



KINDERGARTEN MATH: BOOKS ON SHELVES

UNIT OVERVIEW

Books on Shelves is the culminating task in a multi-week unit focused on operations and algebraic thinking. Students demonstrate mastery by completing the Books on Shelves task in one class period.

TASK DETAILS

Task Name: Books on Shelves

Grade: K

Subject: Math

Depth of Knowledge: 2

Task Description: Students are asked to demonstrate the different possible combinations when placing 6 books on 2 shelves.

Standards Assessed:

K.OA.3 Decompose numbers less than or equal to 10 into pairs in more than one way, e.g., by using objects or drawings, and record each decomposition by a drawing or equation (e.g., $5 = 2 + 3$ and $5 = 4 + 1$).

Standards for Mathematical Practice:

MP.1 Make sense of problems and persevere in solving them.

MP.2 Reason abstractly and quantitatively.

MP.3 Construct viable arguments and critique the reasoning of others.

MP.6 Attend to precision.



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The task and instructional supports in the following pages are designed to help educators understand and implement tasks that are embedded in Common Core-aligned curricula. While the focus for the 2011-2012 Instructional Expectations is on engaging students in Common Core-aligned culminating tasks, it is imperative that the tasks are embedded in units of study that are also aligned to the new standards. Rather than asking teachers to introduce a task into the semester without context, this work is intended to encourage analysis of student and teacher work to understand what alignment looks like. We have learned through the 2010-2011 Common Core pilots that beginning with rigorous assessments drives significant shifts in curriculum and pedagogy. Universal Design for Learning (UDL) support is included to ensure multiple entry points for all learners, including students with disabilities and English language learners.

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KINDERGARTEN MATH: BOOKS ON SHELVES PERFORMANCE TASK

Name _____

Books on Shelves

Miguel has two shelves. Miguel has six books. Miguel wants to put books on the two shelves. How many different ways can Miguel put books on the two shelves? Show and tell how you know.



KINDERGARTEN MATH: BOOKS ON SHELVES

UNIVERSAL DESIGN FOR LEARNING (UDL) PRINCIPLES

" ««§~«a' «j 'zj ~ - Math Grade K
.....Common Core Learning Standards/
.....Universal Design for Learning

The goal of using Common Core Learning Standards (CCLS) is to provide the highest academic standards to all of our students. Universal Design for Learning (UDL) is a set of principles that provides teachers with a structure to develop their instruction to meet the needs of a diversity of learners. UDL is a research-based framework that suggests each student learns in a unique manner. A one-size-fits-all approach is not effective to meet the diverse range of learners in our schools. By creating options for how instruction is presented, how students express their ideas, and how teachers can engage students in their learning, instruction can be customized and adjusted to meet individual student needs. In this manner, we can support our students to succeed in the CCLS.

Below are some ideas of how this Common Core Task is aligned with the three principles of UDL; providing options in representation, action/expression, and engagement. As UDL calls for multiple options, the possible list is endless. Please use this as a starting point. Think about your own group of students and assess whether these are options you can use.

REPRESENTATION: *The “what” of learning.* How does the task present information and content in different ways? How do students gather facts and categorize what they see, hear, and read? How are they identifying letters, words, or an author's style?

In this task, teachers can...

- ✓ **Highlight or emphasize key elements in text, graphics, and diagrams** by providing access to concrete or virtual manipulatives, such as pictures or models of > ««§~«a' «j 'zj ~.

ACTION/EXPRESSION: *The “how” of learning.* How does the task differentiate the ways that students can express what they know? How do they plan and perform tasks? How do students organize and express their ideas?

In this task, teachers can...

- ✓ **Provide graphic organizers and templates for data collection and organizing information** to help students organize their thoughts and establish relationships between ideas. Graphic organizers can be paper/pencil or found on-line..

ENGAGEMENT: *The “why” of learning.* How does the task stimulate interest and motivation for learning? How do students get engaged? How are they challenged, excited, or interested?

In this task, teachers can...

- ✓ **Provide feedback that is frequent, timely, and specific** by helping students see what they did well and why, see their errors and learn how to correct them by providing explicit and informative feedback when assessing student work, making feedback a part of the learning process.

Visit <http://schools.nyc.gov/Academics/CommonCoreLibrary/default.htm> to learn more information about UDL.



KINDERGARTEN MATH:BOOKS ON SHELVES RUBRIC

CCSS Mathematics Content Standards & Standards in Practice

Students apply mathematical reasoning, knowledge, and skills in problems-solving situations and support their solutions using mathematical language and appropriate representations (data).

