

The following instructional plan is part of a GaDOE collection of Unit Frameworks, Performance Tasks, examples of Student Work, and Teacher Commentary. Many more GaDOE approved instructional plans are available by using the Search Standards feature located on GeorgiaStandards.Org.

Georgia Performance Standards Framework for Mathematics – Kindergarten

Unit 1 Organizer: “WHAT ARE NUMBERS?” **(4-6 weeks)**

OVERVIEW:

In this unit students will:

- set routines;
- practice rote counting for numbers 1-10;
- count objects using a one-to-one correspondence up to 10;
- write numbers 1-10;
- compare (equal, more than, less than) up to 10;
- use manipulatives to act out story problems;
- use the strategies of counting on to understand number relationships;
- understand the concept of time such as:
 - names and days of the week;
 - months of the year;
- pose information questions;
- collect data;
- organize and record results using objects and/or pictures; and
- group objects according to common properties.

All mathematical tasks and activities should be relevant and interesting to students. Students may start kindergarten thinking of counting as a string of words, but then they make a gradual transition to using counting as a tool for describing their world. They must construct the idea of counting using manipulatives and other resources to see the numbers visually (dot cards, tens frames). To count successfully, students must remember the rote counting sequence, assign one counting number to each object counted, and at the same time have a strategy for keeping track of what has already been counted and what still needs to be counted. Only the counting sequence is a rote procedure. The meaning students attach to counting is the key conceptual idea on which all other number concepts are developed. Students will develop successful and meaningful counting strategies as they practice counting and as they listen to and watch others count.

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Although the units in this instructional framework emphasize key standards and big ideas at specific times of the year, routine topics such as counting, time, money, positional words, and patterns should be addressed on an ongoing basis through the use of calendar, centers (tubs), and games. This first unit should establish these routines, allowing students to gradually understand the concepts of number and time.

To assure that this unit is taught with the appropriate emphasis, depth, and rigor, it is important that the tasks listed under “Evidence of Learning” be reviewed early in the planning process. A variety of resources should be utilized to supplement, but not completely replace, the textbook. Textbooks not only provide much needed content information, but excellent learning activities as well. The tasks in these units illustrate the types of learning activities that should be utilized from a variety of sources.

ENDURING UNDERSTANDINGS:

- Counting tells how many things are in a set.
- The last number word, when counting, names the quantity in a set.
- A number can be represented by a numeral, a word, and a set of objects.
- Numbers are related to each other through a variety of number relationships. For example, 6 is one more than 5, and is 4 less than 10.
- Each day of the week has a name.
- The year is divided into months.
- Counting can be a way to collect information.

ESSENTIAL QUESTIONS:

- Why do I need to be able to count objects?
- How do I use numbers every day?
- Why would I need to be able to read number words?
- How can I tell what day today is?
- How can I record what I count?

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STANDARDS ADDRESSED IN THIS UNIT

Mathematical standards are interwoven and should be addressed throughout the year in as many different units and activities as possible in order to emphasize the natural connections that exist among mathematical topics.

KEY STANDARDS:

MKN1. Students will connect numerals to the quantities they represent.

- a. Count a number of objects up to 30. (*This unit will concentrate on counting up to 10.*)
- b. Produce models for number words through ten.
- c. Recognize and write numerals through 20 to label sets. (*This unit will focus on numerals through 10.*)
- d. Sequence and identify using ordinal numbers (1st-10th).
- e. Compare two or more sets of objects (1-10) and identify which set is equal to, more than, or less than the other.

MKN2. Students will use representations to model addition and subtraction.

- a. Use counting strategies to find out how many items are in two sets when they are combined, separated, or compared.
- b. Build number combinations up to 10 and for doubles to 10.
- c. Use objects, pictures, numbers or words to create, solve, and explain story problems (combining, separating, or comparing) for two numbers that are each less than 10.

MKM2. Students will understand the measurement of calendar time.

- a. Know the names of the days of the week.
- b. Know the months of the year.

MKD1. Students will pose information questions, collect data, organize, and record results using objects, pictures, and picture graphs.

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RELATED STANDARDS:

MKP1. Students will solve problems (using appropriate technology).

- a. Build new mathematical knowledge through problem solving.
- b. Solve problems that arise in mathematics and in other contexts.
- c. Apply and adapt a variety of appropriate strategies to solve problems.
- d. Monitor and reflect on the process of mathematical problem solving.

