

# Summer New Curriculum Institute

## Math Grade 4-6

Day 3



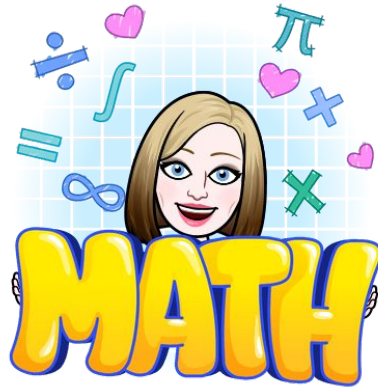
Alberta **Regional** Professional  
Development Consortia

*Adult learning for students' sake*

# Let Us Introduce Ourselves



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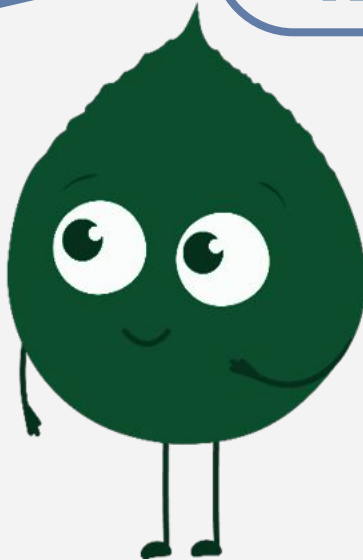
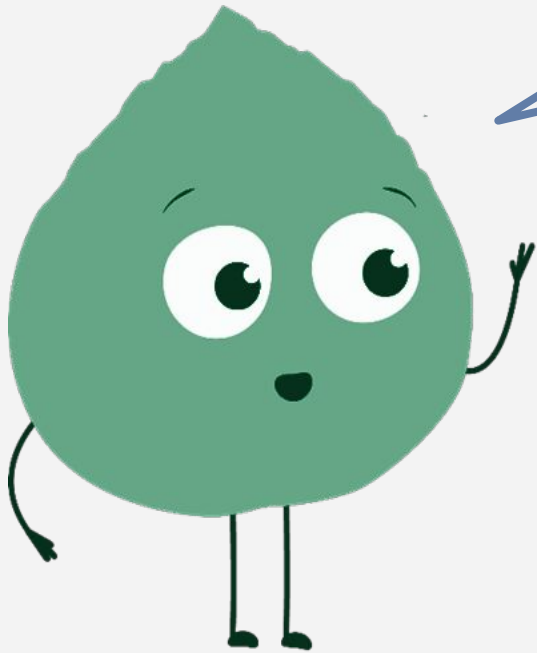


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# Unpacking Student Actions in the 4-6 Math Curriculum



# Introduction

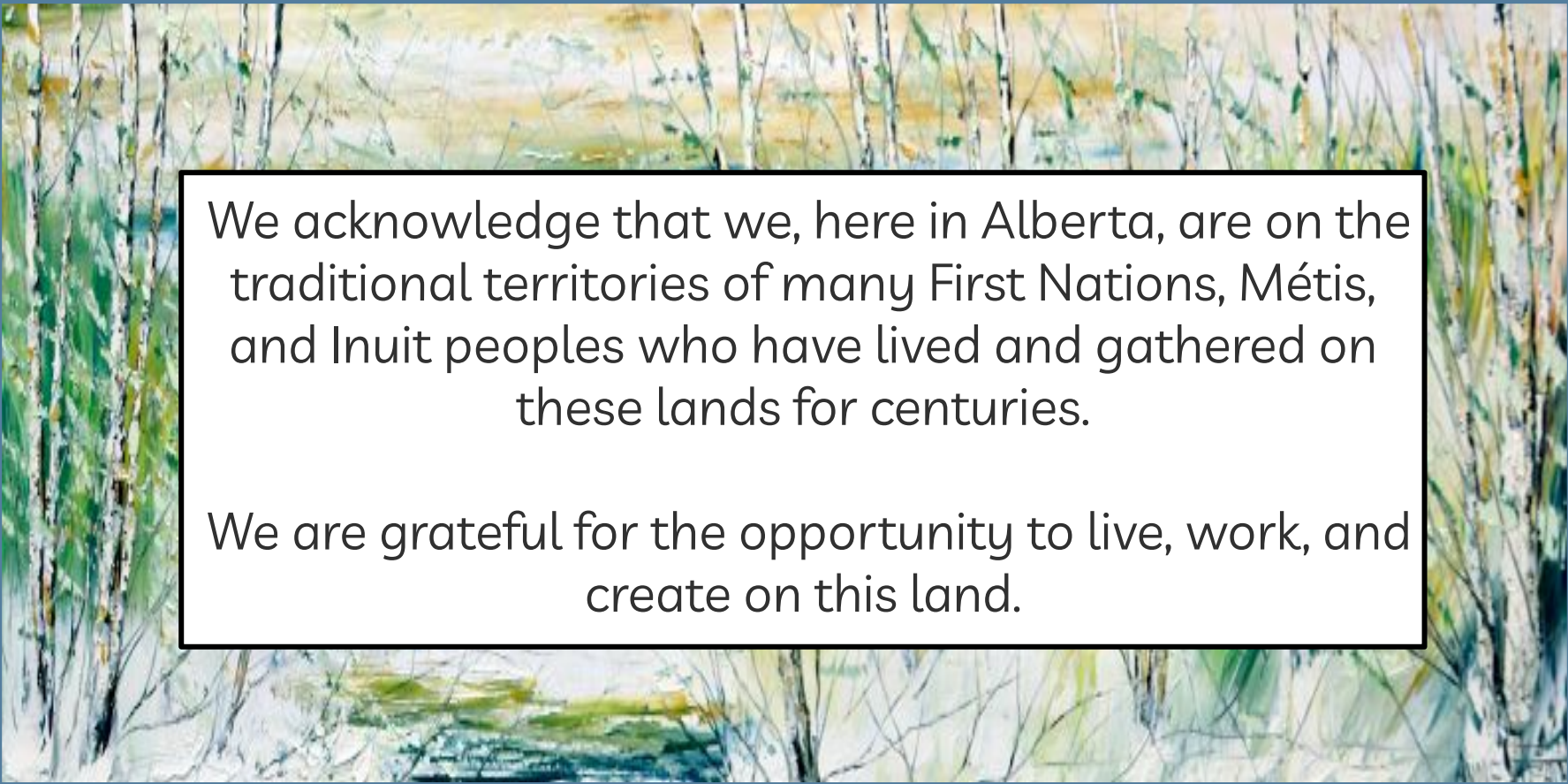


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Alberta **Regional** Consortium









We acknowledge that we, here in Alberta, are on the traditional territories of many First Nations, Métis, and Inuit peoples who have lived and gathered on these lands for centuries.

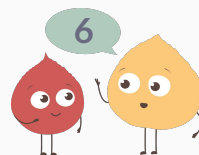
We are grateful for the opportunity to live, work, and create on this land.

Land Acknowledgement

**Evaluate** the value for each picture given the sum of each row and column.

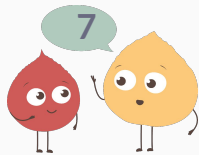
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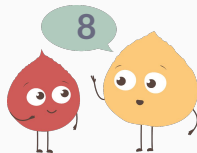
Today's  
Learning  
Intention

We are learning about being intentional when teaching the verbs in the curriculum, so that students can put into action their knowledge and understanding of the concepts.



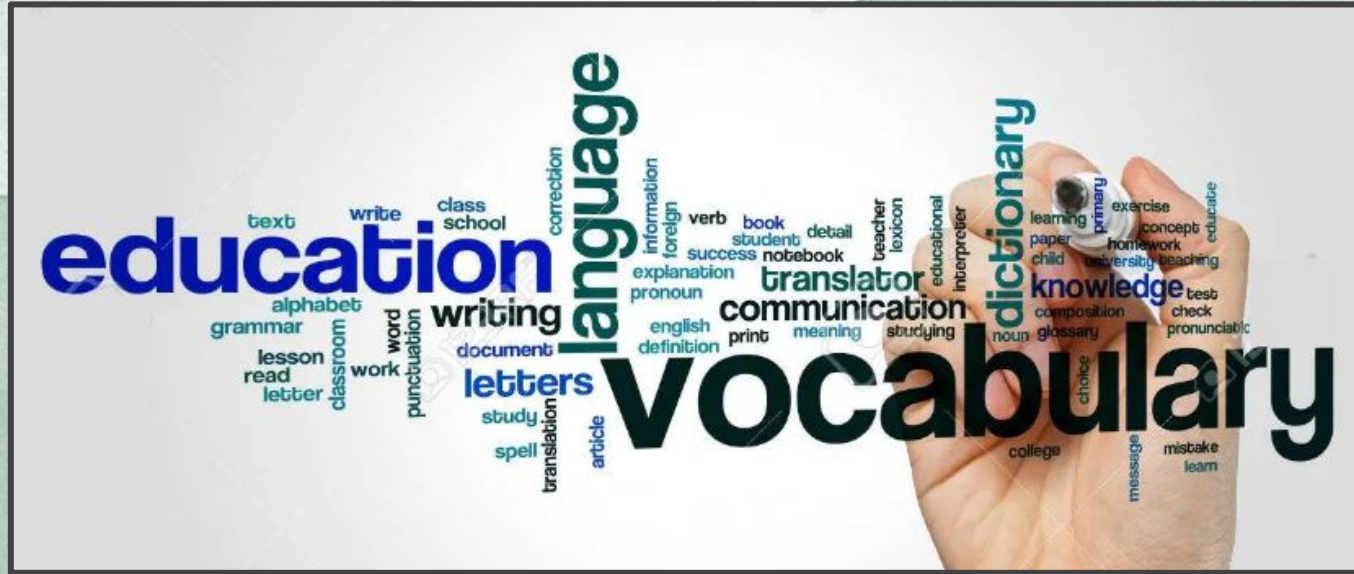
# Success Criteria

- ❑ I can explain why understanding vocabulary is important to interpreting curriculum.
- ❑ I can identify and describe the students action verbs in context.
- ❑ I can describe vocabulary building strategies to support student learning of the 'action verbs'.
  - Hands-on intentional learning experiences
  - Building Anchor Charts
  - Mind Map Visual Wall (math focus or cross-curricular)
  - Interactive Journaling
  - Assessing using Performance Tasks

