Mathematics | 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.
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Grade K Overview

Counting and Cardinality

- Know number names and the count sequence.
- Count to tell the number of objects.
- Compare numbers.

Operations and Algebraic Thinking

- Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from.

Number and Operations in Base Ten

- Work with numbers 11–19 to gain foundations for place value.

Measurement and Data

- Describe and compare measurable attributes.
- Classify objects and count the number of objects in categories.

Geometry

- Identify and describe shapes.
- Analyze, compare, create, and compose shapes.

Mathematical Practices

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.
Counting and Cardinality  K.CC

Know number names and the count sequence. (K.CC.A)

1. Count to 100 by ones and by tens. (K.CC.A.1) (DOK 1)
   a. Example: Solution (DOK 1)
      Have students stand and form a circle facing in toward each other.
      Select a counting sequence to be practiced with no more than 8-10 numbers in the sequence.
      Have the students start counting around the circle one by one until the last number in the sequence is reached.
      When the last number is reached all students clap and that student is out and sits down on the floor in the middle of the circle.
      Start the counting sequence over again until another student reaches the number at the end of the sequence; everyone claps and that student sits in the center with the first student.
      Continue repeating the sequence until only one child is left standing and the rest are seated in the center of the circle. For example: for the counting sequence 1-10: the first student says "one," the next student says "two" and so on until the 10th students gets to "ten" at this point everyone claps and the tenth child sits in the center of the circle. The eleventh student starts over with "one" and so on.
   b. Example: Solution (DOK 1)
      The teacher will need a 100 chart or large number line and a pointer.
      As a whole group, have students chant the counting sequence starting with one to thirty, using the pointer to follow the number sequence. Over time, increase the range to one to fifty and then one to one hundred. Eventually have a student take over the job of pointing out the numbers in the sequence. Highlight the multiples of ten using a marker or a colored screen and have students chant the counting sequence by 10s. This should be done daily.
c. Example: **Solution** (DOK 1)
This activity is designed to determine the appropriate instructional level for a student in a one-on-one interaction with the teacher.

The teacher needs paper and pencil to record the student's reactions. It is important to find a time and place where the student is comfortable and not distracted. Record the exact language of the student's counting, including hesitations, substitutions, and errors, to help identify specific objectives for future lessons. If a student makes an error on a counting sequence, it is not necessary to continue; this is the place where the student needs instruction.

Say,

- “Start counting at 1 and I will tell you when to stop” (stop the student at 22)
- “Start counting at 10 and I will tell you when to stop” (stop the student at 35)
- “Start counting at 54 and I will tell you when to stop” (stop the student at 68)
- “Start counting at 86 and I will tell you when to stop” (stop the student at 102)
d. Example: Solution (DOK 1)

Action

This activity can be done several times a day as it is quick and requires no materials. The objective of this lesson is to gain automaticity counting to 100 and to establish the importance of multiples of ten. The final goal of this lesson is for students to be able to count by tens and articulate the term for this.

For the first week of this activity have students count to 100 chorally. On each number students clap with their hands in front of them (a normal clap) and whisper the number. For each multiple of ten (10, 20, 30, etc) have students clap above their heads and say the number loudly.

After students are very comfortable with this routine and can effortlessly count to 100 ask students what would happen if you only counted the numbers where they clap above their heads. Students can try this out. Ask the students what we might call this (you will get answers such as “ten counting”) guide students by asking appropriate/leading questions until they come up with the term “counting by tens” on their own.

Once students have graduated to counting by tens practice this skill often and quickly.
2. Count forward beginning from a given number within the known sequence (instead of having to begin at 1). (K.CC.A.2) (DOK 1,2)
   a. Example: Solution (DOK 1) 
      This activity is designed to determine the appropriate instructional level for a student in a one-on-one interaction with the teacher.

      The teacher needs paper and pencil to record the student's reactions. It is important to find a time and place where the student is comfortable and not distracted. Record the exact language of the student's counting, including hesitations, substitutions, and errors, to help identify specific objectives for future lessons. If a student makes an error on a counting sequence, it is not necessary to continue; this is the place where the student needs instruction.

      Say,

      • “Start counting at 1 and I will tell you when to stop” (stop the student at 22)
      • “Start counting at 10 and I will tell you when to stop” (stop the student at 35)
      • “Start counting at 54 and I will tell you when to stop” (stop the student at 68)
      • “Start counting at 86 and I will tell you when to stop” (stop the student at 102)
b. Example: Solution (DOK 1)
Have students form a circle and sit facing in toward each other. The teacher selects a range of the number sequence to practice. Start with the teacher walking around the outside of the circle while counting aloud starting at the beginning of the selected counting sequence.

