COWICHAN VALLEY School District

# Grade Nine – Suggested Math Instructional Resources

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## Number Sense

(The principles and processes underlying operations with numbers apply equally to algebraic situations and can be described and analyzed.)

| Curricular Content | Curricular Competencies (The student can…) | Online Resources | Print Resources (all resources are available in the DLC or in schools) |
|---|---|---|---|
| Exponents and exponent laws with whole number exponents | Represent exponent as a repeated multiplication.<br><br>Estimate square root numbers that are imperfect squares (eg. square root of 28 is between 5 and 6.)<br><br>Explain and justify how to simplify exponents using exponent laws | Exponential Functions - Desmos<br><br>Laws of Exponents<br><br>Open Middle Activities | *Radical Math* (Felling, 2021)<br>• Exponents and Radicals (p. 54-56)<br><br>*Elementary and Middle School Mathematics* (Van de Walle, 2022)<br>• pp. 591 - 601 |
| Polynomials | State number as a product of its prime factor<br><br>Define terminology (variables, degree, number of terms, coefficients, constant, monomial, binomial, trinomial, like terms, unlike terms, descending order/power)<br><br>Represent polynomials using concrete, pictorial and symbolic forms | Polynomials - Desmos<br><br>What are Polynomials | *Radical Math* (Felling, 2021)<br>• Polynomials and Their Operations (pp. 57-65)<br><br>*Algebraic Thinking* (Fullerton, 2020)<br>• pp. 204 - 208 |

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*Adapted from Richmond School District and Nanaimo Ladysmith Public Schools (with permission and gratitude)*

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# Computational Fluency

(Computational fluency and flexibility with numbers extend to operations with rational numbers.)

| Curricular Content | Curricular Competencies (The student can…) | Online Resources | Print Resources (all resources are available in the DLC or in schools) |
|---|---|---|---|
| Operations with rational numbers | Use a variety of strategies to simplify operations involving adding, subtracting, multiplying and dividing rational numbers, including brackets, exponents and signs. | Adding and Subtracting Integers<br><br>Multiplying and Dividing Integers<br><br>Open Middle Activities | *Radical Math* (Felling, 2021)<br>• Order of Operations (pp.40-53)<br><br>*Elementary and Middle School Mathematics* (Van de Walle, 2022)<br>• Chapter 15 (pp. 367 – 398)<br><br>Number Talks: Fractions, Decimals and Percentages (Parrish)<br>• Ch. 6 Addition (pp. 135 – 178)<br>• Ch. 7 Subtraction (pp. 179 – 218)<br>• Ch. 8 Subtraction (pp. 219 – 272)<br>• Ch. 9 Subtraction (pp. 273 – 315)<br><br>Proportional Reasoning (Fullerton)<br>• Addition & Subtraction (pp. 135 – 153)<br>• Multiplication & Division (pp. 239 – 251) |

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| Curricular Content | Curricular Competencies (The student can…) | Online Resources | Print Resources (all resources are available in the DLC or in schools) |
|---|---|---|---|
| Polynomials | Apply distributive law/property to multiplying and dividing expressions involving monomial and binomial factors.<br><br>Use a variety of strategies and models to add, subtract, multiply, divide and simplify polynomials | Polynomials - Desmos<br><br>The Distributive Property<br><br>Open Middle Activities | *Algebraic Thinking* (Fullerton, 2020)<br>• pp. 205 - 248 |

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# Patterning

(Continuous linear relationships can be identified and represented in many connected ways to identify regularities and make generalizations.)

| | | | |
|---|---|---|---|
| Two-Variable linear relations | Represent on a graph (eg. y=mx+b)<br>Use a graph to answer questions using interpolation or extrapolation.<br>Demonstrate understanding that a cartesian plane is a relationship between two number lines or sets of values, including quadrants<br>Determine whether values on a table represent a linear relation<br>Use substitution to solve for a variable. Example, if x = 2, what does y equal in the equation y=2x+3<br>Construct a table of values given the equation and graph. | Which One Doesn't Belong<br>Mathematical Mindsets Algebra | *Algebraic Thinking* (Fullerton, 2020)<br>• pp. 129 - 204 |
| Multi-step one variable linear equations | Recognize a linear equation<br>Communicate solutions pictorially and symbolically<br>Solve and verify linear equations using multiple strategies and models | Two-Step Equations<br>Open Middle Activities<br>Interactive Simulation<br>Lesson Series | *Algebraic Thinking* (Fullerton, 2020)<br>• pp. 129 - 204 |

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# General Resources

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|---|---|---|---|
| General Strategies and Routines | Which One Doesn't Belong<br>Dot Card and Number Talks<br>Number Talk Images<br>Interactive Simulations | Esti-Mysteries<br>The Estimation Clipboard<br>Cube Conversations<br>Puzzles, Problems and Tasks | Week of Inspirational Math<br>Building Thinking Classrooms<br>Estimation<br>Math Applications |
| Building Our Understanding | Surrey Video Series<br>Concreteness Fading | Spiraling the Curriculum<br>Progression of Fractions | Progression of Multiplication<br>Progression of Division |
| Classroom Assessment | | | Assessing Curricular Competencies |
| Indigenous Connections | Coast Metro Math Project | When Seagull Stole the Sun | BC Numeracy Network |
| Planning | | Critical Concepts Map | Planning - Year, Week, Day |

**Focusing on the content areas of number sense and computational fluency in this document is intentional as these are foundational skills that can be spiraled throughout the rest of the content standards while being grounded in the curricular competencies.**

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