DRAFT

SD38 Grades 3-5 Numeracy Assessment Tool Support Document

RICHMOND
SCHOOL DISTRICT NO.38

JUNE 2022

compiled by Janice Novakowski
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Overview

The SD38 Grades 3-5 Numeracy Assessment Tool and Support Document were developed in 2022 to build on the SD38 K-2 Numeracy Assessment Tool.

From 2017-2019, the SD38 K-2 Numeracy Assessment Tool was developed in collaboration with the Learning Services Numeracy Assessment Committee and trialled in over 60 Richmond classrooms. The assessment tool and support document were approved for use in Richmond classrooms in 2019 to inform instruction and plan for supports for students.

In 2022, Richmond grades 3-5 teachers from two school sites collaborated with a district teacher consultant (K-12 mathematics and numeracy) to develop the assessment tasks and trial them in their schools. Assessment tasks and focus aree aligned with our BC mathematics curriculum learning standards as well as current mathematics education and cognitive science research.

As the SD38 Numeracy Vision and Framework are further developed and refined, an update to this document may be made.

The SD38 Grades 3-5 Numeracy Assessment Tool is available for trialling during the 2022-2023 school year.

Literacy and Numeracy Assessment

"*Literacy is the ability to understand, critically analyze, and create a variety of forms of communication, including oral, written, visual, digital, and multimedia, in order to accomplish one's goals.*

Numeracy ~~is~~ the ability to understand and apply mathematical concepts, processes, and skills to solve problems in a variety of contexts.

Literacy and numeracy are fundamental to all learning. While they are commonly associated with language learning and mathematics, literacy and numeracy are applied in all areas of learning."

https://curriculum.gov.bc.ca/curriculum/overview

The purpose of this section of this document is to outline the purposes of and provide guidelines and recommendations for Level A assessments in Richmond for Literacy and Numeracy.

What is assessment?

Assessment is the systematic process of gathering information about individual students which may assist in understanding their needs and learning profile so that necessary planning for learning and services can be provided. It begins with the classroom teacher and may expand to include other individuals both within and beyond the school system. While both formal and informal assessment procedures may be useful, assessment should generally begin with observation of the student by the teacher or others in the classroom context. Assessment may then proceed to more formal or clinical measures and contexts in an incremental manner as required to design effective programs and supports for the student.

Levels of Assessment

Since assessment includes more than formal testing, it is important to keep the various types of assessment in mind. The first source of support for all students is the classroom teacher, who has already obtained information through observation, work samples, student and parent interviews, screening tests, etc.. These can be described as **Level A** assessments. When a teacher has questions about a particular student's needs or abilities, the teacher can turn to members of the **School Based Team (SBT)** for further advice, support and assistance. Actions from the School Based Team meeting may result in collecting additional data to supplement the information the teacher has already collected. This is where **Level B** or **Level C** assessment tools may be of assistance. **Level B** tests require specific training for administration, scoring and interpretation. These tests are more complex than Level A assessments and should only be administrated by someone who is trained. **Level C** tests require advanced (graduate level) training for interpretation, and in the school setting are generally administered by the school psychologist. Level A and B assessment data should guide the School Based Team in determining whether additional Level C testing is required to answer questions about a student's learning profile and how to best support learning.

Please note that most Level B and C tests are not aligned to our BC mathematics curriculum. Bridging formal testing results and suggested instructional practices and supports for student learning need to be made with the BC mathematics curriculum learning standards in mind.

The SD38 Grades 3-5 Numeracy Assessment Tool is a Level A assessment.

GRADES 3-5 NUMERACY ASSESSMENT

Focus of project:

The focus of this district project was the development of district language and supports around assessment in the area of mathematics and numeracy. The range of grades of focus for curriculum connections is grades 3-5 but may also be supportive for educators working with older or younger students. Whole class and individual student profiles maybe be created at the beginning, middle or end of the school year to inform instruction and supports for students.

What is numeracy?

