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Curriculum Planning & Assessment Resource

Mathematics
Grade 3

Alberta Regional Professional Development Consortia

Dedicated to the provision of professional learning opportunities at the local, regional and provincial levels

Curriculum Planning & Assessment Resource
Mathematics
Grade 3 Algebra 1

About This Document

This Curriculum Planning & Assessment Resource is intended to be a collection of sample activities, assessments, and resources that teachers may wish to use as they develop their unit plans. This document is not intended to be a sequential list of activities. Rather, the intent is that teachers choose from this resource what is appropriate for their context, and sequence it in their planning.

The sample activities, assessments and resources included in this document have undergone an initial review to determine appropriateness and alignment to the curriculum. However, it is expected that teachers use their professional judgment in selecting activities, assessments and resources that are appropriate for their context.

While every attempt has been made to provide credit and receive permissions, some errors or omissions may have occurred. Please contact info@arpdc.ab.ca to report any error or omissions.

Table of Contents

Important Links

New Learn Alberta Progressions
- Competency Progressions
- Numeracy Progressions
- Literacy Progressions

Recorded Video:
- How to Read these Curriculum Planning & Assessment Resources

Planners and Concept Maps
- K-3 Math Planners
- 4-6 Math Planners (under development)
- Assessment Planners (under development)
- K-3 Math Action Verbs and 4-6 Math Verb Resources

Curriculum Progressions
- Skills and Procedures Progression K-3 (under development)
- Concept Progressions (under development)

Interactive Numbered Outcomes Document with Skills

Acknowledgements

Thank you to all the teachers, numeracy specialists, and technical expertise from Alberta school divisions and ARPDC who collaborated to develop, review, and revise these planning and assessment documents to support curriculum implementation.

Grade 3 - Algebra 1

Organizing Idea

Algebra: Equations express relationships between quantities.

Guiding Question

How can equality facilitate agility with number?

Outcome

3A1 Students illustrate equality with equations.

Summative Assessment(s) - Transfer *(In Progress)*

Summative assessments can include the following.

- *Understanding/making sense of a novel context from the real world using one or more concepts (eg. "How are place value and money related?).*
- *Understanding/making sense of a novel context using one or more understandings (eg.Students use money to model the conversion of base 10 values and relate them to base 10 block').*
- *Being able to describe* why *(linking concepts) something is true, a result, or what might be an extension using learned concepts and understandings.*
- *Apply learning (create products; undertake projects; taking action such as creating a campaign) in a novel context or taking action using the understanding(s).*
- *Construct arguments by taking a position and verifying/proving it with known understandings.*

Summative Assessment(s)

[*understanding surface vs deep vs transfer*]

3A Summative (English) **3A summative** (français)

Click to jump!

KUSP 3A1.1	KUSP 3A1.2

Literature Connections

KUSP 3A1.1

Prerequisite Knowledge / Vocabulary

Value: how much something is worth; **Operation:** addition, subtraction, multiplication, and division are all operations; **Balance:** a scale or number scale that is equal on both sides; **Equal sign:** a symbol that shows that the amounts on both sides of a number sentence are the same/equal (=); **Equality:** the state of having the same amount or value

Student Language | Essential vocabulary & concepts

- **Equation:** a statement showing that two mathematical expressions are equal
- **Expression:** a statement that does not contain equality

I Know Statements | Metacognition

- I know an equation shows equality between the left and right sides.

Pre-Assessments

Nelson Pre-Assessments 2: Finding Each Students Pathway

- Equality and Inequality - p. 28
- Balance It - p. 29
- Missing Numbers - p.30

Nelson Pre-Assessments 3: Finding Each Students Pathway

- Missing Numbers - p. 25

Nelson Leaps and Bounds pages will be referenced in the Assessments to follow up for emerging learners.

I Can Statements | Skills

- I can write equations with two expressions (that are the same amount on both sides).

Learning Recovery

- Balance sides of an equation using different strategies.

Enhancement

- Correct an imbalance in an equation to make both sides of the equal sign represent the same value.

Learning Outcome	3A1.1 Students illustrate equality with equations.				
Knowledge	**Understanding**	**Skills & Procedures**	**Achievement Indicators**	**Illustrative Examples**	**Assessments (Explainer)**
An equation uses the equal sign to indicate equality between two expressions The left and right sides of an equation are interchangeable.	Two expressions are equal if they represent the same number.	Write equations that represent equality between a number and an expression or between two different expressions of the same number.	**Write** equations utilizing the equal sign.	Indicate equal or not equal for equations with a number and an expression. Write the equations that are not equal so they represent equality. A. 6 ⚪ 3+3 B. 25 - 10 ⚪ 35 C. 100 ⚪ 40+60 Indicate true or false for equations with two expressions. Are they equal? A. 2+5 ⚪ 3+4 B. 7 - 2 ⚪ 7 x 2 C. 81÷ 9 ⚪ 1 x 9 Write as many equations as you can that are equivalent to 12 on both sides of the equation similar to the examples below. 8 + 4 = 10 + 2 or 10 + 2 = 8 + 4 3 + 3 + 3 +3 = 4 x 3 or 3 x 4 = 3 + 3 + 3 + 3 1 x 12 = 2 x 6 or 6 x 2 = 12 x 1 Online Number Balance https://nrich.maths.org/4725	3A1.1 Left and Right - Are You the Same? - **deep**

