

K-12 Mathematics Learning Resources

created in collaboration with the Numeracy Learning Resources Committee, Math Mentor Teachers, and Learning Services staff

In 2017, teachers and Learning Services staff were appointed to four curricular area committees (Literacy, Numeracy, Science, Social Studies) to review and curate lists of recommended learning resources to support the enactment of the redesigned BC curriculum framework, published in 2016. The product of the Numeracy Learning Resources Committee is the foundation of this document, and it continues to be updated every two years by Learning Services staff in consultation with teachers in our district.

When we consider the purchase of learning resources in mathematics, it is important to support teachers' pedagogical content knowledge aligned with our BC Mathematics curriculum. The teacher professional resources listed here are intended to provide teachers with routines, tasks, and problems/open questions to sustain their mathematics teaching over the school year.

A list of core materials/manipulatives is also provided, and these materials can be used across curricular content areas, supporting the development of important curricular competencies as well, and are thus, also considered learning resources. Every classroom needs to have a core classroom "library" of materials that students have access to, to support their mathematical thinking.

There is a page of recommendations for each grade range of students (primary, intermediate, secondary) but there is much overlap between these. The teacher resources and materials have been recommended based on curricular content and competencies for those grade ranges.

Please contact the Learning Services Curriculum and Assessment staff if you have any questions. Current information about supporting the teaching and learning of BC's K-12 Mathematics curriculum in the Richmond School District can also be found on Learn38.

As many schools in our district will be focus on mathematics and numeracy as part of their school story for the 2025-2026 school year, staffs may want to engage in a school-wide audit of professional resources and mathematics materials.

Suggested learning resources for consideration follow.

PRIMARY TEACHER RESOURCES

Mathematics Pedagogical Content Knowledge

How Children Learn Number Concepts: A Guide to the Critical Learning Phases by Kathy Richardson (Didax)
Teaching Student-Centered Mathematics: Grades K-3 by John A. Van de Walle & LouAnn H. Lovin
Making Math Meaningful to Canadian Students K-8 by Marian Small
Children’s Mathematics: Cognitively Guided Instruction by Thomas Carpenter, Elizabeth Fennema et al

Pedagogy, Instruction, and Assessment

Becoming the Math Teacher You Wish You’d Had by Tracy Zager
Math Workshop (K-5) by Jennifer Lempp
Teaching Math with Meaning by Cathy Marks Krpan
What to Look For: Understanding and Developing Student Thinking in Early Numeracy by Alex Lawson (Pearson)
Mathematizing Children’s Literature: Sparking Connections, Joy, and Wonder through Read-Alouds and Discussion by Allison Hintz and Antony T. Smith
Cultivating Mathematical Hearts: Culturally Responsive Teaching in Elementary Classrooms by Julia M. Aguirre and Marea del Rosario Zavala
Rethinking Disability and Mathematics: A UDL Classroom Guide for K-8 by Rachel Lambert
Universal Design for Learning in Mathematics Instruction, K-5 by Katie Novak and Ashley Marlow

Routines and Tasks

Number Sense Routines (K-3) by Jessica Shumway
Number Talks by Sherry Parrish
High Yield Routines by NCTM
Choral Counting and Counting Collections: Transforming the PreK-5 Math Classroom by Megan Franke, Elham Kazemi et al
Taking Shape: Activities to Develop Geometric and Spatial Thinking by Joan Moss, Cathy Bruce et al (Pearson)
Which One Doesn’t Belong? How Many? and How Did You Count? by Christopher Danielson
Good Questions: Great Ways to Differentiate Mathematics Instruction by Marian Small
Open Questions for Rich Math Lessons, Grades K-3, (Content Series) by Marian Small (Rubicon)
Mindset Mathematics: Visualizing and Investigating Big Ideas by Jo Boaler, Jen Munson and Cathy Williams (K, 1, 2 & 3 books)
Mathematics Tasks for the Thinking Classroom, Grades K-5 by Peter Liljedahl and Maegan Giroux

Materials

Mastering Math Manipulatives, Grades K-3: Hands-On and Virtual Activities for Building and Connecting Mathematical Ideas by Sara Delano Moore and Kimberly Ann Rimbey
Cuisenaire – from Early Years to Adult by ATM (UK)
Using the Rekenrek as a Visual Model for Strategic Reasoning in Mathematics by Dr. Barbara Blanke
https://www.mathlearningcenter.org/sites/default/files/pdfs/URVM_201903Sec.pdf

PRIMARY MATHEMATICS MATERIALS

Pattern Blocks	Base Ten Blocks	Playing Cards
Cuisenaire Rods	Two-Sided Counters	Loose Parts
Rekenreks	Geoboards (5x5)	SumBlox
Counters	3D Solids/Shapes	Tiny Polka Dot game
Five Frames	Number Balance	Numicon Shapes
Ten Frames	Dice	Measuring tapes
Large Magnetic Ten Frames	Power of Ten Cards	Rulers
Unifix Cubes	Place Value Cards	Currency kits