After a few moments the teacher taps a student on the head and sits in the student's spot. The student then gets up from the circle and continues the counting at the point that the teacher left off while walking around the outside of the circle.

At the teacher's signal the student who is counting selects the nearest student to them by tapping them on the head to take over counting and sits in that student's spot. The next child then continues the counting sequence until the teacher indicates a change and so on until each child has had a turn. If the class reaches the end of the counting sequence before each child has participated simply start the sequence over again.

This is similar to Duck, Duck, Goose but without the chasing to get to a spot.
c. Example: Solution (DOK 1)
Each student will need a different Number After Game Board (a 5x5 grid with numbers from 2 through 15 randomly arranged, one in each square), 15 each of two different color counting chips and a set of 2-3 each of number cards with the numbers 1 through 15 on them.

Begin whole group by discussing what "number after" means. Next have the students identify and point out on a large number line the number after various numbers selected by the teacher. Initially keep these numbers in the range of 1-15. After the group seems to have an understanding of what "number after" means and how to locate them on the number line, have students play Number After bingo on the 5x5 bingo board in pairs. Students will take turns drawing a number card, stating the number after and placing his/her counter on that number on the game board. The first student with 3 counters in a row on the grid is the winner. As students progress the practice range should be increased by changing the numbers on the grid and the corresponding numbers on the cards.
d. Example: **Solution** (DOK 2)

The teacher will need a set of number cards (easily created using large index cards) that begin with 1 and end with the number of students in the class. So for a class of 22, the teacher would need 22 cards numbered from 1-22. Remove the card(s) with the largest number(s) to adjust for absent students.

Shuffle the cards until they are in random order in preparation of handing one card to each student. Ask students not to look at their card until the teacher says, “GO.” The teacher should identify where "1" should stand and the direction the line should form.

When the teacher says, “GO,” students work together to order themselves from 1 to the largest number. Each student should hold his or her number card face out, so that it is visible to others. When students are satisfied with their line up, ask them to read their numbers, beginning with "1." In other words, the student holding the card with a number 1 says “one,” followed by the student with the 2 card who says “two,” until the class counts through the sequence. This is ideal as a weekly routine, giving students the opportunity to develop systems that make lining up easy for them to do.
e. Example: **Solution** (DOK 1)
   This activity is designed to determine the appropriate instructional level for a student in a one-on-one interaction with the teacher.

   The teacher will need paper and pencil to record the student's reactions. It is best to find a time and place where the student is comfortable and not distracted. Record the exact language of the student's counting, including hesitations, substitutions, and errors, to help identify specific objectives for future lessons. If a student makes an error on a counting sequence, it is not necessary to continue; this is the place where the student needs instruction.

   Say,

   - "Tell me the number after 2, after 5, after 8"
   - "Tell me the number after 10, after 13, after 16"
   - "Tell me the number after 20, after 24, after 29"
   - "Tell me the number after 55, after 79, after 87"

   Note: The teacher may have to prompt a student if he or she gives the number before the target rather than the number after the target number with language like, “That is the number before. What number comes after?"

f. Example: **Solution** (DOK 1)
   **Action**

   The teacher puts multiple numbers in a hat or on sticks from the known counting sequence. S/he randomly picks one number and asks the class to count on ten numbers from that number. The class does this chorally.
Example: **Solution** (DOK 2)
This game is a version of the traditional memory or concentration game.

**Materials**
- One set of number cards from 1 to 9 in one color (say blue). These are the "one less" cards.
- Another set of number cards from 2 to 10 in another color (say red). These are the "one more" cards.

**Actions**
- Students work in pairs or trios. The students place all the number cards that are "one less" face down in an 3x3 array on the left and all the number cards that are "one more" face down in a 3x3 array on the right.
- The first student selects a card from the left array, stating the number name and the counting number that follows. For example, if the student selects the number 2, s/he would say, "I have 2 so I need 3."
- S/he then picks one card from the array on the right (the "one more" numbers), hoping to find the target number. If the student finds a matching pair, s/he keeps that pair of cards. If the student does not find a pair, both cards are replaced face down in their original spots.
- It is now the second student's turn to choose a card from the "one less" array and to try to find the appropriate "one more" card. Students should try to remember where each number is located. (The game is called "Concentration" not "Guessing.")
- Play continues until all cards have been matched. The student with the most matched pairs wins.
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). *(K.CC.A.3) (DOK 1)*

   a. Example: **Solution** (DOK 1)
   
   The teacher will need a package of regular sentence strips and a medium point black permanent marker. Write the numbers from 1-20 on a sentence strip, one per student. Indicate the starting point for tracing each number with a dot.

