Mathematics

Within

The Creative Curriculum® for Preschool

by **Teaching**Strategies[®]



Integrate Mathematics Throughout Your Day

With *The Creative Curriculum** for Preschool, teachers nurture mathematics skills development throughout the day, every day. Just like mathematics skills are needed and used during children's daily lives, mathematics learning should occur throughout the classroom day, too, without being limited to a specific time slot. Children need frequent practice in play settings and activities that include meaningful discussions and applications to develop the essential mathematical process skills of problem-solving, reasoning, communicating, making connections, and representing. This guide will illustrate how mathematics skills are nurtured every day, throughout each day, with *The Creative Curriculum** for Preschool.



The Heart of Everything We Do

The Teaching Strategies objectives for development and learning are at the heart of everything we do. They define the path teachers take with the children in their classrooms. Our 38 research-based objectives for development and learning cover all areas that research has shown to be ultimately critical for children's success: social—emotional, physical, language, literacy, cognitive, mathematics, science and technology, social studies, and the arts. Two dedicated objectives also help teachers support and measure the expressive and receptive language learning of English-language learners.





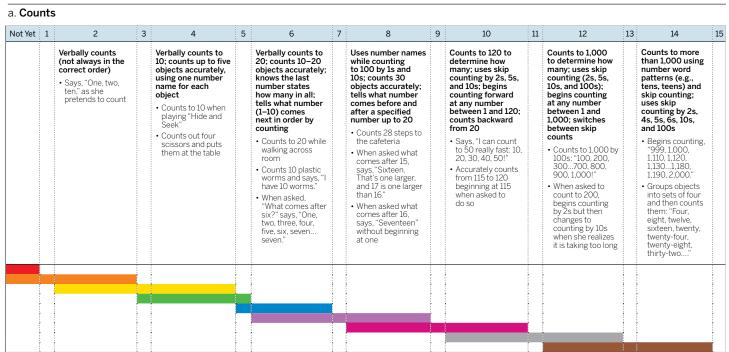
Inform Individualized Mathematics Instruction

The objectives span birth through third grade and enable teachers to see children's development and learning along a progression across the whole of the early childhood years. They enable teachers to see the big picture of mathematics skills development and drill down to the widely held expectations for children at each stage of development from birth through third grade. Because the objectives reflect critical development from birth all the way to age 8, *The Creative Curriculum* for *Preschool* is uniquely inclusive of children with developmental delays and disabilities, children who are English-language or dual-language learners, and children who are advanced learners.

Color-coded progressions illustrate the widely held expectations for the development and learning of various agegroups and grades in the early childhood years. Within a progression, indicators with even-numbered levels describe specific points in the development of children's knowledge, skills, and abilities; odd-numbered levels provide a way to recognize emerging skills that a teacher can scaffold to the next level. "Not Yet" indicates that a particular age group or grade is not yet expected to demonstrate development in an objective.



Objective 20 Uses number concepts and operations



Charting the Path for Mathematics in the Classroom

Our mathematics objectives for development and learning define the path teachers take in the classroom to incorporate mathematics development and learning throughout the day. High-quality early childhood education programs allow children to slowly construct mathematical knowledge with first-hand explorations. In *The Creative Curriculum* for *Preschool*, each day of instruction includes opportunities for children to

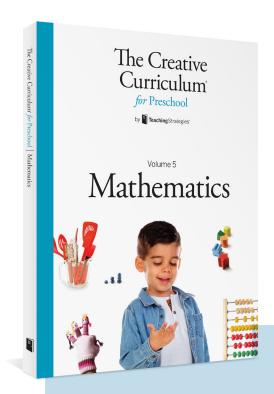
- construct a variety of fundamental mathematical concepts and strategies;
- acquire the essential process skills of problem-solving, reasoning, communicating, making connections, and representing; and
- develop early language and literacy skills, since there is also a clear link between early language skills and later school reading and mathematical achievement.

