Prekindergarten mathematics emphasizes vocabulary and relationships. Students begin to count objects with a one-to-one correspondence to the numeral name, determine which set has more items or less, and recognize numerals. Teachers need to provide lots of opportunities for children to count and match numbers of objects to the numeral. Shapes and spatial reasoning are important and can be emphasized with real-world objects in both two and three dimensions. Hands-on activities in which children begin to explore and create shapes such as triangles, squares, and circles are important. Also, children should begin to understand attributes of objects such as length, height, and weight to develop measurement skills.

Almost any storybook can be used to encourage pre-K children to think about these mathematical concepts and engage them in mathematical explorations. What is important for teachers is to let the mathematics flow from the storybook. Think about posing questions on any aspect of the story, the characters, the illustrations, the plot, objects in the story, and so forth. In preschool classrooms, storybooks can also be used to emphasize literacy concepts, such as dramatization, choral reading, sounds, and rhyming words.

Because pre-K children love to play in the imaginative world, they can be led to think about a story in the land of pretend. As a result, teachers can pose questions that begin with “What if” or “Let’s pretend” to spark children’s interest and have them think mathematically, even if the book is not one with numbers in it.

Prekindergarten Curriculum Focal Points

- **Number and Operations**: Developing an understanding of whole numbers, including concepts of correspondence, counting, cardinality, and comparison
- **Geometry**: Identifying shapes and describing spatial relationships
- **Measurement**: Identifying measurable attributes and comparing objects by using these attributes
We saw how a preschool teacher used storybooks to engage children in mathematical thinking based on objects and characters in a story. *The Napping House* (Wood, 1984) is a cumulative tale about a snoring granny who is sleeping on a rainy afternoon. Gradually, various critters crawl on top of granny (e.g., a child, a dozing dog, a snoozing cat) as she sleeps. The story ends when a flea sets off a chain of events which results in a pile of characters and a broken bed.

In the discussion after reading this book, the preschool teacher posed questions that engaged children in counting the critters or number of legs on the bed each time, and asked questions related to the possible weights of each critter. She posed questions such as “Which critter weighs more?” “Which critter weighs the least?” “How do you know?” “Granny wants us to tell her what size bed she would need to fit all the critters.” She invited the children to pretend each of the critters brought a friend on the bed and asked:

*How many critters would be on the bed now? What if the bed was shaped like a triangle—can you draw a picture of the bed? How many sides would the bed have? Let’s pretend the bed is 1 foot long, can you show me with your hands how long the bed would be? (This was followed up by comparing hand measures with a ruler to demonstrate length of a foot.) Can you find something around the classroom that would be longer than the bed? Can you find something in the classroom that would be shorter than the bed? How about something the same size as a bed?*

The discussions continued with children talking about the size of their beds. She also focused on the concept of sequences and vocabulary such as which came first, next, and last.

**LESSON PLAN: Prekindergarten Example**


**SYNOPSIS:** The book comprises three short stories about a little chick. In the first story, he tries to patiently wait for a carrot he planted to grow. In the second story, he is trying to fly a kite. And in the third story, he is trying to reach for the stars. A wise old hen, Old-Auntie, gives Little Chick advice in each story. Although there is no mention of the word *count* in the story, many pretend opportunities can be created to engage preschool children in counting activities.

**NUMBER AND OPERATIONS:** Developing an understanding of whole numbers, including concepts of correspondence, counting, cardinality, and comparison

**MATERIALS:** Magnetic counters

*I like this story. I like it so much that I would like to pretend with Little Chick for a while. I hope you will pretend with me. Did you hear Little Chick’s grandfather? I think I heard Grandfather Rooster ask Little Chick how strong his legs are now that he is 4 years old. Did you also hear Little Chick tell his grandfather that his legs are strong enough to hop all the way from the chicken house to the carrot field? Little Chick sounded very proud, didn’t he? Grandfather*
Rooster looked very surprised, didn’t he? When Grandfather Rooster asked Little Chick how many hops are needed to go all that distance, Little Chick didn’t know. Do you think we could help him find out how many hops are needed each time he goes from his house to his garden? I think there are lots of ways that Little Chick could figure this out. Let’s help him. What might he do to find out the answer?

The teacher could guide children to see that Little Chick hopped to the garden and count each hop (one-to-one correspondence).

