

# **PRESCHOOL MATH AT HOME**

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**SIMPLE ACTIVITIES TO BUILD THE BEST  
POSSIBLE FOUNDATION FOR YOUR CHILD**

**KATE SNOW**

**WELL-TRAINED MIND PRESS**

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# TABLE OF CONTENTS

<b>Introduction</b> .....	<b>11</b>
What Your Child Will Learn .....	11
How to Use This Book .....	17
What You Will Need.....	19
<b>Chapter 1: Counting to Five</b> .....	<b>21</b>
Chapter Overview.....	21
1.1 Count Five Toys in a Line.....	21
1.2 Count Toys in Different Arrangements .....	22
1.3 Count with Fingers to Five .....	23
1.4 Introduce Zero with Fingers.....	24
1.5 Count Around the House.....	25
1.6 Match My Mat .....	25
1.7 Set the Table for a Tea Party (Optional) .....	27
1.8 Feed the Stuffed Animal .....	28
1.9 Count Hops.....	28
1.10 Match Claps to Counters .....	29
1.11 Count Claps.....	30
Is My Child Ready to Move On?.....	30

<b>Chapter 2: Counting to Ten</b> .....	<b>31</b>
Chapter Overview.....	31
2.1 Hide and Seek to Ten.....	31
2.2 Count Ten Toys in a Line.....	32
2.3 Count with Fingers to Ten.....	33
2.4 Count Scattered Objects .....	34
2.5 Don't Move the Counters! .....	35
2.6 Count Pictures.....	35
2.7 Play Store with Pennies .....	36
2.8 Tens Treasure Hunt (Optional).....	37
Is My Child Ready to Move On?.....	38
<b>Chapter 3: Numbers from Zero to Five</b> .....	<b>39</b>
Chapter Overview.....	39
3.1 I Spy Numbers .....	40
3.2 Hide the Toys.....	42
3.3 Peek-A-Boo Fingers .....	43
3.4 Fingers Up, Fingers Down.....	44
3.5 Counters on the Five-Frame.....	45
3.6 Peek-a-Boo Counters on the Five-Frame .....	45
3.7 Missing Counters on the Five-Frame .....	46
3.8 Hidden Handfuls .....	47
Is My Child Ready to Move On?.....	49
<b>Chapter 4: Numbers from Six to Ten</b> .....	<b>49</b>
Chapter Overview.....	49
4.1 Five Fingers and Some More .....	49
4.2 Peek-A-Boo Fingers with Two Hands .....	51
4.3 Race to Ten Game .....	52

4.4 Hidden Counters on the Ten-Frame .....	53
4.5 Nickels and Pennies (Optional) .....	54
4.6 Fingers Up, Fingers Down to Ten .....	55
4.7 Missing Counters on the Ten-Frame .....	56
Is My Child Ready to Move On? .....	57
<b>Chapter 5: Written Numerals from 0 to 10 .....</b>	<b>59</b>
Chapter Overview .....	59
5.1 Number Snack .....	59
5.2 Making Number Pictures .....	60
5.3 Number Race Game .....	61
5.4 Number Jump .....	62
5.5 Mixed-Up Number Jump .....	63
5.6 Number Card Matching .....	64
5.7 Number Card Line-Up .....	64
5.8 Number Memory Game .....	65
5.9 Go Fish Game .....	66
5.10 Number Scavenger Hunt (Optional) .....	66
Is My Child Ready to Move On? .....	67
<b>Chapter 6: Comparing Quantities and Numbers .....</b>	<b>69</b>
Chapter Overview .....	69
6.1 Compare Cookies, Part One .....	69
6.2 Compare Cookies, Part Two .....	70
6.3 Equal Fish in the Pond .....	71
6.4 More and Fewer Fish in the Pond .....	72
6.5 Who Has More? .....	74
6.6 Dice War .....	75
6.7 Ten-Frame War .....	76

