MATHEMATICS
KINDERGARTEN

EWING PUBLIC SCHOOLS
2099 Pennington Road
Ewing, NJ 08618

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Produced by: Don Wahlers, Supervisor &
Marna Lampe, Mathematics Coach

Michael Nitti
Superintendent

In accordance with The Ewing Public Schools' Policy 2230, Course Guides, this curriculum has been reviewed and found to be in compliance with all policies and all affirmative action criteria.

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The Ewing Public Schools' Math Vision

The Ewing Public Schools will deliver an instructional program in mathematics where students are actively engaged in the discovery of math concepts and are applying these concepts in ways that they find meaningful and relevant.

Ewing students will be mathematical thinkers who can reason, communicate and solve problems.

Ultimately, Ewing students will master and will be able to utilize these math concepts and skills throughout their lives.

Course Description and Rationale

In this kindergarten course in mathematics, students will begin with counting to learn and delve into the structure of our number system, uncovering and discovering patterns which they will utilize to develop visual images of quantities, compose and decompose numbers and begin to formulate strategies for the numerical operations of addition and subtraction with small numbers. Students will also investigate the characteristics and attributes of 2-dimensional and 3-dimensional shapes, collect and analyze data and explore ways to measure both the length and weight attribute of objects.

Students will use the following eight Mathematics Practices to demonstrate understanding of the mathematics process:

- Make sense of problems and persevere in solving them.
- Reason abstractly and quantitatively.
- Construct viable arguments and critique the reasoning of others.
- Model with mathematics.
- Use appropriate tools strategically.
- Attend to precision.
- Look for and make use of structure.
- Look for and express regularity in repeated reasoning.

This course is a year-long course that meets for 60 minutes per day. The course uses a constructivist approach to investigate relationships in math and this approach will be balanced with a level of practice needed to attain skill mastery. Throughout the course, students will be actively engaged in problem solving through reasoning. Students will be expected to communicate their reasoning and problem solving on a daily basis through written and verbal formats.

In the end, the goal of this course is to develop young mathematicians with the habits of mind enabling them to meet the vision shared above; enabling their future success in mathematics.

The course content is arranged into six units of study:

- Counting, Comparing, Combining and Composing Numbers
- Counting and Comparing
- Measuring and Counting
- 2-D and 3-D Geometry
- Addition, Subtraction and the Number System
- Data Analysis

21st Century Skills - During this course, students will work on developing, to an age appropriate level, the following 21st century skills:

Career Readiness Pathways:

- CRP4. Communicate clearly and effectively and with reason.
- CRP6. Demonstrate creativity and innovation.
- CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.
- CRP12. Work productively in teams while using cultural global competence.

Learning and Innovation Skills

Creativity and Innovation

Think Creatively

- Elaborate, refine, analyze and evaluate their own ideas in order to improve and maximize creative efforts

Work Creatively with Others

- View failure as an opportunity to learn; understand that creativity and innovation is a long-term, cyclical process of small successes and frequent mistakes

Critical Thinking And Problem Solving:

Reason Effectively

- Use various types of reasoning (inductive, deductive, etc.) as appropriate to the situation

Use Systems Thinking

- Analyze how parts of a whole interact with each other to produce overall outcomes in complex systems

Make Judgments and Decisions

- Effectively analyze and evaluate evidence, arguments, claims and beliefs
- Synthesize and make connections between information and arguments
- Interpret information and draw conclusions based on the best analysis

Solve Problems

- Identify and ask significant questions that clarify various points of view and lead to better solutions

Communication And Collaboration:

Communicate Clearly

- Articulate thoughts and ideas effectively using oral, written and nonverbal communication skills in a variety of forms and contexts
- Listen effectively to decipher meaning, including knowledge, values, attitudes and intentions
- Use communication for a range of purposes (e.g. to inform, instruct, motivate and persuade)
- Utilize multiple media and technologies, and know how to judge their effectiveness a priori as well as assess their impact
- Communicate effectively in diverse environments (including multi-lingual)

Collaborate with Others

- Assume shared responsibility for collaborative work, and value the individual contributions made by each team member

<u>Information, Media, and Technology Skills</u>

Informational Literacy

Access and Evaluate Information

- Evaluate information critically and competently

Use and Manage Information

- Use information accurately and creatively for the issue or problem at hand

<u>Life and Career Skills</u>

Social and Cross-Cultural Skills

Interact Effectively with Others

- Know when it is appropriate to listen and when to speak

Work Effectively in Diverse Teams

- Respond open-mindedly to different ideas and values

Be Responsible to Others

- Act responsibly with the interests of the larger community in mind

Technology Integration

8.1 Educational Technology

All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and create and communicate knowledge.

ELA Integration:

NJSLS.RI.K.1. With prompting and support, ask and answer questions about key details in a text.
NJSLS.RI.K.4. With prompting and support, ask and answer questions about unknown words in a text.
NJSLS.RI.K.7. With prompting and support, describe the relationship between illustrations and the text in which they appear (e.g., what person, place, thing, or idea in the text an illustration depicts).
NJSLS.RI.K.10. Actively engage in group reading activities with purpose and understanding.
NJSLS.SL.K.1. Participate in collaborative conversations with diverse partners about *kindergarten topics and texts* with peers and adults in small and larger groups.