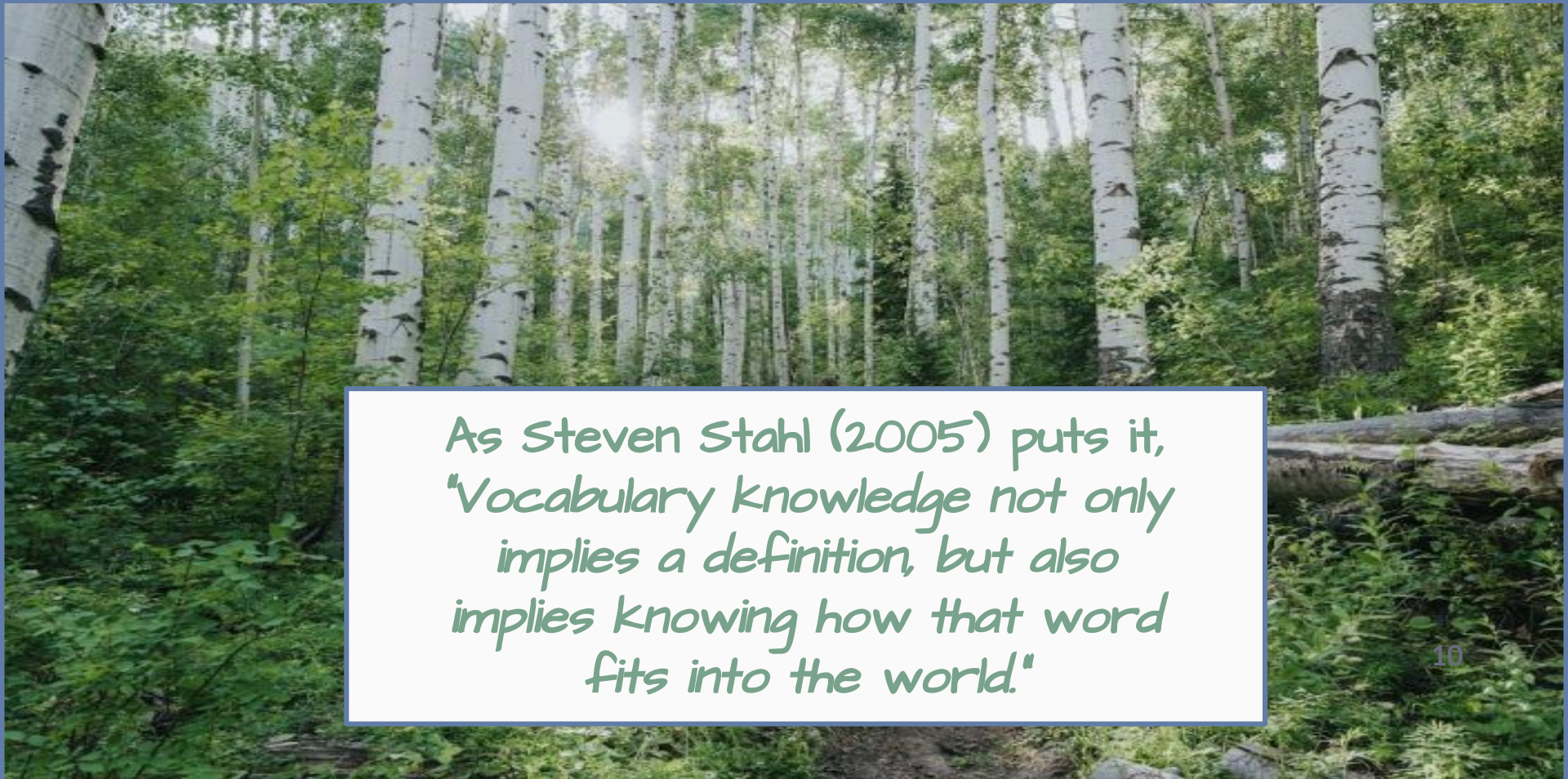


# The Importance of Vocabulary

Vocabulary



# The Power Of Vocabulary Building



*As Steven Stahl (2005) puts it,  
"Vocabulary knowledge not only  
implies a definition, but also  
implies knowing how that word  
fits into the world."*




Algebra: Equations express relationships between quantities.




 GUIDING QUESTION

How can equality create opportunities to reimagine number?

 LEARNING OUTCOME

Students represent and apply equality in multiple ways.

 KNOWLEDGE	 UNDERSTANDING	 SKILLS & PROCEDURES
<p>An expression can include multiple operations.</p> <p>The conventional order of operations provides a set of rules for evaluating expressions, including the following:</p> <ul style="list-style-type: none"> <li>• Multiplication and division are performed before addition and subtraction.</li> <li>• Multiplication and division are performed in order from left to right.</li> <li>• Addition and subtraction are performed in order from left to right.</li> </ul>	<p>There are infinitely many expressions that represent the same number.</p> <p>The order in which operations are performed can affect the value of an expression.</p>	<p>Evaluate expressions according to the order of operations.</p> <p>Create various expressions of the same number using one or more operations.</p>




 KNOWLEDGE	 UNDERSTANDING	 SKILLS & PROCEDURES
<p>Equations can be solved through a process of adding, subtracting, multiplying, or dividing the same number on both sides of the equation (preservation of equality).</p>	<p>An equation is solved by determining an unknown value that makes the left and right sides of the equation equal.</p>	<p>Write equations involving one operation to represent a situation.</p> <p>Investigate preservation of equality using a balance model.</p> <p>Investigate preservation of equality using an equation without an unknown value.</p> <p>Apply preservation of equality to determine the unknown value in an equation, limited to equations</p>




 GUIDING QUESTION

How can expressions enhance communication of number?

 LEARNING OUTCOME

Students interpret numerical and algebraic expressions.

 KNOWLEDGE	 UNDERSTANDING	 SKILLS & PROCEDURES
<p>Numerical expressions with multiple operations may include parentheses to group numbers and operations.</p> <p>The conventional order of operations includes performing operations in parentheses before other operations.</p>	<p>Numerical expressions represent a quantity of known value.</p> <p>Parentheses change the order of operations in a numerical expression.</p>	<p>Evaluate numerical expressions involving addition or subtraction in parentheses according to the order of operations.</p>




 KNOWLEDGE	 UNDERSTANDING	 SKILLS & PROCEDURES
<p>Expressions that include variables are called algebraic expressions.</p> <p>A variable can be interpreted as a specific known value and is represented symbolically with a letter.</p> <p>Products with variables are expressed without the multiplication sign.</p> <p>Quotients with variables are</p>	<p>Algebraic expressions use variables to represent quantities of unknown value.</p> <p>Algebraic expressions may be composed of one algebraic term or the sum of algebraic and constant terms.</p>	<p>Relate repeated addition of a variable to the product of a number and a variable.</p> <p>Express the product of a number and a variable using a coefficient.</p> <p>Express the quotient of a variable and a number as a fraction.</p> <p>Recognize a product with a variable, a quotient with a variable, or a number as a single</p>




 GUIDING QUESTION

How can expressions support a generalized interpretation of number?

 LEARNING OUTCOME

Students analyze expressions and solve algebraic equations.

 KNOWLEDGE	 UNDERSTANDING	 SKILLS & PROCEDURES
<p>Numerical expressions can include powers.</p> <p>The conventional order of operations includes performing operations in parentheses, followed by evaluating powers before other operations.</p>	<p>The conventional order of operations can be applied to simplify or evaluate expressions.</p>	<p>Evaluate numerical expressions involving operations in parentheses and powers according to the order of operations.</p>

 KNOWLEDGE	 UNDERSTANDING	 SKILLS & PROCEDURES
<p>Algebraic terms with exactly the same variable are like terms.</p> <p>Constant terms are like terms.</p> <p>Like terms can be combined through addition or subtraction.</p> <p>The terms of an algebraic expression can be rearranged according to algebraic properties.</p> <p>Algebraic properties include</p>	<p>Algebraic properties ensure equivalence of algebraic expressions.</p>	<p>Investigate like terms by modelling an algebraic expression.</p> <p>Simplify algebraic expressions by combining like terms.</p> <p>Express the terms of an algebraic expression in a different order in accordance with algebraic properties.</p>

## Grade Three

### New Vocabulary

Equality  
Equations  
Expressions  
Balance  
Unknown value

## Grade Four

### New Vocabulary

Numeric expression  
Operations  
Order of operations  
Preservation of equality  
Unknown value

## Grade Five

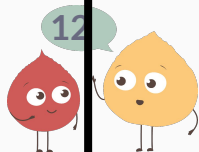
### New Vocabulary

Numerical expressions  
Parentheses  
Order of operations  
Letter variable  
Constant coefficients  
Algebraic expressions  
Variables  
Constant term  
Inverse operations

## Grade Six

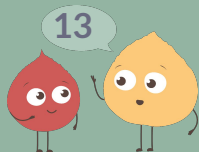
### New Vocabulary

Numerical expressions  
Powers  
Like terms  
Algebraic properties  
Algebraic expressions  
Equivalent expressions  
Simplified form



add	analyze	apply	assess
calculate	categorize	compare	create
decompose	determine	demonstrate	employ
explain	evaluate	express	formulate
generalize	interpret	investigate	justify
model	predict	recall	solve

A few verbs pulled from the Alberta Curriculum



# K-3 Math Curriculum - Investigate

Grade Level	Learning Outcomes	Skills & Procedures
<b>Kindergarten</b>	Children <b>investigate</b> quantity to 10. Children <b>investigate</b> shape.	<b>Investigate</b> three-dimensional shapes by rolling, stacking, or sliding.
<b>Grade 1</b>	Students <b>investigate</b> and represent data.	<b>Investigate</b> symmetry of two-dimensional shapes by folding and matching. <b>Investigate</b> cycles found in nature that inform First Nations, Métis, or Inuit practices. <b>Investigate</b> equal and unequal quantities, including using a balance model. <b>Investigate</b> addition and subtraction strategies.
<b>Grade 2</b>	Students <b>investigate</b> addition and subtraction within 100.	<b>Investigate</b> strategies for addition and subtraction of two-digit numbers. <b>Investigate</b> translation, rotation, and reflection of two- and three-dimensional shapes. <b>Investigate</b> patterns in a hundreds chart. <b>Investigate</b> First Nations, Metis, or Inuit use of the land in estimations of length.

**INVESTIGATE**  
Alberta K-3 Math Verb Toolkit



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Grade Level	Learning Outcomes	Skills & Procedures
<b>Grade 3</b>	<b>Investigate</b> multiplication by 0. <b>Investigate</b> multiplication and division strategies. <b>Investigate</b> the relationships between the sides of a polygon, including perpendicular, parallel, and equal, using referents for $90^\circ$ or by measuring. <b>Investigate</b> the relationships between vertices of a polygon, including equal or right angles, using direct comparison or referents for $90^\circ$ . <b>Investigate</b> relationships between seconds, minutes, and hours using an analog clock.	




# 4-6 Math Curriculum - Investigate

Grade Level	Learning Outcomes	Skills & Procedures
<b>Grade 4</b>		<p>Investigate patterns in multiplication and division of natural numbers by 10, 100, and 1000.</p> <p>Investigate strategies for estimation of products and quotients.</p> <p>Investigate percentage in familiar situations.</p> <p>Investigate preservation of equality using a balance model.</p> <p>Investigate preservation of equality using an equation without an unknown value.</p> <p>Investigate increasing sequences, including the Fibonacci sequence, in multiple representations.</p>
<b>Grade 5</b>	Students investigate symmetry as a geometric property.	<p>Investigate divisibility by natural numbers to 10, including 0.</p> <p>Investigate the composition and decomposition of a quantity within 1 using unit fractions.</p> <p>Investigate order of operations when performing inverse operations on both sides of an equation.</p> <p>Investigate symmetry in familiar 2-D and 3-D shapes using hands-on materials or digital applications.</p>

Grade Level	Learning Outcomes	Skills & Procedures
<b>Grade 6</b>	<p>Students investigate magnitude with positive and negative numbers.</p> <p>Students investigate functions to enhance understanding of change.</p> <p>Students investigate relative frequency using experimental data.</p>	<p>Investigate addition of an integer and its additive inverse.</p> <p>Investigate like terms by modelling an algebraic expression.</p> <p>Investigate tessellations found in objects, art, or architecture.</p> <p>Investigate strategies for determining a value of the independent variable of a function given the corresponding value of the dependent variable.</p> <p>Investigate strategies for determining a value of the independent variable of a function given the corresponding value of the dependent variable.</p>


# Cross-Curricular examples of 'INVESTIGATE'

English Language Arts and Literature > Grade 1

 Learning Outcomes

Students **investigate** meaning communicated in texts.

Physical Education and Wellness > Grade 5

 Learning Outcomes


Students **investigate** maturation and identify changes during adolescence.

Fine Arts > Dance > Grade 5

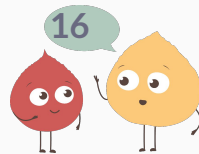
 Learning Outcomes

Students **investigate** how change influenced dance throughout history.

Science > Grade 5

 Learning Outcomes

Students **investigate** and interpret astronomical phenomena.





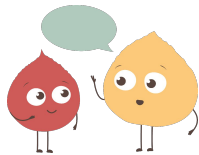
Whatcha thinkin'?

