

Flemington-Raritan School District Mathematics Curriculum Grades K-6

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Mathematics Curriculum Grades K-6

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Flemington-Raritan School District
Mathematics Curriculum

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Flemington-Raritan School District

District Mission Statement

The Flemington-Raritan Regional School District provides our students with an exceptional education, empowering them to become problem solvers, collaborators and critical thinkers. The district creates a culture in which students act responsibly and communicate effectively in preparing to become productive citizens in a changing, global society.

It is the expectation of the Flemington-Raritan School District that all pupils achieve the New Jersey Core Curriculum content Standards at all grade levels.

Philosophy

The Grades K-6 Mathematics Curriculum is based on the belief that all students can learn mathematics. The mathematics program develops each child's mathematical reasoning in understanding the big ideas (concepts) of mathematics. The program sets high benchmarks and expectations for students to effectively express mathematical content, process, and skills through verbal and written communication.

The use of technological tools is a vital component of the program, not only to enhance the understanding of concepts, but an important tool used in the adult world to access and analyze real world data.

In accordance with the above beliefs, the program includes a comprehensive range of content in a variety of contexts. The program integrates skills, concepts, and applications based on the 2004 New Jersey Core Curriculum Content Standards for Mathematics, providing each student the opportunity to become an active participant in his/her mathematical education. Students explore the beauty of mathematics with confidence, with the aim to become a generation of mathematically literate adults.

The grades K-6 mathematics program is built on developmentally appropriate practice for elementary school students:

- All students can learn and understand mathematics;
 - Students construct their own meaning based on prior experience;
 - Learning occurs in social situations;
 - Learning is tied to contextual, real-world situations;
 - Learning involves numerous strategies involving higher order thinking skills.
- Students continually reflect on the following question: "Does this make sense?"

The 21st Century Learning and Thinking Skills are an integral part of the K-6 mathematics program including:

- Critical Thinking and Problem Solving Skills
- Communication Skills
- Creativity and Innovation Skills
- Collaboration Skills
- Information and Media Literacy Skills
- Contextual Learning Skills

2004 New Jersey Core Curriculum Content Standards . Mathematics

The 2004 New Jersey Core Curriculum Content Standards contain Specific Cumulative Progress Indicators for each grade and the Mathematics Curriculum for grades K-6 reflects the relevant cumulative progress indicators. There are five standards altogether, each of which has a number of lettered strands. These standards and their associated strands, are enumerated below:

4.1 Number and Numerical Operations

- A. Number Sense
- B. Numerical Operations
- C. Estimation

4.2 Geometry and Measurement

- A. Geometric Properties
- B. Transforming Shapes
- C. Coordinate Geometry
- D. Units of Measure
- E. Measuring Geometric Objects

4.3 Patterns and Algebra

- A. Patterns
- B. Functions and Relationships
- C. Modeling
- D. Procedures

4.4 Data Analysis, Probability, and Discrete Mathematics

- A. Data Analysis (Statistics)
- B. Probability
- C. Discrete Mathematics -- Systematic Listing and Counting
- D. Discrete Mathematics -- Vertex-Edge Graphs and Algorithms

4.5 Mathematical Processes

- A. Problem Solving
- B. Communication
- C. Connections
- D. Reasoning
- E. Representation
- F. Technology

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Program Description

The curriculum emphasizes a balance between hands-on, inquiry based problem solving and traditional mathematical computation and arithmetic. Teachers focus on making connections between facts and fostering new understanding in students, and tailor their teaching strategies to student responses, encouraging students to analyze, interpret, and predict information. Teachers also rely heavily on open-ended questions and promote extensive dialogue among students through cooperative learning strategies.

Assessment consists of teacher made-quizzes, tests, teacher observations, students' responses, students' projects, students' daily work, district wide and state wide testing. In practice, assessment is ongoing and serves to provide feedback to students and to inform instruction. Teachers use a variety of assessment techniques, both quantitative and qualitative, to assess student development in the areas of mathematical conceptual understanding, mathematical procedures, and mathematical process. Multiple choice, short answer, and open-ended responses requiring written explanations are all components of the ongoing assessments in the classroom.

In grades K-5 all students are grouped heterogeneously and provided with differentiated math instruction within their classrooms. Additional support, as in teacher push-in, small group instruction, and/or special programs, is provided to those students who meet district criteria. A Gifted and Talented Mathematics Program begins in third grade. In grade 6 students are grouped homogeneously by ability and achievement in math. Various district wide tests, teacher recommendation, and student performance are considered when placing students for mathematics.

Mathematics textbooks, support materials, and teacher instruction are modified according to the different needs of students in order for students to meet the New Jersey Core Curriculum Standards for each grade level. Continual assessment and reflection upon student work and achievement drives instruction. All student data, performance and achievement are constantly monitored in order to move students forward to their fullest mathematical potential. Placement procedures include not only student ability and achievement in concepts and computation, but also the ability to work independently at an accelerated pace.

The following courses and textbooks are used in grades K-6 mathematics classes:

Level	Textbook
Grades K-6	Everyday Mathematics
Algebra IA	Discovering Algebra

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Calculator Philosophy

The Flemington-Raritan mathematics program believes that calculators are a vital component of the mathematics program.

The following rationale from Texas Instruments covers many of the advantages of using calculators, as outlined by the NCTM and the 2004 New Jersey Core Curriculum Standards.

Calculators are valuable educational tools that allow students to reach a higher level of mathematical power and understanding. By reducing the time that, in the past, was spent on performing tedious paper-and-pencil arithmetic and algebraic algorithms, calculator use today allows students and teachers to spend more time developing mathematical understanding, reasoning, number sense, and applications. They afford students learning tools that complement, but do not replace, mental and paper-and-pencil skills, and they expand students' ability to solve problems by providing multiple solution techniques.

Calculator technology allows students who would ordinarily be frustrated or bored by tedious manipulations to have access to the real mathematics itself, thus gaining a higher level of mathematical understanding, rather than giving up. The fact is, calculators are better tools to do some of the computations and manipulations that were once done with paper and pencil. In the past, paper and pencil were the only tools available. Appropriate use of technology and associated pedagogy will get more students thinking and reasoning mathematically. Thus more students will develop useful mathematical understanding and mathematical power.

Despite all of their benefits and capabilities, calculators will never be able to replace the human mind when it comes to knowing how to read and understand a problem situation, writing an appropriate equation for the problem, choosing which operations to use to solve the problem, correctly interpreting the solution displayed on the calculator, and determining the appropriateness of the answer. Calculators are only as effective as the information students enter into them. Calculators, in conjunction with mental, paper-and-pencil, and estimation skills when appropriate, comprise the tools to help students work through the computations and manipulations necessary for solving problems. Calculators are like computer word processors to English students. Computer word processors do not "create" essays but they do facilitate the creation of an essay. Calculators do not "understand" mathematics but they do facilitate the understanding of mathematics. Despite all of their capabilities, however, they will never replace the important, complex thought processes of which only humans are capable.

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Kindergarten Math Pacing Guide

SEPTEMBER	*Everyday Kindergarten Math (EKM)	FEBRUARY	Unit 1: 1-11 Unit 2: 2-8 Unit 3: 3-8; 3-11 Unit 6: 6-1; 6-2; 6-7 Unit 7: 7-1; 7-5 Unit 8: 8-7
	Unit 1: Activities 1-1 thru 1-10; 1-12,1-14		
OCTOBER	Unit 2: Activities 2-1 thru 2-7; 2-9; 2-13 thru 2-16 Unit 3: Activity 3-1 (numeral writing may vary in pacing sequence depending on class make-up and pre-requisite);3-1 4 Unit 4: Activities 4-10 *Developing Number Concepts – Chapter 1	MARCH	Unit 3: 3-7 Unit 5: 5-7; 5-11; 5-12 Unit 6: 6-3; 6-6; 6-9 thru 6-12; 6-14; 6-16 *Developing Number Concepts – Chapter 3
NOVEMBER	Unit 3: Activities 3-3 thru 3-6; 3-9 thru 3-12; 3-15 Unit 4: 4-13; 4-14 Unit 5: 5-3; 5-1 *Developing Number Concepts – Chapter 2	APRIL	Unit 7: 7-6 thru 7-7 thru 15 Unit 8: 8-5; 8-6 *Developing Number Concepts – Chapter 2
DECEMBER	Unit 2: Activities 2-10 thru 2-12 Unit 3: 3-16 Unit 4: 4-2; 4-3; 4-5;4-6 *Developing Number Concepts – Chapter 2	MAY	Unit 6: 6-4; 6-13 Unit 8: 8-2; 8-3; 8-9 thru 8-14
JANUARY	Unit 4: Activities 4-1; 4-4; 4-7; 4-8; 4-11; 4-12; 4-15 4-16 Unit 5: 5-2; 5-4; 5-5; 5-8; 5-9; 5-15; 5-16 Unit 8: 8-4*Developing Number Concepts – Chapter 2	JUNE	Review of concepts where needed or “catch-up” month

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Grade: Kindergarten

Standard 4.1 Number and Numerical Operations

Essential Question: How can problems in the real world be solved with mathematics?

How can estimation be useful to us?

How do numbers help us reason out solutions to problems?

How do basic operations help us understand numbers?

Knowledge/Skills/Understandings	Assessments	Learning Experiences	Resources
A. Number Sense			
1. Use real life experiences, physical materials, and technology to construct meaning for numbers.	Observation of students exploration with manipulatives Oral assessment Mid Year/End of Year Assessments	"Look and Find" (Numbers 1 -10) Egg-Carton Mathematics	<i>Everyday Math: Teacher's Guide</i>
* Demonstrates understanding of one-one correspondence. (e.g., places one placement at each place, gives each child one cookie, places one animal in each trunk, hands out manipulatives to be shared with a friend saying "One for you, one for me.") (Preschool)		Listen and Count	<i>Everyday Math: Teacher's Guide</i>
*Verbally counts 20 or more objects in a random arrangement.	Mid-Year and Final: One-to-One Correspondence to 20	Teacher number cards Act. Making Towers Grow and Shrink Creations Unifix Cubes Digi-Blocks	<i>Everyday Math: Teacher's Guide</i> <i>Developing Number Concepts: Counting, Comparing, and Pattern</i> , Kathy Richardson
*Identifies small numbers without counting.	Final: Subitizing with Finger Patterns	Finger Counting Say-It Fast Cards High Roller game	<i>Everyday Math: Teacher's Guide</i> <i>Developing Number Concepts: Counting, Comparing, and Patterns</i> , Kathy Richardson

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<i>*Performs verbal counting to 100.</i>	Mid-Year and Final: Forward counting 1...to 100	Interrupted skip counts Listen and Do Number line Interrupted Counts (0-50) Number Hunt and 100 chart Games on 100 Chart	<i>Everyday Math: Teacher's Guide</i>
<i>*Count with calculator using the repeat key.</i>	Monitor correct use of calculator	Counting and Calculators Calculator Displays Counting with Calculators Counting Shortcut	<i>Everyday Math: Teacher's Guide</i> <i>Everyday Math: Teacher's Guide</i>
<i>*Expose to ordinal numbers and terminology</i>		Ordinal Numbers: Standing in Line	
(Preschool) <i>*Reads any number, 30 or less.</i>	Teacher Observation Mid-Year and Final: Numeral Identification to 30	<i>EM Activity:</i> Monthly Calendar Number Board Teen Partner Game Monster Squeeze Game EM Game: Top It Teen Number Spin	<i>*Learn to say counting numbers.</i> <i>Everyday Math: Teacher's Guide</i>
2. Demonstrate an understanding of place value concepts.		Making a concrete number count collection	<i>Everyday Math: Teacher's Guide</i>
*Recognizes and names some written numerals. Oral assessment (Preschool) <i>*Understands teen numbers in terms of 10's and 1's.</i> Student participation in whole class discussion		Teen Partner Game Listen and Do (10-20) Digit Game Double Digit Dice Game	<i>Everyday Math: Teacher's Guide</i> <i>Everyday Math: Teacher's Guide</i>

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**Writes numerals 0 -10.*

**Reads and writes numbers, 100 or less.*

Final: Writes numerals 0 -
10, randomly.
Oral / Slate Assessments

Slate writing activities
Number Books: Writing 0 -
10
Number Hunt and 100
Chart
Preparation for 100 Day
100 Number Grids
Double Digit Dice Game
Class Collection Project
(100 poster)
Writing on Backs
Spin a number (1 -10)
Interrupted Skip Counts (0 -
50)
Number Grid
Say the Next Number by
1 0s
Countdown
Counting Backwards with /
without calculators
Say the Next Number

Everyday Math: Teacher's Guide
Developing Number Concepts: Counting,
Comparing and Pattern, Kathy Richardson
Teacher Number Cards Activities

**Counts backwards from 10.*

**Counts backwards from 22.*

Mid-Year and Final:
Counting Backwards 10 -
0

Everyday Math: Teacher's Guide

**Counts by 10's to 100. *Counts by 5's. *Counts by
2's.*

Final: Skip Counts by 10's Skip count by 10's
Counting on calculators
Say the Next Number by
10s Introduction to Skip
Counting by 2's
Count Fingers by 5's
Count using tally marks
Count to 70 by 10s

Everyday Math: Teacher's Guide

**Introduce concept of zero*

Oral discussion

Everyday Math: Teacher's Guide

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3. Understand that numbers have a variety of uses

****Discriminates numbers from other symbols in the environment (e.g., street signs, license plates, room number, clock, etc.) (Preschool)***

Teacher observation

Everyday Math: Teacher's Guide

****Recognizes many non-computational uses of numbers through daily experiences***

Teacher observation

Attendance Routine
Recording daily
temperature Weather Chart
Divide Groups into Half
Groups

Everyday Math: Teacher's Guide

****Demonstrates an understanding of simple fractions. ($\frac{1}{2}$, $\frac{1}{4}$)***

Teacher observation

4. Count and perform many simple computations with coins

****Spontaneously counts for own purposes (e.g., counting blocks or cars, counting beads while stringing them, handing out napkins). (Preschool)***

Teacher Observation

Counters, "real" objects

Everyday Math: Teacher's Guide
ongoing activities throughout the year

****Recognizes and names penny, nickel, and dime.***

****Knows the value of a penny, nickel and dime.***

****Recognizes a quarter.***

Ongoing informal Teacher
assessment
Observation of student
while interacting with
coins during play

Coins in the Classroom
Matching Coin Game
Exploring the Penny
Using the cent sign
Introduction of nickel and
dime
Coin Sorting
Coin Dice
Comparing Coins by Feel

Everyday Math: Teacher's Guide
Portrait of Lincoln (Link with Social Studies)

****Record counted money amount using cents symbol***

Oral assessment of cents
label

Informally introduce the
cents symbol as a label

Everyday Math: Teacher's Guide

****Use equivalency for money amounts-
pennies/nickels/dimes***

Oral assessments

Play Store

Everyday Math: Teacher's Guide

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<i>*Introduce the one-dollar bill</i>	Observation of students during play	Use play money	<i>Everyday Math: Teacher's Guide</i>
<i>*Introduce the ten dollar bill</i>	Observation of students during play		<i>Everyday Math: Teacher's Guide</i>
5. Compare and order whole numbers.	Observation of student during play	Playing cards EM: Top -It Game Reading and Comparing Numbers Ascending and Descending Order	<i>Everyday Math: Teacher's Guide</i>
<i>*Compares numbers in different contexts (e.g., using words such as more and less). (Preschool)</i>	Teacher Observation	Counters, Number line EM Game: Monster Squeeze	<i>Everyday Math: Teacher's Guide</i>
<i>*Sequence low to high.</i>	Mid-Year and Final: Ordering Numerals Final: Number After and Number Before	Give the Next Number Children's Number Cards Partner Match Ordinal Numbers: Standing in Line Reading and Comparing Numbers	<i>Everyday Math: Teacher's Guide</i>

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B. Numerical Operations

1. Developing the meaning of addition and subtraction by concretely modeling and discussing a large variety of problems...

Student-teacher
interviews

Number stories throughout
the year
Provide opportunities for
experiences with multiple
number stories throughout
the year, develop meanings
for operations and problem
solving skills
Disappearing Train
Plus or Minus game
"What Number Am I
thinking Of?"
High Roller Game

Everyday Math: Teacher's Guide

***Joining, separating and comparing.**

Oral / Slate assessment

Draw pictures, use models,
manipulatives, counting
objects
Joining Objects

Everyday Math: Teacher's Guide

****Add two groups of concrete objects by counting the total (e.g., three blue pages, three yellow pages, six pegs altogether). (Preschool)***

Teacher Observation

Number line Mathematics
Change to More number
stories
Dice Addition

Everyday Math: Teacher's Guide

****Subtracts one group of concrete objects from another by taking away and then counting the remainder (e.g., "I have four carrot sticks. I'm eating one! Now I have three!"). (Preschool)***

Oral communication with
teacher

Change to Less number
stories

Everyday Math: Teacher's Guide

****Understands equivalent expression as two or more different expressions of the same number.***

Teacher Observation

Dominoes Name
Collections
Bead String
Name Collection
Craft Stick Name Collection

Everyday Math: Teacher's Guide
Developing Number Concepts: Counting,
Comparing and Pattern, Kathy Richardson

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**Developing the basic meaning of addition and subtraction in real situations, in children's own number stories, oral problems, concrete objects and number lines.*

Teacher Observation

Joining Objects
Change to Less
Pocket Game
Disappearing Train
High Roller
What Number Am I
Thinking of?

*Everyday Math: Teacher's Guide
Developing Number Concepts: Counting,
Comparing and Pattern, Kathy Richardson*

**Participates in solving oral number stories.*

Oral assessment
Student sharing of own
stories and solutions

Number Stories throughout
the Year

Everyday Math: Teacher's Guide

**Divide even groups in half* Observation of student
while exploring task with
manipulatives

Divide Groups into Half
Groups use manipulatives

Everyday Math: Teacher's Guide

3. Develop proficiency with basic addition and subtraction number facts using a variety of strategies.

**Develop proficiency with basic addition using the strategy of counting on.*

**Explore counting one more or one less)*

Oral / Slate Assessment

High Roller
Top It

One More or One less

Everyday Math: Teacher's Guide

*Developing Number Concepts: Counting,
Comparing, and Pattern, Kathy Richardson*

C. Estimation

1. Judge without counting whether a set of objects has less than, more than, or the same number of objects as a reference set.

**Determines which of two groups is more and which is less.*

Final: Weather Graph

More or Less Activities
(DNC) Stack, Tell, Spin and Win

*Everyday Math: Teacher's Guide
Developing Number Concepts: Counting,
Comparing, and Pattern, Kathy Richardson*

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3. Explore a variety of strategies for estimating quantities.

Explore ways to develop strategies for estimating

Everyday Math: Teacher's Guide

****Uses estimation as a method for approximating an appropriate amount (e.g., at snack time, deciding how many napkins to take from a large pile for the group, determining number of blocks to use when building a structure). (Preschool)***

Teacher Observation

Estimation Activities

****Estimates comfortably, using such language as about how many, about how much.***

Teacher Observation

Estimation Activities

Everyday Math: Teacher's Guide

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Grade: Kindergarten Standard 4.2 Geometry and Measurement

Essential Questions: How can knowledge of geometric properties help in problem solving situations?

How can coordinate grid systems help in understanding locations?

How does the mathematics of geometry enable us to wonder and understand our natural and physical world?

Knowledge/Skills/Understandings	Assessments	Learning Experiences	Resources
A. Geometric Properties			
1. Identify and describe spatial relationships among objects in space and their relative shapes and sizes.	Oral Discussions	Pattern Block Puzzles	<i>Everyday Math</i> : Teacher's Guide
*Use positional words in a functional way. (ex. Put the red block on top of the cabinet.) (list words) (Preschool)	Teacher Observation	Classroom activities "Do the Hokey Pokey"	<i>Everyday Math</i> : Teacher's Guide
2. Use concrete objects and drawings to identify, classify and describe standard three-dimensional and two-dimensional shapes. *vertex, edge, face, side *3-D figures - cube, rectangular prism, sphere, cone cylinder, and pyramid *2-D figures - square, rectangle, circle, triangle *Relationships between three- and two-dimensional shapes (e.g., the face of a 3D shape is a 2D shape).	Observation of student while interacting with manipulatives	Using A Pattern Block Template Shapes By Feel Compare shapes "I Spy" Comparing four-sided polygon	<i>Everyday Math</i> : Teacher's Guide
*Identifies basic shapes in the environment (e.g., circle, square, triangle, cube, sphere). (Preschool) *Makes three-dimensional constructions and models (e.g., sculptures that have height, depth, and width). (Preschool)	Teacher Observation	Name shapes in the environment Clay 3-D Blocks	
*Makes connections between two-dimensional and three-dimensional forms (circle-sphere, square-cube, triangle-pyramid). (Preschool)	Teacher Observation		

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**Has experience with and recognizes and names basic plane figures.*

Mid-Year and Final:
Names shapes

Shape Designs
Geoboard Shapes
Feely Box Shapes
I Spy
Find the Block

Everyday Math: Teacher's Guide

3. Describe and identify and create instances of symmetry.

Observation of student exploration while interacting with manipulatives
Whole class discussion

Symmetry with Paints

Everyday Math: Teacher's Guide

**Has experiences with basic geometry shapes and symmetry concepts*

Symmetry in Nature
Symmetry Fold and Cut Projects

Everyday Math: Teacher's Guide

4. Recognize, describe, extend and create designs and patterns with geometric objects of different shapes and colors.

**Identifies, describes and uses pattern blocks.*

Teacher Observation

Using a Pattern Block Template
Covering Shapes
Patterns All Around
Pattern Block Puzzles
Making Pattern Block Pictures
Covering Shapes

Everyday Math: Teacher's Guide

B. Transforming Shapes

1. Use simple shapes to make designs, patterns and pictures.

Observation of student creations

Shape Designs
Pattern Blocks

Everyday Math: Teacher's Guide

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****Identifies patterns in the environment (e.g., "Look at the rug. It has a circle, then a number, then a letter..."). (Preschool)***

**Identifies, describes, and uses pattern blocks.*

Teacher observation
Observation of student exploration during play with pattern blocks

Pattern Block Exploration
Pattern Block Design Cards

Everyday Math: Teacher's Guide

C. Coordinate Geometry

1. Give and follow directions for getting from one point to another on a map or grid.

****Use vocabulary to describe directional concept (e.g., "Watch me climb up the ladder and slide down.") (Preschool)***

Teacher observation

Counting Walks

Everyday Math: Teacher's Guide

**Follows a simple map.*

Teacher observation

Following a Simple Map

Everyday Math: Teacher's Guide

D. Units of Measurement

1. Directly compare and order objects according to measurable attributes.

Observation of student during play with attribute blocks

Attribute Blocks
Make comparisons: how are they alike / different?
"What My Rule?" Fishing with attribute blocks
Find the Block
Read My Mind Game
More or Less on a Pan
Balance

Everyday Math: Teacher's Guide

Everyday Math: Teacher's Guide

****Seriates objects according to various properties including size, number, length, heaviness, texture (rough to smooth) or loudness. (Preschool)***

Observation of student presentation of manipulatives

Arranging items by Length
Volume- Exploration

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2. Recognize the need for a uniform unit of measure.

**Estimates and compares length using non-standard and standard units.*

Whole Class discussion

Comparing Length: use parts of body as measures
Marking off Lengths
Partner Match
Building and Measuring in the Block Corner
Comparing Lengths
Arranging Items by Length
Measuring with Children's Feet
Marking Off Lengths
Tools for Measuring Length

Everyday Math: Teacher's Guide

Teacher observation

Everyday Math: Teacher's Guide

**Exploring volume and weight.*

Teacher observation

Sand and Water Play
Rocker Balance
Things that Float or Sink

Everyday Math: Teacher's Guide
Make science connections

3. Select and use appropriate standard and non-standard units of measure and standard measurement tools to solve real-life problems.

**Uses standard and nonstandard measurement units. (e.g., measuring body lengths with Unifix cubes, using a tape measure to gauge height of block construction, counting the number of cups it takes to fill a bucket with water). (Preschool)*

Evaluation of classroom math center activity

Measuring Heights of Children
Measuring with Children's Feet
Need for a Standard Measure of Length
Tools for Measuring Length
Rulers, Linking cubes
Literature Links

Everyday Math: Teacher's Guide

How Big is a Foot?, Rolf Myller
Inch by Inch, Leo Leonni

Whole class discussion
Whole class participation
Oral assessment

Door Clock

Hour clock
Explore duration of an hour
Hour Hand, Minute Hand
Story
Match Game: Analog and Digital Clock (o'clock)

Everyday Math: Teacher's Guide
Everyday Math: Teacher's Guide
Everyday Math: Teacher's Guide

**Become familiar with the clock face*
**Explore shapes using constant perimeter*
**Read hourly clock times*

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4. Estimate measures.

****Uses vocabulary to describe distances (e.g., short, long) (Preschool)***

**Estimates times on an analog clock using only the hour hand.*

**Explore timed activities*

Teacher Observation

Oral assessment

Observation of student participation in activity

Building and Measuring in the Block Corner

Comparing Body Heights to Objects

Make an Hour Hand Clock

Beating out Time
How Long is a Minute?

Everyday Math: Teacher's Guide

Everyday Math: Teacher's Guide

Everyday Math: Teacher's Guide
Judy Clock

Everyday Math: Teacher's Guide

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Grade: Kindergarten

Standard 4.3 Patterns and Algebra

Essential Questions: How can patterns help in problem solving?

How can symbols be used to help us in problem solving?

How does the study of algebra help us understand mathematical patterns as the patterns found in nature & the real world?

Knowledge/Skills/Understandings	Assessments	Learning Experiences	Resources
A. Patterns			
1. Recognize, describe, extend and create pattern.	Observation of students while exploring with manipulatives or models	Patterns with Craft Sticks Patterns with Colors Stand, Squat or Kneel Pattern Macaroni Necklaces BINGO Sing a pattern song Three Object Pattern ABC or other	<i>Everyday Math: Teacher's Guide</i>
<i>*Matches, copies and extends simple patterns.</i>	Mid-Year: Identify a pattern. Final: Create and extend a pattern.	Give the Next Number Counting Patterns Class Patterning Follow My Pattern B-I-N-G-O What's My Rule?Fishing Patterning Activities (DNC) Shoe Pattern	<i>Everyday Math: Teacher's Guide</i> <i>Developing Number Concepts: Counting, Comparing and Patterns</i> , Kathy Richardson
B. Functions and Relationships			
1. Use concrete and pictorial models of function machines to explore the concept of a function.			
<i>*Identify a function rule.</i>	Observation of student while exploring mathematical idea Oral assessment	What's My Rule?... Pairs of Numbers, Numbers in Sequence, Numbers out of Sequence, Large Numbers	<i>Everyday Math: Teacher's Guide</i>

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C. Modeling

1. Recognize and describe changes over time (e.g., temperature, height).

**** Describe the sequence of the daily routine and demonstrates understanding of basic temporal relations. (e.g., We will go outside after snack time.) (Preschool)***

Teacher /student
discussion; teacher
observation

Responsive Classroom, morning
message, calendar activities

Everyday Math: Teacher's Guide

D. Procedures

Comparing numbers in different contexts. (e.g., using words such as more and less) (Preschool)

**Introduce the Number-Model format*

Student-teacher
interview

Oral / Slate assessment

Calendar activities, counters and
other manipulatives

Explore $3 + 4 = \underline{\quad}$ and simple
open sentences

Teacher supplement

Everyday Math: Teacher's Guide

Flemington-Raritan School District Mathematics Curriculum

Grade: Kindergarten

Standard 4.4 Data Analysis, Probability, and Discrete Mathematics

Essential Questions: How can classifying help me in organizing data to solve problems?

How can statistics help us to understand real world situations?

How can the study of real world data help us understand and make accurate predictions?

Knowledge/Skills/Understandings	Assessments	Learning Experiences	Resources
A. Data Analysis			
1. Collect, generate record, and organize data in response to questions, claims or curiosity. *Data collected from students' everyday experiences.	Oral Assessment Student participation in collection and recording of data	Attendance Routine Recording Daily Temperature Favorite Colors graph	<i>Everyday Math: Teacher's Guide</i> <i>Everyday Math: Teacher's Guide</i>
*Data generated from chance devices, such as spinners and dice.	Observation of students during play	Spinners, Dice games Graph sums of dice throws	<i>Everyday Math: Teacher's Guide</i>
2. Read, interpret, construct and analyze displays of data. *Pictures, tally chart, pictograph, bar graph, Venn Diagram Smallest to largest, most frequent (mode)		Calendar activities Reminder for Tally Marks	<i>Everyday Math: Teacher's Guide</i>
*Arrange pictures of events in temporal order. (Preschool)	Teacher Observation		
*Read concrete, pictorial, and simple bar graphs.	Final: Read a graph	Weather Observation Routine Birthday Bar Graph Favorite Color Graph Building the Monthly Calendar Routine	<i>Everyday Math: Teacher's Guide</i>

Flemington-Raritan School District Mathematics Curriculum

B. Probability 2. Provide probability of specific outcomes.

Teacher Observation

Graphing Sums of Dice Throws

Everyday Math: Teacher's Guide

C. Discrete Mathematics-Systematic Listing and Counting

1. Sort and classify objects according to attributes.

*** Venn diagrams**

****Sorts objects into groups (e.g., separate basket of collected items into piles of pinecones, acorns and twigs.) (Preschool)***

Teacher Observation

Counters, "real" counting items

****Classifies objects by sorting them into subgroups by one or more attributes (e.g., sorting counting bears by color into trays, separating a mixture of beans by individual size and shape). (Preschool)***

Teacher Observation

Counters, "real" counting items

****Sorts objects using varying attributes; shares strategies.***

Final: Attribute Block Sorting

Read My Mind
Sorting Boxes

Everyday Math: Teacher's Guide
Attribute Block guide

****Describes an object by characteristics it does or does not possess (e.g., "This button doesn't have holes."). (Preschool)***

Teacher observation,
Student discussion

Counters, "real" counting items

****Seriates objects according to various properties including size, number, length, heaviness, texture (rough to smooth) or loudness. (Preschool)***

Teacher observation,
Student discussion

Counters, "real" counting items

D. Discrete Mathematics - Vertex - Edge - Graphs and Algorithms

1. Follow simple sets of directions (e.g., from one location to another, or from a recipe).

**** Starts and stops on a signal (e.g., freezing in position when music stops). (Preschool)***

Teacher observation

Rug and classroom group
activities

Classroom chime

Flemington-Raritan School District

Grade: Kindergarten

Standard 4.5 Mathematical Processes

Big Idea: Mathematical understandings are an essential part of our lives in and out of school and as such all children need to have an instinctive sense of mathematical resources that they can rely on to help them progress through life.

Essential Questions: How will learning to "think" mathematically enable us to make a life, make a living, and make a difference?
How does the use of technology enable us to have a deeper understanding of mathematics?

Knowledge/Skills/Understandings	Assessments	Learning Experiences	Resources
A. Problem Solving			
1. Learn mathematics through problem solving, inquiry, and discovery.			<i>Best of Math I and II, Exemplars CD</i> <i>Teaching Student Centered Mathematics, K-3,</i> Lovin and Van de Walle
<i>*Uses emergent mathematical knowledge as a problem-solving tool (e.g., Maritza notices that Juan has more carrot sticks than she does. She says, "May I have some of yours? Then we will have the same amount." Jorge decided to fill his bucket by using small cups of water when he realizes that he cannot fit the bucket under the faucet). (Preschool)</i>	Teacher observation	Various whole group, small group and partner classroom activities	Teacher supplement <i>Everyday Math: Teacher's Guide</i>
3. Select and apply a variety of appropriate problem solving strategies.	Teacher observation	Classroom Playing Cards Meet the Calculator	
<i>*Describe how he/she solved mathematical problems in his/her own way. (Preschool)</i>	Student Discussion		<i>Teacher supplement</i>
B. Communication			
1. Use communication to organize and clarify their mathematical thinking.	Teacher observation	What's My Rule? Dismantling the Monthly Calendar	<i>Everyday Math: Teacher's Guide</i>
4. Use the language of mathematics to express mathematical ideas precisely.			<i>Everyday Math: Teacher's Guide</i>
Teacher observation Birthday Graph			

Flemington-Raritan School District

****Uses mathematical terms when conversing with others (e.g., "Which car is faster?" "My building is taller than yours." "I have more sand in my bucket. "). (Preschool)***

Teacher observation Model appropriate math vocabulary
Calendar activities

C. Connections

2. Use connections among mathematical ideas to explain concepts.

Slow and Fast
Compare activities with variable speeds

Everyday Math: Teacher's Guide
The Tortoise and the Hare

**** Making connections between two dimensional and three dimensional forms (circle-sphere, square-cube, triangle-pyramid) (Preschool)***

Student -teacher interview

2-D and 3-D Objects
Ask questions what is same and different between a square and a cube, circle and cylinder

Teacher supplement with questions

3. Recognize that mathematics is used in a variety of contexts outside of mathematics.

Teacher observation

Noticing Numbers in the environment
Patterns All Around
Simple Hopscotch
Telephone Book
100th school day

Everyday Math: Teacher's Guide

D. Reasoning

2. Use reasoning to support their mathematical conclusions and problem solutions.

Observation of partner play

"Feely" Bag or Box
Partners

Everyday Math: Teacher's Guide

****Use emergent mathematical knowledge as a problem-solving tool. (Preschool)***

Teacher observation

Engage student in play that facilitates simple problem solving

Teacher supplement
Use literature books

6. Evaluate examples of mathematical reasoning and determine whether they are valid.

Teacher observation

Everyday Math: Teacher's Guide

Flemington-Raritan School District Mathematics Curriculum

E. Representations

1. Create and use representations to organize, record, and communicate mathematical ideas. -concrete representations
-pictorial representations
-symbolic representations

Observation of student while interacting with manipulatives as they explore math ideas

Provide opportunities for students to model mathematical ideas using manipulatives and other models

Everyday Math: Teacher's Guide
NJ Mathematics Curriculum Framework, selected activities grades K-2

****Identifying the meaning of common signs and symbols. (Preschool)***

Teacher observation / Student responses

Classroom symbols, school symbols, bathroom symbols, street light

2. Select, apply and translate among mathematical representations to solve problems.

Teacher observation Classroom Playing Cards

Everyday Math: Teacher's Guide

F. Technology

4. Use calculators as problem-solving tools.

Teacher observation Calculators
Meet the Calculator
How Many? Answer questions using the calculator
EM Activities: Skip counting activity
Counting Backwards with calculator

Everyday Math: Teacher's Guide

1st Grade Math Pacing Guide

Unit	Number of Days (approximate)	Unit	Number of Days (approximate)
1 . Establishing Routines	18	6 . Developing Fact Power	17
2 . Everyday Uses of Numbers	18	7 . Geometry & Attributes	12
3 . Visual Patterns, Number Patterns, & Counting	19	8 . Mental Arithmetic, Money and Fractions	14
4 . Measurement & Basic Facts	17	9 . Place Value and Fractions	13
5 . Place Value, Number Stories & Basic Facts	18	10 . Year-End Review	12
Mid-Year Benchmark Assessment	2	End-of-the-Year Benchmark Assessment	2

Flemington-Raritan School District Mathematics Curriculum

Grade: 1

Standard 4.1 Number and Numerical Operations

Essential Question: How can problems in the real world be solved with mathematics?

How do numbers help us reason out solutions to problems?

How do basic operations help us understand numbers?

