

PLANNING GUIDE FOR

Developing

Number

Concepts

Kathy Richardson

INTRODUCTION, *p. vii*

INSTRUCTIONAL SETTINGS, *p. xiv*

WHAT DOES THE “MATH-TIME” ROUTINE LOOK LIKE? *p. xx*

THE MATERIALS, *p. xxi*

ESTABLISHING THE LEARNING ENVIRONMENT, *p. xxii*

PLANNING FOR CONCEPT DEVELOPMENT

IN ALL MATH STRANDS, *p. xxiv*

GUIDE TO GRADE-LEVEL PLANNING

Kindergarten, *p. 1*

First Grade, *p. 43*

Second Grade, *p. 101*

Third Grade, *p. 157*

MULTI-AGE CLASSES

Notes to Teachers of Multi-Age Classes, *p. 201*

A Typical Multi-Age “Math Time,” *p. 203*

THE “MEETING THE NEEDS OF YOUR CHILDREN” CHARTS, *p. 205*

Book One: Counting, Comparing, and Pattern, *p. 206*

Book Two: Addition and Subtraction, *p. 212*

Book Three: Place Value, Multiplication, and Division, *p. 216*

This planning guide accompanies the three-book series entitled *Developing Number Concepts*. Each of the books presents cohesive and organized sets of experiences designed to help children develop particular mathematical ideas and concepts. *Book One* includes beginning counting, pattern, and the concepts of more and less. *Book Two* focuses on beginning addition and subtraction. *Book Three* covers place value and beginning multiplication and division. By making full use of the activities in the *Developing Number Concepts* series, you will see the power of this approach to teaching math, and you will find these books to be much more than resources from which you can occasionally pick and choose activities.

■ Included in this planning guide are year-long plans for teaching kindergarten through third grade as well as notes to the teacher of multi-age classes. This guide is not designed to tell you exactly what to teach one day at a time. Rather, it is intended to help you present sets of related activities, each for a period of four to eight weeks. Focusing on a particular concept for several weeks helps children to fully develop their understanding of that concept and to gain competence and facility with the mathematics they are learning. (This also means that the time you spend planning will serve you for several weeks and so, in the long run, will be time well spent.)

■ To be successful in mathematics, children need to be actively involved. They need to make sense of their work. The activities they work with must challenge the children and cause them to think. We must remember, though, that children also need time and meaningful practice in order to become good at what they are learning. If we provide the right kind of practice, children will internalize the concepts, and the mathematics they learn in their early years can serve as a foundation for what they will learn in years to come.

■ This planning guide is designed to make sure that all children are given the time they need to work with particular concepts and to experience these concepts in ways that will help them make connections and see relationships. The underlying structure of the “math-time” routine, as described in this guide, gives teachers a practical, reasonable way to respond to children individually as the children work to make sense of the math they are doing.

What concepts should we be teaching?

In the past, mathematics for children was limited to the study of arithmetic. This was generally presented to children in ways that interfered with their ability to know and understand important mathematical ideas. In 1989, the National Council of Teachers of Mathematics developed curriculum standards that acknowledged the changing needs of an increasingly technological and quantitative world and broadened our view of what kind of mathematics can and should be presented to children. In the document *Curriculum and Evaluation Standards for School Mathematics*, published in 1989 and in the revised document, *Principles and Standards for School Mathematics* (under revision in 1999 and to be published in 2000), both content and process standards are identified as important for students to learn.

The first set of standards deals with the *content* of mathematics:

- Number and Operation
- Patterns, Functions and Algebra
- Geometry and spatial Sense
- Measurement
- Data Analysis, Statistics and Probability

The remaining standards look at the nature of mathematical thinking and focus on the *process* of doing mathematics:

- Problem Solving
- Reasoning and Proof
- Communication
- Connections
- Representations

The “process” standards remind us that mathematics is a discipline that is used in the real world to help us solve problems and understand information. They influence *how* mathematics is taught rather than *what* mathematics is taught. In the book *Reaching Potentials: Transforming Early Childhood Curriculum and Assessment, Volume 2*,* I describe the process *Standards* in the following way.

* “Transforming the Mathematics Curriculum” by Kathy Richardson and Leslie Salkeld in *Reaching Potentials: “Transforming Early Childhood Curriculum and Assessment, Vol. 2*, Sue Bredekamp and Teresa Rosegrant, Editors, National Association for the Education of Young Children, ©1995, p. 24.