Grade 5 Learning Outcome:

Students investigate  
symmetry as a  
geometric property.

What does it mean for  
grade 5 students to  
'investigate'?

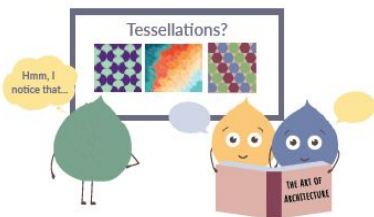
How would you define  
'investigate'?



# INVESTIGATE

4 - 6

To carry out a formal inquiry or a sustained open-ended exploration in order to uncover facts and draw new conclusions about data and information.



*Investigating* requires students to use mathematical knowledge and reasoning to complete a series of tasks connected to the content. *Investigating* is a process in which students have multiple opportunities over time to explore different approaches or strategies. Through *investigation*, students will be able to draw new conclusions and gain a more thorough understanding of a math concept or idea.

The table below shows where *investigate* is included as student action within Alberta's 4-6 Math curriculum.

Grade Level	Learning Outcomes	Skills & Procedures
Grade 4		<p>Investigate patterns in multiplication and division of natural numbers by 10, 100, and 1000.</p> <p>Investigate strategies for estimation of products and quotients.</p> <p>Investigate percentage in familiar situations.</p> <p>Investigate preservation of equality using a balance model.</p> <p>Investigate preservation of equality using an equation without an unknown value.</p> <p>Investigate increasing sequences, including the Fibonacci sequence, in multiple representations.</p>
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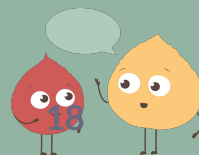


# INVESTIGATE

4 - 6

To carry out a formal inquiry or a sustained open-ended exploration in order to uncover facts and draw new conclusions about data and information.

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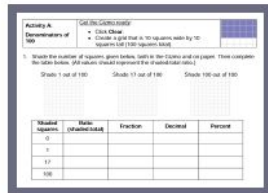


To best support learners, student action verbs should be explicitly taught, modeled and practiced through multiple experiences. The illustrative examples can provide clarification about how student understanding might be developed. It is important to reference the curriculum to view the entire context of the Learning Outcome and related KUSPS.

### Illustrative Examples

Skills and Procedures (4N6): *Investigate* percentage in familiar situations.

Students can investigate percentages through Gizmos (Part-to-Part and Part-to-Whole Ratios). Through a series of interactive simulations, students will develop an understanding of percent, fractions and decimals in relation to a number line and express them as equivalents. This learning experience includes student access to the simulation, a teacher guide, a student exploration page with an answer key and a vocabulary page.



Learning Outcome 6N1.1: Students *investigate* magnitude with positive and negative numbers.

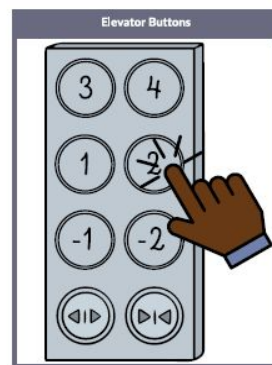
**MATH TALK** (A learning experience where students focus on vocabulary, make connections and use reasoning to justify a response.)

Each image on the following page shows examples of real life contexts where positive and negative integers are used. Have students investigate and discuss one image one at a time. Ask students open-ended questions, such as:

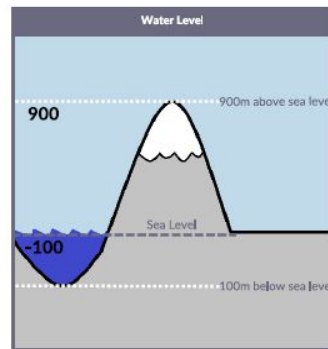
- What do you notice?
- What do you wonder?
- What questions could you ask about the information that you see?

To best support learners, student action verbs should be explicitly taught, modeled and practiced through multiple experiences. The illustrative examples can provide clarification about how student understanding might be developed. It is important to reference the curriculum to view the entire context of the Learning Outcome and related KUSPS.

Golf Tournament		
Player	Total	Strokes
Tiger	-2	70
Dustin	-2	70
Rory	+3	75
Scottie	Even	72



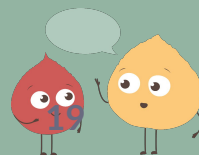
Bank Statement				
Date	Description	Money Out	Money In	Balance
March 17	ATM (withdrawal)	\$10.00		\$40.00
March 25	eDeposit (cheque #0001)		\$50.00	\$90.00
April 5	Skip the Dishes (withdrawal)	\$40.00		\$50.00
April 10	Shoe Purchase (withdrawal)	\$100.00		-\$50.00
April 10	Hoodie Purchase (withdrawal)			-\$110.00



### References

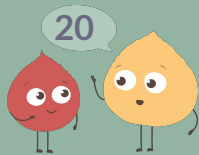
Gizmos. (2019). *Part-to-part and Part-to-whole Ratios*. Gizmos.

<https://curriculum.learnalberta.ca/resources/permalink/UTJOHZN72kmY-szXX4vINw>

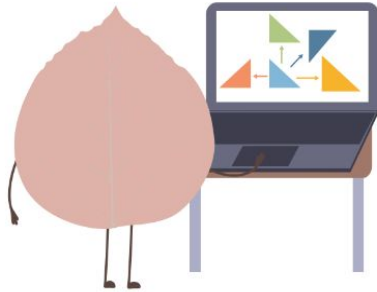




SO ... If we're going to plan, teach and assess our students...  
We need to gain CLARITY.

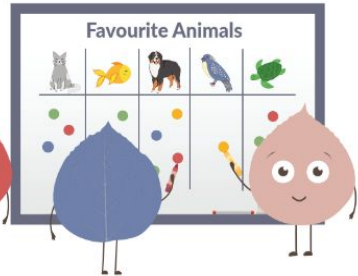
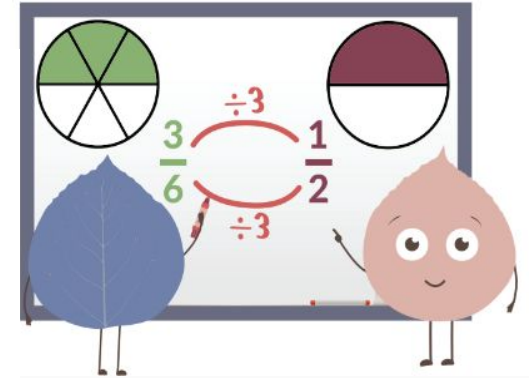


# Introducing a New Resource



86  
in the  
tenths place.  
Will it stay a 3 or  
move up to a 4?

If I round...

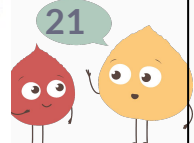


What is the Approximate Population of Alberta Cities?

City	Population
Airdrie	10 leaves
Cold Lake	2 leaves
Red Deer	10 leaves

1 leaf = 10,000 people.

One leaf =  
10,000 people.



# Resource Components



## Glossary for Student Action Verbs ~ Alberta's K-6 Math Curriculum

This interactive glossary and associated resources were developed to help provide clarification, context and support for teaching of the verbs in Alberta Education's K-6 Math Curriculum (2022).

Grades found as LO	Grades found within Ss & Ps	Verb	Definition *Indicates that there is a hyperlinked toolkit.
4, 5, 6	K, 1, 2, 3, 4, 5, 6	<a href="#">add</a>	To combine two or more addends (numbers/quantities) together to get a sum.
2, 3, 4, 5, 6	6	<a href="#">analyze*</a>	To consider in detail for the purpose of finding meaning or relationships, and to identify patterns, similarities, and differences.
3, 4, 6	2, 4, 6	<a href="#">apply*</a>	To use mathematical knowledge in various situations.
	4, 5, 6	<a href="#">assess</a>	To determine (or decide) something after consideration.
	2	<a href="#">approximate</a>	To come close to, or be similar to, something in quality, nature, or quantity.
5		<a href="#">calculate</a>	To determine the amount or number of something mathematically.
	5	<a href="#">categorize</a>	To assign to a category.
3, 4, 5		<a href="#">classify</a>	To arrange into groups based on one or more attributes or properties.
	1	<a href="#">collaborate</a>	To work together on an activity/task to produce, build, or create something.
	2, 3, 6	<a href="#">collect</a>	To gather data and/or information, etc., for use.
2, 4		<a href="#">communicate*</a>	To convey knowledge and understanding.
	K, 1, 2, 3, 4, 5, 6	<a href="#">compare</a>	To consider the qualities of two or more similarities or differences.
	K, 1, 2, 3, 6	<a href="#">compose</a>	To form, combine, or put together.

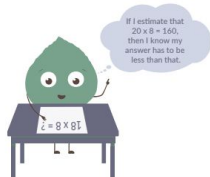
Student Action Verbs  
Alberta K-6 Math Curriculum



## ASSESS

4-6

To determine after thoughtful consideration.



Student Action Verbs  
Alberta 4-6 Math Curriculum

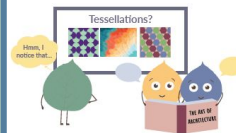


Alberta Regional Professional Development Consortia

## INVESTIGATE

4-6

To carry out a formal inquiry or a sustained open-ended exploration in order to uncover facts and draw new conclusions about data and information.



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The table below shows where investigate is included as student action within Alberta's 4-6 Math curriculum.

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Grade 4		Investigate patterns in natural numbers by 10, 100 Investigate strategies for quotients. Investigate percentage in investigate preservation of model. Investigate preservation of equation without an unknown. Investigate increasing seq Fibonacci sequence. In mu investigate divisibility by including 0.
Grade 5	Students investigate symmetry as a geometric property.	Investigate the composite quantity within 1 using investigate order of operations on both investigate symmetry in f using hands-on materials.

INVESTIGATE  
Alberta 4-6 Math Curriculum



To best support learners, student action verbs should be explicitly taught, modeled and practiced through multiple experiences. The illustrative examples can provide clarification about how student understanding might be developed. It is important to reference the curriculum to view the entire context of the Learning Outcome and related KUSPS.

### Illustrative Examples

Skills and Procedures (NA): Investigate percentage in familiar situations.

Students can investigate percentages through Gizmos (Part-to-Part and Part-to-Whole Ratios). Through a series of interactive simulations, students will develop an understanding of percent, fractions and decimals in relation to a number line and express them as equivalents. This learning experience includes student access to the simulation, a teacher guide, a student exploration page with an answer key and a vocabulary page.



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Each image on the following page shows examples of real life contexts where positive and negative integers are used. Have students investigate and discuss one image one at a time. Ask students open-ended questions, such as:

- What do you notice?
- What do you wonder?
- What questions could you ask about the information that you see?

INVESTIGATE  
Alberta 4-6 Math Curriculum



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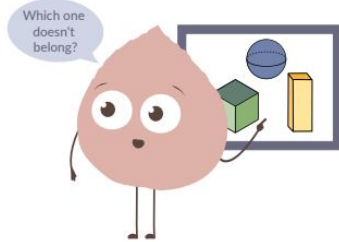
# CLARITY about Student Actions

## ANALYZE

K-6

[view K-3 toolkit](#) [view 4-6 toolkit](#)

To consider in detail for the purpose of finding meaning or relationships, and to identify patterns, similarities, and differences.



Student Action Verbs  
Alberta 4-6 Math Curriculum

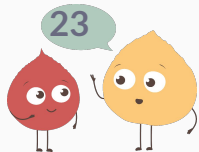


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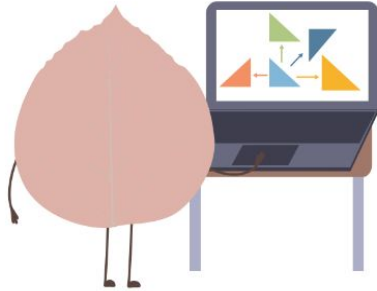
The Learning Outcome states what the learner must know, understand and do.