Numeracy is the application and transfer of mathematical understanding to contextualized situations and problems. For our purposes, we are looking at two aspects of mathematical understanding – number sense and operations and spatial reasoning.

From a cognitive science perspective, particularly in the area of elementary numeracy, numeracy is focused on awareness of quantity, numbers and operations and the relationship between concrete, pictorial and symbolic forms.

Numeracy is a student's number sense as demonstrated through cardinality, ordinality, meaning of symbols, being able to link symbols to sets and understanding arithmetic operations.
from Dr. Ansari, Number Cognition Lab, Western University

In mathematics education, and as defined in the BC Curriculum framework, numeracy is an application of mathematical understanding. *Numeracy is the willingness and ability to interpret and apply mathematical understanding to solve problems in complex situations, and the perseverance to analyze and communicate these solutions in ways that are relevant to the given context.* from Dr. Peter Liljedahl (SFU) from the BC curriculum website

In Grades 3-5, the focus is on developing children's number sense with larger numbers, fractions, and decimals as well as fluency with number operations. Numeracy development occurs with opportunities to connect, apply and transfer this number sense to contextual situations or problems.

Foundational concepts/skills connected to the development of number sense and operations at the grades 3-5 range:

- Place value understanding
- Comparing and ordering numbers
- Addition, subtraction, multiplication, and division
- Fractions
- Decimals (grades 4&5)
- Concrete, pictorial and symbolic representations of different type of numbers

Spatial Reasoning

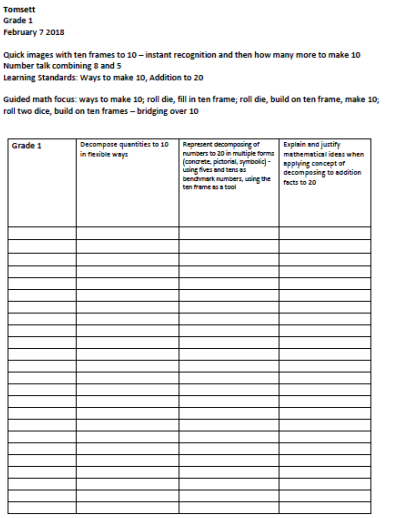
It is important to note that spatial reasoning is foundational to overall mathematics development. When considering developing an understanding of number, concrete and visual materials and tools such as base ten blocks or open number lines utilize spatial reasoning and understanding to support and enhance number sense. Concepts assessed in the included tasks such as placing numbers on a number line and creating arrays involve spatial reasoning. A specific spatial reasoning task is also included.

What are indicators of numeracy development?

- Understanding of number (number sense, fluency, flexibility)
- Application and transfer of mathematical understanding to contextual situations (e.g. stories, problems, play, investigations)
- Making connections (math to self, math to world, math to math)
- Development of mathematical vocabulary and language to use in explaining and justifying process and solutions

Progress Monitoring

Progress monitoring is used to assess students' growth in mathematics, and to evaluate the response to and effectiveness of instruction. Progress monitoring can be used with individual students or with an entire class. Some examples of ways to record and monitor progress over time include class lists, class profiles, and checklists connected to learning standards and foundational concepts and skills.



Tomsett
Grade 1
February 7 2018

Quick images with ten frames to 10 – instant recognition and then how many more to make 10
Number talk combining 8 and 5
Learning Standards: Ways to make 10, Addition to 20

Guided math focus: ways to make 10; roll die, fill in ten frame; roll die, build on ten frame, make 10; roll two dice, build on ten frames – bridging over 10

Grade 1	Decompose quantities to 10 in flexible ways	Represent decomposing of numbers to 20 in multiple forms (concrete, pictorial, symbolic) - using fives and tens as benchmark numbers, using the ten frame as a tool	Explain and justify mathematical ideas when applying concept of decomposing to addition facts to 20

What next?