Children need to experience mathematics as problem solving: investigating, seeing what happens if..., and using mathematics to find out things for themselves that they don't already know. Rather than trying to figure out what the teacher wants them to do, children need to understand that mathematics is about reasoning: making conjectures about why something is the way it is and then checking out those conjectures; thinking for oneself rather than trying to figure out what the teacher wants. Rather than being a task done quietly by a child at her desk, mathematics is about communication: clarifying her thinking by talking to her friends, by listening to what they have to say, by finding ways to write down her experiences and her thinking with words, with diagrams and pictures, and with mathematical symbols. Rather than being a set of isolated skills and procedures to be practiced and drilled until they are mastered, mathematics is about connections: seeing the relationships between mathematical ideas, seeing mathematics everywhere one looks.

The “content” *Standards* point out that mathematics is more than arithmetic and that the study of mathematics should include a broad spectrum of mathematical ideas. NCTM's *Standards* have influenced the development of district-level curriculum guides throughout the country. Most primary teachers are now expected to present mathematical experiences that include topics such as geometry and statistics. In addition, teachers are urged to provide more problem-solving experiences than before, to connect math to the real world, to find ways to integrate math into other subject areas, and to make sure that children are writing about the math they are doing.

If we viewed all the *Standards* as separate and discrete topics to be taught, it would be easy to feel overwhelmed. This might cause us to rush through a variety of activities in an attempt to provide all the required experiences for our children. However, when planning for a year of mathematics, it is important to remember that not all concepts listed in a curriculum guide require equal amounts of time and emphasis. We must be clear about what our students are going to be expected to do in the future so that we are sure to give them the experiences necessary to provide them with a proper foundation. If we try to do too much, we run the risk of not covering any one concept in depth—resulting in our children not learning anything well. We must carefully decide what it is that will best benefit our children in the long run.

When we consider which concepts will provide the foundation for children's future work in mathematics, we see that both number and pattern concepts are central and, therefore, should be at the heart of the primary curriculum. The majority of time spent doing math should be used to develop these concepts in depth. Other mathematical ideas naturally lend themselves to the work with number. Measurement, for example, provides a strong context for developing number concepts and relationships. Data collection and graphing activities, which can be woven into the math program throughout the year, also support the development of number relationships. When children play games that involve number cubes and notice that they roll some numbers more often than others, they begin to become aware of the idea of probability. Other major areas of emphasis, such as geometry and sorting, can be interspersed throughout the year for periods of two to three weeks at a time.

The activities in the *Developing Number Concepts* series provide you with all the activities you need to support children's development of number and pattern concepts. Measurement, sorting, graphing, probability, and geometry are integrated into many of the activities, but additional experiences with these concepts should also be provided. The Concept Development Charts in this guide indicate which of these concepts should be studied at each grade level and show how the concepts integrate into the basic work with number and pattern.

Children also need mathematical experiences that are not a part of their ongoing work with concept development. I refer to such experiences as "mathematical events." You might present a mathematical event because you think that it will interest the children and because you think that they will enjoy the challenge. Children's literature can often be a source for these tasks. These events can be interspersed throughout the year for a day or two at a time. For example, on any given day, you may choose to replace the regular math-time routine by reading a story to the children and then presenting them with a problem related to the story.

There are a few other mathematical skills that children have traditionally been introduced to in the primary grades but which are not core, or basic, at these grade levels. For example, children are expected to learn to tell time, to use rulers, to read a calendar, and to read and write the date. But these topics involve complex mathematical ideas that are beyond the young child's ability to fully understand. Thus, children learn about time and the calendar as social conventions, rather than as foundational skills. At a certain point in time, money becomes a means of helping children understand number concepts. However, children need to understand equivalence before their work with money makes sense to them. Instead of spending large blocks of time focusing on these ideas, you can help children become familiar with time, the calendar, rulers, and money through real-life experiences and through the shorter mini-lessons that are a part of this program.

How do we determine the appropriate pacing and set realistic expectations for the children?

Because children's ability to do well in mathematics will profoundly impact their future, what we do to prepare children in these early years is critical. It is important that we give children experiences that will help them become confident and skilled as they work with mathematics. If we are going to plan appropriate experiences for our students, we must be aware of the complexities of seemingly simple mathematical ideas. We must recognize how young children develop an understanding of these mathematical concepts and we must observe our children closely to determine what they do, and do not, know and understand. When planning a math program, we must look further than just preparing children for their next year in school. We must make sure that what we do each day will serve children as they move on through school and beyond.

This guide describes when to focus on particular concepts at each grade, from kindergarten through grade three. The decisions to focus on certain concepts at particular times have been made very deliberately—based on what we know about how children learn. The suggested sequence and timing has been validated by the years of experience of many teachers who have carefully assessed their students' developing understanding and have reached a consensus on the pacing recommended here.

