Resources

"Nothing can subtract hard work from success, only add to it." Manjunath Harlapur

Programming decisions and the selection of learning resources are made by school authorities, schools, teachers and students.

The use of authorized resources is not mandatory. A broad range of learning resources may be used to meet the needs of all students.

The links below will provide you with a variety of resources that may come in handy when teaching the concept of additive thinking.

These resources are suggestions and are meant to complement what you are already using. They are not necessarily aligned to Alberta Curriculum. These resources come from a variety of sources and are not affiliated with Alberta Education.

+Multi-Grades

[Video: Number Strings to Encourage Addition Strategies - Part 1](#)

[Video: Number Strings to Encourage Addition Strategies - Part 2](#)

+Kindergarten

Mental Math

5. Compare quantities 1 to 10, using one-to-one correspondence. [C, CN, V]

*This outcome is identified as "Pre-Operations"

Resources

Dreambox - http://www.dreambox.com/teachertools

Look at "[Numbers to Ten on the Ten Frame](#)" and/or "[Numbers to Ten on the Math Rack](#)", addresses subitizing using an organized or regular arrangement of dots. Addresses preoperational reasoning for K and Gr. 1.

TeachMath - Resources for Teaching Mathematics

Five/Ten Frames http://teachmath.openschoolnetwork.ca/kindergarten/number-sense/510-frames/ Various activities for working with benchmark numbers 5/10.

Subitizing (Domino Cards) http://teachmath.openschoolnetwork.ca/kindergarten/number-sense/subitizing/
These domino cards are useful for subitizing in that the two sides break the pattern into smaller pieces, providing a smaller anchor. For Kindergarten, mostly dominos with totals of 6 and under are used. Those over six with one side a five are also included as they're a good parallel to 10 frames, and can be used later in the year. They can also be used for students to build the amount on ten frames with counters.

Subitizing (Five Frames, Ten Frames, Dot Patterns) - Reference Material
Coming to Know Number (Wheatley & Reynolds, 2010) http://www.mathematicslearning.org/index.cfm?ref=30505

+Grade One

Mental Math
2. Subitize (recognize at a glance) and name familiar arrangements of 1 to 10 objects or dots. [C, CN, ME, V]

This outcome is identified as "Pre-Operations"

Resources
Dreambox - http://www.dreambox.com/teachertools Look at "Numbers to Ten on the Ten Frame", "Numbers to Ten on the Math Rack", also may include higher numbers (20, 40 or 100) addresses subitizing using an organized or regular arrangement of dots (ten frames & math racks). Addresses preoperational reasoning for K (to 10) and operational reasoning in Gr. 1.

Subitizing (Five Frames, Ten Frames, Dot Patterns) - Reference Material
Coming to Know Number (Wheatley & Reynolds, 2010) http://www.mathematicslearning.org/index.cfm?ref=30505

5. Compare sets containing up to 20 elements, using:
   • referents
   • one-to-one correspondence to solve problems. [C, CN, ME, PS, R, V]

Resources
K-5 Teaching Math Teaching Resources - Making Sets, Who Has More?
Making Sets - http://www.k-5mathteachingresources.com/support-files/making-sets-ver.1.pdf.
This example uses the model of "greater than", can easily be adapted to show the inverse "less than" or "fewer". An additional resource center is "Who Has More?" - http://www.k5mathteachingresources.com/support-files/who-has-more.pdf

8. Identify the number, up to 20, that is:
- one more
- two more
- one less
- two less than a given number. [C, CN, ME, R, V]

This outcome is identified as "Pre-Operations"

Resources

TeachMath - Resources for Teaching Mathematics - Plus/Minus 1, 2
http://teachmath.openschoolnetwork.ca/grade-1/addition-facts/12-near-numbers/
http://teachmath.openschoolnetwork.ca/grade-1/number-sense/near-numbers-±1-±2/

K-5 Teaching Math Teaching Resources - http://www.k-5mathteachingresources.com/1st-grade-number-activities.html - Look at these various listed activities - May apply to SO #'s 5, 8, 9 & 10. This page provides samples of 1st Grade Number Activities aligned with the Common Core State Standards (US). All activities are suitable for use in Math Centers, small group or whole class settings and are designed to provide opportunities for students to communicate their reasoning and mathematical thinking.