MATHEMATICS 20. Uses number concepts and operations a. Counts b. Quantifies c. Connects numerals with their quantities d. Understands and uses place value and base ten e. Applies properties of mathematical operations and relationships f. Applies number combinations and mental number strategies in mathematical operations 21. Explores and describes spatial relationships and shapes a. Understands spatial relationships b. Understands shapes 22. Compares and measures a. Measures objects b. Measures time and money c. Represents and analyzes data 23. Demonstrates knowledge of patterns

Our mathematics objectives for development and learning are also aligned to your state early learning guidelines and the Head Start Early Learning Outcomes Framework.



Learn more about Head Start alignments. Select *Find My State* to learn more about state alignments.



National Council for Teachers of Mathematics (NCTM) Standards

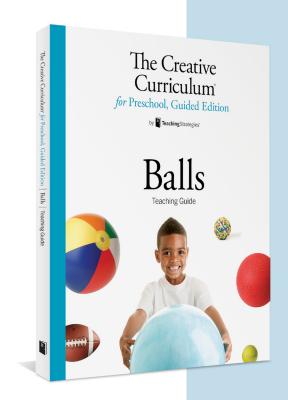
A foundational volume dedicated to mathematics explains the theory and most up-to-date research behind best practices for supporting the development and learning of mathematics.

This volume outlines the curriculum's alignment to NCTM standards, including numbers and operations, geometry and spatial sense, measurement, patterns (algebra) data analysis. Discussions in mathematics are a focus in *The Creative Curriculum®* for *Preschool*. Within each *Teaching Guide*, we incorporate the recommended NCTM standards to ensure that preschool children have acquired the necessary mathematical skills they need to be successful in later formal learning of mathematics.

Mathematics: A Day in the Life of The Creative Curriculum® for Preschool

With The Creative Curriculum for Preschool, teachers nurture mathematics skill development from the time children arrive to the time they depart, during large group, choice time, read-aloud, small group and large-group roundup—in every part of the day.

Let's explore how mathematics is integrated throughout the day, every day using a Guided Edition Teaching Guide. Let's use the Balls study, Investigation 1, Day 2, "What different types of balls are there? How are they the same and different?" as our example.



Day 2

Investigation 1

What different types of balls are there? How are they the same and different?





Large Group

Opening Routine

· Welcome the children to the large-group area and begin your opening routin

Use Mighty Minutes 275, "Movin' Around."

Discussion and Shared Writing:

- · Review the question of the day.
- Ask, "How do we know whether this ball is bigger than this one?" Invite the children to share their responses.
- · Introduce the term circumference distance around an object. Add that knowing an object's circumference tells us how big it is.
- us now tog it is.

 Say, "We are going to measure the circumference of a tennis ball and a volleyball to find out which one is the biggest." Use Intentional Teaching Experience MG2, "How Big Around?" to measure the circumferences of the two balls. Write their circumferences on a sheet of chart paper.

Write the names of the balls prior to writing their circumferences on chart paper. Title the chart Ball Sizes and keep it for the children to add to during choice time.

After the activity, say, "Now that we have measured the circumference of the two balls, which ball is bigger?" Invite the children to compare the circumferences on the chart and share their respons

Before transitioning to the interest areas, tell the children that they can measure the circumferences of balls in the collection in the Discovery area.

Balls Investigating the Topic

Choice Time

As you interact with the children in each interest area, make time to do the following in the Discovery area:

- Display the Ball Sizes chart, the ball collection, and the materials the children used to measure the balls' circumferences during large group.
- · Support children to measure the ircumferences of the balls in the collection. Encourage them to wrap a piece of string or yarn around the widest part of each ball and to cut the string where the two ends meet
- children to lay the pieces of string on top of the chart. Help them mark the length of each string.
- After the children determine the balls circumferences, explain that they will compare those measurements during large-group roundup.

Guiding your observations As children measure and compare balls of different sizes, look for indicators of Objective 22, "Compares and measures." At the beginning of the school year, children should explore nonstandard measuring tools such as string and yarm before being introduced to standard measurement tools such as rulers and measuring tape.

Read-Aloud

- Before reading, show the cover of the book and ask, "What is the title of this book?"
- While reading, pause to let children fill in predictable phrases.
- After reading, ask, "How would you tell this story if you were the troll? What parts of the story would be the same as those we read together? What parts would be different?"

Small Group

Pots & Pans Band

· Use Intentional Teaching Experience M80, "Pots & Pans Band."