In response to assessment and progress monitoring, use small group and whole class instruction to continue to develop foundational mathematical concepts and skills. Targeted intervention may also be necessary in addition to regular classroom instruction in consultation with your School-Based Team.

One resource available to support small group instruction/intervention is:

- ***Do the Math*** kits (available through DRC)

Professional Learning

In order to assess students' mathematical understanding, educators may find it helpful to develop their own knowledge of the mathematics they are assessing. In mathematics, this is called pedagogical content knowledge – the mathematics you need to know to teach and assess the grade/s of students you are working with. Some professional resources that may support educators' mathematical understanding can be found in the list of references at the end of this document. Professional learning opportunities to support the SD38 Grades 3-5 Numeracy Assessment Tool will also be provided within the district.

SD38 Grades 3-5 Numeracy Assessment Tool

The Grades 3-5 Numeracy Assessment Tool is comprised of four components. You may choose how and when you use these components to create a class profile to inform your instruction, assess and track specific student progress or collect global information to contribute to your school or district story.

The assessment tasks are focused on performance-based assessment with an interview aspect. The tasks are designed to do with small groups of students (2-4) in order to get reliable information through observation and listening. This could be done during Math Workshop or in collaboration with a Learning Resource Teacher.

Components:

1) Computational Fluency Questions
2) Mathematical Foundations Tasks (core tasks marked with a *)
3) Numeracy Tasks
4) Spatial Reasoning Task

You may choose to use the Computational Fluency Questions three or four times a year to gather a quick snapshot of both your class profile and track where individual students are in their learning.

You may use the Mathematical Foundations Tasks, particularly the core tasks (marked*), at the beginning of the year to create a class profile to inform instruction and also notice students that may need some additional supports.

The Numeracy and Spatial Reasoning Tasks can be used throughout the year to provide additional layers of information about student learning.

GRADES 3-5 COMPUTATIONAL FLUENCY QUESTIONS

The following three pages include four computational fluency questions connected to grade specific learning standards for grades 3, 4 and 5. As per our curricular competency standards, students are expected to demonstrate understanding of number concepts, use and apply multiple strategies, demonstrate flexibility in their thinking and represent and communicate both their process and solutions.

The K-7 Computational Fluency Assessment Questions are also available HERE.

Grade Three
Number Operations and Computational Fluency

Show at least two different ways to solve each question.

567 + 358 =	623 – 375 =
4 x 6 =	15 ÷ 3 =

created by jnovakowski/march2021

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Grade Four
Number Operations and Computational Fluency

Show at least two different ways to solve each question.

4 877 + 2 185 =	7.5 – 1.7 =
8 x 23 =	128 ÷ 8 =

created by jnovakowski/march2021

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Grade Five
Number Operations and Computational Fluency

Show at least two different ways to solve each question.

429 977 + 387 530 =	8.21 – 3.7 =
34 x 26 =	487 ÷ 19 =

created by jnovakowski/march2021

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GRADES 3-5 MATHEMATICS FOUNDATIONS TASKS

The following six tasks are all performance-based tasks that focus on the foundational number and number-related concepts in the grades 3-5 BC mathematics curriculum. This component of the assessment tool is intended to be completed with individuals, pairs, or small groups of students. The assessment tasks could be one centre or station during a Math Workshop time where students are engaged in independent or small group mathematics practice. The tasks could also be used during a unit of study as formative or summative assessment tasks.

At this point we have developed an indicator of proficiency for each task and grade levels, that encompasses both curricular content and competencies. A class profile can be created to see areas of proficiency and areas needing further development in your class. For the three core (marked*) tasks, there is a full proficiency scale with descriptors available.

