K – 2
VDOE Mathematics Institute
2010

Purpose and Goals

- Support implementation of the 2009 Standards
- Understand Vertical Progression for K-2 SOL
- Identify Challenging SOL and how to address them
- Highlight effective teaching practices in mathematics
- Focus on Number and Number Sense while highlighting other strands and connections between them

Unpacking Number and Number Sense

Number and Number Sense Kindergarten

K.1 The student, given two sets containing 10 or fewer concrete items, will identify and describe one set as having more, fewer, or the same number of members as the other set, using the concept of one - to - one correspondence.

K.2 The student, given a set containing 10 or fewer concrete items, will

a) tell how many are in the set by counting the number of items orally;

b) select the corresponding numeral from a given set; and

c) write the numeral to tell how many are in the set.

K.3 The student, given an ordered set of three objects and/or pictures, will indicate the ordinal position of each item, first through third, and the ordered position of each item from left-to-right, right-to- left, top-to-bottom, and/or bottom- to-top.

K.4 The student will investigate and recognize patterns from counting by fives and tens to 30,using concrete objects and a calculator.

K.5 The student will count forward to 30 and backward from 10.

Number and Number Sense
Grade 1

1.1 The student will count objects in a given set containing between 1 and 100 objects and write the corresponding numeral.

1.2 The student will group a collection of up to 100 objects into tens and ones and write the corresponding numeral to develop an understanding of place value.

1.3 The student will count forward by ones, fives, and tens to 100, by twos to 20, and backward by ones from 20.

1.4 The student will recognize and write numerals 0 through 100.

1.5 The student will identify the ordinal positions first through tenth, using an ordered set of objects.

1.6 The student will identify and represent the concepts of one-half and one-fourth, using appropriate materials or a drawing.

Number and Number Sense
Grade 2

2.1 The student will

a) read, write, and identify the place value of each digit in a three-digit numeral, using numeration models; and

b) round two-digit numbers to the nearest ten.

2.2 The student will compare two whole numbers between 0 and 999, using symbols (>, <, or =) and words (*greater than, less than, or equal to).*

2.3 The student will identify the ordinal positions first through twentieth, using an ordered set of objects

2.4 The student will identify the part of a set and/or region that represents fractions for one-half, one-third, one-fourth, one-eighth, and one-tenth and write the corresponding fraction.

2.5 The student will

a) count forward by twos, fives, and tens to 100, starting at various multiples of 2, 5, or 10, using mental mathematics, paper and pencil, hundred chart, calculators, and/or concrete objects, as appropriate;

b) count backward by tens from 100;

c) group objects by threes and fours; and

d) recognize even and odd numbers, using objects.

Number and Number Sense

Standard:

What do students have to do? Look for verbs.	With what?	With what parameters? Which figures, numbers, shapes?	Vocabulary	Essential Understandings

Number and Number Sense

K.2 The student, given a set containing 15 or fewer concrete objects, will

a) tell how many are in the set by counting the number of objects orally;

b) write the numeral to tell how many are in the set; and

c) select the corresponding numeral from a given set of numerals.

- **Same, Less, More**
- **One More/ One Less**
- **Garbage**
- **Think Board**
- **Equal Schmequal**
- **Roll and Color**
- **Roll and Write**

Number and Number Sense

1.1 The student will

a) count from 0 to 100 and write the corresponding numerals; and

b) group a collection of up to 100 objects into tens and ones and write the corresponding numeral to develop an understanding of place value.

- **Beaded Number Line**

Number and Number Sense

2.1 The student will

b) round two-digit numbers to the nearest ten

- **Beaded Number Line**

Kindergarten, First Grade and Second Grade

NUMBER AND NUMBER SENSE:

CONNECTIONS

TO OTHER

2009 MATHEMATICS

STRANDS

Computation and Estimation

Connected to N&NS SOL 2.1

2.6 The student, given two whole numbers whose sum is 99 or less, will

b) find the sum, using various methods of calculation.

2.7 The student, given two whole numbers, each of which is 99 or less, will

b) find the difference, using various methods of calculation.

- **Beaded Number Line**
- **Empty Number Line**

Number and Number Sense Connections to Computation and Estimation as Fact Strategies

Connected to N&NS SOL K.4

K.4 The student will

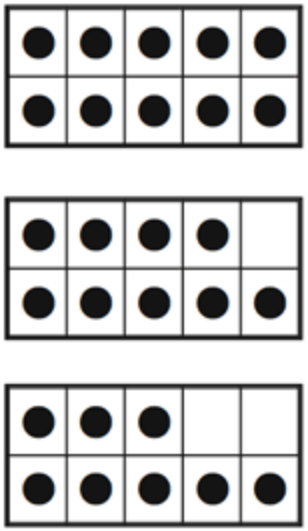
b) identify one more than a number and one less than a number