Resources

Mathology

ARPDC Math Little Books for Alberta Curriculum
Mathology Free Resources on New Learn Alberta

Mathology Little Books
Mathology Little Book: A Week of Challenges

Mathology Activities
Mathology Grade 3: Patterning Unit 2, Variables and Equations: Activities 8, 9, 11, 12

Link to Other Grades
Mathology Grade 2: Patterning Cluster 3, Equality and Inequality: Activity 19 (National)

Math Up

AB_Algebra

- Lesson 1: Using an Equation to Describe a Balance
- Lesson 2: Solving Addition Equations
- Lesson 3: Solving Subtraction Equations

Number Talks

- Select: Activities - Number Talks - Grade 3 - Algebra
- Number Talks 44, 60, 63, and 75 should appear

Existing Textbooks

Math Makes Sense 4 - Unit 1 - p. 18-27

Math Focus 4 - Chapter 1 - p. 18-23

NCETM (teacher guides and resources)

Progression Maps for Reasoning Skills: scroll down to Algebra Reasoning
Lesson videos introducing algebra to primary students
Algebra - Key Stage 1 | Y2 - look at 'missing numbers'

Websites/Other

Balance Scales

Didax - https://www.didax.com/apps/math-balance/

Didax - Alge tiles

Toy Theater - Dominos

NRICH - Cuisenaire Rods

Brainingcamp - Maniplulatives

Mathigon - Manipulatives

Gizmos

New Learn Alberta: (Teacher Login Required)
Using Algebraic Equations
Modeling One-Step Equations

For access to additional resources, request a GIZMOs account: alberta@explorelearning.com

Indigenous Lesson Plans and Resources

• Explore balance and model equations using examples such as:
  • Dogs of equal weight; or saddlebags on horses with the same weight on each side
  • Balance in nature (symbol of the circle divided into quarters)
  • Packing a canoe to ensure the weight is distributed
  • Wipison – baby swing • Moss bags
Source: Infusing Indigenous Knowledge - Main website Grade 3 Math

Problem Solving

Making Algebra Rich - University of Cambridge (nrich)

Super Shapes - University of Cambridge (nrich)

Click to jump!

KUSP 3A1.1	KUSP 3A1.2

Literature Connections

KUSP 3A1.2

Prerequisite Knowledge / Vocabulary

Students should be familiar with the difference between an **expression** and an **equation**; what the term **balanced** means concretely, pictorially and symbolically.

Student Language | Essential vocabulary & concepts

- **Equation:** a number sentence that shows that two expressions are equal. An equation has an equal sign; for example, 13 + 5 = 18
- **Value:** how much something is worth
- **Operation:** addition, subtraction, multiplication, and division are all operations
- **Balance:** a scale or number scale that is equal on both sides
- **Symbol**: used to show a value that is not known in an equation.

I Know Statements | Metacognition

- I know a symbol can be used to show a value that is not known in an equation.

Pre-Assessments

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I Can Statements | Skills

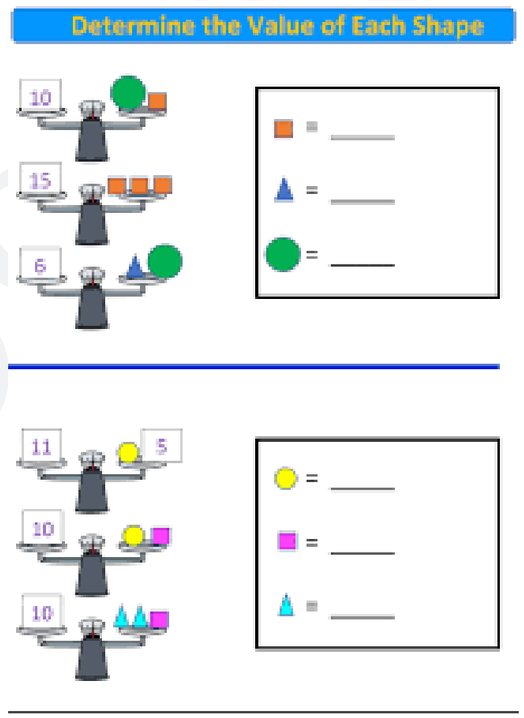
- I can use a number balance to solve an equation.
- I can solve for an unknown value in a given equation.
- I can solve problems using equations.