Plus One (version 1)	**Find Ten**
Plus One (version 2)	**Nine Plus**
Plus Two (Version 1)	**Four in a Row Subtraction**
Plus Three (Version 1)	**Domino Addition**
Doubles Cover Up (version 2)	**Part Part Whole Cards**

Sample - Show One Less - http://www.k-5mathteachingresources.com/support-files/show-one-less.pdf

10. Describe and use mental mathematics strategies, such as:
- counting on and counting back
- making 10
- using doubles
- thinking addition for subtraction for basic addition facts and related subtraction facts to 18. [C, CN, ME, PS, R, V]

Clarification: Understand and apply strategies for addition and related subtraction facts to 18. Recall addition and related subtraction facts to 5.

Resources

NCTM Resource: must be a member and logged in to access resources
Magic Ten: Practicing Combinations to Ten with a card Trick http://www.nctm.org/classroom-resources/lessons/Magic-Ten_-Practicing-Combinations-to-Ten-with-a-Card-Trick/

TeachMath - Resources for Teaching Mathematics - Various support materials for Doubles/ Near Doubles, Bonds of Ten

http://teachmath.openschoolnetwork.ca/grade-2/addition-facts/doubles/

http://teachmath.openschoolnetwork.ca/grade-2/addition-facts/near-doubles/

http://teachmath.openschoolnetwork.ca/grade-2/addition-facts/bonds-of-10/

Video: Students demonstrating Concrete Additive Thinking using "cuisennaire rods"

Application of Understanding

9. Demonstrate an understanding of addition of numbers with answers to 20 and their corresponding subtraction facts, concretely, pictorially and symbolically, by:
- using familiar mathematical language to describe additive and subtractive actions
- creating and solving problems in context that involve addition and subtraction
- modeling addition and subtraction, using a variety of concrete and visual representations, and recording the process symbolically. [C, CN, ME, PS, R, V]

Resources

Why Children Have Difficulties Mastering the Basic Number Combinations and How to Help Them: See Figure 2 for Two Decomposition Activities
http://webmedia.jcu.edu/cmsett/files/2014/06/baroody-facts-article.pdf

NCTM Resource: must be a member and logged in to access resources
Frogs on a Log http://www.nctm.org/classroom-resources/lessons/Frogs-on-a-Log/

NCTM Resource: must be a member and logged in to access resources
Making Tens: Finding Addends That Sum to Ten http://www.nctm.org/classroom-resources/lessons/Making-Tens_-Finding-Addends-That-Sum-to-Ten/

NCTM Resource: must be a member and logged in to access resources
Deep Sea Duel: Sum of 15
http://www.nctm.org/classroom-resources/lessons/Deep-Sea-Duel/
interactive: http://illuminations.nctm.org/Activity.aspx?id=3508

NCTM Resource: must be a member and logged in to access resources
Magical Magic Squares: Constructing Simple Magic Squares in Odd-Numbered Square Arrays
http://www.nctm.org/classroom-resources/lessons/Magical-Magic-Squares_Constructing-Simple-Magic-Squares-in-Odd-Numbered-Square-Arrays/

TeachMath - Resources for Teaching Mathematics - Part Part Whole
http://teachmath.openschoolnetwork.ca/grade-1/number-sense/part-part-whole/

School Division 71 (Comox, BC) WNCP Resources - Part Part Whole Cards
http://www5.sd71.bc.ca/math/index.php?page=lessons-activities-grade-1

Part part whole relationships (PPW) involve seeing numbers as being made of two or more parts. Many researchers have said this is the major conceptual achievement of the early years. A strong understanding of PPW has been shown to increase understanding of subsequent work with place value, number concepts, and word problems.