Grades K-1 Progress-Monitoring Focus: Addition & subtraction; Comparing & ordering numbers

Gr. K-1 Math CCSS Criteria/Clusters	Novice	Apprentice	Practitioner	Expert
Counting & Cardinality (K only)	<p>May recognize number symbols and names, but lacks counting sequence</p> <p>A numerical answer may be correct, but is not supported by student work (e.g., solves problem without applying properties of operations; just copies numbers) OR stated answer is incorrect or lacks relevance</p>	<p>Some parts of problem correct and those parts supported by student work</p> <p>Represents and solves simple addition and subtraction problems using counting, models, visuals, manipulatives, number lines, sounds, etc.</p> <p>May apply commutative property</p>	<p><i>Represents number of objects for written numerals, 0-20</i> K.CC-3 <i>Counts to find out how many; Determines greater than/less than of groups of objects (up to 20 if ordered; up to 10 if random)</i> K.CC- 4, 5 <i>Compares numbers between 1 and 10 using written numerals</i> K.CC-6, 7</p>	<p>Represents, compares, and solves problems using numbers greater than 20</p> <p>Applies associative or commutative properties to solve problems</p>

<p>Operations & Algebraic Thinking</p> <p>And</p> <p>Number & Operations in Base Ten</p>	<p>Uses place value to show 10 or less</p>	<p>Represents and solves simple addition and subtraction problems using counting, models, visuals, manipulatives, number lines, sounds, etc.</p> <p>May apply commutative property</p>	<p><i>Represents, compares, & solves addition & subtraction using strategies – counting, objects, drawings, etc. ...</i> <i>-to 10</i> K.OA-1, 2 <i>-or to 20; with multiple addends; using equal sign and equations</i> 1. OA-1, 2, 6, 7, 8 <i>Composes/ decomposes and compares numbers using tens and ones</i> K.OA-3; K.NBT-1 1.NBT- 2, 3 <i>Applies associative & commutative properties</i> 1.OA-3 <i>Minor computation flaws do not affect outcome of a correct solution</i></p>	<p>Represents, compares, and solves problems using numbers up to 100 (K) 120 (gr1)</p> <p>All parts of problem correct, precise, and supported by student work</p> <p>Applies associative or commutative properties to solve problems in more than one way</p> <p>Uses place value to expand numbers (gr 1)</p>
<p>Measurement & Data</p>	<p>Still demonstrates limited number sense (e.g., difficulty counting, estimating; representing quantities; recognizing measurement attributes.)</p> <p>Tells time to the hour using a digital clock</p>	<p>Recognizes and uses 1 measureable attribute to compare or classify</p> <p>Tells time to hour, & half hour (gr 1) using a digital clock</p>	<p><i>Describes measurable attributes; compares measures of objects</i> K.MD-1, 2 <i>Measures to whole unit; compares 2 or 3 objects; classifies objects using more than 1 attribute</i> 1.MD-1, 2 <i>Measures & compares lengths indirectly</i> 1.MD-1 <i>Tells time to hour & half hour using digital and analog clocks</i> 1.MD-3</p>	<p>Uses a variety of strategies to estimate, measure, and compare Measures and compares lengths of more than 2 objects and determines the difference in lengths</p>



KINDERGARTEN MATH: BOOKS ON SHELVES ANNOTATED STUDENT WORK

This section contains annotated student work at a range of score points. The student work shows examples of student understandings and misunderstandings of the task.

Kindergarten Math: Books on Shelves Annotated Student Work

Expert
Name Student 1D

P/S	R/P	Com	Con	Rep	Ach/Level
E	E	E	E	E	E

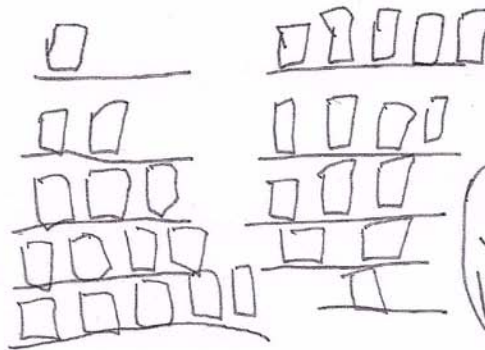
Books on Shelves

Miguel has two shelves.
Miguel has six books.
Miguel wants to put books on the two shelves.
How many different ways can Miguel put books on the two shelves?
Show and tell how you know.

Student's strategy of diagramming five possible combinations for six books on two shelves shows correct reasoning and proof.

The student's diagram is appropriate and accurate with a key to define the shelves & books

Do a diagram



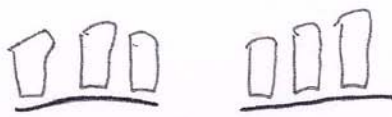
①

The student states a correct answer, "5 ways."

②

5 Ways

Student correctly uses the mathematical terms-"diagram, key, fair share, equal, even number, combinations, table pattern."



③

"This is a fair share of books for the two shelves. That means equal. 6 books means even number."

combinations

"This word is combinations. Miguel has 5 of them."



④

"If the books can go on only one shelf you can have two more ways - zero and six six and zero"

"I think I can do a table."

Student makes a number of Practitioner connections.

Kindergarten Math: Books on Shelves
Annotated Student Work

books shelf 1	books shelf 2
1	5
2	4
3	3
4	2
5	1

7

The student's table is appropriate and accurate with all labels indicated and the data is correct.

$$1+5=6$$

$$2+4=6$$

$$3+3=6$$

$$4+2=6$$

$$5+1=6$$

5

5

Student makes an Expert connection by solving the problem with a new strategy of a table and number sentences to confirm her/his answer is correct.

