment, technological development and consumer goods

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

Have students consider the environmental impact of the car trip they planned, and create an alternate plan that demonstrates conservation and wise resource use. For example, students could:

- Research to find out transportation options for the chosen route. Explore how you could reduce the energy costs of the trip by altering the route, using public transportation, or choosing to bicycle or walk.
- Plan an alternate holiday in the same region, but reduce the costs to \$500.
- Experiment with various plans to find the most cost effective way to holiday in the region of your choice, considering transportation, accommodation, food, and entertainment.
- Brainstorm a list of holidays you would like to take. Work in groups to compare and report on the environmental impact of various types of holidays.
- Research to find out about holiday activities that can have a positive impact on the environment (such as volunteer holidays).

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

Master Q2.1

Unit Rubric: Whole Numbers

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 demonstrating, explaining and applying concepts of: - place value - rounding - estimating sums and differences	may be unable to demonstrate, explain, or use concepts of: - place value - rounding - estimation of sums or differences	partially able to demonstrate, explain, and use concepts of: - place value - rounding - estimation of sums and differences	appropriately demonstrates, explains, and uses concepts of: - place value - rounding - estimation of sums and differences	in various contexts, appropriately demonstrates, explains, and uses concepts of: - place value - rounding - estimation of sums and differences
Processes • accurately compares and orders numbers; adds and subtracts with 3-digit and 4-digit numbers	often makes major errors or omissions in: - comparing and ordering numbers - adding 3-digit and 4-digit numbers - subtracting 3-digit and 4-digit numbers	makes frequent minor errors or omissions in: - comparing and ordering numbers - adding 3-digit and 4-digit numbers - subtracting 3-digit and 4-digit numbers	makes few errors or omissions in: - comparing and ordering numbers - adding 3-digit and 4-digit numbers - subtracting 3-digit and 4-digit numbers	rarely make errors or omissions in: - comparing and ordering numbers - adding 3-digit and 4-digit numbers - subtracting 3-digit and 4-digit numbers
Solves situational problems				
• chooses and carries out a range of strategies to solve and create whole number problems	may be unable to use appropriate strategies to solve and create whole number problems	with limited help, uses some appropriate strategies to solve and create whole number problems; partially successful	uses appropriate strategies to solve and create whole number problems successfully	uses appropriate, often innovative, strategies to solve and create whole number problems successfully
Communicates using mathematical language				
• interprets and produces messages about whole numbers, using appropriate mathematical language	has difficulty interpreting and producing mathematical messages about whole numbers	partially able to interpret and produce mathematical messages about whole numbers	interprets and produces mathematical messages about whole numbers	interprets and produces mathematical messages about whole numbers with precision
Cross-curricular competency: to cooperate with others				
• listens to others, and recognizes and responds to their needs	appears unaware of others' needs	with prompting, listens to others and often recognizes their needs; may have difficulty responding appropriately	listens to others; usually recognizes and tries to respond to their needs	shows sensitivity and support for others; listens, recognizes and responds to their needs

Master Q2.2

**Performance Assessment Rubric:
Where Shall We Go?**

	Level 1	Level 2	Level 3	Level 4
Uses mathematical processes and concepts				
<ul style="list-style-type: none"> shows understanding and ability to apply concepts of addition and subtraction by selecting appropriate operations and determining whether answers are reasonable 	shows little understanding; may be unable to: <ul style="list-style-type: none"> choose appropriate operations determine whether answers are reasonable give appropriate explanations 	shows partial understanding by: <ul style="list-style-type: none"> usually choosing appropriate operations sometimes determining whether answers are reasonable giving some appropriate explanations (often vague) 	shows understanding by: <ul style="list-style-type: none"> choosing appropriate operations, in most cases determining whether most answers are reasonable giving clear and appropriate explanations 	shows thorough understanding by: <ul style="list-style-type: none"> choosing appropriate operations in a variety of contexts determining whether all answers are reasonable giving clear, appropriate, and detailed explanations
<ul style="list-style-type: none"> adds and subtracts accurately to find: <ul style="list-style-type: none"> distance each day cost of fuel and accommodation each day difference between distance travelled from one day to next total distance and total cost amount remaining/owed from \$1000 	often makes major errors or omissions in: <ul style="list-style-type: none"> distance each day cost of fuel and accommodation each day difference between distance travelled from one day to next total distance and total cost amount remaining/owed from \$1000 	makes frequent minor errors or omissions in: <ul style="list-style-type: none"> distance each day cost of fuel and accommodation each day difference between distance travelled from one day to next total distance and total cost amount remaining/owed from \$1000 	makes few errors or omissions in: <ul style="list-style-type: none"> distance each day cost of fuel and accommodation each day difference between distance travelled from one day to next total distance and total cost amount remaining/owed from \$1000 	rarely makes errors or omissions in: <ul style="list-style-type: none"> distance each day cost of fuel and accommodation each day difference between distance travelled from one day to next total distance and total cost amount remaining/owed from \$1000
Solves situational problems				
<ul style="list-style-type: none"> uses appropriate strategies, including estimation, to develop a route that meets the criteria (< 500 km per day between start and stop cities) and determine costs 	unable to develop a workable plan that meets the criteria given	uses some appropriate strategies, including estimation, to develop a route and determine costs; may not fully meet criteria given for route	uses appropriate and effective strategies, including estimation, to develop a reasonable route and determine costs	uses innovative and effective strategies, including estimation, to develop a reasonable route and determine costs
Communicates using mathematical language				
<ul style="list-style-type: none"> uses mathematical terminology correctly shows thinking clearly 	uses few appropriate mathematical terms unable to show thinking clearly	uses some appropriate mathematical terms shows thinking with some clarity	uses appropriate mathematical terms shows thinking clearly	uses a range of appropriate mathematical terms clearly and precisely shows thinking clearly, precisely, and confidently

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
The plan for the trip includes everything that it is supposed to include.				
The math is correct.				
All of the work is clearly shown.				
There is a reasonable explanation for whether or not there will be money left over.				

Planning for Each Unit

Unit 3: Geometry

Recommended Software: *Appleworks*

Supporting Cross-Curricular Competencies

Unit Focus: to communicate appropriately

Materials

Master Q3.1:

Unit Rubric: Geometry

Master Q3.2:

Performance Assessment Rubric: Under Construction

Master Q3.3:

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

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 69, 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 71, 74, 78, 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 426 if they need support.
- The **Connect** section in each lesson models appropriate mathematical language (for example, on pages 71, 74, and 78); students can reference the **Connect** as they complete the **Reflect** activity at the close of each lesson (for example, on pages 72, 76, and 80). 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: 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 select their own strategies and approaches for modelling a castle. As background for their design and model, they could select from the following activities, or pursue ideas of their own:

- Investigate the function behind different parts of a medieval castle.
- Research the middle ages. Include such topics as lifestyles, social structures, and important historical events.
- Write a personal perspective, pretending you are a character from medieval times.
- Research the fabrics and clothing of the middle ages. Compare how clothing was made then, to how it is made today.