MKP2. Students will reason and evaluate mathematical arguments.

- a. Recognize reasoning and proof as fundamental aspects of mathematics.
- b. Make and investigate mathematical conjectures.
- c. Develop and evaluate mathematical arguments and proofs.
- d. Select and use various types of reasoning and methods of proof.

MKP3. Students will communicate mathematically.

- a. Organize and consolidate their mathematical thinking through communication.
- b. Communicate their mathematical thinking coherently and clearly to peers, teachers, and others.
- c. Analyze and evaluate the mathematical thinking and strategies of others.
- d. Use the language of mathematics to express mathematical ideas precisely.

MKP4. Students will make connections among mathematical ideas and to other disciplines.

- a. Recognize and use connections among mathematical ideas.
- b. Understand how mathematical ideas interconnect and build on one another to produce a coherent whole.
- c. Recognize and apply mathematics in contexts outside of mathematics.

MKP5. Students will represent mathematics in multiple ways.

- a. Create and use representations to organize, record, and communicate mathematical ideas.
- b. Select, apply, and translate among mathematical representations to solve problems.
- c. Use representations to model and interpret physical, social, and mathematical phenomena.

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CONCEPTS/SKILLS TO MAINTAIN:

Although many students may have attended pre-school prior to entering kindergarten, this is the first year of school for some students. For that reason, no concepts/skills to maintain will be listed at this time. It is expected that teachers will differentiate to accommodate those students that may enter kindergarten with prior knowledge.

SELECTED TERMS AND SYMBOLS:

The following terms and symbols are often misunderstood. These concepts are not an inclusive list and should not be taught in isolation. However, due to evidence of frequent difficulty and misunderstanding associated with these concepts, instructors should pay particular attention to them and how their students are able to explain and apply them.

The definitions below are for teacher reference only and are not to be memorized by students. Teachers should present these concepts to students with models and real life examples. Students should understand the concepts involved and be able to recognize and/or demonstrate them with words, models, pictures, or numbers.

Number: one of a series of symbols of unique meaning in a fixed order that can be derived by counting

Numeral: symbol or mark used to represent a number

Set: collection of numbers, geometric figures, letters, or other objects that have some characteristic in common

Digits: symbols used to write numerals

Equal: being the same or identical to in value

More: greater or additional quantity, number, degree, or amount

Less: not as great in amount or quantity

Greater: larger in size than others of the same kind

Fewer: quantifier meaning a smaller number of

Same: equal in amount or value

Model: representation of a concept or idea

Day: the period of light between dawn and nightfall; the interval from sunrise to sunset

Week: a seven-day calendar period, especially one starting with Sunday and continuing through Saturday

Month: one of the 12 divisions of a year as determined by a calendar

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EVIDENCE OF LEARNING:

By the conclusion of this unit, students should be able to demonstrate the following competencies:

- Count a number of objects up to 10.
- Count one-to-one in counting order at least to 10.
- After counting, verbally tell the amount in a set.
- Produce models for number words through ten.
- Read number words to ten.
- Match number words to sets of objects.
- Write numerals to 10 to label sets.
- Recognize numerals to 10.
- Rote count to 10.
- Recognize quantities of objects 1 to 10 in terms of benchmark numbers of 5 and 10.
- Group objects by 5's and 10's.
- Know the names of the days of the week and the months of the year.

The following tasks represent the level of depth, rigor, and complexity expected of all kindergarten students. These tasks or a task of similar depth and rigor should be used to demonstrate evidence of learning.

While the tasks in this unit are appropriate for the first 4 weeks, all of these activities can and should be repeated and expanded upon throughout the course of the year.

- Daily Routines
- What's in my bag?
- Fingers Part 1
- Five and Ten
- What Comes in 2's 3's and 4's?
- Baby Bunnies
- Number Book

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Culminating Activity: “Number Book”

Students will make a book that demonstrates their understanding of the numbers one through ten. This book could be used as a reference throughout the year.

STRATEGIES FOR TEACHING AND LEARNING:

- Students should be actively engaged by developing their own understanding.
- Mathematics should be represented in as many ways as possible by using graphs, tables, pictures, symbols and words.
- Appropriate manipulatives and technology should be used to enhance student learning.
- Students should be given opportunities to revise their work based on teacher feedback, peer feedback, and metacognition which includes self-assessment and reflection.