A. Follow agreed-upon norms for discussions (e.g., listening to others with care and taking turns speaking about the topics and texts under discussion).
B. Continue a conversation through multiple exchanges.

NJSLS.SL.K.2. Confirm understanding of a text read aloud or information presented orally or through other media by asking and answering questions about key details and requesting clarification if something is not understood.
NJSLS.SL.K.3. Ask and answer questions in order to seek help, get information, or clarify something that is not understood.
NJSLS.SL.K.5. Add drawings or other visual displays to descriptions as desired to provide additional detail.
NJSLS.SL.K.6. Speak audibly and express thoughts, feelings, and ideas clearly.

Unit 1: Counting, Comparing, Combining and Composing Numbers (Pacing: 18 Days)

Why Is This Unit Important?

This is the first unit in this grade level. The goal for this unit is to establish a mathematical community. This unit introduces the processes, structures and materials that will be important features of math class this year. Students will also be introduced to routines common to what they will encounter in math class this year, such as taking attendance, using the calendar to track days and events, counting sets of objects, and collecting and discussing data. The big ideas embedded in this unit are:

- Number names and numerals are symbols used to describe quantity
- The base ten structure of the number system
- There is a one-to-one correspondence between equal groups
- Data can reveal trends not easily seen

Enduring Understandings:

- Developing strategies for accurately counting a set of objects by ones
- Sorting and classifying objects
- Carrying out a data investigation with a survey
- Manipulatives, drawings, tools and notation are used to show strategies and solutions

Essential Questions:

- What patterns do you see in our number line?
- What does a number stand for?
- What can we look at to help us separate objects into groups?
- What do you see when we look at the results of our survey?

Acquired Knowledge:

- Connecting number names, numerals and quantities
- Establishing one-to-one correspondence between equal groups (e.g., students and cubes)

Acquired Skills:

- Counting the number of students in the class
- Using the calendar to count days
- Developing strategies for accurately counting and keeping track of quantities up to the number of students in the class
- Creating an equivalent set
- Counting, creating and representing quantities

- Identifying attributes (e.g., color, size and shape) and developing language to describe them
- Comparing how objects are the same and different
- Finding objects that share one attribute
- Using attributes to sort a group of objects
- Collecting and keeping track of survey data
- Describing and comparing the number of pieces of data in each category
- Interpreting results of a data investigation
- Using the calendar as a tool for keeping track of time and events
- Representing quantities with pictures, numbers, objects, and/or words

Instructional Materials:

- Investigations in Number, Data and Space, for the Common Core Edition, Pearson Education, Inc.
- Investigations in Number, Data and Space, Manipulatives Kit for Grade K
- Investigations in Number, Data and Space, Cards Package for Grade K
- Everyday Counts Calendar Math
- Digiblocks

Differentiation:

Enrichments:

- During match up activities, have students choose one object and have them identify all other objects that match that one object for that attribute. The number of attributes matched to the object can also be increased.
- Students can experiment with alternative recording methods.

Supplements:

- Provide structure guidance during exploration activities.
- Provide guidance for students trying to match up exact matches only in match up activities.
- During match up activities, if students are struggling, help them focus on one attribute only.

Assessments:

Formative Assessments:

- Launch questions
- Group discussions:
  - Propose higher order questions
  - Present information to students and ask a question
  - Have students discuss their answers with their peers at their table and discuss together as a group
- Teacher observation of student work; anecdotal notes
- Homework

Summative Assessment:

- Observation Rubric on Initial Counting Skills

Benchmarks:

- 1st Quarter Mathematics Assessment
- Kindergarten End-of-Year Mathematics Assessment

Alternative Assessments:

- Teacher observation of student at work
- Performance-based tasks

List of Applicable New Jersey Student Learning Standards for Mathematics Covered in This Unit:

- NJSLS.K.CC.A.1, 3
- NJSLS.K.CC.B.4-5
- NJSLS.K.MD.B.3
- NJSLS.K.G.A.1-2
- NJSLS.K.MP 1-5, 7-8

Suggested Learning Experiences and Instructional Activities:

- Everyday Counts Calendar
- Attendance Routine
- Exploring Pattern Blocks
- Exploring Geoblocks
- Exploring Connecting Cubes
- Counting Around the Circle
- Calendar Routine
- Special Days on the Calendar
- Attendance Stick
- Exploring Color Tiles
- Exploring Attribute Blocks
- Exploring Buttons
- Counting Jar
- Button Match Up
- Attribute Block Match Up
- Labeled Attendance Stick
- Today's Question Routine
- Counting Jar: Recording
- Sorting People
- Sorting Attribute Blocks

Technology:

- Investigations 'Shapes' software
- A variety of Kindergarten interactive math sites: http://www.aaamath.com/kinder.htm#topic6
- 10 interactive kindergarten math sites: http://www.kidport.com/gradek/math/mathindex.htm
- PBS Parents site for kindergarten interactive games: http://www.pbs.org/parents/earlymath/prek_games.html
- Virtual Manipulatives and Games: http://nlvm.usu.edu/en/nav/topic_t_1.html

Classroom Routines:

- Developing strategies for counting accurately
- Considering whether order matters when you count
- Comparing quantities
- Using the calendar as a tool for keeping track of time
- Collecting, counting, representing, describing and comparing data

Unit 2: Counting and Comparing (Pacing - 25 Days)

Why Is This Unit Important?