Number Relationship Mats - Example of a Simple Mat Applications of Number Multiple Number Concepts (Several Models Provided)

+Grade Two

Mental Math

8. Demonstrate and explain the effect of adding zero to, or subtracting zero from, any number. [C,R]

Resources

Literature Connections - this outcome is easily addressed with literature that opens the avenue for Communication, Connections and Reasoning. Suggestions:

A Place For Zero - Angeline Sparagna LoPresti

Zero - Kathryn Otoshi

10. Apply mental mathematics strategies, such as:
   • using doubles
   • making 10
   • ~~one more, one less~~
   • ~~two more, two less~~
   • building on a known double
   • thinking addition for subtraction for basic addition facts and related subtraction facts to 18.[C, CN, ME, PS, R, V]

Clarification: Understand and apply strategies for addition and related subtraction facts to 18. Recall addition and related subtraction facts to 10.

Alberta Education – LearnAlberta.ca – Grade 2 Mathematics Planning Guide (Addition and Subtraction Facts to 18)

K-5 Teaching Math Teaching Resources - http://www.k-5mathteachingresources.com/2nd-grade-number-activities.html Look at these various listed activities - May apply to both Grade Two SO #'s 9 & 10. This page provides samples of 2nd Grade Number Activities aligned with the Common Core State Standards (US). All activities are suitable for use in Math Centers, small group or whole class settings and are designed to provide opportunities for students to communicate their reasoning and mathematical thinking.

Possible Activities:

Sum search	**Four in a row near doubles**
Doubles memory	**11 more**
Doubles bump	**Near 20**
Doubles cover up (version 2)	**Magic star puzzle**
Doubles plus one	**Magic triangle**
Doubles plus two	**Magic square**
Doubles minus one	**Nine plus**
Number relationshop mat	

Coming to Know Number (Wheatley & Reynolds, 2010) - Reference Material - Look at Hundreds Boards (Chunking the Hundreds Board) pp. 137-143. http://www.mathematicslearning.org/index.cfm?ref=30505

Application of Understanding

9. Demonstrate an understanding of addition (limited to 1- and 2-digit numerals) with answers to 100 and the corresponding subtraction by:
- using personal strategies for adding and subtracting with and without the support of manipulatives
- creating and solving problems that involve addition and subtraction
- using the commutative property of addition (the order in which numbers are added does not affect the sum)
- using the associative property of addition (grouping a set of numbers in different ways does not affect the sum)
- explaining that the order in which numbers are subtracted may affect the difference.

[C, CN, ME, PS, R, V]

Resources

Addition/Subtraction Questions: This site allows you to choose a variety of questions depending on students' level to practice. It allows students to use mental math strategies and non-traditional methods to solve questions. Any question type circled in orange is free. Any question type circled in red is part of the paid version.

Alberta Education – LearnAlberta.ca – Grade 2 Mathematics Planning Guide (Adding and Subtracting Number to 100)

School Division #71 – Grade 2 – Possible Addition and Subtraction Strategies (English)

School Division #71 Lesson Plan – to assist with development of strategies – Grades 2 & 3

Mental Math

6. Describe and apply mental mathematics strategies for adding two 2-digit numerals, such as:
   • adding from left to right
   • taking one addend to the nearest multiple of ten and then compensating
   • using doubles.

[C, CN, ME, PS, R, V]

Resources

Alberta Education – LearnAlberta.ca – Grade 3 Mathematics Planning Guide, 2-Digit Mental Mathematics - Applies to SO#'s 6 & 7

School Division #71 Lesson Plan – to assist with development of strategies – Grades 2 & 3

7. Describe and apply mental mathematics strategies for subtracting two 2-digit numerals, such as:
   • taking the subtrahend to the nearest multiple of ten and then compensating
   • thinking of addition
   • using doubles.