6.8 War Card Game (Optional) .....	76
Is My Child Ready to Move On?.....	77
<b>Chapter 7: Addition and Subtraction Stories.....</b>	<b>79</b>
Chapter Overview.....	79
7.1 Penny Addition Stories, Part One .....	79
7.2 Penny Addition Stories, Part Two .....	80
7.3 Add Handfuls.....	81
7.4 Fish Pond Addition Stories .....	82
7.5 Penny Subtraction Stories .....	83
7.6 Subtraction Snack.....	83
7.7 Balloon Subtraction Stories.....	86
Is My Child Ready to Move On?.....	86
<b>Appendix .....</b>	<b>87</b>
Five-Frame.....	89
Number Race Game Board.....	91
Number Cards .....	93
Single Ten-Frame.....	99
Double Ten-Frame.....	101

## PREFACE

Five years ago, when my first child was a preschooler, I marveled at how quickly and easily he learned new things. Whether he was building block towers, looking at his favorite picture books, or digging in the sand box, he always seemed to be absorbing new information like a sponge. His vocabulary grew every day as he learned to name and describe everything around him.

I wanted my son to learn about numbers and the language of math with as much interest and excitement as he learned about the rest of the world. But when I looked for a preschool math program, none of the available options captured the joy and enthusiasm for numbers that I was hoping to instill. Most programs were workbooks with lots of repetitive matching activities and far too much writing. I knew my son would learn math best if he could move, talk, and play—not sit in a chair and do worksheets! I didn't want him to think of math as boring pencil-and-paper work, but as a natural part of everyday life that he could use to better understand the world around him.

Since I couldn't find a high-quality, developmentally-appropriate preschool math curriculum, I decided to create my own. I had plenty of background as an elementary math educator—I had majored in math and teaching in college, taught fifth grade, and even written math curricula—so I read everything that I could find about how preschoolers learn math and created simple, purposeful activities that would give my son a thorough understanding of the numbers from zero to ten. I was busy with a new baby, though, so every activity had to take less than ten minutes, be easy to implement for my sleep-deprived self, and use things I already had around the house!

My son and I had a wonderful time playing with numbers together while his baby sister napped. Now, five years later, I can see how the activities we did together developed his confidence and gave him the skills he needed to thrive in math. Math is now his favorite subject, and he loves to tackle challenging problems. His little sister is now five, and she's learned preschool math using the same activities that I used with her brother. As she begins kindergarten math, I'm seeing how the foundation laid by our math time together has helped her become a confident and enthusiastic math student as well.

I'm thrilled to be able to share with you this preschool math curriculum, based on the simple, straightforward activities that I used with my own kids. Even if you don't feel very comfortable teaching math, this book is designed to give you the tools you need to give your child a great start in math. Every activity is clearly explained, step by step. Notes throughout the book help you understand the reasoning behind the activities: what skill each activity develops, why they are sequenced in this particular order, and how each activity will help your child develop solid math skills. By the time you reach the end of the book, your child will be ready to learn kindergarten math with confidence.

I wish you and your child much fun and joy as you explore the world of numbers together. Happy Math!

Kate Snow  
Grand Rapids, Michigan



# INTRODUCTION

## What Your Child Will Learn

Young children develop many informal ideas about numbers long before receiving any explicit instruction. For example, most one-year-olds can tell the difference between one cookie and three cookies (even if the only word they have to express the difference is “Mine!”).

The activities in this book will build on what your child already knows and help her become skillful with the numbers from zero to ten. They will also teach her the language of math, the words and written numerals that allow us to communicate about numbers and quantities. As you use the activities to teach your child, you’ll focus on five key skills that help preschoolers develop a solid math foundation:

- Counting
- Subitizing (recognizing quantities without counting)
- Recognizing written numerals
- Comparing numbers
- Joining and taking away (beginning addition and subtraction)

Let’s take a closer look at each of these skills.