This unit is the first of three number sense units designed to help the student develop ideas about counting and quantity, comparison, linear measurement, the composition of numbers, and the operations of addition and subtraction. The focus of this unit is to provide students with meaningful opportunities to develop their sense of numbers and quantities, to count and compare amounts and to measure objects by comparing them directly. The big ideas embedded in this unit are:

- A numeral represents a given quantity, a magnitude – cardinality
- A numeral has a position in the number sequence – ordinality
- There is a one-to-one correspondence among items in equal-sized groups
- Direct comparison between objects for some attributes, such as length, can help to better define length

Enduring Understandings:

- Developing strategies for accurately counting a set of objects by ones
- Developing the idea of equivalence
- Understanding the attribute length
- Developing an understanding of the magnitude and position of numbers
- Manipulatives, drawings, tools and notation are used to show strategies and solutions

Essential Questions:

- What are some things you can do so that your counting is correct, without mistakes?
- Which is easier counting forward or backwards? Why do you think that is?
- How can you tell if you have more, less, or the same?
- What is length?

Acquired Knowledge:

- Connecting number words, numerals and quantities
- Visual images for quantities
- Considering whether order matters when you count
- Language to describe and compare lengths (long, longer than, short, shorter than, the same, equal to)

- Language for comparing quantities (more, greater, less, fewer, most, least, fewest, same and equal to)

Acquired Skills:

- Accurately counting and keeping track of quantities up to 12
- Connect number words, numerals and quantities
- Developing visual images for quantities up to 6
- Counting backwards
- Creating an equivalent set
- Directly comparing two objects to determine which is longer
- Sorting objects into two categories according to length
- Describe and compare lengths (long, longer than, short, shorter than, the same, equal to)
- Comparing two (or more) quantities to determine which is more
- Comparing quantities (more, greater, less, fewer, most, least, fewest, same and equal to)
- Ordering quantities from least to most
- Representing quantities with pictures, numbers, objects, and/or words
- Using numerals to represent quantities
- Using a Ten-Frame to develop visual images of quantities up to 10

Instructional Materials:

- Investigations in Number, Data and Space for the Common Core Edition, Pearson Education, Inc.
- Investigations in Number, Data and Space, Manipulatives Kit for Grade K
- Investigations in Number, Data and Space, Cards Package for Grade K
- Everyday Counts Calendar Math
- Digiblocks
- Magnetic Ten Frames

Differentiation:

<u>Enrichments</u>:

- Counting quantities can be increased
- Students can experiment with other ways to record amounts other than the written numeral
- Students can work with larger quantities
- Students can compare for a variety of target (Fewer, more, most, least) as well as between a larger number of students, not just one-to-one comparisons

Supplements:

- Students may need physical proxies to aid with counting, this goes for static things being counted such as windows as well as something to tally counts such as stamps or stickers
- Students can work with smaller quantities
- Height towers for each number possibly compared to can be built and used
- Students struggling with ordering a number of towers can work with a smaller quantity of towers

Assessments:

Formative Assessments:

- Launch questions
- Group discussions:
  - Propose higher order questions
    - Present information to students and ask a question
  - Have students discuss their answers with their peers at their table and discuss together as a group
- Teacher observation of student work; anecdotal notes
- Homework
- Describe measurable attributes of objects such as length, weight and height.
- Describe several measurable attributes of a single object
- Understand the relationship between numbers and quantities; connect counting to cardinality
- Understands the last number stated tells the number of objects counted. This number of objects is the same regardless of rearrangement or the order they were counted in
- Understands that each successive number refers to a quantity that is one larger

Summative Assessment:

- Count a set of up to 10 objects in a scattered configuration
- Decide which of two objects is longer
- Directly compare two objects with a measurable attribute in common, to see which object has 'more of'/'less of' and describe the difference
- Compare two quantities up to 10 to see which is greater, lesser, or equal using matching and counting strategies
- When counting state number names in order pairing each object with only one number name

Benchmarks:

- 1st Quarter Mathematics Assessment
- Kindergarten End-of-Year Mathematics Assessment

Alternative Assessments:

- Teacher observation of student at work
- Performance-based tasks

List of Applicable New Jersey Student Learning Standards for Mathematics Covered in This Unit:

- NJSLS.K.CC. A.1,3
- NJSLS.K. CC.B.4-5
- NJSLS.K.CC.C.6-7
- NJSLS.K.MD.A.1-2
- NJSLS.K.MD.B.3
- NJSLS.K.G.A.1
- NJSLS.MP 1-5, 7-8

Suggested Learning Experiences and Instructional Activities:

- Making a Counting Book
- Grab and Count
- Counting Jar
- Roll and Record
- Pass It
- Build It
- Triple Match
- Inventory Bags
- Tic-Tac-Toe
- Using Towers to Compare
- Measuring Table
- Grab and Count: Compare
- Compare
- Longer/Shorter Hunt
- Making Name Towers
- Comparing Names
- Build A Monster
- Ordering Names
- Ordering Cards

Technology:

- A variety of Kindergarten interactive math sites: http://www.aaamath.com/kinder.htm#topic6
- 10 interactive kindergarten math sites: http://www.kidport.com/gradek/math/mathindex.htm
- PBS Parents site for kindergarten interactive games: http://www.pbs.org/parents/earlymath/prek_games.html
- Virtual Manipulatives and Games: http://nlvm.usu.edu/en/nav/topic_t_1.html

Classroom Routines:

- Developing strategies for counting accurately
- Considering whether order matters when you count
- Using the calendar as a tool for keeping track of time
- Collecting, counting, representing, describing and comparing data

Unit 3: Measuring and Counting (Pacing: 33 Days)

Why Is This Unit Important?