   As an alternative, the teacher could print out number strips on card stock using the computer. Teacher fonts are available free on-line with traceable number formations.

   ![Number Strips](image)

   Give each student five or six different colored crayons (any color but black). Starting at the dot, have them trace over each number with each of the colored crayons. Laminate each number strip and tape it to the student's desk or table area for future reference. Students can also cut the number strip into separate cards to use for sequencing activities.

   b. Example: **Solution** (DOK 1)
   
   The teacher will need a sheet of 1 inch graph paper turned sideways (horizontally) with the numbers 0-9 written one in each box in the bottom row along the 11” side of the paper (one copy per student) and a 10 sided number die (0-9) or a 0-9 spinner.

   ![Graph Paper](image)

   The student rolls a number using the die or spinner and writes that number in the next box of the corresponding column. Students start at the bottom of the page and work to the top. Each time the student rolls/spins a number he/she will write the number on the paper in the next corresponding box. The winning number is the first to make it to the top of the paper. Students can also work in pairs.
c. Example: Solution (DOK 1)
The teacher will need a 3x3 grid with the numerals 1-9 arranged randomly (one in each box in the grid) and 2 different colored crayons, one for each child.

Two students each select a different color crayon and one number grid.

a. Player A chooses and reads a number name on the grid out loud to Player B. If Player B agrees that is the correct number name, then Player A may trace the numeral with his/her crayon.

b. Players switch roles and Player B reads a number name on the grid. If Player A agrees it has been correctly identified, then Player B traces the numeral with his/her crayon color.

c. Repeat steps (a) and (b) until one player has three numerals traced with his/her color in a row.

The object is to identify 3 numbers in a row – horizontally, vertically or diagonally. The winning student must confirm with the teacher by being able to read to the teacher the 3 winning numbers. This will allow for autonomy during the task but provide a check that students are actually identifying the numerals correctly in conjunction with tracing them.

d. Example: Solution (DOK 1)
   • In a small group or whole group setting, give each student a piece of paper. It may be useful to use 1 inch graph paper and have the student write each number in a different box to help with spacing.
   • Ask students to write the number that is spoken, and then say, “Write (number name)”’. Give the numbers from 0-10 in random order.

Students who have trouble writing certain numbers can then get targeted practice. It is also important to assess students writing of the numbers 11-20; perhaps after students are able to write 0-10.
e. Example: **Solution** (DOK 2)

**Materials**

Each pair of students needs: * One worksheet * Two markers of different colors * One pair of dice

**Action**

Student A rolls the two dice, finds the sum, and traces the number on the worksheet which corresponds to the answer with his/her marker. Student A then passes the dice to Student B who rolls both the dice, finds the sum and traces the correct number on the worksheet with his/her marker. Play continues this way until one of the numbers “wins” (i.e. all of the numbers of that quantity have been traced).

| Names
<table>
<thead>
<tr>
<th>1 2 3 4 5 6 7 8 9 10 11 12</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 2 3 4 5 6 7 8 9 10 11 12</td>
</tr>
<tr>
<td>1 2 3 4 5 6 7 8 9 10 11 12</td>
</tr>
<tr>
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</tr>
<tr>
<td>1 2 3 4 5 6 7 8 9 10 11 12</td>
</tr>
<tr>
<td>1 2 3 4 5 6 7 8 9 10 11 12</td>
</tr>
</tbody>
</table>

f. Example: **Solution** (DOK 2)

**Materials**

- 10-15 quart plastic bags of various counters (different numbers of counters in each bag)
- A recording sheet for the activity with pictures of counters and lines for recording the total number of objects
- A teacher completed recording sheet with the correct numbers written for each item
Counting Bags: Count the number of items in each bag. Write it on the line.

- snap cubes_______
- triangles_______
- numbers_______
- circles_______
- buttons_______
- cats_______
- shapes_______
- squares_______
- chain links_______
- pegs_______
- pennies_______
- sticks_______
- spoons_______
- paper clips_______

name______________________________
Count to tell the number of objects. (K.CC.B)

4. Understand the relationship between numbers and quantities; connect counting to cardinality.
   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.
   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.
   c. Understand that each successive number name refers to a quantity that is one larger. (K.CC.B.4)
      (DOK 2)

1. Example: Solution (DOK 1)

   Materials

   • Many small ziplock bags of counting objects (the “goodies”). Each bag
     should contain a number of objects in the counting sequence students
     are working on, between 1 and 20.
   • Post-it notes and pencils.

   Actions

   Students count the objects, record the number on the post-it note and
   stick the post-it note onto the outside of the bag.

