CCGPS • Kindergarten Math Content Standards Unpacked

This document is an instructional support tool. It is adapted from documents created by the Ohio Department of Education and the North Carolina Department of Public Instruction for the Common Core State Standards in Mathematics.

Some kindergarten standards will be taught to both kindergarten students and first grade students during the 2012-2013 school year. In 2013-2014 and subsequent years, kindergarten math standards will only be taught at this grade level.

Frequently asked questions

What is the purpose of this document? To increase student achievement by ensuring educators understand specifically what the new standards mean a student must know, understand and be able to do.

What is in the document? Descriptions of what each standard means a student will know, understand, and be able to do. The "unpacking" of the standards done in this document is an effort to answer a simple question "What does this standard mean that a student must know and be able to do?" and to ensure the description is helpful, specific and comprehensive for educators.

How do I send feedback? The explanations and examples in this document are intended to be helpful and specific. As this document is used, however, teachers and educators will find ways in which the unpacking can be improved and made more useful. Please send feedback to lynn.skinner@cowetaschools.org. Your input will be used to refine the unpacking of the standards.

Just want the standards alone? You can find the CCGPS standards for your grade band at www.georgiastandards.org.

Mathematical vocabulary is identified in bold print. These are words that students should know and be able to use in context.

Document Contents for Kindergarten

Counting and Cardinality CC

Know number names and count the sequence.

- Instructional Strategies
- Instructional Resources/Tools
- Common Misconceptions
- Connections
  - Critical Areas of Focus
  - Other Grade Levels
- Know and be able to do

- **Count to tell the number of objects.**
  - Instructional Strategies
  - Instructional Resources/Tools
  - Common Misconceptions
  - Connections
    - Critical Areas of Focus
    - Other Grade Levels
  - Know and be able to do

- **Compare numbers.**
  - Instructional Strategies
  - Instructional Resources/Tools
  - Common Misconceptions
  - Connections
    - Critical Areas of Focus
    - Other Grade Levels
  - Know and be able to do

Operations and Algebraic Thinking OA

- **Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from.**
  - Instructional Strategies
  - Instructional Resources/Tools
  - Common Misconceptions
  - Connections
    - Critical Areas of Focus
    - Other Grade Levels
  - Know and be able to do

Number and Operations in Base Ten .NBT

- **Work with numbers 11-19 to gain foundations for place value.**
  - Instructional Strategies
  - Instructional Resources/Tools
  - Common Misconceptions
  - Connections
    - Critical Areas of Focus
    - Other Grade Levels
  - Know and be able to do

Measurement and Data MD

- **Describe and compare measurable attributes.**
  - Instructional Strategies
  - Instructional Resources/Tools
  - Common Misconceptions
  - Connections
    - Critical Areas of Focus
    - Other Grade Levels
  - Know and be able to do

- **Classify objects and count the number of objects in each category.**
  - Instructional Strategies
  - Instructional Resources/Tools
  - Common Misconceptions
  - Connections
    - Critical Areas of Focus
    - Other Grade Levels
  - Know and be able to do

Geometry G

- **Identify and describe shapes.**
  - Instructional Strategies
  - Instructional Resources/Tools
  - Common Misconceptions
  - Connections
    - Critical Areas of Focus
    - Other Grade Levels
  - Know and be able to do
- **Analyze, compare, create, and compose shapes.**
  - Instructional Strategies
  - Instructional Resources/Tools
  - Common Misconceptions
  - Connections
    - Critical Areas of Focus
    - Other Grade Levels
  - Know and be able to do

Counting and Cardinality CCGPS.K.CC

CCGPS Cluster: Know number names and the count sequence.

Instructional Strategies

The Counting and Cardinality domain in Kindergarten contains standard statements that are connected to one another. Examine the three samples in this domain at the same time to obtain a more holistic view of the content.

Provide settings that connect mathematical language and symbols to the everyday lives of kindergarteners. Support students' ability to make meaning and mathematize the real world. Help them see patterns, make connections and provide repeated experiences that give students time and opportunities to develop understandings and increase fluency. Encourage students to explain their reasoning by asking probing questions such as "How do you know?"

Students view counting as a mechanism used to land on a number. Young students mimic counting often with initial lack of purpose or meaning. Coordinating the number words, touching or moving objects in a one-to-one correspondence may be little more than a matching activity. However, saying number words as a chant or a rote procedure plays a part in students constructing meaning for the conceptual idea of counting. They will learn how to count before they understand cardinality, i.e. that the last count word is the amount of the set.

Counting on or counting from a given number conflicts with the learned strategy of counting from the beginning. In order to be successful in counting on, students must understand cardinality. Students often merge or separate two groups of objects and then re-count from the beginning to determine the final number of objects represented. For these students, counting is still a rote skill or the benefits of counting on have not been realized. Games that require students to add on to a previous count to reach a goal number encourage developing this concept. Frequent and brief opportunities utilizing counting on and counting back are recommended. These concepts emerge over time and cannot be forced.

Like counting to 100 by either ones or tens, writing numbers from 0 to 20 is a rote process. Initially, students mimic the actual formation of the written numerals while also assigning it a name. Over time, children create the understanding that number symbols signify the meaning of counting. Numerals are used to communicate across cultures and through time a certain meaning. Numbers have meaning when children can see mental images of the number symbols and use those images with which to think. Practice count words and written numerals paired with pictures, representations of objects, and objects that represent quantities within the context of life experiences for kindergarteners. For example, dot cards, dominoes and number cubes all create different mental images for relating quantity to number words and numerals.

One way students can learn the left to right orientation of numbers is to use a finger to write numbers in air (sky writing). Children will see mathematics as something that is alive and that they are involved.

Students should study and write numbers 0 to 20 in this order: numbers 1 to 9, the number 0, and then numbers 10 to 20.

They need to know that 0 is the number items left after all items in a set are taken away. Do not accept "none" as the answer to "How many items are left?" for this situation.

Instructional Resources/Tools	Common Misconceptions
• Board games that require counting • Dot Card and Ten Frame Activities (pp. 1-6, 12-17) Numeracy Project, Winnipeg School Division, 2005-2006 • Mathematics Learning in Early Childhood: Paths Toward Excellence and Equity	Some students might not see zero as a number. Ask students to write 0 and say *zero* to represent the number of items left when all items have been taken away. Avoid using the word *none* to represent this situation.

Return to Contents

Connections – Critical Areas of Focus	Connections to Other Grade Levels
This cluster is connected to the first Kindergarten Critical Area of Focus, **Representing and comparing whole numbers, initially with sets of objects**.	This cluster is connected to the other clusters in the Counting and Cardinality Domain and to *Classify objects and count the number of objects in each category* in Kindergarten, and to *Add and subtract within 20* and *Extend the counting sequence* in Grade 1.