When teachers have clarity about the meaning of the verbs in the context of the curriculum, they are able to more effectively design learning and assessment opportunities.

Students analyze expressions and solve algebraic equations. (Gr. 6)

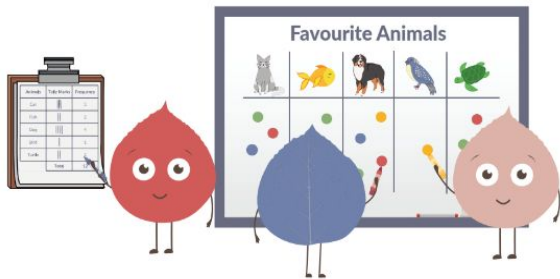
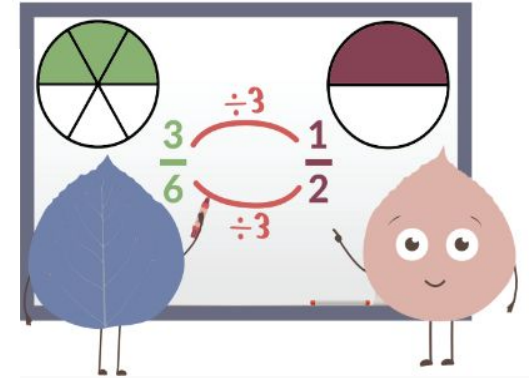


# A bit about... The Process



rounding place  
Will it stay a 3 or  
move up to a 4?

If I round...



What is the Approximate Population of Alberta Cities?

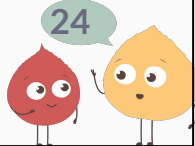
City	Population
Airdrie	10 leaves
Cold Lake	2 leaves
Red Deer	24 leaves

1 leaf = 10,000 people.

One leaf =  
10,000 people.







24

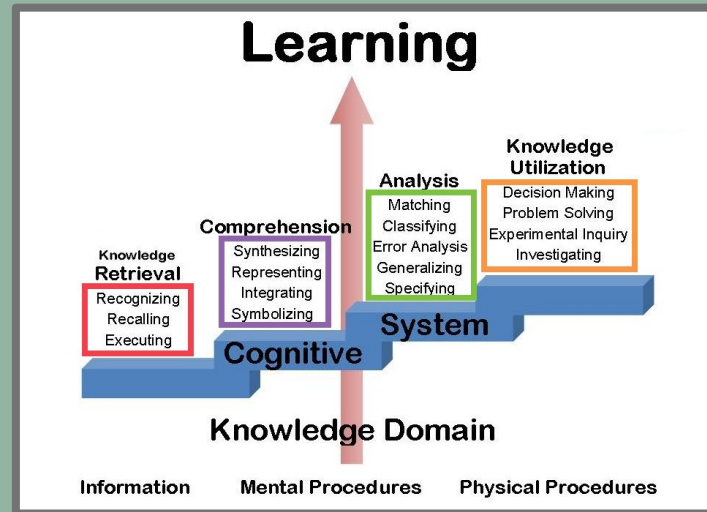


# Cognitive Levels of Verbs

Bloom's Taxonomy

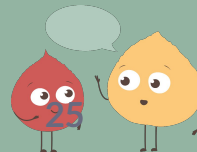
## DOK DEPTH OF KNOWLEDGE SNAPSHOT


LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4
Recall	Skills & Concepts	Strategic Thinking	Extended Thinking
			
<ul style="list-style-type: none"> <li>■ Basic recall of information, such as a fact, definition, term, or procedure</li> <li>■ Requires students to follow a formula or recipe</li> </ul> <p><b>Keywords:</b></p> <ul style="list-style-type: none"> <li>■ Identify</li> <li>■ Recall</li> </ul>	<ul style="list-style-type: none"> <li>■ Complete multiple steps in order to find a solution</li> <li>■ Requires students to make informed decisions about problem-solving and procedures</li> </ul> <p><b>Keywords:</b></p> <ul style="list-style-type: none"> <li>■ Classify</li> <li>■ Organize</li> <li>■ Estimate</li> <li>■ Collect and display data</li> </ul>	<ul style="list-style-type: none"> <li>■ Reasoning, planning, using evidence, or a higher level of thinking</li> <li>■ Requires students to draw conclusions from observations</li> </ul> <p><b>Keywords:</b></p> <ul style="list-style-type: none"> <li>■ Justify</li> <li>■ Explain</li> <li>■ Draw conclusions</li> </ul>	<ul style="list-style-type: none"> <li>■ Complex reasoning, developing, or thinking over a period of time</li> <li>■ Requires students to design and conduct an experiment</li> </ul> <p><b>Keywords:</b></p> <ul style="list-style-type: none"> <li>■ Relate</li> <li>■ Make connections</li> </ul>



Marzano and Kendall

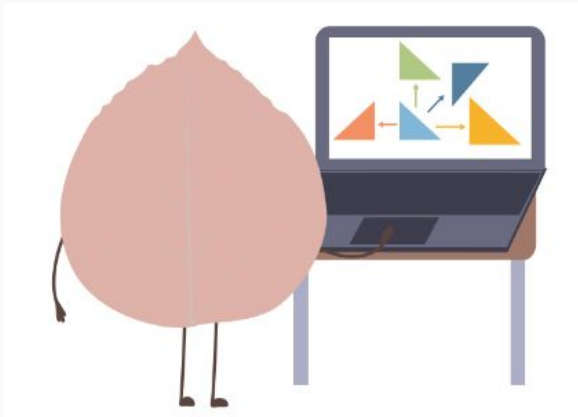
Webb's Depth of Knowledge



Grade	Learner Outcome or Skill and Procedure	Level of Cognition
4	Students <u>investigate</u> symmetry as a geometric property.	
4	Students <u>represent</u> and <u>apply</u> equality in multiple ways.	
6	Students <u>explain</u> location and movement in relation to position in the Cartesian plane.	
5	Students <u>recognize</u> symmetry in nature.	

Curriculum Examples with Levels of Cognition





**17.386**  
The 3 is in the tenths place. Will it stay a 3 or move up to a 4?

If I round...

$\frac{3}{6} \div 3 = \frac{1}{2}$

**Favourite Animals**


What is the Approximate Population of Alberta Cities?

City	Population
Airdrie	
Cold Lake	
Red Deer	

One leaf = 10,000 people.

27

# Character Inspiration



# Character Inspiration

I predict that the plant will...

**Plant Growth**

Date

Height

Date	Height
1	Low
2	Medium-Low
3	Medium
4	Medium-High
5	High



What is the Approximate Population of Alberta Cities?

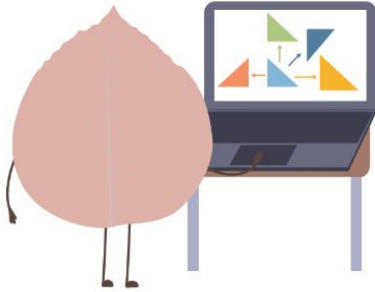
City	Population
Airdrie	10 leaves
Cold Lake	2 leaves
Red Deer	10 leaves

One leaf = 10,000 people.

**Favourite Animals**

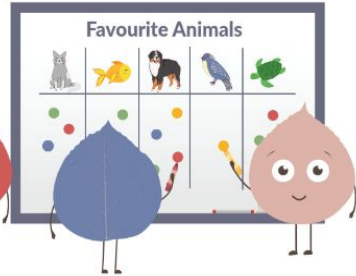
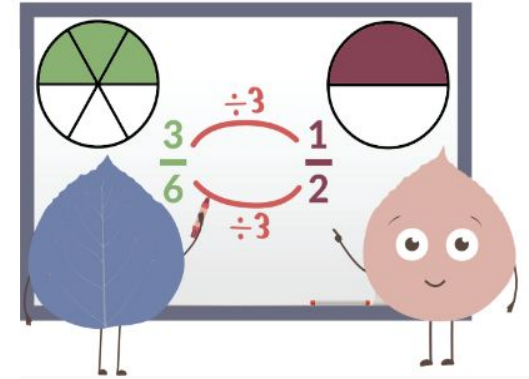
•	•	•	•	•
•	•	•	•	•
•	•	•	•	•

# A Closer look at the Resource



86  
in the  
tens place.  
Will it stay a 3 or  
move up to a 4?

If I round...

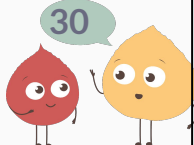


What is the Approximate Population of Alberta Cities?

City	Population
Airdrie	
Cold Lake	
Red Deer	

=

One leaf =  
10,000 people.





## Glossary for Student Action Verbs ~ Alberta's K-6 Math Curriculum

This interactive glossary and [associated resources](#) were developed to help provide clarification, context and support for teaching of the verbs in Alberta Education's K-6 Math Curriculum (2022).

Grades found as LO	Grades found within Ss & Ps	Verb	Definition <small>*Indicates that there is a hyperlinked toolkit.</small>
4, 5, 6	K, 1, 2, 3, 4, 5, 6	<a href="#">add</a>	To combine two or more addends (numbers/quantities) together to get a sum.
2, 3, 4, 5, 6	6	<a href="#">analyze*</a>	To consider in detail for the purpose of finding meaning or relationships, and to identify patterns, similarities, and differences.
3, 4, 6	2, 4, 6	<a href="#">apply*</a>	To use mathematical knowledge in various situations.
	4, 5, 6	<a href="#">assess</a>	To determine (or decide) something after consideration.
	2	<a href="#">approximate</a>	To come close to, or be similar to, something in quality, nature, or quantity.
5		<a href="#">calculate</a>	To determine the amount or number of something mathematically.
	5	<a href="#">categorize</a>	To assign to a category.
	3, 4, 5	<a href="#">classify</a>	To arrange into groups based on one or more attributes or properties.
	1	<a href="#">collaborate</a>	To work together on an activity/task to produce, build, or create something.
	2, 3, 6	<a href="#">collect</a>	To gather data and/or information, etc., from people or sources.
2, 4		<a href="#">communicate*</a>	To convey knowledge and understanding to another.
	K, 1, 2, 3, 4, 5, 6	<a href="#">compare</a>	To consider the qualities of two or more things or sets, in order to discover similarities or differences.
	K, 1, 2, 3, 6	<a href="#">compose</a>	To form, combine, or put together.

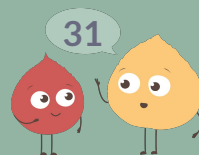
Student Action Verbs  
Alberta K-6 Math Curriculum



Alberta Regional Professional  
Development Consortia

1

# Defining the Verbs Within the Alberta Context

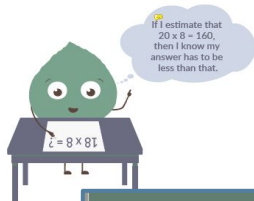


# Definition Cards

## ASSESS

4-6

To determine after thoughtful consideration.



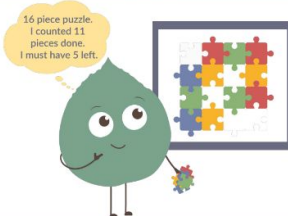
Student Action Verbs  
Alberta 4-6 Math Curriculum



## SOLVE

K-3

To find a solution or an answer.

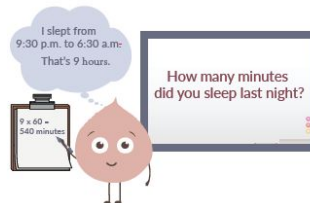


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## CONVERT

4-6

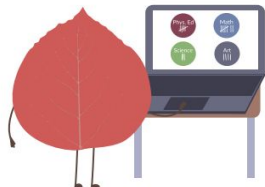
To change a value or expression from one form to another.