Classroom Routines

The importance of establishing classroom routines cannot be overstated. Daily routines must include obvious activities such as taking attendance, doing a lunch count, lining up in a variety of ways (by height, age, type of shoe, hair color, eye color, etc.), daily questions, and calendar activities. They should also include less obvious routines, such as how to select materials, how to use materials in a productive manner, how to put materials away, how to open and close a door, how to do just about everything! An additional routine is to allow plenty of time for children to explore new materials before attempting any directed activity with these new materials. The regular use of the routines are important to the development of students’ number sense, flexibility, and fluency, which will support students’ performances on the tasks in this unit.

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Suggested Routines

- **Lunch count / Attendance-**

Mount small student photos (Polaroid I-Zone or digital) on magnets or magnetic tape. Draw a line down the center of a small magnetic board, and write on one side- lunch from home, and on the other side- school lunch. When children enter the room, they move their photo to the correct side of the board. At morning circle, count the number of photos on each side, and then count the total. Are any pictures missing? Are those people absent? As the year progresses, change the pictures to the first names of the students. Later, the teacher may even replace the first names of students for their last names.

- **Ordinal Numbers**

Stress ordinal numbers when sequencing the day's events, lining up, volunteering, answering questions, sharing work, scheduling centers, playing games, etc. Incorporate them into the daily conversation throughout the year.

Games may also be played similar to having a bag with cards labeled with the numbers and the number words 1-10. Allow each of ten children to draw a card from the bag and line up according to the order of the cards drawn. This could be re-played several times.

- **Center/Choice-**

Allow students to create the signs for the center/choice areas in the room and determine how many people may be in each area. Children then represent that number with drawings, numbers, and/or words.

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- **Calendar-**

Each day help children state and write the day of the week and the date. Include a digital date (6/18/07) and a written date (Monday, June 18, 2007). An example for the board is, “*Today is _____. Yesterday was _____. Tomorrow will be _____.*” Each time, show children where they can find this information on the calendar. Eventually turn this task over to students.

Calendar Number Line

At the end of each day (closing circle) encourage the class to brainstorm things that happened during the day that were important or memorable. Choose one of the suggestions and allow one student to illustrate that activity on an index card. This is done daily with cards left blank to represent weekends or holidays. Post these on the wall each day. Continue until the end of the month. Place the name of the month above the cards. Throughout the year, children create a calendar/timeline of their school activities and develop an understanding of the meaning of a calendar.

At appropriate times throughout the year, be sure to point out how the months and seasons are changing. Ask questions like: What month came after August? February? Students may find their answers by referring to the pictures found around the classroom. Also, as the year changes, mark the calendar with a big new number. Discuss how many months it will be until there is a new year.

- **Question of the Day-**

Each day write a question on the “Question Chart” for the students to answer. Consider using questions similar to these: Are you a boy or girl? Do you have an older brother? Are you 5 or 6 years old? Do you like cookies? The students can indicate their answer by placing their name in the appropriate circle. After each child has responded, discuss the data that they collected. Some questions that would be appropriate are: What is the graph about? Did you notice anything about the graph? How many students answered ____? Did more (or less) students answer ____ than ____?

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This is a routine that should be done on a daily basis. To prepare for this task, make a chart to display the question of the day and the responses of the students. The chart may look something like:

Question of the Day	
Do you like pizza?	
Yes	No

- **Time-**

Order daily events and discuss the time that the daily events occur to the nearest hour, such as “*What time do we go to lunch?*”, “*When do we go to music?*”, “*When do we go to PE?*”, etc. Discuss the day of the week that weekly events occur, “*We always go to art on Tuesdays.*”, “*What day do we go to chorus each week?*” One way to do this would be to create a chart from morning to afternoon with many clocks going down the side of the chart. The teacher will draw the hands on the clocks (analog) and write the time (digital). The children will then create sentence strips with daily events and pictures. Work as a class to place the events next to the appropriate time on the chart. Events can be limited to three or four at the beginning of the year then increased as the year progresses. A suggested book to use is Time To... by Bruce McMillan.

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- **Reward Store-**

Set up a “Rewards Store” consisting of simple items such as stickers, erasers, candy, etc. Determine the cost of each item. All items should be priced to be less than or equal to thirty cents. During the week, reward students for exemplary performance by giving them play money consisting of pennies, nickels, dimes and quarters. On a specific day of the week, allow students to “visit” the reward store to “purchase” items of differing prices. As the students make their purchases, have them explain the coins they are giving you and how they know that the coins represent the appropriate amount for the item they want.