Knowledge/Skills/Understandings	Assessments	Learning Experiences	Resources
1. Use real-life experiences, physical materials, and technology to construct meanings for numbers. *Whole numbers through hundreds *Ordinals *Proper fractions (denominators of 2, 3, 4, 8, 10)	Oral / Slate Assessment Unit Assessments Do Now Teacher Observation Discussion Open Ended Writing Tasks Recognizing Student Achievement sections in Everyday Math 3	A. Number Sense Direct Instruction Collaborative and Cooperative Learning Open Ended Writing Tasks Place Value Mat Cuisenaire Rods Digi-blocks Base Ten Blocks Calendar skills Number line Slides Giant Floor Number Line EM Games and Activities Auntie Pasta's Fraction Game Coins Geometric shapes Number grid Pattern Blocks Calculator EM Skills Link	<i>Everyday Mathematics</i> , Lesson 1.2. 5.6, 8.3, 10.7
<i>*Count by 2's to 100; Count by 5's to 100</i>		Choral skip counting, Stop and start counting Tallies & Nickels & Pennies	<i>Everyday Mathematics</i> Lesson 1.2, 1.12. 1.13, 2.7, 2.9, 2.10, 3.2, 3.3 ongoing throughout the year

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**Count up and back by 1's on the number grid to 100*

Everyday Mathematics, Lesson 1.5,
1.7, 2.1, 9.1
EM Skills Link
EM teacher resource for grid

** Writes any number 100 or less*

EM Project 5: Calendar for the
New Year
EM Project 6: Celebrate the
Hundredth School day

Everyday Mathematics, Lesson 1.2,
1.3, 1.4, 1.9, 4.10
Fish Eye: A Book You Can Count On,
Lois Ehlert
1, 2, 3, Tana Hoban
Can You Count Ten Toes?: Count to
10 in 10 Different Languages, Leslie
Evans
City by Numbers, Stephen T, Johnson

**Count up and back by 10's starting with any
given number up to and including 100*

Try to develop mental math for
10s

Everyday Mathematics, Lesson 6.6,
9.2

**Practice counting on a number line*

Everyday Mathematics, Lesson 3.2,
3.5, 3.6, 3.9, 5.4

**Write and count tallies*

Everyday Mathematics, Lesson 1.7,
2.9

**Find equivalent names for a number*

Everyday Mathematics, Lesson 6.2

**Explore parts and total relationships*

Everyday Mathematics, Lesson 3.14,
4.6, 5.8, 9.4
Fraction Action, Loreen Leedy

Flemington-Raritan School District Mathematics Curriculum

**Identify fractional parts of regions and sets with a focus on unit fractions*

Everyday Mathematics, Lesson 8.6 - 8.9, 9.6,
Eating Fractions, Bruce McMillian
Gator Pie, Louise Mathews
Ed Emberley's Picture Pie: A Circle Drawing Book, Ed Emberley
Elementary School with Pizzazz, Creative Publications

**Find equivalent fractions*

Everyday Mathematics, Lesson 9.8
Teacher Supplement

**Develop an understanding of fractional parts of a whole, unit fraction notation*

Everyday Mathematics, Lesson 8.6 - 8.9, 9.6
EM Resource, Fraction Book

2. Demonstrate an understanding of whole number place value concepts.

Everyday Mathematics, Lesson 4.7, 4.10, 5.2, 8.3

** Understand place value for 10's and 1's*

Everyday Mathematics, Lesson 5.1-5.3, 8.3
Mini Flip Chart Place Digit Game: About Teaching Mathematics, Marilyn Burns

** Identify and use patterns on a number grid or base ten blocks*

Investigate number patterns for counting by 1s and 10s
May explore patterns using a calculator to generate numbers

Everyday Mathematics, Lesson 3.2, 3.3, 5.2, 6.5, 9.1

3. Identify whether a number is even or odd.

Everyday Mathematics, Lesson 3.2, 3.4, 6.7
Even Steven, Odd Todd, Kathryn Cristaldi
Bears Odd, Bears Even, Harriet Ziefert
Splitting the Herd, Trudy Harris

Flemington-Raritan School District Mathematics Curriculum

Explore sums of even and odd numbers

Whole class exploration of
Domino Sort for sum even or odd,

Everyday Mathematics, Lesson 3.14

3. Understand that numbers have a variety of uses.

Everyday Mathematics, activities
ongoing throughout the year
Teacher supplement

4. Count and perform simple computations with coins. (Amounts up to \$1.00, using cents notation)

Everyday Mathematics, Lesson 2.8-
2.11, 3.11, 3.12, 8.1
Teacher supplement
*Elementary School Mathematics with
Pizzazz*, Creative Publications

** Exchange pennies for nickels*

Everyday Mathematics, Lesson 2.9,
2.10, 3.11, 3.12
The Magic Money Machine, by
Joanne Nelson

** Calculate the values of various combinations of pennies, nickels, dimes and quarters*

Everyday Mathematics, Lesson 2.9,
2.10, 3.11, 3.12, 6.9, 8.1
EM Resource, Museum Store Mini-
Poster

** Know the values of pennies, nickels, dimes, and quarters*

Everyday Mathematics, Lesson 2.9,
2.10, 3.11, 3.12

**Introduce the dollar bill*

Everyday Mathematics, Lesson 8.2

**Explore counting up as a strategy for making change*

Everyday Mathematics, Lesson 8.5,
10.3, 10.4

**Solve and write simple money stories problems*

Everyday Mathematics, Lesson 2.13,
8.2, 10.4

Flemington-Raritan School District Mathematics Curriculum

**Introduce the ten dollar, hundred dollar bill*

Everyday Mathematics, Lesson 10.3
Teacher supplement

5. Compare and order whole numbers.

**Order and compare numbers to 22*

Everyday Mathematics, Lesson 1.6

**Compare numbers using $<$ and $>$*

Everyday Mathematics, Lesson 5.3,
5.6, 5.9

**Make the largest and smallest numbers using
number cards*

Everyday Mathematics, Lesson 9.1

**Compare fractions less than 1*

Everyday Mathematics, Lesson 9.7

**Compare prices*

Everyday Mathematics, Lesson 10.4

Flemington-Raritan School District Mathematics Curriculum

B. Numerical Operations

By the end of first grade (MP4), 80% of Flemington-Raritan first graders will have basic fact mastery of sums to 10.

**District timed test: 20 facts in 2 minutes
Marking period packets: addition separate**

1. Develop the meanings of addition and subtraction by concretely modeling and discussing a large variety of problems.

Fact Triangles
Dominoes
Dice
Flashcards
Explore strategies used to help learn facts
EM Games
EM Activities
EM Diagrams: Change to more, Change to less, Part/Part total

*Read It, Draw It, Solve It
Teaching Student-Centered Mathematics, in K-3, Lovin and Van de Walle
Teacher supplement
Everyday Mathematics, Lesson 6.1, 6.5*

3. Develop proficiency with basic addition and subtraction number facts using a variety of fact strategies and then commit them to memory.

*Facts in a Flash
Basic Fact Mastery, Otter Creek
Everyday Mathematics, Lesson 3.14, 4.11, 4.12, 5.9 -5.11, 6.1, 6.4
Website resources
NJ Mathematics Curriculum Framework, Grade K-2, selected activities*

** Know addition facts for +1, +0 doubles and sums of 10*

Everyday Mathematics, Lesson 5.11

**Find complements of 10*

*Everyday Mathematics, Lesson 2.3, 2.4
Illuminations website (Activity: Ten Frames)*

**Learn and know addition facts*

*Anno's Counting House, Mitsumasa
Everyday Mathematics, Lesson 4.11, 6.3, 6.4, 6.7, 7.2, 8.9, ongoing activities throughout the year*

Flemington-Raritan School District Mathematics Curriculum

**Construct fact families for addition and subtraction*

Everyday Mathematics, Lesson 6.3, 6.4, 6.7

**Investigate number grid patterns to reinforce counting, adding, and subtracting by 1s and 10s*

Everyday Mathematics, Lesson 9.3

4. Construct, use and explain procedures for performing addition and subtraction problems with: paper-pencil, mental math, calculator.

Everyday Mathematics, activities, ongoing throughout the year

**Solve simple addition and subtraction number stories*

Everyday Mathematics, Lesson 1.13, 2.13, 5.7, 5.8, 8.4, 10.3, 10.4
Teacher supplement
Website resources

**Solve simple addition and subtraction problems by skip counting on the number line*

Everyday Mathematics, Lesson 3.6

**Complete simple "Frames and Arrows diagrams (B/D)*

Everyday Mathematics, Lesson 3.8, 3.9, 6.8

5. Use efficient and accurate pencil and paper procedures for computation with whole numbers.

Teacher supplement as needed

**Explore and solve addition of 2-digit numbers*

Everyday Mathematics, Lesson 5.5, 9.4 10.3, 10.4

* Solve 2-digit addition and subtraction problems

Everyday Mathematics, Lesson 9.4, 10.3, 10.4

Flemington-Raritan School District Mathematics Curriculum

8. Understand and use the inverse relationship between addition and subtraction.

* Find simple sums and missing addends

Everyday Mathematics, Lesson 5.10

* Find missing numbers and/or the missing rule in "What's My Rule?" problems

Everyday Mathematics, Lesson 5.12, 5.13, 6.8, 8.6

* Complete simple "Frames and Arrows" diagrams

Everyday Mathematics, Lesson 3.8, 3.9, 6.8, 9.2

C. Estimation

1. Judge without counting whether a set of objects has less than, more than, or the same number of objects as a reference set.

Project 3: Pumpkin Math

EM Teacher's guide

3. Explore a variety of strategies for estimating both quantities (ex. The number of marbles in a jar) and results of computation.

Estimation Jar

Teacher supplement

Flemington-Raritan School District Mathematics Curriculum

Grade: 1 Standard 4.2 Geometry and Measurement

Essential Questions: How can knowledge of geometric properties help in problem solving situations?

How can coordinate grid systems help in understanding locations?

How does the mathematics of geometry enable us to wonder and understand our natural and physical world?

Knowledge/Skills/Understandings	Assessments	Learning Experiences	Resources
A. Geometric Properties			
1. Identify and describe spatial relationships among objects in space and their relative shapes and sizes.	Oral / Slate Assessment Unit Assessments Do Now Teacher Observation Discussion Open Ended Writing Tasks Recognizing Student Achievement sections in Everyday Math 3	Pattern Blocks 3D shapes Geometric template Geoboards Polygons EM Activities EM Games Attribute blocks Mira/Reflection Mirrors Fraction Pieces Rulers/Master Rulers Yardstick/Meter stick Inchworms Judy clocks Stopwatch Thermometer Scales/Pan balance/Weights Create 3-D objects Anglelegs	Make appropriate connections to Science Curriculum
* Sort and identify objects by attributes			<i>Everyday Mathematics</i> , activities ongoing Unit 7

Flemington-Raritan School District Mathematics Curriculum

2. Use concrete objects, drawings, and computer graphics to identify, classify, and describe standard three-dimensional and two-dimensional shapes.

* Identify polygons and know their characteristics

Everyday Mathematics, Lesson 7.1, 7.2, 7.5, 7.6 and ongoing activities throughout the year
Website resources

* Identify three dimensional shapes and know their characteristics

Everyday Mathematics, Lesson 4.7, 6.7, 7.3, 7.4, 10.5
The Greedy Triangle, Marilyn Burns
Lois Ehlert's Color Zoo, Lois Ehlert

Everyday Mathematics, Lesson 7.5, 7.6, 10.5

3. Describe, identify and create instances of line symmetry.

* Identify symmetrical figures

Face symmetry project

Everyday Mathematics, Lesson 7.7, 9.5
NJ Mathematics Curriculum Framework, K-2, selected activities

4. Recognize, describe, extend and create designs and patterns with geometric objects of different shapes and colors.

Everyday Mathematics, Lesson 7.2, 7.3

B. Transforming Shapes

1. Use simple shapes to make designs, patterns and pictures.

Everyday Mathematics, Lesson 3.4, 7.2, 7.3

2. Combine and sub-divide simple shapes to make other shapes.

Everyday Mathematics, Lesson 7.2, 7.3

C. Coordinate Geometry

1. Give and follow directions for getting from one point to another on a map or grid.

See map skills unit in Social Studies Curriculum

Flemington-Raritan School District Mathematics Curriculum

D. Units of Measurement

1. Directly compare and order objects according to measurable attributes.

Everyday Mathematics, Lesson 2.7, 4.7, 7.1, 7.2
Teacher supplement

2. Recognize the need for a uniform unit of measure.

Everyday Mathematics, Lesson 4.3
Groundworks for Measurement, Creative Publications

*** Use standard units for measuring length (centimeters/inches)**

***Centimeter measures (Grade 2 secure)**

Everyday Mathematics, Lesson 4.3 - 4.6, 6

3. Select and use appropriate standard and non-standard units of measure and standard measurement tools to solve real life problems.

Everyday Mathematics, Lesson 4.2, 4.3, 4.6, 4.7, 6.6

How Big is a Foot?, Rolf Myller
Measuring Penny, Loreen Leedy
Teacher supplement
Website resources

*** Measure objects to the nearest centimeter**

Everyday Mathematics, Lesson 6.6, activities, ongoing throughout the year
Teacher supplement

**Introducing the meter*

Everyday Mathematics, Lesson 6.6

Flemington-Raritan School District Mathematics Curriculum

**Measuring to the nearest inch and half inch*

Everyday Mathematics, Lesson 4.5
Tom Thumb (story about inchlings), Margaret
Read MacDonald
Inch By Inch, Leo Lionni
Jack and the Beanstalk, Traditional Folktale

**Introducing the yard*

Everyday Mathematics, Lesson 4.2

**Use a tape measure to measure curved and flat
objects in inches*

Everyday Mathematics, Lesson 4.6

**Explore area by counting units*

Everyday Mathematics, Lesson 5.4

** Introduce and tell time using the analog clock
Tell time to the nearest hour and half hour

Everyday Mathematics, Lesson 2.5, 2.6, 3.7,
10.2
Teacher supplement with clock songs

**Telling time on the quarter hour*

Everyday Mathematics, Lesson 4.8

**Telling time to five minutes*

Everyday Mathematics, Lesson 10.2
Big Book: "What Time Is It?"

** Understand digital notation for time*

Everyday Mathematics, Lesson 6.10

**Introduce the use of the second hand for timing
tasks*

Everyday Mathematics, Lesson 2.5

Flemington-Raritan School District Mathematics Curriculum

**Introduce Fahrenheit Thermometer*

**Measure temperature to the nearest 2 degrees*

Everyday Mathematics, Lesson 1.12, 4.1, 10.6

Use appropriate science curriculum links

www.weather.com

Welcome to Green House; Welcome to Ice House, Jane Yolen

Cactus Desert, Artic Tundra, Tropical Rain Forest, Donald Silver

**Explore capacity and compare*

Everyday Mathematics, Lesson 9.5

**Weigh objects with a pan balance*

**Order by weight*

Everyday Mathematics, Lesson 5.4, 5.6

4. Estimate Measures

Project 3: Pumpkin Math

Everyday Mathematics, Lesson 4.5, 9.5
Teaching Student-Centered Mathematics, K3,
Lovin and Van de Walle

E. Measuring Geometric Objects

Teacher supplement

**Measuring and drawing line segments*

Everyday Mathematics, Lesson 4.2 - 4.5, 6.6,

Flemington-Raritan School District Mathematics Curriculum

Grade: 1 Standard 4.3 Patterns and Algebra
Essential Questions: How can patterns help in problem solving?
 How can symbols be used to help us in problem solving?
 How does the study of algebra help us understand mathematical patterns as the patterns found in nature & the real world?

Knowledge/Skills/Understandings	Assessments	Learning Experiences	Resources
A. Patterns			
1. Recognize, describe, extend, and create patterns.	Oral / Slate Assessment Unit Assessments Do Now Teacher Observation Discussion Open Ended Writing Tasks Recognizing Student Achievement sections in Everyday Math 3	Pattern Blocks Attribute blocks Craft sticks Dominoes EDM Activities EDM Games Number grids Frames and Arrows	NJ Mathematics Curriculum Framework, selected activities for grades K-2 <i>Everyday Mathematics</i> , Lesson 3.1, 3.4, 3.5, 7.3 Website resources
<i>*Count by 2's, 5's and 10's to 100</i>			<i>Everyday Mathematics</i> , Lesson 2.1, 2.8, 2.9, 3.2, 3.3, 3.12
<i>* Identify and complete patterns</i>			<i>Everyday Mathematics</i> , Lesson 3.1, 3.4, 3.13, 7.3 National Library of Virtual Manipulatives website activities
<i>*Identify and use patterns on a number grid</i>			<i>Everyday Mathematics</i> , Lesson 3.3

Flemington-Raritan School District Mathematics Curriculum

B.Functions and Relationships

1. Use concrete and pictorial models of function machines to explore the basic concept of a function.

**Complete simple Frames and Arrows diagrams*

* Find simple sums and missing addends

* Find missing numbers and/or the missing rule in "What's My Rule?" problems

Navigations through Algebra in Grades K-2, NCTM selected activities

Everyday Mathematics, activities ongoing throughout the year 3.8, 3.9

Everyday Mathematics, Lesson 3.14 ongoing throughout the year

*Everyday Mathematics, Lesson 5.10, 5.12, 5.13, 6.8
Function Machine from Lakeshore Teacher supplement*

C.Modeling

1. Recognize and describe changes over time.

* Interpreting pictographs, bar graphs

*Everyday Mathematics Lesson 4.5, 4.7, 6.12
Teaching Student-Centered Mathematics, K-3, Lovin and Van de Walle*

2. Construct and solve simple open sentences involving addition or subtraction.

* Find simple sums and missing addends

*Everyday Mathematics Lesson 6.2 - 6.5
Elementary School Mathematics with Pizzazz, Creative Publications*

Flemington-Raritan School District Mathematics Curriculum

D. Procedures

1. Understand and apply (but do not name) the following properties of addition.

Teacher supplement
Elementary School Mathematics with Pizzazz, Creative Publications

*** Zero Identity: knows +0 addition facts**

Everyday Mathematics, Lesson 5.11
Teacher supplement

*** Commutative: identify simple Turn-around addition facts**

Everyday Mathematics, Lesson 5.10
Activities, ongoing throughout the year
Teacher supplement

***Explore associative property when adding three numbers**

Everyday Mathematics, Activities,
ongoing throughout the year
Teacher supplement

**Introduce, understand and apply symbols $<$, $>$ =*

Everyday Mathematics, Lesson 5.3, 5.6

**Write number model stories using more than or less than*

Everyday Mathematics, Lesson 5.6

Flemington-Raritan School District Mathematics Curriculum

Grade: 1

Standard 4.4 Data Analysis, Probability, and Discrete Mathematics

Essential Questions: How can classifying help me in organizing data to solve problems?

How can statistics help us to understand real world situations?

How can the study of real world data help us understand and make accurate predictions?

Knowledge/Skills/Understandings	Assessments	Learning Experiences	Resources
A. Data Analysis 1. Collect, generate, record and organize data in response to questions, claims or curiosity. *Data collected from students' everyday experiences	Oral / Slate Assessment Unit Assessments Do Now Teacher Observation Discussion Open Ended Writing Tasks Recognizing Student Achievement sections in Everyday Math 3	Calendar, Weather, Morning Meeting Procedures EDM Activities EDM Games EDM Project 2: Autumn Leaves EDM Project 7: Amaryllis Plant EDM Activity: Birth-Month graph Fraction Pieces Rulers/Master Rulers Yardstick/Meter stick Judy clocks Stopwatch Thermometer Scales/Pan balance/Weights Spinners, dice, coins Attribute Blocks	<i>Navigations in Data Analysis, Probability in Grades K-2, NCTM, selected activities</i> <i>Everyday Mathematics, Lesson 1.7, 1.12, 2.5, 3.13, 6.12, 10.1</i>
2. Read, interpret, construct, and analyze displays of data. <i>*Pictures, tally chart, pictograph, bar graph, Venn diagram.</i> <i>*Introduce line plots</i>		Calendar, Weather, Morning Meeting Procedures	<i>Everyday Mathematics, Lesson 1.12, 3.13, 4.7, 6.12, 7.4, 7.5, 10.1</i> Teacher supplement Website resources <i>Everyday Mathematics, Lesson 3.13, 4.7, 10.1</i>

Flemington-Raritan School District Mathematics Curriculum

**Smallest to largest, most frequent (mode)*

Everyday Mathematics, Lesson 3.13,
4.7, 6.12, 10.1

**Introduce statistical landmarks range and middle
value*

Everyday Mathematics, Lesson 6.12,
10.1

B. Probability

**1. Use chance devices like spinners and dice to
explore concepts of probability.**

- * certain, impossible**
- * more likely, less likely, equally likely**

Project 7: Weather and
Probability

Everyday Mathematics, Lesson 1.8
*Teaching Student-Centered
Mathematics, K-3*, Lovin and Van de
Walle, Chapter 12

2. Provide probability of specific outcomes.

*Teaching Student-Centered
Mathematics, K-3*, Lovin and Van de
Walle, page 338

C. Discrete Mathematics - Systematic Listing and Counting

*Teaching Student-Centered
Mathematics, K-3*, Lovin and Van de
Walle
Best of Math I and II, Exemplars CD

**1. Sort and classify objects according to
attributes.**

Everyday Mathematics, Lesson 4.2, 7.1,
7.2

**2. Generate all possibilities in simple counting
situations (e.g., all outfits involving two shirts
and three pants)**

Teacher supplement
Best of Math I and II, Exemplars CD

Flemington-Raritan School District Mathematics Curriculum

D. Discrete Mathematics - Vertex-Edge Graphs and Algorithms

1. Follow simple sets of directions.

Teacher supplement

**2. Color simple maps with a small number of
colors.**

See map skills Social Studies Curriculum
Website resources

**3. Play simple two-person games and informally
explore the idea of what the outcome should be.**

Teacher supplement

Flemington-Raritan School District Mathematics Curriculum

Grade: 1 Standard 4.5 Mathematical Processes

Big Idea: Mathematical understandings are an essential part of our lives in and out of school and, as such, all children need to have an instinctive sense of mathematical resources that they can rely on to help them progress through life.

**Essential Questions: How will learning to "think" mathematically enable us to make a life, make a living, and make a difference?
How does the use of technology enable us to have a deeper understanding of mathematics?**

Knowledge/Skills/Understandings	Assessments	Learning Experiences	Resources
A. Problem Solving			
1. Learn mathematics through problem solving, inquiry, and discovery.	Oral / Slate Assessment Unit Assessments Do Now Teacher Observation Discussion Open Ended Writing Tasks Recognizing Student Achievement sections in Everyday Math 3	EDM games EDM Activities Explore ways to solve problems using manipulatives, models, drawing a picture, acting it out, working backwards, guessing and checking	<i>Everyday Mathematics</i> , Activities throughout the year <i>Groundworks Series</i> , selected problems <i>Best of Math I and II, Exemplars CD</i> Website resources for appropriate leveled problems <i>Read It, Draw It, Solve It</i> - Dale Seymour Publications <i>8- Step Model Drawing</i> Crystal Springs Books <i>The Problem-Solver</i> - Creative Publications <i>Roads To Reasoning</i> - Creative Publications
2. Solve problems that arise in mathematics and in other contexts.			<i>Best of Math I and II, Exemplars CD</i> <i>Teaching Student-Centered Mathematics in grades K-3</i> , Lovin and Van de Walle
*Open-Ended problems			Teacher supplement Sample open-ended problems, various resources <i>Everyday Mathematics</i> , Unit Assessment Open Response
*Non-Routine problems			<i>NJ Mathematics Curriculum Frameworks</i> , selected activities
*Problems with multiple solutions			Website resources
*Problems that can be solved in several ways			<i>Best of Math I and II, Exemplars CD</i>

Flemington-Raritan School District Mathematics Curriculum

3. Select and apply a variety of problem solving strategies to solve problems.

Everyday Mathematics, Activities, ongoing throughout the year
Teacher supplement
Elementary School Mathematics with Pizzazz, Creative Publications
The Problem-Solver - Creative Publications
Roads To Reasoning - Creative Publications
Read It, Draw It, Solve It - Dale Seymour Publications

4. Pose problems of various types and levels of difficulty.

Everyday Mathematics, Lesson 8.2
Teacher supplement

5. Monitor their progress and reflect on the process of their problem solving activity.

Teacher created rubrics
Best of Math I and II, Exemplars rubric

B. Communication

1. Use communication to organize and clarify their mathematical thinking.

Teacher supplement
Read It, Draw It, Solve It - Dale Seymour Publications

2. Communicate their mathematical thinking coherently clearly to peers, teachers, and others, both orally and in writing.

Best of Math I and II, Exemplars CD

3. Analyze and evaluate the mathematical thinking and strategies of others.

Everyday Mathematics, Lesson 7.2

Flemington-Raritan School District Mathematics Curriculum

C. Connections

1. Recognize recurring themes across mathematical domains.

Everyday Mathematics, Lesson 1.2, 1.9
Teacher supplement

2. Use connections among mathematical ideas to explain concepts.

Project: 5 Apple Math
Project 2 Amaryllis Plant

3. Recognize that mathematics is used in a variety of contexts outside of mathematics.

Project 1 Geometric Gift
Wrap and Greeting Cards

Everyday Mathematics, Lesson 1.9, 2.2
Link to Social Studies: discuss museum, community helpers

4. Apply mathematics in practical situations in other disciplines.

Seed Unit, Climate Zones

Science Curriculum, Social Studies Curriculum

5. Trace the development of mathematical concepts over time and across cultures (cf. world languages and social studies standards).

Everyday Mathematics, Lesson 4.9
See Science, Social Studies curriculum for resources and connections

D. Reasoning

1. Recognize that mathematical facts, procedures, and claims must be justified.

Everyday Mathematics, Lesson 7.4

2. Use reasoning to support their mathematical conclusions and problem solutions.

Everyday Mathematics, Lesson 1.10, 7.4

4. Rely on reasoning, rather than answer keys, teachers, or peers, to check the correctness of their problem solutions.

Teacher supplement

Flemington-Raritan School District

6. Evaluate examples of mathematical reasoning and determine whether they are valid.

Teacher supplement
Create student friendly rubric
Website resources

E. Representations

1. Create and use representations to organize, record, and communicate mathematical ideas.

- *Concrete representations
- *Pictorial representations
- *Symbolic representations

Everyday Mathematics, Lesson 1.1, 1.10
NJ Mathematics Curriculum Framework, selected activities
Groundworks Series, selected problems
Best of Math I and II, Exemplars CD
Website resources for appropriate leveled problems
Read It, Draw It, Solve It - Dale Seymour Publications
8- Step Model Drawing Crystal Springs Books
The Problem-Solver - Creative Publications
Roads To Reasoning - Creative Publications

F. Technology

4. Use calculators as problem solving tools.

Everyday Mathematics, Lesson 2.4, 3.10, 8.1
8.2
Texas Instruments resources

Flemington-Raritan School District

**Second Grade Math
Pacing Guide**

Unit	Number of Days (Approximate)	Unit	Number of Days (Approximate)
1 - Number and Routines	14	7 - Patterns and Rules	13
2 - Addition & Subtraction	18	8 - Fractions	12
3 - Place Value, Money, & Time	13	9 - Measurement	15
4 - Addition & Subtraction	14	10 - Decimals and Place Value	16
5 - 3-D and 2-D Shapes	13	11 - Whole-Number Operations Revisited	14
6 - Whole Number Operations & Number Stories	15	12 - Year-End Review & Extensions	10
Mid-Year Benchmark Assessment	1	End-of-the-Year Benchmark Assessment	1

Flemington-Raritan School District Mathematics Curriculum

Grade: 2 **Standard 4.1 Number and Numerical Operations**
Essential Question: How can problems in the real world be solved with mathematics?
 How can estimation be useful to us?
 How do numbers help us reason out solutions to problems?
 How do basic operations help us understand numbers?

Knowledge/Skills/Understandings	Assessments	Learning Experiences	Resources
A. Number Sense			
1. Use real-life experiences, physical materials, and technology to construct meanings for numbers (unless otherwise noted, all indicators for grade 2 pertain to these sets of numbers as well)	Unit Assessments Do Now Teacher Observation Discussion Open Ended Writing Tasks Recognizing Student Achievement sections in Everyday Math 3	Direct Instruction Collaborative and Cooperative Learning Open Ended Writing Tasks EM Games Digi-blocks Base Ten Blocks Calendar skills	NJ Mathematics Curriculum Framework grades K-2, selected activities
<i>*Ordinals (First grade secure)</i>			<i>Everyday Mathematics</i> , Lesson 1.3 Teacher supplement <i>Everyday Mathematics</i> , Lesson 1.1
*Whole numbers through hundreds		Number Lines & Open Number Lines	
*Proper fractions (denominators of 2, 3,4, 8, 10)		Fraction Tiles Cuisenaire Rods	<i>Everyday Mathematics</i> , Lessons Unit 8 & 11 Teacher supplement Website resources <i>Elementary School Mathematics with Pizzazz</i> , Creative Publications
<i>*Count by 2's, 5's and 10's through hundreds</i>			<i>Everyday Mathematics</i> , Lessons 1.10, 1.11
<i>*Make tallies and give the total</i>			<i>Everyday Mathematics</i> , Lessons 1.7, 1.9, 1.11, 1.12

Mathematics Curriculum

- * Find equivalent names for numbers
- * Name collection boxes

Fact Families
Funny Numbers
Roman Numerals
Ten-Frames

Everyday Mathematics Lessons
1.9 1.13, 2.9,

- * Understand that the amount represented by a fraction depends on the size of the whole

Eating Fractions, Bruce McMillian
Gator Pie, Louise Matthews
Ed Emberley's Picture Pie: A Circle Drawing Book, Ed Emberley
Everyday Mathematics, Lessons 8.1, 8.2
Teacher Supplement: *Teaching Student-Centered Mathematics*, K-3, Lovin and Van de Walle

- * Shade a specified fractional part of a region or collection

Everyday Mathematics, Lessons 8.3, 8.5
Fraction Factory Game
Elementary School Mathematics with Pizzazz, Creative Publications

- * Give the fraction name for the shaded part of a region or collection (Denominators 2, 3, 4, 8, 10)

Auntie Pasta's Fraction Game

Everyday Mathematics, Lessons 8.1 - 8.6
Teacher supplement
Website games and resources

- * Understand fractions as names for equal parts of a region or set

Everyday Mathematics, Lessons 8.4, 8.5
EM resource for fraction circles, Math Masters, page 144

**Recognize equivalent fraction names*

Everyday Mathematics Lesson
8.4
Everyday Math Fraction Card
Game

Flemington-Raritan School District Mathematics Curriculum

**Compare fractions*

Everyday Mathematics, Lesson
8.5

**Solve number stories involving fractions*

Fraction Kit, Marilyn Burns
Everyday Mathematics, Lesson
8.7

2. Demonstrate an understanding of whole number place value concepts.

** Identify place value in 1, 2, 3 and 4 digit
numbers.*

Place Value Mini Flip Charts
A Collection of Math Lessons,
Marilyn Burns "Digit Place"
Game pg 73-75
*Groundworks-Reasoning with
Numbers, Grade 2*, Creative
Publications

Everyday Mathematics Lessons
1.9, 3.1, 10.8, 10.9, 10.10
Place Value Mini Flip Charts
A Collection of Math Lessons,
(1-3) Marilyn Burns, "Digit
Place" Game pg 73-75

** Identify place value for ones, tens and hundreds.*

Everyday Mathematics, Lessons
1.9, 1.12, 1.13.

** Know and express automatically the values of
digits in 5 digit numbers.*

Quizmo Bingo

Teacher supplement
Website resources

** Solve number grid puzzles*

Everyday Mathematics, Lessons
1.8, 7.2, 10.6, 11.2

Flemington-Raritan School District

3. Understand that numbers have a variety of uses.

Teacher supplement: bring in number related math ideas from everyday life as often as possible

4. Count and perform simple computations with coins.

***Amounts up to \$1.00 using cent notation.**

Everyday Mathematics, Lessons 3.2, 3.7, 3.8, 10.2
EM Fruit Stand Poster, page 54
EM Milk and Juice Vending Machine, EM Math Masters, page 58
EM Good Buys Poster, Journal, page 240
The Purse, by Kathy Caple

** Find values of bill combinations, including \$1, \$5, \$10, and \$100.*

Money Bags Game
Allowance Game

Everyday Mathematics, Lessons 1.2, 1.5, 3.2, 3.8, 4.3, 4.6, Overhead Money, play/real money

**Show "P" "N" "D" and "Q" for a given amount.*

**Make change up to \$1.00.*

**Making change from \$10.00*

Everyday Mathematics, Lesson 1.2, 1.6, 3.2, 4.3
Everyday Mathematics, Lessons 1.2, 1.6, 3.2, 3.7, 3.8, 4.3, 4.6, 10.6
EM resource, Good Buys Poster,
Alexander, Who Used to be Rich Last Sunday, Judith Viorst

** Know exchange values of US coins.*

Everyday Mathematics, Lesson 3.8
Teacher supplement
Website resources

Flemington-Raritan School District Mathematics Curriculum

**Use equivalent coins to show money amounts in different ways.*

Everyday Mathematics, Lessons
3.2, 10.1, 10.4
Teacher supplement

**Use a calculator to compute money amounts.*

Everyday Mathematics, Lessons
10.3, 10.4
EM resource, Then and Now
Poster

**Solve money stories involving change.*

Everyday Mathematics, Lessons
4.5, 10.2, 10.5, 11.1
Create a math center class store
to practice shopping
EM resources, Art Supply Poster
The Great Party Supply Store
Pigs Will Be Pigs: Fun with Math
and Money, Amy Axelrod

5. Compare and order whole numbers.

**Compare and order numbers using less than,
greater than, and equal to.*

Big Book, More or Less
Everyday Mathematics Lessons
1.11

Flemington-Raritan School District

B. Numerical Operations

By the end of second grade, 80% of Flemington-Raritan second grade students will have basic fact mastery for addition facts 0-9, and 70% of Flemington-Raritan second grade students will have basic fact mastery for subtraction facts 0-9.

District Timed Tests: 20 facts in one minute

Marking period packets: MP 1, 2, 3, 4 Addition and Subtraction separate

1. Develop the meanings of addition and subtraction by concretely modeling and discussing a large variety of problems.

***Joining, separating and comparing**

Teaching Student-Centered Mathematics, Grades K-3, Lovin and Van de Walle

*Everyday Mathematics, Lessons 2.7, 4.1, 4.2
Teacher supplement
Website resource*

Putting Together & Taking Apart, student sheets 13-16, Dale Seymour Publications by K. Economopoulos & S.J. Russell

**Solve simple addition number stories.*

*Everyday Mathematics Lessons 2.1, 4.1, 4.2, 6.4
Some students may begin to recognize parts and total or change to more ideas in their stories
Make a class addition story book
Fish Poster
Coins, Coupons, & Combinations, story problems pgs. 157-162, Dale S. Seymour
Start-Change-End diagram*

Flemington-Raritan School District Mathematics Curriculum

**Write addition and subtraction number stories.*

Everyday Mathematics, Lesson 6.2

NJPASS State rubric

**Solve addition and subtraction stories*

Close To 20

Everyday Mathematics Lessons 2.1, 4.1, 4.2, 4.6, 6.2-6.4, 11.1, 11.2

Twelve Ways to Get Eleven,

Eve Merriam

EM Diagram resource

EM resource for jumping height data

2. Explore the meanings of multiplication and division by modeling and discussing problems.

**Model multiplication and division with arrays.*

Everyday Mathematics, Lesson 6.7 - 6.9

EM resource: Multiplication array,

One Hundred Hungry Ants,

Elinor J. Pinczes

Teaching Student-Centered Mathematics K-3, Lovin and Van de Walle

Website resources

**Construct multiplication/division fact families.*

Everyday Mathematics, Lessons 11.7 - 1.9, 12.4, 12.5

**Multiply numbers with 2, 5, or 10 as a factor.*

Everyday Mathematics, Lesson 7.1, 11.6

**Introduce a products table and find patterns for 0 and 1 facts*

Everyday Mathematics, Lesson 11.7

Flemington-Raritan School District Mathematics Curriculum

**Solve stories about multiplication of equal groups*

Everyday Mathematics, Lesson
6.8, 6.9, 6.10, 11.4
Teacher supplement
Each Orange Had Eight Slices:
A Counting Book, Paul Giganti,
Jr.
Sea Squares, Joy N. Hulme
EM resource: multiplication
diagram

**Solve equal grouping and equal sharing division
problems*

Everyday Mathematics, Lesson
6.10, 11.5, 12.5
A Remainder of One, Elinor J.
Pinczes
EM resource: division diagram
Teacher supplement

**Solve simple multiplication and division number
stories.*

Everyday Mathematics, Lesson
11.4, 11.5

**3. Develop proficiency with basic addition and
subtraction number facts using a variety of fact
strategies (such as counting on and near
doubles) and then commit them to memory.**

Oh No 20!
Pyramid of 10
Rio Addition

Teacher Supplement
Everyday Mathematics, ongoing
activities throughout the year
(Double facts)
Everyday Mathematics, Lesson
2.3, EM
Two of Everything: A Chinese
Folktale, Lily Toy Hong
(+/- Facts table)
(Domino-Dot Patterns)
(+ (shortcut)
Facts in a Flash
Fast Facts
Website resources

Flemington-Raritan School District Mathematics Curriculum

**Review +0 and +1 addition facts*

Everyday Mathematics, Lesson
2.2
Fish Eyes: A Book You can
Count On, Lois Ehler

**Know addition facts, sums to 18.*

Everyday Mathematics Lesson
2.1-2.6, 2.10,
EM Skills Link
Website resources
Illustrations website- Five and
Ten Frame activities

**Explore and practice double-plus 1 and doubles-
plus 2 facts*

Everyday Mathematics, Lesson
2.5

**Know subtraction facts.*

Everyday Mathematics, Lesson
2.6, 2.7, 2.10, 2.11, 2.12, 2.13,
3.6, 4.4, 6.2, 6.4, 6.5
Teacher supplement: website,
games, extra practice

**Construct fact families for addition and
subtraction*

Everyday Mathematics, Lesson
2.6, 2.7, 2.10

**Practice doubling and halving*

Everyday Mathematics, Lesson
2.3 & 7.5
Anno's Magic Seeds,
Two of Everything: A Chinese
Folktale, Lilly Toy Hong

** Find distances on a number grid, number line*

Everyday Mathematics, Lesson
2.2, 2.10, 3.6, 4.1

**Complete simple Frames-and-Arrows diagrams.*

Everyday Mathematics, Lesson
2.10

**Solve Frames and Arrow problems having two
rules*

Everyday Mathematics, Lesson
2.10, 3.6

Flemington-Raritan School District

4. Construct, use and explain procedures for performing addition and subtraction calculations with:

- *pencil and paper**
- *mental math**
- *calculator**

**Add and subtract multiples of 10*

** Know compliments of 10. (using two digit numbers)*

**Find missing addends for the next multiple of 10.*

5. Use efficient and accurate pencil and paper procedures for computation with whole numbers.

- *Addition of 2-digit numbers**
- *Subtraction of 2-digit numbers**

** Devise and use strategies for finding sums and differences of 2-digit numbers.*

Everyday Mathematics, Lesson 4.8, 4.9
EM Skills Book
Website Resources for practice

Everyday Mathematics, Lesson 1.5, 1.8, 1.10, 3.1, 3.4, 4.5, 4.6-4.9, 6.5, 7.1, 10.9

Everyday Mathematics, Lesson 7.2
Illumination web-site (Ten Frames)
Website resources

Everyday Mathematics, Lesson 7.2, selected activities
Elementary School Mathematics with Pizzazz, Creative Publications

Everyday Mathematics, activities, ongoing throughout the year
Website resources
Elementary School with Pizzazz, Creative Publications

Everyday Mathematics, Lesson 4.6, 4.8
Teacher Supplement
Website resources for practice
EM Skills Book

Flemington-Raritan School District

**Use partial-sums, traditional and other algorithms to develop a successful strategy for addition*

Everyday Mathematics, Lesson 4.9
Teacher supplement

**Use the trade-first and other methods to solve 2-digit subtraction problems.*

Teacher supplement
Everyday Mathematics, Lesson 6.4, 6.5
Website resources

**Add three 2-digit numbers mentally*

Everyday Mathematics, Lesson 7.3
EM Skills Link
Website resources
EM teacher resource

6. Select pencil and paper, mental math or calculator as the appropriate computational method in a given situation depending on the context and numbers.