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 2-D figures and 3-D solids, and their relationships, by: <ul style="list-style-type: none"> - describing and making generalizations about properties - comparing and sorting figures and solids - explaining or demonstrating relationships (e.g., between 2-D figures and 3-D solids) - describing occurrences of geometric properties in their everyday experiences 	shows little understanding; may be unable to: <ul style="list-style-type: none"> - describe properties - compare and sort figures and solids - explain or demonstrate relationships - describe geometric properties in everyday experiences 	shows some understanding (may be vague or incomplete); partially able to: <ul style="list-style-type: none"> - describe properties - compare and sort figures and solids - explain or demonstrate relationships - describe geometric properties in everyday experiences 	shows understanding; able to clearly and appropriately: <ul style="list-style-type: none"> - describe properties - compare and sort figures and solids - explain or demonstrate relationships - describe geometric properties in everyday experiences 	shows thorough understanding; in various contexts, able to precisely and effectively: <ul style="list-style-type: none"> - describe properties - compare and sort figures and solids - explain or demonstrate relationships - describe geometric properties in everyday experiences
Processes <ul style="list-style-type: none"> accurately: <ul style="list-style-type: none"> - identifies and measures attributes of 2-D figures and 3-D solids (e.g., side length; angle) - identifies and classifies figures and solids according to their attributes - represents figures and attributes (e.g., drawing on graph paper) 	makes major errors or omissions in: <ul style="list-style-type: none"> - identifying and measuring attributes - identifying and classifying figures and solids - representing figures and attributes 	makes frequent minor errors or omissions in: <ul style="list-style-type: none"> - identifying and measuring attributes - identifying and classifying figures and solids - representing figures and attributes 	makes few errors or omissions in: <ul style="list-style-type: none"> - identifying and measuring attributes - identifying and classifying figures and solids - representing figures and attributes 	rarely makes errors or omissions in: <ul style="list-style-type: none"> - identifying and measuring attributes - identifying and classifying figures and solids - representing figures and attributes
Solves situational problems				
<ul style="list-style-type: none"> uses a range of appropriate strategies, including drawing, making models and constructions, to investigate and create geometric problems involving 2-D figures and 3-D solids 	may be unable to use appropriate strategies to investigate and create geometric problems	with limited help, uses some appropriate strategies to investigate and create geometric problems; partially successful	uses appropriate strategies to investigate and create geometric problems successfully	uses appropriate, often innovative, strategies to investigate and create geometric problems successfully
Communicates using mathematical language				
<ul style="list-style-type: none"> uses appropriate terms and symbols related to geometric properties and relationships (e.g., names of figures and solids; degrees) 	uses few appropriate mathematical terms or symbols appropriately	uses some appropriate mathematical terms and symbols	uses appropriate mathematical terms and symbols	uses a range of appropriate mathematical terms and symbols with precision
Cross-curricular competency: to communicate appropriately				
<ul style="list-style-type: none"> makes effective presentations; explains reasoning, procedures, and solutions clearly 	unable to offer clear explanations or presentations; serious flaws	explains and presents work with some clarity; parts may be flawed	explains and presents work clearly and appropriately	explains and presents work clearly, precisely, and effectively

Master Q3.2

**Performance Assessment Rubric:
Under Construction**

	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 demonstrating, explaining, and applying concepts in 2-D and 3-D geometry including: <ul style="list-style-type: none"> attributes of 2-D figures, including angles congruence relationships between 2-D figures and 3-D objects (e.g., castle, wall, sketch) relationship between skeleton and object 	<p>unable to explain or apply:</p> <ul style="list-style-type: none"> attributes of 2-D figures, including angles congruence relationships between 2-D figures and 3-D objects relationship between skeleton and object 	<p>partially explains, and applies:</p> <ul style="list-style-type: none"> attributes of 2-D figures, including angles congruence relationships between 2-D figures and 3-D objects relationship between skeleton and object 	<p>explains and applies:</p> <ul style="list-style-type: none"> attributes of 2-D figures, including angles congruence relationships between 2-D figures and 3-D objects relationship between skeleton and object 	<p>thoroughly and effectively explains and applies:</p> <ul style="list-style-type: none"> attributes of 2-D figures, including angles congruence relationships between 2-D figures and 3-D objects relationship between skeleton and object
<p>Processes</p> <ul style="list-style-type: none"> accurately: <ul style="list-style-type: none"> identifies objects and figures sketches a variety of figures (windows), including congruent figures, on graph paper measures angles 	<p>makes major errors or omissions in:</p> <ul style="list-style-type: none"> naming objects and figures sketching figures measuring angles 	<p>makes frequent minor errors or omissions in:</p> <ul style="list-style-type: none"> naming objects and figures sketching figures measuring angles 	<p>makes few errors or omissions in:</p> <ul style="list-style-type: none"> identifying objects and figures sketching figures measuring angles 	<p>rarely makes errors or omissions in:</p> <ul style="list-style-type: none"> identifying objects and figures sketching figures measuring angles
Solves situational problems				
<ul style="list-style-type: none"> uses appropriate strategies to design: <ul style="list-style-type: none"> a castle that can be modelled by creating a skeleton windows that include congruent figures, and examples of the figures studied 	<p>uses few effective strategies to:</p> <ul style="list-style-type: none"> design the castle and build its skeleton; may be unworkable incorporate the required figures into window design 	<p>uses some appropriate strategies, with partial success, to:</p> <ul style="list-style-type: none"> design the castle and build its skeleton; may have major flaws incorporate the required figures into window design 	<p>uses appropriate and successful strategies to:</p> <ul style="list-style-type: none"> design the castle and build its skeleton; may have some flaws incorporate the required figures into window design 	<p>uses innovative and effective strategies to:</p> <ul style="list-style-type: none"> design the castle and build its skeleton; may have minor flaws incorporate the required figures into window design
Communicates using mathematical language				
<ul style="list-style-type: none"> uses appropriate terms and symbols related to geometric properties and relationships (e.g., names of figures and solids; congruent) explains skeleton and wall clearly 	<p>uses few appropriate mathematical terms or symbols appropriately</p> <p>unable to explain skeleton and wall clearly</p>	<p>uses some appropriate mathematical terms and symbols</p> <p>partially explains skeleton and wall</p>	<p>uses appropriate mathematical terms and symbols</p> <p>explains skeleton and wall clearly</p>	<p>uses a range of appropriate mathematical terms and symbols with precision</p> <p>explains skeleton and wall 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 castle shows all of the figures learned.				
The writing shows understanding of geometric ideas.				
The walls, windows, and doors show the use of right angles wherever needed.				
There is a clear explanation of the procedures, using mathematical language.				

Planning for Each Unit

Unit 4: Multiplication and Division

Materials

Master Q4.1:

Unit Rubric: Multiplication and Division

Master Q4.2:

Performance Assessment Rubric: At the Garden Centre

Master Q4.3:

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

Supporting Cross-Curricular Competencies

Unit Focus: to adopt effective work methods

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 120 and 123) 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 124 and 128) 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: Environmental Awareness and Consumer Rights and Responsibilities

Educational Aim: to encourage students to develop an active relationship with their environment, while maintaining a critical attitude towards exploitation of the environment, technological development and consumer goods

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

Have students research what plants are native to the community, and what features have enabled them to survive. For example, students could:

- Work in groups to identify plants in the community, including those that are cultivated and those that grow naturally. Sort the plants into those that are indigenous and those that were introduced by people.
- Research plants that are native to the community. For each plant, collect information on its growing season, how it reproduces, where it is found, special features, and how it helps support other living things. Present your research findings, both as a display and orally.
- Compare plants that grow naturally in the community with those in a community with a very different climate or terrain.
- Research how and why early settlers introduced ornamental plants (such as flowers) to the community. Include how flowers add to a community or environment.

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 demonstrating, explaining, and applying concepts of: <ul style="list-style-type: none"> -multiplying and dividing whole numbers - relating multiplication and division facts - estimating products and quotients 	may be unable to demonstrate, explain, or use concepts of: <ul style="list-style-type: none"> - multiplying and dividing whole numbers - relating multiplication and division facts - estimating products and quotients 	partially able to demonstrate, explain, and use concepts of: <ul style="list-style-type: none"> - multiplying and dividing whole numbers - relating multiplication and division facts - estimating products and quotients 	appropriately demonstrates, explains, and uses concepts of: <ul style="list-style-type: none"> - multiplying and dividing whole numbers - relating multiplication and division facts - estimating products and quotients 	in various contexts, appropriately demonstrates, explains, and uses concepts of: <ul style="list-style-type: none"> - multiplying and dividing whole numbers - relating multiplication and division facts - estimating products and quotients
Processes <ul style="list-style-type: none"> accurately: <ul style="list-style-type: none"> - multiplies 3-digit whole numbers by single-digit numbers - divides 3-digit whole numbers by 1-digit divisors - verifies solutions using inverse operations, estimation, and calculators - recalls multiplication and division facts to 100 	often makes major errors or omissions in: <ul style="list-style-type: none"> - multiplying 3-digit whole numbers by single-digit numbers - dividing 3-digit whole numbers by single-digit divisors - verifying solutions - recalling facts to 100 	makes frequent minor errors or omissions in: <ul style="list-style-type: none"> - multiplying 3-digit whole numbers by single-digit numbers - dividing 3-digit whole numbers by single-digit divisors - verifying solutions - recalling facts to 100 	makes few errors or omissions in: <ul style="list-style-type: none"> - multiplying 3-digit whole numbers by single-digit numbers - dividing 3-digit whole numbers by single-digit divisors - verifying solutions - recalling facts to 100 	rarely make errors or omissions in: <ul style="list-style-type: none"> - multiplying 3-digit whole numbers by single-digit numbers - dividing 3-digit whole numbers by single-digit divisors - verifying solutions - recalling facts to 100
Solves situational problems				
<ul style="list-style-type: none"> chooses and carries out a range of strategies to solve and create whole number problems 	may be unable to use appropriate strategies to solve and create whole number problems	uses some appropriate strategies to solve and create whole number problems; partially successful	uses appropriate strategies to solve and create whole number problems successfully	uses appropriate, often innovative, strategies to solve and create whole number problems 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