"Look, the books go up by 1 here (pointed to shelf 1) and books go down by 1 here (pointed to shelf 2) that is a pattern. I did 5 ways here and here (pointed to diagram and table). Tell Miguel it is 5 ways cuz I know it is." A2

Kindergarten Math: Books on Shelves Annotated Student Work

Practitioner
Name Student 1C

P/S	R/P	Com	Con	Rep	Ach/Level
P	P	P	P	P	P

K

Books on Shelves

Miguel has two shelves.
Miguel has six books.
Miguel wants to put books on the two shelves.
How many different ways can Miguel put books on the two shelves?
Show and tell how you know.

Student's strategy of using a diagram and number sentences to show the five possible combinations for six books on two shelves works to solve the problem.

Student correctly uses the mathematical terms-"diagram, key, number sentences, equal."

my diagram ③

①

$3+3=6$

②

$2+4=6$

⑤

$5+1=6$

④

$4+2=6$

all is = 6

"The two sides has to equal six."

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key
book □
shelves □

"I made my key. I put the books on shelves. I did my number sentences. I got 5 ways" ②

(pointed to each and explained 3 books add 3 books is 6 books...)

"You can't turn 3 and 3 around because they are the same number." #2

Student's diagram is appropriate and accurate. A key and scribing define the shelves and books.

The student states correct answer, "I got 5 ways."

Student makes a relevant connection, "You can't turn..."

Kindergarten Math: Books on Shelves Annotated Student Work

Practitioner
Name Student 2C

P/S	R/P	Com	Con	Rep	Ach/Level
P	P	P	P	P	P

K

Books on Shelves

Miguel has two shelves.
Miguel has six books.
Miguel wants to put books on the two shelves.
How many different ways can Miguel put books on the two shelves?
Show and tell how you know.

My table



miguel's books

1	2
□	□□□□□
□□	□□□□□
□□□	□□□□
□□□□	□□
□□□□□	□

A
5

Student's strategy of using a table to show the five possible combinations for six books on two shelves works to solve the problem.

The student states correct answer, "5."

Student's tables are appropriate and accurate. A key and scribing define the shelves and books.

Student correctly uses the mathematical terms-"table, key."

"I did a table
I made a key
for shelf 1 and 2
and 6 books
I went 1 book, 2 book
3 book, 4 book, 5 book
so I don't miss any
ways. We learned that
plan. Miguel has 5
ways to do the books.
1 plus 5, 2 plus 4,
3 plus 3
4 plus 2, 5 plus 1 (pointed to table)
They all end at 6 books."

Table 2

1	2
1	5
2	4
3	3
4	2
5	1

"I did it with
the numbers
It is faster
this way."

"3 books and 3 books
is the same on
shelf 1 and shelf 2"
A2

Student makes relevant connections. The student creates a new table to show the possible combinations and states, "three books and three books is the same on shelf one and shelf two."

Kindergarten Math: Books on Shelves Annotated Student Work

Practitioner
Name Student 3C

P/S	R/P	Com	Con	Rep	Ach/Level
P	P	P	P	P	P

K

Books on Shelves


Miguel has two shelves.
Miguel has six books.
Miguel wants to put books on the two shelves.
How many different ways can Miguel put books on the two shelves?
Show and tell how you know.

Student's strategy of diagramming three possible combinations for six books on two shelves leads to a partial answer.


Student correctly uses the mathematical term "diagram."

I will draw a diagram


Key
book shelf




1 + 5 = 6



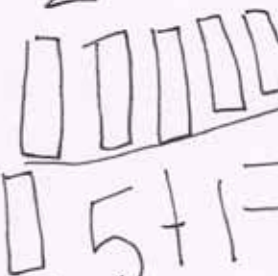
2 + 4 = 6



3 + 3 = 6



4 + 2 = 6



5 + 1 = 6

5

"I used my fingers I did 1 and 5, 2 and 4, 3 and 3, 4 and 2, 5 and 1." (pointed correctly)
"3 and 3 is the only one with the same number of books on a shelf - 3"
AZ

Student's diagram is appropriate but not accurate. Two combinations are not indicated and a key or scribing is not included to define the shelves and books.

The student states an incorrect answer, "3 ways."

Student does not attempt a mathematically relevant connection.