- **Sharing-**

Sharing appropriate amounts equally among 2 or 3 children should be treated informally on an ongoing basis. Look for opportunities to share 2, 4, 6, 8, or 10 objects between 2 students and 3, 6, or 9 among 3 students.

TASKS:

The collection of the following tasks represents the level of depth, rigor and complexity expected of all kindergarten students to demonstrate evidence of learning.

- **What Is In My Bag?**

What Is In My Bag?

1. You and your partner will be given a bag. Inside your bag are some things that you have seen before.
2. You are to write down the letter on your bag and the name of the items in your bag.
3. Count the items in your bag.
4. Represent the number of items that you counted using pictures, a numeral, and a number word.

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Discussion, Suggestions, Possible Solutions

The teacher should prepare enough paper bags for each pair of students. Each bag should be labeled with the items contained in the bag and a letter (for example, A through J for a class of 20 students). Each bag should contain a different set of items, such as pennies, buttons, cubes, tiles, teddy bear counters, beans, pencils, crayons, markers, paper clips, pattern blocks, straws, or erasers.

Students should write on their paper the letter of the bag they received, the name of the item in the bag, and how many they counted. They should represent the amount using pictures, numbers, and/or number words.

As the students are working through this task, the teacher should be making the following observations:

- *When children count the objects in their bags, do they count one-to-one or use other skip counting strategies?*
- *Do they lose count or count objects more than once?*
- *Have students represented the amount in their bag using pictures, the numeral and/or the counting word correctly?*
- *Can you identify which bag the student had?*

- **Fingers Part 1**

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Fingers Part 1

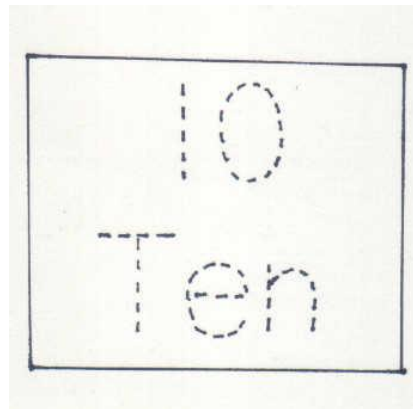
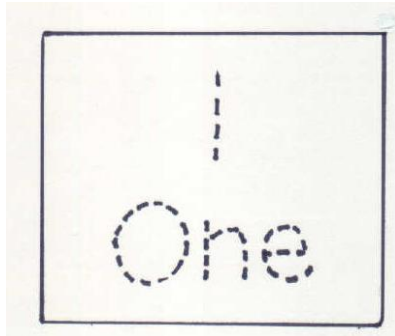
Think about how many fingers you have on both hands.

- Have your partner trace each of your hands on a sheet of paper.
- Count the number of fingers on your paper.
- Record the number of fingers on your paper using the pre-printed pieces of paper with the numeral and the number word. Trace over these dotted numbers and words.
- Compare the number of fingers that you have with the number of fingers your partner has. Are the numbers the same or are they different? How do you know?

Discussion, Suggestions, Possible Solutions

Be sensitive to students with physical differences as they may not be comfortable speaking about them.

Students will trace both hands of their partner on one piece of paper and then determine how many fingers they have on both hands. The pre-printed paper could look like the ones shown below to help student write the number of fingers they have using both the numeral “10” and the word “ten” on their paper.



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Once they have finished this task, they should compare their solutions with their partners. Have students explain how they know they both have the same number of fingers. Counting the fingers on the partner's picture is a good way to "double check" and to get more practice in counting.

- **Five and Ten**

Five and Ten

Part 1:

Take turns choosing a number from 1 to 10.

Place the chosen number of counters on your five-strip using any combination of the squares.

On your worksheet color the squares so that they represent what you have shown on your strips.

Tell about the picture and what it means about the number.

Part 2:

Follow the same directions in part 1 using two five-strips instead of only one.