Materials needed:

- two sets of 0-9 digit cards (or playing cards with 10s and face cards removed)
- a tub of square tiles/colour tiles of various colours
- a geoboard for each student and elastics
- mini whiteboards and markers or paper and pencil
- class profile list
- individual student recording forms

***Task 1:** Deal out three (grade 4 – four, grade 5 – five or six) digit cards to each student. Ask the student to create the greatest (biggest, largest – if not familiar with the term greatest) number possible. Ask the student to read the number and explain why it's the greatest number possible. If working with a small group, ask students to order their numbers from least to greatest. Ask the student what number would be 10 more and to write that number. Ask the student what number would be 200 less and to write that number. Ask student to draw a number line and record the beginning with 0 and then end with 1000. Ask them to record one of the numbers they have made in this task along the number line.

Observe and listen for: place value concepts to 1000, 10 000, 100 000; comparing and ordering numbers. If the greatest number is not presented, note what number student created.

Extension questions: *How do you know that your number is the greatest/biggest/largest that you can make using your cards? Which player has the greatest/biggest/largest number? How do you know? What number is one hundred more/less? Five hundred less? Nine thousand more?*

Indicators of proficiency: The student can represent a number to 1000 (grade 3), 10 000 (grade 4) and 1 000 000 (grade five) in written form, read the number correctly and compare the magnitude of the number to other numbers and by place value (knowing what digit to look at and determine what number is 10 more or 200 less).

Grade 3

Proficient
-the student can represent, read, and compare numbers to 1000 in written form demonstrating understanding of place values -the student can add or subtract 10s or 100s from a three-digit number fluently -the student can place a three-digit number in an appropriate place on an open number line from 0-1000

Grade 4

Proficient
-the student can represent, read, and compare numbers to 10 000 in written form demonstrating understanding of place values -the student can add or subtract 10s or 100s from a four-digit number fluently -the student can place a four-digit number in an appropriate place on an open number line from 0-10 000

Grade 5

Proficient
-the student can represent, read, and compare numbers to 1 000 000 in written form demonstrating understanding of place values -the student can add or subtract 10s or 100s from a five or six-digit number fluently -the student can place a five or six-digit number in an appropriate place on an open number line from 0 - 1 000 000

***Task 2:** Place 20 square tiles in a pile on the table. Ask students: How many different equal groups can you create? Can you create an array to represent how you have grouped the tiles? As students are creating equal groups, ask them to represent the groups in equation form. How would you represent these groups and number of tiles in different equations? If the student does not represent the groups in both multiplication and division equations, provide a prompt such as: Can you think of a division equation for how you have grouped the tiles?
For Grade 5: Teacher can then ask student to orally explain a larger number such as 120 and offer a whiteboard and marker or paper and pencil to the student.

Observe and listen for: understanding of decomposing into equal groups, array representation, relationship between multiplication and division, concrete to symbolic representation of operations

Indicators of proficiency: The student can demonstrate and understanding of the processes of multiplication and division with concrete materials and using arrays (all grades). The student can record multiplication and division equations for different decomposing in equal groupings (all grades). Grade 5 students can demonstrate an understanding of the relationship between multiplication, division, and decomposing numbers with three-digit numbers through arrays and partial products.

Grade 3

Proficient
-the student can represent understanding of multiplication and division with concrete materials, including arrays -the student can record multiplication and division equations corresponding to concrete representations

Grade 4

Proficient
- the student can represent understanding of multiplication and division with concrete materials, including arrays, pictorial and symbolic forms, including equations

Grade 5

Proficient
-- the student can represent understanding of multiplication and division with concrete materials, including arrays, pictorial and symbolic forms - demonstrate an understanding of the relationship between multiplication and division, by using arrays and partial products fluently with three-digit number operations

***Task 3:** What different ways can you make 1000 (grade 3), 10 000 (grade 4) or 1 000 000 (grade 5) using addition and subtraction equations? If you notice that the student is only using equations with benchmark numbers (100s, 1000s, etc), ask them to decompose the numbers in a greater variety of ways. Provide enough time for students to record at least three different equations (with at least one addition and one subtraction equation).