Kindergarten Math: Books on Shelves Annotated Student Work

Apprentice
Name Student 18

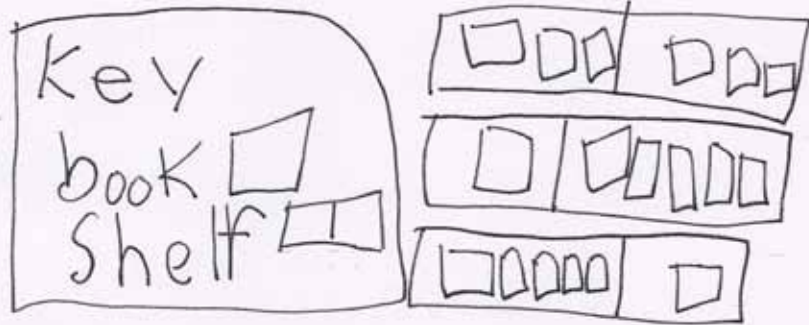
P/S	R/P	Com	Con	Rep	Ach/Level
P	P	P	N	P	A

K

Books on Shelves

Miguel has two shelves.
Miguel has six books.
Miguel wants to put books on the two shelves.
How many different ways can Miguel put books on the two shelves?
Show and tell how you know.

make a diagram. ①



"I used my brain to find out the answer. All of them had 6. Any time I made 6 I kept it." ②

5 ③

④

there is 6 book

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Student's strategy of diagramming the five possible combinations for six books on two shelves is correct.

Student correctly uses the mathematical terms- "diagram, key."

The student states a correct answer, 5.

Student's diagram is appropriate and accurate with a key to define the books and shelves.

Student does not make a mathematically relevant connection.

Kindergarten Math: Books on Shelves Annotated Student Work

Apprentice
Name Student 28

P/S	R/P	Com	Con	Rep	Ach/Level
A	A	A	A	A	A

K

Books on Shelves

Miguel has two shelves.
Miguel has six books.
Miguel wants to put books on the two shelves.
How many different ways can Miguel put books on the two shelves?
Show and tell how you know.

Student only diagrams two possible combinations for a partial answer.

Student correctly uses the mathematical term diagram. The term key is not credited because the key is not accurate.

I will draw a diagram

"I counted the books I made them. This is like the gold fish (problem) because we do a diagram like the gold fish." Az

The student shows some correct reasoning in the scribing.

Student's diagram is appropriate but not accurate. The key is not complete and the student's scribing only defines the books.

Student does not make a mathematically relevant connection.

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Kindergarten Math: Books on Shelves Annotated Student Work

Apprentice
Name Student 3B

P/S	R/P	Com	Con	Rep	Ach/Level
A	A	A	N	A	A

K

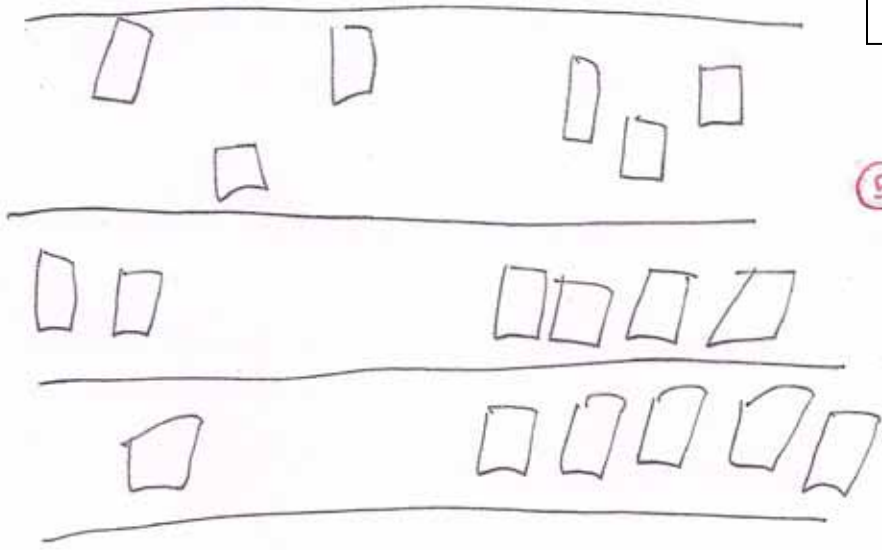
Books on Shelves

Miguel has two shelves.
Miguel has six books.
Miguel wants to put books on the two shelves.
How many different ways can Miguel put books on the two shelves?
Show and tell how you know.

Student's strategy of diagramming three possible combinations for six books on two shelves leads to a partial answer.

My diagram 3

Student correctly uses the mathematical term-"diagram."



Student's diagram is appropriate but not accurate. Two combinations are not indicated and a key or scribing is not included to define the shelves and books.

3 ways 2

The student states an incorrect answer, "3 ways."

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4

Student does not attempt a mathematically relevant connection.

Kindergarten Math: Books on Shelves Annotated Student Work

Name Novice Student 1A

P/S	R/P	Com	Con	Rep	Ach/Level
N	A	P	N	A	N

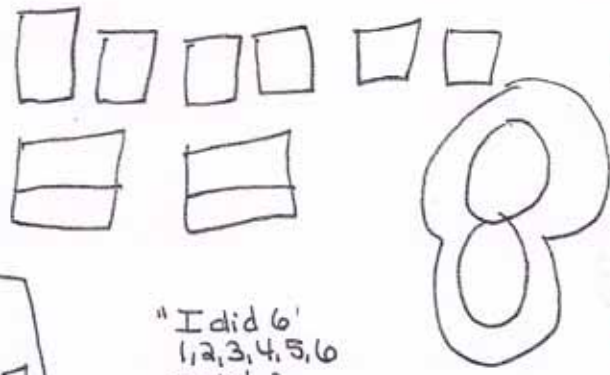
K

Books on Shelves

Miguel has two shelves.
 Miguel has six books.
 Miguel wants to put books on the two shelves.
 How many different ways can Miguel put books on the two shelves?
 Show and tell how you know.