Performance Assessment Rubric: At the Garden Centre

	Level 1	Level 2	Level 3	Level 4
Uses mathematical concepts and processes				
<p>Concepts</p> <ul style="list-style-type: none"> shows understanding and ability to apply concepts of multiplication and division by selecting appropriate operations and determining whether answers are reasonable 	<p>shows little understanding; may be unable to:</p> <ul style="list-style-type: none"> choose appropriate operations determine whether answers are reasonable give inappropriate explanations 	<p>shows partial understanding by:</p> <ul style="list-style-type: none"> usually choosing appropriate operations sometimes determining whether answers are reasonable giving some appropriate explanations 	<p>shows understanding by:</p> <ul style="list-style-type: none"> choosing appropriate operations, in most cases determining whether most answers are reasonable giving clear and appropriate explanations 	<p>shows thorough understanding by:</p> <ul style="list-style-type: none"> choosing appropriate operations in a variety of contexts determining whether all answers are reasonable giving clear, appropriate, and detailed explanations
<p>Processes</p> <ul style="list-style-type: none"> multiplies and divides accurately to find: <ul style="list-style-type: none"> the number of boxes and trays needed the cost of 180 pots the different ways to plant 80 trees in equal rows 	<p>often makes major errors or omissions in finding:</p> <ul style="list-style-type: none"> the number of boxes and trays needed the cost of 180 pots the different ways to plant 80 trees in equal rows 	<p>makes frequent minor errors or omissions in finding:</p> <ul style="list-style-type: none"> the number of boxes and trays needed the cost of 180 pots the different ways to plant 80 trees in equal rows 	<p>makes few errors or omissions in finding:</p> <ul style="list-style-type: none"> the number of boxes and trays needed the cost of 180 pots the different ways to plant 80 trees in equal rows 	<p>rarely makes errors or omissions in finding:</p> <ul style="list-style-type: none"> the number of boxes and trays needed the cost of 180 pots the different ways to plant 80 trees in equal rows
Solves situational problems				
<ul style="list-style-type: none"> uses appropriate strategies to find: <ul style="list-style-type: none"> the number of ways to deliver an order for 72 petunias the number of trays needed for an order of 75 petunias the cheapest way to buy 180 pots 	<p>unable to develop workable plans that meet the given criteria</p>	<p>uses some appropriate strategies to find:</p> <ul style="list-style-type: none"> the number of ways to deliver an order for 72 petunias the number of trays needed for an order of 75 petunias the cheapest way to buy 180 pots 	<p>uses appropriate and effective strategies to find:</p> <ul style="list-style-type: none"> the number of ways to deliver an order for 72 petunias the number of trays needed for an order of 75 petunias the cheapest way to buy 180 pots 	<p>uses innovative and effective strategies to find:</p> <ul style="list-style-type: none"> the number of ways to deliver an order for 72 petunias the number of trays needed for an order of 75 petunias the cheapest way to buy 180 pots
Communicates using mathematical language				
<ul style="list-style-type: none"> uses mathematical terminology, numbers, and symbols correctly 	<p>uses few appropriate mathematical terms and symbols</p>	<p>uses some appropriate mathematical terms and symbols</p>	<p>uses appropriate mathematical terms and symbols</p>	<p>uses a range of appropriate mathematical terms and symbols clearly and precisely</p>
<ul style="list-style-type: none"> shows thinking clearly 	<p>unable to show thinking clearly</p>	<p>shows thinking with some clarity</p>	<p>shows thinking clearly</p>	<p>shows thinking 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
Part 1: All the ways 72 petunias could be delivered in boxes of 4 or 9 are shown.				
Part 2: Multiplication and division are used correctly to find out how many trays are needed for 75 petunias.				
Part 3: The cheapest way to buy the plastic pots is shown.				
Part 4: The ways that May-Lin could plant the trees are shown as multiplication and division facts.				

Planning for Each Unit

Unit 5: Data Management

Recommended Software: *Graphers*

Supporting Cross-Curricular Competencies

Unit Focus: to use information and communications technologies

Materials

Master Q5.1:

Unit Rubric: Data Management

Master Q5.2:

Performance Assessment Rubric: At the Vet

Master Q5.3:

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

In the Data Management 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** lessons (pages 181-183 and 187-189) give students a chance to display data using a computer; review the steps with students before they begin their displays.
- 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 167, students can check their products 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 Spreadsheet/Data/Grapher.

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: 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 research local rules, laws, and regulations related to pets in the community and province. For example, students could:

- Survey family members and neighbours to find out their opinions about how pets are or should be regulated. Display your findings and make comparisons.
- Invite a speaker from a local animal shelter or other organization to talk about the protection and regulation of pets.
- Review local newspapers to find stories about pets and pet owners. Identify why these pets became “news.” Record the number of positive and negative stories about pets. Display your data and draw conclusions.
- Work in groups to develop a “pet owners’ code of conduct.” Include how pet owners should behave.

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: 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"> shows understanding of relevant concepts of surveying and data management by: <ul style="list-style-type: none"> justifying choices in data collection procedures (e.g., survey questions, type of graph, interval) drawing conclusions and asking questions about data displays 	shows little understanding; may be unable to: <ul style="list-style-type: none"> justify choices in data collection procedures draw reasonable conclusions from data ask appropriate questions about data displays 	shows some understanding (may be vague or incomplete); partially able to: <ul style="list-style-type: none"> justify choices in data collection procedures draw reasonable conclusions from data ask appropriate questions about data displays 	shows understanding; able to clearly and appropriately: <ul style="list-style-type: none"> justify choices in data collection procedures draw reasonable conclusions from data ask appropriate questions about data displays 	shows thorough understanding; in various contexts, able to precisely and effectively: <ul style="list-style-type: none"> justify choices in data collection procedures draw reasonable conclusions from data ask appropriate questions about data displays
Processes <ul style="list-style-type: none"> accurately: <ul style="list-style-type: none"> records and organizes data reads/describes the information in a graph constructs tables and graphs 	makes major errors or omissions in: <ul style="list-style-type: none"> recording data reading/describing data presented in a graph constructing tables and graphs 	makes frequent minor errors or omissions in: <ul style="list-style-type: none"> recording data reading/describing data presented in a graph constructing tables and graphs 	makes few errors or omissions in: <ul style="list-style-type: none"> recording data reading/describing data presented in a graph constructing tables and graphs 	rarely makes errors or omissions in: <ul style="list-style-type: none"> recording data reading/describing data presented in a graph constructing tables and graphs
Solves situational problems				
<ul style="list-style-type: none"> uses a range of appropriate strategies (e.g., predicting based on prior knowledge, choosing an appropriate sample, conducting trials) to use data to investigate and solve problems 	may be unable to use appropriate strategies to investigate problems by collecting and interpreting data	with limited help, uses some appropriate strategies to investigate problems by collecting and interpreting data; partially successful	uses appropriate strategies to investigate problems successfully by collecting and interpreting data	uses appropriate, often innovative, strategies to investigate problems successfully by collecting and interpreting data
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 and communications technologies (ICT)				
<ul style="list-style-type: none"> uses spreadsheet software to collect data and produce graphic representations 	unable to use spreadsheet software appropriately	with support, able to use spreadsheet software for simple data collection and graphic representations	uses spreadsheet software appropriately for simple data collection and graphic representations	uses spreadsheet software effectively for data collection and to create a variety of graphic representations