INTERMEDIATE TEACHER RESOURCES

Mathematics Pedagogical Content Knowledge

Teaching Student-Centered Mathematics: Grades 3-5 and Grades 5-8 by John A. Van de Walle & LouAnn H. Lovin
Making Math Meaningful to Canadian Students K-8 by Marian Small
Building Proportional Reasoning Across Grades and Math Strands K-8 by Marian Small
Children’s Mathematics: Cognitively Guided Instruction by Thomas Carpenter, Elizabeth Fennema et al

Pedagogy, Instruction, and Assessment

Becoming the Math Teacher You Wish You’d Had by Tracy Zager
Math Workshop (Grades K-5) by Jennifer Lempp
Math Workshop (Grades 6-12) by Jennifer Lempp and Skip Tyler Jr.
Math First Peoples Teacher Resource Guide (2020) by FNEC
Cultivating Mathematical Hearts: Culturally Responsive Teaching in Elementary Classrooms by Julia M. Aguirre and Marea del Rosario Zavala
Rethinking Disability and Mathematics: A UDL Classroom Guide for K-8 by Rachel Lambert
Universal Design for Learning in Mathematics Instruction, K-5 by Katie Novak and Ashley Marlow
Math Therapy: 5 Steps to Help Your Students Overcome Math Trauma and Build a Better Relationship With Math by Vanessa Vakharia
Rethinking Fractions: 8 Core Concepts to Support Assessment and Learning by Cathy Bruce, Tara Flynn & Shelley Yearley (Pearson)
From Patterns to Algebra: Lessons for Exploring Linear Relationships by Dr. Ruth Beatty and Dr. Catherine D. Bruce (Nelson)
Teaching Math with Meaning by Cathy Marks Krpan
Math Expressions: Developing Student Thinking and Problem Solving Through Communication by Dr. Cathy Marks Krpan (Pearson)

Routines and Tasks

Number Sense Routines (Grades 3-5) by Jessica Shumway
Making Number Talks Matter by Cathy Humphreys and Ruth Parker
Number Talks by Sherry Parrish
Number Talks: Fractions, Decimals and Percentages by Sherry Parrish & Ann Dominick
High Yield Routines by NCTM
Teaching Mathematical Thinking: Tasks and Questions to Strengthen Practices and Processes by Marian Small
Choral Counting and Counting Collections: Transforming the PreK-5 Math Classroom by Megan Franke, Elham Kazemi et al
Which One Doesn’t Belong? How Many? and How Did You Count? by Christopher Danielson
Good Questions: Great Ways to Differentiate Mathematics Instruction by Marian Small
Open Questions for Rich Math Lessons, Grades 4-6 (Content Series) by Marian Small (Rubicon)
Mindset Mathematics: Visualizing and Investigating Big Ideas by Jo Boaler, Jen Munson and Cathy Williams (Grades 4-7 books)
Open Middle Math by Robert Kaplinsky
Up for Debate: Exploring Math through Argument by Chris Luzniak
Building Thinking Classrooms by Peter Liljedahl
Mathematics Tasks for the Thinking Classroom, Grades K-5 by Peter Liljedahl and Maegan Giroux

Materials

Mastering Math Manipulatives, Grades 4-8: Hands-On and Virtual Activities for Building and Connecting Mathematical Ideas by Sara Delano Moore and Kimberly Ann Rimbey
Cuisenaire – from Early Years to Adult by ATM (UK)

INTERMEDIATE MATHEMATICS MATERIALS

Pattern Blocks	Two-Sided Counters	Tangrams	Fraction Bars
Cuisenaire Rods	Colour Tiles (square)	Number Balance	Playing Cards
Power Polygons	Geoboards (10x10 and circular)	Dice	Loose Parts
Unifix cubes		Measuring Tapes	Prime Climb game
Base Ten Blocks	3D Solids/Shapes, Nets	Currency Kit	Compass, protractors

SECONDARY TEACHER RESOURCES

Mathematics Pedagogical Content Knowledge

Teaching Student-Centered Mathematics: Grades 5-8 by John A. Van de Walle & LouAnn H. Lovin
Making Math Meaningful to Canadian Students K-8 by Marian Small
Building Proportional Reasoning Across Grades and Math Strands K-8 by Marian Small
Beyond Invert and Multiply by Julie McNamara

Pedagogy, Instruction, and Assessment

Becoming the Math Teacher You Wish You'd Had by Tracy Zager
Math Workshop (Grades 6-12) by Jennifer Lempp and Skip Tyler Jr.
Math First Peoples Teacher Resource Guide (2020) by FNECS
Rethinking Disability and Mathematics: A UDL Classroom Guide for K-8 by Rachel Lambert
Math Therapy: 5 Steps to Help Your Students Overcome Math Trauma and Build a Better Relationship with Math by Vanessa Vakharia
Rethinking Fractions: 8 Core Concepts to Support Assessment and Learning by Cathy Bruce, Tara Flynn & Shelley Yearley (Pearson)
From Patterns to Algebra: Lessons for Exploring Linear Relationships by Dr. Ruth Beatty and Dr. Catherine D. Bruce (Nelson)
Teaching Math with Meaning by Cathy Marks Krpan
Math Expressions: Developing Student Thinking and Problem Solving Through Communication by Dr. Cathy Marks Krpan (Pearson)