I will draw a diagram
 Miguel has 6 books + 2 shelves

Student correctly uses the mathematical terms- "diagram, key."



Student understands 6 books and two shelves but appears to add the numbers six and two from the problem.

Key
 books □

"I did 6"
 1, 2, 3, 4, 5, 6
 I did 2
 1, 2
 I got 8
 1, 2, 3, 4, 5, 6, 7, 8"
 #2

Student does not use the commutative property to solve the problem.

Student's answer, 8, is incorrect.

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Kindergarten Math: Books on Shelves Annotated Student Work

Novice
Name Student 2A

P/S	R/P	Com	Con	Rep	Ach/Level
N	N	P	N	A	N

K

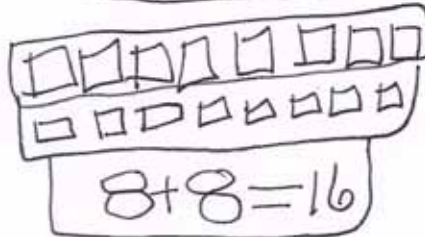
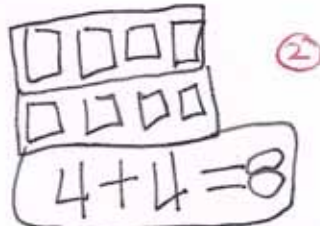
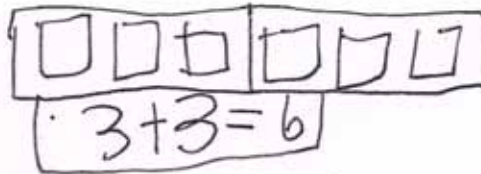
Books on Shelves

Miguel has two shelves.
Miguel has six books.
Miguel wants to put books on the two shelves.
How many different ways can Miguel put books on the two shelves?
Show and tell how you know.

I will draw a diagram ①



③



④

⑤

Student's strategy of diagramming the double of three, four, and eight books would not work to solve the problem.

Student does not use commutative property to find 5 possible combinations.

Student correctly uses the mathematical terms "diagram, key."

Student does not make a mathematically relevant connection.

Student attempts a diagram but it is not appropriate to the problem.

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KINDERGARTEN MATH: BOOKS ON SHELVES INSTRUCTIONAL SUPPORTS

The instructional supports on the following pages include a unit outline with formative assessments and suggested learning activities. Teachers may use this unit outline as it is described, integrate parts of it into a currently existing curriculum unit, or use it as a model or checklist for a currently existing unit on a different topic.

Unit Outline –Kindergarten Math

INTRODUCTION: This unit outline provides an example of how teachers may integrate performance tasks into a unit. *Teachers may (a) use this unit outline as it is described below; (b) integrate parts of it into a currently existing curriculum unit; or (c) use it as a model or checklist for a currently existing unit on a different topic.*

Kindergarten Mathematics: Operations and Algebraic Thinking Unit

UNIT TOPIC AND LENGTH:

- This unit focuses on initial addition concepts with objects, drawings, dramatization, verbal explanations or expressions and equations. Students will work on decomposing numbers up to 10, using and recording their work with objects, drawings and or equations. At this time students should understand cardinal counting, but not necessarily conserve number.
- For developmental reasons this unit should happen in the second half of the year and can last several weeks. *(In Kindergarten, routines and games that support the mathematics in this unit should be happening all year and are not limited to one unit.)*

COMMON CORE CONTENT STANDARDS:

- K.OA.1 Represent addition and subtraction with objects, fingers, mental images, drawings¹, sounds (e.g., claps), acting out situations, verbal explanations, expressions, or equations.
- K.OA.3 Decompose numbers less than or equal to 10 into pairs in more than one way, e.g., by using objects or drawings, and record each decomposition by a drawing or equation (e.g., $5 = 2 + 3$ and $5 = 4 + 1$).
- K.CC.4 Understand the relationship between numbers and quantities; connect counting to cardinality.
- MP.1 Make sense of problems and persevere in solving them.
- MP.3 Construct viable arguments and critique the reasoning of others.
- MP.4 Model with mathematics
- MP.6 Attend to precision

BIG IDEAS/ENDURING UNDERSTANDINGS:

- Mathematicians can organize, represent, and compare the same number using different groupings (numbers or objects).
- Mathematicians can explain how numbers are organized, represented, and compared.

ESSENTIAL QUESTIONS:

- How do we show that numbers work together?
- How can we show and explain our thinking?

¹ Drawings need not show details, but should show the mathematics in the problem. (This applies wherever drawings are mentioned in the Standards.)