This time, let’s pretend that Little Chick hurt his right leg on a stone, and he could not hop anymore that day. Maybe Grandfather Rooster asks Little Chick to estimate or predict the number of hops. I think I heard Little Chick say he didn’t know how to estimate or predict. We could show him how, couldn’t we? Let’s show Little Chick right now. Let’s pretend that Little Chick’s house is here near the window and the carrot field is over there near the door. When we predict, we imagine how many hops are needed. We know that our prediction may not be just the right number, but it is likely to be close to the actual number. We could show Little Chick how to predict and also how to count (when his foot feels better). So, let’s show Little Chick how to do this so he can give Grandfather Rooster an estimated answer today and a counted answer tomorrow. Each of you will get a chance to hop. I will write your predictions on the whiteboard. After you have had a chance to hop, I will write the actual number of hops on the board. I wonder if Grandfather wants an estimated answer or an actual answer. Maybe Little Chick should ask him.

In the story, we saw how Little Chick hops to a carrot. Suppose he wants to know how many hops it takes to reach the carrot. Let’s pretend the carrot is here in the front of the classroom and Little Chick is standing here in our classroom.

The teacher picks a random spot in the classroom. “Can you predict how many hops it would take each of you to hop to the carrot? Let’s make a list of our predictions.” The teacher records children’s estimates on the board and has the children see whether they can find the lowest estimate and the greatest estimate.

The teacher continues, “Now, let’s take turns hopping from this spot to the carrot and see how many hops it takes us.” The teacher selects several students at a time to hop to the carrot. The teacher counts the number of hops for each student with the other students counting along.

Little Chick changed his mind and decided to take large steps instead of hops. What if we took large steps instead of hops? How many large steps do you think it would take you to reach the carrot at the front of the room from this spot here?

The teacher collects the students’ predictions and posts them on the whiteboard, saying, “Let’s see if our predictions were close.” The teacher has students start at the spot she selects as the starting point and take large steps to reach the carrot. She counts with them as they make each step. She posts the students’ actual numbers on the whiteboard next to their predictions. As part of the class discussion, she engages students in a discussion regarding whether their predictions of the number of steps were more or less than what they actually counted.

“How many large steps do you think it would take Old-Auntie to walk from here to the carrot? How could we find out?” The teacher then pretends she is Old-Auntie and the students count how many large steps it takes her to walk to the carrot.

Little Chick was hopping around the garden, and all of a sudden, he saw a rabbit hiding in the bushes. The next thing he knew, the rabbit was hopping quickly from one bush to another. The rabbit took big hops. Can you hop like a rabbit? Can someone show us how a rabbit hops?
What if the rabbit started at the same spot we started at—how many hops do you think he would take to reach the carrot?

The teacher can engage students in a discussion of how the rabbit takes larger hops so he would take fewer hops than Little Chick.

Little Chick wants to place small rocks in a circle around the base of the carrot plant to keep the rabbit away. He wants us to tell him how many small rocks he will need. Let’s pretend these counters are small rocks. I am going to put some counters on the board and have you tell me how many counters there are.

The teacher begins by putting one counter on the board and having students count out loud, “One.” Then she puts two counters on the board and students count, “One, two.” The teacher continues placing counters up to five and changes the way she places them on the board. One time she places four counters in two rows of two, and another time she places the four counters in a horizontal row. She continues having students try to say the number of counters followed by counting the counters to verify the amount.

“What if Little Chick wanted to put five small rocks around the carrot? Can you count five counters to show me what five looks like?” The students use their own counters to count out the number five. The number can change depending on the students’ ability to count. “Let’s take our counters and make a circle out of them.”

“Little Chick finds eight small rocks to place around his carrot. Can you count out eight counters to show me what eight looks like?” If the students are not able to count to eight, the teacher might just model this for the students.

“Let’s see how we could make a circle with the eight counters.” The teacher arranges the magnetic counters in a circle on the whiteboard. “Let’s count the number of counters, and let’s mark this counter [top counter] as our starting point so we know where we begin.” The class counts with the teacher as she points to each counter and counts to eight. Several students are then selected to count the counters for the class to repeat the process. “I wonder if we could make another shape with the eight counters. Does anyone want to come to the whiteboard and rearrange the counters to make another shape?” The teacher selects a volunteer to rearrange the counters. “Let’s see if we could make a rectangle. We could put three counters across the top and three counters across the bottom and one counter on each side. There, we have a rectangle.” It would be a 4x2 rectangle. “Let’s draw a rectangle in the air with our fingers.” The teacher can create another rectangle with two counters on top and two on the bottom with four counters on each side to show a 2x4 rectangle.