## CATEGORIZE

4-6

To assign to a category.



Student Action Verbs  
Alberta 4-6 Math Curriculum

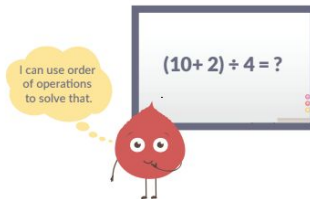


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## EVALUATE

4-6

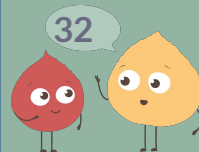
To determine the value, significance, importance, or quality of something.



Student Action Verbs  
Alberta 4-6 Math Curriculum



Alberta Regional Professional Development Consortia





This interactive glossary and associated resources were developed to help provide clarity on the verbs in Alberta Education's K-6 Math Curriculum.

Definition

Grades found as LO	Grades found within Ss & Ps	Verb	Definition
	4, 5, 6	create	To use knowledge, reasoning and understanding to put elements together to form a new pattern, structure, or idea.
	6	demonstrate	To show or express understanding through one's actions.
	4, 5, 6	describe	To communicate (orally or in writing) the qualities, attributes or features of a situation, pattern, process, or concept, etc.
	4, 5, 6	determine	To find a solution using appropriate strategies, procedures, and/or calculations.
	4, 5	discuss	To communicate by talking.
	5	divide	To separate into equal parts or groups.
	4, 5, 6	employ	To use.
	4, 5	engage	To take part/be involved in.
	5	estimate	To come close, or be similar to, a number, calculation, quantity, or measurement.
	4, 5	evaluate	To determine the value, significance, importance, or quality of something.
	4, 5, 6	examine	To carefully and in detail consider the nature and characteristics of something in order to find out more about it.
	4, 5	explain	To describe the how or why of something; give the cause or reason for.
4, 6	4, 5, 6		

The table

Grade L

Grade 4

Grade 5

Grade 6



Explicitly taught, illustrative understanding of the curriculum to view USPS.



# EVALUATE

4 - 6

To determine the value, significance, importance, or quality of something.

I can use order of operations to solve that.



$$(10 + 2) + 4 = ?$$

In Mathematics, *evaluating* requires students to "find the value of" or "calculate the value of". A value refers to the worth or numerical representation of an object, quantity, or expression. For example, to evaluate an algebraic expression means to find the value of the expression when the variable is replaced by a given number.

The table below shows where evaluate is included as student action within Alberta's 4-6 Math curriculum.

Grade Level	Learning Outcomes	Skills & Procedures
Grade 4	Students evaluate the use of scale in graphical representations of data.	Evaluate expressions according to the order of operations.
Grade 5		Evaluate numerical expressions involving addition or subtraction in parentheses according to the order of operations. Evaluate an algebraic expression by substituting a given number for the variable.
Grade 6		Evaluate numerical expressions involving operations in parentheses and powers according to the order of operations.



To best support learners, student action verbs should be explicitly taught, modeled and practiced through multiple experiences. The illustrative examples can provide clarification about how student understanding might be developed. It is important to reference the curriculum to view the entire context of the Learning Outcome and related KUSPS.

## Illustrative Examples

Skills and Procedures (SA1.1) Evaluate numerical expressions involving addition or subtraction in parentheses according to the order of operations.

- Have students watch a video on order of operations. For example, Math Antics- Order of Operations or Khan Academy's "Intro to Order of Operations".
- Tell students that they are going to be using parentheses in the expressions they evaluate. Parentheses are a grouping symbol, indicated by:

parentheses

( )

Tell students that the rule changes when an expression has parentheses, which is to evaluate operations in parentheses before other operations.

- Provide students with an example, such as:

Ashmer and Ana were asked to evaluate the following numerical expressions.

$$4 \times (2 + 5) - 9$$

- Their solutions are as shown below:

Ashmer:

$$\begin{array}{r} 4 \times (2 + 5) - 9 \\ 4 \times 7 - 9 \\ 28 - 9 \\ 19 \end{array}$$

Ana:

$$\begin{array}{r} 4 \times (2 + 5) - 9 \\ 8 + 5 - 9 \\ 13 - 9 \\ 4 \end{array}$$

- There can only be one correct answer. Who do you think did it right? Is it Ashmer or Ana? Have students discuss and share answers.
- Let's find out how Ashmer did it right!

Ashmer:

$$\begin{array}{r} 4 \times (2 + 5) - 9 \\ 4 \times 7 - 9 \\ 28 - 9 \\ 19 \end{array}$$



Work on the calculations inside the parentheses.

Follow the rule working from LEFT to RIGHT

Multiply or Divide  
(whichever comes first)  
Add or Subtract  
(whichever comes first)

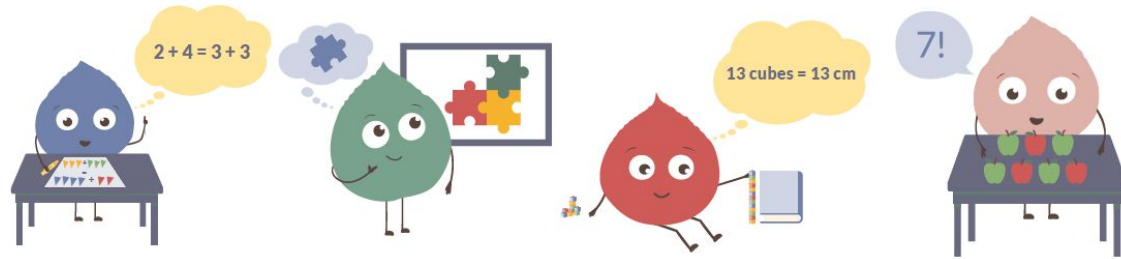
- Provide more numerical expressions for students to evaluate using parentheses.



# Resources to Support the Teaching and Learning of Math Verbs

## Alberta K-3 Curriculum (2022)

[bit.ly/467ITCS](https://bit.ly/467ITCS)



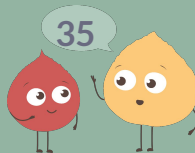
Student Action Verbs  
Alberta K-3 Math Curriculum



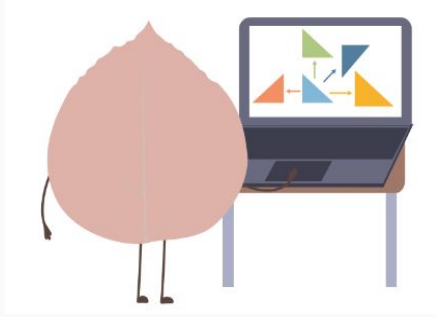
Alberta Regional Professional Development Consortia



K- 3 Resource Package

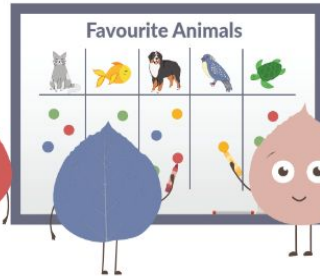
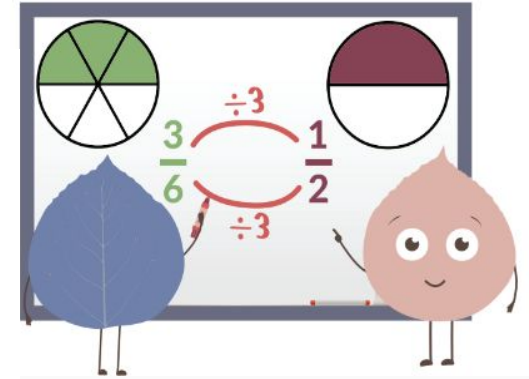
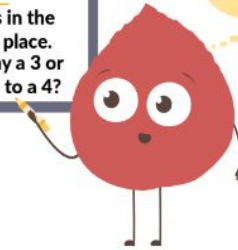


# Planning to Teach



**17.386**  
The 3 is in the tenths place. Will it stay a 3 or move up to a 4?

If I round...

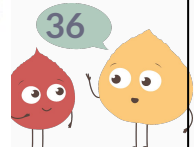
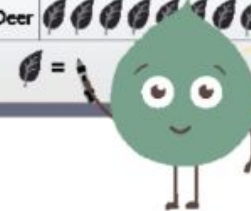


What is the Approximate Population of Alberta Cities?

City	Population
Airdrie	10 leaves
Cold Lake	2 leaves
Red Deer	10 leaves

1 leaf = 10,000 people.

One leaf = 10,000 people.



Grade 4

How can equality create opportunities to reimagine number?

Students represent and apply equality in multiple ways.

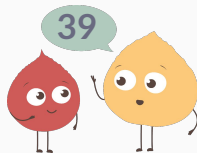
Knowledge	Understanding	Skills & Procedures
<p>An expression can include multiple operations.</p> <p>The conventional order of operations provides a set of rules for evaluating expressions, including the following:</p> <ul style="list-style-type: none"> <li>• Multiplication and division are performed before addition and subtraction.</li> <li>• Multiplication and division are performed in order from left to right.</li> <li>• Addition and subtraction are performed in order from left to right.</li> </ul>	<p>There are infinitely many expressions that represent the same number.</p> <p>The order in which operations are performed can affect the value of an expression.</p>	<p>Evaluate expressions according to the order of operations.</p> <p>Create various expressions of the same number using one or more operations.</p>
<p>Equations can be solved through a process of adding, subtracting, multiplying, or dividing the same number on both sides of the equation (preservation of equality).</p>	<p>An equation is solved by determining an unknown value that makes the left and right sides of the equation equal.</p>	<p>Write equations involving one operation to represent a situation.</p> <p>Investigate preservation of equality using a balance model.</p> <p>Investigate preservation of equality using an equation without an unknown value.</p> <p>Apply preservation of equality to determine the unknown value in an equation, limited to equations with one operation.</p> <p>Solve problems using equations, limited to equations with one operation.</p>

# STEP 1: Teacher Clarity

Unpack the vocabulary at the **START**  
of your Planning

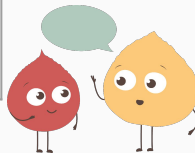
*Remember!!*

When teachers have clarity about the meaning of the curriculum, including the concepts and verbs in the context of the curriculum, they are able to more effectively design learning and assessment opportunities. As students practice these skills and engage in multiple learning experiences, both within and across subject areas, they will retain and be able to apply understanding from year to year.



# Students represent and apply equality in multiple ways. (Gr.4)

Knowledge	Understanding
<p>An <b>expression</b> can include multiple operations.</p> <p>The conventional <b>order of operations</b> provides a set of rules for evaluating expressions, including the following:</p> <ul style="list-style-type: none"><li>● <b>Multiplication</b> and <b>division</b> are performed before addition and subtraction.</li><li>● <b>Multiplication</b> and <b>division</b> are performed in order from left to right.</li><li>● <b>Addition</b> and <b>subtraction</b> are performed in order from left to right.</li><li>● Equations can be solved through a process of adding, subtracting, multiplying, or dividing the same number on both sides of the equation (<b>preservation of equality</b>).</li></ul>	<p>There are infinitely many expressions that represent the same number.</p> <p>The order in which operations are performed can affect the <b>value</b> of an expression.</p> <p>An <b>equation</b> is solved by determining an <b>unknown value</b> that makes the left and right sides of the equation <b>equal</b>.</p>



Students represent and apply equality in multiple ways. (Gr.4)

## Skills and Procedures

**Evaluate** expressions according to the order of operations.

**Create** various expressions of the same number using one or more operations.

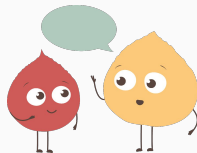
**Write** equations involving one operation to represent a situation.