### ***Counting: More complicated than adults realize***

Counting is the foundation of preschool math. As children count, they learn what numbers *mean*: that two can refer to two apples, two books, two sisters,

two jumps, or two taps. The idea that numbers represent quantities is very abstract; counting is what makes this idea concrete for young children.

Counting seems basic, but young children’s counting mistakes show what a complex skill it is. Perhaps you’ve seen a small child very earnestly point to a pile of crayons and say “one, four, three, eight!” Or, you may have watched a child “count” by pointing in the general direction of a pile of blocks and rattling off “onetwothreefourfivesixseveneight” without any attention to how many blocks there actually are. Some children can even point to three toy cars and say “one, two, three”—but when asked, they can’t say how many toy cars there are!

To be able to count accurately, a child has to learn:

- The order of the counting words (“one, two, three,” etc.),
- That you have to count each item once and only once,
- That you can count objects in any order,
- That any kind of thing can be counted (even intangible ones like sounds or jumps),
- That the last number said when counting is the total number.

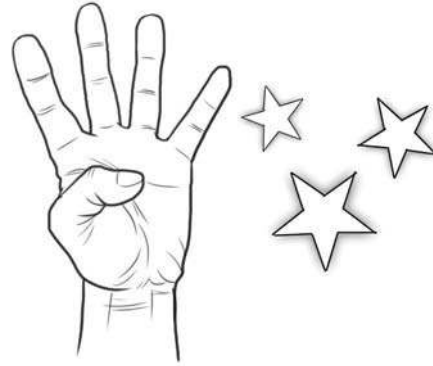
Since preschoolers are concrete thinkers and learn by doing, you can’t just *tell* them these principles, though. To understand these important ideas, they need plenty of experience counting real objects, pictures, jumps, and sounds. The counting activities in this book are designed to help your child develop this thorough understanding of counting.

Your child will learn to count to five in Chapter 1. In Chapter 2, she’ll extend the counting sequence further and learn to count to ten.

### ***Subitizing: Recognizing quantities and combinations without counting***

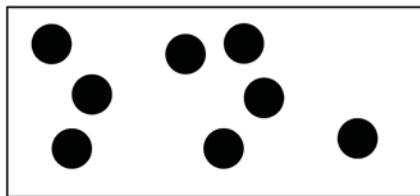
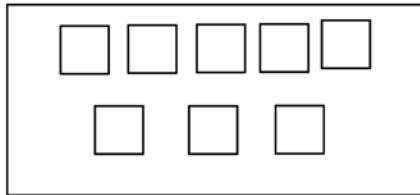
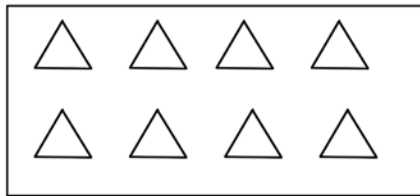
While counting is the foundation of preschool math, it’s essential that children also learn to recognize groups of items *without* counting. This is called learning to *subitize* (pronounced SOO-bi-tize). To understand better what subitizing is, take a quick glance at these illustrations.

Notice how you can immediately tell that there are four fingers raised, without counting each finger? Or that you can just “see” that there are three stars? That’s subitizing. Most adults can easily recognize up to five items at a time, no matter how they are arranged.



*Can you tell at a glance how many fingers and stars there are?*

Once there are more than five items, though, it’s much more difficult to determine the quantity without counting—unless the items are organized into smaller groups. Take



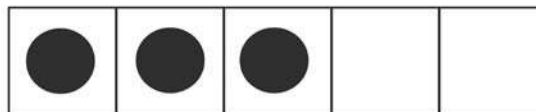
*Can you tell at a glance how many triangles, squares, and dots there are?*

a quick glance at each of the illustrations below. Can you immediately tell how many objects are in each box, or do you have to count them?