Observe and listen for: representing, decomposing numbers, addition and subtraction to 1000 (grade 3), 10 000 (grade 4) and 1 000 000 (grade 5), relationship between addition and subtraction and notice fluency with use of different numbers

Indicators of proficiency: The student can decompose quantities and represent that process in addition and subtraction equations. The student demonstrates place value understanding. The student uses mental math strategies (decomposing, benchmark numbers, relating addition and subtraction, etc).

Grade 3

Proficient
-the student can demonstrate flexible and fluent use of numbers to 1000 by composing and decomposing different types of numbers (benchmarks, complementary numbers, numbers that make 10s, 100s, etc) through addition and subtraction equations

Grade 4

Proficient
-the student can demonstrate flexible and fluent use of numbers to 10 000 by composing and decomposing different types of numbers (benchmarks, complementary numbers, numbers that make 10s, 100s,1000s, etc) through addition and subtraction equations

Grade 5

Proficient
-the student can demonstrate flexible and fluent use of numbers to 1 000 000 by composing and decomposing different types of numbers (benchmarks, complementary numbers, numbers that make 10s, 100s,1000s, etc) through addition and subtraction equations

Task 4: Provide the students with a pile of colour tiles. Ask students to show at least two ways to represent the fraction ¼ (grade 3), ¾ (grade 4) or 4/6 (grade 5) with the tiles and then ask students to record the written form of the fraction. For grade 4s, continue the task by asking the students to compare ¾ to ½ - Which is greater? How do you know? For grade 5s, continue the task by asking the students to create or write an equivalent fraction for 4/6 and ask them to explain how they know.

Observe and listen for: fraction concepts, equal parts, concrete to symbolic notation (understanding of numerator and denominator), comparing and ordering fractions, equivalent fractions

Indicators of proficiency: The student can represent the fraction with concrete materials and in symbolic form. The student can compare fractions (grade 4). The student can create equivalent fractions (grade 5).

Task 5: Provide the students with a pile of colour tiles. Ask students represent the fraction 2/10 with the tiles. Ask grade 3 students to record the fraction in symbolic form. Ask grades 4 and 5 students to record the fraction and decimal form. For grades 4 and 5: What is a decimal that is less than 0.2? What is decimal that is more than 0.2? How do you know? For grade 5: Which decimal number is greater: 0.2 or 0.05? How do you know?

Observe and listen for: fraction concepts, concrete to symbolic notation, representing decimals, comparing and ordering decimals

Indicators of proficiency: The student can create a representation of 2/10 with concrete materials and in symbolic form. The student can record 2/10 in decimal form. The student can compare decimal numbers and explain their thinking.

Task 6: Provide each student with a geoboard and elastics. Ask them to make a rectangle. For grade 3: What multiplication equation can be represented with your rectangle? How do you know? (How many squares in each row? How many rows?) For grade 4: Using the units on the geoboard, what is the perimeter of the rectangle? How do you know? For grade 5: Using the units on the geoboard, what is the perimeter and area of the rectangle? How do you know?

Observe and listen for: ability to create an array/rectangle, connection of array representation to multiplication and area, use of units to measure perimeter and areas, relationship between perimeter and area

Indicators of proficiency: The student can create an array/rectangle. The student can make connections between an array/rectangle and multiplication. The student can measure the perimeter of the rectangle. The student can use multiplication to measure the area of the rectangle.

Extension questions: What other arrays can you make? What do you notice about the relationship between perimeter and area?

SD38 Grades 3-5 Numeracy Assessment Tool

Mathematics Foundations Tasks and Concept/Skill Correlation

TASK	Task Concepts and Competencies
One	place value, comparing and ordering numbers, explaining and justifying solutions
Two	understanding of equal grouping, relationship between multiplication and division, concrete to symbolic representation of operations
Three	representing and decomposing numbers, addition and subtraction, mental math strategies
Four	fraction concepts, comparing and ordering fractions, equivalent fractions, communicating mathematical thinking
Five	representing fractions and decimals, ordering decimals, relationship between fractions and decimals, explaining and justifying solutions and ideas
Six	multiplication, perimeter, area, connecting mathematical ideas