[C, CN, ME, PS, R, V]

Resources

Dreambox - http://www.dreambox.com/teachertools Look at these possible activities to use as starters. May apply to Gr. 3 SO#'s 6, 7, 8

Addition on the Number Line Using Landmark Numbers :
https://play.dreambox.com/play/terms_of_use_form?back=https%3A%2F%2Fplay.dreambox.com%2Fstudent%2Fremote_callout%3Ftry_a_lesson%3DTeacherTool_LandmarkNumbers%26back%3D%252Fteachertools%26eng%3DIntermediate

Subtraction on the Number Line Using Constant Difference:
https://play.dreambox.com/play/terms_of_use_form?back=https%3A%2F%2Fplay.dreambox.com%2Fstudent%2Fremote_callout%3Ftry_a_lesson%3DTeacherTool_ConstantDifference%26back%3D%252Fteachertools%26eng%3DIntermediate

Matching Number Pairs for Two Hundred:
https://play.dreambox.com/play/terms_of_use_form?back=https%3A%2F%2Fplay.drea
mbox.com%2Fstudent%2Fremote_callout%3Ftry_a_lesson%3DTeacherLessonMatchin
gMake200%26back%3D%252Fteachertools%26eng%3DPrimary

Addition with Tens on the Number Line:
https://play.dreambox.com/play/terms_of_use_form?back=https%3A%2F%2Fplay.dreambox.com%2Fstudent
%2Fremote_callout%3Ftry_a_lesson%3DTeacherTool_JumpsOfTen%26back%3D%252Fteachertools%26en
g%3DIntermediate

K-5 Teaching Math Teaching Resources - http://www.k-5mathteachingresources.com/3rd-grade-
number-activities.html

Look at these various listed activities - May apply to both Grade Three **SO #'s 6, 7, 8, 10**. This page provides
samples of 3rd Grade Number Activities aligned with the Common Core State Standards (US). All activities
are suitable for use in Math Centers, small group or whole class settings and are designed to provide
opportunities for students to communicate their reasoning and mathematical thinking.

Round to the nearest ten **Round to the nearest hundred** **What's the nearest ten?** **What's the nearest hundred?** **Round up or down?**	**Estimating sums (version 1)** **Estimating sums (version 2)** **Estimating differences (version 1)** **Estimating Differences (version 2)**

8. Apply estimation strategies to predict sums and differences of two 2-digit numerals in a problem-solving
context.[C, ME, PS, R]

Resources

School Division #71 - Lesson Plans with Problem Solving, applies to SO#'s 8 & 9 - Addition and Subtraction
Story Problems - See lesson descriptions using the Story Problem "*thinkboard*" for ideas for this book.
This lesson includes a mixture of addition and subtraction story problems with result unknown and sums or
differences to 1000. Problems at a lower level can be found in grades 2 and higher in grades 4 and 5. Other
lesson samples, problems and literature link suggestions found at:
http://www5.sd71.bc.ca/math/index.php?page=lessons-activities-grade-3.

Sample Problems - The Garbage Barge (Jonah Winter)

10. Apply mental mathematics strategies and number properties, such as:
   • using doubles
   • making 10
   • using the commutative property
   • using the property of zero
   • thinking addition for subtraction for basic addition facts and related subtraction facts to 18. [C, CN,
     ME, PS, R, V]

Resources

Coming to Know Number (Wheatley & Reynolds, 2010) - Reference Material - Look at Math Squares & Two Ways pp. 147- 172. **To be used as mental math starters, may apply to SO#'s 6, 7, 8 & 10**. http://www. mathematicslearning.org/index.cfm?ref=30505

Application of Understanding

9. Demonstrate an understanding of addition and subtraction of numbers with answers to 1000 (limited to 1-, 2- and 3-digit numerals), concretely, pictorially and symbolically, by:
   • using personal strategies for adding and subtracting with and without the support of manipulatives
   • creating and solving problems in context that involve addition and subtraction of numbers.
[C, CN, ME, PS, R, V]

Resources

NCTM Resource: must be a member and logged in to access resources
Chip Trading: Practicing Single-Digit Addition with colored Chips representing Ones, Tens, and Hundreds
http://www.nctm.org/Classroom-Resources/Browse-All/?ps=20&cp=6&tx=2681

School Division #71 - Lesson Plans with Problem Solving, applies to SO#'s 8 & 9 - Addition and Subtraction Story Problems - See lesson descriptions using the Story Problem "*thinkboard*" for ideas for this book.
This lesson includes a mixture of addition and subtraction story problems with result unknown and sums or differences to 1000. Problems at a lower level can be found in grades 2 and higher in grades 4 and 5. Other lesson samples, problems and literature link suggestions found at
http://www5.sd71.bc.ca/math/index.php?page=lessons-activities-grade-3.