Teacher Supplement with problem solving situations
Website resources

** Devise and use strategies for finding sums and differences of 2-digit numbers.*

Everyday Mathematics, Lesson 11.3
Activities ongoing throughout the year
Teacher supplement

7. Check the reasonableness of results of computations.

Everyday Mathematics activities, ongoing throughout the year
Teacher supplement

Flemington-Raritan School District Mathematics Curriculum

****Select and use various types of reasoning and methods of proof. Use reasoning to support their mathematical conclusions and problem solutions.***

**Make ballpark estimates*

Best of Math I and II, Exemplars
CD
Roads to Reasoning Series,
Creative Publications
NJPASS State rubric
Website resources
Read It Draw It Solve It
Everyday Mathematics, Lessons
4.5, 4.8, 4.9, 10.5, 10.6, 11.1
Teacher supplement

8. Understand and use the inverse relationship between addition and subtraction.

**Frames and Arrows*

** W h a t ' s M y R u l e ? E v e r y d a y M a t h e m a t i c s , L e s s o n 2.11 and ongoing throughout the year*
See also Function machines

**Diagramming Number Stories*

Everyday Mathematics, Lesson
2.10 and ongoing throughout the
year
*Teaching Student Centered
Mathematics, Grades K-3*, Lovin
and Van de Walle pgs 58-59
2.11 and ongoing throughout the
year
See also Function machines

**Understand parts to whole relationships using
addition and subtraction.*

**Develop and find missing addends.*

Everyday Mathematics, Lesson
2.4
Teacher Supplement
8- Step Model Drawing, Bob
Hogan & Char Forsten, Crystal
Springs Books 2007

Teacher Supplement
*Teaching Student Centered
Mathematics, Grades K-3*, Lovin
and Van de Walle
Teacher Supplement

C. Estimation

1. Judge without counting whether a set of objects has less than, more than or the same number of objects as a reference set.

Teacher supplement

2. Determine the reasonableness of an answer by estimating the result of computations (e.g., $15 + 16$ is not 211).

Everyday Mathematics, Lesson 4.5 and ongoing throughout the year

3. Explore a variety of strategies for estimating both quantities (e.g., the number of marbles in a jar) and results of computation.

**Example - Estimating the number of marbles in a jar.*

Teacher supplement

Flemington-Raritan School District Mathematics Curriculum

Grade: 2 Standard 4.2 Geometry and Measurement

Essential Questions: How can knowledge of geometric properties help in problem solving situations?

How can coordinate grid systems help in understanding locations?

How does the mathematics of geometry enable us to wonder and understand our natural and physical world?

Knowledge/Skills/Understandings	Assessments	Learning Experiences	Resources
A. Geometric Properties			
1. Identify and describe spatial relationships between objects in space and their relative shapes and sizes.	Unit Assessments Do Now Teacher Observation Discussion Open Ended Writing Tasks Recognizing Student Achievement sections in Everyday Math 3	Direct Instruction Collaborative and Cooperative Learning Open Ended Writing Tasks EM Games Geoboards Attribute Blocks Miras 3-D Nets Polygon Tiles Wooden 3-D shapes Attribute Bingo Tangram Packet Angles	<i>Everyday Mathematics</i> , Unit 5 NJ Mathematics Curriculum Frameworks K-2, selected activities <i>Teaching Student Centered Mathematics</i> , K-3, Lovin and Van de Walle
* Inside/outside, left/right, above/below, between			<i>Everyday Mathematics</i> activities, ongoing throughout the year Teacher supplement <i>Everyday Mathematics</i> , Lesson 5.4 Teacher supplement
*Smaller/larger/same size, wider/ narrower, longer/shorter			
*Congruence (same size and shape)			<i>Everyday Mathematics</i> , Lesson 5.6 Teacher supplement Website resources

Flemington-Raritan School District Mathematics Curriculum

**Sort and classify objects according to attributes.*

Everyday Mathematics, Lesson 5.4
Teacher supplement

**Define, name and draw point and line segments,*

Everyday Mathematics, Lesson 5.2

**Introduce concept of parallel*

Everyday Mathematics, Lesson 5.3
Create a symmetry booklet or bulletin board

2. Use concrete objects, drawings and computer graphics to identify, classify and describe standard three-dimensional and two-dimensional shapes.

*** Vertex, edge, face, side**

Grandfather Tang's Story, Ann Tompert
Teaching Student-Centered Mathematics, K-3, Lovin and Van de Walle
Everyday Mathematics, Lesson 5.6, 5.7
Create class chart
Website resources

*** 2D Figures- square, rectangle, circle, triangle**

Everyday Mathematics, Lesson 4.7, 5.1
The Greedy Triangle, Marilyn Burns
A Cloak for the Dreamer, Aileen Friedman
Website resources

*** 3D Figures-cube, rectangular prism, sphere, cone, cylinder, and pyramid**

Everyday Mathematics, Lesson 5.6, 5.7
Laminate Pyramid Base cards,
Website resources
Shapes, Shapes, Shapes, Tana Hoban

Flemington-Raritan School District Mathematics Curriculum

**Identify names and characteristics of quadrangles, beyond square and rectangle*

*Everyday Mathematics, Lesson 5.3 & 5.4
Teacher supplement*

***Relationships between three-and two dimensional shapes**

*Groundworks Reasoning with Measurement,
Creative Publications
Everyday Mathematics, Lesson 5.6 & 5.7*

3. Describe, identify, and create instances of line symmetry

Shapes, Halves, and Symmetry pg. 196 & 197

*Everyday Mathematics, Lesson 5.8
Lao Lao of Dragon Mountain, Margaret Bateson-Hill
Website resources
EM Project 5: Making Snowflakes
Investigations in Number, Data, and Space: Shapes, Halves & Symmetry, Joan Akers*

4. Recognize, describe, extend, and create designs and patterns with geometric objects of different shapes and sizes

*Shapes, Halves, & Symmetry
Pg 172 - 175 (Predict & Cover)*

Everyday Mathematics, Lesson 5.5

B. Transforming Shapes

1. Use simple shapes to make designs, patterns, and pictures

*Everyday Mathematics, Lesson 5.1, 5.5, 10.7
Shapes, Shapes, Shapes, Tana Hoban
The Art of Shapes for Children and Adults, Margaret Steele and Cindy Estes
Website resources*

2. Combine and subdivide simple shapes to make other shapes

*Everyday Mathematics, Lesson 5.1, 5.5, 8.2
Teacher supplement*

Flemington-Raritan School District Mathematics Curriculum

C. Coordinate Geometry

1. Give and follow directions for getting from one point to another on a map or grid

Teacher Supplement
See Social Studies Unit on Map Skills

D. Units of Measurement

1. Directly compare and order objects according to measurable attributes

*Attributes- length, weight, capacity, time, temperature.

Mapping Flat Stanley

Everyday Mathematics, Lesson 4.3, 4.7, 5.1

2. Recognize the need for a uniform unit of measure

Everyday Mathematics, Lessons 4.4, 4.7, 7.5 - 7.7, Unit 9,
Navigations in Measurement, grades K-2,
NCTM, selected activities

3. Select and use appropriate standard and non-standard units of measure and standard measurement tools to solve real life problems.

Everyday Mathematics, activities, ongoing in Unit 9
Teacher supplement
Website resources
Groundworks -Reasoning with Measurement, Creative Publications
Elementary School Mathematics with Pizzazz, Creative Publications

Flemington-Raritan School District Mathematics Curriculum

* Length- inch, foot, yard, centimeter, meter

Everyday Mathematics, Lesson 4.7, 7.5, 7.6, 9.1, 9.2

How Big is a Foot? Rolf Myller

Counting on Frank, Rod Clement

Twelve Snails to One Lizard: A Tale of Mischief and Measurement, Susan

Hightower

EM resource, A Foot and A decimete

Create a class table of equivalent measures in US customary and metric

**Investigate accuracy in measurement using tools,
1/2 inch, 1/2 centimeter*

Everyday Mathematics, Lesson 9.3

Teacher supplement

Website resources

Inch by Inch, Leo Lionni

**Introduce the mile and kilometer*

Everyday Mathematics, Lesson 9.5

*Weight- pound, gram, kilogram

**ounce*

Everyday Mathematics, Lesson 2.8, 7.5, 9.9

*Capacity- pint, quart, liter

Everyday Mathematics, Lesson 9.8

Create class table of equivalencies

Elementary School Mathematics with

Pizzazz, Creative Publications

*Time- second, minute, hour, day, week, month, year

Everyday Mathematics, Lesson 1.3, 5.1, 12.1 - 12.3

**Tell time to five minute intervals*

Project 8: How Far Can I
Run in 10 Seconds?

Everyday Mathematics Lesson 3.3, 3.4, 5.1, 12.2

Website resources

Flemington-Raritan School District Mathematics Curriculum

***Temperature- degrees Celsius, degrees Fahrenheit**

Project 2: Weather Station A
Week of Weather
Observations

Thermometer
Everyday Mathematics, Lesson 1.12, 4.3, 4.4
Link to science units on temperature around the country and world

5. Solve problems involving elapsed time.

Everyday Mathematics, Lesson 4.9, 12.3
Teacher supplement
Elementary School Mathematics with Pizzazz, Creative Publications

4. Estimate measures

Teacher supplement
Website resources

E. Measuring Geometric Objects

1. Directly measure the perimeter of simple two-dimensional shapes

Everyday Mathematics, Lesson 9.4
Navigation with Measurement, K-2, NCTM

2. Directly measure the area of simple two-dimensional shapes by covering them with squares.

Everyday Mathematics, Lesson 4.7, 9.7, 10.7
NJ Mathematics Curriculum Framework, grades K-2, selected activities

** Develop the concept of area as square units*

Everyday Mathematics, Lesson 9.7, 10.7
Teaching Student-Centered Mathematics, in Grades K-3, Lovin and Van de Walle

**Investigate perimeter and area relationship*

Everyday Mathematics, Lesson 9.7
Teacher supplement
Website resources

**Explore concept of volume*

Everyday Mathematics, Lesson 8.2
Teaching Student-Centered Mathematics, Grades K-3, Lovin and Van de Walle, pg 239-240.

Flemington-Raritan School District

Grade: 2 Standard 4.3 Patterns and Algebra			
Essential Questions: How can patterns help in problem solving?			
How can symbols be used to help us in problem solving?			
How does the study of algebra help us understand mathematical patterns as the patterns found in nature & the real world?			
Knowledge/Skills/Understandings	Assessments	Learning Experiences	Resources
A. Patterns			
1. Recognize, describe, extend and create patterns	Unit Assessments Do Now Teacher Observation Discussion Open Ended Writing Tasks Recognizing Student Achievement sections in Everyday Math 3	Direct Instruction Collaborative and Cooperative Learning Open Ended Writing Tasks EM Games Geoboards Attribute Blocks Miras, reflection mirrors 3-D Nets Polygon Tiles Wooden 3-D shapes Attribute Bingo Tangram Packet Anglels	<i>Everyday Mathematics</i> , Lesson 1.10, 1.8, 2.10, 7.1, 7.5 Teacher supplement
*Using concrete materials (manipulatives), pictures, rhythms, & whole numbers		Project 1: Boxes, Boxes, Beautiful Boxes	Teacher supplement
*Descriptions using words and symbols (e.g., "add two" or "+2")			Teacher supplement
*Repeating patterns.			
*Whole number patterns that grow or shrink as a result of repeatedly adding or subtracting a fixed number			<i>Everyday Mathematics</i> , Lesson 1.10 Teacher Supplement
<i>*Complete number sequences; identify and use number patterns to solve problems.</i>			<i>Everyday Mathematics</i> Lesson 1.1, 1.8, 1.10
<i>*Solve Number Grid Puzzles</i>			<i>Everyday Mathematics</i> , Lesson 1.8

Flemington-Raritan School District

B. Functions and Relationships			
1. Use concrete and pictorial models of function machines to explore the basic concept of a function.			Teacher supplement <i>Teaching Student-Centered Mathematics</i> , K-3, Lovin and Van de Walle
<i>*Complete "What's My Rule," Input/Output Tables, and T- Charts.</i>			<i>Everyday Mathematics</i> , Lesson 2.11 Ongoing throughout the year
<i>*Complete simple Frames-and-Arrows diagrams. *Complete two rule "Frames-and-Arrows" diagrams</i>			<i>Everyday Mathematics</i> , Lesson 2.10, 3.6 Activities ongoing throughout the year
C. Modeling			
1. Recognize and describe changes over time (e.g., temperature, height).			Teacher supplement
<i>* Interpreting pictures, tally charts, pictographs, bar graphs, and Venn diagrams</i>			Teacher Supplement Website resources
<i>*Collecting daily weather data</i>			Teacher Supplement Website resources
2. Construct and solve simple open sentences involving addition or subtraction.			<i>Everyday Mathematics</i> , activities, ongoing throughout the year Teacher supplement with website resources and other published worksheets
*Result unknown (e.g., $6 - 2 = \underline{\quad}$ or $n = 3 + 5$)			Ongoing activities throughout the year <i>Elementary School Mathematics with Pizzazz</i> , Creative Publications

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*Part unknown (e.g., $3 + \underline{\quad} = 8$)			Ongoing activities throughout the year EM Skills Link
D. Procedures			
*Commutative (e.g., $5 + 3 = 3 + 5$) *Turn-Around Facts.			Teacher Supplement Everyday Mathematics, Lesson 2.4
*Zero as the identity element (e.g., $7 + 0 = 7$)			Everyday Mathematics, Lesson 2.2 Teacher supplement
*Associative (e.g., $7 + 3 + 2$ can be found by first adding either $7 + 3$ or $3 + 2$)			Everyday Mathematics, Lesson 10.11 Teacher supplement
*Introduce the use of parentheses in number models			Everyday Mathematics, Lesson 10.11

Flemington-Raritan School District Mathematics Curriculum

Grade: 2 **Standard 4.4 Data Analysis, Probability, and Discrete Mathematics**

Essential Questions: How can classifying help me in organizing data to solve problems?

How can statistics help us to understand real world situations?

How can the study of real world data help us understand and make accurate predictions?

Knowledge/Skills/Understandings	Assessments	Learning Experiences	Resources
A. Data Analysis			
1. Collect, generate, record, and organize data in response to questions, claims or curiosity.	Unit Assessments Do Now Teacher Observation Discussion Open Ended Writing Tasks Recognizing Student Achievement sections in Everyday Math 3	Direct Instruction Collaborative and Cooperative Learning Open Ended Writing Tasks EM Games Calendars Graphs/Charts Attribute Blocks Miras, reflection mirrors Dominoes	<i>Navigations in Data Analysis and Probability in K-2</i> , NCTM, selected activities NJ Mathematics Framework, grades K-2, selected activities
* Data collected from students everyday experiences.			<i>Everyday Mathematics</i> , Lesson 3.5, 6.3, 7.6 Website resources Daily morning activities, ongoing throughout the year
<i>*Collecting daily weather data</i>			
* Data generated from chance devices, such as spinners and dice			<i>Everyday Mathematics</i> , Lesson 3.2. Frog Math, <i>Math by All Means: Probability 1-2</i> , Marilyn Burns <i>Groundworks Reasoning with Probability</i> , Creative Publications

Flemington-Raritan School District Mathematics Curriculum

2. Read, interpret, construct and analyze displays of data

Everyday Mathematics, Lesson 7.6 -
7.8, 12.6, 12.7
Teacher supplement

***Pictures, tally charts, pictograph, bar graph, Venn diagram**

Everyday Mathematics, Lesson 3.5, 7.9
Link data examples from Language Arts, Science, Social Studies Curriculum
Teacher supplement

***Smallest to largest, most frequent, mode**

Everyday Mathematics, Lesson 10.10, 12.7
Teacher supplement

** Finding the middle number (median) in a set of data*

Everyday Mathematics, Lesson 3.5, 7.6, 12.7
Website resources

**Review range of data*

Teacher supplement

B. Probability

1. Use chance devices like spinners and dice to explore concepts of probability

Math By All Means, Probability 1-2,
Marilyn Burns
Elementary School Mathematics with Pizzazz, Creative Publications

***Certain, impossible**

Teacher Supplement

***More likely, less likely, equally likely**

Teacher Supplement

Flemington-Raritan School District Mathematics Curriculum

2. Provide probability of specific outcomes.

D. Discrete Mathematics-Vertex, edge graphs and Algorithms

*** Probability of getting specific outcome when coin is tossed, when die is rolled, when spinner is spun (e.g., if spinner has five equal sectors, then probability of getting a particular sector is one out of five.)**

*** When picking a marble from a bag with three red marbles, the probability of getting a red marble is three out of seven.**

C. Discrete Mathematics - Systematic Listing and Counting

1. Sort and classify objects according to attributes.

***Venn Diagrams**

2. Generate all possibilities in simple counting situations

District teacher made packets
Best of Math I and II, Exemplars, CD
Navigations in Data Analysis and Probability, K-2, NCTM, selected problems
Website resources

Groundworks-Reasoning with Probability, Creative Publications
NJ Mathematics Curriculum Framework, grades K-2, 3-4, selected activities

Teaching Student-Centered Mathematics in grades K -3, Lovin and Van de Walle

Everyday Mathematics, selected activities, Unit 5
Teacher supplement

Teacher supplement

Read It! Draw It! Solve It!
Teacher Supplement
Best of Math I & II, Exemplar CD

Flemington-Raritan School District

1. Follow simple sets of directions

Navigations Through Geometry Pre K-2,
NCTM
See Map skills, Social Studies
Curriculum

2. Color simple maps with a small number of colors.

District-teacher made worksheets
Website resources for maps

3. Play simple games and informally explore the idea of what the outcome should be.

Math by All Means: Probability 1-2,
Marilyn Burns
NJ Mathematics Curriculum Framework,
K-2, selected activities

4. Explore concrete models of vertex-edge graphs

Navigations Through Geometry PreK- 2,
NCTM
Teacher supplement

**Paths from one vertex to another*

Flemington-Raritan School District

Grade: 2 Standard 4.5 Mathematical Processes

Big Idea: Mathematical understandings are an essential part of our lives in and out of school and as such all children need to have an instinctive sense of mathematical resources that they can rely on to help them progress through life.

**Essential Questions: How will learning to "think" mathematically enable us to make a life, make a living, and make a difference?
How does the use of technology enable us to have a deeper understanding of mathematics?**

Knowledge/Skills/Understandings	Assessments	Learning Experiences	Resources
A. Problem Solving			
1. Learn mathematics through problem solving inquiry and discovery.	Unit Assessments Do Now Teacher Observation Discussion Open Ended Writing Tasks Recognizing Student Achievement sections in Everyday Math 3	Direct Instruction Collaborative and Cooperative Learning Open Ended Writing Tasks EM Games Exemplars Angle Pattern Blocks Attribute Blocks 3-D Shapes MIRA reflection mirrors	<i>Teaching Student-Centered Mathematics, Grades K-3</i> , Lovin and Van de Walle <i>Best of Math I and II, Exemplars</i> CD Website resources for open-ended problems
2. Solve problems that arise in mathematics and in other contexts.			<i>Best of Math I and II, Exemplars</i> CD Use examples of math that occur daily in life Teacher supplement NJ Mathematics Curriculum Framework, page 46 - 47

Flemington-Raritan School District Mathematics Curriculum

* Open ended problems

Best of Math I and II, Exemplars CD
Groundworks books, Creative Publications,
selected activities
Website resources
NJ state rubric
Roads to Reasoning, Developing Thinking Skills, Suzanne Levin

* Non-routine problems

Best of Math I and II, Exemplars CD
Website resources
Everyday Mathematics activities, ongoing
throughout the year

* Problems with multiple solutions

Best of Math I and II, Exemplars CD
Navigation series, NCTM, selected activities
Read It Solve It Draw It

* Problems that can be solved in several ways

Best of Math I and II, Exemplars CD
Sample problems from published workbooks
or internet sources

3. Select and apply a variety of appropriate problem-solving strategies to solve problems.

Best of Math I and II, Exemplars CD
Groundworks series, selected activities,
Creative Publications
Teacher supplement

4. Pose problems of various types and levels of difficulty.

Website resources
Teacher Supplement

5. Monitor their progress and reflect on the process of their problem solving activity.

Read It! Draw It! Solve It!
Best of Math I and II, Exemplars CD
Roads to Reasoning, Suzanne Levin

B. Communication

Flemington-Raritan School District Mathematics Curriculum

1. Use communication to organize and clarify their mathematical thinking.

*** Reading and writing**

***Discussion, listening and questioning**

2. Communicate their mathematical thinking coherently and clearly to peers, teachers, and others, both orally and in writing.

3. Analyze and evaluate the mathematical thinking and strategies of others.

4. Use the language of mathematics to express mathematical ideas precisely.

C. Connections

1. Recognize recurring themes across mathematical domains (e.g., patterns in number, algebra, and geometry).

2. Use connections among mathematical ideas to explain concepts (e.g., two linear equations have a unique solution because the lines they represent intersect at a single point).

Read It! Draw It! Solve It!
Best of Math I and II, Exemplars CD
Roads to Reasoning, Suzanne Levin

Website resources
NJ Mathematics Curriculum Framework, K-2
selected activities

Teacher supplement

Read It! Draw It! Solve It!
Teaching Student-Centered Mathematics, in
Grades K-3, Lovin and Van de Walle, page 4 -
6

Read It! Draw It! Solve It!
Best of Math I and II, Exemplars CD
Roads to Reasoning, Suzanne Levin
Website resources

NJ Mathematics Curriculum Framework,
grades K-2, selected activities

Teacher supplement with website and other
resources

Read It! Draw It! Solve It!
Roads to Reasoning, Suzanne Levin
Teacher supplement

Flemington-Raritan School District Mathematics Curriculum

3. Recognize that mathematics is used in a variety of contexts outside of mathematics.

Everyday Mathematics, Lesson 1.1
Best of Math I & II Exemplars CD
Roads to Reasoning, Suzanne Levin
 Incorporates appropriate math ideas with Science, Language Arts and Social Studies Curriculum

4. Apply mathematics in practical situations and in other disciplines.

Read It! Draw It! Solve It!
 Teacher supplement
 Website Resources

5. Trace the development of mathematical concepts over time and across cultures (cf. world languages and social studies standards).

Project 6: Time Capsule

Everyday Mathematics, Lesson 1.1, 12.3
 See Social Studies curriculum activities

6. Understand how mathematical ideas interconnect and build on one another to produce a coherent whole.

Teacher supplement

D. Reasoning

1. Recognize that mathematical facts, procedures, and claims must be justified.

Read It! Draw It! Solve It!
Best of Math I and II, Exemplars CD
Roads to Reasoning, Suzanne Levin

2. Use reasoning to support their mathematical conclusions and problem solutions.

Teacher Supplement
 NJ Mathematics Curriculum Framework K-2, selected activities
 NJ State Rubric
Best of Math I and II, Exemplars CD

Flemington-Raritan School District Mathematics Curriculum

3. Select and use various types of reasoning and methods of proof.

Read It! Draw It! Solve It!
Groundworks, selected activities Creative Publications
Website resources

4. Rely on reasoning, rather than answer keys, teachers, or peers, to check the correctness of their problem solutions.

Website resources

5. Make and investigate mathematical conjectures.

Read It! Draw It! Solve It!
Teacher supplement
Website resources

*** Counterexamples as a means of displaying conjectures.**

Teacher supplement

*** Verifying conjectures using informal reasoning or proofs.**

Teacher supplement

6. Evaluate examples of mathematical reasoning and determine whether they are valid.

Teacher Supplement

E. Representations

1. Create and use representations to organize, record, and communicate mathematical ideas.

Read It! Draw It! Solve It!
Best of Math I and II, Exemplars CD
Roads to Reasoning, Suzanne Levin
Groundworks series, selected activities, Creative Publications
Elementary School Mathematics with Pizzazz, Creative Publications
Teacher supplement
Everyday Mathematics, Lesson 1.2

*** Concrete representations (e.g., base-ten blocks)**

Flemington-Raritan School District Mathematics Curriculum

* **Pictorial representations (e.g., diagrams, charts, or tables)**

Everyday Mathematics, Lesson 1.2, 1.3

* **Symbolic representations (e.g., a formula)**

Teacher supplement

* **Graphical representations (e.g., a bar graph)**

Teacher supplement

2. Select, apply, and translate among mathematical representations to solve problems.

Roads to Reasoning, Suzanne Levin
Best of Math I and II, Exemplars CD

3. Use representations to model and interpret physical, social, and mathematical phenomena.

Teacher supplement
Website resources

F. Technology

1. Use technology to gather, analyze, and communicate mathematical information.

Teacher supplement

2. Use computer spreadsheets, software, and graphing utilities to organize and display quantitative information (cf. workplace readiness standard 8.4-D).

Teacher supplement
Activities in conjunction with technology teacher

Flemington-Raritan School District Mathematics Curriculum

3. Use graphing calculators and computer software to investigate properties of functions and their graphs.

Teacher supplement
Website resources
Texas Instruments resources

4. Use calculators as problem-solving tools (e.g., to explore patterns, to validate solutions).

TI-1 08

5. Use computer software to make and verify conjectures about geometric objects.

Activities in conjunction with technology teacher
Website resources
National Virtual Manipulatives Library website

6. Use computer-bases laboratory technology for mathematical applications in the sciences (cf. science standards).

Activities in conjunction with technology teacher and or science lessons

Flemington-Raritan School District
Mathematics Curriculum

**Third Grade Math
Pacing Guide**

Unit	Number of Days (approximate)	Unit	Number of Days (approximate)
1 . Routines/Review & Assessment	16	7 . Multiplication & Division	15
2 . Adding & Subtracting Whole Numbers	15	8 . Fractions	11
3 . Linear Measures & Area	14	9 . Multiplication & Division	17
4 . Multiplication & Division	14	10 . Measurement & Data	13
5 . Place Value, Whole Numbers & Decimals	16	11 . Probability	8
6 . Geometry	15	End-of-the-Year Benchmark Assessment	1

Flemington-Raritan School District
Mathematics Curriculum

Mid-Year Benchmark Assessment	1		
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Grade: 3 **Standard 4.1 Number and Numerical Operations**
Essential Question: How can problems in the real world be solved with mathematics?
How can estimation be useful to us?
How do numbers help us reason out solutions to problems?
How do basic operations help us understand numbers?

Knowledge/Skills/Understandings
A. Number Sense

Assessments

Learning Experiences

Resources

1. Use real-life experiences, physical materials, and technology to construct meanings for numbers.

Unit Assessments
Do Now/Ticket In/Exit Ticket
Teacher Observation
Discussion
Open Ended Writing Tasks
Recognizing Student Achievement sections in Everyday Math 3

Direct Instruction
Collaborative and Cooperative Learning
Open Ended Writing Tasks
EM Games & Activities
Digi-blocks
Base Ten Blocks
Calendar skills
Pattern Blocks
Place value mat or chart
Fraction strips
Fraction Circles
Cuisenaire Rods
Tangrams
Geoboards
Otter Creek- Fact Mastery
Greg Tang Strategies

Groundworks- Reasoning with Numbers, Creative Publications
NJ Mathematics Curriculum
Framework in Grade 3-4, selected problems
EM Home Link Book

Flemington-Raritan School District Mathematics Curriculum

***Read and write whole numbers through hundred thousands**

** Read, write and compare large numbers*

***Read and write commonly used fractions (denominators of 2, 3, 4, 5, 6, 8, 10) as part of a whole, as a subset of a set, and as a location on a number line**

**Identify fractional parts of a region*

**Identify fractional parts of a set.*

**Solve fraction number stories*

**Introduce the number line for fractions*

2. Demonstrate an understanding of whole number place value concepts.

**Identify place value in whole numbers up to 6 digits*

**Introduce concept of rounding to a specific place value*

Everyday Mathematics, Lesson 5.1, 5.2, 5.3, 5.5

How Much is a Million?, David Schwartz

Everyday Mathematics Lesson, 5.4,

A Collection of Math Lessons 3-5, Marilyn Burns
About Teaching Mathematics, Marilyn Burns
Everyday Mathematics, Unit 8

Everyday Mathematics Lesson 1.6, 3.2, Unit 8, 9.3,
Ed Emberley's Picture Pie, A Book of Circle Art, Ed Emberley
Eating Fractions, Bruce McMillan

Everyday Mathematics Lesson 8.7, 8.8, 9.7, 9.13

Math Curse, Jon and Lane Smith, Scieszka

Everyday Mathematics, Lesson 8.4

EM Project 6: How Far Can You go in a Million Steps?

Elementary School Mathematics with Pizzazz, Creative Publications

Everyday Mathematics, Lesson 5.1 - 5.5

Teacher supplement

Flemington-Raritan School District Mathematics Curriculum

3. Identify whether any whole number is odd or even.

Everyday Mathematics, activities ongoing throughout the year
Teacher supplement

4. Explore the extension of the place value in decimals through hundredths

**Identify place value in decimals*

Teacher supplement
Everyday Mathematics, Unit 5 activities
Everyday Mathematics, Lesson 5.7 - 5.10

**Read and write 1-, 2-, 3-digit decimals (D/S)*

Everyday Mathematics Lesson 1.9, 1.10, 5.8 - 5.11, 6.10, 9.1, 9.5

5. Understand the various uses of numbers

***counting, measuring, labeling**

***counting money**

Everyday Mathematics, Lesson 1.1, 9.5, 10.1 - 10.5

**Find factors of a number*

Everyday Mathematics, Lesson 9.6

**Find equivalent fractions*

Everyday Mathematics, Lesson 8.4, 8.5, 9.3

**Investigate positive and negative numbers*

Everyday Mathematics, Lesson 9.13

6. Compare and order numbers

Everyday Mathematics, Unit 5
Elementary School Mathematics with Pizzazz, Creative Publications

Flemington-Raritan School District Mathematics Curriculum

**Read, write, and compare up to 6- and 7-digit whole numbers*

Everyday Mathematics, Lesson 5.1
- 5.5, 9.1
How Much is a Million?, David Schwartz
If You Made a Million, David Schwartz
A Million Fish... More or Less, Patricia McKissack

**Compare and order commonly used fractions*

Teacher supplement
Everyday Mathematics, Lesson 3.2, 8.4 - 8.6, 9.3

**Compare and order other fractions*

**Compare and order decimals*

Everyday Mathematics, Lesson 5.7
- 5.9, 5.11

**Identify and use number patterns to solve problems*

Everyday Mathematics, Lesson 1.2, 1.11, 7.1, 9.10, ongoing

**Find equivalent names for numbers (D/S)*

Everyday Mathematics, Lesson 1.6
Twelve Ways to Get to Eleven, Eve Merriam

**Convert between mixed numbers and fractions*

A Collection of Math Lessons, 3-5, Marilyn Burns
Everyday Mathematics Lesson 1.6, 8.7

B. Numerical Operations

By the end of third grade, 90% of Flemington-Raritan third grade students will have basic fact mastery for addition facts 0-20, and 80% of Flemington-Raritan third grade students will have basic fact mastery for subtraction facts 0-20 (10+10).

By the end of third grade, 85% of Flemington-Raritan third graders shall have basic fact mastery of multiplication and division facts for 1, 2, 5, and 10.

Flemington-Raritan School District Mathematics Curriculum

District Timed tests: 50 facts in 3 minutes

Marking Period Packets: MP 1, 2, 3, 4 Addition separate, subtraction separate;; Multiplication and division facts separate

1. Develop the meaning of the four basic arithmetic operations by modeling and discussing a large variety of problems.

***Addition and subtraction: joining, separating, comparing**

***Multiplication: repeated addition, area/array**

***Division: repeated subtraction, sharing**

**Know basic addition and subtraction facts up to 20*

**Complete fact and number families*

**Solve addition and subtraction multi-digit number stories*

2. Develop proficiency with basic multiplication and division number facts using a variety of fact strategies (such as "skip counting" and "repeated subtraction")

**Know multiplication facts having 2, 5, or 10 as a factor*

Amanda Bean's Amazing Dream,
Cindy Neuschwander
Everyday Mathematics, Lessons
2.1, 2.2, 4.1 - 4.8,
*Groundworks-Reasoning with
Numbers*, Creative Publications
*Teaching Student-Centered
Mathematics, Grades 3-5*, Lovin
and Van de Walle

Teacher Supplement
Everyday Mathematics, Unit 2
Website resources

Everyday Mathematics, Lesson
2.1, 4.6, 4.7, 4.8, 7.1, 7.3

Everyday Mathematics, Lesson 2.4
- 2.6, 2.9

Teacher Supplement
Everyday Mathematics, Unit 4;
Lessons 7.1, 9.1
*Elementary School Mathematics
with Pizzazz*, Creative Publications

Teacher supplements
Everyday Mathematics, Lesson 4.4
- 4.6
The Best of Times, Greg Tang

Flemington-Raritan School District Mathematics Curriculum

**Use basic facts to solve fact extensions*

Everyday Mathematics, Unit 2, 7

**Complete multiplication/division fact families*

Everyday Mathematics, Unit 4, and activities ongoing throughout the year
Math by All Means- Multiplication, "Circles and Stars", Marilyn Burns

**Know multiplication facts up to 12 x 12*

Games: Rio; Salute,

Everyday Mathematics, Lesson 4.5, 7.2, 7.3, ongoing activities through Unit 10
Teacher Supplement
Website resources
Illustrations, National Library of Virtual Manipulatives websites

**Know assorted multiplication facts from first and second set of Fact Triangles*

Everyday Mathematics, Lesson 4.5 - 4.8, 7.1 - 7.3, 7.6, 7.8, 9.1 - 9.6
Cupid and Psyche, M. Charlotte Craft
Pegasus, Marianna Mayer
Persephone and the Pomegranate: A Myth from Greece, Kris Waldherr
Everyday Mathematics, Unit 4

**Know multiplication facts having 3 or 4 as one factor and 2 through 7 as the other factor*

**Solve extended multiplication facts to tens x tens*

Everyday Mathematics Lessons 7.6, 7.8, 9.1, 9.2

**Solve extended multiplication facts to hundreds x hundreds*

Everyday Mathematics, Lessons 7.6, 7.8, 9.1, 9.2

**Multiply by multiples of 10, 100, 1000 and divide such multiples by 1-digit numbers*

Everyday Mathematics, Lesson 7.6, 7.8, 9.1, 9.2
Website resources

Flemington-Raritan School District Mathematics Curriculum

**Interpret remainders in division problems*

Everyday Mathematics, Lesson 9.8
Teacher supplement
Remainder of One, Elinor Pinczes

**Recognize and know square products*

Everyday Mathematics, Lessons
4.6 -4.8, 7.1, 9.3
Sea Squares, Joy Hulme

**3. Construct, use and explain procedures
for performing whole number calculations
with:**

- *Pencil and Paper**
- *Mental Math**
- *Calculator**

Teacher supplements

**4. Use efficient and accurate pencil-and-
paper procedures for whole number
computation.**

Teacher supplement as needed

***Addition of 3-digit numbers**

Everyday Mathematics, Unit 2
EM Skills Book
Website resources

***Subtraction of 3-digit numbers**

Everyday Mathematics, Unit 2
EM Skills Book
Website resources

***Multiplication of 2-digit numbers by 1-
digit numbers**

Everyday Mathematics, Lessons
4.8, 7.1, 7.3, 7.6, 7.8, 9.2, 9.4, 9.5,
9.9, 9.11, 9.12, 10.6
EM Skills Book
Website Resources

Flemington-Raritan School District Mathematics Curriculum

5. Count and perform simple computations with money ***use cents notation (¢)**

**Count combinations of bills and coins and write the total using dollars and cents notation*

Everyday Mathematics, assorted Math Boxes in Units 1, 2, 4, 5, 7, 9
Teacher supplement
Website resources

Everyday Mathematics Lesson 1.9, 1.10, 7.7, 9.5, 9.7
26 Letters and 99 Cents, Tana Hoban

6. Select pencil-and-paper, mental math, or a calculator as the appropriate computational method in a given situation depending on the context and numbers

**Solve number stories involving equal groups by using multiplication*

Everyday Mathematics, Unit 2, 7, 9
Elementary School Mathematics with Pizzazz, Creative Publications
Best of Math I and II, Exemplars CD

Everyday Mathematics, Lessons 4.1, 4.2, 7.1, 7.2, 7.3, 7.8, 9.1 - 9.6, 11.1
Each Orange Had Eight Slices: A Counting Book, Paul Giganti
Sea Squares, Joy Hulme
One Hundred Hungry Ants, Elinor J. Pinczes

**Solve number stories involving equal sharing and equal grouping*

**Solve number stories involving positive and negative numbers*

Everyday Mathematics, Unit 4

Everyday Mathematics, Lesson 9.13
Teacher supplements

7. Check the reasonableness of results of computations

Everyday Mathematics, Units 2, 7, 9
Website resources
Exemplars, Best of Math I and II CD
Elementary School Mathematics with Pizzazz, Creative Publications

Flemington-Raritan School District Mathematics Curriculum

C. Estimation

1. Judge without counting whether a set of objects has less than, more than, or the same number of objects as a reference set.