SD38 Grades 3-5 Assessment Tool
Mathematics Foundations Tasks and Indicators of Proficiency

TASK	Indicators of Proficiency
One	The student can: • represent a number to 1000 (grade 3), 10 000 (grade 4) and 1 000 000 (grade five) in written form • read the number correctly • compare the magnitude of the number to other numbers and by place value (knowing what digit to look at and determine what number is 10 more or 200 less)
Two	The student can: • demonstrate and understanding of the processes of multiplication and division with concrete materials • represent equal groups in arrays • record multiplication and division equations for different decomposing in equal groupings • can demonstrate an understanding of the relationship between multiplication, division, and decomposing numbers with three-digit numbers through arrays and partial products (grade 5)
Three	The student can: • decompose quantities and represent that process in addition and subtraction equations • demonstrates place value understanding • use mental math strategies (decomposing, benchmark numbers, relating addition and subtraction, etc). * to 1000 (grade 3), 10 000 (grade 4) and 1 000 000 (grade 5)
Four	The student can: • represent the fraction with concrete materials and in symbolic form • compare fractions (grade 4)

	• create equivalent fractions (grade 5). *¼ (grade 3), ¾ (grade 4), 4/6 (grade 5)
Five	The student can: • create a representation of 2/10 with concrete materials and record the fraction in symbolic form • record 2/10 in decimal form (grades 4 & 5) • compare decimal numbers and explain their thinking – more than, less than 0.2 (grades 4 & 5) • explain which decimal is greater 0.2 or 0.05
Six	The student can: • create an array/rectangle • make connections between an array/rectangle and multiplication • measure the perimeter of the rectangle (grade 4) • use multiplication to measure the area of the rectangle (grade 5)

SD38 Grades 3-5 Numeracy Assessment: Mathematics Foundations Class Profile Recording Form

student name	place value	represents multiplication in concrete and symbolic forms	represents division in concrete and symbolic forms	fluency with addition and subtraction and decomposing numbers	fraction understanding	decimal understanding	perimeter and area

0

1 4 7

2 5 8

3 6

SD38 Grades 3-5 Numeracy Assessment: Mathematics Foundations
Individual Student Record

place value concepts (task one)	
comparing and ordering numbers (task one)	
multiplication concepts (tasks two and six)	
division concepts (task two)	
addition and subtraction concepts and relationships (task three)	
fraction concepts (task four)	
decimal concepts grades 4&5 only (task five)	
perimeter and area concepts (task six)	

_____
student name

_____
student birthdate, grade

_____
date of assessment

_____
completed by

notes

SD38 GRADES 3-5 NUMERACY TASKS

The SD38 Grades 3-5 Numeracy Assessment Tool focuses on assessing the development of foundational number concepts and number operations.

The following numeracy tasks are provided to be used in parallel with the assessment tool, to assess the ability of students to connect, apply and transfer their understanding of foundational mathematics concepts.

SHARING PIZZA

"A class of 25 was awarded a pizza lunch by a community group. Each large pizza has eight slices. How would you decide what pizzas to request and how many you would need for the class to share? What are some different things you need to consider?"

Notes:
You may change the context to reflect your class' composition or interests.
Have mini whiteboards and markers, paper, pencils, pencil crayons, or fraction pieces available for students to use if they choose.

Observe and listen for: is the student able to interpret the situation and come up with a plan for solving, apply data, division and/or fractional concepts and language to think about ways to solve the situation, consider different ways this situation may be solved (different pizza preferences or constraints, concepts of equal or what is fair), student competence in following through on their plan and solving and analyzing their results, competence in explaining their reasoning and solution

Indicators of proficiency: The student demonstrates a comprehensive interpretation and understanding of the situation. The student applies mathematical knowledge about fractions or division as a means to solving the situation. Student analysis and reasoning is clearly communicated and the student provides evidence of their process and solution. The student uses mathematical language and vocabulary to describe the situation and is able to explain and justify their solution for how many pizzas to order.