Many teachers have expressed concerns about being asked to have their young students meet expectations that do not take into account the natural stages of development that influence children's abilities to understand certain mathematical ideas. Children sometimes learn to repeat words and follow procedures even though they do not understand what they are saying or doing. This leads some adults to assume that children understand more than they really do. When teachers feel pressured to have children do more than they can do with understanding, they rely on showing children procedures and leading them through tasks that they cannot do on their own. It is futile to have children work with ideas and procedures that do not make sense to them. Such procedures are then easily forgotten by the children and become virtually useless as tools for solving problems. Learning these procedures takes time away from the important work that should be done and may leave children with dead-end skills rather than foundational understandings.

Sometimes children's lack of fluency with numbers and lack of understanding of these basic concepts show up later—in upper elementary and in middle school. This results in teachers often having to spend time reviewing topics that the children failed to learn in the primary grades. We see then that children are not served when we set goals they can meet only if they learn the content by rote. They are not served if they learn to get answers but don't learn to see relationships between quantities. They are not served if they never have time to become good at what they are doing.

Introduction

If we want the time we spend with children to lead to a deeper understanding of foundational skills, then it is important that we look at what the children really know and understand. We need to respect the real work of the young child. We do not want children doing work that only looks challenging but that is, in reality, meaningless to them. It takes time for children to develop competence and understanding. Children must be given the time they need to build the foundation for understanding the concepts that they will be expected to work with in the future.

When deciding when and how to present mathematical ideas in this guide, I paid particular attention to making sure that children are asked to work with those ideas that enhance their understanding of mathematics and help them experience mathematics as a sense-making process.

How do I make sure that I am expecting enough of my children and challenging them all?

When we help children build a strong foundation that will serve them in the future, we are raising standards and expectations—not lowering them. The activities in the *Developing Number Concepts* series are designed to meet a range of needs so that no child works at a level that is either too easy or too difficult to be of value. Every chapter in each book in the series has a section entitled “Meeting the Range of Needs” which will help you see how to use the activities to fulfill your children’s various needs.

What is meant by “meaningful” practice?

Children develop their understanding of math concepts not through rote memorization but through a process of internalization. Once a child has internalized a concept, he or she will not forget it. It becomes a part of the way the child sees the world. We want to provide the kind of practice that helps children internalize the concepts they are working with. To internalize a concept, children need multiple experiences over time using related activities that confirm, challenge, and extend their thinking. No single activity is of particular importance in and of itself. Rather, it is through repeated experiences with various related activities that children begin to make generalizations and to know number relationships.

Children can get meaningful practice through the activities in *Developing Number Concepts*, which are intended to be experienced by children over and over again. If we were to continually present children with new and different activities, then we would find that they would be focusing more on how to do the activities than on what they are learning from them. However, when children work repeatedly with familiar activities that provide the appropriate amount of challenge, they become increasingly engaged in the tasks over time and thus become able to get the full benefit from them.

How do we fit everything in?

Each concept introduced to children must be developed throughout the year. Some concepts will be emphasized more than others during any particular planning period. Once introduced, however, they should never be dropped completely. To make sure that the math program is balanced and that all the major concepts are developed throughout the school year, I divided the year into three blocks of time. I then made sure that each concept is worked with in some way during each block of time. For example, pattern is introduced to kindergarten children through whole-group experiences at the beginning of the year. In the middle of the year, the children may spend quite a bit of time working at pattern stations. Near the end of the year, the familiar pattern stations with new challenges can be made available to them once again. Although pattern should not be children's primary focus at all times, natural opportunities for them to notice patterns and/or to work with them will also arise throughout the year.

First-grade children need to spend long blocks of time in which addition and subtraction is the major focus. This work can be interrupted occasionally with a week or more of geometry or sorting activities. The children should then return to their focus on addition and subtraction to ensure that they develop a deep understanding of these basic operations and the number relationships with which they are working.

Second-grade children need to spend much of the year working with place-value concepts. Place value can be introduced sometime during the first three months of the year. Children can then spend several weeks working at place-value stations through which they learn to *organize* quantities into tens and ones. Later in the year, the familiar stations can be brought out again with the focus changing to *comparing* quantities. Pattern and measurement concepts are naturally integrated into the place-value activities. Blocks of time devoted to sorting and geometry can be interspersed throughout the year.

Meeting the Needs of Your Children

Rather than using the year-long plans, you may choose to use selected activities to meet your children's particular needs. The Meeting the Needs of Your Children charts identify the particular concepts and skills presented in each chapter of each book in the series and cite the specific activities that help develop the the concepts and skills. These charts can be found beginning on page 205 of this guide. (They also appear in the introduction to each of *Books One, Two, and Three*.)