**Performance Assessment Rubric:
At the Vet**

	Level 1	Level 2	Level 3	Level 4
Uses mathematical concepts and processes				
Concepts <ul style="list-style-type: none"> shows understanding of relevant concepts of surveying and data management by explaining results and how they can be used 	unable to explain results or how they can be used	partially explains results; may have difficulty explaining how they can be used	explains results and how they can be used	thoroughly and effectively explains results and how they can be used; some depth and insight
Processes <ul style="list-style-type: none"> accurately: <ul style="list-style-type: none"> records data reports results (including any calculations needed) constructs tally chart and graph 	makes major errors or omissions in: <ul style="list-style-type: none"> recording data reporting results (including any calculations needed) constructing tally chart and graph 	makes frequent minor errors or omissions in: <ul style="list-style-type: none"> recording data reporting results (including any calculations needed) constructing tally chart and graph 	makes few errors or omissions in: <ul style="list-style-type: none"> recording data reporting results (including any calculations needed) constructing tally chart and graph 	rarely makes errors or omissions in: <ul style="list-style-type: none"> recording data reporting results (including any calculations needed) constructing tally chart and graph
Solves situational problems				
<ul style="list-style-type: none"> uses appropriate strategies to develop a plan including: <ul style="list-style-type: none"> an appropriate survey question (clear, easy to answer, no overlapping options) a reasonable prediction, based on prior knowledge and experience an effective method of displaying results 	uses few effective strategies; may: <ul style="list-style-type: none"> develop an inappropriate survey question be unable to make a reasonable prediction choose an inappropriate display 	uses some appropriate strategies, with partial success; may: <ul style="list-style-type: none"> develop a partially appropriate survey question make a reasonable, but limited, prediction need help to choose an appropriate display 	uses appropriate and successful strategies to: <ul style="list-style-type: none"> develop an appropriate survey question make a reasonable prediction choose an appropriate display 	uses innovative and effective strategies to: <ul style="list-style-type: none"> develop an effective survey question make an insightful prediction choose an effective display
Communicates using mathematical language				
<ul style="list-style-type: none"> explains results and conclusions clearly presents graph clearly, including appropriate scale, title, and labels 	unable to explain results and conclusions clearly graph is unclear; labelling is omitted or inappropriate	partially explains results and conclusions graph may be correct but difficult to interpret; title and labels may be vague or missing	explains results and conclusions clearly graph is clear and complete; scale is appropriate	explains results and conclusions clearly, precisely, and confidently graph is clear, complete, and precise; effective choice of labels and title

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 topic is appropriate.				
A reasonable prediction was made about the survey results.				
A graph shows results clearly, and has a title and labels.				
The results are presented clearly.				

Planning for Each Unit

Unit 6: Measurement

Supporting Cross-Curricular Competencies

Unit Focus: to construct his/her identity

Materials

Master Q6.1:

Unit Rubric: Measurement

Master Q6.2:

Performance Assessment Rubric: The Cooking Show

Master Q6.3:

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

The Measurement 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 202 and 205) 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, and participating in fundraising events).
- 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 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: ***Media Literacy***

Educational Aim: to develop students' critical and ethical judgment with respect to media and give them opportunities to produce media documents that respect individual and collective rights

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

Have students view and analyse part of a cooking show on television (with parental permission). Students could:

- Compare the cooking show to real-life cooking. What is the same? What is different? Record and display your answers.
- Discuss how your ideas about cooking shows have been confirmed or changed.
- Discuss the kind of advertising that was included in the cooking show. Include who it was likely directed at (the target audience).
- Work in groups to role-play your own cooking show to demonstrate a simple recipe. Write a script for your show. Include correct measurements and amounts. Present your role-play to the class.

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"> shows understanding by demonstrating, explaining, and applying: <ul style="list-style-type: none"> estimation and measurement of volume how the size of a measuring unit affects results 	may be unable to demonstrate, explain, or use estimations and measurements of: <ul style="list-style-type: none"> volume the effect of the size of a measuring unit on results 	partially able to demonstrate, explain, and use estimations and measurements of: <ul style="list-style-type: none"> volume the effect of the size of a measuring unit on results 	appropriately demonstrates, explains, and uses estimations and measurements of: <ul style="list-style-type: none"> volume the effect of the size of a measuring unit on results 	in various contexts, appropriately demonstrates, explains, and uses estimations and measurements of: <ul style="list-style-type: none"> volume the effect of the size of a measuring unit on results
Processes <ul style="list-style-type: none"> accurately: <ul style="list-style-type: none"> estimates, measures, records, orders, and compares volume selects appropriate units and identifies relationships to other units estimates and measures duration of time 	often makes major errors or omissions in: <ul style="list-style-type: none"> estimating, measuring, and recording volume selecting and relating units estimating and measuring duration of time 	makes frequent minor errors or omissions in: <ul style="list-style-type: none"> estimating, measuring, and recording volume selecting and relating units estimating and measuring duration of time 	makes few errors or omissions in: <ul style="list-style-type: none"> estimating, measuring, and recording volume selecting and relating units estimating and measuring duration of time 	rarely make errors or omissions in: <ul style="list-style-type: none"> estimating, measuring, and recording volume selecting and relating units estimating and measuring duration of time
Solves situational problems				
<ul style="list-style-type: none"> chooses and carries out a range of strategies to solve and create measurement problems 	may be unable to use appropriate strategies to solve and create measurement problems	with limited help, uses some appropriate strategies to solve and create measurement problems; partially successful	uses appropriate strategies to solve and create measurement problems successfully	uses appropriate, often innovative, strategies to solve and create measurement problems 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 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 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

Master Q6.2

**Performance Assessment Rubric:
The Cooking Show**

	Level 1	Level 2	Level 3	Level 4
Uses mathematical concepts and processes				
Concepts <ul style="list-style-type: none"> shows understanding of measurement by choosing appropriate procedures to determine the answers 	shows little understanding; may be unable to choose appropriate procedures	shows partial understanding by usually choosing appropriate procedures	shows understanding by choosing appropriate procedures, in most cases	shows thorough understanding by choosing appropriate procedures for all parts of the problem
Processes <ul style="list-style-type: none"> calculates and records measurements accurately, including appropriate units for ingredients in own recipe 	makes frequent major errors or omissions in calculating and recording measurements	makes frequent minor errors or omissions in calculating and recording measurements	generally accurate; few errors or omissions in calculating and recording measurements	accurate; rarely makes errors or omissions in calculating and recording measurements
Solves situational problems				
<ul style="list-style-type: none"> uses appropriate strategies, including estimating, to develop a recipe and determine how many people it will serve 	unable to create a recipe and determine how many it will serve; may be unworkable	creates a simple recipe and determines how many it will serve; amount of some ingredients and/or serving sizes may be unrealistic	creates a recipe with simple measurements and makes a reasonable estimate of how many it will serve	creates a recipe that shows some complexity or innovation in measurement; offers a reasonable estimate of how many it will serve
Communicates using mathematical language				
<ul style="list-style-type: none"> explains reasoning and procedures clearly, including appropriate terminology presents records, calculations, and results clearly including appropriate symbols or units (e.g., a.m., p.m.) 	unable to explain reasoning and procedures clearly often presents records, calculations, or results unclearly; rarely uses appropriate symbols or units	partially explains reasoning and procedures presents records, calculations, and results with some clarity; uses some appropriate symbols and units	explains reasoning and procedures clearly presents records, calculations, and results clearly and accurately; uses appropriate symbols and units	explains reasoning and procedures clearly, precisely, and confidently presents records, calculations, and results clearly and precisely; uses appropriate symbols and units

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 and answers are shown.				
Questions are answered correctly. Measurement units are recorded correctly.				
A recipe for a new dish is shown. It is easy to follow and interesting.				
Instructions are clear and easy to understand. They include all the needed information.				