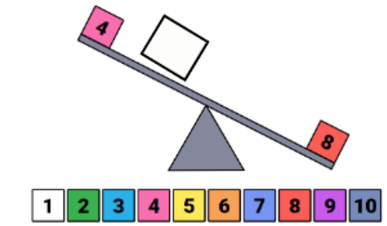
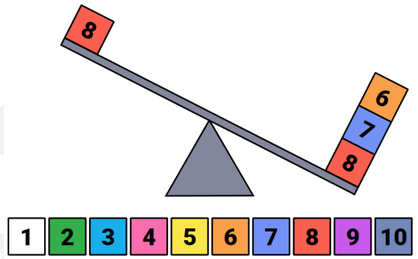
Learning Recovery

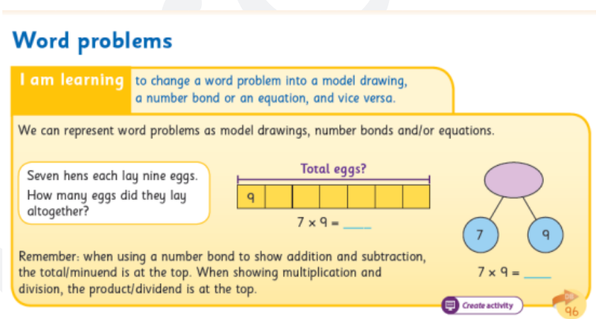
- Compose and decompose numbers.
- Represent numbers using concrete materials.
- Model addition and subtraction on a number line.

Enhancement

-

Learning Outcome	3A1.2 Students illustrate equality with equations.				
Knowledge	**Understanding**	**Skills & Procedures**	**Achievement Indicators**	**Illustrative Examples**	**Assessments**
Equations can be modelled using a balance. A symbol may represent an unknown value in an equation.	Equations can include unknown values.	**Model** equations that include an unknown value, including with a balance.	**Model** the same value on either side of an equal sign using manipulatives (e.g., counters, unit cubes, etc.) on a pan balance.	**Algebra: Solving equations with one unknown - addition** (Discovery Education UK video) **Manipulative using cups and counters on a balance scale**  **From Mathstory.com** - solving for symbols on a balance scale **Toy Theatre - Balance Scale**	**3A1.2 Both Sides Equal - surface** **3A1.2 Solve It! - surface** **Solving Equations -** Choosing Learning Activities (Samples at the bottom of the page) - LearnAlberta Planning Guide Grade 4

		Determine an unknown value on the left or right side of an equation, limited to equations with one operation.	Solve, using manipulatives, a given equation with one unknown. **Represent** a variety of different equations resulting in the same given number. **Use** various strategies to balance an equation.	 What needs to be added in order to balance the scale?  [Toy Theatre - Balance Scale] [NCTM - balance scale with shapes] [NCTM - Balance with Numbers]  5 + □ = 8 Write equations with one unknown that are equivalent to 12 on both sides similar to the examples below. a. 10 + □ = 8 + 4 b. 3 x 4 = x + 6 c. 1 x 12 = □ x 1 d. 14 - 2 = x + 2	[3A1.2 A Symbol is Needed!] - **surface**

				Find the unknown value: a. $14 + 7 = \triangle$ b. $20 - \bigcirc = 15$ c. $\square + 2 = 18$ d. $16 - 4 = \hexagon$ Manitoba Ministry of Education. Grade 3 Mathematics: Support Document for Teachers. p.20	
		Solve problems using equations, limited to equations with one operation.	Solve one operation problems using equations.		3A1.2 Let's Solve Them! - **deep**

Resources

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Mathology Little Books
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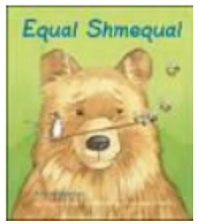
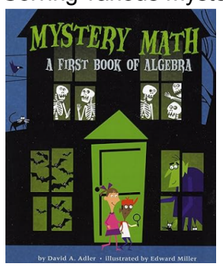
Click to jump!

KUSP 3A1.1	KUSP 3A1.2

Literature Connections

Literature Connections

Title & Author	Format (Picture Book, Novel, Non-fiction, other)	Publisher & ISBN	Notes
Equal Shmequal by ***Virginia Kroll*** What does it mean to be equal? Mouse and her friends want to play tug-of-war but they can't figure out how to make teams that are equal. Nothing works until Mouse starts thinking mathematically. Wonderful illustrations capture Mouse and her animal friends from whiskers to tails.	Picture Book	Charlesbridge; Illustrated edition (July 1 2005) 10- 1570918929 13-978-1570918926	 3A1.1 Lesson Plan developed by BC Teachers
Mystery Math: A First Book of Algebra by ***David A Adler*** Boo! There is a mystery behind every door of the creepy haunted house. Luckily, algebra will help you solve each problem. By using simple addition, subtraction, multiplication, and division, you'll discover that solving math mysteries isn't scary at all -- it's fun!	Picture Book	Holiday House; Reprint edition (June 1, 2012) 10-0823425487 13-978-0823425488	Solving various mysteries with algebra  3A1.2 Read Aloud