Each box contains eight objects. You can probably tell at a glance that there are eight triangles and eight squares, because those objects are organized into smaller groups (four and four triangles; five and three squares). But since the dots are scattered randomly, it’s very difficult to tell how many there are without counting each dot one-by-one.

In Chapter 3, your child will learn to recognize quantities from zero to five by sight. You’ll use a simple grid of five squares (called a five-frame), along with your fingers and household objects, to teach her this skill.

Once she has learned to recognize small quantities by sight, she'll then use this skill to learn the combinations that make five (four and one; three and two; five and zero). The five-frame makes it easy to



*Five-frame with three counters*

learn these combinations visually; in the example to the right, three boxes are full and two are empty, so three and two must make five. Learning these combinations previews addition and subtraction: a child who can mentally “see” that two and three make five will later be able to solve simple addition and subtraction problems like  $2 + 3$  or  $5 - 2$  with ease.

In Chapter 4, you'll use a ten-frame (a grid of *ten* squares) to teach more complex subitizing. Your child will learn how to recognize six to ten objects as combinations of five and some more. For example, this arrangement on the ten-frame will lead your child to discover that seven equals five and two more (since there are five circles on the left-hand side of the dark line, and two circles on the right-hand side).



*Ten-frame with seven counters*

Just as the five-frame helps children learn the combinations that make five, the ten-frame will help your child learn the combinations that make ten (five and five; six and four; seven and three; eight and two; nine and one;

ten and zero). With the ability to visualize combinations, she'll be well-prepared to master addition facts in kindergarten and first grade.

***Recognizing written numerals: Making the connection between concrete objects, spoken words, and written symbols***

Written numerals (0, 1, 2, 3, etc.) are our short-hand for communicating about numbers. After children have a firm understanding of the concept of numbers and have gotten to know the numbers from zero to ten well, they are ready to

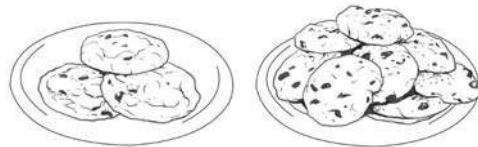
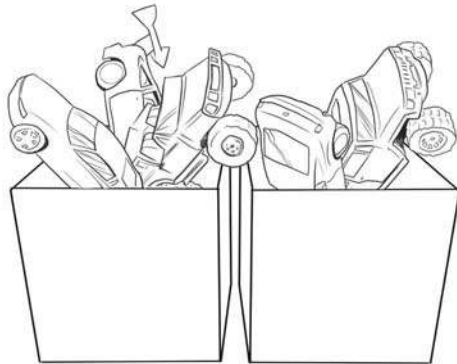
connect spoken numbers with written symbols. Learning the written numerals in preschool will make calculations and more advanced work in kindergarten much easier. (Imagine trying to solve  $3 + 6$  when you're not quite sure what the symbols "3" or "6" mean!)

Recognizing these written numerals is much like learning the letters of the alphabet, because children learn to match a symbol with a spoken word. Just as learning the alphabet takes time, your preschooler will likely need quite a bit of practice to learn which squiggly shape goes with which spoken number. Chapter 5 focuses on teaching your child how to recognize the written numerals from 0 to 10.

### ***Comparing numbers and quantities: Which has more?***

Learning to compare quantities helps preschoolers begin to make sense of the relationships between numbers: seven is one *less* than eight, but it is one *more* than six. Your child will build on these relationships in kindergarten addition and subtraction. For example, a kindergartner might use her knowledge that eight is one more than seven to solve  $7 + 1$ .

Preschoolers already understand the concept of more and less informally, especially if they feel that someone else is getting "more" and they are getting "less"! Even without any instruction, most are able to compare quantities if only small amounts are involved, or if two quantities are very different from each other visually. For example, in the pictures below, your child could probably tell right away which box of cars has more cars, or which plate of cookies has fewer cookies.