Large-Group Roundup

- · Display the Ball Sizes chart.
- · Invite the children to look at the different
- Invite the children to look at the dilline lengths marked on the chart.
 Ask, "Which line is the longest?,"
 "Which line is the shortest?," and "Which lines are close to the same size?
- Confirm that the ball with the longest line is the biggest and the ball with the shortest line is the smallest.
- Save the Ball Sizes chart to share with families at the end-of-study celebration.

The Creative Curriculum® for Preschool, Guided Edition

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This is pages 44-45 of the Balls study.

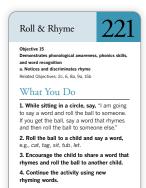
Arrival Time

When children arrive, the question of the day provides an immediate opportunity to practice mathematics skills. The teacher will return to the question of the day later to engage children in a conversation about their answers. In this example, the question of the day invites children to compare the sizes of objects and provides an opportunity to represent and analyze data.

> Prior to the day's first large-group meeting, children help take attendance in a The Creative Curriculum® classroom. This might look like an interactive attendance chart displayed at children's eye level or a space for children to sign in. Teachers are encouraged to individualize their interactions with children based on their understanding of children's knowledge, skills, and abilities.



Question of the Day: Which ball is bigger? (Display a tennis ball and a volleyball.) Vocabulary: circumference, measure Spanish: circunferencia, medir Mighty Minutes®: Mighty Minutes 221, "Roll & Rhyme"





Mighty Minutes® are short songs, chants, games, and rhymes to turn every transition and every moment into a meaningful opportunity to teach content such as mathematics and literacy.

Mathematics Objectives Covered:

22a. Measures objects 22c. Represents and

Large Group

Movin' Around

What You Do

Reach up high

Invite the children to perform the movements as you recite the chant.

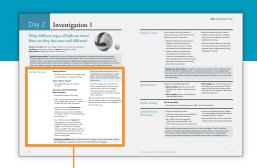
Then touch the ground. Spin your body 'round and 'round.

movements to incorporate into the chant, e.g., march in place, swing arms in the air, balance on one leg.

All day long, we go, go, go.

2. Ask the children to share new

When large group begins, the teacher uses a *Mighty Minutes** activity to engage the children. In this example, children practice counting. During large group, the teacher leads the children in a discussion and shared writing experience: in this example, they will be introduced to math vocabulary, explore shapes, and analyze data while engaging in meaningful conversations based on the question of the day and the study topic.



During this large group, *Mighty Minutes* 275, "Movin' Around," children will engage in sociodramatic play where they perform a chant about different body movements. Teachers then lead a discussion and shared writing activity about the circumference and measurment of balls in the classroom collection.

Large Group

Opening Routine

• Welcome the children to the large-group area and begin your opening routine.

Chant: "Movin' Around"

 Use Mighty Minutes 275, "Movin' Around."

Discussion and Shared Writing: Measuring Balls

- · Review the question of the day.
- Ask, "How do we know whether this ball is bigger than this one?" Invite the children to share their responses.
- Introduce the term circumference.
 Explain that circumference is the distance around an object. Add that knowing an object's circumference tells us how big it is.
- Say, "We are going to **measure** the circumference of a tennis ball and a volleyball to find out which one is the biggest." Use *Intentional Teaching Experience* M62, "How Big Around?," to measure the circumferences of the two balls. Write their circumferences on a sheet of chart paper.

Write the names of the balls prior to writing their circumferences on chart paper. Title the chart *Ball Sizes* and keep it for the children to add to during choice time.

After the activity, say, "Now that we have measured the circumference of the two balls, which ball is bigger?" Invite the children to compare the circumferences on the chart and share their responses.

Before transitioning to the interest areas, tell the children that they can measure the circumferences of balls in the collection in the Discovery area.

Including all children After asking which ball is bigger, support nonverbal children by inviting them to gesture or point to the ball they think is bigger.

Mathematics Objectives Covered:

20a. Counts 21b. Understands shapes 22c. Represents and analyzes data



Choice Time

During choice time, children explore interest areas. Interest areas include Blocks, Dramatic Play, Toys and Games, Discovery, Art, Library, and Sand and Water. Classrooms may also feature areas dedicated to Technology, Cooking, and Music and Movement.