MEASUREMENT: Identifying measurable attributes and comparing objects by using these attributes

MATERIALS: String, paper inchworms, pencils with no points

In the second story in the book, Little Chick is trying to fly a kite made out of a leaf. He has trouble getting the leaf to fly high in the sky.

“Little Chick wants to fly his kite that is made from a leaf he found on the ground. Have any of you ever flown a kite?” The teacher waits for the students’ responses. “How high do you think your kite was off the ground?” Again, the teacher waits for responses.

The teacher shows a short and long piece of string to represent the different lengths of string Little Chick could have used. “I have two pieces of string here. Let’s mark this piece string A and the other piece string B. What do you notice about the strings?” The teacher waits for responses. “Which piece of string is longer?” “Which piece of string is shorter?” “Let’s measure the length of strings. I have some paper inchworms. Let’s see how many inchworms long each
piece of string is.” The teacher has several students place the paper inchworms along the string to measure the strings.

“I have some pencils with no points. Let’s measure the lengths of the strings using the pencils.” The teacher has several students measure the strings with the pencils. The teacher records the lengths of the strings in terms of the inchworms and the pencils on the whiteboard. The class discusses the difference in the measurements. “How long is string A when we measure it with the inchworms? How long is string A when we measure it with pencils?”

Discussion continues with string B and the teacher emphasizing vocabulary such as more, less, shorter, longer, same, and different.

In the third story, Little Chick is trying to reach up and touch the stars. “Can you all pretend to reach up to touch the stars? How far away do you think the stars are up in the sky?” The teacher waits for student responses. The teacher might want to discuss the distance from earth to the stars as an extension of the lesson. “When Little Chick is stretching to reach the stars, does he get taller? When you reach up to try to touch the stars, are you growing taller? Let’s try to find out.” The teacher then has students come to the whiteboard and marks their height against the board with their names. The students come to the whiteboard and stretch their hands and stand on their tiptoes to make themselves as tall as they can. The teacher marks their stretched height above the students’ original height. “Let’s see how much taller you were when you stretched up to reach the sky.” The discussion focuses on vocabulary such as taller, more, less, shorter, and so forth.

**GEOMETRY:** Identifying shapes and describing spatial relationships

**MATERIALS:** String

I wonder what kind of shape Little Chick’s garden is. How many of you have a garden at home? Can you tell us what shape your garden is? Let’s use the string in front of you to make some shapes. I am going to draw a square up on the whiteboard, and I would like you to make a square with your string.

The teacher walks around to see that each student is able to make a square.

Let’s suppose Little Chick hopped into our classroom and wanted to see all the squares we made. Then Little Chick wanted us to show him where there were other squares in our classroom. Can you find other squares in our classroom that we could show Little Chick?

The teacher will respond to the various items the students select to verify whether or not they are in the shape of a square.

I think we found a lot of squares in our classroom. Let’s make a circle out of our string. I am going to make a circle on the whiteboard, and I would like you to make one out of your string.

The teacher checks to be sure each student correctly made a circle. “If Little Chick entered our classroom, I think he would be so excited to see all our beautiful circles. If he wanted to see some other circles in our classroom, what could we show him?” Again, the students select items in the classroom that are in the shape of a circle and the teacher verifies their responses and asks students how they know the shape is a circle.

**Excellent work! I think you found all the squares and all the circles in our classroom. Now Little Chick wants to describe to Old-Auntie what a square looks like. What should he tell her? Can someone help Little Chick describe a square? Can someone help Little Chick describe a circle?**

The teacher solicits responses for each shape from several students and poses questions to be sure the students understand the properties of a circle and square. One example could be asking whether the sides of the square are all the same length. How do the students know
whether the sides are the same length? How could they find out? “I think Little Chick would be very happy to know we have squares and circles all around us. Let’s draw some squares and circles on our papers.”

**LESSON PLAN:** Prekindergarten Example


**SYNOPSIS:** Sergio is a little penguin who likes many things, especially water. He enjoys playing in water, relaxing in water, and drinking water. However, when his teacher tells the class that they will learn to swim, Sergio feels frightened. Sergio’s teacher, Mrs. Waddle, helps him remember all the fun he has with water in other ways and suggests that swimming in water will be fun, too. Eventually, Sergio overcomes his fear by putting on a floatie and jumping into the ocean. To his surprise, he discovers that he likes swimming, too. But when his teacher says that next time they will all learn how to swim without their floaties, Sergio is not so sure.