Planning for Each Unit

Unit 7: Transformational Geometry

Recommended Software: *Appleworks*

Materials

Master Q7.1:

Unit Rubric: Transformational Geometry

Master Q7.2:

Performance Assessment Rubric: At the Fun House!

Master Q7.3:

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

Supporting Cross-Curricular Competencies

Unit Focus: to use creativity

The Transformational Geometry 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 236 and 244).
- The **Reflect** activities (for example, on pages 246 and 250) 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 7) using a different strategy than the one highlighted.

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 to have students explore this question: Is fun a basic need? Students could engage in some of the following activities, or develop others of their choice:

- Brainstorm ways you have fun and then categorize these into groups. Display your findings. Review the categories. Develop your own definition for “fun.”
- Research how different groups of people have fun, for example, different age groups or various cultures. List ways that “fun” is similar for all groups and ways it is different.
- Write about your favourite ways to have fun, and how you feel when you are having fun.
- Discuss how and why fun is important. Share your answers with a group.
- Create a poster or brochure to remind people of the importance of including fun in their lives.

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: Transformational 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 transformations by: <ul style="list-style-type: none"> - applying terms of direction and relating them to maps and grids - predicting and confirming results of reflections 	shows little understanding; may be unable to: <ul style="list-style-type: none"> - apply terms of direction and relate them to maps and grids - predict and confirm results of reflections 	shows some understanding (may be vague or incomplete); partially able to: <ul style="list-style-type: none"> - apply terms of direction and relate them to maps and grids - predict and confirm results of reflections 	shows understanding; able to clearly and appropriately: <ul style="list-style-type: none"> - apply terms of direction and relate them to maps and grids - predict and confirm results of reflections 	shows thorough understanding; in various contexts, able to precisely and effectively: <ul style="list-style-type: none"> - apply terms of direction and relate them to maps and grids - predict and confirm results of reflections
Processes <ul style="list-style-type: none"> ● accurately: <ul style="list-style-type: none"> - locates an object on a grid or axis, or in a plane - describes location and movement on a grid - identifies and performs reflections 	makes major errors or omissions in: <ul style="list-style-type: none"> - locating an object on a grid or axis, or in a plane - describing location and movement on a grid - identifying and performing reflections 	partially accurate; makes frequent minor errors or omissions in: <ul style="list-style-type: none"> - locating an object on a grid or axis, or in a plane - describing location and movement on a grid - identifying and performing reflections 	generally accurate; makes few errors or omissions in: <ul style="list-style-type: none"> - locating an object on a grid or axis, or in a plane - describing location and movement on a grid - identifying and performing reflections 	accurate; rarely makes errors or omissions in: <ul style="list-style-type: none"> - locating an object on a grid or axis, or in a plane - describing location and movement on a grid - identifying and performing reflections
Solves situational problems				
<ul style="list-style-type: none"> ● uses a range of appropriate strategies, including identifying patterns, using grids and diagrams, and making models to investigate and create problems involving the relative position of objects in two dimensions 	may be unable to use appropriate strategies to investigate and create problems involving relative position	with limited help, uses some appropriate strategies to investigate and create problems involving relative position; partially successful	uses appropriate strategies to investigate and create problems involving relative position successfully	uses appropriate, often innovative, strategies to investigate and create problems involving relative position successfully
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 use creativity				
<ul style="list-style-type: none"> ● suggests various ways of proceeding and attaining an objective, such as creating a pattern or design 	may be unable to suggest various ways of proceeding or attaining the objective; often follows classmates lead	with support, can suggest more than one way of proceeding or attaining an objective; may need help getting started	can suggest more than one way of proceeding or attaining an objective	can suggest several ways of proceeding or attaining an objective; enjoys discovering and experimenting with new approaches

Master Q7.2

**Performance Assessment Rubric:
At the Fun House!**

	Level 1	Level 2	Level 3	Level 4
Uses mathematical concepts and processes				
Concepts <ul style="list-style-type: none"> offers explanations that show understanding of: <ul style="list-style-type: none"> transformations symmetry (figure/image) coordinate systems (map) 	unable to explain or apply: <ul style="list-style-type: none"> transformations symmetry (figure/image) coordinate systems (map) 	partially explains, and applies: <ul style="list-style-type: none"> transformations symmetry (figure/image) coordinate systems (map) 	explains and applies: <ul style="list-style-type: none"> transformations symmetry (figure/image) coordinate systems (map) 	thoroughly and effectively explains and applies: <ul style="list-style-type: none"> transformations symmetry (figure/image) coordinate systems (map)
Processes <ul style="list-style-type: none"> accurately: <ul style="list-style-type: none"> applies required transformations draws lines of symmetry uses map coordinates to describe room location 	makes major errors or omissions in: <ul style="list-style-type: none"> applying required transformations drawing lines of symmetry using map coordinates 	makes frequent minor errors or omissions in: <ul style="list-style-type: none"> applying required transformations drawing lines of symmetry using map coordinates 	makes few errors or omissions in: <ul style="list-style-type: none"> applying required transformations drawing lines of symmetry using map coordinates 	rarely makes errors or omissions in: <ul style="list-style-type: none"> applying required transformations drawing lines of symmetry using map coordinates
Solves situational problems				
<ul style="list-style-type: none"> uses appropriate strategies to design: <ul style="list-style-type: none"> a pattern using transformations fun house rooms using transformations 	uses few effective strategies to design: <ul style="list-style-type: none"> a front wall pattern fun house rooms 	uses some appropriate strategies, with partial success, to design: <ul style="list-style-type: none"> a front wall pattern fun house rooms 	uses appropriate and successful strategies to design: <ul style="list-style-type: none"> a front wall pattern fun house rooms 	uses innovative and effective strategies to design: <ul style="list-style-type: none"> a front wall pattern fun house rooms
Communicates using mathematical language				
explains transformations clearly uses appropriate terms and symbols	unable to explain transformations clearly uses few appropriate mathematical terms or symbols appropriately	partially explains transformations uses some appropriate mathematical terms and symbols	explains transformations clearly uses appropriate mathematical terms and symbols	explains transformations clearly, precisely, and confidently uses a range of appropriate mathematical terms and symbols 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
There is a geometric pattern created for the front wall of the fun house.				
A map is created that is correctly labelled, and gives the coordinates for each room.				
A clear explanation, using the map, is included telling how a person could move from one room to another.				
Correct mathematical language is used to describe all work.				

Planning for Each Unit

Unit 8: Fractions and Decimals

Recommended Software: TI-108 calculator

Supporting Cross-Curricular Competencies

Unit Focus: to solve problems

Materials

Master Q8.1:

Unit Rubric: Fractions and Decimals

Master Q8.2:

Performance Assessment Rubric: Spring Activities Day

Master Q8.3:

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

In the Fractions and Decimals 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 4), 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: 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 collaboratively to develop their own class Spring Activities Day. If possible, invite other classes to participate. Focus on teamwork and collaborative planning. Students could:

- Compile a list of games and activities that are appropriate for a Spring Activities Day. Encourage students to research games from a variety of cultures, and recall activities at other school and community events.
- Create a list of guidelines/rules for appropriate activities. Emphasize the importance of giving all students an equal chance to participate, to have fun, and to be successful.
- Form teams. Each team is responsible for designing or choosing one activity, organizing any materials needed, and supervising the activity. Remember to check the guidelines/rules.
- Run Spring Activities Day. Each team presents and supervises the activity they designed or chose. Reflect on and self-evaluate your teamwork.