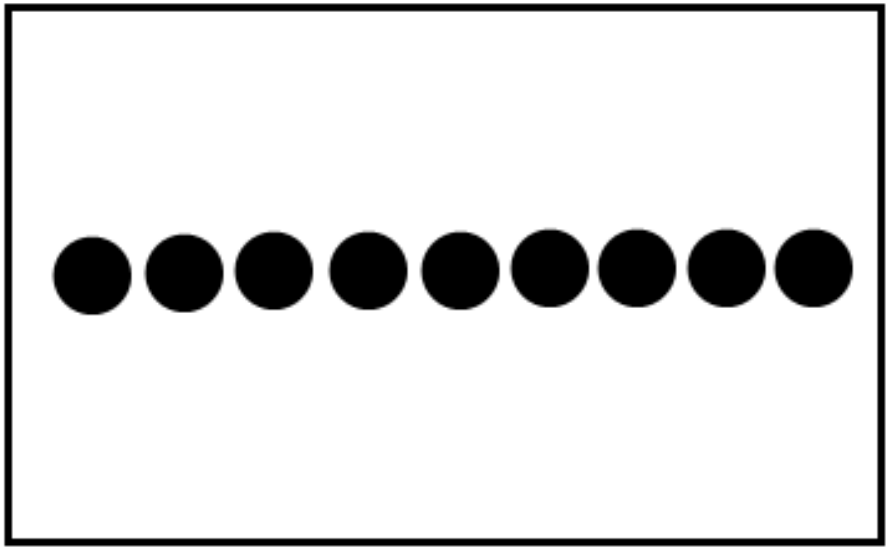
C&E:

1.5 The student will recall basic addition facts with sums to 18 or less and the corresponding subtraction facts.

2.5 The student will recall addition facts with sums to 20 or less and the corresponding subtraction facts

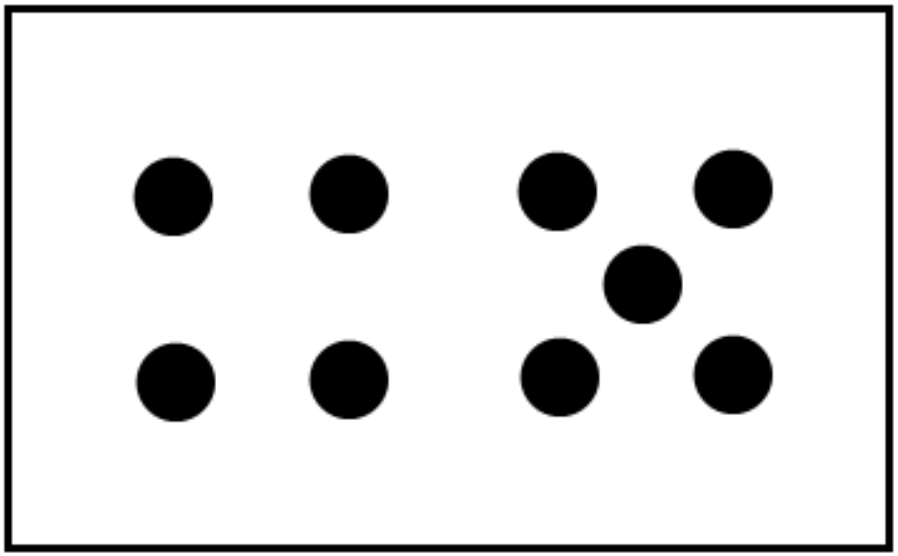
- **Build a Stack**
- **Neighbor Facts**
- **Quick Images**
- **Dot Cards**
- **Ten Frames**
- **Garbage**





Draw It

How Many?



Draw It

How Many?

Fact Strategies

Connected to N&NS SOL K.4

K.4 The student will

b) identify one more than a number and one less than a number

C&E:

1.5 The student will recall basic addition facts with sums to 18 or less and the corresponding subtraction facts.

2.5 The student will recall addition facts with sums to 20 or less and the corresponding subtraction facts

- Chop/Snap
- Turn over Ten
- Tens Go Fish
- Double Cover-up

Inverse Relationships

***Connected to N&NS SOL* 2.1, 2.4**

C&E:

2.5 The student will recall addition facts with sums to 20 or less and the corresponding subtraction facts.

2.9The student will recognize and describe the related facts that represent and describe the inverse relationship between addition and subtraction.