CCGPS	What does this standard mean that a student will know and be able to do?
CCGPS.K.CC.1 Count to 100 by ones and by tens.	This standard calls for students to rote count by starting at one and count to 100. When students count by tens they are only expected to master counting on the decade (0, 10, 20, 30, 40 …). This objective does not require recognition of numerals. It is focused on the rote number sequence.
CCGPS.K.CC.2 Count forward beginning from a given number within the known sequence (instead of having to begin at 1).	This standard includes numbers 0 to 100. This asks for students to begin a rote forward counting sequence from a number other than 1. Thus, given the number 4, the student would count, "4, 5, 6 …" This objective does not require recognition of numerals. It is focused on the rote number sequence.
CCGPS.K.CC.3 Write numbers from 0 to 20. Represent a number of objects with a written numeral 0-20 (with 0 representing a count of no objects).	This standard addresses the writing of numbers and using the written numerals (0-20) to describe the amount of a set of objects. Due to varied development of fine motor and visual development, a reversal of numerals is anticipated for a majority of the students. While reversals should be pointed out to students, the emphasis is on the use of numerals to represent quantities rather than the correct handwriting formation of the actual numeral itself. In addition, the standard asks for students to represent a set of objects with a written numeral. The number of objects being recorded should not be greater than 20. Students can record the quantity of a set by selecting a number card/tile (numeral recognition) or writing the numeral. Students can also create a set of objects based on the numeral presented.

Return to Contents

Counting and Cardinality — CCGPS.K.CC

CCGPS Cluster: Count to tell the number of objects.

Students use numbers, including written numerals, to represent quantities and to solve quantitative problems, such as counting objects in a set; counting out a given number of objects and comparing sets or numerals.

Instructional Strategies

One of the first major concepts in a student's mathematical development is cardinality. Cardinality, knowing that the number word said tells the quantity you have and that the number you end on when counting represents the entire amount counted. The big idea is that number means amount and, no matter how you arrange and rearrange the items, the amount is the same. Until this concept is developed, counting is merely a routine procedure done when a number is needed. To determine if students have the cardinality rule, listen to their responses when you discuss counting tasks with them. For example, ask, "How many are here?". The student counts correctly and says that there are seven. Then ask, "Are there seven?". Students may count or hesitate if they have not developed cardinality. Students with cardinality may emphasize the last count or explain that there are seven because they counted them. These students can now use counting to find a matching set.

Students develop the understanding of counting and cardinality from experience. Almost any activity or game that engages children in counting and comparing quantities, such as board games, will encourage the development of cardinality. Frequent opportunities to use and discuss counting as a means of solving problems relevant to kindergarteners is more beneficial than repeating the same routine day after day. For example, ask students questions that can be answered by counting up to 20 items before they change and as they change locations throughout the school building.

As students develop meaning for numerals, they also compare numerals to the quantities they represent. Models that can represent numbers – such as dot cards and dominoes – become tools for such comparisons. Students can concretely, pictorially or mentally look for similarities and differences in the representations of numbers. They begin to "see" the relationship of one more, one less, two more and two less, thus landing on the concept that successive numbers name quantities that are one larger. In order to encourage this idea, children need discussion and reflection of pairs of numbers from 1 to 10. Activities that utilize anchors of 5 and 10 are helpful in securing understanding of the relationships between numbers. This flexibility with numbers will build students' ability to break numbers into parts.

Provide a variety of experiences in which students connect count words or number words to the numerals that represent the quantities. Students will arrive at an understanding of a number when they acquire cardinality and can connect a number with the numerals and the number word for the quantity they all represent

Instructional Resources/Tools	Common Misconceptions
• Dot Card and Ten Frame Activities (pp. 1-6, 12-17) Numeracy Project, Winnipeg School Division, 2005-2006	Some students might think that the count word used to tag an item is permanently connected to that item. So when the item is used again for counting and should be tagged with a different count word, the student uses the original count word. For example, a student counts four geometric figures: triangle, square, circle and rectangle with the count words: one, two, three, four. If these items are rearranged as rectangle, triangle, circle and square and counted, the student says these count words: four, one, three, two.
Connections – Critical Areas of Focus	**Connections to Other Grade Levels**
This cluster is connected to the first Kindergarten Critical Area of Focus, **Representing and comparing whole numbers, initially with sets of objects**.	This cluster is connected to the other clusters in the Counting and Cardinality Domain and to *Classify objects and count the number of objects in each category* in Kindergarten, and to *Add and subtract within 20* in Grade 1.

Return to Contents

CCGPS	What does this standard mean that a student will know and be able to do?
CCGPS.K.CC.4 Understand the relationship between numbers and quantities; connect counting to cardinality	This standard asks students to count a set of objects and see sets and numerals in relationship to one another, rather than as isolated numbers or sets. These connections are higher-level skills that require students to analyze, to reason about, and to explain relationships between numbers and sets of objects. This standard should first be addressed using numbers 1-5 with teachers building to the numbers 1-10 later in the year. The expectation is that students are comfortable with these skills with the numbers 1-10 by the end of Kindergarten.
a. When counting objects, say the number names in the standard order, pairing each object with one and only one number name and each number name with one and only one object.	This standard reflects the ideas that students implement correct counting procedures by pointing to one object at a time (one-to-one correspondence) using one counting word for every object (one-to-one tagging/synchrony), while keeping track of objects that have and have not been counted. This is the foundation of counting.
b. Understand that the last number name said tells the number of objects counted. The number of objects is the same regardless of their arrangement or the order in which they were counted.	This standard calls for students to answer the question "How many are there?" by counting objects in a set and understanding that the last number stated when counting a set (…8, 9, **10**) represents the total amount of objects: "There are **10** bears in this pile." (cardinality). It also requires students to understand that the same set counted three different times will end up being the same amount each time. Thus, a purpose of keeping track of objects is developed. Therefore, a student who moves each object as it is counted recognizes that there is a need to keep track in order to figure out the amount of objects present. While it appears that this standard calls for students to have conservation of number, (regardless of the arrangement of objects, the quantity remains the same), conservation of number is a developmental milestone of which some Kindergarten children will not have mastered. The goal of this objective is for students to be able to count a set of objects; regardless of the formation those objects are placed.
c. Understand that each successive number name refers to a quantity that is one larger.	This standard represents the concept of "one more" while counting a set of objects. Students are to make the connection that if a set of objects was increased by one more object then the number name for that set is to be increased by one as well. Students are asked to understand this concept with and without objects. For example, after counting a set of 8 objects, students should be able to answer the question, "How many would there be if we added one more object?"; and answer a similar question when not using objects, by asking hypothetically, "What if we have 5 cubes and added one more. How many cubes would there be then?" This concept should be first taught with numbers 1-5 before building to numbers 1-10. Students are expected to be comfortable with this skill with numbers to 10 by the end of Kindergarten.
CCGPS.K.CC.5 Count to answer "how many?" questions about as many as 20 things arranged in a line, a rectangular array, or a circle, or as many as 10 things in a scattered configuration; given a number from 1–20, count out that many objects.	This standard addresses various counting strategies. Based on early childhood mathematics experts, such as Kathy Richardson, students go through a progression of four general ways to count. These counting strategies progress from least difficult to most difficult. First, students move objects and count them as they move them. The second strategy is that students line up the objects and count them. Third, students have a scattered arrangement and they touch each object as they count. Lastly, students have a scattered arrangement and count them by visually scanning without touching them. Since the scattered arrangements are the most challenging for students, CCGPS.K.CC.5 calls for students to only count 10 objects in a scattered arrangement, and count up to 20 objects in a line, rectangular array, or circle. Out of these 3 representations, a line is the easiest type of arrangement to count.