   Students can work in pairs to scaffold their counting, and teachers
   should take care that at least one student in each pair is a confident
   counter and at least one student is a confident writer. Students can be
   provided with a number line to aid in writing the numbers. If the
   teacher is concerned that students cannot write the numbers
   independently s/he can write the quantities on post-it notes ahead of
   time and let the students choose the post it note that goes with each
   goody bag.
2. Example: Solution (DOK 1)

Materials

- The Napping House by Audrey Wood

![The Napping House book cover]

- One ten-frame for each child (see PDF for black line master)

![Ten-frame illustration]

- 6-10 counters per child

Actions

The teacher reads The Napping House to the class, stopping each time a person or animal gets into the bed so the students can add a counter to the ten-frame. After each page, stop to ask the children how many are sleeping in the bed after each counter is added to the ten-frame. For example, at the beginning there should be 1 counter for granny. When the child gets in the bed, there should be 2 counters. Have the children tell how many people there are in the bed now. Do this after each counter is added to the ten-frame. There should be 6 counters on the ten-frame once the wakeful flea is added. Once the flea bites the mouse, the children should begin taking the counters off the ten-frame to represent how many people/animals are still in the bed. For example, once the flea bites the mouse, there are only 4 people/animals left in the bed. By the end of the story, there should be no counters on the ten-frame.
3. Example: Solution (DOK 1)

Materials
- Counting Mats
- Small objects to count, such as bears or tiles.

Action
The teacher gives students the counting mat and many small objects to count with. Some students will automatically read the numbers and assemble the correct number of object then match them to the dots on the counting mat to verify they counted correctly. Other students who need more scaffolding will match each object to a dot. Students who do it this way should be guided to count the objects once they have assembled them on the dots. Once a student is done with each number they can move on to the next number. The teacher should do a quick check of a student's work before the student begins working on the larger numbers.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Image of dots for 1, 2, 3]</td>
<td>![Image of dots for 1, 2, 3]</td>
<td>![Image of dots for 1, 2, 3]</td>
</tr>
<tr>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>7</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>![Image of dots for 7]</td>
<td>![Image of dots for 8]</td>
<td>![Image of dots for 9]</td>
</tr>
<tr>
<td>10</td>
<td>11</td>
<td>12</td>
</tr>
</tbody>
</table>

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. (K.CC.B.5) (DOK 2)
   a. Example: Solution (DOK 2)
Material

- Assorted objects to create the groups
- Clear ziplock bags or small cups
- Index cards and stickers
- An egg timer or a kitchen timer

Action

The teacher will assemble a variety of groups of objects in a few different forms. For example, the teacher might put together:

- an index card with 5 stickers
- a clear ziplock bag with 7 beans
- a cup filled with 4 pennies
- an index card with a 4 smiley faces drawn onto it
- a clear ziplock bag with 4 unifix cubes inside
- 5 crayons held together by a rubber band
- a picture of 7 fingers
- 5 small toy animals in a clear ziplock bag
- 7 erasers in a small cup
- a group of 4 pencils held together by a rubber band

The teacher will give students a timer, and the students will race against the clock to sort the groups of objects into three separate groups (grouped by quantity) by the time the timer is finished. This can be played individually or in pairs.

Compare numbers (K.CC.C)

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 (K.CC.C.6) (DOK 2)
   a. Example: Solution (DOK 2)

¹ Include groups with up to ten objects.
Action:

This task should be done as a whole group. * The teacher will show the class two groups of objects or drawings of objects.

* The class will chorally count the two groups and the teacher or a student can record the number below the group. * The teacher will then ask the class to chorally say which number is greater and which number is less. * The teacher will then instruct students to turn to their talking partner and tell them how they know which number is greater or less than the other number. It can be helpful if students have preassigned "talking partners." This is not necessary, but will make the lesson go more smoothly as students will quickly know who they should turn and talk with.
7. Compare two numbers between 1 and 10 presented as written numerals. \((K.CC.C.7)\) (DOK 1,2)
   
a. Example: Solution (DOK 2)
   
   This activity can be done as an entire class or in small groups.

Materials

Paper bags and marbles (or some other counter, as long as it is relatively noisy).

Actions

(Whole-class version) The teacher secretly places between 1 and 10 marbles in a paper bag, then shows the bag to the class. After shaking it enough times for students to hear the marbles inside, and 4 or 5 students guess how many marbles are in the bag. The teacher writes the guesses on the board. Afterwards the contents of the bag are revealed and counted out. The teacher writes the number representing the total on the board, and the students then help sort their guesses into less than, greater than, or equal to the number of marbles in the bag. The game repeats until everyone has had a chance to guess at least once.