Everyday Mathematics, Unit 1 and ongoing activities throughout the year
Teaching Student-Centered Mathematics, Grades 3-5, Lovin and Van DeWalle

2. Construct and use a variety of estimation strategies (e.g., rounding and mental math) for estimating both quantities and the result of computations.

Everyday Mathematics Units 2, 7, 9

**Estimating Costs*

Everyday Mathematics, Lesson 7.7

3. Recognize when an estimate is appropriate, and understand the usefulness of an estimate as distinct from an exact answer.

Everyday Mathematics, Unit 7
Exemplars, Best of Math I and II
CD

4. Use estimation to determine whether the result of a computation (either by calculator or by hand) is reasonable.

Everyday Mathematics, Unit 2, 7, 9
Teacher supplement
Exemplars, Best of Math I and II
CD

**Estimate answers to multi-digit addition and subtraction problems*

Everyday Mathematics, Unit 2

Flemington-Raritan School District Mathematics Curriculum

Grade: 3

Standard 4.2 Geometry and Measurement

Essential Question: How can knowledge of geometric properties help in problem solving situations?

How can coordinate grid systems help in understanding locations?

How does the mathematics of geometry enable us to wonder and understand our natural and physical world?

Knowledge/Skills/Understandings

Assessments

Learning Experiences

Resources

Building upon knowledge and skills gained in preceding grades, by the end of grade 3, students will:

A. Geometric Properties

1. Identify and describe spatial relationships of two or more objects in space.

Unit Assessments
Do Now/Ticket In/Exit Ticket
Teacher Observation
Discussion
Open Ended Writing Tasks
Recognizing Student Achievement sections in Everyday Math 3

Direct Instruction
Collaborative and Cooperative Learning
Open Ended Writing Tasks
EM Games & Activities
Calendar skills
Pattern Blocks
Cuisenaire Rods
Tangrams
Geoboards
Geosolids
Polygon Tiles
Balance/Scale/Weights
Master Rulers
Mira (mirrors)

Teaching Student-Centered Mathematics, Grades K-3, Grades 3-5, Lovin and Van DeWalle, page 42-43, 245

***Direction, orientation, and perspectives (e.g., which object is on your left when you are standing here?)**

***Relative shapes and sizes**

EM Project 2: Using a Magnetic Compass
centimeter cubes

Teacher supplement

Flemington-Raritan School District Mathematics Curriculum

2. Use properties of standard three-dimensional and two-dimensional shapes to identify, classify, and describe them.

* Vertex, edge, face, side, angle

* 3D figures - cube, rectangular prism, sphere, cone

*2D figures - square, rectangle, circle triangle, pentagon, hexagon, octagon

**Explore various types of triangles*

**Explore various types of quadrangles*

**Recognize the characteristics of polygons, with regular polygon emphasis*

**Recognize 3-D shapes and identify bases of pyramids and prisms*

** Explore the characteristics of prisms*

3. Identify and describe relationships among two-dimensional shapes.

***Same size, same shape**

**Identify congruent shapes.*

***Lines of symmetry**

**Identify symmetric figures and draw lines of symmetry*

Everyday Mathematics Lesson 3.5, - 3.9, 5.6, 6.4 -6.6, 6.11, 6.12, 7.9, 9.10, 10.2 - 10.5

Groundworks for Geometry, Creative Publication

Shapes, Shapes, Shapes, Tana Hoban
Anno's Magic Seeds, Mitsumasa Anno

Everyday Mathematics, Lesson 6.4, 9.10
Website resources

Everyday Mathematics, Lesson 6.5

Everyday Mathematics, Lesson 6.6

Everyday Mathematics, Lesson 6.11, 6.12, 10.2

Elementary School Mathematics with Pizzazz, Creative Publications
The Greedy Triangle, Marilyn Burns

Everyday Mathematics, Lesson 7.9

Everyday Mathematics, Lesson 6.10
Teacher created materials

Teacher supplements
Everyday Mathematics, Lesson 6.9
Teacher supplement
Exemplars, Best of Math I and II CD

Teacher made-materials
Everyday Mathematics Lesson 6.9

Flemington-Raritan School District Mathematics Curriculum

4. Understand and apply concepts involving lines, angles and circles.

***Identify, draw, and name line segments, lines, and endpoints.**

**Draw parallel and intersecting line segments, lines and rays*

**Identify right angles*

**Draw angles as records of rotations*

Everyday Mathematics, Lesson 3.8

Everyday Mathematics Lesson 3.2 - 3.4, 5.6, 6.1, 6.2, 9.10, 10.1

Opt: An Illusionary Tale, Arline and Joseph Baum Teacher supplement

Everyday Mathematics Lesson 1.4, 3.2 - 3.4, 5.6, 6.2, 7.9, 9.10, 10.1

Everyday Mathematics Lesson 6.3, 6.7, 6.8, 7.9

Everyday Mathematics Lesson 6.3, 6.7, 11.4

5. Recognize, describe, extend, and create space-filling patterns

Everyday Math Lesson 6.6
Teacher supplement

B. Transforming Shapes

1. Describe and use geometric transformations (slide, flip, turn).

District-made teacher packet
NJ Mathematics Curriculum Frameworks,
selected geometry activities for grades 3 - 4
Navigations in Geometry, grades 3-5, NCTM,

2. Investigate the occurrence of geometry in nature and art.

EM Project 3: Illusions

Everyday Math Unit 6
Website resources

Flemington-Raritan School District Mathematics Curriculum

C. Coordinate Geometry

1. Locate and name points in the first quadrant on a coordinate grid.

Teacher supplement
Everyday Mathematics, Lesson 10.10
The Fly on the Ceiling, Julie Glass

D. Units of Measurement

1. Understand that everyday objects have a variety of attributes, each of which can be measured in many ways.

EM Project 5: Attributes

Counting On Frank, Rod Clement
Groundworks for Geometry, Creative Publications
About Teaching Mathematics, Marilyn Burns, page 71

2. Select and use appropriate standard units of measure and measurement tools to solve real-life problems.

Everyday Mathematics, Units 3 and 10, Lesson 1.4
NJ Mathematics Framework Curriculum, selected activities for grades 3 -4
Navigations in Measurement, grades 3-5, NCTM

*Length- fractions of an inch ($\frac{1}{4}$, $\frac{1}{2}$), mile, decimeter, kilometer, *Length- centimeter, meter (grade 3 secure)

Teacher supplement
Everyday Mathematics, Lesson 3.1-3.4, 10.1

*Recognize equivalents in US customary and metric systems for length, weight

Everyday Mathematics, Lesson 10.1, 10.3, 10.4
Teacher supplement

*Area-square inch, square centimeter

Teacher supplement
Groundworks- Reasoning for Measurement, Creative Publications

*Weight-ounce

Everyday Mathematics, Lesson 10.3, 10.4
Elementary School Mathematics with Pizzazz, Creative Publications

Flemington-Raritan School District Mathematics Curriculum

*Consider relationships between weight and volume

* **Capacity- fluid ounce, cup, gallon, milliliter**

Everyday Mathematics, Lesson, 10.4

Everyday Mathematics, Lesson 10.5
NJ Mathematics Curriculum Frameworks, grades 3-4, selected activities

Everyday Mathematics, Lesson, 6.7 & 6.8, 11.4

**Measure angles*

3. Incorporate estimation in measurement activities (e.g., estimate before measuring).

Everyday Math Unit 3
How Big is a Foot?, Rolf Myllar
Everyday Mathematics, Lesson, 4.9, 6.8

5. Solve problems involving elapsed time

District teacher made supplements

E. Measuring Geometric Objects

1. Determine the area of simple two-dimensional shapes on a square grid

Teacher supplements
Everyday Mathematics, Lesson 3.6, 3.7, 3.8
Teaching Student-Centered Mathematics, Grades 3-5, Lovin and Van DeWalle

2. Determine the perimeter of simple shapes by measuring all of the sides.

Teacher supplements
Everyday Math Lesson 3.4, 3.6
A Cloak for the Dreamer, Aileen Friedman

3. Measure and compare the volume of three-dimensional objects using materials such as rice or cubes

Everyday Mathematics, Lesson 10.2, 10.4
The Librarian Who Measured the Earth, Kathryn Lasky

*Explore the volume of rectangular prisms

Everyday Mathematics, Lesson 10.2, 10.4

Flemington-Raritan School District Mathematics Curriculum

Grade: 3

Standard 4.3 Patterns and Algebra

Essential Question: How can patterns help in problem solving?

How can symbols be used to help us in problem solving?

How does the study of algebra help us understand mathematical patterns as the patterns found in nature and the real world?

Knowledge/Skills/Understandings

Assessments

Learning Experiences

Resources

A. Patterns

1. Recognize, describe, extend, and create patterns.

Unit Assessments
Do Now/Ticket In/Exit Ticket
Teacher Observation
Discussion
Open Ended Writing Tasks
Recognizing Student Achievement sections in Everyday Math 3

Direct Instruction
Collaborative and Cooperative Learning
Open Ended Writing Tasks
EM Games & Activities
Calendar skills
Pattern Blocks
Cuisenaire Rods
Tangrams
Geoboards
Geosolids
Polygon Tiles
Balance/Scale/Weights
Master Rulers
Mira (mirrors)

Everyday Mathematics, Lesson 1.12, 2.3, 7.1, 9.4
Navigations in Algebra, grades 3-5, NCTM

***Descriptions using words and number sentences/expressions**

Everyday Mathematics, Lesson 7.1

***Whole number patterns that grow or shrink as a result of repeatedly adding, subtracting, multiplying by, or dividing by a fixed number (e.g., 5, 8, 11, . . . or 800, 400, 200)**

Everyday Mathematics, Lesson 2.3
Groundworks, Creative Publications

**Identify and use number patterns to solve problems*

Everyday Mathematics, 7.1, 7.6, 9.1

**Use of a calculator to explore patterns*

Calculator TI 108

Flemington-Raritan School District Mathematics Curriculum

**Understand function and placement of parentheses in number sentences*

Everyday Mathematics, Lesson 7.4, 7.5

B. Functions & Relationships

1. Use concrete and pictorial models to explore the basic concept of a function.

Groundworks- Algebraic Thinking, Creative Publications

***Input/ output tables; T charts**

**Complete "What's My Rule?" tables*

Everyday Mathematics, Lesson 2.3

** Complete "Frames and Arrows" problems*

Everyday Mathematics, Lesson 2.5

C. Modeling

1. Recognize and describe change in quantities.

***Graphs representing change over time (e.g., temperature, height)**

*Teacher supplement
Everyday Mathematics, Lesson 5.12*

2. Construct and solve simple open sentences involving addition or subtraction (e.g., $3 + 6 = \underline{\quad}$, $n = 15 - 3$, $3 + \underline{\quad} = 3$, $16 - c = 7$).

*Everyday Mathematics Units 1 & 2
Teacher created materials
Elementary School Mathematics with Pizzazz, Creative Publications*

D. Procedures

1. Understand and apply the properties of operations and numbers.

***Commutative (e.g., $3 \times 7 = 7 \times 3$)**

**Turn-around facts*

*Teacher-made supplements
NJ Mathematics Framework Curriculum, grades 3-4, selected activities*

Flemington-Raritan School District Mathematics Curriculum

***Identity element for multiplication is 1 (e.g., $1 \times 8 = 8$)**

***Any number multiplied by zero is zero**

***Associative (Grade 2 Secure)**

2. Understand and use the concepts of equal, less than and greater than to describe the relationship between numbers.

***Symbols ($=$, $<$, $>$)**

Teacher-made supplements

Teaching Student-Centered Mathematics, Grades 3-5, Lovin and Van de Walle

Teacher supplement

Everyday Mathematics, Lesson 2.6, 5.2, 5.3, 5.4, 5.10

Flemington-Raritan School District Mathematics Curriculum

Grade: 3

Standard 4.4 Data Analysis, Probability, and Discrete Mathematics

Essential Question: How can classifying help me to organize data to solve problems?

How can statistics help us to understand real world situations?

How can the study of real world data help us to understand and make accurate predictions?

Knowledge/Skills/Understandings

Assessments

Learning Experiences

Resources

A. Data Analysis

1. Collect, generate, organize, and display data in response to questions, claims, or curiosity.

Unit Assessments
Do Now/Ticket In/Exit Ticket
Teacher Observation
Discussion
Open Ended Writing Tasks
Recognizing Student Achievement sections in Everyday Math 3

Direct Instruction
Collaborative and Cooperative Learning
Open Ended Writing Tasks
EM Games & Activities
Calendar skills
Pattern Blocks
Cuisenaire Rods
Tangrams
Geoboards
Geosolids
Polygon Tiles
Balance/Scale/Weights
Master Rulers
Mira (mirrors)

Everyday Mathematics, activities ongoing throughout the year
Teacher supplement

*** Data collected from the classroom environment**

**Find the median of a data set*

Everyday Mathematics, Lesson 5.12, 10.6

Everyday Mathematics, Lesson 1.5, 10.6
Website resources

**Make a frequency table*

Everyday Mathematics, Lesson 1.5, 10.9

**Find the mean of a data set*

Everyday Mathematics, Lesson 1.5, 1.10, 10.6, 10.8
Exemplars, Best of Math I and II CD
Teaching Student-Centered Mathematics, Grades 3-5, Lovin and Van de Walle, page 326
Teacher supplement

Flemington-Raritan School District Mathematics Curriculum

**Find the mode of the set of data*

Everyday Mathematics, Lesson 1.5

**Find the range of data*

Teacher supplement

2. Read, interpret, construct, analyze, generate questions about, and draw inferences from displays of data.

Everyday Mathematics Lessons, 1.5, 5.10, 10.9, 10.10, 11.1, 11.2, 11.5

***Pictograph, bar graph, table**

*Exemplars, Best of Math I and II CD
Everyday Mathematics, Lesson 11.9*

B. Probability

1. Use everyday events and chance devices, such as dice, coins, and unevenly divided spinners, to explore concepts of probability.

*Math By All Means, Probability 3-4,
Marilyn Burns
Everyday Mathematics Lesson 1.5, 11.1
The I Hate Mathematics Book, Marilyn Burns
About Teaching Mathematics, Marilyn Burns, page 71*

***likely, unlikely, certain, impossible**

District Teacher-Made Probability worksheets
*Everyday Mathematics, Lesson 11.3, 11.4, 11.5
Navigation with Data and Probability in Grades 3-5, NCTM*

***more likely, less likely, equally likely**

Everyday Mathematics, Lesson 11.3, 11.4, 11.5
District Teacher-Made Probability worksheets

Flemington-Raritan School District

Mathematics Curriculum

2. Predict probabilities in a variety of situations (e.g., given the number of items of each color in a bag, what is the probability that an item picked will have a particular color). *What students think will happen (intuitive) *Collect data and use that data to predict the probability (experimental).

**Uses fractions to record probability of events*

Everyday Mathematics, Lesson 8.2, Unit 11

District Teacher-Made Probability worksheets

Groundworks- Reasoning with Data and Probability, Creative Publications

Everyday Mathematics, Lesson 10.9, 11.3, 11.4, 11.5

Exemplars, Best of Math II CD

Samples NJASK 3 Open-Ended problems

C. Discrete Mathematics-Systematic Listing and Counting

1. Represent and classify data according to attributes, such as shape or color, and relationships.

**Venn diagrams*

**Numerical and alphabetical order*

2. Represent all possibilities for a simple counting situation in an organized way and draw conclusions from this representation.

**Organized lists, charts*

Teacher supplement

Groundworks- Reasoning with Geometry, Creative Publications

Exemplars, Best of Math I and II CD

Groundworks- Reasoning with Data and Probability, Creative Publications

Everyday Mathematics, Lesson 8.2

Navigation with Data and Probability in Grades 3-5, NCTM, selected activities

Website resources

D. Discrete Mathematics- Vertex-Edge Graphs and Algorithms

1. Follow, devise, and describe practical sets of directions (e.g., to add two 2-digit numbers).

Everyday Mathematics, all units

Flemington-Raritan School District

Mathematics Curriculum

2. Explore vertex-edge graphs

***vertex, edge**

***path**

District Teacher-Made Worksheets
Website resources

3. Find the smallest number of colors needed to color a map.

District Teacher-Made Map Coloring
worksheets
Website resources

Flemington-Raritan School District

Mathematics Curriculum

Grade: 3

Standard 4.5 Mathematical Processes

Big Idea: Mathematical understandings are an essential part of our lives in and out of school and as such all children need to have an instinctive sense of mathematical resources that they can rely on to help them progress through life.

Essential Questions: How will learning to "think" mathematically enable us to make a life, make a living, and make a difference?
How does the use of technology enable us to have a deeper understanding of mathematics?

Knowledge/Skills/Understandings	Assessments	Learning Experiences	Resources
A. Problem Solving			
1. Learn mathematics through problem solving inquiry and discovery	Unit Assessments Do Now/Ticket In/Exit Ticket Teacher Observation Discussion Open Ended Writing Tasks Recognizing Student Achievement sections in Everyday Math 3	Direct Instruction Collaborative and Cooperative Learning Open Ended Writing Tasks EM Games & Activities Calendar skills Pattern Blocks Cuisenaire Rods Tangrams Geoboards Geosolids Polygon Tiles Balance/Scale/Weights Master Rulers Mira (mirrors)	<i>Everyday Mathematics</i> , Open Response questions & activities ongoing throughout the year <i>Best of Math I and II, Exemplars</i> CD <i>About Teaching Mathematics</i> , Marilyn Burns <i>Elementary School Mathematics with Pizzazz</i> , Creative Publications <u><i>Groundworks</i></u> , Creative Publications
2. Solve problems that arise in mathematics and in other contexts			<i>Best of Math I and II, Exemplars</i> CD <i>NJ Mathematics Curriculum Frameworks</i> , page 51 - 53

Flemington-Raritan School District Mathematics Curriculum

* Open ended problems	<i>Best of Math I and II, Exemplars CD</i> <i>Navigation Series</i> , NCTM selected problems Sample NJASK Open-ended problems NJASK State Rubric Website resources Teacher supplement
* Non-routine problems	<i>Best of Math I and II, Exemplars CD</i> Sample NJASK Open-ended problems Website resources Teacher Supplement
* Problems with multiple solutions	<i>Best of Math I and II, Exemplars CD</i> Sample Open-ended problems from other states Website resources Teacher supplement <u>Groundworks</u> , Creative Publications
* Problems that can be solved in several ways	<i>Best of Math I and II, Exemplars CD</i> <i>Naviagation Series</i> , NCTM selected problems Sample NJASK Open-ended problems Website resources Teacher Supplement
3. Select and apply a variety of appropriate problem-solving strategies to solve problems.	<i>Best of Math I and II, Exemplars CD</i> <u>Groundworks</u> , Creative Publications <i>Everyday Mathematics</i> , All units -Open Response question
4. Pose problems of various types and levels of difficulty	<i>Everyday Mathematics</i> , Problem solving: verbal, pictorial, concrete and symbolic, teacher's guide ongoing <i>Best of Math I and II, Exemplars CD</i> <i>Navigation Series</i> , NCTM selected problems Website resources for Open-ended problems <i>Elementary School Mathematics with Pizzazz</i> , Creative Publications

Flemington-Raritan School District Mathematics Curriculum

5. Monitor their progress and reflect on the process of their problem solving activity

Teacher supplement

B. Communication

1. Use communication to organize and clarify their mathematical thinking

*** Reading and writing**
*** Discussion, listening and questioning**

Teacher supplement

Best of Math I and II, Exemplars CD

Navigation Series, NCTM selected problems

Website resources Open-ended problems

Teaching Student-Centered Mathematics, Grades 3-5, Lovin and Van De Walle, page 5

2. Communicate their mathematical thinking coherently and clearly to peers, teachers, and others, both orally and in writing.

Best of Math I and II, Exemplars CD

NJ Mathematics Curriculum Framework, selected activities for grades 3-4

Sample NJASK Open-ended problems

3. Analyze and evaluate the mathematical thinking and strategies of others.

Best of Math I and II, Exemplars CD

Navigation Series, NCTM selected problems

Website resources for Open-ended problems

4. Use the language of mathematics to express mathematical ideas precisely.

Best of Math I and II, Exemplars CD

NJ Mathematics Core Curriculum Content Standards for appropriate grade level vocabulary and mathematical concepts and skills (2002)

NJASK State mathematics rubric

NJ Mathematics Curriculum Framework selected activities for grades 3 - 4

Flemington-Raritan School District Mathematics Curriculum

C. Connections

1. Recognize recurring themes across mathematical domains (e.g., patterns in number, algebra, and geometry).

Best of Math I and II, Exemplars CD
Everyday Mathematics Activities, ongoing throughout the year
Open-ended problems from website resources

2. Use connections among mathematical ideas to explain concepts (e.g., two linear equations have a unique solution because the lines they represent intersect at a single point).

Everyday Mathematics Activities, ongoing throughout the year
Best of Math II, Exemplars CD
Navigation Series, NCTM selected problems
Sample NJASK Open-ended problems
Groundworks, Creative Publications

3. Recognize that mathematics is used in a variety of contexts outside of mathematics

Everyday Mathematics Activities, ongoing throughout the year
Best of Math I and II, Exemplars CD
Website resources for "real world" applications of mathematics

4. Apply mathematics in practical situations and in other disciplines

Everyday Mathematics- Activities, on-going throughout the year
Best of Math I and II, Exemplars CD
Navigation Series, NCTM selected problems
Teacher supplement with assorted problems from Website resources, newspapers, children's literature and professional magazines

5. Trace the development of mathematical concepts over time and across cultures (cf. world languages and social studies standards).

Social Studies unit on timelines
Teacher supplement with Website and media center resources
Science: Space timeline

Flemington-Raritan School District Mathematics Curriculum

6. Understand how mathematical ideas interconnect and build on one another to produce a coherent whole

Everyday Mathematics Activities, ongoing throughout the year

NJ Mathematics Curriculum Framework, selected activities, grade 3-4

D. Reasoning

1. Recognize that mathematical facts, procedures, and claims must be justified.

Best of Math I and II, Exemplars CD

Navigation Series, NCTM selected problems

Sample NJASK Open-ended problems

Website resources

NJ Mathematics Curriculum Framework, grades 3-4, selected activities

2. Use reasoning to support their mathematical conclusions and problem solutions.

Elementary School Mathematics with Pizzazz,

Creative Publications

Navigation Series, NCTM selected problems

Teacher supplement with Open-ended problems from website resources

Everyday Mathematics, Lesson 11.3, 11.5

3. Select and use various types of reasoning and methods of proof.

Best of Math I and II, Exemplars CD

Sample open-ended problems from various

Website resources

NJASK State rubric

4. Rely on reasoning, rather than answer keys, teachers, or peers, to check the correctness of their problem solutions

Elementary School Mathematics with Pizzazz,

Creative Publications

Best of Math I and II, Exemplars CD

Flemington-Raritan School District Mathematics Curriculum

5. Make and investigate mathematical conjectures

* Counterexamples as a means of displaying conjectures

* Verifying conjectures using informal reasoning or proofs.

Best of Math I and II, Exemplars CD
Navigation Series, NCTM selected problems
Sample NJASK Open-ended problems

Teacher supplement with website resources
Best of Math I and II, Exemplars CD

Teacher supplement
Sample open-ended problems from website resources
NJ Mathematics Curriculum Frameworks, selected activities for grades 3 - 4

6. Evaluate examples of mathematical reasoning and determine whether they are valid

Best of Math I and II, Exemplars CD
Teacher supplement with website resources

E. Representations

1. Create and use representations to organize, record, and communicate mathematical ideas.

* Concrete representations (e.g., base-ten blocks or algebra tiles)

* Pictorial representations (e.g., diagrams, charts, or tables)

Everyday Mathematics activities ongoing throughout the year
Best of Math I and II, Exemplars CD
Teacher supplement with problems from various resources

Everyday Mathematics activities ongoing throughout the year
Best of Math I and II, Exemplars CD
Navigation Series, NCTM selected problems

Everyday Mathematics activities ongoing throughout the year
Best of Math I and II, Exemplars CD
NJ Mathematics Curriculum Framework, selected activities grades 3-4
Everyday Mathematics, Lesson 7.9

Flemington-Raritan School District

Mathematics Curriculum

* Symbolic representations (e.g., a formula)

Everyday Mathematics activities ongoing throughout the year

Sample open-ended problems from NJASK and other states

* Graphical representations (e.g., a line graph)

Everyday Mathematics activities ongoing throughout the year

Teacher supplement with website resources

Everyday Mathematics, Lesson 5.12, 11.5

2. Select, apply, and translate among mathematical representations to solve problems

Teacher supplement

Best of Math I and II, Exemplars CD

Navigation Series, NCTM selected problems

Website resources for Open-ended problems

NJ Mathematics Curriculum Frameworks, selected activities for grades 3-4

3. Use representations to model and interpret physical, social, and mathematical phenomena

Everyday Mathematics activities, ongoing throughout the year

Website resources: e.g., National Library of Virtual Manipulatives

Elementary School Mathematics with Pizzazz,

Creative Publications

Navigation Series, NCTM selected problems

F. Technology

1. Use technology to gather, analyze, and communicate mathematical information.

Everyday Mathematics, calculator activities ongoing throughout the year

Teacher made materials in conjunction with

Technology teacher

Website resources

Flemington-Raritan School District

Mathematics Curriculum

2. Use computer spreadsheets, software, and graphing utilities to organize and display quantitative information (cf. workplace readiness standard 8.4-D).

Microsoft Office tools such as Word, Excel, PowerPoint
United Streaming, videos
Website resources
Consult with technology teacher to supplement

3. Use graphing calculators and computer software to investigate properties of functions and their graphs.

Teacher supplement
Website resources
Texas Instruments resources

4. Use calculators as problem-solving tools (e.g., to explore patterns, to validate solutions).

Best of Math I and II, Exemplars CD
Everyday Mathematics, activities ongoing throughout the year
Sample open-ended problems using website resources

Everyday Mathematics, Lesson 10.8

**Introduce memory keys on a calculator*

5. Use computer software to make and verify conjectures about geometric objects.

NCTM's Illuminations website
National Library of Virtual Manipulatives website

6. Use computer-based laboratory technology for mathematical applications in the sciences (cf. science standards).

Teacher supplement with websites in conjunction with Technology teacher
Texas Instrument website lessons

Flemington-Raritan School District

Mathematics Curriculum

**Fourth Grade Math
Pacing Guide**

Unit	Number of Days (approximate)	Unit	Number of Days (approximate)
1 - Geometric Figures	12	7 - Fractions & Probability	16
2 - Numbers and Data	13	8 - Perimeter & Area	12
3 - Multiplication & Division	15	9 - Fractions, Decimals, & Percents	13
4 - Decimals	14	10 - Reflections & Symmetry	10
5 - Big Numbers	15	11 - Weight, Volume, & Capacity	11
6 - Division and Angles	14	12 - Rates	12
Mid-Year Benchmark Assessment	1	End-of-the-Year Benchmark Assessment	1

Flemington-Raritan School District Mathematics Curriculum

Grade: 4 Standard 4.1 Number and Numerical Operations

Essential Question: How can problems in the real world be solved with mathematics?

How can estimation be useful to us?

How do numbers help us reason out solutions to problems?

How do basic operations help us understand numbers?

Knowledge/Skills/Understandings

Assessments

Learning Experiences

Resources

A. Number Sense

1. Use real-life experiences, physical materials, and technology to construct meanings for numbers (unless otherwise noted, all indicators for grade 4 pertain to these sets of numbers as well)

Unit Assessments
Do Now
Teacher Observation
Discussion
Open Ended Writing Tasks
Recognizing Student
Achievement sections in
Everyday Math 3

Direct Instruction
Collaborative and Cooperative
Learning
Open Ended Writing Tasks
Games
Base Ten Blocks
Digi-blocks
Pattern Blocks
Place value mat or chart
Fraction pieces
Fraction Circles
Cuisenaire Rods
Tangrams
Geoboards

*Groundworks- Reasoning with
Numbers*, Creative Publications
Frame FunFraction Factory

* Give equivalent names for numbers. _____

Twelve Ways to Get Eleven, Eve
Merriam
Everyday Mathematics, Lesson 1.6,
2.2, 7.6, 7.9, 9.1, 9.3
Everyday Mathematics, Lesson 5.8

***Read and write whole numbers through millions**

* Read and write numbers through billions

Everyday Mathematics, Lesson 2.3,
2.4
How Much is a Million?, (book & video)
David Schwartz
If You Made a Million, David Schwartz

Flemington-Raritan School District Mathematics Curriculum

***Commonly used fractions (denominators of 2, 3, 4, 5, 6, 8, 10, 12, and 16) as part of a whole, as a subset of a set, and as a location on a number line**

***Decimals through hundredths**

**Identify fractional parts of a collection of objects and regions*

**Rename fractions with denominators of 10 and 100 as decimals.*

** Find equivalent fractions for given fractions*

** Use percents to describe real-life situations*

**Find a percent or a fraction of a number*

**Give equivalencies between "easy" fractions (fourths, fifths, and tenths), decimals, and percents.*

**Give equivalencies between hundredths fractions, decimals, and percents*

**Use a calculator to rename any fractions as decimal or percent.*

Everyday Mathematics, Lesson 7.1 - 7.3, 7.6, 7.7, 7.9, 7.10
Fraction Factory

Everyday Mathematics, Lesson 4.1, 4.3
Decimal Factory
Digi-decimals

Eating Fractions, Bruce McMillian
Only One, Jean Harshman
Everyday Mathematics, Lesson 7.1, 7.2, Yellow/red counters
Exemplar: "Deluxe Birthday Cake"

Everyday Mathematics, Lesson 9.1 – 9.5
Fraction kit games

Everyday Mathematics, Unit 7, 9.1 – 9.5

Everyday Mathematics, Lessons 7.7, 9.1- 9.5

Everyday Mathematics, Lesson 9.1- 9.5
Illuminations website
Everyday Mathematics, Lesson 9.1- 9.5

Everyday Mathematics, Lesson 9.1

Everyday Mathematics, Lesson 9.3, 9.4, 9.5
Writing in Math Class, M. Burns

Flemington-Raritan School District Mathematics Curriculum

2. Demonstrate an understanding of place value concepts.

** Practice place-value skills through a calculator routine*

**Develop the concept of rounding*

Everyday Mathematics Lessons 2.2-2.4, 4.1- 4.6 (decimal), 4.10, 5.8-5.11 (big numbers)

Everyday Mathematics, Lesson 2.3

Teacher supplement

3. Demonstrate a sense of the relative magnitudes of numbers.

Everyday Mathematics, Lesson 4.3, 5.4,

4. Understand the various uses of numbers.

***Counting, measuring, labeling (e.g., numbers on baseball uniforms), locating (e.g., Room 235 is on the second floor)**

5. Use concrete and pictorial models to relate whole numbers, commonly used fractions, and decimals to each other, and to represent equivalent forms of the same number.

**Identify the whole for fractions*

Everyday Mathematics, Lesson 2.1, 3.5, and ongoing throughout the year

Best of Math I and II, Exemplars CD (Skating Party & Farmer Brown)

Everyday Mathematics, Lesson 9.1 - 9.5

Games: Fraction Fish (TERC
Different Shapes, Equal Pieces)

Everyday Mathematics, Lesson 7.1 - 7.3, 7.6, 7.7, 7.9, 7.10

6. Compare and order numbers.

** Compare large numbers*

Twelve Ways to Get to 11, Eve Merriam
Everyday Mathematics, Lesson 4.2, 7.9
Everyday Mathematics Unit 2, Unit 3, Lessons 5.8, 5.10, 5.11

Flemington-Raritan School District Mathematics Curriculum

**Compare and order fractions*

Everyday Mathematics, Lesson 7.9 - 7.11

** Compare and order decimals*

Everyday Mathematics, Lesson 4.2

7. Explore settings that give rise to negative numbers.

Everyday Mathematics, Lessons 2.3, 11.6

Teacher supplement
Number line (negative to positive)
Teacher-made supplement
Weather/Science Unit

***Temperatures below zero degrees, debts**

Thermometer

***Extension of the number line**

Everyday Mathematics, Lesson 7.1 Teacher supplement
Everyday Mathematics, Lesson 10.6, 11.6
[Visit the Statue of Liberty](#), Nathan Zimelman (Social Studies link)

** Use exponential notation to represent powers of ten*

almanacs, atlas, reference books
sound, speed, distance

Everyday Mathematics, Lesson 5.9, 5.10
Teacher supplement
Website resources for real life uses of exponential notation

Flemington-Raritan School District
Mathematics Curriculum

B. Numerical Operations

By the end of fourth grade, 90% of Flemington Raritan fourth graders will have basic fact mastery of addition facts 0-20.

By the end of fourth grade, 85 % of Flemington-Raritan fourth graders will have basic fact mastery of subtraction facts 0-20.

By the end of fourth grade, 80% of Flemington Raritan fourth graders will have basic fact mastery of multiplication and division facts up to 12. (12 x 12)

District Timed Tests: 50 facts in 3 minutes

Addition and subtraction fact tests should be given every six weeks.

MP 1 addition and subtraction separate; multiplication separate

MP 2,3 addition and subtraction separate; multiplication and division separate

MP 4 addition and subtraction separate; multiplication and division separate

1. Develop the meanings of the four basic arithmetic operations by modeling and discussing a large variety of problems.

Everyday Mathematics, Lessons 2.7, 2.9, 3.1, 3.2, 3.3, 3.4, 5.1, 6.1
Teaching Student-Centered Mathematics, Grades 3-5, Lovin and Van de Walle
Fact Mastery District Assessment

***Addition and subtraction: joining, separating, comparing**

Games: Rio, Four in a Row, The Winning Touch

Everyday Mathematics, Lesson 1.7, 2.7, 2.9
Website Links:
Exemplar: Lost Count (Farmer Brown)

***Use and explain strategies for solving addition and subtraction number stories**

Rio

Anno's Hat Tricks, Akihiro Nozaki
Everyday Mathematics Lesson 3.7, 3.11

Flemington-Raritan School District Mathematics Curriculum

***Multiplication: repeated addition, area/array**

Everyday Mathematics, Lesson, 3.1,
3.2, 3.3, 3.4, 5.1
*Elementary and Middle School
Mathematics Teaching
Developmentally*, Fifth edition, John A.
Van De Walle page 149
Grapes of Math, The Best of Times,
Greg Tang

***Division: repeated subtraction, sharing**

What Comes in 2's, 3's, 4's?, Suzanne
Aker
Exemplar: Farming
Math by All Means Multiplication,
Grade 3, Marilyn Burns
Everyday Mathematics, Lesson 6.1,
6.2, 6.3, 6.4

*Solve equal-grouping division stories using a
multiples of 10 strategy

Everyday Mathematics, Lesson 6.1

*Solve multiplication and division number stories

Everyday Mathematics, Lesson 6.3,
6.11
A Remainder of One, E.J. Pinczes
Sea Squares, Joy N. Hulme

**2. Develop proficiency with basic
multiplication and division number facts
using a variety of fact strategies (such as
"skip counting" and "repeated subtraction")
and then commit them to memory.**

I Have... Who Has Cards
Multiplication Tic Tac Toe
How Long How Many (About
Teaching Mathematics, Marilyn
Burns)
Circles and Stars (Marilyn Burns)

Everyday Mathematics, Lesson 3.1,
3.2, 3.3, 3.4, 6.1
Each Orange Had 8 Slices, Paul
Giganti
Amanda Bean's Amazing Dream

** Solve basic multiplication/ division facts to 10*

Each Orange Had Eight Slices: A
Counting Book, Paul Giganti
Everyday Mathematics Lesson 3.1 -
3.6, 3.9
Everyday Mathematics, Lesson 3.1

**Solve basic multiplication/division facts to 12*

* Review square numbers

Everyday Mathematics, Lesson 3.1

Flemington-Raritan School District Mathematics Curriculum

**Express the remainder of a whole number division problem as a fraction and the answer as a mixed number.*

- *Interpret the remainder in division problems*
- *How to express remainder, round up, fraction, or ignore*

3. Construct, use, and explain procedures for performing whole number calculations and with:

***Pencil-and-paper**

***Mental math**

***Calculator**

4. Use efficient and accurate pencil-and-paper procedures for computation with whole numbers.

** Solve addition and subtraction facts up to 20*

***Addition of 3-digit numbers**

Everyday Mathematics, Lesson 6.1, 6.4

A Remainder of One, Elinor J. Pinczes
Everyday Mathematics Lesson 6.2, 6.3, 6.4

Teaching Student Centered Mathematics, Grades 3-5, Lovin and VanDeWalle, Chapter 4

Everyday Mathematics, Lesson 2.7, 2.9
Grapes of Math and Math For All Seasons Greg Tang

Student Reference Book

Elementary Mathematics with Pizzazz, Creative Publications

Chart progress of students. Most fourth graders should have mastered these facts already. Ongoing throughout the year

Everyday Mathematics. Lesson 2.7
Teacher supplements

Flemington-Raritan School District Mathematics Curriculum

***Subtraction of 3-digit numbers**

Everyday Mathematics, Lesson 2.9
Funny Numbers – Greg Tang

***Multiplication of 2-digit numbers**

Everyday Mathematics, Lesson 5.5,
5.6, 5.7

***Division of 3-digit numbers by 1-digit numbers**

Everyday Mathematics, Lesson 6.1,
6.2, 6.3, 6.4

5. Construct and use procedures for performing decimal addition and subtraction.

*Construct and use procedures for performing decimal multiplication and division

Everyday Mathematics, Lesson 4.6
Money

Everyday Mathematics, Lesson 9.8,
9.9

6. Count and perform simple computations with money.

Everyday Mathematics, Lesson 4.6
Exemplar: Skating Party

***Standard dollars and cents notation**

Everyday Mathematics, Lesson 4.6
The Lunch Line (Hello Math Reader level 3)

7. Select pencil-and-paper, mental math, or a calculator as the appropriate computational method in a given situation depending on the context and numbers.

