

**Chapter 1 Planning Chart: Factors and Exponents**

**Cross-Curricular Focus: To solve problems.** Lesson 8 provides students with an opportunity to make and test predictions about the patterns that result from raising integers to successive powers. Encourage students to consider other patterns (such as sums of powers, in Question 10) and to make and test predictions about the problems they create.

**Broad Area of Learning: Consumer Rights and Responsibilities.** Discuss lump-sum payments from lottery winnings or lump-sum payments made to satisfy a loan in the context of the central question of Lesson 5. Discuss the advantages and disadvantages of each of the methods of paying or being paid. Encourage students to state which method they would prefer in each type of situation (whether paying or being paid) and to support their preference with logical reasoning.

Content	QEP Concepts	QEP Processes	Addressing Concepts and Processes
<b>Getting Started:</b> Annual Garage Sale, pp. 2–3			Assessment Opportunity
<b>Lesson 1:</b> Using Multiples, pp. 4–7	<i>Arithmetic: Number Sense With Regard to Decimal and Fractional Notation and Operation Sense</i> <ul style="list-style-type: none"> <li>Reading, writing, various representations, patterns, properties</li> </ul>	<i>Arithmetic: Different Ways of Writing and Representing Numbers</i> <ul style="list-style-type: none"> <li>Using a variety of representations (e.g. numerical, graphic)</li> </ul>	
<b>Lesson 2:</b> A Factoring Experiment, pp. 8–9	<i>Arithmetic: Number Sense With Regard to Decimal and Fractional Notation and Operation Sense</i> <ul style="list-style-type: none"> <li>Reading, writing, various representations, patterns, properties</li> </ul>	<i>Arithmetic: Different Ways of Writing and Representing Numbers</i> <ul style="list-style-type: none"> <li>Using a variety of representations (e.g. numerical, graphic)</li> <li>Recognizing and using equivalent ways of writing numbers:                             <ul style="list-style-type: none"> <li>Decomposition of numbers (e.g. additive, multiplicative)</li> </ul> </li> <li>Switching from one way of writing numbers to another or from one type of representation to another</li> </ul> <i>Arithmetic: Operations Involving Numbers Written in Decimal and Fractional Notation</i> <ul style="list-style-type: none"> <li>Looking for equivalent expressions</li> </ul>	
<b>Curious Math:</b> Pool-Table Reflections, p. 9	<i>Arithmetic: Number Sense With Regard to Decimal and Fractional Notation and Operation Sense</i> <ul style="list-style-type: none"> <li>Reading, writing, various representations, patterns, properties</li> </ul>	<i>Arithmetic: Different Ways of Writing and Representing Numbers</i> <ul style="list-style-type: none"> <li>Using a variety of representations (e.g. numerical, graphic)</li> </ul>	Optional
<b>Lesson 3:</b> Factoring, pp. 10–13	<i>Arithmetic: Number Sense With Regard to Decimal and Fractional Notation and Operation Sense</i> <ul style="list-style-type: none"> <li>Reading, writing, various representations, patterns, properties</li> <li>Properties of operations:                             <ul style="list-style-type: none"> <li>Distributive property of multiplication over addition or subtraction and factoring out the common factor</li> </ul> </li> </ul>	<i>Arithmetic: Different Ways of Writing and Representing Numbers</i> <ul style="list-style-type: none"> <li>Using a variety of representations (e.g. numerical, graphic)</li> <li>Recognizing and using equivalent ways of writing numbers:                             <ul style="list-style-type: none"> <li>Decomposition of numbers (e.g. additive, multiplicative)</li> </ul> </li> </ul>	
<b>Lesson 4:</b> Exploring Divisibility, pp. 14–15	<i>Arithmetic: Number Sense With Regard to Decimal and Fractional Notation and Operation Sense</i> <ul style="list-style-type: none"> <li>Reading, writing, various representations, patterns, properties</li> <li>Properties of divisibility (by 2, 3, 4, 5, 10)</li> </ul>	<i>Arithmetic: Different Ways of Writing and Representing Numbers</i> <ul style="list-style-type: none"> <li>Using a variety of representations (e.g. numerical, graphic)</li> <li>Recognizing and using equivalent ways of writing numbers:                             <ul style="list-style-type: none"> <li>Decomposition of numbers (e.g. additive, multiplicative)</li> </ul> </li> <li>Switching from one way of writing numbers to another or from one type of representation to another</li> </ul>	<b>Teaching and Learning:</b> The rule for divisibility by 4 is not covered in this lesson. Supplement the lesson by explaining that divisibility by 4 may be determined by checking if the number formed by the last two digits of a number is divisible by 4. <b>Consolidation:</b> Allow students to practise checking for divisibility by 4, using the following numbers. 1. 426                   no 2. 124                   yes 3. 5136                  yes 4. 10 006               no 5. 250 276              yes 6. 123 456 780        yes