(Small group version) This works like the class version but one student in a group fill the bag with marbles themselves and the rest of the group tries to guess the number. With this variation it is practical to allow the students to both hear and feel the marbles inside the bag before they make their guess.

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**Operations and Algebraic Thinking**  
**K.OA**

Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from. (K.OA.A)

1. Represent addition and subtraction with objects, fingers, mental images, drawings\(^2\), sounds (e.g., claps), acting out situations, verbal explanations, expressions, or equations. \((K.OA.A.1)\) (DOK 2)
   
a. Example: Solution (DOK 1)

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\(^{2}\) Drawings need not show details, but should show the mathematics in the problem. (This applies wherever drawings are mentioned in the Standards.)
Adding two numbers to make an equation.

**Materials**

- One pair of dice per student
- A recording sheet for the activity. For example:

<table>
<thead>
<tr>
<th>Dice Addition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>+</strong>=__</td>
</tr>
<tr>
<td><strong>+</strong>=__</td>
</tr>
<tr>
<td><strong>+</strong>=__</td>
</tr>
</tbody>
</table>

**Action**

The students roll the dice. They record the numbers on the dice, one as the first addend and the other as the second addend in the equation, with numerals or dot pattern from the dice. They count all the dots and record the total in the equation.
b. Example: Solution (DOK 1-2)

Materials

- One 10-frame per pair of students (see example below)

```
  1  2  3  4  5
  6  7  8  9 10
```

- Counters, 10 per pair of students

- Decks of number cards 0-5 (with 4 of each number) or two 0-5 dice

Setup

This activity is done in pairs. The students sit side by side with 10-frame and deck of cards or dice. If they have cards, the cards are shuffled and placed face down in front of them.

Action

Player 1 flips a card or rolls the die. They place that many counters on the 10-frame. Player 2 flips a card or rolls the die. They place that many more counters on the 10-frame next to the counters already on the ten frame. The students count the total together.

A recording sheet can be added when the students have been introduced to equations and number sentences. For those students who can handle higher numbers, a deck of 0-10 cards and two 10-frames can be used.

This game can also be played alone.
2. Solve addition and subtraction word problems, and add and subtract within 10, e.g., by using objects or drawings to represent the problem. (K.OA.A.2) (DOK 2)
   a. Example: Solution (DOK 2)
      Adding two numbers to make an equation.

      **Materials**
      - One pair of dice per student
      - A recording sheet for the activity. For example:

      ![Dice Addition Table]

      **Action**
      The students roll the dice. They record the numbers on the dice, one as the first addend and the other as the second addend in the equation, with numerals or dot pattern from the dice. They count all the dots and record the total in the equation.

   b. Example: Solution (DOK 2)
      Show the student 6 counters (small, flat objects). Ask the student to close his/her eyes. Hide some of the counters under a sheet of heavy paper. When the student opens his/her eyes, s/he determines how many were hidden based on the number of counters still showing.

c. Example: Solution (DOK 2)
   **Materials**
   - Ten Flashing Fireflies by Philemon Sturges
   - 10 frame and 10 counters per student

   Video
Activity

Begin with 10 counters off the 10 frame mat with the yellow side facing up to represent the fireflies in the sky. As you read the story, the students should move a yellow counter to the ten frame to represent the firefly in the jar. Stop several times during the story to allow the students time to talk with their partner about how many fireflies are in their jar and how many are in the sky. Ex. There are 3 fireflies in my jar and 7 fireflies are in the sky. That equals 10 fireflies all together. At the end of the story, let the students put the counters away to represent the fireflies flying away. As a group, have the students come together to write a class list of all the combinations for 10 that were made.

d. Example: Solution (DOK 2)

Materials

Each pair of students needs: * One worksheet * Two markers of different colors * One pair of dice

Action

Student A rolls the two dice, finds the sum, and traces the number on the worksheet which corresponds to the answer with his/her marker. Student A then passes the dice to Student B who rolls both the dice, finds the sum and traces the correct number on the worksheet with his/her marker. Play continues this way until one of the numbers “wins” (i.e. all of the numbers of that quantity have been traced).
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.OA.A.3) (DOK 2,3)

a. Example: Solution (DOK 1)

   Materials
   For each student:
   
   • 5 two-color counters (e.g., red on one side and yellow on the other)
   • Cup (optional)

   Action
   • The students put the counters in the cup, shake it, and spill them onto the table. Alternatively they can use their hands.
   • The students determine how many of each color is showing and record the sum using drawings or equations.