**Investigate** preservation of equality using a balance model.

**Investigate** preservation of equality using an equation without an unknown value.

**Apply** preservation of equality to determine the unknown value in an equation, limited to equations with one operation.

**Solve** problems using equations, limited to equations with one operation.



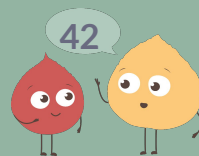
Grade Four: Algebra

<b>Organizing Idea:</b> <b>Algebra:</b> Equations express relationships between quantities.	<b>Guiding Question:</b> How can equality create opportunities to reimagine <u>number</u> ?
<b>Learning Outcome:</b> Students <b>represent</b> and <b>apply equality</b> in multiple ways.	
<b>Understanding(s):</b> ( K & SPs support students working towards these understandings—which in turn leads to your ability to determine summative assessment of the LO)	
4A11 There are infinitely many <b>expressions</b> that represent the same <b>number</b> .	
4A11 The order in which <b>operations</b> are performed can affect the <b>value</b> of an <b>expression</b> .	
4A12 An <b>equation</b> is solved by determining an <b>unknown value</b> that makes the left and right sides of the <b>equation equal</b> .	
<b>Knowledge:</b> <b>4A1.1</b> An <b>expression</b> can include <b>multiple operations</b> .  <b>4A1.1</b> The conventional <b>order of operations</b> provides a set of rules for evaluating <b>expressions</b> , including the following: <ul style="list-style-type: none"> <li>• <b>Multiplication</b> and <b>division</b> are performed before addition and subtraction.</li> <li>• Multiplication and division are performed in order from left to right.</li> <li>• <b>Addition</b> and <b>subtraction</b> are performed in order from left to right.</li> </ul>	<b>Skills and Procedures:</b> <b>4A1.1. Evaluate expressions</b> according to the <b>order of operations</b> .  <b>4A1.1. Create</b> various <b>expressions</b> of the same number using <b>one or more operations</b>  <b>4A1.2 Write equations</b> involving one operation to represent a situation.  <b>4A1.2 Investigate preservation of equality</b> using a balance model.  <b>4A1.2 Investigate preservation of equality</b> using an equation without an <b>unknown value</b> .

Developed by ARPDC facilitators: T. Leslie and K. Waugh-Motoska

<b>4A1.2</b> Equations can be solved through a process of adding, subtracting, multiplying, or dividing the same number on both sides of the equation ( <b>preservation of equality</b> ).	<b>4A1.2 Apply preservation of equality</b> to determine the <b>unknown value</b> in an <b>equation</b> , limited to equations with <b>one operation</b> .  <b>4A1.2 Solve problems</b> using <b>equations</b> , limited to equations with <b>one operation</b> .
<b>Action Verbs:</b> <i>(these require explicit teaching and modeling, and provide focus for students' learning experiences)</i> <ul style="list-style-type: none"> <li>- from the LO <i>(must be included in summative assessment)</i></li> <li>- from the Skills and Procedures</li> </ul> <ul style="list-style-type: none"> <li>• Represent</li> <li>• Apply</li> <li>• Evaluate</li> <li>• Create</li> <li>• Write</li> <li>• Investigate</li> <li>• Solve</li> </ul>	<b>Math Terms and Concepts:</b> <i>(Identify the nouns/terms which are integral to student understanding)</i> <ul style="list-style-type: none"> <li>- from the LO <i>(must be included in summative assessment)</i></li> <li>- from the Skills and Procedures: <i>(part of formative and/or summative assessment)</i></li> </ul> <ul style="list-style-type: none"> <li>• Equality</li> <li>• Expressions</li> <li>• Equations</li> <li>• Operations</li> <li>• Order of Operations</li> <li>• Preservation of equality</li> <li>• Unknown value</li> </ul>
<b>Additional Vocabulary:</b> <ul style="list-style-type: none"> <li>• Addition</li> <li>• Subtraction</li> <li>• Multiplication</li> <li>• Division</li> </ul>	

# Planning Template



Students represent and apply equality in multiple ways.

(Gr.4)

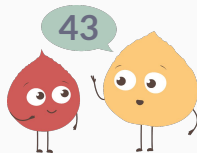


# Verbs, Verbs, Verbs

The Learning Outcome verbs indicate explicitly what the learner must know, understand and do in order to demonstrate learning by the end of the learning.

The verbs in the *Skills and Procedures* tell you the way in which students will demonstrate learning of the Knowledge and *understandings*, on which the LO is based.

Note: Within the *Skills and Procedures*, verbs used express the type of action the student takes to learn, practice and be formatively assessed during the learning process.

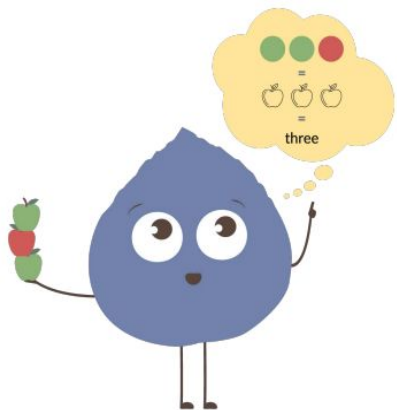


# Gr. 4 Learning Outcome: Students represent and apply equality in multiple ways.

## REPRESENT

K - 3

To demonstrate a mathematical concept through pictures, diagrams, models, manipulatives, symbols, words, etc.

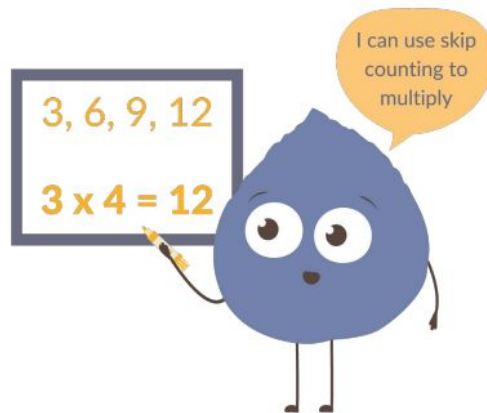


**Representing** indicates that students are showing their knowledge and understanding. For example, **representing** a story problem using an equation and/or manipulatives, or choosing which coins might be used to purchase a chocolate bar. When students express the same concept in different forms it helps to clarify their understanding.

## APPLY

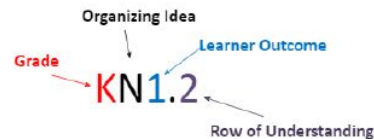
K - 3

To use mathematical knowledge in various situations, such as problem solving.



**Applying** requires that students use a fact, procedure, rule or strategy to answer a math question. When **applying** knowledge and understanding, it often helps students to recall previous experiences in which a method, strategy or procedure was useful. For example, a student who has learned how to skip count, may **apply** that strategy to solve a multiplication problem.

# Note: ARPDC Interactive Vocabulary Document



	Kindergarten			Grade 1			Grade 2		
<b>Organizing Idea</b>	Number: Quantity is measured with numbers that enable counting, labelling, comparing, and operating.								
<b>Guiding Question</b>	How can quantity contribute meaning to daily life?			How can quantity be communicated?			How can quantity contribute to a sense of number?		
<b>Learning Outcome</b>	KN1.1 Children <u>investigate</u> quantities to 10.			1N1.1 Students <u>interpret</u> and <u>explain</u> quantities to 100.			2N 1.1 Students <u>analyze</u> quantity to 1000.		
	Knowledge	Understanding	Skills & Procedures	Knowledge	Understanding	Skills & Procedures	Knowledge	Understanding	Skills & Procedures
	<p><u>Quantity</u> can be represented using</p> <p>objects pictures words numerals</p>	<p>Quantity can be the number of objects in a <u>set</u>.</p>	<p><u>Recognize</u> a number of familiar objects as a quantity.</p> <p><u>Represent</u> a quantity in different ways.</p> <p><u>Relate</u> a numeral to a specific quantity.</p>	<p>A <u>numeral</u> is a <u>symbol</u> or group of symbols used to represent a number.</p> <p>The absence of <u>quantity</u> is represented by 0.</p>	<p>Quantity is expressed in words and numerals based on <u>patterns</u>.</p> <p><u>Quantity</u> in the world is represented in multiple ways.</p>	<p><u>Represent</u> quantities using words, numerals, <u>objects</u>, or pictures.</p> <p><u>Identify</u> a quantity of 0 in familiar situations.</p>	<p>Any number of objects in a set can be represented by a <u>natural number</u>.</p> <p>The <u>values</u> of the places in a four-<u>digit</u> natural number are thousands, hundreds, tens, and ones.</p> <p>Places that have no value within a given number use zero as a placeholder.</p> <p>The number line is a spatial representation of quantity.</p>	<p>There are <u>infinitely</u> many natural numbers.</p> <p>Every digit in a natural number has a value based on its place.</p> <p>Each natural number is associated with exactly one point on the number line.</p>	<p><u>Represent</u> quantities using words and natural numbers.</p> <p><u>Identify</u> the digits representing thousands, hundreds, tens, and ones based on place in a natural number.</p> <p><u>Relate</u> a number, including zero, to its position on the number line.</p>



**STEP 2: Be Intentional**  
Plan multiple learning lessons for  
students to practice the student action.  
Use the verb in student activities.

# The Power Of Vocabulary Building

**As Steven Stahl (2005) puts it, "Instruction in vocabulary involves far more than looking up words in a dictionary and using the words in a sentence. Vocabulary is acquired incidentally through indirect exposure to words and intentionally through explicit instruction in specific words and word-learning strategies."**

Quote taken from  
<https://www.readingrockets.org/article/teaching-vocabulary>

Students represent and apply equality in multiple ways. (Gr.4)

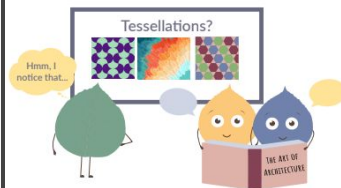
### Preservation of Equality - "to keep equal"

When performing the same operation with the same value to both sides of the equation the equality is preserved.

## INVESTIGATE

4-6

To carry out a formal inquiry or a sustained open-ended exploration in order to uncover facts and draw new conclusions about data and information.



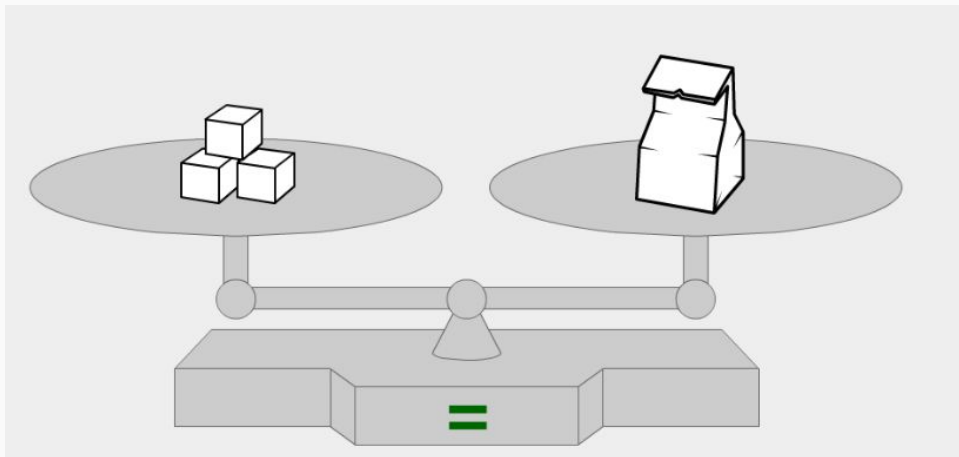
*Investigating* requires students to use mathematical knowledge and reasoning to complete a series of tasks connected to the content. *Investigating* is a process in which students have multiple opportunities over time to explore different approaches or strategies. Through *investigation*, students will be able to draw new conclusions and gain a more thorough understanding of a math concept or idea.