*Most preschoolers can easily tell which box has more cars and which plate has more cookies.*

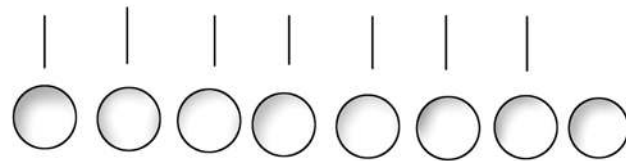
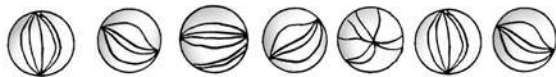
But comparing larger quantities (or quantities that look about equal) is much more difficult. To learn to make these more difficult comparisons, preschoolers need instruction and lots of practice. For example, in the picture to the right, most young children would find it very difficult to tell which bag has more marbles.

Preschoolers who are just learning to compare larger quantities begin by matching the objects one-by-one to see which group has more.

Then, as they gain more experience with comparing, children learn that they can use counting to compare quantities: “There are seven striped marbles and eight plain marbles. Eight comes after seven, so eight marbles is more than seven marbles.” In Chapter 6, you will help your child learn to compare quantities and written numerals.



*Most preschoolers find it difficult to tell which bag has more marbles.*



*Matching one-by-one to compare two groups*

### ***Joining and taking away: Beginning addition and subtraction***

Counting, subitizing, recognizing written numerals, and comparing all help children understand what numbers are. But preschoolers also need to begin to learn what they can *do* with numbers. That doesn't mean that you should make your child sit down and solve pages of addition and subtraction problems, though! What's most important at this stage is that your child understands

the *meanings* of the operations: addition as joining two sets together, and subtraction as taking part of a set away. In Chapter 7, you will use simple stories and concrete objects to introduce your child to the concepts of addition and subtraction.

## How to Use This Book

### *Start when your child is interested*

Most children will be ready to start the activities in this book around age four. If your child becomes interested in numbers at age three, go ahead and start trying some of the activities. No matter what age your child is, if there's frustration or tears, stop! Put the book away for a month and then give it another try. Sometimes, children's brains just need a little more time to mature before they're ready to understand number concepts.

### *Do the activities in order, but follow your child's lead for pacing*

The activities in this book build math skills step-by-step. Each activity builds on the activities that came before, and each chapter builds on the skills developed in previous chapters. Plan to teach the activities in order without skipping around. (A few activities are labeled as optional, either because they are advanced for most preschoolers or because they require a lot of props. Feel free to skip those if they are too challenging for your child or too time-intensive for you to set up.)

Take as much time as you need with each activity. Generally, you'll want to spend a few (short!) teaching sessions on each activity so that your child understands it well before moving on to the next activity. Follow your child's lead. If your child has a lot of experience with a topic, you may breeze through several activities in one session. On the other hand, if your child struggles with a brand-new concept, you may want to stick with the same activity for a couple of weeks.

At the end of each chapter, you'll find a brief description of what your child should be able to do before moving on to the next chapter. Use this to help you decide whether to move on to the next chapter or give your child more practice with the current chapter.

***Have a consistent (and short) math time***

You're more likely to remember to do math if you choose a consistent time each day. You might do a little math with your preschooler before bedtime, or you might play with numbers together after morning snack each day.

Most four-year-olds have a very short attention span, so don't expect a focused, twenty-minute lesson. You'll be amazed at what your child will learn in a year if you do math together for just five minutes per day, several times per week.

***Ask, "How many?"***

As your child masters counting, she needs to learn that the last number she says when counting is the total number. For example, she may be able to point to blocks and *count* "one, two, three," but she may not be able to answer afterward when you ask *how many* blocks there are. Until she masters this important skill, make sure to ask her how many objects there are every time she counts. And, make sure you explicitly say how many objects there are every time you model counting.