Instructional Settings

Three basic instructional settings facilitate the different kinds of lessons and activities recommended in this guide. Note that the time spans suggested here are for grades 1, 2, and 3. For kindergarten, some of the suggested time spans are a bit shorter.

During math time, the children will work:

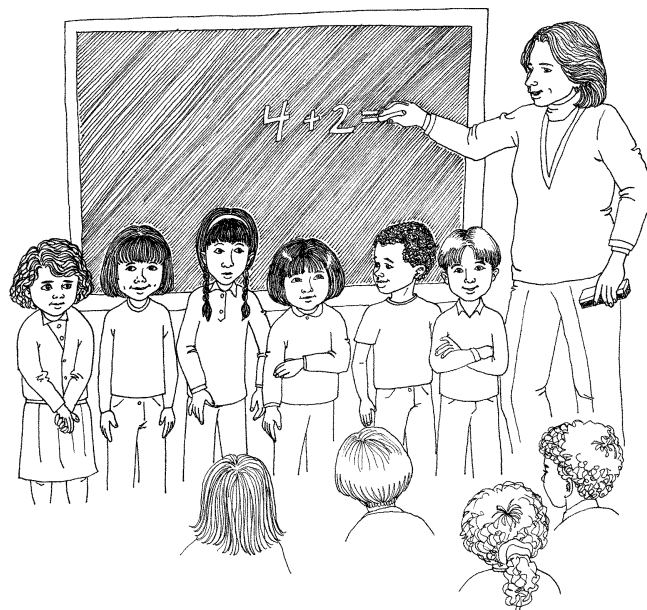
- as a *whole class* working together during “mini-lessons” or “shared experiences”
- at *independent stations*, alone or with partners
- with the teacher in a *small group*

Arrange the room to accommodate these three ways of working. You will need to clear a large floor area for gathering the whole class together. For independent-station-work arrange tables or push desks together. You can then work with small groups of children either on a rug on the floor or at the tables.

Whole-Class Work

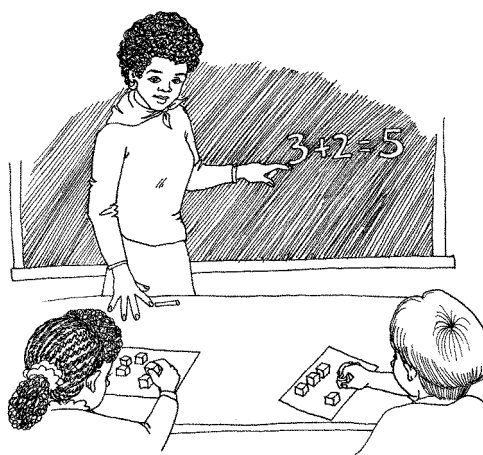
Mini-Lessons (*Shorter Mini-Lesson*: 5–10 minutes, 3 to 5 times a week; *Longer Mini-Lesson*: 15–25 minutes, as needed)

Mini-lessons provide you with a format for ongoing work with various concepts. You can continually review previously introduced concepts and help children become familiar with new concepts that they will be working with in more depth in the future. A typical math period begins with the class meeting together for a few minutes for a mini-lesson before the children begin work with independent tasks. An activity presented during a mini-lesson should be repeated several times over a period of a few weeks, allowing children to make connections and to internalize the concepts.



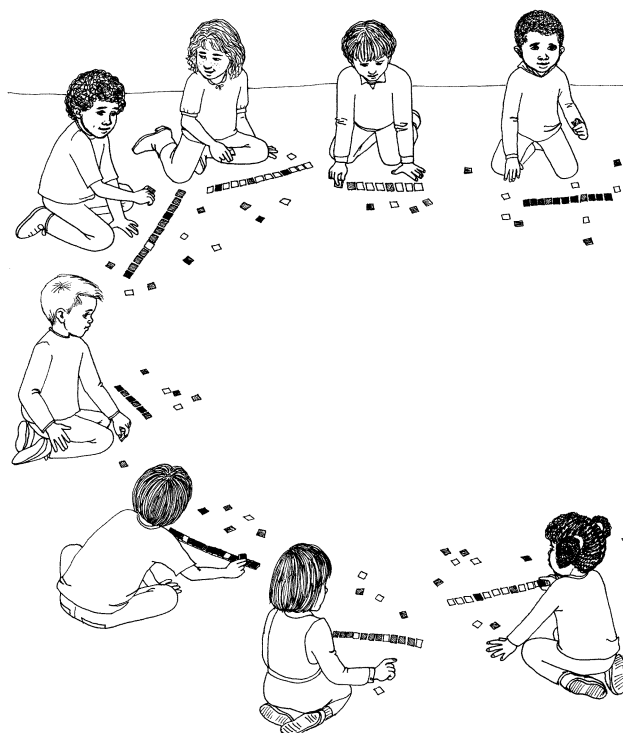
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You will need to allot more time for those mini-lessons in which the children use manipulatives or other materials. To help you plan your time, the mini-lessons have been designated as “Shorter Mini-Lessons” and “Longer Mini-Lessons.”