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<b>Mental Math:</b> Doubling and Halving Again and Again, p. 15	<p><i>Arithmetic: Number Sense With Regard to Decimal and Fractional Notation and Operation Sense</i></p> <ul style="list-style-type: none"> <li>• Reading, writing, various representations, patterns, properties</li> <li>• Inverse operations: addition and subtraction, multiplication and division, square and square root</li> </ul>	<p><i>Arithmetic: Operations Involving Numbers Written in Decimal and Fractional Notation</i></p> <ul style="list-style-type: none"> <li>• Mental computation: the four operations, especially with numbers written in decimal notation, using equivalent ways of writing numbers and the properties of operations</li> <li>• Written computation: the four operations involving numbers that are easy to work with (including large numbers) and sequences of simple operations performed in the proper order (numbers written in decimal notation), using equivalent ways of writing numbers and the properties of operations</li> </ul>	The strategies presented in this feature provide students with a method for multiplying and dividing by powers of 2. While the focus is narrow, this is another tool that students can use for simplifying calculations or reducing their reliance on calculators.
<b>Lesson 5:</b> Powers, pp. 16–19	<p><i>Arithmetic: Number Sense With Regard to Decimal and Fractional Notation and Operation Sense</i></p> <ul style="list-style-type: none"> <li>• Reading, writing, various representations, patterns, properties</li> <li>• Fractional, decimal and exponential (integral exponent) notation; percentage, square root</li> </ul>	<p><i>Arithmetic: Different Ways of Writing and Representing Numbers</i></p> <ul style="list-style-type: none"> <li>• Switching from one way of writing numbers to another or from one type of representation to another</li> </ul> <p><i>Arithmetic: Operations Involving Numbers Written in Decimal and Fractional Notation</i></p> <ul style="list-style-type: none"> <li>• Looking for equivalent expressions</li> <li>• Mental computation: the four operations, especially with numbers written in decimal notation, using equivalent ways of writing numbers and the properties of operations</li> <li>• Use of a calculator: operations and sequences of operations performed in the proper order</li> </ul>	
<b>Mid-Chapter Review:</b> pp. 20–21			Assessment Opportunity
<b>Lesson 6:</b> Square Roots, pp. 22–25	<p><i>Arithmetic: Number Sense With Regard to Decimal and Fractional Notation and Operation Sense</i></p> <ul style="list-style-type: none"> <li>• Reading, writing, various representations, patterns, properties</li> <li>• Fractional, decimal and exponential (integral exponent) notation; percentage, square root</li> <li>• Inverse operations: addition and subtraction, multiplication and division, square and square root</li> </ul>	<p><i>Arithmetic: Different Ways of Writing and Representing Numbers</i></p> <ul style="list-style-type: none"> <li>• Using a variety of representations (e.g. numerical, graphic)</li> <li>• Switching from one way of writing numbers to another or from one type of representation to another</li> </ul> <p><i>Arithmetic: Operations Involving Numbers Written in Decimal and Fractional Notation</i></p> <ul style="list-style-type: none"> <li>• Estimating and rounding numbers in different situations</li> <li>• Looking for equivalent expressions</li> <li>• Use of a calculator: operations and sequences of operations performed in the proper order</li> </ul>	
<b>Math Game:</b> Rolling Powers, p. 25	<p><i>Arithmetic: Number Sense With Regard to Decimal and Fractional Notation and Operation Sense</i></p> <ul style="list-style-type: none"> <li>• Reading, writing, various representations, patterns, properties</li> <li>• Fractional, decimal and exponential (integral exponent) notation; percentage, square root</li> </ul>		Optional