Return to Contents

Instructional Strategies

As children develop meaning for numerals, they also compare these numerals to the quantities represented and their number words. The modeling numbers with manipulatives such as dot cards and five- and ten-frames become tools for such comparisons. Children can look for similarities and differences in these different representations of numbers. They begin to "see" the relationship of one more, one less, two more and two less, thus landing on the concept that successive numbers name quantities where one is larger. In order to encourage this idea, children need discussion and reflection of pairs of numbers from 1 to 10. Activities that utilize anchors of 5 and 10 are helpful in securing understanding of the relationships between numbers. This flexibility with numbers will greatly impact children's ability to break numbers into parts.

Children demonstrate their understanding of the meaning of numbers when they can justify why their answer represents a quantity just counted. This justification could merely be the expression that the number said is the total because it was just counted, or a "proof" by demonstrating a one to-one match, by counting again or other similar means (concretely or pictorially) that makes sense. An ultimate level of understanding is reached when children can compare two numbers from 1 to10 represented as written numerals without counting.

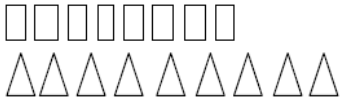
Students need to explain their reasoning when they determine whether a number is greater than, less than, or equal to another number. Teachers need to ask probing questions such as "How do you know?" to elicit their thinking. For students, these comparisons increase in difficulty, from greater than to less than to equal. It is easier for students to identify differences than to find similarities.

Instructional Resources/Tools	Common Misconceptions
• Board games • Dot Card and Ten Frame Activities Numeracy Project, Winnipeg School Division, 2005-2006	
Connections – Critical Areas of Focus	**Connections to Other Grade Levels**
This cluster is connected to the first Kindergarten Critical Area of Focus, **Representing and comparing whole numbers, initially with sets of objects**.	This cluster is connected to the other clusters in the Counting and Cardinality Domain and *to Classify objects and count the number of objects in each category* in Kindergarten, and to *Add and subtract within 20* and *Extend the counting sequence* in Grade 1.

CCGPS	What does this standard mean that a student will know and be able to do?
CCGPS.K.CC.6 Identify whether the number of objects in one group is greater than, less than, or equal to the number of objects in another group, e.g., by using matching and counting strategies.[1]	This standard expects mastery of up to ten objects. Students can use matching strategies (Student 1), counting strategies or equal shares (Student 3) to determine whether one group **is greater than**, **less than**, or **equal to** the number of objects in another group (Student 2).

Return to Contents

[1] Include groups with up to ten objects.

	Student 1 I lined up one square and one triangle. Since there is one extra triangle, there are more triangles than squares. 	**Student 2** I counted the squares and I got 8. Then I counted the triangles and got 9. Since 9 is bigger than 8, there are more triangles than squares.	**Student 3** I put them in a pile. I then took away objects. Every time I took a square, I also took a triangle. When I had taken almost all of the shapes away, there was still a triangle left. That means there are more triangles than squares.
CCGPS.K.CC.7 Compare two numbers between 1 and 10 presented as written numerals.	This standard calls for students to apply their understanding of numerals 1-10 to compare one from another. Thus, looking at the numerals 8 and 10, a student must be able to recognize that the numeral 10 represents a larger amount than the numeral 8. Students should begin this standard by having ample experiences with sets of objects (CCGPS.K.CC.3 and CCGPS.K.CC.6) before completing this standard with just numerals. Based on early childhood research, students should not be expected to be comfortable with this skill until the end of kindergarten.		

Return to Contents

Operations and Algebraic Thinking CCGPS.K.OA

CCGPS Cluster: Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from.
All standards in this cluster should only include numbers through 10. Students will model simple joining and separating situations with sets of objects, or eventually with equations such as 5 + 2 = 7 and 7 – 2 = 5. (Kindergarten students should see addition and subtraction equations, and student writing of equations in kindergarten is encouraged, but it is not required.) Students choose, combine, and apply effective strategies for answering quantitative questions, including quickly recognizing the cardinalities of small sets of objects, counting and producing sets of given sizes, counting the number of objects in combined sets, or counting the number of objects that remain in a set after some are taken away.

Instructional Strategies

Provide contextual situations for addition and subtraction that relate to the everyday lives of kindergarteners. A variety of situations can be found in children's literature books. Students then model the addition and subtraction using a variety of representations such as drawings, sounds, acting out situations, verbal explanations and numerical expressions. Manipulatives, like two-color counters, clothespins on hangers, connecting cubes and stickers can also be used for modeling these operations. Kindergarten students should see addition and subtraction equations written by the teacher. Although students might struggle at first, teachers should encourage them to try writing the equations. Students' writing of equations in Kindergarten is encouraged, but it is not required.

Create written addition or subtraction problems with sums and differences less than or equal to 10 using the numbers 0 to 10 and Table 1 at the end of this document for guidance. It is important to use a problem context that is relevant to kindergarteners. After the teacher reads the problem, students choose their own method to model the problem and find a solution. Students discuss their solution strategies while the teacher represents the situation with an equation written under the problem. The equation should be written by listing the numbers and symbols for the unknown quantities in the order that follows the meaning of the situation. The teacher and students should use the words *equal* and *is the same as* interchangeably.