Shared Experiences (35–50 minutes, 1 or 2 times about every two weeks)

During shared-experience time the whole class works together for the entire math period, usually using manipulatives. This is to ensure that all the children are actively engaged in the lesson. Sometimes the shared experiences will support the development of the concept currently being worked with. Other times, the experiences will be devoted to problem-solving lessons or to additional work from various math strands.



..... **Instructional Settings**

Independent-Station Work

(35–50 minutes, 3 to 5 times a week)

This is the classroom setting that provides children with the greatest opportunity possible to get the practice they need if they are to internalize the math concepts they are working with. New activities are introduced, either to the whole class or to a small group, over a period of about a week. As each activity is introduced, it is put out at an independent station. Then, children choose activities to work with from among eight to ten that deal with a particular concept. The activities for a given concept should be made available for several weeks at a time. You will find that the children become increasingly engaged in the activities as they become more familiar with the tasks. Children can't really learn from an activity until they fully understand how to do the activity. By keeping activities available to them for long periods of time, you ensure that the children will get as much as possible from the experiences.

When you introduce a set of activities, make sure that the children understand:

- which materials to get
- how to do the activity

If an activity is new to you, refer to it in the activity book as often as necessary. It is okay to keep the book open in front of you as you work.

These independent-station tasks will meet a variety of needs depending on what the children bring to them. For example, when working on counting tasks, some children may be focused on developing consistency and strength in counting while others may be focused on number sense and discovering relationships. At the same time, still other children may be developing basic counting skills.

When children work independently, you can learn much about their thinking and level of concept development by observing them at work. You will be able to interact with individual children, providing support and challenge as needed. You will also be able to gather children with similar needs to work in small groups with the teacher-directed activities. The children need not be grouped by ability in order to perform the independent activities. Individual needs can be met with children working side by side on many different levels.

After you have introduced a set of activities, you will notice that it usually takes two or three days for the children to really settle in and focus on the tasks. When the tasks are appropriate for them, you will see most children working hard, making a few mistakes, and double-checking their work to see if they did it correctly. After many days or weeks, you will notice that the children are working less intensely as the tasks become easier for them. You will begin to see less concentration and sense some restlessness. When the children know the answers to your questions quickly, without having to figure them out, then it is time to move on.

Instructional Settings

Teacher-Directed, Small-Group Focus Work

(10–20 minutes, 2 to 3 times a week)

Working with a small group allows you to watch closely, interact with, and respond to individual children. You can use this instructional time in three ways:

- to introduce activities that are difficult to introduce to the whole class
- to assess the needs of children without having to do individual interviews
- to provide experiences to meet the needs of a particular group of children

Rather than setting a permanent schedule for small-group time, work with small groups only when you see a specific need. Call a group together either when certain children need help or when they need a challenge or because a particular activity is most effective when done this way.



Just before beginning work with a small group, ask the children to come to the meeting area and give them something to keep them occupied while you make sure that the rest of the class is working appropriately at independent stations. A simple task, such as writing on individual chalkboards, works well as it takes no introduction and is easily interrupted when it is time to stop and work together.

After working for a short time with the small group, have the children rejoin the others. Then spend the rest of the period observing and interacting with the whole class as they work.

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What Does the “MATH-TIME” Routine Look Like?

Usually...MATH TIME is

Whole-Class Time/Mini-Lessons (*Shorter Mini-Lesson:* 5–10 minutes, 3 to 5 times a week;
Longer Mini-Lesson: 15–25 minutes, as needed)

The math period begins with the whole class meeting together to work with one or two short activities. These activities can give children ongoing practice with concepts previously worked with or they can be used to introduce children to concepts that they will work with in the future. Sometimes you will use this time to introduce the independent activities. On days when you have a longer mini-lesson, you will probably not have time to work with a small group.

Preparation for Independent-Station Time and Small-Group Focus Work

After completing a mini-lesson, you may plan to work with a small group of children during the independent-station time. Call out the names of these children and ask them to gather in one place—the rug area, for example. Give them a task to do so they will be productive while you are making sure that the rest of the children are working appropriately at the independent stations.