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: Fractions and Decimals

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 demonstrating, explaining, and applying: <ul style="list-style-type: none"> tenths and hundredths as decimals proper fractions estimation 	may be unable to demonstrate, explain, or use: <ul style="list-style-type: none"> tenths and hundredths as decimals proper fractions estimation 	partially able to demonstrate, explain, and use: <ul style="list-style-type: none"> tenths and hundredths as decimals proper fractions estimation 	appropriately demonstrates, explains, and uses: <ul style="list-style-type: none"> tenths and hundredths as decimals proper fractions estimation 	in various contexts, appropriately demonstrates, explains, and uses: <ul style="list-style-type: none"> tenths and hundredths as decimals proper fractions estimation
Processes <ul style="list-style-type: none"> accurately: <ul style="list-style-type: none"> reads, writes, compares, and orders fractions and decimals adds and subtracts decimals compares fractions to 0, $\frac{1}{2}$, and 1 	often makes major errors or omissions in: <ul style="list-style-type: none"> reading and writing decimals and fractions comparing and ordering fractions and decimals adding and subtracting decimals comparing fractions to 0, $\frac{1}{2}$, and 1 	somewhat accurate; makes frequent minor errors or omissions in: <ul style="list-style-type: none"> reading and writing decimals and fractions comparing and ordering fractions and decimals adding and subtracting decimals comparing fractions to 0, $\frac{1}{2}$, and 1 	generally accurate; makes few errors or omissions in: <ul style="list-style-type: none"> reading and writing decimals and fractions comparing and ordering fractions and decimals adding and subtracting decimals comparing fractions to 0, $\frac{1}{2}$, and 1 	accurate; rarely make errors or omissions in: <ul style="list-style-type: none"> reading and writing decimals and fractions comparing and ordering fractions and decimals adding and subtracting decimals comparing fractions to 0, $\frac{1}{2}$, and 1
Solves situational problems				
<ul style="list-style-type: none"> chooses and carries out a range of strategies to solve and create problems involving fractions and decimals 	may be unable to use appropriate strategies to solve and create problems with decimals or fractions	with limited help, uses some appropriate strategies to solve and create problems with decimals or fractions; partially successful	uses appropriate strategies to solve and create problems with decimals or fractions successfully	uses appropriate, often innovative, strategies to solve and create problems with decimals or fractions successfully
Communicates using mathematical language				
<ul style="list-style-type: none"> interprets and produces messages and presentations about fractions and decimals, using appropriate mathematical language and displays 	has difficulty interpreting and producing mathematical messages and presentations about fractions and decimals	partially able to interpret and produce mathematical messages and presentations about fractions and decimals	interprets and produces mathematical messages and presentations about fractions and decimals	interprets and produces mathematical messages and presentations about fractions and decimals with precision
Cross-curricular competency: to solve problems				
<ul style="list-style-type: none"> tests, evaluates, or justifies solutions; when necessary, adjusts or tries a new solution 	unable to test and evaluate solutions	with support, tests and evaluates solutions; may have difficulty adjusting or changing solution	tests and evaluates solutions, usually following procedures that have been presented in class; often able to adjust or change solution as needed	tests and evaluates solutions, often using own procedures; adjusts or changes solutions as needed

**Performance Assessment Rubric:
Spring Activities Day**

	Level 1	Level 2	Level 3	Level 4
Uses mathematical concepts and processes				
<p>Concepts</p> <ul style="list-style-type: none"> • shows understanding and ability to apply concepts related to decimals and fractions by selecting appropriate procedures, determining whether answers are reasonable, and justifying results 	<p>shows little understanding; may be unable to:</p> <ul style="list-style-type: none"> - choose appropriate procedures - determine whether answers are reasonable - justify results 	<p>shows partial understanding by:</p> <ul style="list-style-type: none"> - usually choosing appropriate procedures - sometimes determining whether answers are reasonable - giving some justification (often vague) 	<p>shows understanding by:</p> <ul style="list-style-type: none"> - choosing appropriate procedures, in most cases - determining whether most answers are reasonable - giving clear and appropriate justifications 	<p>shows thorough understanding by:</p> <ul style="list-style-type: none"> - choosing appropriate procedures - determining whether all answers are reasonable - giving clear, appropriate, and detailed justifications
<p>Processes</p> <ul style="list-style-type: none"> • accurately: - orders fractions and decimals to determine winner, second, and third in each activity • calculates differences in decimals • orders or calculates with decimals or fractions to solve own problem • provides examples for own event 	<p>often makes major errors or omissions in:</p> <ul style="list-style-type: none"> - ordering fractions and decimals - subtracting decimals - ordering or calculating with decimals or fractions to solve own problem - examples given for new event 	<p>makes frequent minor errors or omissions in:</p> <ul style="list-style-type: none"> - ordering fractions and decimals - subtracting decimals - ordering or calculating with decimals or fractions to solve own problem - examples given for new event 	<p>makes few errors or omissions in:</p> <ul style="list-style-type: none"> - ordering fractions and decimals - subtracting decimals - ordering or calculating with decimals or fractions to solve own problem - examples given for new event 	<p>rarely makes errors or omissions in:</p> <ul style="list-style-type: none"> - ordering fractions and decimals - subtracting decimals - ordering or calculating with decimals or fractions to solve own problem - examples given for new event
Solves situational problems				
<ul style="list-style-type: none"> • uses appropriate strategies to create a story problem and plan a new event using fractions or decimals 	<p>unable to create and solve a story problem</p> <p>unable to design an appropriate event; may be unworkable</p>	<p>creates and solves a very simple story problem; may have some flaws</p> <p>designs a simple event, often similar to those provided; parts may be confusing</p>	<p>creates and solves an appropriate story problem</p> <p>creates and gives examples of an appropriate new event</p>	<p>creates and solves a story problem that offers some complexity</p> <p>creates and gives examples of an appropriate and often innovative new event</p>
Communicates using mathematical language				
<ul style="list-style-type: none"> • uses mathematical terminology, numbers, and symbols correctly • explains answers clearly 	<p>uses few appropriate mathematical terms and symbols</p> <p>unable to explain answers clearly</p>	<p>uses some appropriate mathematical terms and symbols</p> <p>explains answers with some clarity</p>	<p>uses appropriate mathematical terms and symbols</p> <p>explains answers clearly</p>	<p>uses a range of appropriate mathematical terms and symbols clearly and precisely</p> <p>explains answers clearly and precisely</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. It includes how decimals and fractions are used to find the answers.				
Answers and solutions are correct.				
Fractions or decimals are used to create a new event.				
All work is explained clearly, using correct mathematical language.				

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 Backyard

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 320 and 324) 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 328 and 333) 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 while maintaining a critical attitude towards exploitation of the environment, technological development and consumer goods

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

Have students work in teams to design the “perfect” schoolyard. For example, students could:

- Consider how the design of a schoolyard can show environmental awareness and a sense of conservation and sustainability.
- Discuss activities you enjoy doing in the schoolyard. Include activities for all seasons.
- Develop two sets of guidelines: a set of environmental guidelines and a set of guidelines for an enjoyable schoolyard. Remind students that everyone should be able to enjoy the schoolyard, in all seasons.
- In groups, design your “perfect” schoolyard. **Option:** Students develop ways of making their current school yard more enjoyable and more environmentally friendly.
- Invite groups to present their designs to the class, and, if possible, to a parent council or the principal.