Have students decompose numbers less than or equal to 5 during a variety of experiences to promote their fluency with sums and differences less than or equal to 5 that result from using the numbers 0 to 5. For example, ask students to use different models to decompose 5 and record their work with drawings or equations. Next, have students decompose 6, 7, 8, 9, and 10 in a similar fashion. As they come to understand the role and meaning of arithmetic operations in number systems, students gain computational fluency, using efficient and accurate methods for computing.

Use backmapping and scaffolding to teach students who show a need for more help with counting. For instance, ask students to build a tower of 5 using 2 green and 3 blue linking cubes while you discuss composing and decomposing 5. Have them identify and compare other ways to make a tower of 5. Repeat the activity for towers of 7 and 9. Help students use counting as they explore ways to compose 7 and 9.

Instructional Resources/Tools

- Colored cubes
- Linking cubes
- Part-Part-Whole Mat: Students can use the mat and objects to model problem situations and find solutions.
- Dot Card and Ten Frame Activities (pp. 7-11, 18-37)
- Table 1: Common addition and subtraction situations
- Exploring adding with sets: This lesson builds on the previous two lessons in the unit *Do It with Dominoes* and encourages students to explore another model for addition, the set model.
- Links Away: In the unit *Links Away* (lessons 2, 4, 5, and 7), students

Common Misconceptions

Students may over-generalize the vocabulary in word problems and think that certain words indicate solution strategies that must be used to find an answer. They might think that the word *more* always means to add and the words *take away* or *left* always means to subtract. When students use the words *take away* to refer to subtraction and its symbol, repeat students' ideas using the words *minus* or *subtract*. For example, students use addition to solve this Take from/Start Unknown problem: Seth took the 8 stickers he no longer wanted and gave them to Anna. Now Seth has 11 stickers *left*. How many stickers did Seth have to begin with?

Return to Contents

explore models of subtraction (counting, sets, balanced equations, and inverse of addition) and the relation between addition and subtraction using links. Students also write story problems in which subtraction is required. • More and More Buttons: In this lesson, students use buttons to create, model, and record addition sentences.	If students progress from working with manipulatives to writing numerical expressions and equations, they skip using pictorial thinking. Students will then be more likely to use finger counting and rote memorization for work with addition and subtraction. Counting forward builds to the concept of addition while counting back leads to the concept of subtraction. However, counting is an inefficient strategy. Provide instructional experiences so that students progress from the concrete level to the pictorial level to the abstract level.
Connections – Critical Areas of Focus	**Connections to Other Grade Levels**
This cluster is connected to the first Kindergarten Critical Area of Focus, **Representing and comparing whole numbers, initially with sets of objects**.	This cluster is connected to *Work with numbers 11-19 to gain foundations for place value* in Kindergarten, and to all clusters in the Operations and Algebraic Thinking Domain in Grade 1.

CCGPS	What does this standard mean that a student will know and be able to do?
CCGPS.K.OA.1 Represent addition and subtraction with objects, fingers, mental images, drawings[2], sounds (e.g., claps), acting out situations, verbal explanations, expressions, or equations.	This standard asks students to demonstrate the understanding of how objects can be joined (addition) and separated (subtraction) by representing addition and subtraction situations in various ways. This objective is primarily focused on understanding the concept of addition and subtraction, rather than merely reading and solving addition and subtraction number sentences (equations).
CCGPS.K.OA.2 Solve addition and subtraction word problems, and add and subtract within 10, e.g., by using objects or drawings to represent the problem.	This standard asks students to solve problems presented in a story format (context) with a specific emphasis on using objects or drawings to determine the solution. This objective builds upon their understanding of addition and subtraction from K.OA.1, to solve problems. Once again, numbers should not exceed 10. Teachers should be cognizant of the three types of problems. There are three types of addition and subtraction problems: Result Unknown, Change Unknown, and Start Unknown. These types of problems become increasingly difficult for students. Research has found that Result Unknown problems are easier than Change and Start Unknown problems. Kindergarten students should have experiences with all three types of problems. The level of difficulty can be decreased by using smaller numbers (up to 5) or increased by using larger numbers (up to 10). Please see Appendix, Table 1 for additional examples.
CCGPS.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).	This standard asks students to understand that a set of (5) object can be broken into two sets (3 and 2) and still be the same total amount (5). In addition, this objective asks students to realize that a set of objects (5) can be broken in multiple ways (3 and 2; 4 and 1). Thus, when breaking apart a set (decomposing), students develop the understanding that a smaller set of objects exists within that larger set (inclusion). This should be developed in context before moving into how to represent decomposition with symbols (+, -, =). Example: "Bobby Bear is missing 5 buttons on his jacket. How many ways can you use blue and red buttons to finish his jacket? Draw a picture of all your ideas.

Return to Contents

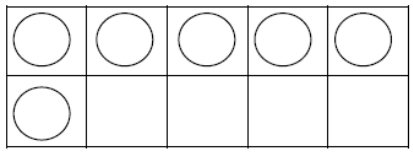
[2] Drawings need not show details, but should show the mathematics in the problem. (This applies wherever drawings are mentioned in the Standards.)

<table>
<tr><td></td><td>Students could draw pictures of:
4 blue and 1 red button
3 blue and 2 red buttons
2 blue and 3 red buttons
1 blue and 4 red buttons
After the students have had numerous experiences with decomposing sets of objects and recording with pictures and numbers, the teacher eventually makes connections between the drawings and symbols: 5=4+1, 5=3+2, 5=2+3, and 5=1+4.

The number sentence only comes after pictures or work with manipulatives, and students should never give the number sentence without a mathematical representation.</td></tr>
<tr><td>CCGPS.K.OA.4 For any number from 1 to 9, find the number that makes 10 when added to the given number, e.g., by using objects or drawings, and record the answer with a drawing or equation.</td><td>This standard builds upon the understanding that a number can be decomposed into parts (K.OA.3). Once students have had experiences breaking apart ten into various combinations, this asks students to find a missing part of 10.

Example:

“A full case of juice boxes has 10 boxes. There are only 6 boxes in this case. How many juice boxes are missing?

Student 1
Using a Ten-Frame
I used 6 counters for the 6 boxes of juice still in the case. There are 4 blank spaces, so 4 boxes have been removed. This makes sense since 6 and 4 more equals 10.
 

Student 2
Think Addition
I counted out 10 cubes because I knew there needed to be ten. I pushed these 6 over here because there were in the container. These are left over. So there’s 4 missing.