***Weave math throughout the day***

Math is more than just numbers, but the other math concepts your preschooler needs to know will come up naturally during the day. Keep an eye out for opportunities to talk about patterns, clocks, shapes, and measurements, and use these teachable moments to introduce these ideas to your preschooler. This can be as simple as checking the time on the clock or measuring flour for pancakes together.

***Have fun!***

Math time for preschoolers should be *fun*! Feel free to adapt the games and activities to your preschooler's personality. Use her favorite trucks for the counting activities, or pretend that the counters on the ten-frame are people sitting on a bus.

Preschoolers especially love peek-a-boo games and being in charge. In this book, you'll see lots of hiding games and chances for your child to "be the teacher." Go ahead and make the hiding games as dramatic and fun as



possible, and enjoy the chance for your child to show off what she knows when she leads activities. Most of all, enjoy this time with your preschooler.

## What You Will Need

The activities in this book require only simple items from around your house, and many of the activities do not require any materials at all. However, it's much easier to do math consistently if you don't have to hunt for supplies. To make it as easy as possible to have math time each day, put together a small "Math Basket" with the most frequently-used materials, including:

- This book
- 20 small counters (You can use whatever you have around the house, such as pennies, Legos, or plastic cubes. It's best to use something simple and geometric so that your child will focus on counting, not examining the items. If your child still tends to put things in her mouth, make sure to use something large enough not to be a choking hazard, such as small wooden blocks.)
- Resources from the Appendix, preferably printed on cardstock (pages 89-91)
- One nickel and ten pennies
- Blank paper and a writing utensil

There are also some items that you will only need occasionally. If you would like to gather everything you'll need in advance, here is the full list:

- Ten small toys (like toy cars or small animal figures)
- Four stuffed animals
- Small blanket
- Two small paper bags
- Two regular, six-sided dice
- Tape
- Two different small objects for game tokens
- Two different-colored writing utensils
- Toy cups, plates, spoons, and play food items (optional)

- Dot stickers (optional)
- Small food items (raisins, pieces of cereal, etc.) (optional)
- Large index cards (optional)
- Small stickers (optional)

— CHAPTER 3 —  
**NUMBERS  
FROM ZERO  
TO FIVE**

### **Chapter Overview**

In Chapter 3, your child will learn to recognize amounts up to five *without* counting. (This important skill is called subitizing; see pages 12-14 in the Introduction for more explanation.) You'll use small groups of items around the house, your fingers, and a simple grid called a five-frame to help him learn to "see" at a glance how many objects there are in a group. Once your child has learned to recognize the quantities to five, he'll continue to use his fingers and the five-frame to learn the combinations that make five (four and one, two and three, five and zero).

### **3.1 I Spy Numbers**

***Purpose***

Begin to think of quantities as groups rather than counting them one-by-one

***Materials***

No special materials needed

***Activity***

Secretly choose a set of two objects in the room you are in (for example, two pictures on the wall or two books on the coffee table), and say, "I spy with my little eye two of something." Encourage your child to guess your

secret objects. He might ask, “Are you thinking of those two toy cars on the rug? Or the two lamps by the window?” Try to choose objects that are large, obvious, and close together. If your child needs help, give clues about the color or size of the objects, or look directly at the objects so your child can follow your gaze.

Play several times, including sets with one, two, three, four, and five items. Then, reverse roles and let your child choose secret objects for you to guess.

**Note**

In Chapter 1, your child counted out small objects and counted items in your home. He may find looking for a set with a certain number of objects more challenging, because he has to think about what the number means, hold the number in his head, and look for the matching set.

Also note that zero isn’t included in this activity, since it is very difficult to “spy” zero of an object!