🎓 KNOWLEDGE	💡 UNDERSTANDING	✂️ SKILLS & PROCEDURES
<p>Equations can be solved through a process of adding, subtracting, multiplying, or dividing the same number on both sides of the equation (preservation of equality).</p>	<p>An equation is solved by determining an unknown value that makes the left and right sides of the equation equal.</p>	<p>Write equations involving one operation to represent a situation.</p> <p>investigate preservation of equality using a balance model.</p> <p>Investigate preservation of equality using an equation without an unknown value.</p> <p>Apply preservation of equality to determine the unknown value in an equation, limited to equations with one operation.</p> <p>Solve problems using equations, limited to equations with one operation.</p>

# Gr. 4 Sample Lesson

Skills and Procedure (4A1.2) **Investigate** preservation of equality using a balance model.

**TASK:** Here is a balanced scale. How many blocks have to be in the bag? What would happen if you removed removed a block from the left. What would happen if you added a block on the left? **Investigate** and use your intuition about balance to solve some problems. **Write** each step along the way.



## KNOWLEDGE

Equations can be solved through a process of adding, subtracting, multiplying, or dividing the same number on both sides of the equation (preservation of equality).

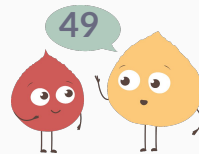


## SKILLS & PROCEDURES

Write equations involving one operation to represent a situation.

Investigate preservation of equality using a balance model.

Activity taken from  
<https://contrib.pbslearningmedia.org/WGBH/conv20/mgbh-int-balance/index.html>

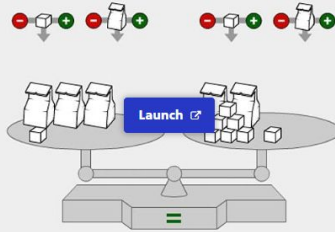


# Title: Balancing Scales to Solve Equations

How many blocks are in the bag?

## Balancing Scales To Solve Equations

Interactive Grades: 3-5, 6-8 Collection: Math at the Core: Middle School

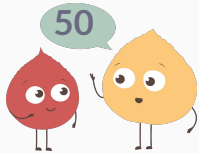


About Standards

Predict the number of blocks you need to equal the weight of one bag and then test your theory. This interactive exercise focuses on using critical thinking skills to add and subtract items on the scales to achieve balance and visual problem solving.



A screenshot of the interactive exercise interface. At the top, there is a 'Reset' button. Below it are three sets of icons: a red minus sign and a white cube, a green plus sign and a white cube, and a red minus sign and a white bag, each with a downward arrow. The main part of the interface shows a balance scale with two pans. The left pan contains two bags and three blocks. The right pan contains one bag and six blocks. The scale is currently unbalanced, with the left pan being heavier. At the bottom of the interface, there is a navigation bar with a back arrow, the word 'INTRO', and three radio buttons labeled 'A', 'B', and 'C'. The 'A' radio button is selected. To the right of the radio buttons is an 'Open Hint' button. On the far right of the navigation bar is an 'Open Instructions' button.



Students represent and apply equality in multiple ways. (Gr.4)

The *order of operations* is the rule that tells us the sequence in which we should solve an expression with multiple operations.

# EVALUATE

4-6

[View 4-6 toolkit](#)

To determine the value, significance, importance, or quality of something.

I can use order of operations to solve that.

$$(10+2) + 4 = ?$$



Student Action Verbs  
Alberta 4-6 Math Curriculum



Grade Four Focus

## KNOWLEDGE

An expression can include multiple operations.

The conventional order of operations provides a set of rules for evaluating expressions, including the following:

- Multiplication and division are performed before addition and subtraction.
- Multiplication and division are performed in order from left to right.
- Addition and subtraction are performed in order from left to right.

## UNDERSTANDING

There are infinitely many expressions that represent the same number.

The order in which operations are performed can affect the value of an expression.

## SKILLS & PROCEDURES

Evaluate expressions according to the order of operations.

Create various expressions of the same number using one or more operations.



# Gr. 4 Sample Lesson

Skills and Procedure (4A1.1) **Evaluate** expressions according to the order of operations.

Jadon and Cory were asked to **evaluate** the following expression.

$$3 + 4 \times 2$$

Their solutions are as shown here

Jadon	Cory
$3 + 4 \times 2$	$3 + 4 \times 2$
$7 \times 2$	$3 + 8$
14	11

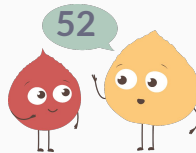
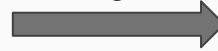
There can only be one correct answer. Who do you think is right? **Evaluate** and explain your thinking. Continue with additional expressions.

## Order of Operations in Grade 4

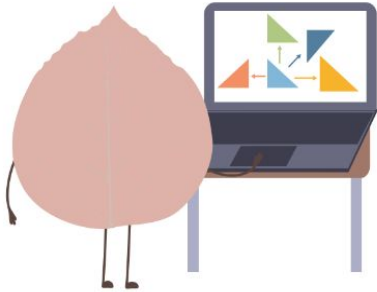
Multiplication and Division Left to right , whichever comes first.



Addition and Subtraction  
Left to right , whichever comes first .

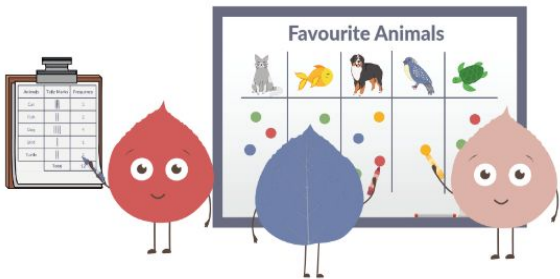
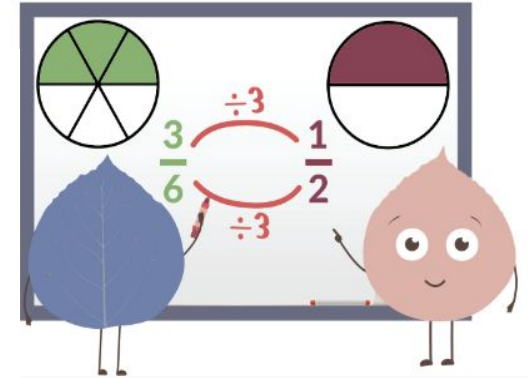


# Additional Learning Experiences



7.386  
The 3 is in the tenths place. Will it stay a 3 or move up to a 4?

If I round...



What is the Approximate Population of Alberta Cities?

City	Population
Airdrie	10 leaves
Cold Lake	2 leaves
Red Deer	10 leaves

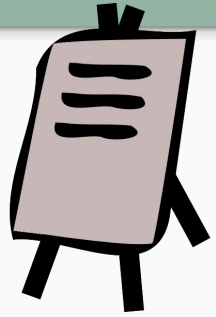
1 leaf = 10,000 people.

One leaf = 10,000 people.



## What does it mean to 'investigate'?

- I use my knowledge and reasoning to complete my work.
- I review all the information I have gathered to make a judgement about my new learning.
- I can make connections to other contexts.
- I can justify my understanding to others based on my learning experiences.

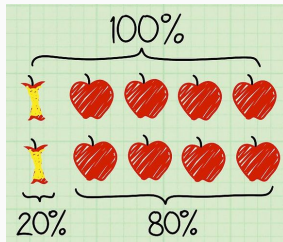


# Create a Visual Wall with Student Math Exemplars

I can **investigate** patterns in multiplication and division of natural numbers by 10, 100, and 1 000.



I can **investigate** percentage in familiar situations.



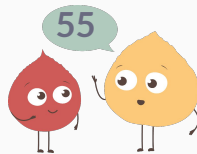
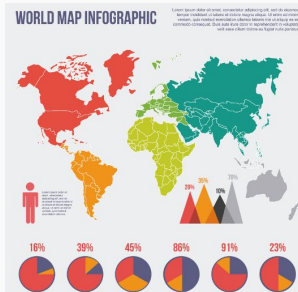
## INVESTIGATE

4 - 6

To carry out a formal inquiry or a sustained open-ended exploration in order to uncover facts and draw new conclusions about data and information.

Investigating requires students to use mathematical knowledge and reasoning to complete a series of tasks connected to the content. *Investigating* is a process in which students have multiple opportunities over time to explore different approaches or strategies. Through *investigation*, students will be able to draw new conclusions and gain a more thorough understanding of a math concept or idea.

I can **investigate** strategies for estimation of products and quotients.





# Have Students Use Journals



## Vocabulary Journal Prompts

*What does it mean to investigate?*

Use pictures, words, symbols etc.

Fruyer Model

What does <u>investigate</u> mean? (Teacher Definition)	What does <u>investigate</u> mean in my own words.
What can be <u>investigated</u> in math?	What is a non-example of investigate?

Investigate

# Have Students Use a Digital App

Provide students with a prompt and have them create a video demonstrating their understanding.



What does it mean to **investigate** preservation of equality using a balance model?

Or

How would you **evaluate** the following expressions. Explain your process.

**INVESTIGATE** 4-6

To carry out a formal inquiry or a sustained open-ended exploration in order to uncover facts and draw new conclusions about data and information.

*Investigating* requires students to use mathematical knowledge and reasoning to complete a series of tasks connected to the content. *Investigating* is a process in which students have multiple opportunities over time to explore different approaches or strategies. Through *investigation*, students will be able to draw new conclusions and gain a more thorough understanding of a math concept or idea.

An illustration for the 'INVESTIGATE' slide showing a computer monitor displaying a colorful tessellation. A speech bubble next to the monitor says 'Here's a tessellation!'. Below the monitor are three cartoon characters: a green one, a yellow one, and a blue one. The blue character is holding a book titled 'ALL ABOUT INVESTIGATION'.

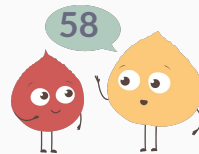
**EVALUATE** 4-6

View 4-6 toolkit

To determine the value, significance, importance, or quality of something.

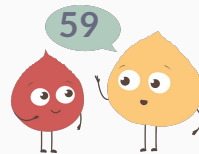
I can use order of operations to solve that.

$(10 \div 2) \div 4 = ?$

An illustration for the 'EVALUATE' slide showing a red cartoon character with a speech bubble that says 'I can use order of operations to solve that.' The character is pointing towards a whiteboard that displays the mathematical expression  $(10 \div 2) \div 4 = ?$ . At the bottom of the slide, there are icons for 'Student Action Verbs' and the 'Alberta Regional Professional Development Consortia' logo.

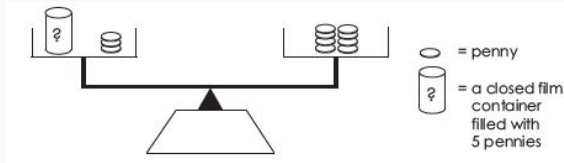
# Assessment with a Performance Task

- A performance task includes learning activities and assessments that require students to produce a product that demonstrates their understanding and proficiency.
- The product that is created, as a result of the performance task, provides the teacher with the necessary evidence to assess their learning (summative).
- It is an excellent way to assess knowledge, understanding and skills as a result of multiple learning activities.
- Students are asked to do more than recall knowledge with performance tasks. They are asked **to apply what they know to a new problem.**
- These tasks typically don't have one solution. Problems are open ended and allow for different pathways to arrive at feasible solutions.
- **An excellent opportunity to demonstrate the process or 'put into action' multiple verbs.**





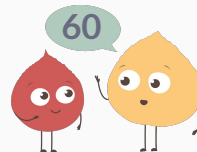
# Student Performance Task

**TASK:** Provide students with small colored containers, counters/pennies and a balance scale. Have students model the preservation of equality using the balance scale. Choose an equation. Balance the equation. You can use addition, subtraction, multiplication or division. Create a Flipgrid video to record the process and explain how equality is applied in the preservation of equality.