Content	QEP Concepts	QEP Processes	Addressing Concepts and Processes
<b>Lesson 7:</b> Order of Operations, pp. 26–29	<p><i>Arithmetic: Number Sense With Regard to Decimal and Fractional Notation and Operation Sense</i></p> <ul style="list-style-type: none"> <li>• Reading, writing, various representations, patterns, properties</li> <li>• Fractional, decimal and exponential (integral exponent) notation; percentage, square root</li> <li>• Order of operations and the use of no more than two levels of parentheses in different contexts</li> </ul>	<p><i>Arithmetic: Different Ways of Writing and Representing Numbers</i></p> <ul style="list-style-type: none"> <li>• Switching from one way of writing numbers to another or from one type of representation to another</li> </ul> <p><i>Arithmetic: Operations Involving Numbers Written in Decimal and Fractional Notation</i></p> <ul style="list-style-type: none"> <li>• Simplifying the terms of an operation</li> <li>• Mental computation: the four operations, especially with numbers written in decimal notation, using equivalent ways of writing numbers and the properties of operations</li> <li>• Written computation: the four operations involving numbers that are easy to work with (including large numbers) and sequences of simple operations performed in the proper order (numbers written in decimal notation), using equivalent ways of writing numbers and the properties of operations</li> <li>• Use of a calculator: operations and sequences of operations performed in the proper order</li> </ul>	
<b>Lesson 8:</b> Solve Problems by Using Power Patterns, pp. 30–32	<p><i>Arithmetic: Number Sense With Regard to Decimal and Fractional Notation and Operation Sense</i></p> <ul style="list-style-type: none"> <li>• Reading, writing, various representations, patterns, properties</li> <li>• Fractional, decimal and exponential (integral exponent) notation; percentage, square root</li> </ul>	<p><i>Arithmetic: Different Ways of Writing and Representing Numbers</i></p> <ul style="list-style-type: none"> <li>• Using a variety of representations (e.g. numerical, graphic)</li> <li>• Switching from one way of writing numbers to another or from one type of representation to another</li> </ul>	
<b>Chapter Self-Test:</b> p. 33			Self-Assessment Opportunity
<b>Chapter Review:</b> pp. 34–35			Assessment Opportunity
<b>Chapter Task:</b> Designing Interesting Numbers, p. 36	<p><i>Arithmetic: Number Sense With Regard to Decimal and Fractional Notation and Operation Sense</i></p> <ul style="list-style-type: none"> <li>• Reading, writing, various representations, patterns, properties</li> <li>• Fractional, decimal and exponential (integral exponent) notation; percentage, square root</li> <li>• Properties of divisibility (by 2, 3, 4, 5, 10)</li> <li>• Inverse operations: addition and subtraction, multiplication and division, square and square root</li> <li>• Order of operations and the use of no more than two levels of parentheses in different contexts</li> </ul>	<p><i>Arithmetic: Different Ways of Writing and Representing Numbers</i></p> <ul style="list-style-type: none"> <li>• Recognizing and using equivalent ways of writing numbers:             <ul style="list-style-type: none"> <li>• Decomposition of numbers (e.g. additive, multiplicative)</li> </ul> </li> </ul> <p><i>Arithmetic: Operations Involving Numbers Written in Decimal and Fractional Notation</i></p> <ul style="list-style-type: none"> <li>• Looking for equivalent expressions</li> <li>• Mental computation: the four operations, especially with numbers written in decimal notation, using equivalent ways of writing numbers and the properties of operations</li> <li>• Written computation: the four operations involving numbers that are easy to work with (including large numbers) and sequences of simple operations performed in the proper order (numbers written in decimal notation), using equivalent ways of writing numbers and the properties of operations</li> <li>• Use of a calculator: operations and sequences of operations performed in the proper order</li> </ul>	Assessment Opportunity