### 3.2 Hide the Toys

**Purpose**

Begin to recognize quantities up to five without counting; explore the combinations that make five (five and zero, four and one, two and three)

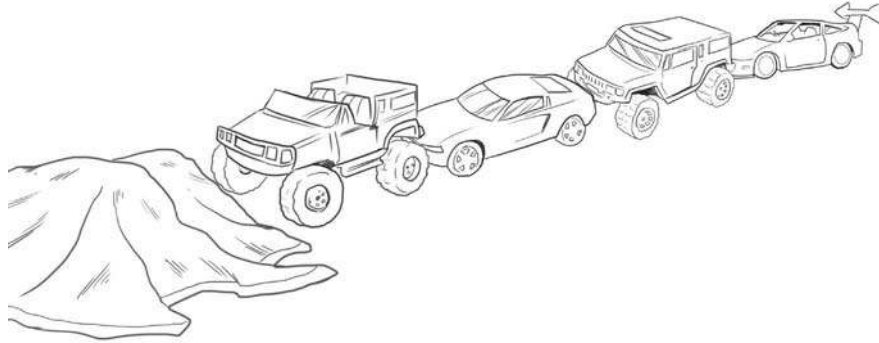
**Materials**

Five small toys (such as cars or plastic animals); small blanket

**Activity**

Line up the five toys and ask your child how many there are. (Five.) With your child’s eyes closed, secretly hide one toy under the blanket. When he opens his eyes, ask how many toys are still showing. (Four.) Also ask how many he thinks are under the blanket. (One.) If your child’s not sure, have him look at how many lumps are under the blanket.

After he answers, let him look under the blanket to see if he was correct. Then, move the hidden toy back to the line and play some more, hiding different numbers of toys each time. To include zero, move all of the



toys under the blanket (so that five are under the blanket and zero are visible). Or, leave all the toys in the line, so that five are visible and zero are under the blanket.

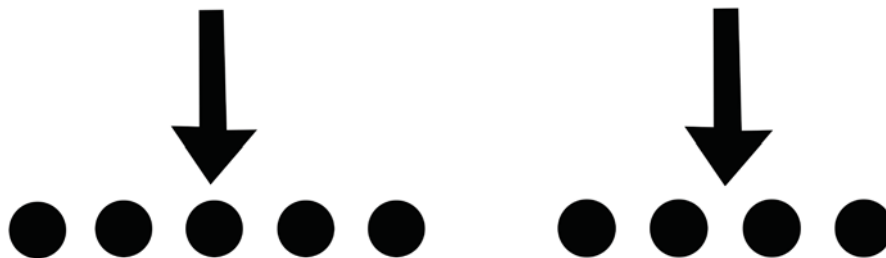
Allow your child to hide the toys and ask you how many there are, too.

Lining up the toys (rather than scattering them randomly) makes it easier to tell how many are missing. When your child is ready for more of a challenge, arrange the five toys in a haphazard pattern before hiding any under the blanket.

### **Note**

Many preschoolers can easily recognize groups of one, two, or three objects but have trouble distinguishing between four and five objects. One way to help your child tell the difference between four and five is to point out that a line of five always has one object in the middle with two objects on either side.

On the other hand, a line of four objects does not have a middle object.



*A line of five always has one counter in the middle, with two counters on either side.*

*A line of four has a space in the middle, not an object.*

### 3.3 Peek-A-Boo Fingers

**Purpose**

Become faster at recognizing quantities up to five without counting

**Materials**

No special materials needed

**Activity**

Review Activity 1.3 (“Count with Fingers to Five”). Then, put your hand behind your back and hold up three fingers. Tell your child that you are going to show your fingers very quickly, and his job is to tell how many fingers you’re holding up, as fast as he can.

With drama, briefly show your child your hand and then put it behind your back again. Ask him how many fingers you are holding up. (Three.) After he has guessed, bring your hand out again to let him count the fingers and see whether he was right.

Repeat with the other numbers up to five, including a closed fist for zero. Then, reverse roles. Let him hide his hand and ask *you* how many fingers he’s holding up.