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"> shows understanding by demonstrating, explaining, and applying: <ul style="list-style-type: none"> estimation and measurement of linear dimensions, perimeter, and area relationships among linear dimensions, perimeter, and area 	may be unable to demonstrate, explain, or use estimations and measurements of: <ul style="list-style-type: none"> linear dimensions perimeter area relationships among linear dimensions, perimeter, and area 	partially able to demonstrate, explain, and use estimations and measurements of: <ul style="list-style-type: none"> linear dimensions perimeter area relationships among linear dimensions, perimeter, and area 	appropriately demonstrates, explains, and uses estimations and measurements of: <ul style="list-style-type: none"> linear dimensions perimeter area relationships among linear dimensions, perimeter, and area 	in various contexts, appropriately demonstrates, explains, and uses estimations and measurements of: <ul style="list-style-type: none"> linear dimensions perimeter area relationships among linear dimensions, perimeter, and area
Processes <ul style="list-style-type: none"> accurately: <ul style="list-style-type: none"> estimates and measures linear dimensions and perimeter in conventional units, and area in unconventional units selects appropriate units and identifies their relationship to other units (e.g., 130 cm = 1.3 m) 	often makes major errors or omissions in: <ul style="list-style-type: none"> estimating, measuring, and recording linear dimensions, perimeter, and area ordering and comparing linear dimensions, perimeter, and area relating mm, cm, dm, and m 	makes frequent minor errors or omissions in: <ul style="list-style-type: none"> estimating, measuring, and recording linear dimensions, perimeter, and area ordering and comparing linear dimensions, perimeter, and area relating mm, cm, dm, and m 	makes few errors or omissions in: <ul style="list-style-type: none"> estimating, measuring, and recording linear dimensions, perimeter, and area ordering and comparing linear dimensions, perimeter, and area relating mm, cm, dm, and m 	rarely make errors or omissions in: <ul style="list-style-type: none"> estimating, measuring, and recording linear dimensions, perimeter, and area ordering and comparing linear dimensions, perimeter, and area relating mm, cm, dm, and m
Solves situational problems				
<ul style="list-style-type: none"> chooses and carries out a range of strategies to solve and create measurement problems involving length, height, perimeter, and area 	may be unable to use appropriate strategies to solve and create measurement problems	with limited help, uses some appropriate strategies to solve and create measurement problems; partially successful	uses appropriate strategies to solve and create measurement problems successfully	uses appropriate, often innovative, strategies to solve and create measurement problems successfully
<ul style="list-style-type: none"> constructs various shapes of the same area 	needs assistance to construct one shape of a given area	constructs at least two simple shapes of the same area	constructs several simple shapes with the same area	constructs several shapes with the same area; some are innovative or complex
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:
Design a Backyard**

	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 the concept of area and its relationship to length and perimeter by choosing appropriate procedures, and selecting reasonable dimensions for each required feature 	<p>shows little understanding; may be unable to:</p> <ul style="list-style-type: none"> choose appropriate procedures select reasonable dimensions 	<p>shows partial understanding by:</p> <ul style="list-style-type: none"> usually choosing appropriate procedures selecting reasonable dimensions for some features 	<p>shows understanding by:</p> <ul style="list-style-type: none"> choosing appropriate procedures, in most cases selecting reasonable dimensions for most features 	<p>shows thorough understanding by:</p> <ul style="list-style-type: none"> choosing appropriate procedures selecting reasonable dimensions for all features
<p>Processes</p> <ul style="list-style-type: none"> accurately: calculates the perimeter and area of each feature draws dimensions, labelled on grid paper 	<p>often makes major errors or omissions in:</p> <ul style="list-style-type: none"> calculating and recording perimeter and area drawing dimensions 	<p>makes frequent minor errors or omissions in:</p> <ul style="list-style-type: none"> calculating and recording perimeter and area drawing dimensions 	<p>generally accurate; few errors or omissions in</p> <ul style="list-style-type: none"> calculating and recording perimeter and area drawing dimensions 	<p>accurate; rarely makes errors or omissions in:</p> <ul style="list-style-type: none"> calculating and recording perimeter and area drawing dimensions
Solves situational problems				
<ul style="list-style-type: none"> uses appropriate strategies, including estimating, to design a backyard that meets the given specifications 	<p>unable to create an appropriate design; may omit features or exceed given size</p>	<p>designs a backyard that includes most of the required features and is close to fitting within the required dimensions (20 m long; 16 m wide); several features may be of unrealistic size</p>	<p>designs a backyard that includes the required features and fits within the required dimensions; some features may be of unrealistic size</p>	<p>designs a backyard that shows some innovation; required features are included and of realistic size; includes at least one additional feature; fits within required dimensions</p>
Communicates using mathematical language				
<ul style="list-style-type: none"> uses mathematical terminology, numbers, and symbols correctly presents plan clearly, including labels and units 	<p>uses few appropriate mathematical terms and symbols</p> <p>plan is unclear</p>	<p>uses some appropriate mathematical terms and symbols</p> <p>plan is presented with some clarity; may omit some labels or units</p>	<p>uses appropriate mathematical terms and symbols</p> <p>plan is presented clearly</p>	<p>uses a range of appropriate mathematical terms and symbols clearly and precisely</p> <p>plan is presented clearly and precisely</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 could work for a real backyard the Rizvi family would enjoy.				
Each feature is an appropriate size and makes sense.				
The answers show understanding of how to find perimeter and area correctly.				
The plan is carefully drawn and labelled.				

Planning for Each Unit

Unit 10: Patterns in Number and Geometry

Recommended Software: *Appleworks*

Supporting Cross-Curricular Competencies

Unit Focus: to exercise critical judgment

Materials

Master Q10.1:

Unit Rubric: Patterns in Number and Geometry

Master Q10.2:

Performance Assessment Rubric: Fun and Games

Master Q10.3:

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

The Patterns in Number and Geometry unit supports 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 365); 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 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: Media Literacy

Educational Aim: to develop students' critical and ethical judgment with respect to media and to give them opportunities to produce media documents that respect individual and collective rights

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

Have students examine media advertisements for games or toys targeted at children their age; then construct a responsible advertisement for the game they created. Students could:

- Survey students about their favourite game or toy. Display the results. Discuss what sticks out in students' minds about the advertising for their favourite games and toys.
- Collect examples of print or broadcast advertisements for games or toys, and review them in groups. Develop a template for evaluating the advertisements critically, for example: At whom is the message directed? What do the advertisers want their viewers or listeners to think, believe, or do? What strategies do the advertisers use to attract attention?
- Make a list of criteria for responsible advertising: advertising that is true and fair. Construct an advertisement for the game you created using the criteria in your list.

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 demonstrating, explaining and applying: <ul style="list-style-type: none"> - repeating and growing patterns - relationships in patterns - patterns in multiplying and dividing whole numbers ● uses patterns to make and justify predictions 	may be unable to demonstrate, explain, or apply: <ul style="list-style-type: none"> - repeating and growing patterns - relationships in patterns - multiplying and dividing whole numbers - predictions based on patterns 	partially able to demonstrate, explain, and apply: <ul style="list-style-type: none"> - repeating and growing patterns - relationships in patterns - multiplying and dividing whole numbers - predictions based on patterns 	appropriately demonstrates, explains, and applies: <ul style="list-style-type: none"> - repeating and growing patterns - relationships in patterns - multiplying and dividing whole numbers - predictions based on patterns 	in various contexts, appropriately demonstrates, explains, and applies: <ul style="list-style-type: none"> - repeating and growing patterns - relationships in patterns - multiplying and dividing whole numbers - predictions based on patterns
Processes <ul style="list-style-type: none"> ● accurately: <ul style="list-style-type: none"> - identifies, and applies pattern rules; extends patterns - multiplies and divides 3-digit whole numbers by a 1-digit number 	often makes major errors or omissions in: <ul style="list-style-type: none"> - identifying and applying pattern rules - extending patterns - multiplying or dividing 3-digit whole numbers by a 1-digit number 	makes frequent minor errors or omissions in: <ul style="list-style-type: none"> - identifying and applying pattern rules - extending patterns - multiplying or dividing 3-digit whole numbers by a 1-digit number 	makes few errors or omissions in: <ul style="list-style-type: none"> - identifying and applying pattern rules - extending patterns - multiplying or dividing 3-digit whole numbers by a 1-digit number 	rarely makes errors or omissions in: <ul style="list-style-type: none"> - identifying and applying pattern rules - extending patterns - multiplying or dividing 3-digit whole numbers by a 1-digit number
Solves situational problems				
<ul style="list-style-type: none"> ● uses appropriate strategies to solve and create problems that involve patterns 	may be unable to use appropriate strategies to solve and create problems that involve patterns	with limited help, uses some appropriate strategies to solve and create problems that involve patterns; partially successful	uses appropriate strategies to solve and create problems that involve patterns successfully	uses appropriate, often innovative, strategies to solve and create problems that involve 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 exercise critical judgment				
<ul style="list-style-type: none"> ● compares his/her opinions and approaches to problems with others, being open to questions 	appears unable or unwilling to consider others' opinions or approaches	with prompting, compares own opinion or approach with others'; responds to questions with some reasonable justifications	compares own opinion or approach with others'; responds to questions and offers openness and some reasonable justification	compares own opinion or approach with others'; responds to questions thoughtfully and openly, offering reasonable justifications