This unit is the second of three number sense units designed to help the student develop ideas about counting and quantity, comparison, linear measurement, the composition of numbers, and the operations of addition and subtraction. The focus of this unit is on using multiple non-standard units to measure length, begin exploring measuring the attribute weight, counting sets of objects, finding the total after a small amount is added to (or taken away from) a set of objects and figuring out what needs to be added to (or taken away from) a set in order to make a set of a given size. Students begin making sense of the operation of addition and subtraction as they act out stories and play games that involve combining or separating small amounts. Students also create a wide range of images for the quantities up to 10 by finding many different ways to arrange a set of square tiles. The big ideas embedded in this unit are:

- A numeral represents a given quantity, a magnitude – cardinality
- A numeral has a position in the number sequence – ordinality
- Combining sets of objects increase the total amount, whereas taking objects away decreases the amount
- Iterating units of measurement can be used to compare objects that cannot be directly compared

Enduring Understandings:

- Length is an attribute of distance that can be judged by using linear units of measurement
- Weight is an attribute of matter that can be judged by comparing objects
- Developing strategies for accurately counting a set of objects by ones
- Making sense of and developing strategies to solve addition and subtraction problems with small numbers
- Developing an understanding of the magnitude and position of numbers
- Use manipulatives, drawings, tools and notation to show strategies and solutions

Essential Questions:

- When you measured the same object more than once did you get the same amount for how long the object was? Why did the amounts measured differ (or not differ)? What could be done to get the same answer?
- When different people measured the same object did everyone get the same amount for how long the object was? Why did the amounts measured differ? What could be done to get the same answer?
- How can we determine which object has more weight?
- When objects are put together, what are the ways that can be used to figure out how many there are?
- When objects are taken away for a group, what are the ways that can be used to figure out how many are left?

Acquired Knowledge:

- Understanding what length is
- Strategies for measuring the length of an object
- Understanding what weight is
- Connecting number words, numerals and quantities
- Combining and separation
- Developing an understanding of more than and fewer than

Acquired Skills:

- Identifying the longest dimension of an object
- Comparing lengths of different objects
- Repeating multiple nonstandard units to quantify length
- Developing strategies for measuring the length of an object
- Comparing the weight of two objects
- Counting a set of objects and creating an equivalent set
- Connecting number words, numerals and quantities
- Keeping track of a growing set of objects
- Counting spaces and moving on a game board
- Creating a set of a given size
- Developing and analyzing visual images for quantities up to 10
- Finding the total after a small amount (1, 2, 3) is added to a set of up to 7
- Combining two amounts
- Modeling the action of combining and separating situations
- Separating one amount from another
- Adding or subtracting one to/from numbers up to 10
- Adding to or subtracting from one quantity to make another quantity
- Decomposing numbers in different ways
- Exploring combinations of a number (e.g., 6 is 3 and 3 and also 5 and 1)
- Developing an understanding of more than and fewer than
- Recording measurements with pictures, numbers, and/or words
- Using numbers to represent quantities and to record how many
- Using a Ten-Frame to develop visual images of quantities up to 10
- Recording an arrangement of a quantity

Instructional Materials:

- Investigations in Number, Data and Space for the Common Core Edition, Pearson Education, Inc.
- Investigations in Number, Data and Space, Manipulatives Kit for Grade K
- Investigations in Number, Data and Space, Cards Package for Grade K
- Everyday Counts Calendar Math
- Digiblocks
- Magnetic Ten-Frames
- Pan Balances

Differentiation:

Enrichments:

- Students can bring in shoe outlines from family members
- Students can use length units other than craft sticks, or measure their own chosen objects
- Work with larger numbers
- Allow game variations permitting students to split numbers making choices more challenging

Supplements:

- Let students make mistakes in how they measure! Note them for later discussion.
- Students can bring in shoe outlines from family members
- For students struggling counting beyond 10, help them use a number line
- If students are using a Ten-Frame haphazardly see if they can be guided into using it in a more organized way
- Students struggling with dot images can use counters
- Students struggling with counting, may benefit from creating an 'already counted' pile as they count
- Extra practice with 'Build It' and 'Build On'

Assessments:

Formative Assessments:

- Launch questions
- Group discussions:
  - Propose higher order questions
  - Present information to students and ask a question
  - Have students discuss their answers with their peers at their table and discuss together as a group
- Teacher observation of student work; anecdotal notes
- Homework
- Represent addition and subtraction with objects, fingers, mental images, drawings, sounds, acting out situations, verbal explanations, expressions, or equations