   The students should "shake and spill" several times to show different pairs of numbers that sum to 5.

b. Example: Solution (DOK 2)

   For each set of numbers below, pick two numbers that add to make six. Write an equation that shows that those two numbers add to make 6.

   a. 3, 5, 3
   b. 6, 0, 2
   c. 1, 6, 5
   d. 3, 2, 4
   e. 4, 2, 6

   c. Example: Solution (DOK 2)

   Pose this question to the students:

   *Bobbie Bear has a box of red and blue buttons. She takes 4 buttons out of the box. How many of each color button might she have?*

   After students answer the question, ask them to draw pictures and write the number for each color. Students may represent their solution using drawings, equations, or both. Not all possible pairs that total 4 are required to meet this standard, but students should be encouraged to include more than one.
d. Example: **Solution** (DOK 3)
   This task is meant to be presented as a sequence of questions posed by
   the teacher to the students.

   Christina has 7 candies. Some of them are chocolate, and some of
   them are lemon.
   a. If she has one chocolate candy, how many lemon candies does she
      have if the rest are lemon?
   b. If she has two chocolate candies, how many lemon candies does she
      have if the rest are lemon?
   c. If she has 3, (4, 5, 6) chocolate candies, how many lemon candies
      does she have if the rest are lemon?

   Once a student finds one answer, ask him/her to find another. Ask the
   student to use objects, pictures, or equations to demonstrate his/her
   thinking. Not all pairs that total 7 are required to meet this standard,
   but students must include more than one.

e. Example: **Solution** (DOK 2)
   Make 9 in as many ways as you can by adding two numbers between 0 and 9.

f. Example: **Solution** (DOK 2)
   **Materials**
   * Double sided counters

   ![Image of counters]

   * Markers that are the same colors as the counters * Teacher-made “My
     Book of 5” (see below for detailed directions)
Action

Students will be given double sided counters/dots (see picture of counters, above). It is important for the markers to match the colors on the counters. Students take five counters in their cupped hands (or a cup), shake them around, pour them onto the desk. Next, they count how many counters are yellow and how many are red. Students then record the numbers in their book and write a corresponding equation. For example, if the counters landed so that 1 was yellow and 4 were red, then the student would draw one yellow dot and four red dots and then write “1+4=5” under the drawing. The student would then collect the counters and roll them again. For each combination of colors, the students record with a picture and an equation. Students continue until they fill their book of 5. The teacher can choose how many pages to put in, somewhere between five and eight is a good number so that students get a chance to see multiple combinations. After the students have completed their books, the teacher should have a whole-group discussion to make the number relationships explicit. One way to do this is to write each of the two addends into a table and to discuss possible patterns and reasons for the pattern. The teacher can ask specific questions such as, “What do you notice about the numbers in the table?” Or “Why is it that as one number gets bigger, the other number gets smaller?”

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

0+5= 5 1+4 =5 2+3 = 5 3+2 = 5 4+1 = 5 5+0 = 5

Once students have completed the book, the activity can be repeated but with a book that has 6 pages. The students would then need to create one page for each possible way to make five. How to make "My Book of 5": The book could simply be blank pages stapled together and the student creates the circle and writes the equation under. If your students need more scaffolding each page of the book can consist of five empty circles which the students color in. This will make it impossible for the students to accidentally draw four or six circles. See below for an example: Empty Book Pages:
My Book of 5
by Georgia

1 + 4 = 5
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. *(K.OA.A.4) *(DOK 2)*

5. Fluently add and subtract within 5. *(K.OA.A.5) *(DOK 1)*  
   a. Example: Solution *(DOK 2)*
      
      **Materials**
      * Double sided counters*

      * Markers that are the same colors as the counters * Teacher-made “My Book of 5” (see below for detailed directions)
Action

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My Book of 5
by Georgia

1 + 4 = 5
Here is a photo of students working on different numbered books (not books of five):
b. Example: Solution (DOK 2)

Materials

- Class white board and one marker
- Paper and pencil for students
- Materials such as counters or linker cubes
- Number lines that go from 0 to 10

Actions

- The teacher writes a simple addition problem on the white board. This should be a problem that is within easy grasp of all students, such as 3+2.
- Students then solve the problem using whichever strategy they choose. Then the teacher and the class should establish that the answer is 5. The focus of this lesson isn’t the solution 3+2 = 5 but rather making explicit to students all the ways they can go about solving such a problem. However, young learners love to have the “answer” to things and students won’t be able to focus on the next part of the problem until they know the teacher knows that they know the answer.
- The teacher should then have students brainstorm all the ways they can solve an addition problem like 3+2. Students should be encouraged to imagine a different strategy than the one they used. Students should talk with a partner first so everyone can have a chance to participate.
• Once students have been given about 90 seconds to talk, the teacher should bring the class back together. The teacher can use a random calling method such as sticks with students' names or can take raised hands. Random calling will ensure that many students get a chance to talk. The teacher will compile a list on the board of all the ways students have come up with.