Unit Outline –Kindergarten Math

CONTENT:

Numbers and quantities up to 10

- Order of numbers
- One to one correspondence
- Count
- Written numbers up to 10
- Quantities up to 10

Addition and subtraction up to 10 with objects

Number composition and decomposition

- Put together/take apart number strategies. Numbers less than and up to 10, not including zero, can be composed and put back together in more than one way.

SKILLS:

- **Recognize and name** numbers up to 10
- **Count** up to 10 orally
- **Match** a written number to objects
- **Sequence** numbers 1-up to 10
- **Write** numbers 1 – up to 10
- **Count** a number of objects
- **Demonstrate** that numbers have a quantity using objects

- **Add** objects to a set to show a number
- **Take away** objects in a set to show a number
- **Manipulate** objects to show a number sentence
- **Demonstrate** at least 2 different combinations of objects for one number
- **Explain** how to add or subtract objects to show a different number

KEY TERMS/ VOCABULARY:

- Add, subtract, explain

ASSESSMENT EVIDENCE AND ACTIVITIES:

INITIAL ASSESSMENT : GOLDFISH

Students are given a narrative situation in which they are asked to decompose the number 4 in as many ways as they can. Students represent the different combinations using pictures, numbers or any manipulative allowing them to show pairs of numbers that make four. Some Kindergarteners may need manipulatives such as stickers, unifix cubes, etc rather than actual drawings or symbolic numerical representation to show the decomposition pairs. The teacher should be carefully observing students as they work on this task noting the strategies they use. *See the task Goldfish and the associated planning sheet for full details.*

FORMATIVE ASSESSMENT: PRETTY TULIPS

Students are given another narrative situation in which they are asked to decompose the number five in as many ways as they can. Five is a benchmark number in our base ten system and it's important that students have fluency with the number. The students should be able to represent their solutions with manipulatives, pictures, five frames, numbers and or equations. The teacher should be carefully observing students as they work on this task noting the

Unit Outline –Kindergarten Math

strategies they use. *See the task Pretty Tulips and the associated planning sheet for full details.*

FINAL PERFORMANCE TASK: BOOKS ON SHELVES

Students are given a narrative situation in which they are asked to decompose the number six into as many ways as they can. Some Kindergarteners may need manipulatives such as stickers, unifix cubes etc rather than actual drawings or symbolic numerical representation to show the decomposition pairs. The teacher should be carefully observing students as they work on this task noting the strategies they use. *See the task Books on Shelves and the associated planning sheet for full details.*

LEARNING PLAN & ACTIVITIES:

- Routines and activities around counting and creating sets for a given number are important.
- Five and Ten frame counting and initial adding activities are listed below in a developmental sequence. Corresponding activity sheets are included in the unit. **It should be noted that most kindergarten instructional programs include games and routines that address these standards. The list below is a sampling of routines and games you may add to your repertoire. ***

Quick Images: This routine can be done with dice faces, dot cards, five frames and ten frames. Initially children can use manipulatives to show the quantity projected on the screen. As the student's skills development around subitizing you can project more complex image amounts from the ten frames for a shorter amount of time. Challenge the students to say a quantity that is to more or two less than what is on the screen.

Breaking cubes: The teacher should model this activity first before children to play with their partners.

Unifix Towers

Make Five on the Five Frame

Shake Five and Spill

Sums of Five

Five Squares

Part-Whole Mats

Make Ten on the Ten Frame

Making Apple Ten Packs

Bunk Bed Problem

On and Off

Counters in a Cup

- Closely observe students while they are engaged in the activities and make note of the strategies they are using. Are they beginning to subitize or are they counting all? Are they finding several solutions or are they moving on after one or two?
- Make sure that you give students the opportunity to talk about their experience with their classmates.

Unit Outline –Kindergarten Math

Let children explain how they found their answers to each other.

- Students should be asked if later activities and assessment problems remind them of other activities they have done. Do they recognize that although the numbers and contexts are different, the mathematics is the same?

*Activities and games are included in this packet

RESOURCES:

Children's Related Literature Sampling:

- *Rooster's off to See the World* by Eric Carle
- *The Very Hungry Caterpillar* by Eric Carle
- *Ten Black Dots* by Donald Crews
- *Benny's Pennies* by Pat Brisson
- *Fish Eyes: A Book You Can Count On* by Lois Ehlert
- *Ten Little Rabbits* by Virginia Grossman
- *Ten, Nine, Eight* by Molly Bang
- *Mouse Count* by Ellen Stoll Walsh
- *Ten Flashing Fireflies* by Philemon Sturges
- *1 Hunter* by Pat Hutchins
- *12 ways to get to 11* by Eve Merriam

Professional Literature Resources and Research Articles:

Learning and Teaching Early Mathematics by Douglas Clements and Julie Surgma

Teaching Student Centered Mathematics Volume 1 Grades K-2 by Van de Walle and Lovin

Coming to Know Number by Wheatley and Reynolds

Young Mathematicians at Work: Constructing Number Sense, Addition and Subtraction by Fosnot and Dolk

Number Talks by Sherry Parrish

Research Articles

Number Relationships in Preschool by Myoungwhon Jung

An Algebraic-Habits-of-Mind Perspective on Elementary School by Goldenberg, Mark and Cuocco