**NUMBER AND OPERATIONS:** Developing an understanding of whole numbers, including concepts of correspondence, counting, cardinality, and comparison

**MATERIALS:** Cut-outs of floaties (optional)

*I like Sergio! I like his friends, too. Did you notice how his friends tried to help him when he was afraid? Let’s pretend that we heard his friends whisper that they wish they had floaties, too. Let’s pretend that Sergio heard them and promised to bring a floatie to each friend the next day. Sergio is a very young penguin so he doesn’t know how to figure out how many floaties to bring.*

The teacher can help the children figure out several ways to find out how many penguins are Sergio’s friends. For example, they can count the penguins when they are riding in the bus and when they are swimming in the ocean. The children might notice that on some pages there are five penguins and on some pages there are four penguins. What might that mean? Is one penguin hiding or swimming somewhere else? The children might notice that there are always five penguins on the bus going to the swimming place and going away from the swimming place. What might that mean? The teacher might help the children realize that they can decide how many floaties to bring by drawing a chart that shows five individual penguins and attach (with tape or Velcro) a predrawn floatie to the wing of each penguin. The teacher might also help the children count the number of penguins and count out the number of floaties.

**GEOMETRY:** Identifying shapes and describing spatial relationships

**MATERIALS:** Pictures of igloos, toy penguins or cutout pictures of penguins

*Let’s pretend that Sergio and his friends enjoyed swimming so much that they stayed in the cold water a long time. One day a big polar bear came down to the water to watch them swimming. He asked the little penguins if they would like to learn some fancy diving tricks. They all wondered if a big bear could do any fancy tricks, so the bear quickly showed them tricks for diving into the water and then diving under the water, spinning around in the water and then popping above the water again. Next, he showed them the fancy trick of climbing up*
to the top of an iceberg. Then he showed them how to slide all the way down into the water, under the water, and all the way to the bottom of the ocean. Let's pretend our penguins are playing Simon Says with the polar bear and penguins. Let's think of some more tricks for them to do.

With toy or cutout penguins, the children could show on a slate or flannel board how the penguins would move to accomplish each change of spatial location.

Let’s pretend that while the penguins were playing, Mrs. Waddle and Mr. Polar Bear asked us to help build an igloo for everyone for when they get cold and tired. Let’s pretend that they ask us to help them figure out how to make an igloo out of the ice shapes all around them. Mr. Polar Bear and Mrs. Waddle brought their ice-cutting and ice-lifting tools. They are ready to work, but they do not know how to find out what shapes to cut out of the ice, and they do not know how to pile the blocks of ice into the igloo shape. I am sure that we can help them figure this out. How can we help them?

The teacher might bring pictures of igloos, cutout shapes, and flannel boards or Velcro pads.

**MEASUREMENT**: Identifying measurable attributes and comparing objects by using these attributes

**MATERIALS**: Cutouts of penguins (optional)

I have been wondering why Sergio was afraid to learn to swim in the ocean. Is it possible that he thinks he is too small to swim in an ocean with big waves? Maybe Sergio whispers to Mrs. Waddle, the teacher, that he is afraid because he is not big enough to swim in the ocean. On the first page, we learn how big Sergio is. He is 1 foot tall and weighs 1 pound. Mrs. Waddle wants to know the height and weight of all the penguins on the page. How could she help Sergio find out the height and weight of his friends?

The children might suggest that the penguins stand near one another and see if their shoulders are the same height or their heads are at the same height. The teacher might ask what tools we use to measure the tallness or height of something or someone. Of course, the teacher might also ask what tools we use to measure the heaviness or weight of something or someone.

Do you think that Sergio might stop being afraid if he knew that all the penguins are about the same size and they are all swimming in the ocean very safely? What if Sergio still does not want to swim in the big ocean? Maybe he tells Mrs. Waddle that he wants to practice walking around in a pool before he tries swimming in the ocean. I think that I heard Mrs. Waddle say she thinks the pool is too deep for penguins to walk in. Sergio told me that he looked carefully at the pool near the school and he really thinks that it is just the right size for penguins to walk in. Let’s help him figure out how deep the pool would need to be to fit the penguins.