For example, in the Block area, children may be invited to tally and count how many blocks are used to make a tower. In the Toys and Games area, a collection of marbles might be available for sorting and counting. In the Library area, story retelling props for *The Three Billy Goats Gruff* provide an opportunity for children to count, quantify, and explore spatial relationships.

In this example from the *Balls* study, children in the Discovery area measure the circumference of balls in the classroom collection and create a representative chart to record their findings. This activity also supports their understanding of shapes.



As you interact with the children in each interest area, make time to do the following in the Discovery area:

- Display the Ball Sizes chart, the ball collection, and the materials the children used to measure the balls' circumferences during large group.
- Support children to measure the circumferences of the balls in the collection. Encourage them to wrap a piece of string or yarn around the widest part of each ball and to cut the string where the two ends meet.

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- Move the chart to the floor. Ask the children to lay the pieces of string on top of the chart. Help them mark the length of each string.
- After the children determine the balls' circumferences, explain that they will compare those measurements during large-group roundup.

Guiding your observations As children measure and compare balls of different sizes, look for indicators of Objective 22, "Compares and measures." At the beginning of the school year, children should explore nonstandard measuring tools such as string and yarn before being introduced to standard measurement tools such as rulers and measuring tape.

Mathematics Objectives Covered:

21b. Understands shapes22a. Measures objects





Teachers can explore both Volume 2: Interest Areas and Volume 5: Mathematics to learn more about planning and facilitating mathematical learning opportunities during choice time.

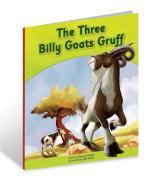
Read-Aloud

Reading aloud to children is one of the most important activities for reading and writing success, which are both critical to the development of mathematics skills.

Daily read-alouds leverage our Digital Children's Library; *Children's Book Collection*; and corresponding *Book Discussion Cards*, which provide strategies for teachers to effectively implement the repeated read-aloud approach, to ensure children are getting the most out of the literacy experience. The *Book Discussion Cards* offer teachers suggestions for before, while, and after reading, including how to introduce each book, emphasize vocabulary, discuss the characters, and ask complex questions that nurture mathematics skills development.

In this read-aloud, children will practice the mathematics skills of counting, quantifying, and measuring with *The Three Billy Goats Gruff*.





Read-Aloud

Read The Three Billy Goats Gruff.

- Before reading, show the cover of the book and ask, "What is the title of this book?"
- While reading, pause to let children fill in predictable phrases.
- After reading, ask, "How would you tell this story if you were the troll? What parts of the story would be the same as those we read together? What parts would be different?"

Mathematics Objectives Covered:

20a. Counts20b. Quantifies21a. Understands spatial relationships22a. Measures objects



First Read-Aloud

Before Reading

Introduce characters and the problem.

"This book is called *The Three Billy Goats Gruff*: Three billy goats named Gruff have eaten all the grass in their valley. There's more grass to eat on the other side of the river. But to get there, they have to cross a bridge—a bridge that is home to a hungry troll. Can the three billy goats figure out how to cross the bridge without getting eaten? Let's find out."

While Reading

Expand vocabulary by pointing to pictures, using gestures to dramatize, and describing:

valley, boulder, hooves, nervous, nubs, skin and bones, hideous, planks, trembled, gulp, wobbled, stomped

Comment on main characters' thoughts and actions.

- "Middle Billy Goat Gruff looks nervous and worried about not having enough to eat."
- "I wonder how Little Billy Goat Gruff plans to get all three of them past the troll."
- "I think Little Billy Goat Gruff's plan is very smart. He's tricking the troll into not eating him and his brothers. I wonder what Big Billy Goat Gruff will do when he meets the troll."
- "Little Billy Goat Gruff's plan worked. Each Billy Goat Gruff played an important part in the plan."

After Reading

Invite explanations, wonder aloud, and ask follow-up questions.

- "Why do you think Little Billy Goat Gruff's plan worked? Do you think he knew he could trick the troll?"
- "What do you think Middle or Big Billy Goat Gruff's plan would have been? What would you have done to get past the troll?"