Everyday Mathematics, Lesson 3.7,
Exemplars, Best of Math I and II CD
"Shopping for Shoes"

8. Check the reasonableness of results of computations.

*Calculate unit prices to determine which product is the "better buy."

Everyday Mathematics,
Activities ongoing throughout the year
Lesson 3.8

Everyday Mathematics, Lesson 12.4,
12.5

Flemington-Raritan School District Mathematics Curriculum

9. Use concrete models to explore addition and subtraction with fractions.

Everyday Mathematics, Lesson 7.1 - 7.6

** Add and subtract fractions*

Everyday Mathematics, Lesson 7.5

10. Understand and use the inverse relationships between addition and subtraction and between multiplication and division.

Everyday Mathematics, Lesson 3.5
Teacher Supplement

C. Estimation

1. Judge without counting whether a set of objects has less than, more than, or the same number of objects as a reference set.

Ten Frames

Everyday Mathematics: Units 2, 3, 4, 5, 6
Teacher supplement

2. Construct and use a variety of estimation strategies (e.g., rounding and mental math) for estimating both quantities and the results of computations.

Beans and Scoops Investigation
Activity: Estimation Scavenger Hunt- find an object who length is 3.5 m etc. (Marilyn Burns)

Everyday Mathematics, Lesson 4.4, 5.3, 5.4, and throughout the year
About Teaching Mathematics, Marilyn Bums
Teaching Student-Centered Mathematics Grades 3-5, Lovin and VanDeWalle, page 280

3. Recognize when an estimate is appropriate, and understand the usefulness of an estimate as distinct from an exact answer.

How Big is a Foot?, Rolf Myller
ED Unit 5

4. Use estimation to determine whether the result of a computation (either by calculator or by hand) is reasonable.

** Estimate sums*

Everyday Mathematics, Lesson 5.3

Flemington-Raritan School District

** Estimate products*

Everyday Mathematics, Lesson 5.4

** Round whole numbers to a given place*

*Everyday Mathematics, Lesson 5.4,
5.10*

Flemington-Raritan School District

Grade: 4 Standard 4.2 Geometry and Measurement

Essential Questions: How can knowledge of geometric properties help in problem solving situations?

How can coordinate grid systems help in understanding locations?

How does the mathematics of geometry enable us to wonder and understand our natural and physical world?

Knowledge/Skills/Understandings	Assessments	Learning Experiences	Resources
A. Geometric Properties			
1. Identify and describe spatial relationships of two or more objects in space.	Unit Assessments Do Now Teacher Observation Discussion Open Ended Writing Tasks Recognizing Student Achievement sections in Everyday Math 3	Direct Instruction Collaborative and Cooperative Learning Open Ended Writing Tasks EM Games Polygon Tiles Centimeter cubes Geometric solids Geometry Riddles, “I have, who has” Match up game Polygon tiles, tangrams, pattern blocks Mira/ Transparent Mirror Angelegs Protractor Master Rulers MIRA –transparent mirrors Project 6: Building & Viewing Structures	<i>Everyday Mathematics</i> , activities ongoing throughout the year <i>Groundworks: Reasoning with Geometry</i> Teacher-made supplements <i>Teaching Student-Centered Mathematics, Grades 3-5</i> , Lovin and VanDeWalle, page 246 Directions using a map Teacher-made supplements NJ Mathematics Curriculum Framework for grades 3-4, selected activities Teacher-made supplements
*Direction, orientation, and perspectives (e.g., which object is on your left when you are standing here?)			
* Relative shapes and sizes			
*Shadows (projections) of everyday objects			

Flemington-Raritan School District Mathematics Curriculum

2. Use properties of standard three-dimensional and two-dimensional shapes to identify, classify, and describe them.

***2D figures -- square, rectangle, circle, triangle, quadrilateral, pentagon, hexagon, octagon**

**Name, draw, and label line segments, lines, rays, angles, triangles, and quadrangles (include square, rectangle, rhombus, parallelogram, trapezoid).*

** Use a compass and a straightedge to construct geometric figures*

**Classify quadrangles based on their properties*

**Identify properties of polygons and distinguish between convex and concave (nonconvex) polygons*

***3D figures – cube, rectangular prism, sphere, cone, cylinder, and pyramid**

***Vertex, edge, face, side, angle**

Everyday Mathematics, Unit 1, Unit 11, and ongoing throughout the year

Everyday Mathematics, Unit 1

Everyday Mathematics, Lesson 1.2 - 1.5

Teacher supplement

Everyday Mathematics Lesson 1.6, 1.7, 1.8

Everyday Mathematics, Lesson 1.4, 1.5 *Teaching Student-Centered Mathematics*, Grades 3-5, Lovin and VanDeWalle, Chapter 8 selected activities

Everyday Mathematics, Lesson 1.5

The Greedy Triangle, Marilyn Burns

Everyday Mathematics, Unit 11

Everyday Mathematics Lesson 11.2, 11.3

National Library of Virtual Manipulatives Library Website
Shapes, Shapes, Shapes, Tana Hoban

NJ Mathematics Curriculum Framework, Grades 3-4, selected activities

Flemington-Raritan School District Mathematics Curriculum

***Inclusive relationships -- squares are rectangles, cubes are rectangular prisms**

Navigations through Geometry in Grades 3-5, NCTM, selected activities
Everyday Mathematics, Lesson 1.4, Unit 11
Teaching Student-Centered Mathematics, Grades 3-5, Lovin and Van DeWalle, Chapter 8, page 231
Teacher supplement

3. Identify and describe relationships among 2-D shapes.

Everyday Mathematics, Lesson 1.3, 1.5, 11.3
Ed Emberley's Big Green (Orange, Purple and Red) Drawing Book, Ed Emberley

***Congruence**

Everyday Mathematics, Lesson 10.1
Teaching Student-Centered Mathematics, Grades 3-5, Lovin and VanDeWalle, page 216

***Lines of symmetry**

Everyday Mathematics, Lesson 10.2 - 10.4
Website resources

* Lines of reflection

Everyday Mathematics, Lesson 10.1, 10.2, 10.3,
Shadows and Reflections, Tana Hoban
Round Trip, Ann Jonas
Reflections, Ann Jonas

4. Understand and apply concepts involving lines, angles, and circles.

***Point, line, line segment, endpoint**

***Ray**

Everyday Mathematics, Lesson 1.2, 1.7

***Parallel, perpendicular (symbols: \parallel and \perp)**

Teacher supplement with perpendicular practice

Flemington-Raritan School District Mathematics Curriculum

***Angles – acute, right, obtuse**

**Angle - Reflex*

**Use circle protractor and half circle protractor to measure and draw angles.*

** Identify and describe right angles and parallel lines and line segments*

***Circles – diameter, radius, center**

**Drawing circles with a compass*

**Define a circle, explore designs with circles (concentric circles, nonconcentric circles)*

5. Recognize, describe, extend, and create space-filling patterns.

**Use a map scale to estimate distances*

B. Transforming Shapes

1. Use simple shapes to cover an area (tessellations).

Introduce symbols for parallel and perpendicular
Everyday Mathematics, Lesson 1.4

Everyday Mathematics Lesson 1.3, 6.7
Grandfather Tang's Story, Ann Tompert

Everyday Mathematics, Lesson, 6.7

Everyday Mathematics, Lesson 6.6, 6.7

Everyday Mathematics, Lesson 1.3, 6.5, 6.7

Navigations through Geometry in grades 3-5, NCTM

Pi Day

Everyday Mathematics Lesson 1.6, 1.7
Ed Emberley's Picture Pie: A Circle Drawing Book, Ed Emberley

Everyday Mathematics, Lesson 10.5

Everyday Mathematics Lesson 2.1, 3.6, Unit 6, Unit 8

Everyday Mathematics, Lesson 10.5
Grandfather's Tang Story, Ann Tompert

Flemington-Raritan School District Mathematics Curriculum

2. Describe and use geometric transformations (slide, flip, turn).

- **Slide (translation)**
- **Flip (reflection)**
- **Turn (rotation)**

** Use a transparent mirror to draw reflection of a figure.)*

**Relate turns and angles*

3. Investigate the occurrence of geometry in nature and art.

C. Coordinate Geometry

1. Locate and name points in the first quadrant on a coordinate grid.

2. Use coordinates to give or follow directions from one point to another on a map or grid.

Project 4: Making a Quilt

Hurkle

Everyday Mathematics Lessons Unit 10
Elementary School Mathematics with Pizzazz, Creative Publications
Grandfather's Tang Story, Ann Tompert

Everyday Mathematics Lessons Unit 10

Everyday Mathematics, Lesson 6.5

NJ Mathematics Curriculum Framework, selected activities for grades 3-4
Shapes, Shapes, Shapes, Jon Scieszka
EM Teacher's Guide, page 895
Everyday Mathematics, Unit: 1,10,11
Greedy Triangle, Marilyn Burns

Everyday Mathematics, Lesson 6.8, 6.9
Teacher supplement
Fly on the Ceiling, Julie Glass
Everyday Mathematics, Lesson 6.9
Teacher supplement

Flemington-Raritan School District Mathematics Curriculum

D. Units of Measurement

1. Understand that everyday objects have a variety of attributes, each of which can be measured in many ways.

Everyday Mathematics, Unit 4 activities
Groundworks for Measurement, Creative Publications
Illuminations Website

2. Select and use appropriate standard units of measure and measurement tools to solve real-life problems.

Teacher supplement
Everyday Mathematics, Lesson 4.8, 4.9, 4.10
Groundworks-Reasoning with Measurement, Creative Publications

Length – fractions of an inch ($\frac{1}{8}$, $\frac{1}{4}$, $\frac{1}{2}$), mile, centimeter (grade 2 Secure), decimeter, kilometer

About Teaching Mathematics, M. Burns
Everyday Mathematics, Unit 4, 8.1, Teacher supplement
Elementary School Mathematics with Pizzazz, Creative Publications

* Length -- millimeter

* **Area – square inch, square centimeter**

Everyday Mathematics, Lesson 8.3, 8.4, 8.5, 8.6, 8.7, 8.8
Exemplar: Stain Glass Window

*Draw and measure line segments to the nearest centimeter

Inchworm and a Half, E. Pinczes
EDM Unit 8

* Draw and measure line segments to the nearest millimeter

Everyday Mathematics, Lesson 4.10
Teacher supplement

***Volume – cubic inch, cubic centimeter**

Everyday Mathematics, Lesson 11.4, 11.5

***Weight – ounces / grams**

balance, scale

Science: Matter Unit D

Everyday Mathematics, Lesson 11.7

* *Estimate the weight of objects in ounces or grams and weigh objects in ounces or grams*

Everyday Mathematics, Lesson 11.7

Flemington-Raritan School District Mathematics Curriculum

***Capacity – fluid ounce, cup, gallon, milliliter**

Gallon Man
Gallon Game

Everyday Mathematics, Lesson 11.7
Best of Math Exemplars II CD Rom
The King's Chessboard, David Birch
One Grain of Rice: A Mathematical
Folktale, Demi
*Teaching Student Centered
Mathematics, Grades 3-5*, Lovin and
VanDeWalle, page 265-266

3. Develop and use personal references to approximate standard units of measure (e.g., a common paper clip is about an inch long).

4. Incorporate estimation in measurement activities (e.g., estimate before measuring).

Everyday Mathematics, Lesson 4.9

*Teaching Student Centered
Mathematics, Grades 3-5*, Lovin and
VanDeWalle, page 278-280

*Use a map scale to estimate distances.

Everyday Mathematics, Lesson 2.1,
3.6, 6.8, 6.9
See Social Studies / NJ Unit on map
scales
Everyday Mathematics, Unit 4

*Convert between metric measures

* Express metric measures with decimals.

Using a ruler, meter stick, tape
measure

Everyday Mathematics, Lesson 4.9

*Identify locations on Earth for which latitude and longitude are given: find latitude and longitude for given locations.

Project 1: making a Cutaway Globe
Project 2: Using a Magnetic compass

Everyday Mathematics, Lesson 6.9

See Social Studies NJ Unit/
longitude/latitude

5. Solve problems involving elapsed time

Everyday Mathematics, Lesson 3.8,
6.6
*Teaching Student Centered
Mathematics, Grades 3-5*, Lovin and
VanDeWalle, page 270
District Teacher-Made Elapsed Time
Worksheets
*Groundworks: Reasoning about
Measurement*

Flemington-Raritan School District Mathematics Curriculum

E. Measuring Geometric Objects

1. Determine the area of simple two-dimensional shapes on a square grid.

Everyday Mathematics, Lessons 8.1-8.8

Teacher supplement

2. Distinguish between perimeter and area and use each appropriately in problem-solving situations.

Teaching Student-Centered Mathematics, Grades 3-5, Lovin and Van De Walle, page 265

Everyday Mathematics, Unit 8 Teacher Supplement [Spaghetti and Meatballs for All](#)

Math by All Means: Perimeter and Area Grades 5-6, Marilyn Burns
www.mathsolutions.com

3. Measure and compare the volume of three-dimensional objects using materials such as rice or cubes.

Everyday Mathematics, Lessons 11.4, 11.5

Science: Matter Unit . Compare volumes of containers

Teaching Student-Centered Mathematics, Grades 3-5, Lovin and Van De Walle, page 267

Everyday Mathematics, Lesson 11.4, 11.5

**Solve cube stacking volume problems.*

Flemington-Raritan School District Mathematics Curriculum

Grade: 4 Standard 4.3 Patterns and Algebra

Essential Questions: How can patterns help in problem solving?

How can symbols be used to help us in problem solving?

How does the study of algebra help us understand mathematical patterns as the patterns found in nature & the real world?

Knowledge/Skills/Understandings	Assessments	Learning Experiences	Resources
A. Patterns			
1. Recognize, describe, extend, and create patterns.	Unit Assessments Do Now Teacher Observation Discussion Open Ended Writing Tasks Recognizing Student Achievement sections in Everyday Math 3	Hundreds Grid Direct Instruction Collaborative and Cooperative Learning Open Ended Writing Tasks Tinkerplots Software Geometer's Sketchpad Software Games	<i>Everyday Mathematics</i> , Lesson 10.5
*Descriptions using words, number sentences/expressions, graphs, tables, variables (e.g., shape, blank, or letter)			<i>Navigations through Algebra 3-5, NCTM Teaching Student-Centered Mathematics, Grades 3-5</i> , Lovin and Van DeWalle
*Sequences that stop or that continue infinitely			<i>Navigations through Algebra 3-5, NCTM Teacher Supplement</i>
*Whole number patterns that grow or shrink as a result of repeatedly adding, subtracting, multiplying by, or dividing by a fixed number (e.g., 5, 8, 11,...or 800, 400, 200,...)			Illustrations website <i>Teaching Student-Centered Mathematics, Grades 3-5</i> , Lovin and Van DeWalle, page 293 Teacher Supplement
*Sequences can often be extended in more than one way (e.g., the next term after 1, 2, 4, ... could be 8, or 7, or...)			<i>Teaching Student-Centered Mathematics, Grades 3-5</i> , Lovin and VanDeWalle, page 294

Flemington-Raritan School District Mathematics Curriculum

B. Functions and Relationships

1. Use concrete and pictorial models to explore the basic concept of a function.

*Input/output table, T-charts

* Complete a "What's My Rule"? Chart

*Combining two function machines

*Reversing a function machine

Everyday Mathematics, Lesson 12.1, 12.2, 12.3
Teacher Supplement
Model Drawing books
Everyday Mathematics, Activities ongoing throughout the year
Teaching Student-Centered Mathematics, Grades 3-5, Lovin and VanDeWalle, page 295-298

Everyday Mathematics, activities ongoing throughout the year

Teacher Supplement

Navigations through Algebra in grades 3-5, NCTM

C. Modeling

1. Recognize and describe change in quantities.

*Graphs representing change over time (e.g., temperature, height)

*Solve problems involving elapsed time

Teaching Student-Centered Mathematics, Grades 3-5, Lovin and VanDeWalle, page 333
Teacher supplements

District Teacher-Made Elapsed Time worksheets

Flemington-Raritan School District Mathematics Curriculum

***How change in one physical quantity can produce a corresponding change in another (e.g., pitch of a sound depends on the rate of vibration)**

** Find unit rates*

** Solve rate problems using rates tables as necessary*

2. Construct and solve simple open sentences involving any one operation (e.g., $3 \times 6 = \underline{\hspace{1cm}}$, $n = 15 \div 3$, $3 \times \underline{\hspace{1cm}} = 0$, $16 - c = 7$).

**Determine whether number sentences are true or false*

D. Procedures

1. Understand, name, and apply the properties of operations and numbers.

***Commutative (e.g., $3 \times 7 = 7 \times 3$)**

"Turn around property" order does not change an answer

***Identity element for multiplication is 1 (e.g., $1 \times 8 = 8$)**

***Associative (e.g., $2 \times 4 \times 25$ can be found by first multiplying either 2×4 or 4×25)**

Teacher Supplement
Teaching Student Centered Mathematics,
Grades 5-8, Lovin and VanDeWalle,
Chapter 10

Everyday Mathematics, Unit 12

Everyday Mathematics, Unit 12

Everyday Mathematics, Lesson 3.11
Teaching Student Centered Mathematics,
Grades 3-5, Lovin and Van De Walle,
page 307

Everyday Mathematics, Lesson 3.9

Teaching Student-Centered Mathematics,
Grades 3-5, Lovin and VanDeWalle, page
66
Teacher-made supplements

Teaching Student-Centered Mathematics,
Grades 3-5, Lovin and VanDeWalle, page
66
Teacher-made supplements

Teaching Student-Centered Mathematics,
Grades 3-5, Lovin and VanDeWalle
Teacher-made supplements

Flemington-Raritan School District Mathematics Curriculum

***Division by zero is undefined**

*Teaching Student-Centered Mathematics,
Grades 3-5, Lovin and VanDeWalle, page
66
Teacher-made supplements*

***Any number multiplied by zero is zero**

*Teaching Student-Centered Mathematics,
Grades 3-5, Lovin and VanDeWalle, page
66
Teacher-made supplements*

** Determine whether number sentences are true
or false*

Everyday Mathematics, Lesson 3.9

** Insert parentheses to make true number
sentences. Solve problems with parentheses*

Everyday Mathematics, Lesson 3.10

**2. Understand and use the concepts of
equals, less than, and greater than in simple
number sentences.**

***Symbols ($=$, $<$, $>$)**

*Everyday Mathematics, Lesson 3.8
Elementary School Mathematics with
Pizzazz, Creative Publications*

Flemington-Raritan School District Mathematics Curriculum

Grade: 4 Standard 4.4 Data Analysis, Probability, and Discrete Mathematics

Essential Questions: How can classifying help me in organizing data to solve problems?

How can statistics help us to understand real world situations?

How can the study of real world data help us understand and make accurate predictions?

Knowledge/Skills/Understandings	Assessments	Learning Experiences	Resources
A. Data Analysis			
1. Collect, generate, organize, and display data in response to questions, claims, or curiosity.	Unit Assessments Do Now Teacher Observation Discussion Open Ended Writing Tasks Recognizing Student Achievement sections in Everyday Math 3	Direct Instruction Collaborative and Cooperative Learning Open Ended Writing Tasks EM Games Attribute blocks Polygon Tiles Venn Diagrams Graphs/Charts	<i>Everyday Mathematics, Lessons 2.5, 2.6, & 2.8, 12.1 - 12.5</i>
*Data generated from the school environment		Project 5: Which Soft Drink is the Best Buy?	<i>Navigations through Data Analysis and Probability, 3-5, NCTM</i> <i>Teaching Student Centered Mathematics 3-5, Lovin and VanDeWalle, page 321</i>
			* Display data in a line plot
2. Read, interpret, select, construct, analyze, generate questions about and draw inferences from displays of data.			<i>Everyday Mathematics Unit 2, 5.11</i> <i>Teaching Student-Centered Mathematics, Grades 3-5, Lovin and Van De Walle, page 329</i>
*Pictograph, bar graph, line plot, line graph, table			<i>Everyday Mathematics, Lesson 2.8, 9.6</i> Illuminations website
*Average (mean), most frequent (mode), middle term (median)			<i>Teaching Student Centered Math 3-5, page 326-328, LouAnn Lovin and John Van DeW alle</i>

Flemington-Raritan School District Mathematics Curriculum

** Use the statistical landmarks of maximum and minimum number and range in a set of data*

B. Probability

1. Use everyday events and chance devices, such as dice, coins, and unevenly divided spinners, to explore concepts of probability

PIG, The Two-Dice Sum Game

Everyday Mathematics, Lesson 2.5

*Everyday Mathematics, Lesson 7.11
District Teacher-Made Packet of
Probability worksheets
About Teaching Mathematics, Marilyn
Burns, page 70, 71, 73, 74
Groundworks-Reasoning with Data and
Probability, Creative Publications*

***Likely, unlikely, certain, impossible, improbable, fair, unfair**

*Everyday Mathematics, Lesson 7.11, 7.12
District Teacher-Made Probability
worksheets*

***More likely, less likely, equally likely**

*Teaching Student-Centered Mathematics,
Grades 3-5, Lovin and Van De Walle,
Chapter 12
Teacher-made supplements
teacher supplement*

***Probability of tossing "heads" does not depend on outcomes of previous tosses**

2. Determine probabilities of simple events based on equally likely outcomes and express them as fractions.

*District Teacher-Made Probability
worksheets
Everyday Mathematics, Lesson 7.11, 7.12*

3. Predict probabilities in a variety of situations (e.g., given the number of items of each color in a bag, what is the probability that an item picked will have a particular color).

*Everyday Mathematics, Lesson 7.11, 7.12
District Teacher-Made Probability
worksheets
Math by All Means, Probability 3-4,
Marilyn Burns*

***What students think will happen (intuitive)**

Everyday Mathematics, Lesson 7.11, 7.12

Flemington-Raritan School District Mathematics Curriculum

***Collect data and use that data to predict the probability (experimental)**

Everyday Mathematics, Lesson 7.12
Navigating through Data Analysis and Probability 3-5, NCTM

***Analyze all possible outcomes to find the probability (theoretical)**

Navigating through Data Analysis and Probability 3-5, NCTM
Exemplar: "A Lucky Draw"

C. Discrete Mathematics-Systematic Listing and Counting

1. Represent and classify data according to attributes, such as shape or color, and relationships.

Everyday Mathematics, activities ongoing throughout the year Matter and Solid Earth Units in Science- rock characteristics
Website resources

***Venn diagrams**

EM Adjusting the Activity, page 28
Teacher supplement
NJ Mathematics Curriculum Framework, selected activities for grades 3-4

***Numerical and alphabetical order**

Everyday Mathematics, Units 2, 4, 5, 7, 8, 11

2. Represent all possibilities for a simple counting situation in an organized way and draw conclusions from this representation.

Groundworks: Reasoning with Data and Probability
Illuminations website
Count Your Way Through...(Series), Jim Haskins and Kathleen Benson
Exemplars: Super Bowl Sunday"

Flemington-Raritan School District Mathematics Curriculum

***Organized lists, charts, tree diagrams**

Teacher-made supplements
Best of Math I and II, Exemplars CD

***Dividing into categories (e.g., to find the total number of rectangles in a grid, find the number of rectangles of each size and add the results)**

Teacher-made supplements

D. Discrete Mathematics - Vertex - Edge - Graphs and Algorithms

1. Follow, devise, and describe practical sets of directions (e.g., to add two 2-digit numbers).

Everyday Mathematics, Units 2, 5, 7, 9
Teacher supplement

2. Play two-person games and devise strategies for winning the games (e.g., "make 5" where players alternately add 1 or 2 and the person who reaches 5, or another designated number, is the winner.)

Game of Nim
Game of Pig
Odd Number Wins

Math By All Means Probability 3-4, Marilyn Burns

3. Explore vertex-edge graphs and tree diagrams.

Teaching Student-Centered Mathematics, Grades 3-5, Lovin and VanDeWalle, page 348

***Vertex, edge, neighboring/adjacent, number of neighbors**

District teacher-made worksheets
NJ Mathematics Curriculum Framework, selected activities for grades 3-4

***Path, circuit (i.e., path that ends at its starting point)**

District teacher-made worksheets

4. Find the least number of colors needed to color a map or a graph.

Use US state maps, NJ county maps and abstract drawings

Everyday Mathematics, Lesson 9.7
Map Coloring District Teacher Made worksheets

Flemington-Raritan School District Mathematics Curriculum

Grade: 4 Standard 4.5 Mathematical Processes

Big Idea: Mathematical understandings are an essential part of our lives in and out of school and as such all children need to have an instinctive sense of mathematical resources that they can rely on to help them progress through life.

Essential Questions: How will learning to "think" mathematically enable us to make a life, make a living, and make a difference?
How does the use of technology enable us to have a deeper understanding of mathematics?

Knowledge/Skills/Understandings	Assessments	Learning Experiences	Resources
A. Problem Solving			
1. Learn mathematics through problem solving inquiry and discovery	Unit Assessments Do Now Teacher Observation Discussion Open Ended Writing Tasks Recognizing Student Achievement sections in Everyday Math 3	Direct Instruction Collaborative and Cooperative Learning Open Ended Writing Tasks EM Games	Illuminations website <u>Inside the Amazon</u> , Don Lessem and Michael Rothman <i>Elementary School Mathematics with Pizzazz</i> , Creative Publications <i>Everyday Mathematics</i> , activities ongoing throughout the year
2. Solve problems that arise in mathematics and in other contexts			<u>Incredible Comparisons</u> , Russell Ash <i>Everyday Mathematics</i> , Unit 9 <i>Everyday Math</i> , World Tour Lessons
*Open ended problems			Best of Math I and II, Exemplars CD Website resources Sample open-ended assessment problems from various states <i>Groundworks</i> , Creative Publications <i>Read It, Draw It Solve It</i> , Dale Seymour <i>Explain It</i> , Creative Publications

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***Non-routine problems**

NJ Mathematics Curriculum Framework
Grades 3-4, Standard 1: Problem Solving
Exemplars, Best of Math I and II, CD
Website resources

***Problems with multiple solutions**

Exemplars, Best of Math I and II CD
Website Resources
Groundworks, Creative Publications

Problems that can be solved in several ways

Rain Forest, Barbara Taylor
Best of Math I and II, Exemplars CD
:Shopping for Shoes”, “Skating Trip”

3. Select and apply a variety of appropriate problem-solving strategies to solve problems.

Everyday Mathematics, Lesson 3.7, 3.11, 6.1,
6.3
National Geographic Atlas for Young
Explorers, National Geographic Society
Exemplars, Best of Math I and II CD
NJ Mathematics Curriculum Frameworks,
selected activities
Website resources
Guinness Book of World Records

4. Pose problems of various types and levels of difficulty

Everyday Mathematics Problem solving:
verbal, pictorial, concrete and symbolic,
Everyday Math – all unit “Readiness” and
“Enrichment” activities
Scholastic Kid's Almanac for 21st Century, E.
Pascoe and D. Kops
Website resources
Teacher supplement – tiered worksheets

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5. Monitor their progress and reflect on the process of their problem solving activity

Use NJ state rubric for mathematics
Website resources
Everyday Math Open Response rubrics

B. Communication

1. Use communication to organize and clarify their mathematical thinking

Illustrations website
Teacher supplement
Math Curse, Jon Scieszka

***Reading and writing**

Best of Math I and II, Exemplars CD
Sample NJASK Open-Ended Problems
Getting the Facts:
Counting on Frank, Rod Clement
Read It, Draw It, Solve It, Dale Seymour
Online Powerpoints

***Discussion, listening and questioning**

Teaching Student Centered Mathematics, Grades 3-5, Lovin and Van DeWalle
Math Talk, Suzanne Chapin, Math Solutions
Classroom Discussions, Chapin O'Connor, and Anderson, Math Solutions

2. Communicate their mathematical thinking coherently and clearly to peers, teachers, and others, both orally and in writing.

Everyday Mathematics, Lesson 3.7
Teacher supplement with various math writing prompts: what was easy, most difficult, how do "I know that...", "Is there more than one way?"
Everyday Math Open-Ended Responses

3. Analyze and evaluate the mathematical thinking and strategies of others.

Best of Math I and II Exemplars, CD
NJ state rubric
Website resources

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4. Use the language of mathematics to express mathematical ideas precisely.

Best of Math I and II Exemplars, CD
NJ Mathematics Core Curriculum Content
Standards for appropriate grade level
vocabulary and mathematics concepts and
skills (2002)

C. Connections

1. Recognize recurring themes across mathematical domains (e.g., patterns in number, algebra, and geometry).

Everyday Math –Unit 4, 5, and 12
Website resources
Teacher supplement
Elementary School Mathematics with Pizzazz,
Creative Publications

2. Use connections among mathematical ideas to explain concepts (e.g., two linear equations have a unique solution because the lines they represent intersect at a single point).

Everyday Mathematics-, Unit Assessments

3. Recognize that mathematics is used in a variety of contexts outside of mathematics.

EM Project 6: Building and
Viewing Structures

Everyday Mathematic -s Throughout all Units
Teacher supplement

4. Apply mathematics in practical situations and in other disciplines.

Best of Math I and II, Exemplars CD
Teacher supplement with Open Ended
Problems from website resources,
newspapers, children's literature and
professional magazines

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5. Trace the development of mathematical concepts over time and across cultures (cf. world languages and social studies standards).

EM Project 7: Numbers,
Mayan Style
EM Project 4: Making a Quilt

Website / Media Center resources

6. Understand how mathematical ideas interconnect and build on one another to produce a coherent whole.

Math Curse, Jon Scieska
Teacher supplement
NJ Mathematics Curriculum Framework activities
Teaching Student-Centered Mathematics, Grades 3-5, Lovin and VanDeWalle, Chapter 1
Website resources

D. Reasoning

1. Recognize that mathematical facts, procedures, and claims must be justified.

Illustrations website
Website Resources
NJ State Rubric
Best of Math I and II, Exemplars CD

2. Use reasoning to support their mathematical conclusions and problem solutions.

Project 3: A Carnival Game

Illustrations website
Website Resources
NJ Mathematics Curriculum Frameworks, pages 48-50
Everyday Mathematics, Lesson 3.11
Anno's Hat Tricks, Akihiro Nozaki

* Develop reasoning skills

3. Select and use various types of reasoning and methods of proof.

Best of Math I and II, Exemplars CD Sample Open-Ended Problems from website resources
Teacher supplement

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4. Rely on reasoning, rather than answer keys, teachers, or peers, to check the correctness of their problem solutions.

Everyday Mathematics Lesson 12.3
Teacher supplement
Website resources
Elementary School Mathematics with Pizzazz,
Creative Publications

5. Make and investigate mathematical conjectures.
***Counterexamples as a means of displaying conjectures**

Teacher supplement
Best of Math I and II, Exemplars CD
Sample Open-Ended Problems from Website
resources
NJ Mathematics Curriculum Frameworks

***Verifying conjectures using informal reasoning or proofs.**

Teacher supplement
Best of Math I and II, Exemplars CD
Sample Open-Ended Problems from Website
resources
NJ Mathematics Curriculum Frameworks

6. Evaluate examples of mathematical reasoning and determine whether they are valid.

Teacher supplement with website resources

E. Representations

1. Create and use representations to organize, record, and communicate mathematical ideas.

Everyday Mathematics activities ongoing
throughout the year
Teacher supplement
Groundworks, Creative Publications

***Concrete representations (e.g., base-ten blocks or algebra tiles)**

Everyday Mathematics activities ongoing
throughout the year

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***Pictorial representations (e.g., diagrams, charts, or tables)**

Everyday Mathematics activities ongoing throughout the year

***Symbolic representations (e.g., a formula)**

Everyday Mathematics activities ongoing throughout the year

***Graphical representations (e.g., a line graph)**

Everyday Mathematics activities ongoing throughout the year

2. Select, apply, and translate among mathematical representations to solve problems

Everyday Mathematics, Lesson 3.7
Best of Math I and II, Exemplars CD

3. Use representations to model and interpret physical, social, and mathematical phenomena.

Everyday Mathematics activities ongoing throughout the year

F. Technology

1. Use technology to gather, analyze, and communicate mathematical information.

Illumination website
Website resources: math forum

2. Use computer spreadsheets, software, and graphing utilities to organize and display quantitative information (cf. workplace readiness standard 8.4-D).

Illuminations website
Website resources: MS office programs: Word, Excel and PowerPoint
United Streaming,
Consult with technology teacher to supplement

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3. Use graphing calculators and computer software to investigate properties of functions and their graphs.

Teacher supplement
Texas Instruments Resources
Website resources

4. Use calculators as problem-solving tools (e.g., to explore patterns, to validate solutions).

Everyday Mathematics, activities ongoing throughout the year
Best of Math I and II, Exemplars CD

5. Use computer software to make and verify conjectures about geometric objects.

National Library of Virtual Manipulatives
Website
Illuminations website
Website resources
MS Office programs: Word

6. Use computer-based laboratory technology for mathematical applications in the sciences (cf. science standards).

Teacher supplement
See also science standards

Fifth Grade Math Pacing Guide

Unit	Number of Days (approximate)	Unit	Number of Days (approximate)
1 - Number Theory	12	7 - Exponents and Negative Numbers	14
2 - Estimation and Computation	13	8 - Fractions and Ratios	15
3 - Geometry Explorations & The American Tour	13	9 - Coordinates, Area, Volume & Capacity	13
4 - Division	10	10 - Using Data; Algebra Concepts and Skills	12
5 - Fractions, Decimals, and Percents	15	11 - Volume	10
6 - Using Data; Addition & Subtraction of Fractions	13	12 - Probability, Ratios, and Rates	10
Mid-Year Benchmark Assessment	1	End-of-the-Year Benchmark Assessment	1

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Grade: 5 Standard 4.1 Number and Numerical Operations

Essential Question: How can problems in the real world be solved with mathematics?

How can estimation be useful to us?

How do numbers help us reason out solutions to problems?

How do basic operations help us understand numbers?