Teachers should guide the children to consider whether the penguins would want the water to be over their heads or up to their beaks or at the top of their wings. Also, the teacher might use toy (or cutout) penguins and a deep tub of water to show how many inches deep the pool should be.

What tools could help Sergio find this out? But what if some of the penguins are different heights? Maybe some penguins are 2 feet high and some are 3 feet high and some are the same as Sergio, 1 foot high? What difference would that make when they climbed into the water?
Kindergarten

Kindergarten Curriculum Focal Points

- **Numbers and Operations**: Representing, comparing, and ordering whole numbers and joining and separating sets
- **Geometry**: Describing shapes and space
- **Measurement**: Ordering objects by measurable attributes

At the kindergarten level, the curriculum focuses on counting activities, creating and comparing sets, ordering numbers, and classifying objects into sets. Simple readiness activities for addition and subtraction and identifying and counting coins are emphasized as well. Simple concepts are taught. Students begin to understand measurement by learning that a measurement can be expressed as a number and objects can be compared by their height or weight. Geometry activities are designed to help students learn vocabulary and how to identify and describe simple two- and three-dimensional shapes.

One kindergarten teacher in our workshop planned a lesson around units of money that focused on enhancing her children’s use of mathematical language. She integrated various storybooks into her reading block and developed mathematics centers using the books and mathematical manipulatives such as play money, counting bears, and number tiles. She read stories such as *A Chair for My Mother* by Vera Williams (1982) to embed mathematical language into storytime. Her children engaged in learning about the value of money as they connected to the characters and the language in the story. The teacher discovered that by becoming engaged in conversations about the story, her children also developed important processes of reasoning and explaining mathematical relationships. In short, the kindergarten children were enhancing their understanding of mathematics through communication.
LESSON PLAN: Kindergarten Example

BOOK: Chen, C.-Y. (2004). *Guji Guji*. La Jolla, CA: Kane/Miller. (Cover art reproduced by permission.)

SYNOPSIS: When a crocodile egg rolls into a duck nest, the emerging baby, Guji Guji, is raised by a mother duck and plays happily with brother and sister ducklings. One day some scary, snarling, creatures inform Guji Guji that he is not a duck but a misplaced crocodile. Also, the crocodiles insist that Guji Guji bring all the ducks to the crocodiles so that they might enjoy a meal of duck. Instead, Guji Guji thinks and thinks and figures out a way to save his duck family.

NUMBERS AND OPERATIONS: Representing, comparing, and ordering whole numbers and joining and separating sets

MATERIALS: Cutouts of rocks with numbers 1–12 on them

*Guji Guji does not look like the other baby ducks. What does Guji Guji look like? There were other baby ducks, some with stripes and some with spots. Guji Guji tried to count them all and said he counted 12 ducklings. Let's see if we can all count to 12.*

Children count to 12.

*Guji Guji wants to know if we can help him figure something out. He counted three ducklings with spots and four ducklings with stripes, and he wants to know if there are more ducklings with stripes or spots? How could we find this out? Can you show this with your counters?*

Children work on comparing the numbers 3 and 4. The teacher can pose other similar questions with different pairs of numbers.

*Guji Guji counts 12 ducks on the bridge. He knows that each duck wants to sit on one of those heavy rocks near the bridge. The rocks are numbered from 1 to 12. I have cutouts of ducks with numbers 1 to 12 on them and cutouts of rocks with numbers 1 to 12 on them. Work with your partner to match each duck's number with the same number on the rock.*

Children take time to pair the ducks and rocks. The teacher can have a Velcro version to demonstrate or use an interactive board with 12 ducks and 12 rocks numbered.

*In the story, there are crocodiles that show up and have their eyes on the ducks. The crocodiles think the ducks might make good dinner. Guji Guji wants to make sure that the crocodile teeth do not bite his family of ducks. So, Guji Guji calls a dentist to ask if the crocodile teeth could be made less sharp so the ducks could be kept more safe. Of course, the dentist would want to know how many teeth each crocodile has. The dentist would probably also want to know the total number of teeth. Let's see how many teeth we see in the pictures. How could we find out how many teeth each crocodile has and also the total number of teeth the dentist would have to fix? Let's write the numbers on a Post-it note and add to this page in the book so that the next time we read it, we will know exactly how many teeth to worry about.*

GEOMETRY: Describing shapes and space

MATERIALS: Pattern blocks, three-dimensional objects, die-cut shapes (optional)