Routines and Tasks

Making Number Talks Matter by Cathy Humphreys and Ruth Parker
Number Talks: Fractions, Decimals and Percentages by Sherry Parrish & Ann Dominick
High Yield Routines by NCTM
Teaching Mathematical Thinking: Tasks and Questions to Strengthen Practices and Processes by Marian Small
More Good Questions: Great Ways to Differentiate Secondary Mathematics Instruction by Marian Small
Open Questions for Rich Math Lessons, Grades 7-9 (Content Series) by Marian Small (Rubicon)
Mindset Mathematics: Visualizing and Investigating Big Ideas by Jo Boaler, Jen Munson and Cathy Williams (Grade 8 book)
Open Middle Math by Robert Kaplinsky
Up for Debate: Exploring Math through Argument by Chris Luzniak
Building Thinking Classrooms by Peter Liljedahl
Clothesline Math: The Master Number Sense Maker by Chris Shore

Materials

Mastering Math Manipulatives, Grades 4-8: Hands-On and Virtual Activities for Building and Connecting
Mathematical Ideas by Sara Delano Moore and Kimberly Ann Rimbey
Cuisenaire – from Early Years to Adult by ATM (UK)

SECONDARY MATHEMATICS MATERIALS

Pattern Blocks	Geoboards (10x10, circular, isometric)	Dice
Cuisenaire Rods	3D Solids/Shapes (including fillable) and Nets	Playing Cards
Power Polygons	Tangrams	Loose Parts
Two-Sided Counters	Number & Fraction Balances	Prime Climb game
Algebra Tiles		Compass, protractors
Colour Tiles (squares)		Fraction Bars and Circles

K-12 STUDENT RESOURCES

The following resources have been reviewed by district staff for use in SD38 schools.

The following textbooks and programs can be used as part of a year-plan for instruction. None of these resources are completely aligned with the goals, big ideas and learning standards of the current BC Mathematics curriculum, so other resources and plans need to be used to address all aspects of our curriculum.

- Pearson Mathology Practice Workbooks (grades 3-9)
- Pearson Mathology Little Books (K-3)
- Nelson BC Math Boost K-7 (links older Math Focus resource to our current BC curriculum)
- Nelson Math Focus K-9 (older curriculum alignment but can be used a supplementary resource)
- Pearson Math Makes Sense K-9 (older curriculum alignment but can be used a supplementary resource)
- MathLinks 7-9 (older curriculum alignment but can be used a supplementary resource)

The following digital tools and resources are suggested for use in SD38 schools:

Learn38 K-12 Numeracy Foundations Framework

Coast Metro Elementary Math Project:

<https://coastmetro.ca/elementary-math-project/>

Mathigon Polypad <https://polypad.amplify.com/p>

Desmos <https://www.desmos.com>

Geogebra <https://www.geogebra.org>

MathUp (Canadian, Marian Small) <https://www.rubiconpublishing.com/mathup-marian-small/>

Zorbits (Canadian in both English and French, now Carnegie Learning)

<https://www.carnegielearning.ca/math>

Please also see the current math apps list available on Learn38 within the Digital Literacy tile.

SD38 Recommended Online Instructional Resources

K-12 Mathematics and Numeracy

instructional routines, tasks, and problems to develop mathematics curricular competencies connected to content and extend to numeracy

Same But Different

<https://www.samebutdifferentmath.com>

Which One Doesn't Belong? (WODB)

<https://talkingmathwithkids.com/wodb/>

Number Talk Images <http://ntimages.weebly.com>

Splat <http://www.stevewyborney.com/?p=893>

Fraction Talks <http://fractiontalks.com>

Estimation 180 <http://www.estimation180.com>

Clothesline Math <https://clotheslinemath.com>

Numberless Word Problems <https://bstockus.wordpress.com/numberless-word-problems/>

Visual Patterns <http://www.visualpatterns.org>

Would You Rather Math <https://www.wouldyourathermath.com>

Solve Me Mobiles <https://solveme.edc.org/mobiles/>

Numeracy Tasks (Peter Liljedahl - SFU) <http://www.peterliljedahl.com/teachers>

Centre for Education in Mathematics and Computing (University of Waterloo, Ontario)
<https://cemc.uwaterloo.ca/resources/potw>

NRICH – rich math tasks (UK) <https://nrich.maths.org>

Open Middle Tasks (Robert Kaplinsky) <https://www.openmiddle.com>

Math for Love – (Dan Finkel) <https://mathforlove.com>

Three Act Tasks <https://gfletchy.com/3-act-lessons/>

Youcubed – Jo Boaler's weeks of inspirational math
<https://www.youcubed.org/week-inspirational-math/>