Student 3
Basic Fact
I know that it’s 4 because 6 and 4 is the same amount as 10.</td></tr>
<tr><td>CCGPS.K.OA.5 Fluently add and subtract within 5.</td><td>This standard uses the word fluently, which means accuracy (correct answer), efficiency (a reasonable amount of steps), and flexibility (using strategies such as the distributive property). Fluency is developed by working with many different kinds of objects over an extended amount of time. This objective does not require students to instantly know the answer. Traditional flash cards or timed tests have not been proven as effective instructional strategies for developing fluency.</td></tr>
</table>

Return to Contents

Number and Operations in Base Ten — CCGPS.K.NBT

CCGPS Cluster: Work with numbers 11–19 to gain foundations for place value.

Instructional Strategies

Kindergarteners need to understand the idea of *a ten* so they can develop the strategy of adding onto 10 to add within 20 in Grade 1. Students need to construct their own base-ten ideas about quantities and their symbols by connecting to counting by ones. They should use a variety of manipulatives to model and connect equivalent representations for the numbers 11 to19. For instance, to represent 13, students can count by ones and show 13 beans. They can anchor to five and show one group of 5 beans and 8 beans or anchor to ten and show one group of 10 beans and 3 beans. Students need to eventually see *a ten* as different from 10 ones.

After the students are familiar with counting up to 19 objects by ones, have them explore different ways to group the objects that will make counting easier. Have them estimate before they count and group. Discuss their groupings and lead students to conclude that grouping by ten is desirable. *10 ones make 1 ten* makes students wonder how something that means a lot of things can be one thing. They do not see that there are 10 single objects represented on the item for ten in pre-grouped materials, such as the rod in base-ten blocks. Students then attach words to materials and groups without knowing what they represent. Eventually they need to see the rod as *a ten* that they did not group themselves. Students need to first use groupable materials to represent numbers 11 to 19 because a group of ten such as a bundle of 10 straws or a cup of 10 beans makes more sense than *a ten* in pre-grouped materials.

Kindergarteners should use proportional base-ten models, where a group of ten is physically 10 times larger than the model for a one. Non-proportional models such as an abacus and money should not be used at this grade level.

Students should impose their base-ten concepts on a model made from groupable and pre-groupable materials (see Resources/Tools). Students can transition from groupable to pre-groupable materials by leaving a group of ten intact to be reused as a pre-grouped item. When using pre-grouped materials, students should reflect on the ten-to-one relationships in the materials, such as the "tenness" of the rod in base-ten blocks. After many experiences with pre-grouped materials, students can use dots and a stick (one tally mark) to record singles and a ten.

Encourage students to use base-ten language to describe quantities between 11 and 19. At the beginning, students do not need to use *ones* for the singles. Some of the base-ten language that is acceptable for describing quantities such as18 includes *one ten and eight, a bundle and eight, a rod and 8 singles* and *ten and eight more.* Write the horizontal equation 18 = 10 + 8 and connect it to base-ten language. Encourage, but do not require, students to write equations to represent quantities.

Instructional Resources/Tools

Groupable models

- Dried beans and small cups for holding groups of 10 dried beans
- Linking cubes
- Plastic chain links

Pre-grouped materials

- Strips (ten connected squares) and squares (singles)
- Base-ten blocks
- Dried beans and bean sticks (10 dried beans glued on a craft stick)
- Five-frame and Ten-frame
- Place-value mat with ten-frames

Common Misconceptions

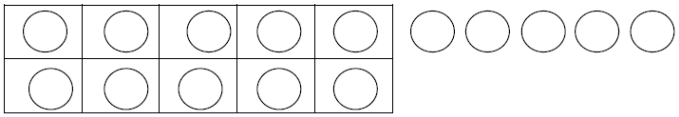
Students have difficulty with *ten* as a singular word that means 10 things. For many students, the understanding that a group of 10 things can be replaced by a single object and they both represent 10 is confusing. Help students develop the sense of 10 by first using groupable materials then replacing the group with an object or representing 10. Watch for and address the issue of attaching words to materials and groups without knowing what they represent. If this misconception is not addressed early on it can cause additional issues when working with numbers 11-19 and beyond.

Return to Contents

Connections – Critical Areas of Focus	Connections to Other Grade Levels
This cluster is connected to the first Kindergarten Critical Area of Focus, **Representing and comparing whole numbers, initially with sets of objects**.	This cluster is connected to Operations and Algebraic Thinking in Kindergarten, and to *Add and subtract within 20* and *Understand place value* in Grade 1.

Number Operations in Base Ten — CCGPS.K.NBT

CCGPS Cluster: Work with numbers 11–19 to gain foundations for place value.

CCGPS	What does this standard mean that a student will know and be able to do?
CCGPS.K.NBT.1 Compose and decompose numbers from 11 to 19 into ten ones and some further ones, e.g., by using objects or drawings, and record each composition or decomposition by a drawing or equation (e.g., 18 = 10 + 8); understand that these numbers are composed of ten ones and one, two, three, four, five, six, seven, eight, or nine ones.	This standard is the first time that students move beyond the number 10 with representations, such as objects (manipulatives) or drawings. The spirit of this standard is that students separate out a set of 11-19 objects into a group of ten objects with leftovers. This ability is a pre-cursor to later grades when they need to understand the complex concept that a group of 10 objects is also one ten (unitizing). Ample experiences with ten frames will help solidify this concept. Research states that students are not ready to unitize until the end of first grade. Therefore, this work in Kindergarten lays the foundation of composing tens and recognizing leftovers. Example: Teacher: "Please count out 15 chips." Student: Student counts 15 counters (chips or cubes). Teacher: "Do you think there is enough to make a group of ten chips? Do you think there might be some chips leftover?" Student: Student answers. Teacher: "Use your counters to find out." Student: Student can either fill a ten frame or make a stick of ten connecting cubes. They answer, "There is enough to make a group of ten."  Teacher: "How many leftovers do you have?" Student: Students say, "I have 5 left over." Teacher: How could we use words and/or numbers to show this? Student: Students might say "Ten and five is the same amount as 15," "15 = 10 + 5," etc.

Return to Contents

Measurement and Data	CCGPS.K.MD
CCGPS Cluster: Describe and compare measurable attributes.	

Instructional Strategies

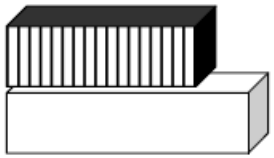
It is critical for students to be able to identify and describe measureable attributes of objects. An object has different attributes that can be measured, like the height and weight of a can of food. When students compare shapes directly, the attribute becomes the focus. For example, when comparing the volume of two different boxes, ask students to discuss and justify their answers to these questions: Which box will hold the most? Which box will hold least? Will they hold the same amount? Students can decide to fill one box with dried beans then pour the beans into the other box to determine the answers to these questions.