NUMERACY TASK	Task Concepts and Competencies
Sharing Pizza	division, fractions, decomposing quantities, data collection and interpretation, visualizing, problem-solving, communicating mathematical thinking

PLANNING AND DESIGNING A GARDEN

"Design a garden. What will you grow and why? What do you need to consider? How much space does each kind of plant need? What size should it be? Make a plan and draw or build a model of the garden. Share your reasoning for your design."

Notes:
You may change the context to connect to your students' interests, for example, designing a vegetable garden to help feed the community.
Students are encouraged to use standard units such as centimetres or metres.
Have mini-whiteboards and markers, paper, pencils, rulers, popsicle sticks, cubes, and other creating materials available for students to use if they choose.

Observe and listen for: is the student able to interpret the situation and come up with a plan for solving, ability to apply measurement or multiplication concepts and language to think about ways to solve the situation, consider different ways this situation may be solved (different types of plants, purpose of garden, watering, who will need to access it), student competence in following through on their plan and solving and analyzing their results, competence in explaining their reasoning and solution

Indicators of proficiency: The student demonstrates a comprehensive interpretation and understanding of the situation. The student applies mathematical knowledge about measurement or multiplication (arrays) as a means to solving the situation. Student analysis and reasoning is clearly communicated and the student provides evidence of their process and solution. The student uses mathematical language and vocabulary to describe the situation and is able to explain and justify their solution for the design of their garden.

NUMERACY TASK	**Task Concepts and Competencies**
Planning & Designing a Garden	standard measurement – linear, area, perimeter, multiplication, addition, financial literacy, estimating, visualizing, problem-solving, using mathematical language, communicating mathematical thinking

SD38 GRADES 3-5 SPATIAL REASONING TASK

The following task looks at the important mathematical thinking of spatial reasoning and connects to the big idea in the BC mathematics curriculum of "we can describe, measure and compare spatial relationships." For Grades 3-5 the curricular focus in on describing, measuring, and comparing attributes of two and three-dimensional shapes.

Materials: three dimensional blocks (prisms, cubes, cylinders, etc) or objects (boxes, cans, paper cones, etc), measuring tools such as cm cubes, rulers, measuring tapes, paper and pencil or whiteboard and markers

Student Task:

1. Using three-dimensional blocks or objects build a structure or tower with at least three shapes.
2. Draw the construction from two different perspectives (such as side view or birds eye view).
3. Label the drawings of the construction with what shapes you see.
    a. Choose two shapes to compare. How are the alike? How are they different? (grade 3 – 3D, grades 4&5 – polygons)
4. What different ways could you measure the construction?
    a. Record your measurements.

Observe and listen for: knowledge and language to identify and describe shapes and their attributes, competency in visualizing, examining, and recording construction from different perspectives, using measurement language (quantity and standard units) to think about and measure shapes in different ways

Indicators of proficiency: The student draw a 2D representation of a 3D construction from more than one perspective. The student can use mathematical language and vocabulary to describe and compare shapes and their attributes. The student can measure a linear dimension/attribute of a shape using standard units.

TASK	Task Concepts and Competencies
Spatial Reasoning	geometry, measurement, 3D objects and shapes, polygons, closed 2D shapes, attributes of shapes, standard measurement – linear, area, perimeter, visualizing, using mathematical language, communicating mathematical thinking

Glossary

Assessment: Assessment is the systematic process of gathering information about individual students which may assist in understanding their needs and learning profile so that necessary planning for learning and services can be provided.

Contextualized Situation: A task or problem embedded in a story, in play, a problem, project or an investigation.

Decomposing: Decomposing and composing quantities or numbers are related concepts. Decomposing is essentially "breaking" a quantity into parts, such as ten can be decomposed into five and four and one.

Magnitude: Magnitude looks at the relative size of a quantity in comparison to others and can be measured visually (with sets of objects or pictures) or symbolically (with number symbols).