Discussion, Suggestions, Possible Solutions

Part 1:

- *Give each student a laminated five-strip, a set of ten counters, and a worksheet with preprinted five-strips.*
- *Let students take turns choosing a number from 1-10.*
- *Have students place the chosen number of counters on their strip, making use of any combination of the squares.*
- *Have students color their representation on their worksheet..*
- *Allow students to discuss and share the different ways that they have shown their numbers.*

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Worksheet:

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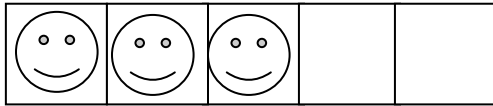
Here is an example of a five-strip.

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This is a very rich task that allows students to compare numbers to five; to visualize sums; to see the difference between five and a number; and to comprehend one-to-one correspondence.

For example, three may be represented by:



Students might say:

- “There are three counters and two empty squares.”
- “Three is less than five because there are two empty squares.”
- “Three is two less than five.”
- “Three needs two more to make five.”



For this example, students might say:

- “One counter and two counters are three counters. One empty square and one empty square are two empty squares.”
- “There are three counters and two empty squares.”
- “Three is less than five because there are two empty squares.”
- “Three is two less than five.”
- “Three needs two more to make five.”

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For this example, students might say:

- “One counter and two counters are three counters. There are two empty squares.”
- “There are three counters and two empty squares.”
- “Three is less than five because there are two empty squares.”
- “Three is two less than five.”
- “Three needs two more to make five.”

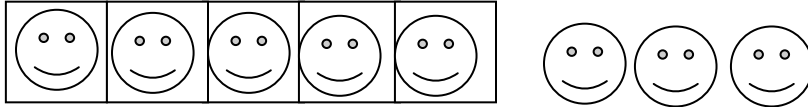


For this example, students might say:

- “One counter and one counter and one counter are three counters. One empty square and one empty square are two empty squares.”
- “There are three counters and two empty squares.”
- “Three is less than five because there are two empty squares.”
- “Three is two less than five.”
- “Three needs two more to make five.”

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Suppose a student picked a number more than five, such as eight.



Students should notice that:

- All their pictures look the same because all five squares are filled up and there are three more counters left over.
- Eight is more than five.
- Eight is three more than five.
- Five and three more makes eight.

Part 2:

- Give each student two laminated five-strips and a set of ten counters.
- Let students take turns choosing a number from 1-10.
- Have students place the chosen number of counters on their strips, making use of any combination of the squares.
- Have students draw their representations.
- Allow students to discuss and share the different ways that they have shown their numbers.

This part of the task should help students decide whether a number is more than five, equal to five, or less than five.

Some suggested questions for this section of the task include:

- Is a number more than five, equal to five, or less than five?
- Is a number closer to five or closer to ten?
- What combinations exist based on five and ten as benchmarks? (For example, nine is five and four more; or one less than ten.)
- As the number of counters increases, what happens to the number of empty squares?

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- **What Comes in 2s, 3s, and 4s?**

What Comes in 2s, 3s, and 4s?

Adapted with permission: “What Comes in 2’s, 3’s & 4’s,” pp 123-126. *Growing Mathematical Ideas in Kindergarten*, by Linda Schulman Dacey and Rebekka Eston.

- Ask children what they can think of that comes in groups of 5s. They have had experience in the Fingers activity with 5s, so this should be familiar ground.
- Write their answers on chart paper. Ask if they can think of things that come in 2’s, 3’s or other groups. Add their suggestions to the chart paper list, grouping by number. Children may give responses that do not fit the categories correctly.
- Review list of items on the chart paper to see if they all fit correctly in their categories. For example, a child may have said, “Cats come in twos, because I have two cats!” But do they always come in pairs, in the way shoes do?
- Have children think of at least one answer for the question for each number, 2-5. Have them record their answers using numbers, words, and drawings on a piece of paper divided into 6 spaces. In one space they will put their name and date. The other spaces are for each number and illustration.
- Discuss how children decided on their answers and display the posters.

Discussion, Suggestions, Possible Solutions

As a suggested follow-up, read the book What comes in 2s, 3s, and 4s? by Suzanne Aker published by Aladdin.. The teacher could encourage the children to come up with some of the same ideas mentioned in the book.

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- **Baby Bunnies**

Baby Bunnies

The pet store has received ten new baby bunnies. The owner of the store has two pens and needs to put the new baby bunnies into the pens.

Show how many different ways the owner of the store can put the baby bunnies into the pens. Be sure to use pictures, words, and numbers.

Discussion, Suggestions, Possible Solutions

The number of baby bunnies may be changed to be less than ten. Using manipulatives will help the students to model the problem.