Knowledge/Skills/Understandings	Assessments	Learning Experiences	Resources
A. Number Sense			
1. Use real-life experiences, physical materials, and technology to construct meanings for numbers (unless otherwise noted, all indicators for grade 5 pertain to these sets of numbers as well).	Teacher Observation/RSA (Recognizing student achievement); Test/Quiz; Exit tickets		
• Whole numbers through millions (Grade 4 secure)		Place Value Puzzle Literature Link Journal pages and math boxes	
<i>* Demonstrate an understanding of place value concepts.</i>	EM Unit 2 checking progress,	EM Activity: Place Value Puzzles	<i>Place Value Poster</i> <i>Everyday Mathematics</i> , Lesson 2.10, 3.2.
<i>*Know place value to billions</i>		Use real numbers: house prices, stock market daily volume, bank account, profit / loss statements for companies, tax obligations	<i>Everyday Mathematics</i> , Lesson 2.10
<i>*Know place value to hundredths</i>		Math Game: Number Top It	
<i>*Understand the relative size of 1 million, 1 billion, 1 trillion</i>			<i>Everyday Mathematics</i> , Lesson 2.10

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*Round numbers to designated places		Engage in discussion when and why rounding is beneficial Discuss rounding in context: finding mean to nearest tenth, finding number of people for a party, finding exact interest for a bank account	<i>Everyday Mathematics</i> , Lesson 2.7 and ongoing activities throughout the year; Sketch pad Lesson: Place Value Counter Target
* All fractions as part of a whole, as subset of a set, as a location on a number line, and as divisions of whole numbers		Important to allow students to manipulate with models to master the part-whole relationships Provide opportunities given an identified whole, find part values Review basic fraction ideas with class.	<i>Everyday Mathematics</i> , Lesson 5.1, 5.2, <i>Fraction Tiles, fraction circles, rulers</i> Sketchpad Lesson: Fraction Tiles, Comparing fractions. Balloon Dart game on website.
*Convert between mixed numbers and improper fractions		Pattern blocks, tan grams Fraction Tiles, fraction circles	<i>Everyday Mathematics</i> , Lesson 5.2
*All decimals *Rounding decimals	EM, Unit 5 checking progress	EM Game: 2-4-5-10 Frac-Tac-Toe (Decimal Version) Discuss purposes for rounding decimals. Offer always down, always up, to nearest selected place. Ask when is each appropriate?	<i>Everyday Mathematics</i> , Unit 5 <i>Everyday Mathematics</i> , Lesson 5.5 Sketchpad lesson: Zooming decimals, Balloon Flight, How Close Can You Get.
2. Recognize the decimal nature of United States currency and compute with money.	EM Unit 4 checking progress		<i>Everyday Mathematics</i> , Lesson 2.4, 5.8

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3. Demonstrate a sense of the relative magnitudes of numbers

**Make magnitude estimates.*

**Make magnitude estimates for quotients of whole and decimal numbers divided by whole numbers*

4. Use whole numbers, fractions, and decimals to represent equivalent forms of the same number.

**Rename fractions as decimals*

EM Game: First to 100,
Estimation Squeeze,
Multiplication Bullseye.
Discuss data used for
circle graphs

Everyday Mathematics, - 5 Lesson 2.10, 4.3
How Much is a Million?, by David Schwartz

Everyday Mathematics, Unit 2

Everyday Mathematics, Unit 4

EM Activity: Magnitude
Estimates
Explore division with base
ten blocks

EM Unit 5 checking progress Everyday Mathematics,
Unit 5.4

Everyday Mathematics, Unit 5
Middle School Mathematics with Pizzazz,
selected activities
Sketchpad: Fraction tiles, Comparing
Fractions, Feed the Mouse.

Use 10 x 10 grids, fraction
stick chart, decimal
number line
* writing equivalent
fractions using 10 or 100
as denominators before
writing decimals
* find decimal equivalents
before being allowed to
use the calculator for
converting fractions to
decimals.
* Discuss terminating
versus repeating decimal
numbers
* Encourage students to
find numerical patterns for
decimal equivalents

Everyday Mathematics, Lesson 8.1, 8.7, 8.9
EM Probability Meter Poster

EM Game: 2-4-5-10 Frac-
Tac-Toe (Decimal Version)

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<i>*Find decimals between pairs of numbers</i>	Evaluation of written response with reasoning Do Now, Exit Ticket	EM Game: Estimation Squeeze Provide opportunities for multiple step problems in open-ended format	<i>Everyday Mathematics, Lesson 8.4, 8.5</i> <i>Balloon target website.</i> <i>Sketchpad: Zooming Decimals</i>
<i>*Convert among fractions, decimals and percents.</i>	EM Unit 5 checking progress	EM Game: Fraction / Percent Concentration, 2-4-5-10 Frac-Tac-Toe (Percent Version, Bingo Version)	<i>Everyday Mathematics, Unit 5, 8.7, 8.9, 8.10</i> <i>Sketchpad: Stretchy Percent Ruler.</i>
<i>*Convert between fractions and mixed or whole numbers.</i>		Use games, allow students to explore with manipulatives or models	<i>Everyday Mathematics, Lesson 5.2, 8.12</i>
<i>*Convert between decimals, fractions and mixed numbers</i>		Use games, allow students to explore with manipulatives or models EM Game: Spoon Scramble	<i>Everyday Mathematics, Lesson 5.6, 5.8, 5.10, 5.11, 8.8</i> <i>Middle School Mathematics with Pizzazz, Creative Publications, selected activities</i>
<i>*Find common denominators</i>		Provide opportunities for students to find strategies for finding common denominators	<i>Everyday Mathematics, Lesson 6.9, 6.10</i> <i>Website resources</i> <i>Sketchpad: Open the Safe</i>
<i>*Find equivalent fractions</i>		Provide opportunities for students to explore equivalencies using paper folding and diagram modeling as well as use of other manipulatives or models EM activity: Using Fraction Sticks	<i>Everyday Mathematics, Lesson 5.4, 6.9, 6.10</i> Teacher supplement
<i>*Finding a fraction of a number</i>		Provide opportunities for students to model sets, paper fold and use other manipulatives including number line	<i>Everyday Mathematics, Lesson 5.1, 5.2, 8.4, 8.5</i> <i>EM Bulletin Board of Fraction of a Fraction examples</i>

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**Explore meaning of and purpose of percent*

Explore meaning of percent that makes sense to students, comparison of different units e.g., grades, percent as a number representation of a whole e.g., 25% of \$10 not the

*Everyday Mathematics, Unit 5
Teaching Student-Centered Mathematics,
Grades 3-5, Lovin and Van de Walle.*

**Find percent of a number*

Discuss various ways to find percent of a number
Provide multiple opportunities to find most efficient method.
EM Activity: American Tour
Populations: rural and urban

*Everyday Mathematics, Unit 5, Lesson 8.9,
8.11*

**Practice finding the whole, given a fraction or percent of the whole*

same as 25% of \$1 000
Provide opportunities to model using manipulatives

*Everyday Mathematics, Lesson 5.1, 5.2, 6.5,
8.10*

**Review concept of rates; represent rates with formulas, tables, and graphs*

Graphically explore rates: discuss continuous and discrete quantities,
Demonstrate Distance, speed and time using CBR and graphing calculator

*Everyday Mathematics, Lesson 10.4, 10.6
Website resources
CBR / graphing calculator*

5. Develop and apply number theory concepts in problem solving situations.

EM Game: Advanced Factor Captor
EM Project 2: "Deficient, Abundant, & Perfect

*Everyday Mathematics, Unit 1 and activities ongoing throughout the year
NJ Mathematics Curriculum Framework for grades 5-6, selected activities
NJ State rubric
Teacher supplement with Logic Number Problems
Sketchpad: Mystery Number
Teacher-made supplement (review skill from earlier grade)*

**Identify even and odd numbers*

EM Unit 1 checking progress Have students tell why number is even or odd
Numbers"

Flemington-Raritan School District Mathematics Curriculum

• *Primes, factors, multiples*

		Project 1: The Sieve of Eratosthenes	<i>Everyday Mathematics, Unit 1 Middle School Mathematics with Pizzazz, selected activities, Creative Publications Teacher supplement Sketchpad: Combination Locks, Factor Puzzles. Everyday Mathematics, Unit 1, 12.1</i>
<i>find and identify the factors of a number.</i>	EM Unit 1 checking progress	EM Activity: Factor pairs EM Game: Factor Captor, Factor Bingo EM Activity: Factor Rainbows, Square and Square Roots. Practice factor tree, write product of primes using exponents (EM uses factor strings)	
<i>find the prime factorizations of numbers</i>			<i>Everyday Mathematics, Lesson 1.9, 12.1 Middle School Mathematics with Pizzazz, selected activities Teacher supplement</i>
<i>identify prime and composite numbers</i>	EM Unit 1 checking progress	Explore array strategy for finding primes EM Project 1: The Sieve of Eratosthenes	<i>Everyday Mathematics, Lesson 1.6</i>
<i>*Find the greatest common factor of two numbers</i>		Provide examples using prime factorization	<i>Everyday Mathematics, Lessons 12.1 Teacher supplement using other resource Sketchpad: Combination Locks.</i>
<i>*Find the least common multiple of two numbers</i>		Provide examples using prime factorization	<i>Everyday Mathematics, Lessons 12.1 Teacher supplement Sketchpad: Combination Locks.</i>
<i>*Represent square numbers as arrays and as numbers written as exponents</i>		EM Activity: Exploring Square numbers	<i>Everyday Mathematics, Lesson 1.7</i>
<i>find the square root of a square number</i>		Refer to square root as unsquaring a number: use squeeze method	<i>Everyday Mathematics, Lesson 1.8</i>

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* Explore rates		Provide opportunities to solve number stories using rates	<i>Everyday Mathematics, Lesson 12.1</i> <i>Teacher supplement</i> <i>Website resources</i> <i>Teaching Student-Centered Mathematics in grades 3-5, 5-8, Lovin and Van de Walle</i> <i>Everyday Mathematics, Lesson 12.3, 12.4, 12.5</i> <i>Teacher supplement</i> <i>Middle School Mathematics with Pizzazz, Creative Publications</i> <i>NJ Mathematics Curriculum Framework in grades 5-6, selected activities</i>
* Explore uses of ratios and way of expressing ratios		Provide opportunities to explore ratios in everyday life; model and solve problems involving ratios of part to whole relationship and number stories EM American Tour data EM Activity: Musical Ratios.	
* Solve rate story problems	EM, Unit 12 checking progress	EM Activity: Find your Heart Rate. Provide multiple opportunities to model using manipulatives, discuss rate tables, and explore relationships between numbers using rate stories Practice setting up equivalent ratios that yield the same solutions.	<i>Everyday Mathematics, Lesson 12.6, 12.7, 12.8</i> <i>Teacher supplement</i> <i>Best of Math I and II, Exemplars CD</i> <i>Website resources</i>
* Introduce cross multiplication for solving ratio problems (proportions)			<i>Everyday Mathematics, Lesson 12.5</i> <i>Teacher supplement</i> <i>Middle School Mathematics with Pizzazz, Creative Publications</i> <i>Website resources</i>
6. Compare and order numbers.		EM Activity: Ranking States by Their Native-American Populations	<i>Everyday Mathematics, Lesson 3.2, 4.6</i>
* Order and compare positive and negative numbers		Explore practical uses for negative numbers: golf scores, football gains and losses, having and owing money, above and below sea level, stock market * Use number line	<i>Everyday Mathematics, Lesson 2.10, 5.3, 7.7</i> <i>Sketchpad: Jump Along.</i>

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Order and compare fractions	<p> Explore -x as the "opposite of x" since x may be a positive or negative number</p> <p>Use 0, 1/2 and 1 as benchmarks, Provide students with Fraction pieces, stick chart or number line to support their ordering</p> <p>EM Game: Build It</p>	<p><i>Everyday Mathematics, Lesson 5.3, 8.1</i> <i>Super Source with Cuisenaire series, Marilyn Burns</i></p>
*Understand and apply exponential notation	<p>Explore as repeated multiplication</p> <p>Introduce calculator keys A and y to the x</p>	<p><i>Everyday Mathematics, Lesson 7.1, 7.2, 7.3</i></p>
*Introduce number and word notation for large numbers	<p>EM Game: Exponent Ball</p> <p>Create place value charts</p> <p>Discuss and show examples of standard form and number and word notation</p> <p>Give students practice writing numbers such as 4.2 million, 35 billion, 29.3 thousand, What is 8K?</p>	<p><i>Everyday Mathematics, Lesson 7.1, 7.2, 7.3</i></p>
*Introduce exponential notation for powers of 10	<p>Explore relative size of numbers when distinguishing between positive and negative exponents for powers of ten</p>	<p><i>Everyday Mathematics, Lesson 7.1, 7.2, 7.3</i></p>
*Understand and apply scientific notation	<p>Explore uses of scientific notation, find examples on the Internet</p> <p>Literature Link</p> <p>While calculators may differ- introduce using scientific notation on a calculator for discussion purposes</p> <p>EM Game: Scientific Notation Toss</p>	<p><i>Everyday Mathematics, Lesson 7.3</i> <i>Teacher supplement; Website resources</i> <u><i>The King's Chessboard, David Birch</i></u></p>

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B. Numerical Operations

By the end of fifth grade, 90% of Flemington-Raritan students will have mastery of basic facts for addition and subtraction up to 20, and multiplication and division up to 12 x 12.

District Timed tests: 50 facts in two minutes

MP 1, 2, 3, 4 addition and subtraction separate; multiplication and division separate

<i>* Demonstrates proficiency in basic facts for addition and subtraction and multiplication and division</i>	EM Unit 1 Checking	EM Game: Advanced	<i>Everyday Mathematics</i> , Unit 1 and ongoing
	Progress	version of Factor Captor Game	throughout the year Website resources
<i>* Draw arrays to model multiplication</i>	EM Unit 1 Checking Progress	EM activity: Finding Rectangular Arrays in Perpetual Calendar Use array dot paper Geoboard Activity	<i>Everyday Mathematics</i> , Lesson 1.2
<i>*Find the quotient and remainder of a whole number divided by a 1-digit whole number</i>	EM Unit 4 Checking Progress	Discuss what form the remainder should be written in: decimal, fraction Provide opportunities to divide in context so remainder is valid	<i>Middle School Mathematics with Pizzazz</i> , selected activities
<i>*Find the quotient and remainder of a whole number divided by a 2 -digit whole number</i>	EM Unit 4 Checking Progress, Part B.	EM Game: Division Dash Explore remainder uses and formats at length Student should use appropriate estimation	<i>Everyday Mathematics</i> , Lesson 4.1, 4.2 <i>Middle School Mathematics with Pizzazz</i> , selected activities Give extra practice: teacher made or published worksheets

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**Add and subtract positive and negative numbers*

EM Unit 7 checking progress Use two color counters activities
Student should be able to demonstrate add / subtraction with counters or using the number line.
EM Game: Top It, Credit/Debits Game
Calculators should not be used for computation

Everyday Mathematics, Lesson 7.8, 7.9, 7.10
(NO calculator)

1. Recognize the appropriate use of each arithmetic operation in problem situations.

EM Unit 2, checking progress

EM Project 3: Ancient Multiplication Algorithm

Everyday Mathematics, Units 2.2, 2.3, 2.4, 2.8, 2.9, 4.2, 4.6

2. Construct, use, and explain procedures for performing addition and subtraction with fractions and decimals

EM Unit 2, 5, 8 checking progress

Students should have a successful strategy for computation. Students should be able to show understanding of computation method they are using. Encourage students to use appropriate and efficient procedures as time and problem warrants.

Everyday Mathematics, Lesson 2.2, 2.3, 2.4, 5.3, 6.8, 6.9, 6.10, 8.1, 8.2, 8.3, 8.4

- **Pencil-and-paper**

Provide practice appropriate to student need

- **Mental math**

Provide class competitions Teacher supplement

- **Calculator**

Use appropriate numbers and monitor student use
Discuss answer interpretations EM Game: Beat the Calculator

Website resources

Flemington-Raritan School District Mathematics Curriculum

<i>* Find the sum and difference of multi-digit whole numbers and decimals</i>		Assess place value using EM whole class discussion. Review various algorithms for adding and subtracting numbers, include traditional EM Games: Addition Top IT, Subtraction Target Practice	<i>Everyday Mathematics</i> , Lessons 2.2, 2.3, 2.4
<i>* Find the product of multi-digit whole numbers, fractions, and decimals</i>	EM Unit 2, Checking progress	Review various algorithms for multiplying numbers, include traditional. EM Games: Multiplication Wrestling	<i>Everyday Mathematics</i> , Lesson 2.8, 2.9, 8.5, 8.6, 8.7
<i>* Use an algorithm to add and subtract mixed numbers</i>	EM Unit 8 checking progress	EM Game: Fraction Capture, Mixed Number Spin, Fraction Action, Fraction Friction	<i>Everyday Mathematics</i> , Lesson 8.2, 8.3.
<i>* Add and subtract fractions with common denominators</i>	EM Unit 5, 6 checking progress	Provide opportunities for students to use manipulatives and other models to support their thinking Fraction pieces Explore the use of equivalent fractions to find common denominators EM Game: Fraction Capture,	<i>Everyday Mathematics</i> , Lesson 6.8, 6.9, 6.10, 5.3 <i>Middle School Mathematics with Pizzazz</i> , Creative Publications, selected activities
<i>* Add and subtract fractions with unlike denominators</i>	EM Unit 5, 6 checking progress	Provide opportunities for visual and concrete experiences to help students to understand concept EM Activity: Clock Fraction	<i>Everyday Mathematics</i> , Lesson 5.3, 6.8, 6.9, 6.10

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<i>* Use area model for fraction multiplication</i>		Paper folding	<i>Everyday Mathematics</i> , Lesson 8.5
<i>*Use an algorithm to multiply fraction, whole number and mixed numbers by a fraction of same</i>	EM Unit 8 checking progress, Part B.	Student should understand reasons behind multiplication algorithm: provide ample opportunities for modeling using manipulatives EM Game: Fraction/Whole Number Multiplication Top It	<i>Everyday Mathematics</i> , Lesson 8.5, 8.6, 8.7, 8.8, 8.10
<i>*Find the quotient for dividing a whole number by a whole number</i>	EM Unit 4 checking progress	Review partial-quotients algorithm and traditional method. Encourage good estimating	<i>Everyday Mathematics</i> , Lesson 4.1, 4.2, 4.4
<i>*Introduce strategy for dividing fractions</i>		Provide opportunities for discussion and understanding, use manipulatives and models	<i>Everyday Mathematics</i> , Lesson 8.12
3. Use an efficient and accurate pencil-and-paper procedure for division of a 3-digit number by a 2-digit number.	EM Unit 4 checking progress, Part B.	Provide opportunities for students to show mastery of efficient methods: emphasis is on efficiency, students who use one method should be encouraged to have alternate methods based on problem set	<i>Everyday Mathematics</i> , Lessons 4.2, 4.4, 4.5, 4.6 <i>Middle School Mathematics with Pizzazz</i> , selected activities
<i>*Use a divisibility test to determine if a number is divisible by another number.</i>		Enrichment: Exploring a Divisibility test EM Activity: Divisibility Tests	<i>Everyday Mathematics</i> , Lesson 1.5 <i>Middle School Mathematics with Pizzazz</i> , Creative Publications, selected activities
<i>*Interpret the remainder in division number stories</i>	EM Unit 4 checking progress	Provide visual representation of division using diagrams or models EM Activity: Solving division stories with remainders	<i>Everyday Mathematics</i> , Lesson 4.6 Website resources

Flemington-Raritan School District Mathematics Curriculum

**Divide decimal numbers by whole numbers with no remainders (B/D)*

EM Unit 4 checking progress Provide opportunities for students to estimate answer before calculating solution

Everyday Mathematics, Lesson 4.5
Middle School Mathematics with Pizzazz,
Creative Publications

4. Select pencil-and-paper, mental math, or a calculator as the appropriate computational method in a given situation depending on the context and numbers.

Supplemental enrichment activities

Everyday Mathematics, Units 1, 2, 3, 8, 10
Best of Math I and II, Exemplars CD

** Solve number stories (addition and subtraction) (S)*

Provide models of number stories including open sentences

Everyday Mathematics, Lesson 2.4, 2.8

5. Check the reasonableness of results of computations.

Always remind student to ask "Does this answer make sense?"

Everyday Mathematics, Units 2.1, 2.5, 2.7, 2.8, 9.7

6. Understand and use the various relationships among operations and properties of operations.

EM Unit 4, 7, 9 checking progress

EM Activity: The Four 4's

Everyday Mathematics, Lesson 1.4, 1.5, 1.9, 4.1, 9.7

• Understand how square numbers and their square roots are related

Create and explore patterns for squares and square roots
Use visual representations: geoboard
Introduce square root as the undo of squaring

Everyday Mathematics, Lesson 1.7, 1.8

Flemington-Raritan School District Mathematics Curriculum

- *Solve ratio and rate number stories*

Provide multiple opportunities for students to explore relationships and use as problem solving strategy
Encourage: Does this make sense? How can I use this information to help solve other problems?

Everyday Mathematics, Lesson 12.4, 12.5

C. Estimation

1. Use a variety of estimation strategies for both number and computation.

EM Unit 2 checking progress Provide ongoing opportunities for student guesses in estimation jars filled with a variety of objects.

Everyday Mathematics, Lesson 2.1, 2.5, 2.7

*Make magnitude estimates for product of multi-digit numbers, including decimals

EM Unit 2 checking progress Encourage students always to make estimates whenever doing computation whether on a calculator or by hand
EM Game: Multiplication Bull's Eye

Everyday Mathematics, Lesson 2.7

2. Recognize when an estimate is appropriate, and understand the usefulness of an estimate as distinct from an exact answer.

EM Activity: Estimation
EM Activity: Estimate Reaction Time
EM Activity: American Tour: Population estimates
Literature Link

Everyday Mathematics, Lesson 2.1, 2.5.

Counting on Frank, Rusty Bresser

Flemington-Raritan School District Mathematics Curriculum

* Use sampling to make an estimate

Explore the enormity of such large numbers through class discussions
EM Activity: Making Time Estimates for 1 Billion and 1 Trillion
Literature Link
EM Activity: Earth's Water Surface and School's Land area.

Everyday Mathematics, Lesson 2.10, 9.7
Website resources for real data numbers
How Much is a Million?, David Schwartz

3. Determine the reasonableness of an answer by estimating the result of operations.

EM Unit 2 checking progress Provide opportunities to practice estimation prior to computation Encourage good estimates and define key numbers to use

Everyday Mathematics, Lesson 2.1, 2.5, 2.7

4. Determine whether a given estimate is an overestimate or an underestimate.

Multiplication Bulls Eye.

Everyday Mathematics, Lesson 2.1, 2.7

Flemington-Raritan School District Mathematics Curriculum

Grade: 5 Standard 4.2 Geometry and Measurement

Essential Questions: How can knowledge of geometric properties help in problem solving situations?

How can coordinate grid systems help in understanding locations?

How does the mathematics of geometry enable us to wonder and understand our natural and physical world?

Knowledge/Skills/Understandings	Assessments	Learning Experiences	Resources
A. Geometric Properties			
1. Understand, apply, and identify concepts involving lines and angles.	Teacher Observation/RSA (Recognizing Student Achievement) Test/Quiz Exit Ticket	Provide hands-on models Discuss and model appropriate examples	<i>Everyday Mathematics</i> Unit 3 Website resources
• Notation for line, ray, angle, line segment		Provide practice for students to name, write, draw, notations.	<i>Everyday Mathematics</i> , Lesson 3.4, 3.5
• Properties of parallel, perpendicular, and intersecting lines		including those found within 2-D and 3-D figures Demonstrate using paper to show angle measures total 180 degrees	<i>Everyday Mathematics</i> , Lesson 3.5, 9.6 <i>Everyday Mathematics</i> , Lesson 3.9 Website resources
• Sum of the measures of the interior angles of a triangle is 180°		Explore different kinds of triangles and sizes Provide opportunities for students to explore the sums of angles; Use appropriate software such as Geometer's Sketchpad or other internet resource	<i>Everyday Mathematics</i> , Lesson 3.9 <i>Middle School Mathematics with Pizzazz</i> , selected activities Website resources
*Find the sum of the measures of the angles in any polygon			

Flemington-Raritan School District Mathematics Curriculum

**Determine angle measures based on relationships between angles*

EM Activity: Finding pattern-block angle measures.

Everyday Mathematics, Lesson 3.3, 3.4, 3.5, 3.9

EM Activity: Solving a Baseball Challenge.

Provide examples using a half protractor with angles drawn;

Provide right triangle and one angle measure, find the third, give one base angle of isosceles and find other two measures

EM Games: Angle Tangle
Provide ample opportunities to explore relationships using models or software

Everyday Mathematics, Lesson 3.4, 3.5
Teacher supplement

compass
Geometer's Sketchpad

Everyday Mathematics, Lesson 3.5
Teacher supplement

** Identify types of angles*

** Explore relationships for adjacent and vertical angles with intersecting lines*

** Use a compass to draw a circle and copy a line segment*

2. Identify, describe, compare, & classify polygons. • Triangles by angles & sides• Quadrilaterals, including squares, rectangles, parallelograms, trapezoids, rhombi

"Geodeo's Sorting Scheme"

Everyday Mathematics, Lesson 3.6

**• Polygons by number of sides
• Equilateral, equiangular, regular
• All points equidistant from a given point form a circle**

Geometry solids, Polygon tiles

Everyday Mathematics, Lesson 3.7, 3.9
Illuminations website

EM Game: Polygon Capture

Use graph paper and geoboard activities to model heights and bases

Everyday Mathematics, Lesson 3.6
Website resources

Everyday Mathematics, Lesson 9.5, 9.6

**Identify types of triangles*

**Identify the base and height of triangles and parallelograms*

Flemington-Raritan School District Mathematics Curriculum

3. Identify similar figures.

Use Problems for the Geometry Template;
Explore angle measures and side lengths, discuss relationships;
Show examples and non examples for definition "same shape different size"

Everyday Mathematics, Lesson 3.10
Teacher supplement
Sketchpad: Sliding Shapes

** Know the properties of geometric solids*

Use or create geosolid models
EM Game: 3-D Shape Sort,
EM Activity: polyhedral Dice,
EM Activity: Cube pattern,
EM Activity: rectangular Prism Pattern,

Everyday Mathematics, Lesson 11.1, 11.2
Website resources

***Identify faces, vertices and edges
(Grade 4 secure)**

Use geosolids models
Literature Link

Everyday Mathematics, Lesson 11.2
The Boy Who Reversed Himself,
Flatland

3. Understand and apply the concepts of congruence and symmetry (line and rotational).

EM Study Link 9.3 (reflection)
Look for congruent and similar shapes in wallpaper, fabric, art

Everyday Mathematics, Lesson 3.6, 9.3
Teacher supplement

B. Transforming Shapes

1. Use a translation, a reflection, or a rotation to map one figure onto another congruent figure.

EM Game: Robot Activity: "Shape Cutter"
This is new vocabulary for students: slide, flip and turn are previous vocabulary used
Provide projects in which student must use one shape and show all three transformations

Everyday Mathematics, Lesson 3.6, 3.8, 9.3
Illuminations website
Teaching Student-Centered Mathematics,
Grades 3-5, Lovin and Van de Walle
Teacher supplement
Middle School Mathematics with Pizzazz,
selected activities

Flemington-Raritan School District Mathematics Curriculum

**Define and create tessellations*

EM Activity: Tessellation Museum.

Everyday Mathematics, Lesson 3.8
Teaching Student-Centered Mathematics,
Grades 3-5, Lovin and Van de Walle.
The Art of MC Escher,
"Tessellmania"
Sketchpad: Making Kaleidoscopes, Sliding Shapes, Mosaic Tile Designs.

2. Recognize, identify, and describe geometric relationships and properties, as they exist in nature, art, and other real-world settings.

**Know properties of polygons*

**Know names of geometric solids and compare properties of prisms, pyramids, cylinders and cones.*

Use real applications

Everyday Mathematics, Unit 3
Teacher supplement Illuminations website *Geometry in the World of Art - Grades 3-5*

Provide models for student to explore
Provide students with models to explore and compare
Literature Link

Everyday Mathematics, Lesson 3.7
Teacher supplement
Everyday Mathematics, Lesson 1.1, 11.2
The Boy Who Reversed Himself, William Sleator

C. Coordinate Geometry

1. Create geometric shapes with specified properties in the first quadrant on a coordinate grid.

**Plot ordered pairs on a four-quadrant coordinate grid*

**Explore transformations of figures in a plane*

Activity: "Lost in the Crowd"
Literature Link

The Fly on the Ceiling, Julie Glass

Battleship game
EM Activity: Hidden Treasure
EM Activity: coordinates in a classroom

Everyday Mathematics, Lesson 9.1, 9.2, 9.3

Use graph paper, geoboard, pattern blocks, block letters
Have students write directions on how to move an object to a new location on the graph or describe changes from its original position;
Provide practice in reflections, translations, and rotations.

Everyday Mathematics, Lesson 9.2, 9.3
Teacher supplement
Website resources

Flemington-Raritan School District Mathematics Curriculum

EM Activity: Sailboat graph

D. Units of Measurement

1. *Select and use appropriate units to measure angles and area.*

Have whole class discussions about measures and the appropriate measuring units: both metric and US customary

*Everyday Mathematics Lesson 3.3, 3.4, 3.9, 9.4, 9.5, and 9.6
Teacher supplement*

**Understand the concept of area of a figure*

Provide multiple opportunities for student to explore area using manipulatives, models and graph paper in different unit sizes.
Emphasize square units as the measuring unit

Everyday Mathematics, Lesson 9.4, 9.5, 9.6

**Use the formula for area of a rectangle*

Explore ideas of variables used in formulas;
Explore patterns to help develop the formula;
Explore areas of irregular shapes that could be partitioned into smaller rectangles.

*Everyday Mathematics, Lesson 9.4
Middle School Mathematics with Pizzazz,
Creative Publications, selected activities*

Flemington-Raritan School District Mathematics Curriculum

**Explore strategies, including the rectangle method, for finding areas of polygons*

**Use formulas for area of triangle and parallelogram*

**Estimate distances using a map scale*

**Reading a ruler (previous grade secure)*

**Select reasonable measurement units , US and metric*

2. Convert measurement units within a system (e.g., 3 feet = ____ inches).

3. Know approximate equivalents between the standard and metric systems (e.g., one kilometer is approximately 6/10 of a mile).

EM Unit 9 Checking Progress

Explore using geoboard, centimeter graph paper; Elicit strategies to find the areas, e.g., add parts, build up and subtract
Literature Link
Explore using manipulatives and models heights (altitude) and bases of triangles and parallelograms, use geoboard activities and graph paper

Have class discussions about measuring on a map; Work in cooperative groups

Provide multiple opportunities for students to measure and draw lengths using both centimeter and inch ruler.

EM Activity: Finding Personal Measures for One's Body
Allow students to create own multiple choice problems using both US customary and metric units for length, weight and capacity

Activity: "Measuring Up"
EM Activity: Finding Measurement Equivalencies

Reference Page of Journal 2 (back cover)

Everyday Mathematics, Lesson 9.5 and 9.6
Spaghetti and Meatballs for All, Cheryl Rectanus

Everyday Mathematics, Lesson 9.6
Middle School Mathematics with Pizzazz, Creative Publications, selected activities

Everyday Mathematics, Lesson 4.3
Teacher supplement
Sketchpad: U.S. Cities

Teacher supplement
Website resources
Transparency Rulers - Master Rulers

Everyday Mathematics, Lesson 6.2
Math Masters
Sample multiple choice assessment like items from NJ state and other state assessments

Illuminations website
Teacher supplement
Middle School Mathematics with Pizzazz, selected activities
Everyday Mathematics, Lesson 9.10

Everyday Mathematics, Lesson 6.2, 11.6

Flemington-Raritan School District Mathematics Curriculum

**Examine the relationship among liter, milliliter, and cubic centimeter*

Use models to demonstrate equivalencies

Everyday Mathematics, Lesson 9.10

4. Use measurements and estimates to describe and compare phenomena.

Project 8- Pendulums
Provide some informal indirect measurement examples

Everyday Mathematics, Lesson 2.5, 10.5

** Understand the concept of capacity and how to calculate it*

Solve problems involving units of weight, see Teacher's guide for examples

Everyday Mathematics Lesson 11.6
Teacher supplement with Open-ended problems from various sources

5. Solve problems with elapsed time (Grade 4 secure)

Provide students with opportunities to write and solve number stories involving elapsed time: include fractions, decimals and whole numbers, e.g., daily schedule, cooking, appointments, getting ready for school

EM teacher's guide
Teacher supplement
Website resources

E. Measuring Geometric Objects

1. Use a protractor to measure angles.

Geometry template,
Have students explore using both half and circle protractors
EM Activity: Pattern Block Angles

Everyday Mathematics, Lesson 3.3 3.4
Middle School Mathematics with Pizzazz, selected activities

**Estimate the measure of an angle*

Cooperative group exploration activities

Everyday Mathematics, Lesson 3.6, 3.8
Sketchpad: Angle Estimation.

** Measure an angle within 2 degrees*
Math Masters
Sketchpad: Introducing Protractors.

Flemington-Raritan School District Mathematics Curriculum

2. Develop and apply strategies and formulas for finding perimeter and area.

<p>*Square</p> <p>V P t a Q J i V l l 1</p>	<p>EM Project 6: Sports Areas EM Math Masters EM Project 7: Polygon Areas and Pick's Theorem Use geoboard activities</p>	<p><i>Everyday Mathematics, Lessons 9.3, 9.4, 9.5, 10.8, and 10.9</i> <i>Sketchpad: Rectangles with Same Area, Rectangles with Same Perimeter.</i></p>
<p>*Polygons</p>	<p>Use models to explore formulas Graph paper, geoboard Explore to find formula Use models, polygon tiles or other to explore area Student not expected to generate formulas for all polygons, such as hexagon, pentagon etc.</p>	<p><i>Teacher supplement</i> <i>Everyday Mathematics, Lesson 9.4</i> <i>Everyday Mathematics Unit 9</i></p>
<p>*Triangles</p>	<p>Explore using manipulatives and models Geoboards, graph paper</p>	<p><i>Everyday Mathematics, Lesson 9.6</i> <i>Math Masters</i> <i>Sketchpad: Rectangles and Triangles.</i> <i>Everyday Mathematics, Lesson 9.6</i> <i>Everyday Mathematics, Lesson 9.4, 9.5, 9.6</i></p>
<p>* Parallelograms</p>	<p>Provide activities to explore the diameter and radius relationship between circumference and area using manipulatives and models Explore "pi" EM Activity: Circumference Investigation Literature Link</p>	<p><i>Everyday Mathematics, Lesson 10.8 and 10.9</i> <i>Teacher supplement</i> <i>Everyday Mathematics, Lesson 10.8, 10.9</i> <i><u>The Librarian Who Measured the Earth,</u></i> <i>Kathryn Lasky</i> <i>Website resources for "pi"</i></p>
<p>*Identify the base and height of triangles and parallelograms</p>		
<p>*Circles</p>		
<p>*Distinguish between circumference and area of circle problems</p>		

Flemington-Raritan School District Mathematics Curriculum

**Use formulas to find the circumference and area of circles*

**Understand the concept of volume of a figure*

**Understand the relationship between the volume of pyramids and prisms, and the volume of cones and cylinders*

** Use formulas to find the volume of prisms and cylinders*

**Explore the volume of an irregular object by submerging it in water and measuring the volume of water it displaces*

Explore using manipulatives and models
Creates 3-D models from net patterns
EM Activity: explore volume using open boxes

Demonstrate using geosolids and water or other dry material to derive the relationship
Use net patterns

Use centimeter cubes to build prisms and develop the formulas

Use geosolids as reference models
Provide opportunities to view the results of the volume of two cylinders with height of 5, 10 and radius of 10, 5 to see if same, or which is larger.
Practice finding volumes with missing measures, e.g.,
Given $V = 36$ cubic units, $l = 4$ units, $w = 3$ units, what is h ?
Demonstration by teacher or students working in cooperative groups. Students may not be adept in experimentation accuracy for this to show accurate results.
Have students make prediction and then find the difference between their prediction and the actual result.

Everyday Mathematics Lesson 10.8, 10.9

*Everyday Mathematics Lesson 9.8, 9.9, 9.10
Sketchpad: Cube Nets, Stack it Up*

*Everyday Mathematics, Lesson 11.7
NJ Mathematics Curriculum Framework in grades 5-6, selected activities
Teacher supplement*

*Middle School Mathematics with Pizzazz, Creative Publications, selected activities
Best of Math I and II, Exemplars, CD*

*Everyday Mathematics, Lesson, 11.5
See science curriculum topics of displacement or calibration
Website resources*

Flemington-Raritan School District Mathematics Curriculum

**Understand the concept of surface area of a figure*

Geosolid with folding nets
Gather 3-D objects and discuss the faces and their coverings

*Everyday Mathematics, Lesson 11.7
Sketchpad: Perfect Package*

** Find the surface area of prisms*

Geosolid with folding nets
Explore surface area using nets and writing recipes for finding surface areas

*Everyday Mathematics, Lesson 11.7
Teacher supplement*

** Understand how to find the surface area of cylinders*

Use everyday examples of cylinders

Everyday Mathematics Lesson 11.7

3. Recognize that rectangles with the same perimeter do not necessarily have the same area and vice versa.

Explore rectangles using geoboard activities and other models

Everyday Mathematics Lesson 9.4

4. Develop informal ways of approximating the measures of familiar objects (e.g., use a grid to approximate the area of the bottom of one's foot).

*Everyday Mathematics Journal
Teacher supplement
Estimation Challenge*

Flemington-Raritan School District Mathematics Curriculum

Grade: 5 Standard 4.3 Patterns and Algebra

Essential Questions: How can patterns help in problem solving?

How can symbols be used to help us in problem solving?

How does the study of algebra help us understand mathematical patterns as the patterns found in nature & the real world?