Number Sense: A student with well-developed number sense is able to think fluently and flexibly about numbers and their relationships with each other.

Numeracy: Numeracy is the application and transfer of mathematical understanding to contextualized situations and problems.

Quantity: A quantity is an amount or number of a set, materials, objects, pictures, etc.

Spatial Reasoning: Spatial reasoning is based in dynamic processes with a focus on mental understanding and physical transformation.

Symbol: The numeric symbol or number that represents the quantity/amount.

BC Mathematics Curriculum Connections

The assessment tasks focus on number with the numeracy tasks focusing on application of number, measurement, and spatial reasoning. BC Mathematics Curriculum Big Ideas that are the overall focus for this assessment support document are: ***Number represent and describes quantity*** *and* ***Computational fluency develops from a strong sense of number.***

BC Mathematics Curriculum	**Curricular Competencies Learning Standards** *(focused on in the task design)*	**Curricular Content Learning Standards**
Grade Three	• use reasoning to explore and make connections • develop mental math strategies and abilities to make sense of quantities • develop, demonstrate, and apply mathematical understanding through play, inquiry, and problem solving • visualize to explore mathematical concepts • develop and use multiple strategies to engage in problem solving • communicate mathematical thinking in many ways • explain and justify mathematical ideas and decisions • represent mathematical ideas in concrete, pictorial and symbolic forms • reflect on mathematical thinking	• number concepts to 1000 • addition and subtraction facts to 20 • addition and subtraction to 1000 • fraction concepts • multiplication and division concepts
Grade Four		• number concepts to 10 000 • addition and subtraction facts to 20 • addition and subtraction to 10 000 • ordering and comparing fractions • decimals to hundredths • addition and subtraction of decimals to hundredths • multiplication and division facts to 100 • multiplication and division of two or three-digit numbers by one-digit numbers
Grade Five		• number concepts to 1 000 000 • addition and subtraction facts to 20 • addition and subtraction of whole numbers to 1000 000 • equivalent fractions • decimals to thousandths • addition and subtraction of decimals to thousandths • multiplication and division facts to 100 • multiplication and division of three-digit numbers including division with remainders

Resources

Pedagogical Content Knowledge Resources

How Children Learn Number Concepts: A Guide to the Critical Learning Phases by Kathy Richardson (available through didax.com)
Making Math Meaningful to Canadian Students K-8 by Marian Small
Teaching Student-Centered Mathematics: Grades 3-5 by John A. Van de Walle & LouAnn H. Lovin
Children's Mathematics: Cognitively Guided Instruction by Thomas Carpenter, Elizabeth Fennema et al
How Many? by Christopher Danielson (picture book & teacher guide)
Choral Counting and Counting Collections: Transforming the PreK-5 Math Classroom by Megan Franke, Elham Kazemi et al
Extending Children's Mathematics: Fractions & Decimals: Innovations in Cognitively Guided Instruction by Linda Levi and Susan B. Empson
Beyond Pizzas & Pies, Grades 3-5, Second Edition: 10 Essential Strategies for Supporting Fraction Sense by Julie McNamara and Meghan M. Shaughnessy
Rethinking Fractions: Eight Concepts to Support Assessment and Learning by Catherine D. Bruce, Tara Flynn and Shelley Yearley
Making Number Talks Matter: Developing Mathematical Practices and Deepening Understanding, Grades 3-10 by Cathy Humphreys and Ruth Parker

BC Numeracy Network foundations page
https://bit.ly/BCNNfoundations

Numeracy

BC Numeracy Network website
http://bit.ly/bcnumeracynetwork

Dr. Peter Liljedahl website
https://www.peterliljedahl.com/teachers/numeracy-tasks

SD38 Portal – Learn 38: Mathematics and Numeracy
https://portal.sd38.bc.ca/learn38/Pages/default.aspx#/=

SD38 District Mathematics Blog
https://blogs.sd38.bc.ca/sd38mathandscience/