This list should include:

• draw a picture of the problem

• using fingers to count

• using a number line

• counting on

• using counters

• knowing a subtraction fact and using that information (such as 5 - 2 = 3, therefore I know that 2 + 3 = 5)

• using knowledge of all the ways to make five, such as 0 + 5, 1 + 4, 2 + 3

To get variety, the teacher can ask, "Did anyone do it another way?" Students may come up with ways other than those described here; the teacher should include all reasonable responses in the list. The teacher may need to provide a few of the higher level ideas, such as using a subtraction fact or counting on. Once students have brainstormed ideas, the teacher should give them another chance to talk. The teacher can use the give one/get one procedure. Students stand up and find a friend to talk to. They give the friend one addition strategy and then get one additional strategy.
Number and Operations in Base Ten  

Work with numbers 11–19 to gain foundations for place value. (K.NBT.A)

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. (K.NBT.A.1) (DOK 2)
   a. Example: Solution (DOK 2)
      Decompose teen numbers using 10-frames and a number equation.

Materials

- Number cards 11-19
- Pencil, crayon, or marker
- Attached student worksheet

Action

This activity can be done individually, in partners, or in small groups. The students have a teacher-made sheet and a writing implement. The cards are shuffled and placed face down.

```
    □□□□□  □□□□□
    _____ = _____ + _____
```

The student picks a card off of the top of the pile. The student then says the number and draws that many dots beginning with the first 10-frame. When the first 10-frame is filled, the student continues drawing the remaining dots in the next 10-frame. The student then fills in the blank equation with the corresponding numbers.

Example:

```
    □□□□□□□□  □□□□□□
    13 = 10 + 3
```

The student continues to pick cards and illustrate numbers in this way until all cards are used or the sheet is filled.
Describe and compare measurable attributes. (K.MD.A)

1. Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object. (K.MD.A.1) (DOK 2)
   a. Example: Solution (DOK 2)

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. For example, directly compare the heights of two children and describe one child as taller/shorter. (K.MD.A.2) (DOK 2)
   a. Example: Solution (DOK 2)
Materials

- One pair of "taller" and "shorter" cards for each student.

```
[Image: taller shorter]
```

Action

- The students stand in a circle with the cards in their hands.

- The teacher says "GO." The students find a partner and stand face-to-face. The taller student holds up the "taller" card and the shorter student holds up the "shorter" card.

- When the teacher calls out a student's name, they respond in a complete sentence:

  \[
  \text{I am shorter (taller) than} \quad \underline{\text{_____}}. \\
  \]

  The teacher calls on three or four students each round.

  The teacher says "GO" and calls on three or four different students each time until all the students have had a turn to respond.
b. Example: Solution (DOK 2)

Materials:

- Sheets of paper for each student that are folded in half with the words "Heavier" and "Lighter" written at the top of each side.

<table>
<thead>
<tr>
<th>Heavier</th>
<th>Lighter</th>
</tr>
</thead>
</table>

- A box of large blocks.

- A box of different objects with different weights to compare with a block from the first box. Some should be lighter than a single block and some should be heavier. The weight differences should be fairly pronounced.

Action:

- The students begin by choosing a block that they will use to compare with other objects.

- Students will then choose an item from the second box and compare its weight to their block. They then draw a picture of it under "Heavier" or "Lighter" depending which applies. They continue to choose objects from the box to measure against their block until they have two or three drawings on each side of their sheet.
c. Example: Solution (DOK 2)

Students will need various items to compare weights, a balance scale, and a recording sheet with four sections with enough space for a small drawing. The students work in pairs. They choose two items to compare weights. Using the balance scale, they put one item on each side of the balance scale. Then they draw the two items and circle the one that is heavier. They continue same steps with different pairs of items.
d. Example: Solution (DOK 2)

#### Materials
* One of the student's shoes to use to compare to other items.
* A bin of seven to ten commonly used classroom items, such as a glue bottle, a pair of scissors and a crayon, that are similar in size but distinctly longer or shorter than a student's shoe.
* Sheets of paper, folded in half with the words 'longer' and 'shorter' written, in 2 different colors, at the top of each side.