Have students work in pairs to compare their arm spans. As they stand back-to-back with outstretched arms, compare the lengths of their spans, then determine who has the smallest arm span. Ask students to explain their reasoning. Then ask students to suggest other measureable attributes of their bodies that they could directly compare, such as their height or the length of their feet.

Connect to other subject areas. For example, suppose that the students have been collecting rocks for classroom observation and they wanted to know if they have collected typical or unusual rocks. Ask students to discuss the measurable attributes of rocks. Lead them to first comparing the weights of the rocks. Have the class chose a rock that seems to be a "typical" rock. Provide the categories: *Lighter Than Our Typical Rock* and *Heavier Than Our Typical Rock*. Students can take turns holding a different rock from the collection and directly comparing its weight to the weight of the typical rock and placing it in the appropriate category. Some rocks will be left over because they have about the same weight as the typical rock. As a class, they count the number of rocks in each category and use these counts to order the categories and discuss whether they collected "typical" rocks.

Instructional Resources/Tools	Common Misconceptions
• Two-and three-dimensional real-world objects • Dried beans • Rice • The Weight of Things: This lesson introduces and provides practice with the measurable attribute of weight.	
Connections – Critical Areas of Focus	**Connections to Other Grade Levels**
This cluster is connected to the first Kindergarten Critical Area of Focus**, Representing and comparing whole numbers, initially with sets of objects**.	This cluster is connected to *Measure lengths indirectly and by iterating length units* in Grade 1.

CCGPS	What does this standard mean that a student will know and be able to do?
CCGPS.K.MD.1 Describe measurable attributes of objects, such as **length** or **weight**. Describe several measurable attributes of a single object.	This standard calls for students to describe measurable attributes of objects, such as **length**, **weight**, size. For example, a student may describe a shoe as "This shoe is **heavy**! It's also really **long**." This standard focuses on using descriptive words and does not mean that students should sort objects based on attributes. Sorting appears later in the Kindergarten standards.
CCGPS.K.MD.2 Directly compare two objects with a measurable attribute in common, to see which object has "**more of**"/"**less of**" the attribute, and describe the difference.	This standard asks for direct comparisons of objects. Direct comparisons are made when objects are put next to each other, such as two children, two books, two pencils. For example, a student may line up two blocks and say, "This block is a lot longer than this one." Students are not comparing objects that cannot be moved and lined up next to each other.

*For example, directly compare the heights of two children and describe one child as **taller/shorter**.*	Through ample experiences with comparing different objects, children should recognize that objects should be matched up at the end of objects to get accurate measurements. Since this understanding requires conservation of length, a developmental milestone for young children, children need multiple experiences to move beyond the idea that …. "Sometimes this block is **longer than** this one and sometimes it's **shorter** (depending on how I lay them side by side) and that's okay." "This block is always longer than this block (with each end lined up appropriately)." Before conservation of length: The striped block is longer than the plain block when they are lined up like this. But when I move the blocks around, sometimes the plain block is longer than the striped block.  After conservation of length: I have to line up the blocks to measure them. The plain block is always longer than the striped block. 

Return to Contents

Measurement and Data — CCGPS.K.MD

CCGPS Cluster: Classify objects and count the number of objects in each category.

Instructional Strategies

Provide categories for students to use to sort a collection of objects. Each category can relate to only one attribute, like *Red* and *Not Red* or *Hexagon* and *Not Hexagon*, and contain up to 10 objects. Students count how many objects are in each category and then order the categories by the number of objects they contain.

Ask questions to initiate discussion about the attributes of shapes. Then have students sort a collection of two-dimensional and three-dimensional shapes by their attributes. Provide categories like *Circles* and *Not Circles* or *Flat* and *Not Flat*. Have students count the objects in each category and order the categories by the number of objects they contain.

Have students infer the classification of objects by guessing the rule for a sort. First, the teacher uses one attribute to sort objects into two loops or regions without labels. Then the students determine how the objects were sorted, suggest labels for the two categories and explain their reasoning.

Instructional Resources/Tools	Common Misconceptions
• Attribute blocks • Yarn for loops • Large paper to draw loops • A variety of objects to sort	
Connections – Critical Areas of Focus	**Connections to Other Grade Levels**
This cluster is connected to the first Kindergarten Critical Area of Focus, **Representing and comparing whole numbers, initially with sets of objects**.	This cluster is connected to *Know number names and the count sequence* and *Count to tell the number of objects* in Kindergarten, and to *Represent and interpret data* in Grade 1.

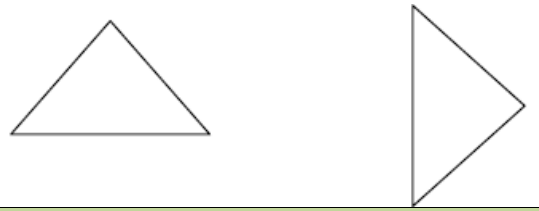
CCGPS	What does this standard mean that a student will know and be able to do?
CCGPS.K.MD.3 Classify objects into given categories; count the numbers of objects in each category and sort the categories by count. *(Limit category counts to be less than or equal to 10.)*	This standard asks students to identify similarities and differences between objects (e.g., size, color, shape) and use the identified attributes to **sort** a collection of objects. Once the objects are sorted, the student counts the amount in each set. Once each set is counted, then the student is asked to sort (or group) each of the sets by the amount in each set. For example, when given a collection of buttons, the student separates the buttons into different piles based on color (all the blue buttons are in one pile, all the orange buttons are in a different pile, etc.). Then the student counts the number of buttons in each pile: blue (5), green (4), orange (3), purple (4). Finally, the student organizes the groups by the quantity in each group (Orange buttons (3), Green buttons next (4), Purple buttons with the green buttons because purple also had (4), Blue buttons last (5). This objective helps to build a foundation for data collection in future grades. In later grade, students will transfer these skills to creating and analyzing various graphical representations.

Return to Contents

Geometry CCGPS.K.G

CCGPS Cluster: Identify and describe shapes (squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, and spheres).