Summative Assessment:

- Measure the length of an object by lining up multiple units
- Count a set of up to 15 objects
- Figure out what is one more or one fewer than a number

Benchmarks:

- 2nd Quarter Mathematics Assessment
- Kindergarten End-of-Year Mathematics Assessment

Alternative Assessments:

- Teacher observation of student at work
- Performance-based tasks

List of Applicable New Jersey Student Learning Standards for Mathematics Covered in This Unit:

- NJSLS.K.CC.A.1, 3
- NJSLS.K.CC.B.4-5
- NJSLS.K.CC.C.6-7
- NJSLS.K.OA.A.1-4
- NJSLS.K.MD.A.1-2
- K.MD.B.3
- NJSLS.K.G.A.1
- NJSLS.MP 1-5, 7-8

Suggested Learning Experiences and Instructional Activities:

- How Long is Your Shoe?
- Measuring Shoes
- Counting Jar
- Measuring with Sticks
- Measuring with Cubes
- Heavier or Lighter?
- Comparing Weights
- Measuring Weights with Cubes
- Measuring weights with Bears
- Build It
- Grab and Count: Two Handfuls
- Collect 10 Together
- Build On
- Roll and Record 2
- Quick Images: Ten Frames
- Collect 15 Together
- Racing Bears
- Three Story Problems
- One More, One Fewer
- Show Me
- Double Compare
- Build It/Change It
- Six Tiles in All
- Quick Images: Square Tiles
- Arrangements of 5 to 10 Tiles
- Toss the Chips
- Quick Images in Pairs
- Choosing Favorite Arrangements

Technology:

- A variety of Kindergarten interactive math sites: http://www.aaamath.com/kinder.htm#topic6
- 10 interactive kindergarten math sites: http://www.kidport.com/gradek/math/mathindex.htm
- PBS Parents site for kindergarten interactive games: http://www.pbs.org/parents/earlymath/prek_games.html
- Virtual Manipulatives and Games: http://nlvm.usu.edu/en/nav/topic_t_1.html

Classroom Routines:

- Using the calendar as a tool for keeping track of time
- Developing strategies for counting accurately
- Considering whether order matters when you count
- Comparing quantities
- Collecting, counting, representing, describing and comparing data

Unit 4: 2-D and 3-D Geometry (Pacing: 33 Days)

Why Is This Unit Important?

Students entering Kindergarten bring with them a good deal of informal experience with geometry. Young children use their hands and eyes to interact with shapes and images. They develop an intuitive feeling for how these shapes and images are the same and different. The goal of this unit is to build upon students' experience to further develop their spatial sense and deepen their understanding of the 3 dimensional world they live on. The big ideas embedded in this unit are:

- 2-D shapes can be decomposed into other smaller 2-D shapes. Likewise 2-D shapes can be composed into a larger 2-D shape
- 3-D shapes can be decomposed into other smaller 3-D shapes. Likewise 3-D shapes can be composed into a larger 3-D shape
- The faces of a 3-D shapes are 2-D shapes
- Shapes are composed of attributes which can be used to sort, classify, compare and identify shapes.

Enduring Understandings:

- Describing, identifying, comparing and sorting 2-D and 3-D shapes
- Composing and decomposing 2-D and 3-D shapes

Essential Questions:

- Where do you see this 2-D shape out in the world?
- Where do you see this 3-D shape out in the world?
- In what ways are 2-D and 3-D shapes similar? How do they differ?

Acquired Knowledge:

- Language to describe and compare 2-D and 3-D shapes and their attributes
- Attributes of circles and rectangles
- Attributes of triangles and squares

Acquired Skills:

- Relating 2-D and 3-D shapes to real-world objects
- Describing the attributes of circles and rectangles
- Describing the attributes of triangles and squares
- Comparing the faces of different 3-D shapes and the faces of a single 3-D shape
- Constructing 2-D shapes
- Finding combinations of shapes that fill an area
- Constructing 3-D shapes
- Combining 3-D shapes to make a given 3-D shape

Instructional Materials:

- Investigations in Number, Data and Space for the Common Core Edition, Pearson Education, Inc.
- Investigations in Number, Data and Space, Manipulatives Kit for Grade K
- Investigations in Number, Data and Space, Cards Package for Grade K
- Everyday Counts Calendar Math
- Digiblocks

Differentiation:

Enrichments:

- Students can shape hunt for a composite of shapes.

Supplements:

- For 'shape hunt', students can bring the shape with them, while they search for it.