<table>
<thead>
<tr>
<th>Longer</th>
<th>Shorter</th>
</tr>
</thead>
</table>

#### Setup
All students have the prepared sheet of paper and a pencil.

#### Action
The students begin by removing their shoe; this is their 'measuring item'. Then they select an item from the bin to measure against their 'measuring item'. They directly compare it by holding it against their item and decide if it is longer or shorter than their shoe. The students then draw a picture of it on the correct side of the longer/shorter sheet depending on how it measured up. They continue to compare items to measure against their shoe until they have 2-3 drawings on each side of their sheet.
e. Example: Solution (DOK 2)

Materials

- Blackline Master
- Pencil or Crayons
- Long, skinny objects to compare; for example:
  - a pair of scissors
  - a crayon
  - a glue stick
  - a long, skinny wooden block from the classroom block set
  - a marker

Actions

The teacher will pre-select a group of classroom objects (8-12) for the students to use. Each student will choose two objects to compare and they will lay them next to each other and compare which is longer. The teacher may need to show students that they need to make sure the starting ends are correctly lined up, like this:

Not like this this:

The teacher can have the students record their findings in one of two ways: * Students can trace both objects on a black piece of white paper. The students can label their drawings depending on their literacy skills and then circle the longer object. * Students can use the attached blackline master. This requires higher level skills as students must decide which object is the longer and shorter object, conserve that information in their brain and then write the word/draw pictures (not trace) of the item in the correct box. This also asks students to work with both the concepts longer and shorter instead of simply determining which is longer. Students should repeat the activity with multiple pairs of objects.
f. Example: Solution (DOK 2)

Materials

- Blackline Master
- Pencil or Crayons
- Balance Scale
- Objects to compare (sample list, teacher can use these or other objects like this they have in their classroom)
  - a small book
  - a pair of scissors
  - a bundle of 4 crayons
  - a bottle of Elmer's glue or a glue stick
  - a wooden block from the classroom block set
  - a marker
  - white board eraser
Classify objects and count the number of objects in each category. (K.MD.B)

3. Classify objects into given categories; count the numbers of objects in each category and sort the categories by count. \(^3\) (K.MD.B.3.) (DOK 1,2)
   a. Example: Solution (DOK 2)

\(^3\) Limit category counts to be less than or equal to 10.
You will need sorting cards or items, for example: colors, shapes, animals, foods, etc. Cards should be able to be sorted multiple ways (example, foods could be sorted by color, then sorted by fruit vs. veggie vs. grain). Another example is animals could first be sorted by pet vs. wild animal vs. farm animal and next be sorted by number of legs and finally be sorted by furry animals/skin animals/scale animals.

First have students look at the cards and decide two or three different ways to sort. Next each student can randomly choose a card or item. Then when all class has one, they sort themselves into categories according to color, shape, type of animal or food they have. Then the teacher can ask the questions:

- “Which group has the most?”
- “Which group has the least?”
- “Do any groups have the same number?”

The students count the groups and answer the teacher's questions.

b. Example: Solution (DOK 2)

**Materials**

- Ziplock bags containing 10-30 small objects (such as buttons or shapes cut out of construction paper) with different characteristics.

**Action**

Students get a bag of small objects. Each bag should contain objects that can be sorted in multiple ways. For example, if the bag contains round buttons, students can sort by color, size, or the number of holes in each button. If the bag contains different shapes in different colors, they can sort by color or shape.

- Students take their bag and spill it onto a large sheet of paper or a tray. Students then sort them according to one attribute such as color, shape, size, or some other attribute.
- When they have sorted all of the objects, students then count the number of objects in each group.
- When students have finished sorting and counting according to one attribute, they sort and count according to another attribute.

c. Example: Solution (DOK 2)
Geometry          K.G

Identify and describe shapes (squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, and spheres). (K.G.A)

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. (K.G.A.1) (DOK 1,2)
2. Correctly name shapes regardless of their orientations or overall size. (K.G.A.2) (DOK 1)
3. Identify shapes as two-dimensional (lying in a plane, "flat") or three-dimensional ("solid"). (K.G.A.3) (DOK 1)

Analyze, compare, create, and compose shapes. (K.G.B)

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). (K.G.B.4) (DOK 2,3)
   a. Example: Solution (DOK 2)
Materials:

This game uses the 16 cards below.

Actions:

Students in pairs take turns drawing two cards. They should name something that is the ALIKE or DIFFERENT between the two cards. Then the next two cards are drawn and the process repeats until no cards remain.

In a cooperative game, the students work together to name a property for each pair.

In a competitive game, the student who can name a property first gets to keep the cards and the student with the most cards at the end of the game wins. Since the properties may depend on the orientation of the cards, students should sit side-by-side in this version.

5. Model shapes in the world by building shapes from components (e.g., sticks and clay balls) and drawing shapes. *(K.G.B.5) (DOK 2,3)*

6. Compose simple shapes to form larger shapes. For example, "Can you join these two triangles with full sides touching to make a rectangle?" *(K.G.B.6) (DOK 2,3)*