Websites directly related to the unit, great for games activities and ideas:

For teachers:

- <http://www.K-5mathteachingresources.com>
- http://commoncoretools.files.wordpress.com/2011/05/ccss_progression_cc_0a_k5_2011_05_302.pdf

For students:

- <http://illuminations.nctm.org/LessonDetail.aspx?ID=L54>
- <http://illuminations.nctm.org/LessonDetail.aspx?ID=L26>
- <http://www.fi.uu.nl/rekenweb/en/welcome.xml?groep=2>

P/S	R/P	Com	Con	Rep	Ach/Level

Name _____

Goldfish

Jarod has four goldfish. Jarod has a square bowl and a round bowl. Jarod wants to put the four goldfish in the two bowls. How many different ways can Jarod put the four goldfish in two bowls? Show and tell how you know.

Preliminary Planning Sheet for a Mathematics Portfolio Piece/Task

(K)

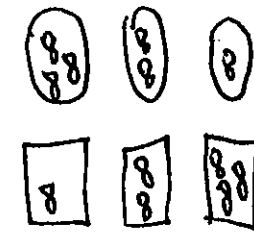
Title of Task Goldfish Content Strand(s) Addressed Operations + Algebraic Thinking
 State Standard(s) Addressed _____ Program Link _____
 Common Core Standard(s) K.OA.3

Underlying Mathematical Concepts

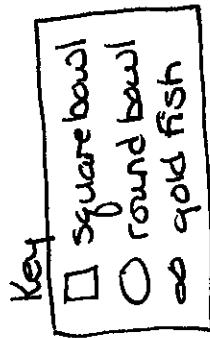
Combinations of 4
 square / round
 number sense to 4
 counting on (addition commutative property)

Problem Solving Strategies/Representation
 diagram (key)
 model (manipulatives)
 tally chart
 table

Mathematical Language
 diagram square
 key more/less than
 model equal
 tally chart fair share
 table pattern
 odd equation
 even
 combination
 per
 commutative property
 Related Tasks



Answer
 3 ways / combinations



Goldfish fishing	Square bowl	Round bowl
1+3=4	1	3
2+2=4	2	2
3+1=4	3	1

use graph paper and colors

1+3=4
 2+2=4
 3+1=4

Connections

- 2 goldfish per bowl is a fair share
- Always even fish or odd goldfish in a combination
- 1 less combination than total goldfish - prove this phenomenon
- Recreate problem by adding more goldfish to see if "less rule" continues
- Relate to a similar problem and state math
- Verify by solving more than one way

See Resource Binder

Can't use zero - fish have to be in both bowls

P/S	R/P	Com	Con	Rep	Ach/Level

Name _____

Pretty Tulips

Hector has five tulips. Hector has two vases. Hector wants to put the tulips in the two vases. Hector needs your help. How many different ways can Hector put five tulips in two vases? Show and tell how you know.

Games & Activities

'Breaking Cubes

Materials: 5-10 snap or unifix cubes in a stick

Players: 1-3

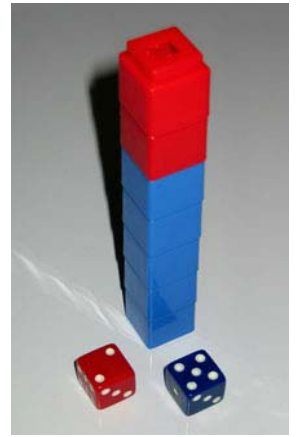
Object: To figure out how many cubes are hidden behind
Your partner's back.

How to Play:

1. Make a stick of cubes 5-10 cubes long and one color.
2. Behind your back break apart your cube stick into two parts and show only one part.
3. Your partner will guess how many sticks you have hidden behind your back.
3. Show what you have hidden.
4. Let you partner have a turn and repeat steps 1-3

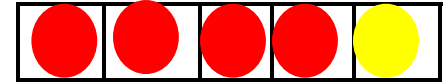
Unifix Towers

Materials dice, unifix cubes, paper, pencils



1. Roll two dice and build a unifix tower to match the total.
2. Keep rolling and building until you have made 5 towers.
3. Put your towers in order from smallest to largest.
4. Draw a picture or write about your towers.

Make Five on the Five Frame



Materials: two color counters (red and yellow), blank five frame

I placed five counters on my five frame. Some were red and some were yellow. What might my five frame have looked like?

Use pictures, numbers, or words to show as many different solutions as you can.

How many different solutions did you find?

Sums of Five

Materials: dot or numeral cards 0-5, Sums of Five gameboard, 10 counters for each player of different colors (e.g. one stick of 10 orange Unifix cubes and one stick of 10 blue Unifix cubes)

1. Work with a partner. Player A: Turn over a card and place that many counters on the first five-frame on the gameboard. Complete the math talk sentence



I have ____.
I need ____ more to get to five.