Assessments:

Formative Assessments:

- Launch questions
- Group discussions:
  - Propose higher order questions
  - Present information to students and ask a question
  - Have students discuss their answers with their peers at their table and discuss together as a group
- Teacher observation of student work; anecdotal notes
- Homework
- Describe the overall size, shape, function, and/or features of familiar 2-D and 3-D shapes

- Describe objects in their environment using names of shapes and describe their relative positions using terms such as above, below, beside, in front of, behind and next to
- Construct 2-D and 3-D shapes
- Model shapes in the world by building shapes from components (sticks and clay balls) and drawing shapes
- Make 2-D and 3-D shapes by combining shapes

Summative Assessment:

- Correctly name shapes regardless of their orientations or overall size
- Identify shapes as either 2 dimensional ('flat') or 3 dimensional ('solid')
- Analyze and compare 2-D and 3-D shapes, in different sizes and orientations, using informal language to describe their similarities, differences and parts (number of sides, vertices/'corners') and other attributes (having sides of equal length)

Benchmarks:

- 3rd Quarter Mathematics Assessment
- Kindergarten End-of-Year Mathematics Assessment

Alternative Assessments:

- Teacher observation of student at work
- Performance-based tasks

List of Applicable New Jersey Student Learning Standards for Mathematics Covered in This Unit:

- NJSLS.K.CC.A.1-2
- NJSLS.K.CC.B.4-5
- NJSLS.K.CC.C.6
- NJSLS.K.MD.B.3
- NJSLS.K.G.A.1-3
- NJSLS.K.G.B.4-6
- NJSLS.MP 1, 5, 7-8

Suggested Learning Experiences and Instructional Activities:

- Looking at 2-D Shapes
- Making a Shape Picture
- Exploring Pattern Blocks
- Exploring Geoboards
- Exploring Clay
- Shapes Software
- Making Clay Shapes

- Shapes on the Geoboard
- Pattern Block Pictures
- Making a Book of Shapes
- Shape Mural
- Shape Sort
- Attributes
- Making a Shape Family
- Pattern Block Puzzles
- Fill the Hexagons
- Counting Jar
- Where's Abe?
- Listen to Your Partner
- Listen and Do!
- Looking at 3-D Shapes
- Shape Hunt
- Exploring Geoblocks
- Copying Cubes
- Matching Faces
- Geoblock Match-Up
- Build a Block
- What's in the Bag?

Technology:

- Investigations 'Shapes' software
- Patch Tool http://illuminations.nctm.org/ActivityDetail.aspx?ID=27
- Cat in the Hat – The Great Shape Race
- http://pbskids.org/catinthehat/games/great-shape-race.html
- Shapes concentration
- http://illuminations.nctm.org/ActivityDetail.aspx?ID=73
- Sid the Science Kid - Shadow Show
- http://pbskids.org/sid/shadowshow.html

Classroom Routines:

- Developing strategies for counting accurately
- Considering whether order matters when you count
- Comparing quantities
- Counting forward and backward
- Using the calendar as a tool for keeping track of time
- Collecting, counting, representing, describing and comparing data

Unit 5: Addition, Subtraction and the Number System (Pacing: 41 Days)

Why Is This Unit Important?

This unit is the third of three number sense units designed to help the student develop ideas about counting and quantity, comparison, linear measurement, the composition of numbers, and the operations of addition and subtraction. The focus of this unit is on counting sets up to 20 objects, decomposing the numbers to 10 in a variety of ways, using numbers and notation to describe the arrangement of tiles and other addition situations and finding and exploring combinations of numbers. Students continue to develop an understanding of the operations of addition and subtraction as they act out, model and solve story problems and play games that involve combining or separating small amounts. The big ideas embedded in this unit are:

- A numeral represents a given quantity, a magnitude – cardinality
- A numeral has a position in the number sequence – ordinality
- Combining sets of objects increase the total amount, whereas taking objects away decreases the amount
- Decomposition and combination strategies can be used to determine changes in amounts during addition and subtraction.

Enduring Understandings:

- Developing strategies for accurately counting a set of objects by ones
- Making sense of and developing strategies to solve addition and subtraction problems with small numbers
- Using manipulatives, drawings, tools and notation to show strategies and solutions

Essential Questions:

- When objects are put together, what are the ways that can be used to figure out how many there are?
- When objects are taken away for a group, what are the ways that can be used to figure out how many are left?
- In what ways are addition and subtraction related?

Acquired Knowledge:

- Combining and separating

Acquired Skills:

- Developing and analyzing visual images for quantities up to 10
- Developing strategies for accurately counting and keeping track of quantities up to 20
- Using subsets to count a set of objects
- Counting spaces and moving on a game board
- Decomposing numbers in different ways
- Finding the total after 1, 2, or 3 is added to, or subtracted from, a set
- Combining two single-digit numbers, with totals to 20
- Modeling the action of combining and separating situations
- Separating one amount from another
- Developing strategies for solving addition and subtraction story problems
- Finding combinations of five and six
- Considering combinations of a number (e.g., 6 is 3 and 3 and also 5 and 1)
- Using numbers, and/or addition notation, to describe arrangements of objects, to record how many and to represent an addition situation
- Using numbers, pictures, and/or words to represent a quantity, measurement, or a solution to a problem

Instructional Materials:

- Investigations in Number, Data and Space for the Common Core Edition, Pearson Education, Inc.
- Investigations in Number, Data and Space, Manipulatives Kit for Grade K
- Investigations in Number, Data and Space, Cards Package for Grade K
- Everyday Counts Calendar Math
- Digiblocks
- Magnetic Ten-Frames

Differentiation:

Enrichments:

- At the end of the 'Toss the Chips' students can analyze the recorded results to determine all the combinations not rolled during the game
- Students can work with larger numbers

Supplements:

- In 'Race the Bears' students who are struggling adjust the rules so that they can end their turn at the tenth space without having to deal with the 'left-overs'
- Students may benefit from the use of a fifteen-frame