Sample Problems - The Garbage Barge (Jonah Winter)
K-5 Teaching Math Teaching Resources - More two-digit problems (involves multiple - two digit addends)

Pattern & Relations

4. Solve one-step addition and subtraction equations involving a symbol to represent an unknown number. [C, CN, PS, R, V]

Resources

Coming to Know Number (Wheatley & Reynolds, 2010) - Reference Material - Look at Math Balances pp. 147-172. To be used as mental math starters, may apply to SO#'s 6, 7, 8 & 10, Pattern SO# 4. http://www. mathematicslearning.org/index.cfm?ref=30505. Please reference Grade 3 "Equality Resources" on the ARPDC Learning Portal.

Mental Math

3. Demonstrate an understanding of addition of numbers with answers to 10 000 and their corresponding subtractions (limited to 3- and 4-digit numerals) by:
   • using personal strategies for adding and subtracting
   • estimating sums and differences
   • solving problems involving addition and subtraction. [C, CN, ME, PS, R]

Resources

Alberta Education – LearnAlberta.ca - Grade Four Mathematics Planning Guide (Addition and Subtraction)

School Division #71 - Lesson Plans with Problem Solving, applies to Grade 4 - SO# 3 - Addition and Subtraction Story Problems - "*thinkboard*" may be used. Problems at a lower level can be found in grades 2 and higher in grades 4 and 5. This lesson includes a mixture of addition and subtraction story problems (result unknown, change unknown and start unknown) based on the Michael Phelps book, How to Train with a T.Rex and Win 8 Gold Medals. See grades 2 and 3 for simpler versions of the problems. Extensions for partner problems, independent problems and adapted versions are available.

5. Describe and apply mental mathematics strategies, such as:
   • skip counting from a known fact [C, CN, ME, R]

Resources

Please NOTE - This minor outcome is best linked or combined with other SO's to provide a context. Students who use rote learning without context often do not bridge the Connections to "bigger ideas" like multiplicative reasoning. Consciously bridging ***Connections*** is KEY!

Application of Understanding

11. Demonstrate an understanding of addition and subtraction of decimals (limited to hundredths) by:
   • using personal strategies to determine sums and differences
   • estimating sums and differences using mental mathematics strategies to solve problems. [C, ME, PS, R, V]

Resources

Video Series: Using Base Ten Blocks for Addition and Subtraction of Decimals
   • Video 1: Renaming the Base Ten Blocks
   • Video 2: Using the Base Ten Blocks for Addition of Decimals
   • Video 3: Using the Base Ten Blocks for Subtraction of Decimals

Pattern & Relations

6. Solve one-step equations involving a symbol to represent an unknown number.
[C, CN, PS, R, V]

Resources

+Grade Five

Mental Math

11. Demonstrate an understanding of addition and subtraction of decimals (limited to thousandths). [C, CN, PS, R, V]

Resources

Video Series:

- Video 1: Using Base Ten Blocks to Represent Decimals
- Video 2: Using Base Ten Blocks to Add Decimals
- Video 3: Using the Base Ten Blocks for Subtraction of Decimals

+Grade Six

Mental Math

No Outcomes

Application of Understanding

2. Solve problems involving whole numbers and decimal numbers. [ME, PS, T]

Resources

Video Series:

- Video 1: Using Base Ten Blocks to Represent Decimals
- Video 2: Using Base Ten Blocks to Add Decimals
- Video 3: Using the Base Ten Blocks for Subtraction of Decimals