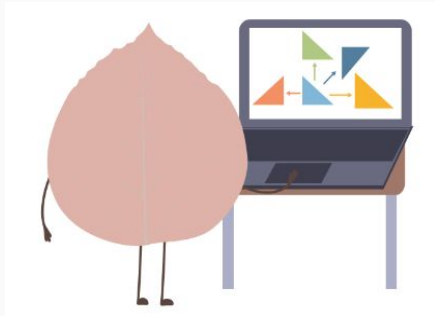


## performance task

Learning Outcome: Students <u>represent</u> and <u>apply</u> equality in multiple ways.		
GLOW 	SUCCESS CRITERIA	GROW   
	I can <b>investigate</b> preservation of equality using a balance model.	
	I can <b>investigate</b> preservation of equality using an equation without an unknown value.	
	I can <b>balance</b> an equation (addition, subtraction, multiplication or division)	
	I can use Flipgrid to explain the process and how <b>equality is applied</b> in preservation of equality.	

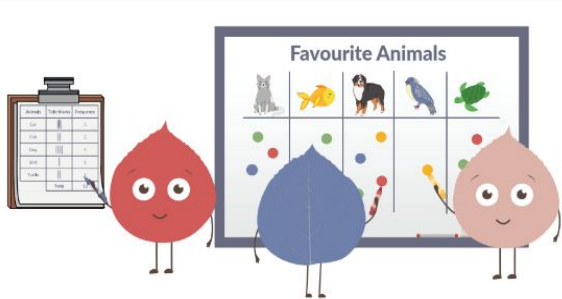
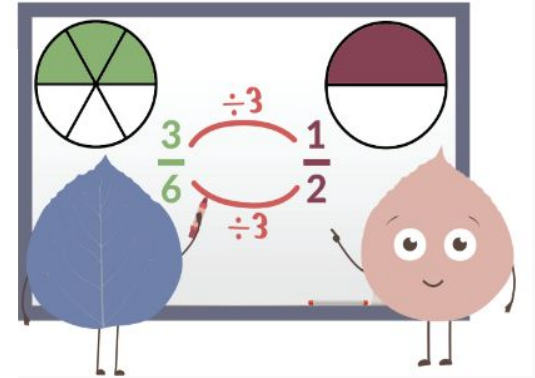
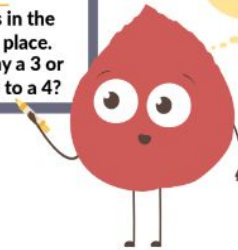


# Teacher Resources



**17.386**  
The 3 is in the tenths place. Will it stay a 3 or move up to a 4?

If I round...

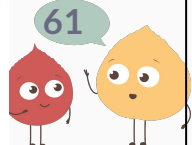
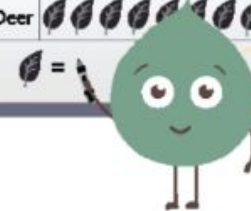


What is the Approximate Population of Alberta Cities?

City	Population
Airdrie	10 leaves
Cold Lake	2 leaves
Red Deer	10 leaves

1 leaf = 10,000 people.

One leaf = 10,000 people.





## Glossary for Student Action Verbs ~ Alberta's K-6 Math Curriculum

This interactive glossary and [associated resources](#) were developed to help provide clarification, context and support for teaching of the verbs in Alberta Education's K-6 Math Curriculum (2022).

Grades found as LO	Grades found within Ss & Ps	Verb	Definition <small>*Indicates that there is a hyperlinked toolkit.</small>
4, 5, 6	K, 1, 2, 3, 4, 5, 6	<a href="#">add</a>	To combine two or more addends (numbers/quantities) together to get a sum.
2, 3, 4, 5, 6	6	<a href="#">analyze*</a>	To consider in detail for the purpose of finding meaning or relationships, and to identify patterns, similarities, and differences.
3, 4, 6	2, 4, 6	<a href="#">apply*</a>	To use mathematical knowledge in various situations.
	4, 5, 6	<a href="#">assess</a>	To determine (or decide) something after consideration.
	2	<a href="#">approximate</a>	To come close to, or be similar to, something in quality, nature, or quantity.
5		<a href="#">calculate</a>	To determine the amount or number of something mathematically.
	5	<a href="#">categorize</a>	To assign to a category.
	3, 4, 5	<a href="#">classify</a>	To arrange into groups based on one or more attributes or properties.
	1	<a href="#">collaborate</a>	To work together on an activity/task to produce, build, or create something.
	2, 3, 6	<a href="#">collect</a>	To gather data and/or information, etc., from people or sources.
2, 4		<a href="#">communicate*</a>	To convey knowledge and understanding to another.
	K, 1, 2, 3, 4, 5, 6	<a href="#">compare</a>	To consider the qualities of two or more things or sets, in order to discover similarities or differences.
	K, 1, 2, 3, 6	<a href="#">compose</a>	To form, combine, or put together.

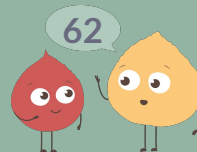
Student Action Verbs  
Alberta K-6 Math Curriculum



Alberta Regional Professional  
Development Consortia

1

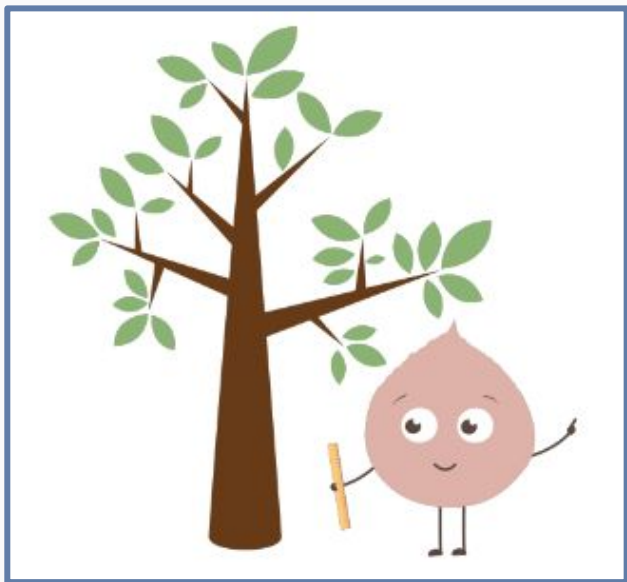
# Defining the Verbs Within the Alberta Context





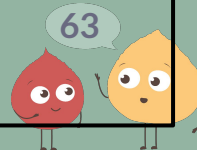
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# Future Sessions



## A Guide to Planning and Assessing Student Actions - Grade Specific

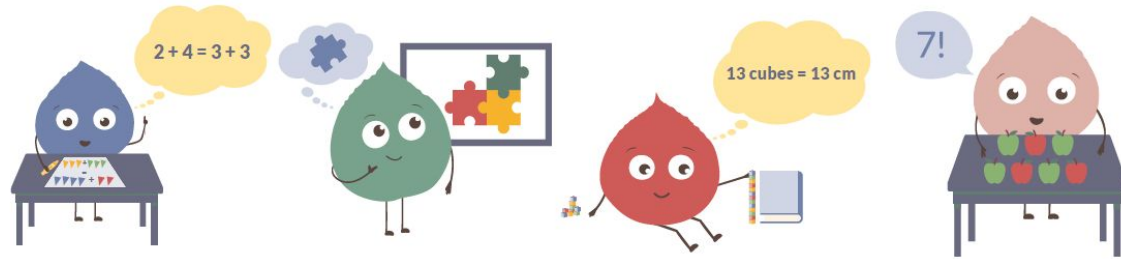
It can be challenging to determine what students should know, understand and do in order to plan and assess the Grade 1/2/3/4/5/6 Math curriculum. Explore new resources and share practical strategies with a focus on curriculum related to student actions (the verbs that are part of the Learning Outcomes and Skills & Procedures in context). During this session, you will be guided through the planning and assessment process for a specific grade 1/2/3/4/5/6 Learning Outcome. A resource package including a planning template, verb glossary, visual definition cards, and teacher toolkits will be provided.



# Resources to Support the Teaching and Learning of Math Verbs

## Alberta K-3 Curriculum (2022)

[bit.ly/467ITCS](https://bit.ly/467ITCS)



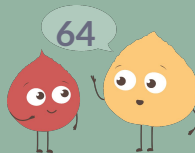
Student Action Verbs  
Alberta K-3 Math Curriculum



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K- 3 Resource Package



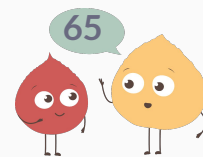
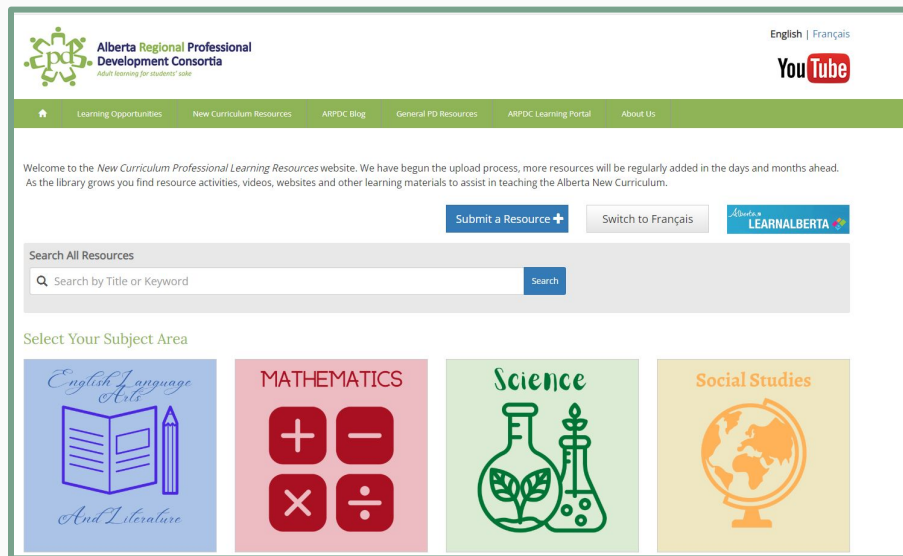
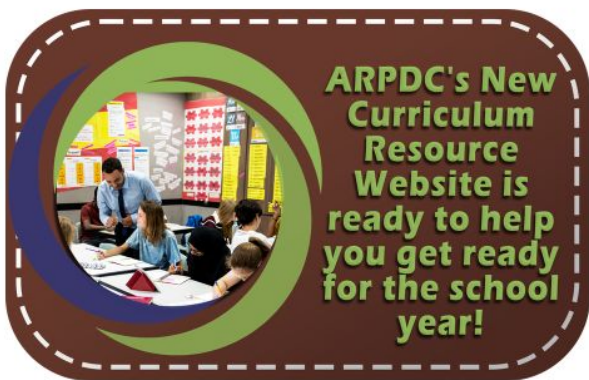
# \* New ARPDC WEBSITE - Curriculum Supports



Unlocking Potential, Empowering Teachers!



ARPDC consultants across the province are busy preparing for Gr. 4-6 curriculum implementation support resources. All current K-6 New Curriculum resources are available at the [www.arpdc.ab.ca](http://www.arpdc.ab.ca) via the New Curriculum Tab.



# THANK YOU!!



Alberta **Regional** Consortia

Want to Know  
More...

Reach me at

[tammy.leslie@erlc.ca](mailto:tammy.leslie@erlc.ca)



# Reminder for Day Four

1. Order of Operations
2. Use of manipulatives
3. Fraction support



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*Adult learning for students' sake*