Independent-Station Time: (35–50 minutes, 3 to 5 times a week)

Excuse those children who are *not* part of the small group a few at a time to choose their independent activities.

Small-Group Focus Work: (10–20 minutes, 2 to 3 times a week)

Spend a few minutes working with the small group of children who have similar needs. At the end of this lesson, excuse these children to choose their independent activities.

Teacher Observation of Children Working Independently

After the small-group lesson is over, you can move around the room observing and interacting with the children as they work independently.

Cleanup Time

After a period of about 35 to 50 minutes of independent work time, have the children clean up their stations and meet together again as a class.

Brief Discussion of Math Time: (less than 5 minutes)

Spend a few minutes reviewing what went on during independent-station time.

Sometimes...MATH TIME is:

Shared Experiences/Mathematical Events:

(35–50 minutes, 1 or 2 times about every two weeks)

Occasionally vary the usual routine by having the whole class work together on the same task for the entire class period. You may use this time to support the children’s current work with a concept, or you may continue work with concepts previously introduced. This is also the time during which you can present mathematical events.

A Typical Kindergarten “Math Time”

1. Whole-Class Work: *Shorter Mini-Lesson* (5–10 minutes)

The math period begins with a short lesson that provides ongoing practice with concepts previously introduced.

- Rhythmic Clapping
- Estimation (using a container that holds about 12 objects)

2. Preparation for Working with a Small Group

A small group of children stay in the rug area and are given a short task. Today the teacher asks them to practice writing numerals on individual chalkboards while they are waiting for her to make sure that the rest of the children are working appropriately at independent stations.

3. Independent-Station Work (35–40 minutes)*

Having been introduced to the following activities over a period of three or four days, the children now work with them on their own. These activities provide children with opportunities to practice counting while developing a sense of quantities. Both dot cubes and number cubes are included with the activities in order to meet children’s various needs.

- | | |
|----------------------------------|---------------------------|
| 1: 1–21 Counting Boards, Level 1 | 1: 1–22 Creations Station |
| 1: 1–25 Roll-a-Tower Race | 1: 1–26 Make-a-Train Race |
| 1: 1–28 Build a City | 1: 1–30 Shape Puzzles |
| 1: 1–31 Line Puzzles | |

4. Teacher-Directed, Small-Group Focus Work (10–15 minutes)

The teacher uses these activities to provide the children with the extra practice they need in counting to 6.

- | | |
|--------------------------|-------------------------|
| 1: 1–1 Slide and Check | 1: 1–4 Counting Stories |
| 1: 1–7 Grab-Bag Counting | 1: 1–8 Grow and Shrink |

After the small-group lesson is over, the teacher excuses the children to choose an independent-activity station.

5. Teacher Observation of Children Working Independently

The teacher moves around the room observing and interacting with individual children.

6. Cleanup Time

After about 40 minutes of working independently, the children clean up their stations and meet back together again on the rug.

7. Whole-Class Work: Brief Discussion of Math Time (no longer than 5 min.)

The class reviews what went on during math time.

* Each activity number refers to book, chapter, and activity. For example, 2: 1–14 means book 2, chapter 1, activity 14. Notice whether each activity appears in Book One (1:), Book Two (2:), or Book Three (3:).

Planning Chart

Kindergarten Planning Chart*

First Planning Period: 8–10 Weeks (Sept., Oct., Nov.)

Focus: Learning to Work Independently,
Beginning Counting and Pattern Activities

Whole-Class Work: Mini-Lessons	
Shorter Mini-Lesson (5–10 minutes, 3 to 5 times a week)	Longer Mini-Lesson (10–20 minutes, as needed)
Pattern Experiences 1: 2–1 Rhythmic Patterns 1: 2–2 People Patterns 1: 2–3 Patterns in the Environment 1: 2–21 Looking for Patterns on the Calendar Estimation Experiences to 15 Informal Rote-Counting Practice	Data Collection and Graphing Math and Literature Counting Books
Ongoing Independent-Station Work (35–40 minutes, 3 to 5 times a week)	
Self-Directed Exploration of the Math Manipulatives Connecting cubes Color Tiles Wooden cubes Toothpicks Collections <i>Include any additional math materials you have available, such as Pattern Blocks, geoboards, geoblocks, scales, and containers.</i> Introduce Math Manipulatives and Establish Expectations for Independent Work	<i>After a few weeks, gradually introduce these activities.</i> Independent Counting Experiences 1: 1–21 Counting Boards, Level 1 1: 1–22 Creations Station, Level 1 1: 1–23 Cover the Dots 1: 1–24 Counting with the Number Shapes 1: 1–25 Roll-a-Tower Race, Level 1 1: 1–26 Make-a-Train Race, Level 1

* Each activity number refers to book, chapter, and activity. For example, 2: 1–14 means book 2, chapter 1, activity 14. Notice whether each activity appears in Book One (1:), Book Two (2:), or Book Three (3:).