This entire cluster asks students to understand that certain attributes define what a shape is called (number of sides, number of angles, etc.) and other attributes do not (color, size, orientation). Then, using geometric attributes, the student identifies and describes particular shapes listed above. Throughout the year, Kindergarten students move from informal language to describe what shapes look like (e.g., "That looks like an ice cream cone!") to more formal mathematical language (e.g., "That is a triangle. All of its sides are the same length"). In Kindergarten, students need ample experiences exploring various forms of the shapes (e.g., size: big and small; types: triangles, equilateral, isosceles, scalene; orientation: rotated slightly to the left, „upside down") using geometric vocabulary to describe the different shapes. In addition, students need numerous experiences comparing one shape to another, rather than focusing on one shape at a time. This type of experience solidifies the understanding of the various attributes and how those attributes are different- or similar- from one shape to another. Students in Kindergarten typically recognize figures by appearance alone, often by comparing them to a known example of a shape, such as the triangle on the left. For example, students in Kindergarten typically recognize that the figure on the left as a triangle, but claim that the figure on the right is not a triangle, since it does not have a flat bottom. The properties of a figure are not recognized or known. Students make decisions on identifying and describing shapes based on perception, not reasoning.



Instructional Strategies

Develop spatial sense by connecting geometric shapes to students' everyday lives. Initiate natural conversations about shapes in the environment. Have students identify and name two- and three-dimensional shapes in and outside of the classroom and describe their relative position.

Ask students to find rectangles in the classroom and describe the relative positions of the rectangles they see, e.g. *This rectangle (a poster) is over the sphere (globe)*. Teachers can use a digital camera to record these relationships.

Hide shapes around the room. Have students say where they found the shape using positional words, e.g. *I found a triangle UNDER the chair*.

Have students create drawings involving shapes and positional words: *Draw a window ON the door* or *Draw an apple UNDER a tree*. Some students may be able to follow two- or three-step instructions to create their drawings.

Use a shape in different orientations and sizes along with non-examples of the shape so students can learn to focus on defining attributes of the shape.

Manipulatives used for shape identification actually have three dimensions. However, Kindergartners need to think of these shapes as two-dimensional or "flat" and typical three-dimensional shapes as "solid." Students will identify two-dimensional shapes that form surfaces on three-dimensional objects. Students need to focus on noticing two and three dimensions, not on the words *two-dimensional* and *three-dimensional*.

Instructional Resources/Tools

- Common two- and three-dimensional items Digital camera
- Pattern blocks
- Die cut shapes
- Three-dimensional models
- Assorted shapes
- Tangrams
- Going on a Shape Hunt: Integrating Math and Literacy. In this unit, students are introduced to the idea of shapes through a read-aloud session with an appropriate book. They then use models to learn the names of shapes, work together and individually to locate shapes in

Common Misconceptions

Students many times use incorrect terminology when describing shapes. For example students may say a *cube* is a *square* or that a *sphere* is a *circle*. The use of the two-dimensional shape that appears to be part of a three-dimensional shape to name the three-dimensional shape is a common misconception. Work with students to help them understand that the two-dimensional shape is a part of the object but it has a different name.

Return to Contents

their real-world environment. • Investigating Shapes (Triangles): Students will identify and construct triangles using multiple representations in this unit. • I've Seen That Shape Before: Students will learn the names of solid geometric shapes and explore their properties at various centers or during multiple lessons.	
Connections – Critical Areas of Focus	**Connections to Other Grade Levels**
This cluster is connected to the second Kindergarten Critical Area of Focus, **Describing shapes and space**.	This cluster is connected to *Analyze, compare, create and compose shape*s in Kindergarten, and to *Reason with shapes and their attributes* in Grade 1.

CCGPS	What does this standard mean that a student will know and be able to do?
CCGPS.K.G.1 Describe objects in the environment using names of shapes, and describe the relative positions of these objects using terms such as ***above, below, beside, in front of, behind,*** and ***next to*.**	This standard expects students to use positional words (such as those italicized above) to describe objects in the environment. Kindergarten students need to focus first on location and position of two-and-three-dimensional objects in their classroom prior to describing location and position of two-and-three-dimension representations on paper.
CCGPS.K.G.2 Correctly name shapes regardless of their orientations or overall size.	This standard addresses students" identification of shapes based on known examples. Students at this level do not yet recognize triangles that are turned upside down as triangles, since they don't "look like" triangles. Students need ample experiences looking at and manipulating shapes with various typical and atypical orientations. Through these experiences, students will begin to move beyond what a shape "looks like" to identifying particular geometric attributes that define a shape.
CCGPS.K.G.3 Identify shapes as two-dimensional (lying in a plane, "**flat**") or three dimensional ("**solid**").	This standard asks students to identify flat objects (2 dimensional) and solid objects (3 dimensional). This standard can be done by having students sort flat and solid objects, or by having students describe the appearance or thickness of shapes.

Return to Contents

Geometry	CCGPS.K.G
CCGPS Cluster: Analyze , compare, create, and compose shapes.	

Instructional Strategies

Use shapes collected from students to begin the investigation into basic properties and characteristics of two- and three-dimensional shapes. Have students analyze and compare each shape with other objects in the classroom and describe the similarities and differences between the shapes. Ask students to describe the shapes while the teacher records key descriptive words in common student language. Students need to use the word *flat* to describe two-dimensional shapes and the word *solid* to describe three-dimensional shapes.

Use the sides, faces and vertices of shapes to practice counting and reinforce the concept of one-to-one correspondence.

The teacher and students orally describe and name the shapes found on a Shape Hunt. Students draw a shape and build it using materials regularly kept in the classroom such as construction paper, clay, wooden sticks or straws.

Students can use a variety of manipulatives and real-world objects to build larger shapes with these and other smaller shapes: squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, and spheres. Kindergarteners can manipulate cardboard shapes, paper plates, pattern blocks, tiles, canned food, and other common items.

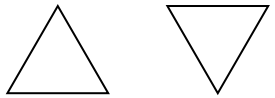
Have students compose (build) a larger shape using only smaller shapes that have the same size and shape. The sides of the smaller shapes should touch and there should be no gaps or overlaps within the larger shape. For example, use one-inch squares to build a larger square with no gaps or overlaps. Have students also use different shapes to form a larger shape where the sides of the smaller shapes are touching and there are no gaps or overlaps. Ask students to describe the larger shape and the shapes that formed it.

Instructional Resources/Tools

- Pattern blocks
- Tangrams
- Colored tiles
- Cubes
- Three-dimensional models
- Cans of food
- Carpet squares or rectangles
- Paper plates
- Balls
- Boxes that are cubes
- Floor tiles
- Straws
- Wooden sticks
- Clay
- Construction paper
- Building with triangles: What can you build with two triangles? The first lesson in this unit includes the *Just Two Triangles* activity worksheet requiring two triangles to form different, larger shapes.

Common Misconceptions

One of the most common misconceptions in geometry is the belief that orientation is tied to shape. A student may see the first of the figures below as a triangle, but claim to not know the name of the second.