- **Spill the Beans**
- **Counters in a Cup**
- **Bears in a Cave**

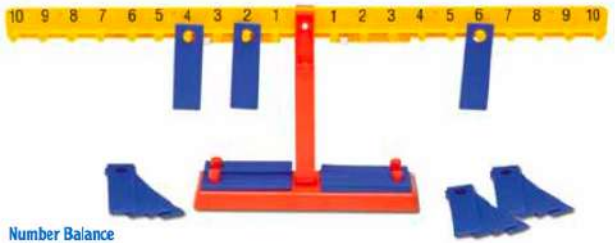
Equality

Connected to N&NS SOL 2.1c

1.18 The student will demonstrate an understanding of equality through the use of the equal sign.

2.22 The student will demonstrate an understanding of equality by recognizing that the symbol = in an equation indicates equivalent quantities and the symbol ≠ indicates that quantities are not equivalent.

- **Circle Maps**
- **Number Balance Activities**
- **Measurement Model using cubes**



Equality

Connected to N&NS SOL 3.1

3.20 The student will

b) identify examples of the identity and commutative properties for addition and multiplication

Identity Property of Addition

Identity Property of Multiplication

Commutative Property of Addition and Multiplication

Equality

Identity Property of Addition

8 + 0 = 8

Identity Property of Multiplication

8 x 1 = 8

Commutative Property of Addition

4 + 3 = 3 + 4

Commutative Property of Multiplication

2 x 5 = 5 x 2

Problem Solving…

is about seeing (interpreting, describing, explaining) situations mathematically, and not simply about executing rules, procedures, or skills expertly. Students need opportunities to solve various problem types through modeling to strengthen their mathematics understandings and use of concepts and skills.

Multistep Problem Solving involves:

- the use of two or more operations; and
- operations can be different.

Example:

Emily is reading the latest Magic Maggie book. She reads 12 pages each day. After 7 days, Emily still has 20 pages left to read. How many pages are in Emily's book?

Problem Solving Computation and Estimation

Connected to N&NS SOL 3.2

1.6 The student will create and solve one-step story and picture problems using basic addition facts with sums 10 18 or less and the corresponding subtraction facts.

2.8 The student will create and solve one- and two-step addition and subtraction problems, using data from simple tables, picture graphs, and bar graphs

3.4 The student will estimate solutions to and solve single-step and multistep problems involving the sum and difference of two whole numbers, each 9,999 or less, with or without regrouping.

- **Classify Types of Problems**
- **Create problems according to type**
- **Gallery Walk**

Vary the types of problems students experience because they need opportunities to solve various problem types through modeling to strengthen their mathematics understandings and use of concepts and skills.

Problem Solving Types

Join	**Result Unknown** Mark has 45 erasers. His sister gave him 35 more. How many erasers does Mark have?	**Change Unknown** Caitlyn has 32 stickers. Suzy gave her some more. Now Caitlyn has 58 stickers. How many stickers did Suzy give her?	**Start Unknown** Joey had some cookies. Susie gave him 3 more. Now he has eight cookies. How many cookies did Joey start with?

Problem Solving Types

Separate	**Result Unknown** Matt had 36 erasers in his collection. He gave 19 to his brother. How many erasers did Matt have in his collection?	**Change Unknown** Hannah had $57. She bought some school supplies. Then she had $23 left. How much money did Hannah spend on school supplies?	**Start Unknown** Katie had some cookies. She gave 1 ½ to Andrea, then had 2 ½ left. How many cookies did Katie have to start with?