*Did you notice in the story that the crocodiles were sharpening their teeth on the trees in the neighborhood? Maybe Guji Guji could think of some way to trick the crocodiles. Maybe he knows that some shapes have very sharp corners, and maybe he could glue the shapes to the trees. Maybe the shapes are made of metal or wood. Do you think that they might hurt a little if a crocodile bit down on a sharp corner? Each time the crocodile would bite the sharp shape*
on the tree, the corner might hurt the crocodile’s mouth a little. Maybe you could help Guji Guji figure out which shapes have sharp corners that he could tie or glue to the trees. Would a circle have a sharp corner? How about a triangle? How about a rectangle? Square? What about a cone? Cylinder?

The teacher can hold up different shapes from pattern blocks, die-cuts, or three-dimensional objects to pose the questions.

**MEASUREMENT:** Ordering objects by measurable attributes

**MATERIALS:** String, straws, measuring tape, paper, pencils or crayons

I wonder if Guji Guji ever wondered why he was so much bigger than his other family members. Let’s pretend that we happened to be visiting the lake where Guji Guji sat down to think. Maybe he is thinking he wants us to help him find out if he is really a duck or really a crocodile. Do you think we would say something about how tall he was compared with his duckling brothers and sisters? I am holding up some strings, some are as tall as Guji Guji, some are as tall as the ducklings with spots, and the other are as tall as the ducklings with stripes. Which string do you think is as tall as Guji Guji? How do you know?

Children should be able to determine that the longer string is the one that represents Guji Guji.

I’m going to pass these strings out, and I would like you to search for things around the room that are as long as your string. Then we can tell Guji Guji that he and the ducklings are as tall as the objects you find that are the same lengths.

Have the children find objects in the classroom that are the same length as the strings. The teacher can have three strings taped to the board that represent the two ducklings and Guji Guji. Students can tell the teacher what to write next to each string that they find in the room as the same length.

Now, Guji Guji wants to know if he is taller than the distance around your head. This long string is the one we said is as long as Guji Guji. Here is one string for each pair of students. Use the string to determine if Guji Guji is taller than the distance around your head.

Children can compare the length of the string (representing Guji Guji’s height) and the distance around their head. Next you can have them see if Guji Guji is taller than the distance from the floor to their belly buttons.

What would we say if Guji Guji said that he did not want to be a big, bad crocodile? We could show him that we are all bigger than ducks too, and we could tell him that we are good people. What if he would want to know how big we are? We could measure ourselves—our height, neck, leg, mouth—right?

The teacher could have tape measures or straws to represent tall blades of grass or thin branches of trees—the perfect size for measuring.

What if Guji Guji lived where there were no big rocks? Do you think we could help Guji Guji find some way to convince the crocodiles to move to some other place to live? Do you think that a wise old owl might come along and remind the crocodiles that the water is deeper and better for hiding in the lake 2 miles away? How far do you think 2 miles is? Guji Guji wants to know how far it is from the school to your home. He wants you to make a map of the route from your home to the school to show him how far it is. Let’s work on drawing a map of the route from your home to the school, and let’s estimate how far it is. Draw your map and put the estimated number of miles you think it is between your home and school on the bottom.
LESSON PLAN: Kindergarten Example

BOOK: Tierney, F. (2010). Lion’s lunch? New York: Chicken House. (The cover of Lion’s Lunch?, by Fiona Tierney and illustrated by Margaret Chamberlain, appears courtesy of Chicken House, an imprint of Scholastic Inc. Copyright © 2010. All rights reserved.)

SYNOPSIS: Sarah walks through the jungle and meets the lion, king of the jungle. The lion threatens to eat Sarah because she was walking through the jungle singing. The lion claims that nobody walks or sings in the jungle. They slither, swoop, gallop, squeak, grunt, chatter, and so forth. When Sarah draws a picture of the lion to show him how mean and mad he is, the lion is angry. He vows to change if Sarah draws a picture of him happy and nice.

NUMBERS AND OPERATIONS: Representing, comparing, and ordering whole numbers and joining and separating sets

MATERIALS: Pictures of some of the animals in the book, tape, large hundreds chart, eight crayons (or straws) for each child or pair of children, two different-colored paper plates for each child or pair of children

Sarah sees all kinds of animals in the jungle. Some of the animals might be friendly to people, and some of the animals might not be so friendly to people. Sarah wants us to make a list of some of the animals she sees and separate them into two groups: friendly and not friendly.