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Teacher-Directed, Small-Group Focus Work (10–15 minutes, 2 to 3 times a week)

Focus on One-to-One Counting

If you have children who need extra help, choose from the following activities to provide them with focused practice. Choose several activities over time, using two to four of them during any one lesson.

- 1: 1–1 Slide and Check
- 1: 1–2 Count and Dump
- 1: 1–3 Making Towers
- 1: 1–4 Counting Stories, Level 1
- 1: 1–5 Creations
- 1: 1–6 Finger Counting
- 1: 1–7 Grab-Bag Counting
- 1: 1–8 Grow and Shrink (focus on small numbers), Levels 1 and 2
- 1: 1–9 Hide It

If you wish to provide more variation, include some of the following activities.

- 1: 1–10 Hunt for It, Levels 1 and 2
- 1: 1–11 Peek and Count, Level 1
- 1: 1–12 Find a Match, Levels 1 and 2
- 1: 1–15 Tall and Short, Level 1

OR

Shared Experiences/Mathematical Events

(35–45 minutes, 1 or 2 times about every two weeks)

You will not need to present additional math experiences during this time as self-directed exploration provides children with informal opportunities to work with sorting, geometry, and measurement concepts.

Planning Notes

Kindergarten Planning Notes

First Planning Period: 8–10 Weeks (Sept., Oct., Nov.)

Focus: Learning to Work Independently,
Beginning Counting and Pattern Activities

Whole-Class Work: Mini-Lessons

You can present new concepts and review previously taught concepts by spending just a few minutes at the beginning of each math period on either a *Shorter Mini-Lesson* (5–10 minutes) or a *Longer Mini-Lesson* (10–20 minutes).

Shorter Mini-Lesson

(5–10 minutes, 3 to 5 times a week)

Begin math time with a mini-lesson. Choose two to four activities from among those listed.

Pattern Experiences

Introduce the children to pattern through rhythmic patterns, people patterns, patterns in the environment, and patterns on the calendar. Present two or three different pattern experiences several times a week. Provide the appropriate level of difficulty for your children. Make sure you give the children a variety of experiences to help them develop a broad view of pattern. Be sure to include more than one type of pattern so that children do not think that the term “pattern” refers only to AB patterns. Include such patterns as AABB, AAAB, and ABC. Don’t worry if some children do not recognize a pattern right away. Just continue modeling many different patterns for several weeks using these activities.

- 1: 2–1 Rhythmic Patterns
- 1: 2–2 People Patterns
- 1: 2–3 Patterns in the Environment
- 1: 2–21 Looking for Patterns on the Calendar

Estimation Experiences to 15

Materials: Assorted see-through containers and various objects with which to fill them.

Once or twice a week, give children the opportunity to estimate the number of objects that will fill a container. After they have had a chance to guess the number of objects, have them count with you as you put objects into the container to determine the actual count.

Informal Rote-Counting Practice

Some children come to kindergarten not yet able to count to ten. It is very important that these children learn this counting sequence so that they can participate fully in other math activities. By just taking a minute or two at a time, you can help them get the practice they need. While everyone can participate in the counting, make sure that the counting sequence fits the needs of those children who need help. Take advantage of all opportunities to count as they come up. For example, the children can count at music time when they are using rhythm sticks and/or when they are marching around the room. Children can also get the practice they need through familiar counting songs and finger plays.

Longer Mini-Lesson (10–20 minutes, as needed)

Occasionally you will need to spend more than just five to ten minutes on a mini-lesson. This will usually happen when you want the children to use materials. In this case you will teach a longer mini-lesson.

Data Collection and Graphing

Sometime during this planning period, provide opportunities for children to organize data into graphs.

Math and Literature

Provide children with additional counting experiences by reading a variety of counting books to them.

Ongoing Independent-Station Work (35–40 minutes, 3 to 5 times a week)

During independent-work time, the children are able to practice and internalize the concepts they are learning. Provide frequent ongoing opportunities for them to work at the various stations.

Self-Directed Exploration of the Math Manipulatives

Materials: Connecting cubes, Color Tiles, wooden cubes, toothpicks, and collections. Include any additional math materials that you plan to use for math instruction.

In order for kindergarteners to get the most from their math work time, the focus in the beginning of the year must be on developing routines and expectations. Children need to learn how to make responsible choices, how to get along

with the many other children in the class, and what it means to work hard. They can learn this most effectively during a several-week-long period during which they work with and explore the math manipulatives. This time is critical as the children need to work with the manipulatives using their own ideas before they will be able to focus on the tasks you have in mind for them. Having the children explore the manipulatives on their own also allows you to focus on developing the work environment.