Students need to have many experiences with shapes in different orientations. For example, in the *Just Two Triangles* activity referenced in the list of instructional resources/tools, ask students to form larger triangles with the two triangles in different orientations.

Another misconception is confusing the name of a two-dimensional shape with a related three-dimensional shape or the shape of its face. For example, students might call a *cube* a *square* because the student sees the face of the cube.

Return to Contents

Connections – Critical Areas of Focus	Connections to Other Grade Levels
This cluster is connected to the second Kindergarten Critical Area of Focus**, Describing shapes and space**.	This cluster is connected *to Identify and describe shapes (squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, and spheres)* in Kindergarten, and to *Reason with shapes and their attributes* in Grade 1.

CCGPS	What does this standard mean that a student will know and be able to do?
CCGPS.K.G.4 Analyze and compare two- and three-dimensional shapes, in different sizes and orientations, using informal language to describe their similarities, differences, parts (e.g., number of **sides** and vertices/"**corners**") and other attributes (e.g., having sides of **equal** length).	This standard asks students to note similarities and differences between and among 2-D and 3-D shapes using informal language. These experiences help young students begin to understand how 3-dimensional shapes are composed of 2-dimensional shapes (e.g.., The base and the top of a cylinder is a circle; a circle is formed when tracing a sphere).
CCGPS.K.G.5 Model shapes in the world by building shapes from components (e.g., sticks and clay balls) and drawing shapes.	This standard asks students to apply their understanding of geometric attributes of shapes in order to create given shapes. For example, a student may roll a clump of play-doh into a sphere or use their finger to draw a triangle in the sand table, recalling various attributes in order to create that particular shape.
CCGPS.K.G.6 Compose simple shapes to form larger shapes. For example, "Can you join these two triangles with full sides touching to make a rectangle?"	This standard moves beyond identifying and classifying simple shapes to manipulating two or more shapes to create a new shape. This concept begins to develop as students‟ first move, rotate, flip, and arrange puzzle pieces. Next, students use their experiences with puzzles to move given shapes to make a design (e.g., "Use the 7 tangram pieces to make a fox."). Finally, using these previous foundational experiences, students manipulate simple shapes to make a new shape.

Return to Contents

Table 1

Common Addition and Subtraction Situations

	Result Unknown	Change Unknown	Start Unknown
Add to	Two bunnies sat on the grass. Three more bunnies hopped there. How many bunnies are on the grass now? 2 + 3 = ?	Two bunnies were sitting on the grass. Some more bunnies hopped there. Then there were five bunnies. How many bunnies hopped over to the first two? 2 + ? = 5	Some bunnies were sitting on the grass. Three more bunnies hopped there. Then there were five bunnies. How many bunnies were on the grass before? ? + 3 = 5
Take from	Five apples were on the table. I ate two apples. How many apples are on the table now? 5 – 2 = ?	Five apples were on the table. I ate some apples. Then there were three apples. How many apples did I eat? 5 – ? = 3	Some apples were on the table. I ate two apples. Then there were three apples. How many apples were on the table before? ? – 2 = 3
	Total Unknown	**Addend Unknown**	**Both Addends Unknown[1]**
Put together/ Take apart[2]	Three red apples and two green apples are on the table. How many apples are on the table? 3 + 2 = ?	Five apples are on the table. Three are red and the rest are green. How many apples are green? 3 + ? = 5, 5 – 3 = ?	Grandma has five flowers. How many can she put in her red vase and how many in her blue vase? 5 = 0 + 5, 5 = 5 + 0 5 = 1 + 4, 5 = 4 + 1 5 = 2 + 3, 5 = 3 + 2
	Difference Unknown	**Bigger Unknown**	**Smaller Unknown**
Compare[3]	("How many more?" version): Lucy has two apples. Julie has five apples. How many more apples does Julie have than Lucy? ("How many fewer?" version): Lucy has two apples. Julie has five apples. How many fewer apples does Lucy have than Julie? 2 + ? = 5, 5 – 2 = ?	(Version with "more"): Julie has three more apples than Lucy. Lucy has two apples. How many apples does Julie have? (Version with "fewer"): Lucy has 3 fewer apples than Julie. Lucy has two apples. How many apples does Julie have? 2 + 3 = ?, 3 + 2 = ?	(Version with "more"): Julie has three more apples than Lucy. Julie has five apples. How many apples does Lucy have? (Version with "fewer"): Lucy has 3 fewer apples than Julie. Julie has five apples. How many apples does Lucy have? 5 – 3 = ?, ? + 3 = 5

Adapted from Box 2-4 of Mathematics Learning in Early Childhood, National Research Council (2009, pp. 32, 33).

Return to Contents

[1] Either addend can be unknown, so there are three variations of these problem situations. Both Addends Unknown is a productive extension of this basic situation, especially for small numbers less than or equal to 10.

[2] These take apart situations can be used to show all the decompositions of a given number. The associated equations, which have the total on the left of the equal sign, help children understand that the = sign does not always mean makes or results in but always does mean is the same number as.

[3] For the Bigger Unknown or Smaller Unknown situations, one version directs the correct operation (the version using more for the bigger unknown and using less for the smaller unknown). The other versions are more difficult.

CCGPS • Critical Areas of Focus

Kindergarten

In Kindergarten, instructional time should focus on two critical areas: (1) representing, relating, and operating on whole numbers, initially with sets of objects; (2) describing shapes and space. More learning time in Kindergarten should be devoted to number than to other topics.

(1) Students use numbers, including written numerals, to represent quantities and to solve quantitative problems, such as counting objects in a set; counting out a given number of objects; comparing sets or numerals; and modeling simple joining and separating situations with sets of objects, or eventually with equations such as 5 + 2 = 7 and 7 – 2 = 5. (Kindergarten students should see addition and subtraction equations, and student writing of equations in kindergarten is encouraged, but it is not required.) Students choose, combine, and apply effective strategies for answering quantitative questions, including quickly recognizing the cardinalities of small sets of objects, counting and producing sets of given sizes, counting the number of objects in combined sets, or counting the number of objects that remain in a set after some are taken away.

(2) Students describe their physical world using geometric ideas (e.g., shape, orientation, spatial relations) and vocabulary. They identify, name, and describe basic two-dimensional shapes, such as squares, triangles, circles, rectangles, and hexagons, presented in a variety of ways (e.g., with different sizes and orientations), as well as three-dimensional shapes such as cubes, cones, cylinders, and spheres. They use basic shapes and spatial reasoning to model objects in their environment and to construct more complex shapes.

Return to Contents