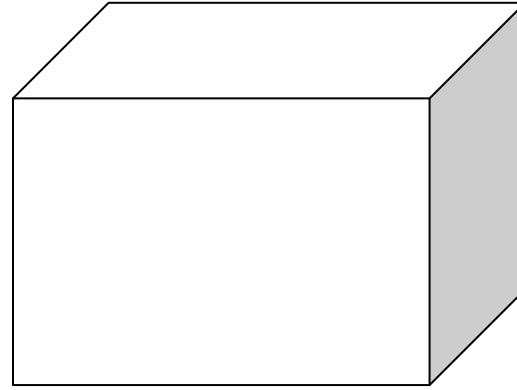
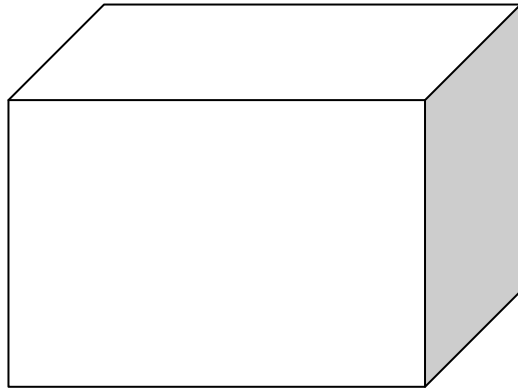
Providing a page similar to the one below will help students to organize their work.

Baby Bunnies

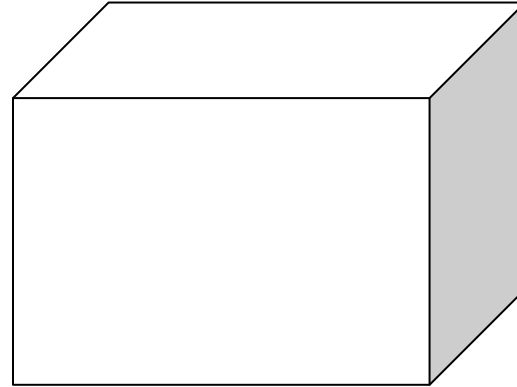
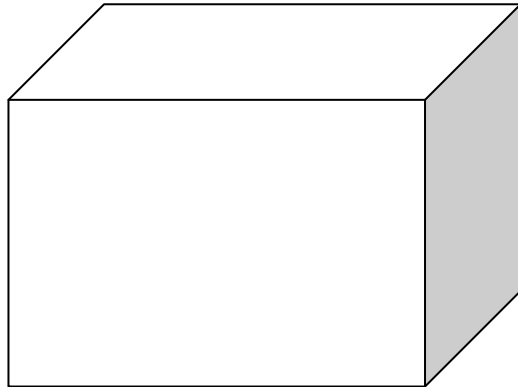
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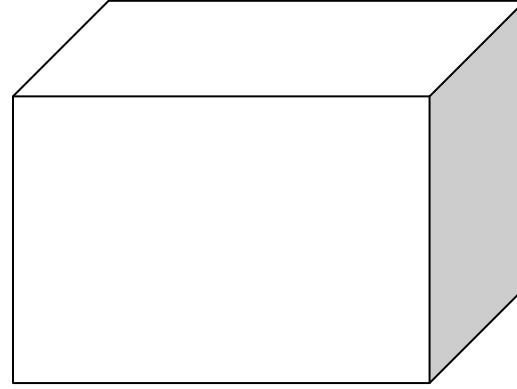
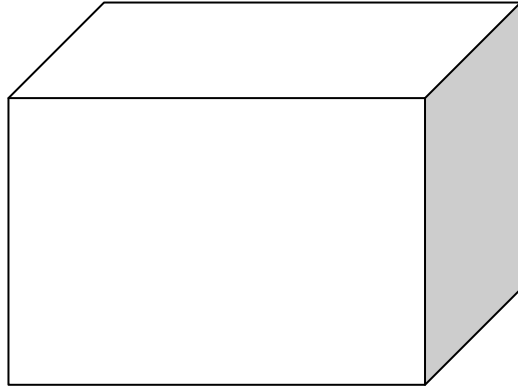


There are _____ bunnies in this pen and _____ bunnies in this pen.