2. Player B: Turn over a card and place that many counters on the second five-frame on the gameboard. Complete the math talk sentences.
3. Player A: Turn over a card and place that many counters on the third five-frame on the gameboard. Complete the math talk sentences.
4. Continue to turn over cards to try and fill a five-frame. Each frame must be filled with only two cards (e.g. 4 and 1 or 2 and 3). If a player turns over a card that can not be used to complete a frame she or he misses a turn. Whoever completes a frame scores a point.

Sums of Five

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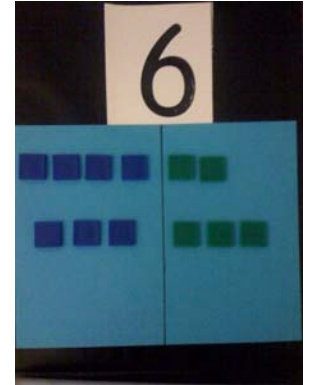
Five Squares

Materials: container of square pattern blocks, numeral cards (0-5)

1. Count out five square pattern blocks.
2. Put your five squares into two sets.
3. Show a different way to put the five squares into two sets.
4. How many different ways can you find to do this?
5. Record your work using pictures, numbers, or words.



Part-Whole Mats



Materials: Part-Whole Mats, numeral cards, counters

1. Choose a numeral card and place it above your Part-Whole Mat.
2. How many different pairs of numbers can you find to equal the number on your Part-Whole Mat?
3. Use pictures, numbers or words to record your work.

Part-Whole Mats

Mathematical Ideas: Part-whole relationships, Using counting strategies and number facts to solve problems, Commutativity. Communicating Mathematically

Math Vocabulary: different, equals, altogether, pairs

Materials: part-whole mats, numeral cards, counters, blank paper, pencils

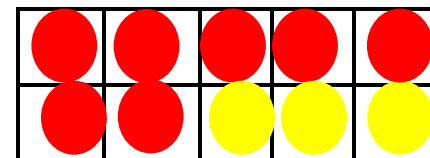
Starting Point: Choose a numeral card. Place the number you have chosen above your Part-Whole mat. How many different pairs of numbers can you find to equal the number on your Part-Whole Mat? Use pictures, numbers or words to record your work.

Possible questions to develop and extend students' thinking:

- How many different pairs of numbers have you found that equal (10)?
- Do you know any other pairs of numbers that equal (10)?
- Tell me about your recording.
- Can you order your number sentences? What do you notice when you put your number sentences in order?
- You recorded that (7) plus (3) equals (10) and (3) plus (7) equals (10). Why do (7) plus (3) and (3) plus (7) both equal (10)?

* Adjust numbers in () to match student's recording.

Make Ten on the Ten Frame



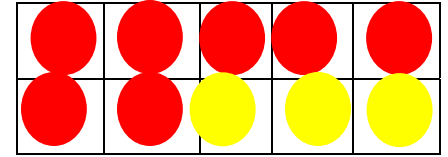
Materials: two color counters (red and yellow), blank ten frame

I placed ten counters on my ten frame. Some were red and some were yellow. What might my ten frame have looked like?

Draw a picture and write a number model for each solution that you find.

How many different solutions did you find?

Making Apple Ten Packs



Materials: red and yellow counters, ten frames

The greengrocer wanted to make a pack of ten apples.

How many different ways could the greengrocer make a ten pack with some red and some yellow apples?

Use pictures, numbers, or words to show your thinking.

Bunk Bed Problem



Materials: counters, numeral cards 5-12, pencils, blank paper

1. Turn over a numeral card and use it to complete this number story.

___ children sat on a bunk bed. Some sat on the top bunk and some sat on the bottom bunk. How many sat on the top bunk? How many sat on the bottom bunk?

2. Record as many different solutions to the problem as you can using pictures, numbers or words.

On and Off

Materials: Counters (5-10)
On and Off game grid
Sheet of paper

Players: 1-3

Object: Toss counters over a sheet of paper.
Record how many land on and off the paper.

How to Play

1. Decide how many counters you will toss each time. Write this total number on the game grid.
2. Lay the sheet of paper on a flat surface.
3. Hold the counters in one hand and toss them over the paper.
4. On the game grid, write how many landed on the paper and off the paper.
5. Repeat steps 3 and 4 until you have filled one game grid.

You can assign a total number and ask children to tally or represent the counters with a dot.

On and Off Game Grid

On	Off

Counters in a Cup

Materials: Counters (5-10)
Counters in a Cup game grid
Paper cup

Players: 2

Object: Figure out how many of a set of counters are hidden.

How to Play

1. Decide how many counters you will use each time. Write this total number on the game grid.
2. Player A hides a secret number of counters under the cup and leaves the rest out.
3. Player B figures out how many are hidden and says the number. Lift the cup to check.
4. On the game grid, write the number hidden in the cup and the number left out.
5. Players switch roles. Hide a different number of counters. (It's ok to hide the same number of counters more than once in a game.)
6. Repeat steps 2-5 until you have filled the game grid. (Hide the counters eight times.)

You can assign a total number and ask children to tally or represent the counters with a dot.

On and Off Game Grid

On	Off

Counters in a Cup Game Grid

Total number: _____

In 	Out 