Small Group

During small group, teachers use *Intentional Teaching Experiences* to engage small groups of children in adaptable activities focused on specific skills. Mathematics *Intentional Teaching Experiences* focus on specific mathematics objectives that are supported by the activity with embedded guidance for supporting all children.

In this example from the *Balls* study using *Intentional Teaching Experience* M80, "Pots & Pans Band," children will identify how a variety of pots, pans, bowls, spoons, and spatulas create different sounds. As they join the "band" and play different "instruments," the teacher will model different patterns and sounds the band can create. Children will hear the patterns emerge in the rhythm, tempo, and use of soft and loud sounds.

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Small Group

Pots & Pans Band

• Use Intentional Teaching Experience M80, "Pots & Pans Band."

Pots & Pans Band

4,4,4,4,4

M80

Music and Movement

Objective 23

Demonstrates knowledge of patterns Related Objectives: 2c, 3a, 7a, 8a, 11a, 34

What You Do

Materials: variety of pots, pans, and bowls; wooden spoons; plastic spatulas

- Show the children the pots, pans, wooden spoons, and plastic spatulas. Explain that you will use the materials to make music together as a band.
- "We have different kinds of pots and pans to make music with today. We are going to form a band and play the pots and pans together."
- 2. Demonstrate how you can use the spoons or spatulas to tap on the pots and pans to make different sounds.
- "Listen to the different sounds you can make. When I use the wooden spoon, it makes a lower sound than when I use the plastic spatula."
- Invite the children to choose their own materials and join you in the band.
- "Which pots or pans would you like to try first? You can test them out to see which sounds you like the most."
- 4. Model different patterns and sounds including different rhythms and tempos.
- "Listen to the pattern that I can make. It goes soft, soft, loud; soft, soft, loud."
- Give children an opportunity to create their own sounds and patterns for as long as they are interested.

English-Language Learners

- Model each action as you are describing it.
- Use the child's name and ensure that you have his full attention before asking him
 ...
- Name and touch each object as you introduce it.

Including All Children

- Offer a variety of materials to make music with.
- Cover the pots and pans with dishcloths or blankets to create a softer sound.
- Wrap foam around the handles of the wooden spoons or plastic spatulas to make them easier to grip.
- Offer items that make sounds when shaken, such as a plastic container with heads inside

Mathematics Objectives Covered:

23. Demonstrates knowledge of patterns





Watch "Drop, Pick-Up and Count," an Intentional

Teaching Experience focused on math in action.

Teaching Sequence

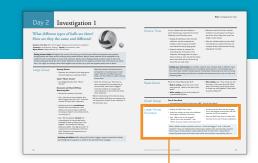
YELLOW	As the child bangs on the pots, draw his attention to the natural patterns that he is creating. "Ernie, listen to the pattern that you are making. It sounds like bomp [pause], bomp [pause], bomp [pause]."
YELLOW	While playing on the pots and pans together, ask the child to follow along with the patterns that you model for her. "Listen, these two pots make a different sound. I am going to tap on this one and then on that one. Can you tap along with me?"
GREEN	
GREEN	Challenge the child to copy your patterns while playing on the pots and pans. "Listen carefully so you can hear the pattern that I am making. Can you copy the pattern that you hear?"
BLUE	
BLUE	Invite the child to create his own simple pattern. Once he has established his pattern, join in and play the pattern together. "What pattern did you create with the pots and pans? I hear it; you are doing two fast beats and then one slow beat; fast, fast, slow; fast, fast, slow."
PURPLE	
PURPLE	Encourage the child to create longer, more complex patterns using different rhythms and different pots and pans.

Questions to Guide Your Observations

- What patterns of sound did the child
- How did the child use and share the pots and pans, spoons and spatulas with others? (3a)
- In what ways did the child use her hands to hold and manipulate the spoons or spatulas? (7a)

Large-Group Roundup

At the close of the day, the classroom community comes together to reflect on their learning. Teachers frequently use this time to reinforce mathematical concepts. For example, teachers might document children's discoveries from the day on chart paper and help them analyze the data.