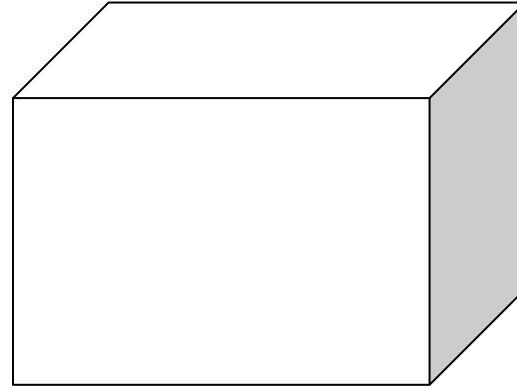
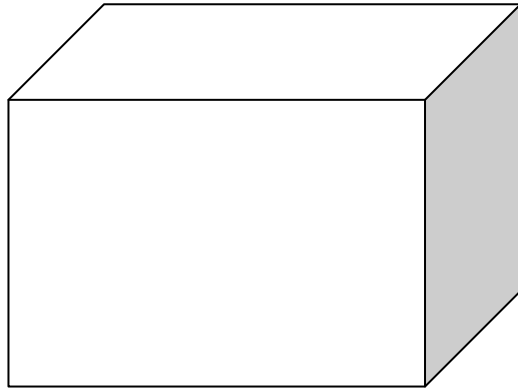


There are _____ bunnies in this pen and _____ bunnies in this pen.

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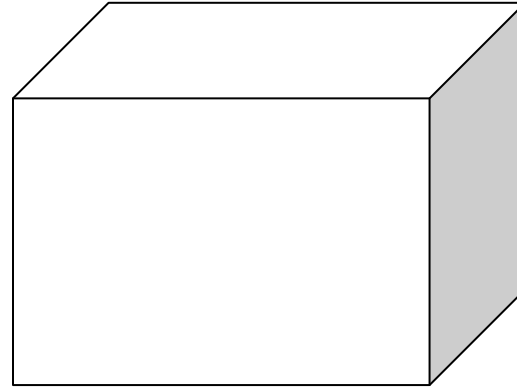
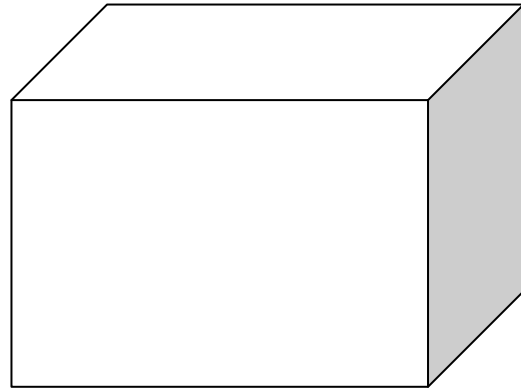


There are _____ bunnies in this pen and _____ bunnies in this pen.



There are _____ bunnies in this pen and _____ bunnies in this pen.

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There are _____ bunnies in this pen and _____ bunnies in this pen.

Variation:

The teacher may change the number baby bunnies and or pens.

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- **Culminating Task**

This culminating task represents the level of depth, rigor and complexity expected of all kindergarten students to demonstrate evidence of learning.

Unit One Task: “NUMBER BOOK”

Number Book

Your teacher will read a number book to you.

While you are listening carefully, think about why we count and when we would need to count.

After talking about the book, you will be asked to make your own number book.

Follow the directions below to make your book.

1. Design a page for each number, one through ten. Be creative.
2. Write the numeral and the number word on each of the pages.
3. Draw, stamp or glue objects that demonstrate each number. You may use more than one set of objects on your number page.
4. On the side of each page, color the appropriate number of circles.

Suggestions for Classroom Use

While this task may serve as a summative assessment, it also may be used for teaching and learning. It is important that all elements of the task be addressed throughout the learning process so that students understand what is expected of them.

- Peer Review
- Display for parent night
- Place in portfolio
- Photographs

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Discussion, Suggestions and Possible Solutions

There are many books available that are about counting to ten. One example would be the book , Every Buddy Counts, by Stuart J. Murphy

The teacher should encourage students to talk about what they notice about the items on each page.

This task could be started during math time one day and extended on subsequent days during student choice time.

Do students show more than one group of objects on each page?

Are the groups represented accurately?

When children count the objects on their pages, do they count one-to-one or use other skip counting strategies?

Do they lose count or count objects more than once?

Have students represented the numeral and counting word correctly on each page?