Master Q10.2

**Performance Assessment Rubric:
Fun and Games**

	Level 1	Level 2	Level 3	Level 4
Uses mathematical concepts and processes				
Concepts <ul style="list-style-type: none"> • applies and explains pattern rules appropriately 	may be unable to apply or explain a pattern rule	applies a simple pattern rule but may have difficulty explaining it	applies one or more appropriate pattern rules; explanation shows understanding	applies one or more appropriate pattern rules; explanation shows thorough understanding
Processes <ul style="list-style-type: none"> • follows patterning rules accurately to create a numeric and/or geometric pattern 	makes major errors or omissions in patterns; creates a pattern with major errors or omissions	makes several minor errors or omissions in patterns; creates a pattern with several minor errors or omissions	creates one or more patterns with few minor errors or omissions	creates one or more patterns with practically no minor errors or omissions
Solves situational problems				
<ul style="list-style-type: none"> • chooses appropriate patterning strategies, including changing attributes to create a number and/or geometry pattern, to create a workable game 	chooses limited patterning strategies to create game; game may be unworkable	chooses some appropriate patterning strategies to develop a game that is somewhat workable (may be flawed)	chooses appropriate and effective patterning strategies to develop a workable game	chooses innovative, appropriate, and effective patterning strategies to develop a workable game
Communicates using mathematical language				
<ul style="list-style-type: none"> • uses mathematical terminology (e.g., repeating pattern; growing pattern) correctly • describes game clearly 	uses few appropriate mathematical terms describes game unclearly and imprecisely	uses some appropriate mathematical terms describes game with some clarity	uses appropriate mathematical terms describes game clearly and precisely	uses a range of appropriate mathematical terminology clearly and precisely describes game clearly, precisely, and confidently

Master Q10.3

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

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 uses patterns and would be fun to play.				
The patterns and pattern rules are described.				
The instructions for playing the game are clear.				

Planning for Each Unit

Unit 11: Probability

Supporting Cross-Curricular Competencies

Unit Focus: to use information

Materials

Master Q11.1:

Unit Rubric: Probability

Master Q11.2:

Performance Assessment Rubric: At the Carnival

Master Q11.3:

Peer and Self-Assessment: Unit Problem (Unit 11)

The Probability 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 400 and 404) 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 401, 405, and 411) 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 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: 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 collaboratively to create a Family Carnival to raise money for a charity or cause that is important to them. For example, students could:

- Make a list of charities or causes that you know about. Discuss ways people raise money for charity and why it is important to contribute.
- Choose a charity or cause, and plan a Family Carnival. Make a list of games and other features that might be included (such as food or performances).
- Discuss what carnival games and prizes would be appropriate, and how much they should cost. Emphasize the importance of inclusion. Talk about responsibility in designing the games: Should there be an equal chance of winning and losing? How would the chances of winning change the kinds of prizes given out?
- Work in teams. Choose one event or feature, and work collaboratively to plan the event, including all of the materials, displays, and so on.
- Conduct the Family Carnival and donate the money to the chosen cause or charity. Reflect on the event. Discuss why it is important for communities to work together.

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 <ul style="list-style-type: none"> shows understanding of probability by: <ul style="list-style-type: none"> - explaining why one outcome is equally/more/less likely than another - drawing reasonable conclusions from probability experiments 	shows little understanding; may be unable to: <ul style="list-style-type: none"> - explain why one outcome is equally/more/less likely than another - draw reasonable conclusions from probability experiments 	shows some understanding (may be vague or incomplete); partially able to: <ul style="list-style-type: none"> - explain why one outcome is equally/more/less likely than another - draw reasonable conclusions from probability experiments 	shows understanding; able to clearly and appropriately: <ul style="list-style-type: none"> - explain why one outcome is equally/more/less likely than another - draw reasonable conclusions from probability experiments 	shows thorough understanding; in various contexts, able to precisely and effectively: <ul style="list-style-type: none"> - explain why one outcome is equally/more/less likely than another - draw reasonable conclusions from probability experiments
Processes <ul style="list-style-type: none"> accurately: <ul style="list-style-type: none"> - identifies an outcome as possible, impossible, certain, uncertain - compares outcomes as equally likely, more likely, less likely - records experimental data (e.g., in a tree diagram or table) 	makes major errors or omissions in: <ul style="list-style-type: none"> - identifying an outcome as possible, impossible, certain, uncertain - comparing outcomes as equally likely, more likely, less likely - recording experimental data 	makes frequent minor errors or omissions in: <ul style="list-style-type: none"> - identifying an outcome as possible, impossible, certain, uncertain - comparing outcomes as equally likely, more likely, less likely - recording experimental data 	makes few errors or omissions in: <ul style="list-style-type: none"> - identifying an outcome as possible, impossible, certain, uncertain - comparing outcomes as equally likely, more likely, less likely - recording experimental data 	rarely makes errors or omissions in: <ul style="list-style-type: none"> - identifying an outcome as possible, impossible, certain, uncertain - comparing outcomes as equally likely, more likely, less likely - recording experimental data
Solves situational problems				
<ul style="list-style-type: none"> poses appropriate questions for probability experiments uses a range of appropriate strategies to design and conduct experiments to answer own questions 	may be unable to use appropriate strategies to: <ul style="list-style-type: none"> - pose simple questions for probability experiments - use appropriate strategies to design and conduct experiments 	with limited help: <ul style="list-style-type: none"> - poses some simple questions for probability experiments - uses some appropriate strategies to design and conduct experiments; partially successful 	uses appropriate strategies to: <ul style="list-style-type: none"> - pose simple questions for probability experiments - use appropriate strategies to design and conduct experiments successfully 	uses appropriate, often innovative, strategies to: <ul style="list-style-type: none"> - pose a range of questions for probability experiments - use appropriate strategies to design and conduct experiments successfully
Communicates using mathematical language				
<ul style="list-style-type: none"> 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 use information				
<ul style="list-style-type: none"> collects and organizes information to explore questions about probability 	unable to collect and organize appropriate information to explore probability questions	with support, collects and organizes appropriate information to explore probability questions; relies on methods outlined by the teacher	collects and organizes appropriate information to explore probability questions; usually relies on methods outlined by the teacher or peers	collects and organizes appropriate information to explore probability questions; often discovers own methods

Performance Assessment Rubric: At the Carnival

	Level 1	Level 2	Level 3	Level 4
Uses mathematical concepts and processes				
Concepts <ul style="list-style-type: none"> offers explanations of each game and the chances of winning that indicate understanding of probability 	unable to explain probability of winning the games	gives a partial explanation that shows some understanding of probability; flawed or incomplete	gives appropriate explanations that show understanding of basic concepts of probability	thoroughly and effectively explains the probability of winning each game
Processes <ul style="list-style-type: none"> calculates probability of winning each game accurately 	calculations of probability have major errors or omissions	calculations of probability have several minor errors or omissions	calculations of probability have few minor errors or omissions:	calculations of probability are accurate and precise, with few, if any, errors or omissions
Solves situational problems				
<ul style="list-style-type: none"> uses appropriate strategies to design three games with different probabilities of winning as specified in the problem 	uses few simple strategies to develop games; games may be unworkable and meet few requirements	uses some appropriate strategies to develop at least two workable games that meet some of the requirements; may be very simple	uses appropriate and successful strategies to develop three games that meet most requirements	uses innovative and effective strategies to develop three games that meet all requirements effectively
Communicates using mathematical language				
<ul style="list-style-type: none"> explains games and the probability of winning clearly uses appropriate mathematical terms (e.g., more/less likely; outcome, probable, improbable) 	unable to explain the games and the probability of winning clearly uses few appropriate mathematical terms appropriately	partially explains the games and the probability of winning uses some appropriate mathematical terms	explains the games and the probability of winning clearly uses appropriate mathematical terms	explains the games and the probability of winning 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
One game is designed where winning is more likely than losing.				
One game is designed where winning and losing are equally likely.				
One game is designed where it is likely that a player would win one time out of five times played.				
The games are explained clearly, using mathematical language.				



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