In this large-group roundup from the *Balls* study, children are asked to analyze data gathered earlier in the day, comparing the lengths of lines to determine which classroom balls are the biggest or smallest.

Large-Group Roundup

- Display the Ball Sizes chart.
- Invite the children to look at the different line lengths marked on the chart.
- Ask, "Which line is the longest?,"
 "Which line is the shortest?," and
 "Which lines are close to the same size?
- Confirm that the ball with the longest line is the biggest and the ball with the shortest line is the smallest.
- Save the *Ball Sizes* chart to share with families at the end-of-study celebration.

When children answer questions such as "Is this ball bigger?" and "Is this ball smaller?," they use mathematical reasoning to explain how and why they reached their answer. Giving children ample opportunities to share their mathematical reasoning helps them build upon these skills and use them successfully later on.

Mathematics Objectives Covered:

22a. Measures objects
22c. Analyzes and represents data



Intentional Teaching Experiences

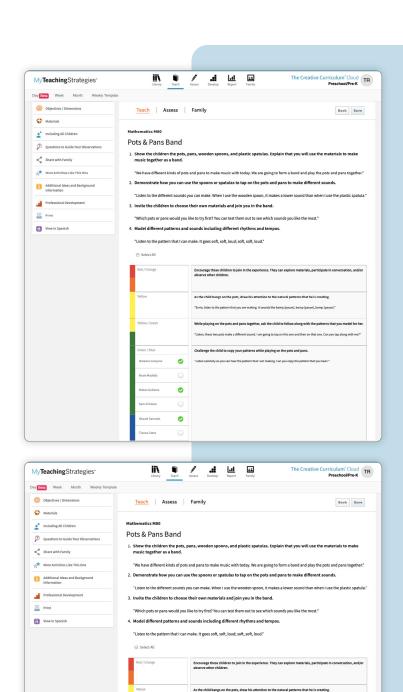
These engaging activities can be implemented throughout the day, whether during small group, large group, outdoor time, or in one-on-one experiences. *Intentional Teaching Experiences* are bilingual, offering content in English and Spanish, and



include Teaching Sequences to make it easy for teachers to individualize the experience for each child. Each *Intentional Teaching Experience* also identifies related objectives that are supported by the activity.

In addition to guiding individualized instruction, *Intentional Teaching Experiences* provide formative assessment opportunities. Guided observation questions help teachers easily gather documentation of children's mathematics learning while they are teaching, assess how children are progressing, and select the color-coded level for each child's demonstrated abilities.

The Creative Curriculum® Cloud automatically connects the GOLD® assessment data that a teacher gathers to her daily instructional resources—meaning that children's names will automatically appear alongside individualized guidance for each Intentional Teaching Experience based on the teacher's most recent assessment information. This automated link between assessment data and curricular Intentional Teaching Experiences creates an instantaneous and ongoing feedback loop so teachers can simultaneously lead an activity and add new observations with just a few taps on the screen. The future learning experiences she has planned will update for each child based on the new data. When curriculum and assessment are linked in this way, teachers can be confident that they're doing just what each child needs in order to be successful.



Digital Children's Library and Children's Book Collection

With over 200 titles in English and Spanish, our Digital Children's Library and *Children's Book Collection* allow teachers to choose from a variety of genres, including beloved classic tales; contemporary works by well-known authors; and original nonfiction books that support language, literacy, and social—emotional development.

The books are filled with illustrations and storylines that reflect the wide range of experiences of the diverse families and communities to which children belong. Our Digital Children's Library includes an interactive e-reader experience for families to create even more reading opportunities at home.





Ensure Mathematics Are Incorporated Throughout the Day, Every Day in Your Program

The Creative Curriculum* for Preschool ensures mathematics is a focus throughout the day, every day in preschool classrooms—not just at a defined time of day. Mathematics objectives are incorporated from the time children arrive to the time they depart, during large group, small group, a dedicated time for a read-aloud, and large-group roundup. Daily Resources, including Mighty Minutes*, Intentional Teaching Experiences, Book Discussion Cards**, and our Children's Book Collection, enable teachers to seamlessly incorporate mathematics learning into every day, throughout each day.











Ready to get started with *The Creative Curriculum®* for *Preschool?*Contact An Expert