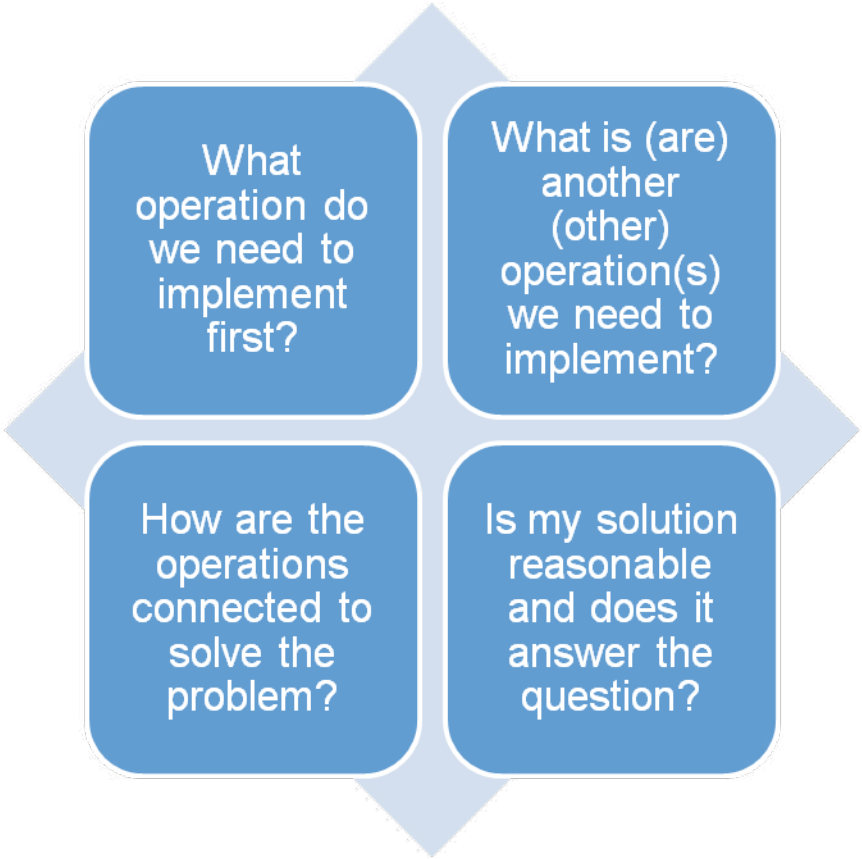
Problem Solving Types

Part-Part-Whole	**Whole Unknown** Cindy owns 15 fiction books and 73 non-fiction books. How many books does Cindy own?	**Part Unknown** Betty has 19¢ in her piggy bank. She has 9¢ in pennies. The rest are nickels. How much money does she have in nickels?

Problem Solving Types

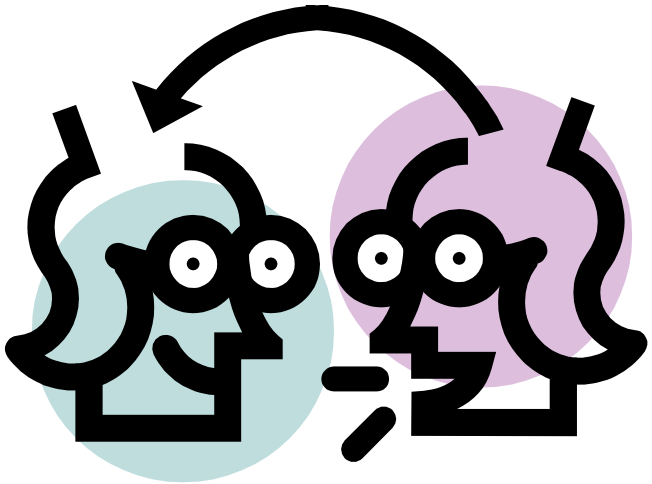
Compare	**Difference Unknown** Chris had 27 games. Jason had 44 games. How many more games does Jason have than Chris?	**Larger Unknown** Laura has 6 fewer pennies than Jacob. Laura has 12 pennies. How many pennies does Jacob have?	**Smaller Unknown** Whitney has 8 fewer pennies than . has 22 pennies. How many pennies does Whitney have?

Multistep Problem Solving



Multistep Problem Solving

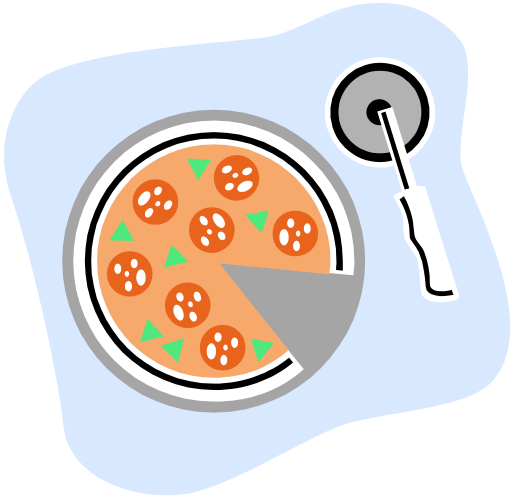
- **Create a multistep problem**
- **Share**



Fractions

K.5 The student will identify the parts of a set and/or a region that represent fractions for halves and fourths.

- **Fraction Circle Plates**



Fractions

1.3 The student will identify the parts of a set and/or region that represent fractions for halves, thirds, and fourths and write the fractions.

2.3The student will

a)identify the parts of a set and/or region that represent fractions for halves, thirds, fourths, sixths, eighths, and tenths;

b)write the fractions; and

c)compare the unit fractions for halves, thirds, fourths, sixths, eighths, and tenths.

- Fraction Sort
- Compare Unit Fractions
- Fraction War
- One Away from Whole
- Making Generalizations

Process Standards

- Problem Solving
- Communication
- Reasoning and Proof
- Representations
- Connections

Good Questioning

- How did you solve it?
- What was your strategy?
- How do you know?
- Can you prove that it always works with other numbers?
- Does anyone have another strategy?

3 , 2 , 1 …..Then you'll be done!

ON YOUR EXIT CARD PLEASE WRITE DOWN…..

- 3 KEY THINGS YOU'VE LEARNED
- 2 THINGS YOU ARE STILL THINKING ABOUT
- 1 PLAN OF WHAT WILL BE THE NEXT STEPS

THANKS FOR COMING!

Making Mathematics Meaningful for All