**Note**

Keep this activity (and all of the peek-a-boo activities in this book) fast-paced and fun, adjusting the speed to your child. Try to flash the fingers as quickly as possible so that your child doesn’t have time to count one-by-one but instead begins to recognize the quantities. Never push your child to guess, though, and always allow your child to count one-by-one any time he’s not sure or makes a mistake. With repeated practice, he’ll learn to recognize quantities up to five instantly.

### 3.4 Fingers Up, Fingers Down

**Purpose**

Begin to identify combinations that make five (five and zero, four and one, two and three)

**Materials**

No special materials needed

**Activity**

Show your child four fingers, with your palm facing you. Ask how many fingers are up (four). Then, ask how many fingers are down without turning your hand around.

After your child responds (one), turn your hand so that your palm faces your child and he can confirm his answer.

Repeat with other numbers of fingers. Then, let your child be the teacher and quiz you on how many fingers he has up and down.



*Four fingers up, one  
finger down*

**Note**

It might take your child a minute to figure out how many fingers are down. Make sure to give him some thinking time before offering help. Children sometimes copy their parent's hand with their own hand to see how many are down, and sometimes they look closely at the edge of the parent's hand to see where the tucked fingers' edges are. Whatever method makes sense to your child is fine; what's most important is that he realizes he can reason out the answer. If he makes a mistake, just turn your hand around to show him how many fingers are down and then try again.

### 3.5 Counters on the Five-Frame

**Purpose**

Introduce the five-frame

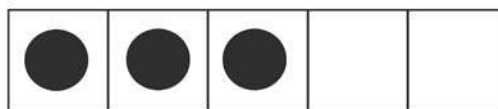
**Materials**

Five-frame (page 89); five counters

**Activity**

Place three counters on the five-frame as shown below. When using the five-frame, always place the counters from left to right, with no empty spaces between counters.

Ask your child how many counters there are. (Three.) As in the other activities in this chapter, encourage him to recognize the quantity by sight, but allow him to count if he's not sure.



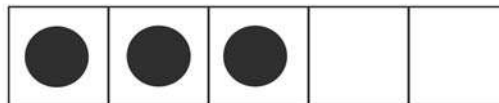
*How to place three counters on the five-frame*

Repeat for other numbers up to five, including zero. Then, tell your child a number from zero to five and have him put the matching number of counters on the five-frame.

**Note**

This activity introduces your child to the five-frame. This simple grid helps children visualize quantities in an orderly way. It also helps children begin to notice relationships between numbers, which is essential for comparing numbers and for beginning addition and subtraction. For example, when a child puts three counters on the five-frame, he can immediately see that he would need to add two more counters for all five boxes to be filled.

This builds a mental framework for comparing numbers (three is less than five) and for addition (two



*Three boxes are full, and two are empty.*



plus three equals five). You'll use the five-frame (and its cousin, the ten-frame) more throughout this book.

### 3.6 Peek-a-Boo Counters on the Five-Frame

#### **Purpose**

Practice identifying quantities up to five without counting

#### **Materials**

Five-frame (page 89); five counters; blank piece of paper

#### **Activity**

Ask your child to close his eyes. While his eyes are closed, secretly place one counter on the five-frame and cover the five-frame with the blank piece of paper. Tell him to open his eyes, and then remove the piece of paper for a second and cover the five-frame again. Ask how many counters are on the frame. (One.) If he's not sure, remove the paper and let him look for as long as he needs.

Repeat with other numbers of counters from zero to five.

#### **Note**

As in Activity 3.4 (Fingers Up, Fingers Down), try to reveal the counters for just a second so that your child doesn't have time to count one-by-one but instead begins to recognize the quantities by sight. Adjust the pace to your child, going as fast as possible without frustrating him. Also, make sure your piece of paper isn't see-through. Construction paper or a manila file folder works perfectly.

### 3.7 Missing Counters on the Five-Frame

#### **Purpose**

Learn to visualize the combinations that make five (five and zero, four and one, two and three)