Assessments:

Formative Assessments:

- Launch questions
- Group discussions:
  - Propose higher order questions
  - Present information to students and ask a question
  - Have students discuss their answers with their peers at their table and discuss together as a group
- Teacher observation of student work; anecdotal notes
- Homework
- Count a set of up to 20 objects (including 0) arranged in a line, rectangular array, or a circle.
- When given a number from 1 to 20, count out that many objects
- Combine two small quantities
- Decompose numbers less than or equal to 10 into pairs in more than one way

Summative Assessment:

- Write the numbers up to 20 (including 0)
- Represent a set of up to 20 objects with a written numeral
- Compare two written numerals between 1 and 10
- Count to 100 by ones and tens
- Count forward beginning from a given number within the known sequence
- Solve addition and subtraction story problems within 10 by using objects or drawings
- For any number 1 to 9 find the number added to it that makes 10 using objects or drawings and representing the answer with a drawing or equation
- Fluently add and subtract within 5
- Compose and decompose numbers (using objects or drawings) from 11 to 19 as a ten and the correct amount of additional ones AND as ten ones and the correct amount of additional ones (the composition and decompositions should be recorded by drawing or equation)

Benchmarks

- 3rd Quarter Mathematics Assessment
- Kindergarten End-of-Year Mathematics Assessment

Alternative Assessments:

- Teacher observation of student at work
- Performance-based tasks

List of Applicable New Jersey Student Learning Standards for Mathematics Covered in This Unit:

- NJSLS.K.CC.A.1-3
- NJSLS.K.CC.B.4-5
- NJSLS.K.CC.C.6-7
- NJSLS.KOA.A.1-5
- NJSLS.K.NBT.A.1
- NJSLS.K.MD.A.1
- NJSLS.K.MD.B.3
- NJSLS.MP 1-5, 7-8

Suggested Learning Experiences and Instructional Activities:

- Quick Images: Square Tiles
- Six Tiles in All
- Going Bananas
- Toss the Chips
- Arrangements of 5 Through 10 Tiles
- 'SUM'oning FIVES
- The Counting Jar
- Racing Bears
- Class Book
- Collect 15 Together
- Inventory Bags
- Collect 20 Together
- Measuring Ourselves
- Race to 20
- Roll and Record 3
- Make 10 Go Fish
- Acting Out Story Problems
- Double Compare
- Build and Remove
- How Many Balls
- How Many Grapes
- How Many Blocks
- 5 Crayons in All
- Dropping Pennies
- Combinations of Six
- Totals of Six
- Six Crayons in All
- Teddy Bear Picnic
- Toss 10 chips
- How Many to 10?
- Build It: Teen Numbers
- Roll and Record: The Teen Numbers

Technology:

- A variety of Kindergarten interactive math sites: http://www.aaamath.com/kinder.htm#topic6
- 10 interactive kindergarten math sites: http://www.kidport.com/gradek/math/mathindex.htm
- PBS Parents site for kindergarten interactive games: http://www.pbs.org/parents/earlymath/prek_games.html
- Virtual Manipulatives and Games: http://nlvm.usu.edu/en/nav/topic_t_1.html

Classroom Routines:

- Developing strategies for counting accurately
- Considering whether order matters when you count
- Comparing quantities
- Counting forward and backward
- Using the calendar as a tool for keeping track of time
- Collecting, counting, representing, describing and comparing data

Unit 6: Data Analysis (Pacing: 22 Days)

Why Is This Unit Important?

Collecting, representing and interpreting information are ongoing activities in our daily lives. In today's world, these activities are vital to understanding events and making decisions Young students' curiosity make them avid collectors of materials and information. Working with data builds on their desire to know about their world and the people in it. In this unit, students count, compare, sort and represent information.

The big idea embedded within this unit is:

- Data can reveal trends not easily seen

Enduring Understandings:

- Developing strategies for accurately counting a set of objects by ones
- Representing data
- Sorting and classifying
- Carrying out a data investigation

Essential Questions:

- What did you find? Explain how you know?

Acquired Knowledge:

- Seeing the one-to-one correspondence between a set of data and a representation of this data set
- Attributes of an object
- Commonality of attributes

Acquired Skills:

- Counting and keeping track of quantities
- Matching sets with a one-to-one correspondence
- Working with two-to-one correspondence
- Counting by groups of 2
- Making a representation of a set of data
- Identifying the attributes of an object
- Identifying an attribute that is common to several objects
- Comparing how objects are the same and different
- Using attributes to sort a set of objects
- Grouping data into categories based on similar attributes
- Sorting a set of objects or data in different ways
- Choosing a survey question with two possible responses
- Collecting and keeping track of survey data

- Interpreting results of a data investigation
- Using data to solve a problem

Instructional Materials:

- Investigations in Number, Data and Space for the Common Core Edition, Pearson Education, Inc.
- Investigations in Number, Data and Space, Manipulatives Kit for Grade K
- Investigations in Number, Data and Space, Cards Package for Grade K
- Everyday Counts Calendar Math
- Digiblocks
- Magnetic Ten-Frames

Differentiation:

Enrichments:

- Increase the rigor of the task. For example, instead of the number of eyes in the class, it could be the number of eyes in all the students' homes.