The students can identify some of the animals in the book and decide whether they would be friendly or not. The teacher can have pictures of some of the animals to tape onto the lists along with the word name for the animal. In the story, all the animals except the lion are nice to Sarah, but what if Sarah went into a real jungle? The children may have some debates regarding whether certain animals would be friendly or not. “Let’s count how many animals we have in each group.” The teacher can help the children count the animals listed in each group and write the number of animals for each group as numerals. Students can practice reading the numerals and count on the hundreds chart until they reach the number of animals in each group.

Sarah is amazed at how well you all can count! She wants us to help her figure out how many animals are in both lists. Do you think we can help her find this out? How could we do this? What are some different ways we could total the number of animals in both groups?

Some ways the children could suggest or the teacher could demonstrate are with base 10 blocks, adding with different manipulatives such as Unifix cubes or chips, adding on with the hundreds chart, and so forth.

Sarah likes to draw pictures of animals. She likes to use crayons to draw pictures just like you like to use crayons to draw pictures. She has a box with eight crayons in it. So to represent the eight crayons, I am going to give each pair of children eight crayons.

The teacher can give each pair of children eight crayons. If crayons are not available, the students can use short straws to represent the crayons. Also, the teacher should give each pair of children two different-colored paper plates.

Let’s see how many different ways we can separate the crayons into two groups. For example, we could put two crayons on the red plate and six crayons on the blue plate, or we could put one crayon on the red plate and seven crayons on the blue plate. Take a few minutes to work with your partner to see how many different ways you can find.
Encourage the children to talk about the number of different ways they can divide up eight crayons into two groups.

**Very good! I think Sarah will really be pleased to see how many different ways you separated your crayons. Suppose Sarah lost three crayons. Can you talk to your partner and see if you can tell Sarah how many crayons she now has?**

Have students explore ways to solve $8 - 3 = 5$.

“**Now, let’s see how many ways we can separate five crayons into two groups. Use your red and blue plate to find out how many ways there are to separate the five crayons. Be sure to talk to your partners.**” Teachers can continue with different number of crayons.

**GEOMETRY:** Describing shapes and space

**MATERIALS:** Paper and crayons, plastic bags with different shapes (e.g., large and small triangles, some scalene, right, or obtuse; large and small squares, large and small rectangles) in each for groups of students

“**When Sarah draws a picture of the lion being happy, she holds it up so all the animals can see it. What shapes do you see in her drawing?**” Children might be able to identify circles and triangles. “**How many circles do you see in her drawing?**” You can have children count the face as one large circle, the two ears, and two eyes. (Some children might want to count the eyeballs as circles). “**How many triangles do you see?**” This may be a little harder to count. Show children how to mark where to start counting, and count the triangles.

So we see Sarah’s drawing of a lion that is made of only circles and triangles. I am going to have each of you take a piece of drawing paper and some crayons. I would like you to draw a picture of anything you would like. But your picture should only have circles and triangles in it. Be as creative as you can, and think about a picture you would like to draw.

After the children draw their pictures, encourage them to talk about their pictures and how many circles and triangles they have drawn in their pictures.

**Now the lion wants us to help him. The lion wants Sarah to draw different shapes and tell him stories about the shapes. He wants to learn about the different shapes so he can build some huts in the jungle. The lion wants us to help Sarah draw different shapes and describe the shapes. Sarah made a list of different shapes, and I put the list on the board: circle, square, rectangle, triangle, and semicircle. How could Sarah describe these shapes to the lion? Let’s take a few minutes to talk about these shapes.**

The teacher can lead the discussion to focus on how many sides, the angles, the characteristics of the shapes, and so forth. “**Now, each group has a plastic bag with different shapes inside. Let’s work with our partners to separate the shapes into groups. Decide what your groups will be and be sure each shape is in a group.**” As the teacher walks around the groups, pose questions to ask students why they put certain shapes in groups or how they are defining their groups. As a summary, the children can tell Sarah what group they put the different shapes into.

**MEASUREMENT:** Ordering objects by measurable attributes

**MATERIALS:** Cutouts of various animals in the book

*Sarah meets all kinds of animals in the jungle. Let’s look at a few of the animals. We can see a crocodile, a leopard, and a friendly squirrel on this page on which Sarah is drawing. I have made some cutouts of these animals, and I would like you to think about the size of the ani-
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