Knowledge/Skills/Understandings	Assessments	Learning Experiences	Resources
A. Patterns 1. Recognize, describe, extend, and create patterns involving whole numbers.	Teacher Observation/RSA (Recognizing Student Achievement) Test/Quiz Exit Ticket EM Unit 10 checking progress	EM Activity: Number Patterns using dots, Math Masters. "Patterns that Grow" Provide multiple opportunities for exploring patterns involving manipulatives, numbers, models and other objects	<i>Everyday Mathematics</i> Units 1, 2, 7, 10 Teacher supplement Illuminations websites Sketchpad: The Envelope
• Descriptions using tables, verbal rules, simple equations, and graphs			<i>Everyday Mathematics</i> , Lesson 10.4, 10.5, 10.7 Website resources <i>Navigations in Algebra, grades 3-5</i> , NCTM, selected activities
<i>*Explore Fibonacci Sequence</i>		Provide opportunities for students to explore pattern and find patterns in the Fibonacci sequence, especially those found in nature: sunflower seeds, nautilus shell, pine cones	Teacher supplement Website and Library resources
B. Functions & Relationships 1. Describe arithmetic operations as functions, including combining operations and reversing them.		Allow student to explore ways to evaluate expressions	<i>Everyday Mathematics</i> Lesson 7.4, 7.5 <i>Groundworks for Algebra</i> , Creative Publications <i>Sketchpad: Function Machines</i> .
<i>*Translate word descriptions into algebraic expression</i>		Discuss common symbols for words, e.g., twice, half	<i>Everyday Mathematics</i> , Lesson 10.3

Flemington-Raritan School District Mathematics Curriculum

<i>*Complete "What's My Rule?"</i>	EM Unit 10 checking progress		<i>Everyday Mathematics</i> , Lesson 10.3, 10.4
2. Graph points satisfying a function from T-charts, from verbal rules, and from simple equations.	EM Unit 10 checking progress assessment	Explore linear relationships	<i>Everyday Mathematics</i> Lesson 10.4, 10.5, 10.6
C. Modeling			
1. Use number sentences to model situations.		Use concrete models to represent variables At first, discuss what makes sense rather than procedural Geoboard EM Game: First to 100 EM Game: Algebra Election Game Provide opportunities for types of open sentences that are true, false and neither	<i>Everyday Mathematics</i> Lesson 2.4, 4.6, 10.3, 10.4, 10.6 Teacher supplement <i>NJ Mathematics Curriculum Frameworks in grades 5-6</i> , selected activities
<ul style="list-style-type: none"> • Using variables to represent unknown quantities • Using concrete materials, tables, graphs, verbal rules, algebraic expressions/equations <ul style="list-style-type: none"> • <i>Understand and apply the use of</i> • <i>Identify if equation is true or false</i> 			<i>Everyday Mathematics</i> , Lesson 7.4 Teacher supplement
<i>parentheses in number sentences</i>		Explore why parentheses have importance in expression simplifying (Words use commas to give meaning) EM Game: Name That Number EM Activity: Number Stories (Discuss nested parenthesis: most often used as brackets or braces) e.g., $[(3+8) - (11 - 2)]$ EM Activity: Converting Celsius to Fahrenheit Students should work in a vertical format and show each calculation. ONLY after students have mastery of steps for order of operations, provide exploration of simplifying using a calculator.	<i>Everyday Mathematics</i> , Lesson 7.4 NJ Mathematics Curriculum Frameworks, Grades 5-6, selected activities EM Activity: The Four 4's Problem.
<ul style="list-style-type: none"> • <i>Determine the value of a variable: use this value to complete a number sentence</i> • <i>Understand and apply order of operations to evaluate expressions and solve number sentences</i> 			<i>Everyday Mathematics</i> , Lesson 4.6, 10.6 <i>Everyday Mathematics</i> , Lesson 7.5

Flemington-Raritan School District Mathematics Curriculum

- Write algebraic expressions to describe situations

- Represent rate problems as formulas, graphs and tables

- Write and solve open sentences for number stories

- Write and solve number sentences with variables for division number stories

2. Draw freehand sketches of graphs that model real phenomena and use such graphs to predict and interpret events.

***Changes over time**

***Rates of change (e.g., when is plant growing slowly/rapidly, when is temperature dropping most rapidly/slowly)**

Use story problems to generate variable expressions

Provide multiple opportunities to explore rate relationships in various problem situations

Use manipulatives and models to explore solutions

Allow students to use manipulatives and other models to assist in solving stories

EM Activity: Predicting Old Faithful's Next Eruption
EM Project 8: Pendulum

Explore line graph data

Explore: temperature over a month time, growth of plants, height of growth from child to adult

Everyday Mathematics, Lesson 10.3 teacher supplement

Everyday Mathematics Lesson 10.4 Teacher supplement

Everyday Mathematics, Lesson 2.4, 10.2 Teacher supplement

Everyday Mathematics, Lesson 4.5, 4.6

Everyday Mathematics, Lesson 10.5, 10.7

Website resources

Teacher supplement
Website resources

D. Procedures

1. Solve simple linear equations with manipulatives and informally

***Whole-number coefficients only, answers also whole numbers**

*** Variables on one side of equation**

EM Unit 9, 10 checking progress and assessment.

Use pan-balance, geoboard, manipulatives and other models to solve

Everyday Mathematics, Lesson 9.6, 10.3, 10.4, 10.5, 10.7.
Middle School Mathematics with Pizzazz, selected activities
Teaching Student Centered Mathematics, Grade 3-5 & 5-8, Lovin & Van de Walle, selected activities

Flemington-Raritan School District Mathematics Curriculum

*Solve one-step pan-balance problems		Demonstrate using manipulatives and models, then use symbols before using variables Students should explore equation solving in cooperative groups	<i>Everyday Mathematics</i> , Lesson 10.1.
*Solve two-step pan-balance problems		Begin with manipulatives and models	<i>Everyday Mathematics</i> , Lesson 10.2.
2. Understand and use the concepts of equals, less than, and greater than in simple number sentences. (Grade 4 secure) *Symbols (<, >, =)	EM Unit 7 checking progress	Incorporate use of these symbols when comparing all numbers including fractions and decimals	SRB, American Tour Section Website or library book resources
1. Understand, name and apply the properties of operations and numbers. (Grade 4 secure) *Commutative *Identity element for multiplication *Associative *Division by zero *Any number multiplied by zero is zero		Apply these properties when simplifying numerical expression including whole numbers, decimals, fractions and integers.	Teacher supplement <i>Middle School Mathematics with Pizzazz</i> , Creative Publications

Flemington-Raritan School District Mathematics Curriculum

Grade: 5 Standard 4.4 Data Analysis, Probability, and Discrete Mathematics

Essential Questions: How can classifying help me in organizing data to solve problems?

How can statistics help us to understand real world situations?

How can the study of real world data help us understand and make accurate predictions?

Knowledge/Skills/Understandings	Assessments	Learning Experiences	Resources
A. Data Analysis			
1. Collect, use, generate, organize, and display data.	Teacher Observation/RSA (Recognizing Student Achievement) Unit 6 Checking Progress/Quiz Exit Ticket Evaluation of student completed projects	EM Activity: Class Data for number of States students / adults have visited EM Activity: Collecting Exercise Data	<i>Everyday Mathematics</i> , Lesson 6.1, 12.7 <i>Best of Math I & II, Exemplars CD</i>
• Data generated from surveys		Have student generate surveys to collect data about themselves Introduce the American Tour Census Data EM Journal EM Activity: Interpret data in the news	<i>Everyday Mathematics</i> , Lesson 3.1, 3.2, 6.1, 6.6
	using a rubric		

2. Read, interpret, select, construct, analyze, generate questions about, and draw inferences from displays of data.

Activity: "Information Represented Graphically"
EM Activity: Education and Earnings
EM Activity: Estimating Colonial Populations
EM: American Tour, School Days, EM Journal
EM Activity: reading Graphs, Mystery Graphs.

Illuminations website
Everyday Mathematics, Lesson 3.1, 3.2, 5.12, 10.7
Teacher supplement with various graphs from newspapers, periodicals, encyclopedias, and other related documents

Sketchpad: Target Mean Game.

Flemington-Raritan School District Mathematics Curriculum

• Bar graph, line graph, circle graph, table

EM Unit 5 checking progress

Discuss differences of each type of graph and why one over another is appropriate for different types of data
EM activity: Interpreting Data
EM Activity: Create circle graphs with Class Snack Survey
EM Activity: Acting out the Construction of a Circle graph

Teacher supplement
Website resources
Everyday Mathematics, Lesson 5.9, 5.10, 5.11, 6.1, 6.4, 6.6
Best of Math I and II, Exemplars

**Use a Percent Circle to find percents of circle graphs*

**Measures pieces of a circle graph; interpret a circle graph*

**Construct circle graph*

**Construct, read and interpret stem-and-leaf plots (B/D)*

Find and use circle graphs
Use protractor to measure sectors

Everyday Mathematics, Lesson 5.10, 5.11
EM Math Masters

Everyday Mathematics, Lesson 6.5
Teacher supplement

Everyday Mathematics, Lesson 5.11 Math Masters

Website sources for data
Everyday Mathematics, Lesson 6.3, 6.4

Use various sample data sets to create stem and leaf plots
EM Journal activity;
Measuring the Great Span
EM Math Masters
EM Activity: Reaching and Jumping

• range, median, and mean

EM Unit 2 checking progress

Provide multiple opportunities to explore these measures and their value in different contexts
Discuss meaning for average and different uses of

Teacher supplement
Best of Math I & II, Exemplars CD
Sketchpad: Target Mean Game

**Identify the statistical landmarks for maximum, minimum, median, and mode*

EM Activity: The Great Span
EM Activity: Estimate Reaction Time
EM Activity: States visited by Adults and Students

Illuminations website and others
Middle School Mathematics with Pizzazz,
Creative Publications
Everyday Mathematics, Lessons 2. 5, 6.1, 6.4, 6.5, 6.6

Flemington-Raritan School District Mathematics Curriculum

** Collect, organize, use and display data landmarks*

Give students central tendency data and have them create data sets: e.g., Sample data set, mean is 10, median is 15, mode is 8, find the set of 5 numbers that satisfy these conditions
Use open-ended problems
EM Math Masters
EM Activity: Constructing a Graph from Landmarks.

Everyday Mathematics, Lesson 2.5, 6.5
Website resources
Best of Math I and II, Exemplars CD

**Interpret mystery line plots and graphs*

Explore examples of story telling graphically and then model

Everyday Mathematics, Lesson 6.4, 10.7, 12.7
Teacher supplement

**Understand how sample size affects results*

EM Activity: Sample Candy Color
Provide multiple experiences changing sample size using models and manipulatives e.g., number of test questions

Everyday Mathematics, Lesson 6.5
Website resources

3. Respond to questions about data and generate their own questions and hypotheses.

Everyday Mathematics - Unit 6
Teacher supplement

Flemington-Raritan School District Mathematics Curriculum

B. Probability

1. Determine probabilities of events.

Teacher
Observation/RSA
(Recognizing Student
Achievement)
EM Unit 12 Checking
Progress/Quiz
Exit Ticket

EM Journal: Describing
Chance
Probability Meter Poster
EM Activity: Thumbtack
Experiment

Everyday Mathematics, Lesson 2.6, 12.2
Jumanji, Chris Van Allsburg
Teacher supplement
Navigations in Data Analysis and Probability,
grades 3-5, 5-8, NCTM, selected activities
Best of Math I and II, Exemplars CD

• Event, probability of an event

EM Activity: US Census
results on the Probability
Meter

Everyday Mathematics, Lesson 2.6 and 12.2
Middle School Mathematics with Pizzazz,
Creative Publications

• Probability of certain event is 1 and of impossible event is 0

Whole class discussion
about real events and their
certainty or uncertainty e.g.,
day/ night, drive to Europe
from NY
EM Activity: Probability
Investigations

Everyday Mathematics, Lesson 2.6
Teacher supplement
Probability Meter Poster

Everyday Mathematics. Lesson 12.2
Teacher supplement

**Compute the probability of outcomes
when choices are equally likely*

2. Determine probability using intuitive, experimental, and theoretical methods (e.g., using model of picking items of different colors from a bag).

Provide multiple
opportunities for students to
find probability through
simulations using coins, dice,
cubes in a bag, etc.
Have students explore
experimental versus
theoretical probabilities and
discuss why they may be
different

Everyday Mathematics Unit 2, 6, and 12, selected
activities
Teacher supplement
Website resources
Sketchpad: Red Light, Green Light

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• **Given numbers of various types of items in a bag, what is the probability that an item of one type will be picked**

Provide multiple opportunities for students to find probability through simulations using coins, dice, cubes in a bag, etc.
EM Activity: Taking a Small Sample of Candy Colors

Everyday Mathematics, Lesson 2.6, 6.5, and 12.5
Navigation in Data and Analysis in Grades 3-5, NCTM, selected activities

• **Given data obtained experimentally, what is the likely distribution of items in the bag**

Perform probability simulations and give results of experiment

Everyday Mathematics, Lesson 12.2
Teacher supplement

3. Model situations involving probability using simulations (with spinners, dice) and theoretical models.

Provide students with opportunities to model probability situations using manipulatives.
EM Activity: Making Spinners

Everyday Mathematics, Lesson 2.6, 12.2
Jumanji, Chris Van Allsburg
Teacher supplement

C. Discrete Mathematics-Systematic Listing and Counting

1. Solve counting problems and justify that all possibilities have been enumerated without duplication.

EM Activity: Counting License Plates
"The Handshake Problem"

Website resources
Best of Math I and II, Exemplars CD
Sketchpad: Hide the Spinner

• **Organized lists, charts, tree diagrams, tables**

EM Activity: Venn Diagrams

Everyday Mathematics, Lesson 11.2, 12.2
Sample Open-ended problems from various sources

**Use tree diagrams to find all possible ways a sequence of choices can be made (DS)*

Use Multiplication Counting Principle and provide multiple opportunities to write out all possible outcomes

Everyday Mathematics, Lesson 12.2
Teacher supplement

Flemington-Raritan School District Mathematics Curriculum

2. Explore the multiplication principle of counting in simple situations by representing all possibilities in an organized way (e.g., you can make $3 \times 4 = 12$ outfits using 3 shirts and 4 skirts).

**Use the Multiplication Counting Principle to find the total number of possible outcomes of a sequence of choices*

Fourth Grade Extension
Activity: "Four-by-Four Block"

Everyday Mathematics, Lesson 12.2
Explain It! Selected problems
Website resources
Sketchpad: How Many Ways

EM Activity: Probability Investigations

Everyday Mathematics, Lesson 12.2
Middle School Mathematics with Pizzazz, Creative Publications

D. Discrete Mathematics-Vertex-Edge Graphs and Algorithms

1. Devise strategies for winning simple games

(e.g., start with two piles of objects, each of two players in turn removes any number of objects from a single pile, and the person to take the last group of objects wins) and express those strategies as sets of directions.

*** Explore vertex-edge graphs and tree diagrams (Grade 4)**

*** Vertex, edge, neighboring/adjacent number of neighbors (Grade 4)**

***Path, circuit (Paths that end at its starting point) (Grade 4)**

EM Game: Finish First
Design games to play and find strategies for winning: dice

Everyday Mathematics, Lesson 6.2
Teacher supplement

EM Activity: Making Spinners *Everyday Mathematics*, Lesson 12.2

Use models and design communication chains: office manager can talk with every employee, each employee can talk to office manager and one other employee

Everyday Mathematics, Lesson 12.2
Teacher supplement
Website resources

Use manipulatives and other models

Teacher supplement

Use museum, zoo, or school floor plans

Teacher supplement
NCTM website
Question Quest Level A

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***Find the smallest number of colors
needed to color a map or graph. (Graph 4)**

Use sample maps or
drawings

Teacher supplement
Website resources for maps

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Grade: 5 Standard 4.5 Mathematical Processes

Big Idea: Mathematical understandings are an essential part of our lives in and out of school and as such all children need to have an instinctive sense of mathematical resources that they can rely on to help them progress through life.

Essential Questions: How will learning to "think" mathematically enable us to make a life, make a living, and make a difference?
How does the use of technology enable us to have a deeper understanding of mathematics?

Knowledge/Skills/Understandings	Assessments	Learning Experiences	Resources
A. Problem Solving			
<i>Note - Since Everyday Mathematics is a spiraling program, NJ standard 4.5 occurs throughout daily lessons. Additional resources that are used in conjunction with the program are listed below.</i>			
1. Learn mathematics through problem solving, inquiry, and discovery.	Teacher Observation/RSA (Recognizing Student Achievement) Test/Quiz Exit Ticket	Provide multiple opportunities with partner/small group/independent investigations of problem solving using manipulatives and other models. Problem Solving Diagram	<i>Best of Math I and II, Exemplars CD Everyday Mathematics Projects Everyday Mathematics</i>
2. Solve problems that arise in mathematics and in other contexts (cf. workplace readiness standard 8.3).		Provide examples of math in "real life" : shopping, discounts, counting and making change, scheduling for after school events, birthday and party planning	<i>Everyday Mathematics Lessons 5.8, 5.9, and 5.10 Best of Math I and II, Exemplars CD</i>
• Open-ended problems	Evaluation of student solution using a rubric	Provide students with opportunities to score other students solutions using a rubric	Sample open-ended questions from NJ and other states <i>Best of Math I and II Exemplars CD</i>

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<ul style="list-style-type: none"> • Non-routine problems 	Exemplars	EM teacher's Guide <i>Best of Math I and II, Exemplars CD</i> Open-ended responses
<ul style="list-style-type: none"> • Problems with multiple solutions 	Provide opportunities for student to answer questions using the Geometer's Template. Explore open-ended questions Discuss solution strategies for various open-ended problems EM Activity: Fraction Problems	<i>Explain It</i> <i>Everyday Mathematics</i> , Lesson 3.10 Sample Open-ended questions from NJ and other states Website resources for open-ended problems
<ul style="list-style-type: none"> • Problems that can be solved in several ways 		Teacher supplement <i>Best of Math I and II, Exemplars CD</i> Open-ended responses
<p>3. Select and apply a variety of appropriate problem-solving strategies (e.g., "try a simpler problem" or "make a diagram") to solve problems.</p>	EM Math Journal: Number Stories EM activity: Finding the Area of Words	<i>Best of Math I and II, Exemplars CD</i>
<p>4. Pose problems of various types and levels of difficulty.</p>	Provide multiple opportunities for students to solve problems using models and manipulatives EM Activity: clock fractions EM Activity: Pattern Block Fractions	<i>Best of Math I and II, Exemplars CD</i> Sketchpad: Jeff's Garden

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Mathematics Curriculum

5. Monitor their progress and reflect on the process of their problem solving activity.

Provide student with opportunities to tell what they know and how they know and what they might not completely understand or are unclear on.

Teacher supplement

B. Communication

1. Use communication to organize and clarify their mathematical thinking.

EM Project 5: How Would you Spend \$1,000, 000? (rubric provided)

Best of Math I and II, Exemplars CD
Teacher supplement

- Reading and writing
-

Discussion, listening, and questioning

Provide opportunities for students to discuss, listen and Use cooperative groups and partners to share mathematically thinking

Teacher supplement

2. Communicate their mathematical thinking coherently and clearly to peers, teachers, and others, both orally and in writing.

Best of Math I and II, Exemplars CD

3. Analyze and evaluate the mathematical thinking and strategies of others.

Teacher Observation
Group presentations of winning strategies for games

EM Game: First to 21

4. Use the language of mathematics to express mathematical ideas precisely.

Ask student to create a poem about order of operations, area, perimeter and volume

Best of Math I and II, Exemplars CD
Teacher supplement

C. Connections

1. Recognize recurring themes across mathematical domains (e.g., patterns in number, algebra, and geometry).

Everyday Mathematics Lesson 3.8

2. Use connections among mathematical ideas to explain concepts (e.g., two linear equations have a unique solution because the lines they represent intersect at a single point).

Math Masters

Best of Math I and II, Exemplars CD

3. Recognize that mathematics is used in a variety of contexts outside of mathematics.

Everyday Mathematics
American Tour
Lessons

Everyday Mathematics: American Tour in Student Reference book

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4. Apply mathematics in practical situations and in other disciplines.

Everyday Mathematics: American Tour in Student Reference book Math Masters

Everyday Mathematics
American Tour
Example: Lesson 6.7
EM Activity: Locating Points on Land or Water
EM Activity: Investigate Consumption of Rice for a Thai family of four

Everyday Mathematics: American Tour in SRB Math Masters
Everyday Mathematics, Lesson 5.12, 6.2, 7.3, 11.6 Teacher supplement

5. Trace the development of mathematical concepts over time and across cultures (cf. world languages and social studies standards).

EM American Tour
EM Activity: An Ancient Multiplication Method
EM Activity: Find out about American History
EM Activity: Learn about Nonstandard Units of Measure
EM Activity: History of the Earth
EM Activity: Researching Rice

6. Understand how mathematical ideas interconnect and build on one another to produce a coherent whole.

Frac-Tac-Toe Game *Everyday Mathematics*, Lesson 8.1
American Tour Teacher supplement with website and other resources
EM Activity: Blast from the Past

D. Reasoning

1. Recognize that mathematical facts, procedures, and claims must be justified.

Class/group oral/
written discussions
Whole class
discussion questions
on "average"
agreement or
disagreement in
given situations,

2. Use reasoning to support their mathematical conclusions and problem solutions.

EM Activity: Sorting
attribute Blocks by
Two Properties

NJ State rubric
Best of Math I and II, Exemplars CD

3. Select and use various types of reasoning and methods of proof.

Explore different
ways to support
reasoning and proof
for problems
EM Activity: Attribute
Puzzles
EM Activity: Mystery
Plots
EM Game: Polygon
Capture

Best of Math I and II, Exemplars CD

4. Rely on reasoning, rather than answer keys, teachers, or peers, to check the correctness of their problem solutions.

EM Journal

Website resources that include self check

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5. Make and investigate mathematical conjectures.

EM Activity: Graphing race results -make prediction who will complete the course first

*Best of Math I and II, Exemplars CD
Everyday Mathematics, Lesson 10.6*

• **Counterexamples as a means of disproving conjectures**

Provide opportunities for examples and non-examples, e.g., polygon / not polygon

• **Verifying conjectures using informal reasoning or proofs.**

Exemplars I and II

NJ State rubric

6. Evaluate examples of mathematical reasoning and determine whether they are valid.

Evaluation of student solution using a rubric

Provide opportunities to score solutions of their students and provide appropriate feedback
Exemplars I and II

*Best of Math I and II, Exemplars CD
NJ State mathematics rubric*

E. Representations

1. Create and use representations to organize, record, and communicate mathematical ideas.

Explore strategies for solving open-ended problems

Best of Math I and II, Exemplars CD

•
ten blocks or algebra tiles)
•
diagrams, charts, or tables)

Concrete representations (e.g., base-Fraction Factory Teacher supplement

Pictorial representations (e.g., graphs, charts
Everyday Mathematics, Unit 10

Flemington-Raritan School District Mathematics Curriculum

• Symbolic representations (e.g., a formula)

variables, equations

Everyday Mathematics, Unit 10

• Graphical representations (e.g., a line graph)

EM Journal

Everyday Mathematics, Unit 10
Teacher supplement

2. Select, apply, and translate among mathematical representations to solve problems.

EM Lesson 2.4,
Mental Math and
Reflexes

Best of Math I and II, Exemplars CD

3. Use representations to model and interpret physical, social, and mathematical phenomena.

Everyday
Mathematics
American Tour
Lessons Example
Lesson 12.3

Everyday Mathematics: American Tour in Student Reference
book

F. Technology

1. Use technology to gather, analyze, and communicate mathematical information.

Students display
of findings; ex.
posters, charts,
PowerPoint

Place Value Puzzles Website resources
Math Boxes

2. Use computer spreadsheets, software, and graphing utilities to organize and display quantitative information (cf. workplace readiness standard 8.4-D).

Use Microsoft Excel

Everyday Mathematics: Lesson Units 5 and 6
Teacher supplement

Flemington-Raritan School District Mathematics Curriculum

3. Use graphing calculators and computer software to investigate properties of functions and their graphs.		Explore Microsoft Excel activities using formulas and charts	Graphing calculators Texas Instruments resources Teacher supplement
4. Use calculators as problem-solving tools (e.g., to explore patterns, to validate solutions).	Student created tessellation	Explore tessellations	<i>Everyday Mathematics</i> Lesson 3.8
5. Use computer software to make and verify conjectures about geometric objects.	Observation of students while interacting with software/	Provide appropriate opportunities for students to interact with software	<i>Geometer's Sketchpad</i> <i>Best of Math I and II Exemplars CD</i> Use additional website resources as needed
6. Use computer-based laboratory technology for mathematical applications in the sciences (cf. science standards).	Journal writing	Geometer's Sketchpad	<i>Geometer's Sketchpad</i>

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Mathematics Curriculum

**Sixth Grade Math
Pacing Guide**

Unit	Number of Days (approximate)	Unit	Number of Days (approximate)
Unit 1 Data and Landmarks	15	Unit 8 Rates and Ratios	13
Unit 2 Operations with Whole Numbers and Decimals	20	Unit 5 2 Dimensional Geometry	15
Metric and Customary Measurement	8	3 Dimensional Geometry	7
Unit 3 Variables, Formulas and Graphs	20	Unit 6 - Number Systems and Algebra Concepts	14
Prime Time- Factors, Multiples, and Prime Numbers	10	Unit 7 - Probability	5
Unit 4 Rational Number Uses and Operations	20	Unit 9 - Variables, Formulas and Graphs	10
Mid-Year Assessment	1	End-of-the-Year Assessment	1

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Grade: 6th Topic 4.1 Number and Numerical Operations

Essential Question: How can problems in the real world be solved with mathematics?

How can estimation be useful to us?

How do numbers help us reason out solutions to problems?

How do basic operations help us understand numbers?

Knowledge/Skills/Understandings	Assessments	Learning Experiences	Resources
A. Number Sense			
1. Use real-life experiences, physical materials, and technology to construct meanings for numbers: All Integers; All fractions as part of a whole, as subset of a set, as a location on a number line, and as divisions of whole numbers; All Decimals; percents; whole numbers with exponents	Unit Assessments Do Now Teacher Observation Class Discussion Slate Assessments Open Ended Writing Tasks RSA Sections of EM3	Direct Instruction Cooperative – Collaborative Learning Experiences Written Explanations Open Ended Writing Tasks Games Geometer's Sketch Pad -Lesson Links	<i>Everyday Mathematics, Book 6-</i> Units 2, 4, 6 Selected Brain Pop applications www.brainpop.com Geometer's Sketch Pad New Jersey Math Frameworks 13 http://dimacs.rutgers.edu/njmathcoalition/framework.html <i>Van De Walle</i> Chapters 9-14
2. Recognize the decimal nature of United States currency and compute with money.			<i>Everyday Mathematics, Book 6-</i> Unit 2
3. Demonstrate a sense of the relative magnitudes of numbers.		<i>Power of Ten-video</i>	<i>Everyday Mathematics, Book 6-</i> Unit 2
4. Explore the use of ratios and proportions in a variety of situations.			<i>Everyday Mathematics, Book 6-</i> Unit 8 <i>Van De Walle</i> Chapter 18
5. Understand and use whole-number percents between 1 and 100 in a variety of situations.			<i>Everyday Mathematics, Book 6-</i> Unit 4 <i>Van De Walle</i> Chapter 7

Flemington-Raritan School District Mathematics Curriculum

6. Use whole numbers, fractions, and decimals to represent equivalent forms of the same number.

Everyday Mathematics, Book 6- Unit 4
Van De Walle Chapters 15, 16
New Jersey Math Frameworks
<http://dimacs.rutgers.edu/njmathcoalition/framework.html>

7. Develop and apply number theory concepts in problem solving situations: Primes, Factors, Multiples; common multiples, common factors

Connected Math- Prime Time

8. Compare and order numbers of all types.

Everyday Mathematics, Book 6 Units 2, 4

9. Understand that all fractions can be represented as repeating or terminating decimals.

Everyday Mathematics, Book 6 Units 2, 4

10. Understand and use ratios, proportions, and percents in a variety of situations.

Everyday Mathematics, Book 6- Unit 8
Van De Walle Chapter 18

B. Numerical Operations

1. Recognize the appropriate use of each arithmetic operation in problem situations.

Everyday Mathematics, Book 6

2. Construct, use, and explain procedures for performing calculations with fractions and decimals with: paper and pencil, mental math, calculator

Everyday Mathematics, Book 6
Everyday Mathematics, 5 Minute Math
Van De Walle Chapters 15, 16

Flemington-Raritan School District Mathematics Curriculum

3. Use an efficient and accurate pencil-and-paper procedure for division of a 3-digit number by a 2-digit number.

Everyday Mathematics, Book 6- Unit 2

4. Select pencil-and-paper, mental math, or a calculator as the appropriate computational method in a given situation depending on the context and numbers.

Everyday Mathematics, Book 6

5. Find squares and cubes of numbers.

Everyday Mathematics, Book 6
Units- 2, 3
Van De Walle Chapters 24
New Jersey Math Frameworks
<http://dimacs.rutgers.edu/njmathcoalition/framework.html>

6. Check the reasonableness of results of computations.

New Jersey Math Frameworks 3
<http://dimacs.rutgers.edu/njmathcoalition/framework.html>

7. Understand and use the various relationships among operations and properties of operations.

Everyday Mathematics, Book 6 Units- 3, 6

8. Understand and apply the standard algebraic order of operations for the four basic operations, including appropriate use of parenthesis.

Everyday Mathematics, Book 6 Units- 3, 6

9. Use and explain procedures for performing calculations involving addition, subtraction, multiplication, division, and exponentiation with integers and all number types named above with: pencil and paper, mental math; calculator

Everyday Mathematics, Book 6

Flemington-Raritan School District Mathematics Curriculum

C. Estimation

1. Use a variety of strategies for estimating both quantities and the results of computations.

Everyday Mathematics, Book 6

2. Recognize when an estimate is appropriate, and understand the usefulness of an estimate as distinct from an exact answer.

Everyday Mathematics, Book 6

3. Determine the reasonableness of an answer by estimating the result of operations.

Everyday Mathematics, Book 6

4. Determine whether a given estimate is an overestimate or an underestimate.

Everyday Mathematics, Book 6

5. Use equivalent representations of numbers such as fractions, decimals, and percents to facilitate estimation.

Everyday Mathematics, Book 6

Flemington-Raritan School District Mathematics Curriculum

Grade: 6 Topic 4.2 Geometry and Measurement

Essential Questions: How can knowledge of geometric properties help in problem solving situations?

How can coordinate grid systems help in understanding locations?

How does the mathematics of geometry enable us to wonder and understand our natural and physical world?

Knowledge/Skills/Understandings	Assessments	Learning Experiences	Resources
A. Geometric Properties			
	Unit Assessments Do Now Teacher Observation Class Discussion Slate Assessments Open Ended Writing Tasks RSA Sections of EM3	Direct Instruction Cooperative – Collaborative Learning Experiences Written Explanations Open Ended Writing Tasks Games Geometer's Sketch Pad -Lesson Links	<i>Everyday Mathematics</i> , Book 6- Units 5, 10 <i>Van De Walle</i> Chapter 20 <i>Groundworks Series – Geometry</i> <i>Groundworks Series – Measurement</i> New Jersey Math Frameworks, 7 http://dimacs.rutgers.edu/njmathcoalition/framework.html <i>NCTM Navigation Through Geometry 6-8</i> <i>Geometer's Sketch Pad</i>
2. Identify, describe, compare, and classify polygons and circles: Triangles, by angles and sides; Quadrilaterals, including squares, rectangles, parallelograms, trapezoids, rhombi; Polygons by number of sides; Equilateral, equiangular, regular; All points equidistant from a given point from a circle.			<i>Everyday Mathematics</i> , Book 6- Unit 5, <i>Van De Walle</i> Chapter 20 <i>Groundworks Series – Geometry</i> <i>Groundworks Series – Measurement</i> New Jersey Math Frameworks, 7 http://dimacs.rutgers.edu/njmathcoalition/framework.html <i>NCTM Navigation Through Geometry 6-8</i> <i>Geometer's Sketch Pad</i>
3. Identify similar figures.			<i>Everyday Mathematics</i> , Book 6- Unit 5, <i>Van De Walle</i> Chapter 20 <i>Groundworks Series – Geometry</i> <i>Geometer's Sketch Pad</i> <u><i>Sir Cumference and the Nights of the Round Table</i></u> , Cindy Neuschwander

Flemington-Raritan School District Mathematics Curriculum

4. Understand and apply the concepts of congruence and symmetry (line and rotational)

Everyday Mathematics, Book 6- Unit 5,
Van De Walle Chapter 20
Groundworks Series – Geometry
Groundworks Series – Measurement
New Jersey Math Frameworks, 7
<http://dimacs.rutgers.edu/njmathcoalition/framework.html>
NCTM Navigation Through Geometry 6-8
Geometer's Sketch Pad

5. Compare properties of cylinders, prisms, cones, pyramids, and spheres.

Everyday Mathematics, Book 6- Unit 9,
Van De Walle Chapter 20
NCTM Navigation Through Geometry 6-8
Geometer's Sketch Pad

6. Identify, describe, and draw the faces or shadow (projections) of three-dimensional geometric objects from different perspectives.

Everyday Mathematics, Book 6- Unit 9,
Van De Walle Chapter 20
NCTM Navigation Through Geometry 6-8
Geometer's Sketch Pad

7. Identify a three dimensional shape with given projections(top, front and side views)

Van De Walle Chapter 20
Geometer's Sketch Pad
New Jersey Math Frameworks, 7
<http://dimacs.rutgers.edu/njmathcoalition/framework.html>

8. Identify a three dimensional shape with a given net (ie., a flat pattern that folds into a 3-d shape)

Van De Walle Chapter 20
Geometer's Sketch Pad

B. Transforming Shapes

1. Understand a translation, a reflection, or a rotation to map one figure onto another congruent figure

Groundworks Series – Geometry
Van De Walle Chapter 20
Geometer's Sketch Pad

Flemington-Raritan School District Mathematics Curriculum

2. Recognize, identify, and describe geometric relationships and properties as they exist in nature, art, and other real world settings

Groundworks Series – Geometry
Van De Walle Chapter 20
Geometer's Sketch Pad

C. Coordinate Geometry

Create geometric shapes with specified properties in the first quadrant on a coordinate grid.(

Everyday Mathematics, Book 6- – Unit 5

D. Units of Measurement

1. Select and use appropriate units to measure angles, area, surface area, and volume.

Groundworks Series – Measurement
Van De Walle Chapters 19, 20
Everyday Mathematics, Book 6- – Unit 5

2. Use a scale to find a distance on a map or a length on a scale drawing
3. Convert measurement units within a system,
e.g. 3 feet = ____ inches.

Everyday Mathematics, Book 6- – Unit 8
NJ ASK Coach
Teacher created resources

4. Know approximate equivalents between standard and metric

NJ ASK Coach
Teacher created resources

5. Use measurements and estimates to describe and compare phenomena

NJ ASK Coach
Teacher created resources

E. Measuring Geometric Objects

1. Use a protractor to measure angles.

Everyday Mathematics, Book 6- – Unit 5

2 Develop and apply strategies and formulas for finding perimeter and area: Triangle, square, rectangle, parallelogram, and trapezoid; Circumference and area of a circle;

Groundworks Series – Measurement
Van De Walle Chapters 19, 20

Flemington-Raritan School District Mathematics Curriculum

3. Develop and apply strategies and formulas for finding the surface area and volume of rectangular prisms and cylinders.

Everyday Mathematics, Book 6- Unit 9

4. Recognize that shapes with the same perimeter do not necessarily have the same area and vice versa.

Teacher created resources

5. Develop informal ways of approximating the measures of familiar objects (e.g., use a grid to approximate the area of the bottom of one's foot)

Van De Walle Chapters 19

Flemington-Raritan School District Mathematics Curriculum

Grade: 6 Topic 4.3 Patterns and Algebra

Essential Questions: How can patterns help in problem solving?

How can symbols be used to help us in problem solving?

How does the study of algebra help us understand mathematical patterns as the patterns found in nature & the real world?

Knowledge/Skills/Understandings	Assessments	Learning Experiences	Resources
A. Patterns			
1. Recognize, describe, extend, and create patterns involving whole numbers, and rational numbers: descriptions using tables, verbal simple equations and graphs; formal iterative formulas; recursive patterns, including Pascal's Triangle and the Fibonacci Sequence; Generating sequences by using calculators to repeatedly apply a formula.	Unit Assessments Do Now Teacher Observation Class Discussion Slate Assessments Open Ended Writing Tasks RSA Sections of EM3	Direct Instruction Cooperative – Collaborative Learning Experiences Written Explanations Open Ended Writing Tasks Games Geometer's Sketch Pad - Lesson Links	<i>Groundworks Series</i> ± Algebraic Reasoning <i>Van De Walle</i> Chapters 22-25 <i>Everyday Mathematics, Book 6</i> - ± Units, 3, 6, 9 * <i>!-R'!-A!-rlsE6NI-AhKEPad Lesson Links</i>
B. Functions and Relationships			
1. Describe the general behavior of functions given by formulas or verbal rules			<i>Van De Walle</i> Chapter 23
C. Modeling			
1. Use patterns, relations, and linear functions to model situations: Using variables to represent unknown quantities; Using concrete materials (manipulatives), tables, graphs, verbal rules, algebraic expressions/equations/ inequalities.			<i>Van De Walle</i> Chapter 23

Flemington-Raritan School District Mathematics Curriculum

D. Procedures

1. Solve simple equations with manipulatives and informally: whole number coefficients only, answers also whole numbers; variables on one or both sides of equation.