Introduce Math Manipulatives and Establish Expectations for Independent Work*

Introduce the various math manipulatives over a period of several days. As you do so, discuss the rules for working with the manipulatives and your expectations for hard work. (See “Establishing the Learning Environment” on p. xxii.)

After the manipulatives have been introduced, have a few children deliver them to the various stations around the room. Then, excuse the rest of the children, a few at a time, to choose where to work. Observe and interact with them while they are at work, commenting and redirecting if necessary. At the end of the math period, spend a minute or two discussing the good hard work you have observed and/or reminding the children of any behaviors that need to be changed.

Make sure you provide sufficient time for the children to work with the math manipulatives. This means that they should work for 35–40 minutes at least three times a week for several weeks. The work children do at this time is very important and will influence how they work with the independent stations throughout the year.

Independent Counting Experiences

Materials: Concept Development Packets—each set up to accommodate six children.

After several weeks, when the children have learned how to work independently with the math manipulatives, you can begin to introduce them to the counting activities in Book One, Chapter One. The first tasks you introduce should be those that are easy for the children to learn so that they can all participate. The purpose of these tasks is not only to give the children practice in counting, but also to help them learn how to follow directions in order to do a specific task, how to choose a task, how to work hard, and how to clean up before moving on to a new task. You can learn much about your children as you observe them at work and engage them in conversation. The tasks can be introduced in a variety of ways by:

- introducing an activity to half the class or to a small group during self-directed exploration time while the rest of the class is busy working with the math manipulatives.

* See *Math Time: The Learning Environment* for more information about establishing expectations.

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- presenting these activities, on occasion, in place of self-directed exploration time.
 - adding a few of the counting activities to the self-directed exploration time.

In the beginning, you will want to have enough materials prepared so that all the children being introduced to the activity can participate. The materials needed for the recommended activities are easy to make, so it will not be difficult for you to have many children work with them at one time. Observe the children to determine whether or not they are able to follow the directions and stay on task as they use these activities.

- 1: 1–21 Counting Boards, Level 1
- 1: 1–22 Creations Station, Level 1
- 1: 1–23 Cover the Dots
- 1: 1–24 Counting with the Number Shapes
- 1: 1–25 Roll-a-Tower Race, Level 1
- 1: 1–26 Make-a-Train Race, Level 1

Teacher-Directed, Small-Group Focus Work

(10–15 minutes, 2 to 3 times a week)

It is important for you to work with children having similar needs in order to help them focus on developing concepts. Give children a variety of experiences, choosing from the recommended activities. Spend a few minutes on each of two to four activities during every lesson.

Focus on One-to-One Counting

Materials: Before working with the recommended activities, first assemble your Teacher Tub of Materials and be sure to have connecting cubes, Color Tiles, and collections available to use as needed. This will provide you with the materials you need to do any of the recommended activities.

Teacher Tub of Materials

- Working-space papers (1 per child)
- Counting Boards (1 per child)
- Large dot cubes (1–6 dots)
- Small plastic bowls (10–12)
- Paper lunch bags
- Xylophone (optional)

If you find, through observations or individual assessments, that you have some children who need extra support in learning the counting sequence or

Planning Notes

one-to-one correspondence, use the following activities for small-group work. These activities provide a lot of repetition for those who need it in a form that young children find intriguing. You may wish to work with these children during another small-group work time if this fits into your day, or you may work with them for a few minutes during the math period before excusing them to join the rest of the class. Do just two or three activities at a time for a total of 10 to 15 minutes.

- 1: 1-1 Slide and Check
- 1: 1-2 Count and Dump
- 1: 1-3 Making Towers
- 1: 1-4 Counting Stories, Level 1
- 1: 1-5 Creations
- 1: 1-6 Finger Counting
- 1: 1-7 Grab-Bag Counting
- 1: 1-8 Grow and Shrink (focus on small numbers),
Levels 1 and 2
- 1: 1-9 Hide It

If you wish to provide more variation, include some of the following activities.

- 1: 1-10 Hunt for It, Levels 1 and 2
- 1: 1-11 Peek and Count, Level 1
- 1: 1-12 Find a Match, Levels 1 and 2
- 1: 1-15 Tall and Short, Level 1

OR

Shared Experiences/Mathematical Events

(35–45 minutes, 1 or 2 times about every two weeks)

You will not need to present additional math experiences during this time as self-directed exploration provides children with informal opportunities to work with sorting, geometry, and measurement concepts.