Supplements:

- If the class size is large, allow the students to use counters to help them total or split the class into two groups to look at (boys and girls?).
- Students can organize the objects into groups and then record how many for each group once their separated.

Assessments:

Formative Assessments:

- Launch questions
- Group discussions:
  - Propose higher order questions
  - Present information to students and ask a question
  - Have students discuss their answers with their peers at their table and discuss together as a group
- Teacher observation of student work; anecdotal notes
- Homework
- Sort a set of objects according to their attributes

Summative Assessment:

- Represent a set of data
- Use data to solve a problem
- Classify objects into given categories; count the number of objects in each category and sort the categories by count

Benchmarks:

- Kindergarten End-of-Year Mathematics Assessment

Alternative Assessments:

- Teacher observation of student at work
- Performance-based tasks

List of Applicable New Jersey Student Learning Standards for Mathematics Covered in This Unit:

- NJSLS.K.CC.A.1-2
- NJSLS.K.CC.B.4-5
- NJSLS.K.CC.C.6
- NJSLS.K.MD.B.3
- NJSLS.MP 1-4, 7- 8

Suggested Learning Experiences and Instructional Activities:

- How Many Are We?
- Pattern Block Grab
- Counting Jar
- How Many Eyes
- Counting Chairs
- Eyes at Home
- Counting Fingers
- Sorting People
- Self Portraits
- Sorting Portraits
- Attribute Match Up
- Attribute Train Game
- Same or Different
- Boxes, Bottles and Cans
- Triplets
- Attribute Dominoes
- Lunch Food Data Activity
- 'Do You Like…' Surveys
- How Many Are Here Today?

Technology:

- A variety of Kindergarten interactive math sites: http://www.aaamath.com/kinder.htm#topic6
- 10 interactive kindergarten math sites: http://www.kidport.com/gradek/math/mathindex.htm
- PBS Parents site for kindergarten interactive games: http://www.pbs.org/parents/earlymath/prek_games.html
- Virtual Manipulatives and Games: http://nlvm.usu.edu/en/nav/category_g_1_t_5.html

Classroom Routines:

- Developing strategies for counting accurately
- Considering whether order matters when you count
- Comparing quantities
- Counting forward and backward
- Using the calendar as a tool for keeping track of time
- Collecting, counting, representing, describing and comparing data

Sample Standards Integration

21st Century Skills & Career Readiness Practices

CRP4. Communicate clearly and effectively and with reason.

For example in Unit 5, students will explain their counting strategies during activities such as Collect 20 Together and Inventory Bags; students must explain their thinking about moving from a counting-all to a counting-on strategy and justify why both strategies work.

CRP6. Demonstrate creativity and innovation.

For example in Unit 6, students will create self-portraits that include important attributes using a variety of materials so that they can later sort these creations by common characteristics.

CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.

For example in Unit 5, students will model the action of combining and separating items when solving problems during the *How Many Blocks?* activities. Students will also work to make sense of situations that may have more than one solution, such as those in the *Five Crayons in All* activities.

CRP12. Work productively in teams while using cultural global competence.

For example in Unit 6, students will work in teams to design a survey question, collect data, and present what they learned from the data to the class.

8.1 Educational Technology

All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and create and communicate knowledge.

For example throughout Unit 4 students will access, manage, evaluate, and synthesize information to explore models for geometric shapes, manage their manipulation, combine figures to make new shapes, and explore the properties of the composed shapes.

Interdisciplinary Connections

NJSLS.RI.K.1. With prompting and support, ask and answer questions about key details in a text.
NJSLS.RI.K.4. With prompting and support, ask and answer questions about unknown words in a text.

NJSLS.RI.K.7. With prompting and support, describe the relationship between illustrations and the text in which they appear (e.g., what person, place, thing, or idea in the text an illustration depicts).
NJSLS.RI.K.10. Actively engage in group reading activities with purpose and understanding.

These standards are met throughout the course. For example in Unit 1, students will discuss literature such as *Count the Ways, Little Brown Bear* to explore concepts related to counting. Students will engage in discussion about the text and its connection to relevant math concepts. They will create and illustrate their own counting books and share them with classmates.

NJSLS.SL.K.1. Participate in collaborative conversations with diverse partners about *kindergarten topics and texts* with peers and adults in small and larger groups.

- **A. Follow agreed-upon norms for discussions (e.g., listening to others with care and taking turns speaking about the topics and texts under discussion).**
- **B. Continue a conversation through multiple exchanges.**

NJSLS.SL.K.2. Confirm understanding of a text read aloud or information presented orally or through other media by asking and answering questions about key details and requesting clarification if something is not understood.
NJSLS.SL.K.3. Ask and answer questions in order to seek help, get information, or clarify something that is not understood.
NJSLS.SL.K.5. Add drawings or other visual displays to descriptions as desired to provide additional detail.
NJSLS.SL.K.6. Speak audibly and express thoughts, feelings, and ideas clearly.

These standards are met throughout the course. For example in Unit 2, students will discuss literature such as *Anno's Counting Book* or *Zero the Hero* to explore concepts related to counting. Students will engage in discussion about the text and its connection to relevant math concepts. They will create and illustrate their own counting books and share them with classmates.