Everyday Mathematics, Book 6- – Units, 3, 6

2. Understand and apply the properties of operations and numbers: distributive property; the product of a number and its reciprocal is 1 .

Everyday Mathematics, Book 6- – Units, 3, 9
NJ ASK Coach
Brain Pop www.brainpop.com Properties
Geometer's Sketch Pad Lesson Links

3. Evaluate numerical expressions

Everyday Mathematics, Book 6- – Units, 3, 6

4. Extend understanding and the use of inequality. Symbols (3 , 1 , \pounds)

Everyday Mathematics, Book 6- – Unit 6

Flemington-Raritan School District

Grade: 6 Topic 4.4 Data Analysis, Probability, and Discrete Mathematics

Essential Questions: How can classifying help me in organizing data to solve problems?

How can statistics help us to understand real world situations?

How can the study of real world data help us understand and make accurate predictions?

Knowledge/Skills/Understandings	Assessments	Learning Experiences	Resources
A. Data Analysis			
1. Collect, generate, organize, and display data; data generated from surveys.	Unit Assessments Do Now Teacher Observation Class Discussion Slate Assessments Open Ended Writing Tasks RSA Sections of EM3	Direct Instruction Cooperative – Collaborative Learning Experiences Written Explanations Open Ended Writing Tasks Games Geometer's Sketch Pad - Lesson Links	<i>Everyday Mathematics, Book 6- . Unit 1 Navigations through Data Analysis TinkerPlots</i> New Jersey Math Frameworks, 5, 12 http://dimacs.rutgers.edu/njmathcoalition/framework.html
2. Read, interpret, select, construct, analyze, generate questions about, and draw inferences from displays of data: bar graph, line graph, circle graph, table, histogram; range, median, and mean; calculators and computers used to record and process information.			<i>Everyday Mathematics, Book 6- . Unit 1 Navigations through Data Analysis TinkerPlots</i> <i>NJ ASK Coach</i> New Jersey Math Frameworks, 5, 12, 14 http://dimacs.rutgers.edu/njmathcoalition/framework.html
3. Respond to questions about data, generate their own questions and hypotheses, and formulate strategies for answering their questions and testing their hypotheses.			<i>Everyday Mathematics, Book 6- . Unit 1 Navigations through Data Analysis TinkerPlots</i> <i>NJ ASK Coach</i> New Jersey Math Frameworks, 5, 12, 14 http://dimacs.rutgers.edu/njmathcoalition/framework.html

Flemington-Raritan School District

B. Probability

1. Determine probabilities of events: event, complementary event, probability of an event; Multiplication rule for probabilities; probability of certain event is 1 and of impossible event is 0; probabilities of event and complementary event add up to 1.

*Everyday Mathematics, Book 6- . Unit 7
Groundworks Series Data and Probability*

2. Determine probability using intuitive, experimental, and theoretical methods (e.g., using model of picking items of different colors from a bag.

*Everyday Mathematics, Book 6- . Unit 7
Groundworks Series Data and Probability*

- Given numbers of various types of items in a bag, what is the probability that an item of one type will be picked

- Given data obtained experimentally, what is the likely distribution of items in the bag.

3. Explore compound events.

*Everyday Mathematics, Book 6- . Unit 7
Groundworks Series Data and Probability*

4. Model situations involving probability using simulations (with spinners, dice) and theoretical models.

*Everyday Mathematics, Book 6- . Unit 7
Groundworks Series Data and Probability*

5. Recognize and understand the connections among the concepts of independent outcomes, picking at random, and fairness.

*Everyday Mathematics, Book 6- . Unit 7
Groundworks Series Data and Probability*

Flemington-Raritan School District Mathematics Curriculum

C. Discrete Mathematics-Systematic Listing and Counting

1. Solve counting problems and justify that all possibilities have been enumerated without duplication.

Everyday Mathematics, Book 6- . Unit 7
Groundworks Series: Data and Probability
NJ Ask Coach

- Organized lists, charts, tree diagrams, tables
- Venn Diagrams

2. Apply the multiplication principle of counting: Simple situations (e.g., you can make $3 \times 4 = 12$ outfits using 3 shirts and 4 skirts); Number of ways a specified number of items can be arranged in order (concept of permutation); Number of ways of selecting a slate of officers from a class

Everyday Mathematics, Book 6- . Unit 7
Groundworks Series Data and Probability
NJ Ask Coach
Explain It

3. List the possible combinations of two elements chosen from a given set (e.g., forming a committee of two from a group of 12 students, finding how many handshakes there will be among ten people if everyone shakes each other person's hand once).

Everyday Mathematics, Book 6- . Unit 7
Groundworks Series: Data and Probability
NJ Ask Coach
Explain It, Creative Publications

D. Discrete Mathematics - Vertex - Edge - Graphs and Algorithms

1. Devise strategies for winning simple games and express those strategies as sets of diagrams.

Everyday Mathematics, Book 6-
New Jersey Math Frameworks, 14
<http://dimacs.rutgers.edu/njmathcoalition/framework.html>

2. Analyze vertex-edge graphs and tree diagrams: Can a picture or a vertex-edge graph be drawn with a single line? Can you get from any vertex to any other vertex?

New Jersey Math Frameworks, 14
<http://dimacs.rutgers.edu/njmathcoalition/framework.html>

Flemington-Raritan School District

3. Use vertex-edge graphs to find solutions to practical problems: delivery route that stops at specified sites but involves less travel; shortest route from one site on a map to another.

New Jersey Math Frameworks, 14

<http://dimacs.rutgers.edu/njmathcoalition/framework.html>

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Grade: 6 Topic 4.5 Mathematical Processes

Big Idea: Mathematical understandings are an essential part of our lives in and out of school and as such all children need to have an instinctive sense of mathematical resources that they can rely on to help them progress through life.

Essential Questions: How will learning to "think" mathematically enable us to make a life, make a living, and make a difference?
How does the use of technology enable us to have a deeper understanding of mathematics?

Knowledge/Skills/Understandings	Assessments	Learning Experiences	Resources
A. Problem Solving			
1. Learn mathematics through problem solving inquiry and discovery.	Unit Assessments Do Now Teacher Observation Class Discussion Slate Assessments Open Ended Writing Tasks RSA Sections of EM3	Direct Instruction Cooperative – Collaborative Learning Experiences Written Explanations Open Ended Writing Tasks Games Geometer's Sketch Pad - Lesson Links	<i>Everyday Mathematics, Book 6-</i> New Jersey Math Frameworks 1-4 http://dimacs.rutgers.edu/njmathcoalition/framework.html <i>Explain It</i> <i>Question Quest - Level B</i> <i>8 Step Model Drawing</i>
2. Solve problems that arise in mathematics and in other contexts: open ended problems; non-routine problems; problems with multiple solutions; problems that can be solved in several ways			
3. Select and apply a variety of appropriate problem-solving strategies to solve problems.			
4. Pose problems of various types and levels of difficulty			

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5. Monitor their progress and reflect on the process of their problem solving activity

B. Communication

1. Use communication to organize and clarify their mathematical thinking: Reading and writing; Discussion, listening and questioning.

2. Communicate their mathematical thinking coherently and clearly to peers, teachers, and others, both orally and in writing.

3. Analyze and evaluate the mathematical thinking and strategies of others.

4. Use the language of mathematics to express mathematical ideas precisely.

C. Connections

1. Recognize recurring themes across mathematical domains (e.g., two linear equations have a unique solution because the lines they represent intersect at a single point).

Everyday Mathematics, Book 6
New Jersey Math Frameworks 1-4
<http://dimacs.rutgers.edu/njmathcoalition/framework.html>
Explain It, Creative Publications, Creative Publications
Question Quest . Level B
8 Step Model Drawing, Char Forsten

Everyday Mathematics, Book 6- New Jersey Math
Frameworks 1-4
<http://dimacs.rutgers.edu/njmathcoalition/framework.html>
Explain It, Creative Publications
Question Quest . Level B
8 Step Model Drawing, Char Forsten

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2. Use connections among mathematical ideas to explain concepts (e.g., two linear equations have a unique solution because the lines they represent intersect at a single point).

3. Recognize that mathematics is used in a variety of contexts outside of mathematics.

4. Apply mathematics in practical situations and in other disciplines.

5. Trace the development of mathematical concepts over time and across cultures (cf. world languages and social studies standards).

6. Understand how mathematical ideas interconnect and build on one another to produce a coherent whole.

D. Reasoning

1. Recognize that mathematical facts, procedures, and claims must be justified.

2. Use reasoning to support their mathematical conclusions and problem solutions.

Everyday Mathematics, Book 6- New Jersey Math Frameworks 1-4

<http://dimacs.rutgers.edu/njmathcoalition/framework.html>

Explain It, Creative Publications

Question Quest - Level B

8 Step Model Drawing, Char Forsten

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3. Select and use various types of reasoning and methods of proof.

4. Rely on reasoning, rather than answer keys, teachers, or peers, to check the correctness of their problem solutions.

5. Make and investigate mathematical conjectures: counterexamples as a means of displaying conjectures; verifying conjectures using informal reasoning or proofs.

6. Evaluate examples of mathematical reasoning and determine whether they are valid.

E. Representations

1. Create and use representations to organize, record, and communicate mathematical ideas: concrete; pictorial; symbolic; and graphical representations

2. Select, apply, and translate among mathematical representations to solve problems

3. Use representations to model and interpret physical, social, and mathematical phenomena.

Everyday Mathematics, Book 6- New Jersey Math Frameworks 1-4

<http://dimacs.rutgers.edu/njmathcoalition/framework.html>

Explain It, Creative Publications

Question Quest - Level B

8 Step Model Drawing, Char Forsten

Flemington-Raritan School District Mathematics Curriculum

F. Technology

1. Use technology to gather, analyze, and communicate mathematical information.

Geometer's Sketch Pad
TinkerPlots
Geometer's Sketch Pad Lesson Links
Brain Pop

2. Use computer spreadsheets, software, and graphing utilities to organize and display quantitative information

Everyday Mathematics, Book 6- – Unit 3
Lessons 3.7, 3.8

3. Use graphing calculators and computer software to investigate properties of functions and their graphs.

TI 73 and TI 82 Calculators
Everyday Mathematics, Book 6- – Unit 3
Lessons 3.5, 3.10, 3.11

4. Use calculators as problem-solving tools (e.g., to explore patterns, to validate solutions).

Geometer's Sketch Pad
Geometer's Sketch Pad Lesson Links

5. Use computer software to make and verify conjectures about geometric objects.

6. Use computer-based laboratory technology for mathematical applications in the sciences

6th Grade Advanced Math

A student in the 6th grade Advanced math will have a more rigorous experience through discussion, activities, assessments and homework than a student placed in the grade level math class. The following is a list of skills for each state standard that a student placed in the 6th Grade Advanced Class will be expected to master beyond the 6th grade curriculum.

4.1 Number Sense

- possess automatic recall of all basic and extended math facts
- be able to use the most efficient representation of a number to solve a problem FDP
- convert proficiently between fraction, decimal, percent mentally
- master all integer operations
- recognize a situation that requires a proportion to arrive at a solution
- given a word problem, set up and solve a proportion for any missing part
- be secure with inverse operation concepts

4.2 Geometry

- use ratios to solve for similar figures
- use proportions to test for similarity
- apply the square root strategy to solve area problems
- apply formulas for geometric figures

4.3 Algebra

- solve two-step equations with variables and rational numbers on both sides
- gain experience with graphing calculator
- discover more complex number sequences and derive the rule using variables

4.4 Data & Probability

- interpret and create a histogram
- create an appropriate scale for a graph
- given the mean and a partial data set, find the missing data value
- apply data landmarks to problem solving situations

4.5 Processes

- Be able to use the most efficient strategy to solve a problem
- Be able to solve and write open ended and/or multi-step problems with fluency
- Be able to apply the most appropriate problem solving strategy.

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Mathematics Curriculum

**6th Grade Algebra 1A
Pacing Guide**

Unit	Approximate Number of Class Days
Data Exploration	30
Proportional Reasoning	34
Probability	22
Variations and Graphs	36
Linear Equations	28
Slope and Fitting a Line to Data	10

Flemington-Raritan School District

Mathematics Curriculum

Grade: 6 Algebra 1A Topic 4.1 Number and Numerical Operations

Essential Question: How can problems in the real world be solved with mathematics?

How can estimation be useful to us?

How do numbers help us reason out solutions to problems?

How do basic operations help us understand numbers?

Knowledge/Skills/Understandings	Assessments	Learning Experiences	Resources
A. Number Sense			
1. Extend understanding of the number system by constructing meanings for the following (unless otherwise noted, all indicators for grade 8 pertain to these sets of numbers as well): Rational numbers; Percents; Exponents; Roots; Absolute Values; Numbers represented in scientific notation	Unit Assessments Do Now Teacher Observation Discussion Investigation Results Open Ended Writing Tasks	Direct Instruction Collaborative and Cooperative Learning Open Ended Writing Tasks Tinkerplots Software Geometer's Sketchpad Software Lesson Investigations Investigate decimal patterns using calculator	<i>Discovering Algebra</i> Chapters 2, 4 <i>UCSMP Transitions</i>
2. Demonstrate a sense of the relative magnitudes of numbers.		Number line graphing Lesson Investigations throughout the textbook	<i>Discovering Algebra</i> Chapters 1,2
3. Understand and use ratios, proportions, and percents (including percents greater than 100 and less than 1) in a variety of situations.		Lesson Investigations 2.2, 2.3, 3.1, 3.2, 3.3	<i>Discovering Algebra</i> Chapters 2,3
4. Compare and order numbers of all named types.		Lesson Investigation 2.2	<i>Discovering Algebra</i> Chapters 1,2
5. Use whole numbers, fractions, decimals, and percents to represent equivalent forms of the same number.		Lesson Investigation 2.1	<i>Discovering Algebra</i> Chapter 2

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Mathematics Curriculum

6. Recognize that repeating decimals correspond to fractions and determine their fractional equivalents.

Lesson Investigation 2.1

Discovering Algebra Chapter 2

B. Numerical Operations

1. Use and explain procedures for performing calculations involving addition, subtraction, multiplication, division, and exponentiation with integers and all number types named above with:

- Pencil-and-paper
- Mental math
- Calculator

Math with Pizzazz
Pre Algebra with Pizzazz
Algebra with Pizzazz
Discovering Algebra Chapter 3

2. Use exponentiation to find whole number powers of numbers.

Discovering Algebra Chapter 4

3. Find square and cube roots of numbers and understand the inverse nature of powers and roots.

Lesson Investigation 4.2

Discovering Algebra Chapter 4

4. Solve problems involving proportions and percents.

- Use unit-rate and means-extremes methods to solve proportion and percent problems including the following: tax, tip, discount, interest, and similar figures.

Lesson Investigations 2.2, 2.3 *Discovering Algebra* Chapters 2,3

5. Understand and apply the standard algebraic order of operations, including appropriate use of parentheses.

Algebra with Pizzazz
Discovering Algebra Chapter 4

C. Estimation

Lesson Investigation 4.1

Ongoing throughout chapter investigations

1. Use equivalent representations of numbers such as fractions, decimals, and percents to facilitate estimation.

2. Recognize the limitations of estimation and assess the amount of error resulting from estimation

Ongoing throughout chapter investigations
NJ ASK Coach

Lesson Investigations 4.1. 4.2 *Math with Pizzazz*
Pre Algebra with Pizzazz

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Mathematics Curriculum

Grade: 6th Algebra 1A **Topic 4.2 Geometry and Measurement**

Essential Questions: How can knowledge of geometric properties help in problem solving situations?

How can coordinate grid systems help in understanding locations?

How does the mathematics of geometry enable us to wonder and understand our natural and physical world?

Knowledge/Skills/Understandings	Assessments	Learning Experiences	Resources
A. Geometric Properties			
1. Understand and apply properties of polygons: Quadrilateral, including squares, rectangles, parallelograms, trapezoids, rhombi; regular polygons	Unit Assessments Do Now Teacher Observation Discussion Investigation Results Open Ended Writing Tasks	Direct Instruction Collaborative and Cooperative Learning Open Ended Writing Tasks Tinkerplots Software Geometer's Sketchpad Software Lesson Investigations	Geometer's Sketchpad Geometer's Sketchpad Lesson Links
2. Understand and apply the concept of similarity: Using proportions to find missing measures; <i>scale drawings</i> ; models of 3D objects		Lesson Investigation 3.3 Measure shadow of flagpole to determine height.	<i>Discovering Algebra</i> Chapter 3
3. Use logic and reasoning to make and support conjectures about geometric objects.		Lesson Investigation 3.3	<i>Discovering Algebra</i> Chapter 3 Geometer's Sketchpad Geometer's Sketchpad Lesson Links
B. Transforming Shapes			
1. Understand and apply transformations: Finding the image, given the pre-image, and vice-versa; Sequence of transformations needed to map one figure onto another; Reflections, rotations and translations result in images congruent to the pre-image; Dilations		Manipulatives	Geometer's Sketchpad Geometer's Sketchpad Lesson Links <i>NJ ASK Coach</i>

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Mathematics Curriculum

(stretching /shrinking) result in images similar

Flemington-Raritan School District Mathematics Curriculum

to pre-image.

C. Coordinate Geometry

1. Use coordinate in four quadrants to represent geometric concepts

- Slope of a line segment

Lesson Investigations 1.6, 4.4,
4.6, 4.7, 5.1, 5.2
Graphing Calculator
Applications

Discovering Algebra Chapter 1,4+5
Algebra with Pizzazz
Pre-Algebra with Pizzazz
NJ ASK Coach
Geometer's Sketchpad Lesson Links

2. Use a coordinate grid to model and quantify transformations (e.g. translate right 4 units).
Graphing Calculator

NJ ASK Coach
Geometer's Sketchpad Lesson Links

D. Units of Measurement

1. Solve problems requiring calculations that involve different units of measurement within a measurement system (e.g. 4'3" plus 7'1 0" equals 12'1")

Lesson Investigations 2.3 , 3,2 *Discovering Algebra Chapters 2, 3*

2. Use approximate equivalents between stand and metric systems to estimate measurements.

Lesson Investigations 2.3 , 3,2 *Discovering Algebra Chapters 2*

3. Select and use appropriate units and tools to measure quantities to the degree of precision needed in a particular problem-solving situation.

Appropriate use throughout
Lesson. Investigations Ongoing

4. Recognize that all measurements of continuous quantities are approximations.

Appropriate use throughout
Lesson. Investigations Ongoing

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5. Solve problems that involve compound measurement units, such as speed (miles per hour), air pressure (pounds per square inch), and population density (persons per square mile).

Lesson Investigation 2.3
Dimensional Analysis

Discovering Algebra Chapter 2 lesson 3

E. Measuring Geometric Objects

1. Develop and apply strategies for finding perimeter and area: Geometric figures made by combining triangles, rectangles and circles or parts of circles; Estimation of area using grids of various size

Various Lesson Investigations

Van De Walle Chapter 19
Geometer's Sketchpad
Math with Pizzazz! Book D
Pre-Algebra with Pizzazz

2. Recognize that the volume of a pyramid or cone is $\frac{1}{3}$ of the volume of the prism or cylinder with the same base and height. For example use rice to compare volumes of figures with same base and height.

Direct Instruction

Van De Walle Chapter 19
Geometer's Sketchpad
Math with Pizzazz! Book D
Pre-Algebra with Pizzazz
NJ Ask Coach

Flemington-Raritan School District Mathematics Curriculum

Grade: 6th Algebra 1A

Topic 4.3 Patterns and Algebra

Essential Questions: How can patterns help in problem solving?

How can symbols be used to help us in problem solving?

How does the study of algebra help us understand mathematical patterns as the patterns found in nature & the real world?

Knowledge/Skills/Understandings	Assessments	Learning Experiences	Resources
A. Patterns			
1. Recognize, describe, extend, and create patterns involving whole numbers, rational numbers, and integers: Descriptions using tables, verbal and symbolic rules, graphs, simple equation or expressions; Finite and infinite sequences; Arithmetic sequences; Geometric sequences; Generating sequences by using calculators to repeatedly apply to a formula.	Unit Assessments Do Now Teacher Observation Discussion Investigation Results Open Ended Writing Tasks	Direct Instruction Lesson Investigation 4.3, 4.4, 4.6 Modeling Graphing Calculators	<i>Discovering Algebra</i> Chapter 4
B. Functions and Relationships			
1. Graph functions, and understand and describe their general behavior: Equations involving two variables; Rates of change (informal notion of slope).		Lesson Investigations 4.4, 4.6, 4.7, 5.1, 5.1, 5.2, 5.3	<i>Discovering Algebra</i> Chapters 4 and 5
C. Modeling			
1. Analyze functional relationships to explain how a change in one quantity can result in a change in another, using pictures, graphs, charts, and equations.		Lesson Investigations 3.2, 4.3, 4.4, 4.6, 4.7, 5.1, 5.2, 5.3	<i>Discovering Algebra</i> Chapters 3, 4, 5

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2. Use patterns, relations, symbolic algebra, and linear functions to model situations: Using concrete materials (manipulatives), tables, graphs, verbal rules, algebraic expressions/equations/inequalities; Growth situations, such as population growth and compound interest, using recursive (e.g. NOW-NEXT) formulas (cf. science and social studies standards)

Lesson Investigations 3.2, 4.3, 4.4, 4.6, 4.7, 5.1, 5.2, 5.3

Discovering Algebra
Chapters 3, 4, 5

D. Procedures

1. Use graphing techniques on a number line. Arithmetic operations represented by vectors (arrows) (e.g., " $-3 + 6$ " is "left 3, right 6")

Geometer's Sketchpad Lesson
Links

Pre-Algebra with Pizzazz
Geometer's Sketchpad

2. Solve simple linear equations informally, graphically and using formal algebraic methods: multi-step, integer coefficients only (although answers may not be integers) simple literal equations (e.g. $A=lw$) Using paper-and-pencil, calculators, graphing calculators, spreadsheets, and other technology.

Discovering Algebra
Chapters 2, 3, 4

3. Create, evaluate, and simplify algebraic expressions involving variables Order of operations, including appropriate use of parentheses; Distributive property; Substitution of a number for a variable; Translation of a verbal phrase or sentence into an algebraic expression, equation, or inequality, and vice versa

Lesson Investigation 4.1

Discovering Algebra
Chapters 2, 3, 4
Pre-Algebra with Pizzazz

Flemington-Raritan School District

5. Understand and apply the properties of operations, numbers, equations, and inequalities: Additive inverse; Multiplicative inverse; addition and multiplication properties of equality

Discovering Algebra
Chapters 2, 3, 4 *Pre-Algebra with Pizzazz*

Flemington-Raritan School District Mathematics Curriculum

Grade: 6 Algebra 1A Topic 4.4 Data Analysis, Probability, and Discrete Mathematics

Essential Questions: How can classifying help me in organizing data to solve problems?

How can statistics help us to understand real world situations?

How can the study of real world data help us understand and make accurate predictions?

Knowledge/Skills/Understandings	Assessments	Learning Experiences	Resources
A. Data Analysis 1. Select and use appropriate representations for sets of data , and measures of central tendency (mean , median, and mode): Type of display most appropriate for given data; Box-and-whisker plot, upper quartile, lower quartile; Scatter plot; Calculators and computer used to record and process information; Finding the median and mean (weighted average) using frequency data; Effect of additional data measures of central tendency 2. Make inferences and formulate and evaluate arguments based on displays and analysis of data. 3. Estimate lines of best fit and use them to interpolate within the range of data	Unit Assessments Do Now Teacher Observation Discussion Investigation Results Open Ended Writing Tasks	Direct Instruction Collaborative and Cooperative Learning Open Ended Writing Tasks Tinkerplots Software Geometer's Sketchpad Software Lesson Investigations 1.1 to 1.7 Investigate decimal patterns using calculator Lesson Investigations 1.1-1.7 Lesson Investigation 5.3	<i>Discovering Algebra</i> Chapter 1 TinkerPlots Lesson Investigations 1.1-1.7 TinkerPlots Lesson Investigation 5.3 <i>Discovering Algebra</i> Chapter 5
B. Probability 1. Interpret probabilities as ratios, percents, and decimals.		Lesson Investigations 2.6, 2.7 Selected Experiments from <i>Connected Mathematics "What Do You Expect"</i>	<i>Discovering Algebra</i> Chapter 2 <i>Connected Mathematics "What Do You Expect"</i> <i>Math With Pizzazz Book E</i> <i>Pre Algebra with Pizzazz</i>

Flemington-Raritan School District Mathematics Curriculum

2. Model situations involving probability with simulations (using spinners, dice, calculators and computers) and theoretical models: Frequency, relative frequency.

Lesson Investigations 2.6, 2.7

Selected Experiments from

Connected Mathematics "What Do You Expect"

Dii Alb Chapter 2

Mh Wi h Pi Bk E

Alb i h Pi

3. Estimate probabilities and make predictions based on experimental and theoretical probabilities.

Dii Alb Chapter 2

Connected Mathematics "What

Do You Expect"

Mth With Pi

Bk E

Dii Alb Chapter 2

Connected Mathematics "What Do You Expect"

4. Play and analyze probability-based games, and discuss the concepts of fairness and expected value.

Selected Experiments from

C t d M t h t i " W h a t

Do You Expect"

Connected Mathematics "What Do You Expect"

C. Discrete Mathematics - Systematic Listing and Counting

1. Apply the multiplication principle of counting: permutations; ordered situations with replacement vs. ordered situations without replacement.

Experiments from *Wht D Y*

.....
New Jersey Math Frameworks 12

<http://dimacs.rutgers.edu/njmathcoalition/framework.html>

Gdk S_i Data and Probability

2. Explore counting problems involving Venn diagrams with three attributes

.....
Experiments from *Wht D Y*

New Jersey Math Frameworks 12

<http://dimacs.rutgers.edu/njmathcoalition/framework.html>

Gdk S_i Data and Probability

3. Apply techniques of systematic listing, counting, and reasoning in a variety of different contexts.

.....
Experiments from *Wht D Y*

.....
New Jersey Math Frameworks 12

<http://dimacs.rutgers.edu/njmathcoalition/framework.html>

Gdk Si Data and Probability

**D. Discrete Mathematics - Vertex- Edge
Graphs and Algorithms**

1. Use vertex-edge graphs to represent and find solutions to practical problems: finding the shortest network connecting specified sites; Finding the shortest route on a map from one site to another: Finding the shortest circuit on a map that makes a tour of specified sites.

What Do You Expect?
New Jersey Math Frameworks 12
<http://dimacs.rutgers.edu/njmathcoalition/framework.html>
Groundworks Series Data and Probability
NJ Ask Coach

Flemington-Raritan School District

Grade: 6 Algebra 1A Topic 4.5 Mathematical Processes

Big Idea: Mathematical understandings are an essential part of our lives in and out of school and as such all children need to have an instinctive sense of mathematical resources that they can rely on to help them progress through life.

Essential Questions: How will learning to "think" mathematically enable us to make a life, make a living, and make a difference?
How does the use of technology enable us to have a deeper understanding of mathematics?

Knowledge/Skills/Understandings	Assessments	Learning Experiences	Resources
A. Problem Solving			
1. Learn mathematics through problem solving inquiry and discovery.	Unit Assessments Do Now Teacher Observation Class Discussion Slate Assessments Open Ended Writing Tasks	Direct Instruction Cooperative – Collaborative Learning Experiences Written Explanations Open Ended Writing Tasks Games Geometer's Sketch Pad - Lesson Links	<i>Discovering Algebra</i> New Jersey Math Frameworks 1-4 http://dimacs.rutgers.edu/njmathcoalition/framework.html <i>Explain It</i> <i>Question Quest . Level B</i> <i>8 Step Model Drawing</i>
2. Solve problems that arise in mathematics and in other contexts: open ended problems; non-routine problems; problems with multiple solutions; problems that can be solved in several ways.			
3. Select and apply a variety of appropriate problem-solving strategies to solve problems.			
4. Pose problems of various types and levels of difficulty			

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5. Monitor their progress and reflect on the process of their problem solving activity

B. Communication

1. Use communication to organize and clarify their mathematical thinking: Reading and writing; Discussion, listening and questioning.

2. Communicate their mathematical thinking coherently and clearly to peers, teachers, and others, both orally and in writing.

3. Analyze and evaluate the mathematical thinking and strategies of others.

4. Use the language of mathematics to express mathematical ideas precisely.

C. Connections

1. Recognize recurring themes across mathematical domains (e.g., two linear equations have a unique solution because the lines they represent intersect at a single point).

Discovering Algebra

New Jersey Math Frameworks 1-4

<http://dimacs.rutgers.edu/njmathcoalition/framework.html>

Explain It

Question Quest . Level B

8 Step Model Drawing

Discovering Algebra

New Jersey Math Frameworks 1-4

http://dimacs.rutgers.edu/nj_math_coalition/framework.htm

Explain It

Question Quest . Level B

8 Step Model Drawing

Flemington-Raritan School District

2. Use connections among mathematical ideas to explain concepts (e.g., two linear equations have a unique solution because the lines they represent intersect at a single point).

3. Recognize that mathematics is used in a variety of contexts outside of mathematics.

4. Apply mathematics in practical situations and in other disciplines.

5. Trace the development of mathematical concepts over time and across cultures.

6. Understand how mathematical ideas interconnect and build on one another to produce a coherent whole.

D. Reasoning

1. Recognize that mathematical facts, procedures, and claims must be justified.

2. Use reasoning to support their mathematical conclusions and problem solutions.

Discovering Algebra

New Jersey Math Frameworks 1-4

<http://dimacs.rutgers.edu/njmathcoalition/framework.html>

Explain It

Question Quest - Level B

8 Step Model Drawing

Flemington-Raritan School District

3. Select and use various types of reasoning and methods of proof.

4. Rely on reasoning, rather than answer keys, teachers, or peers, to check the correctness of their problem solutions.

5. Make and investigate mathematical conjectures: counterexamples as a means of displaying conjectures; verifying conjectures using informal reasoning or proofs.

6. Evaluate examples of mathematical reasoning and determine whether they are valid.

E. Representations

1. Create and use representations to organize, record, and communicate mathematical ideas: concrete; pictorial; symbolic; and graphical representations

2. Select, apply, and translate among mathematical representations to solve problems

3. Use representations to model and interpret physical, social, and mathematical phenomena.

F. Technology

Discovering Algebra Chapters 1-5
New Jersey Math Frameworks 1-4
<http://dimacs.rutgers.edu/njmathcoalition/framework.html>
Explain It
Question Quest - Level B
8 Step Model Drawing

Flemington-Raritan School District Mathematics Curriculum

1. Use technology to gather, analyze, and communicate mathematical information.

Geometer's Sketch Pad
TinkerPlots
Geometer's Sketch Pad Lesson Links
Brain Pop

2. Use computer spreadsheets, software, and graphing utilities to organize and display quantitative information

Discovering Algebra Chapter 1
Geometer's Sketchpad Lesson Links
Geometer's Sketchpad
Tinker Plots

3. Use graphing calculators and computer software to investigate properties of functions and their graphs.

TI 73 and TI 84 Calculators
Discovering Algebra – Chapters 1-5

4. Use calculators as problem-solving tools (e.g., to explore patterns, to validate solutions).

Discovering Algebra – Chapters 1-5

5. Use computer software to make and verify conjectures about geometric objects.

Geometer's Sketch Pad
Geometer's Sketch Pad Lesson Links
Tinker Plots

6. Use computer-based laboratory technology for mathematical applications in the sciences

Discovering Algebra – Chapters 1-5
Geometer's Sketch Pad
Geometer's Sketch Pad Lesson Links
Tinker Plots

Flemington-Raritan School District

Mathematics Curriculum

**3rd Grade Gifted and Talented Math
Pacing Guide**

Unit	Number of Days (Approximate)	Unit	Number of Days (Approximate)
1 . Naming & Constructing Geometric Figures	12	7 . Fractions & Their Uses, Probability	17
2 . Using Numbers & Organizing Data	13	8 . Perimeter & Area	11
3 . Multiplication & Division Number Sentences & Algebra	19	9 . Fractions, Decimals, & Percents	12
4 . Decimals & Their Uses	14	10 . Reflections & Symmetry	10
5 . Big Numbers; Estimation & Computation	14	11 . 3-D Shapes, Weight, Volume, & Capacity	10
6 . Division, Map Reference, Measure of Angles	13	12 - Rates	9
		Hands on Algebra	5

Flemington-Raritan School District

Mathematics Curriculum

Grade: 3rd - Gifted and Talented Topic 4.1 Number and Numerical Operations

Essential Question: How can problems in the real world be solved with mathematics?

How can estimation be useful to us?

How do numbers help us reason out solutions to problems?

How do basic operations help us understand numbers?

Knowledge/Skills/Understandings	Assessments	Learning Experiences	Resources
A. Number Sense			
1. Use real-life experiences, physical materials, and technology to construct meanings for numbers (unless otherwise noted, all indicators for grade 6 pertain to these sets of numbers as well).	Teacher observation Teacher play with student	Games: Chip Trading, High Number Toss, Top It (<i>Everyday Mathematics</i>) Digit Place or Pico, Fermi, Bagels	Sheet # 37 <i>Family Math</i> , Lawrence Hall of Science, Berkeley, CA, 1986
<ul style="list-style-type: none"> Whole numbers through millions Commonly used fractions (denominators of 2, 3, 4, 5, 6, 8, 10, 12, and 10) as part of a whole, as a subset of a set, and as a location on a number line 	Do Now: SL.2.3 Unit 7 W-Up Quiz and <i>Everyday Mathematics</i> assessment 7.13	Metric Model Class Project 1-Million (picture) SP 134 & 135 <i>Everyday Mathematics</i> Unit 7 MB Fraction Kit, Circle Fractions Fraction Factory Do Now Sheet #28 Decimal Factory, Decimal Model (picture) SL. 4.1	
<ul style="list-style-type: none"> Decimals through hundredths 	Decimal Quiz Sheet # 2	 <i>Everyday Mathematics</i> 2.3 & 2.4 Decimal Do Now Sheet #27	
2. Demonstrate an understanding of place value concepts.		 <i>Everyday Mathematics</i> 4.3, SRB p. 24 Game: Smaller to Larger SL 4.9	 <i>TERC: Name that Portion</i> , Dale Seymour Publishing, 1996
3. Demonstrate a sense of the relative magnitudes of numbers.	Slates: <i>Everyday Mathematics</i> Manual p. 225 Adjusting the Activity	Ordering and Comparing Decimals	Sheet #38

Flemington-Raritan School District

Mathematics Curriculum

4. Understand the various uses of numbers.

Math congress

SRB p. 2
More About Dates

www.mathsolutions.com
Past Issues: Fall/Winter 2000-2001

- Counting, measuring, labeling (e.g., numbers on baseball uniforms), locating (e.g., Room 235 is on the second floor)

Students share strategies

Game: Number Paths, Sheet # 8
Calling All Students

www.exemplars.com/materials/samples

5. Use concrete and pictorial models to relate whole numbers, commonly used fractions, and decimals to each other, and to represent equivalent forms of the same number.

Quiz: JP 29

Anecdotal notes with observation rubric

Pattern blocks
Geoboards
Tangram
Cuisenaire Rods
Games: Fraction Fish
Capture Fractions
Clock Fractions

TERC: Name that Portion, Dale Seymour Publishing, 1996

6. Compare and order numbers.

Performance task: students create page for ____ ways to get to 15

Literature Link (manual p. 86)

Twelve Ways to Get to 11, Eve Merriam, Aladdin Paperback, 1995

7. Explore settings that give rise to negative numbers.

3rd grade addition/subtraction problems sheet #10

Everyday Mathematics 2.3

Create a number sentence sheet #13

Above/below Sea level
4 Quadrant Coordinate Grid

- Temperatures below zero degrees, debts
- Extension of the number line

B. Numerical Operations

Flemington-Raritan School District Mathematics Curriculum

1 .Develop the meanings of the four basic arithmetic operations by modeling and discussing a large variety of problems.	Teacher observes and checks off on class recording sheet reasoning, justifying, listen to partner	Frame Fun Cooperative cards 24 Game Tiguous Sheet # 6	<i>Math Homework that Counts</i> , A. Raphael <i>Math Solutions 2000</i>
<ul style="list-style-type: none"> Addition and subtraction: joining, separating, comparing 	SL. 3.7 Teacher observation	<i>Everyday Mathematics 2.7 & 2.9</i> Games: Rio, Four in a Row, The Winning Touch	<i>Multiplication Games</i> , Kamii & Anderson <i>Teaching Children Math</i> , November 2003
<ul style="list-style-type: none"> Multiplication: repeated addition, area/array Division: repeated subtraction, sharing 	Journal prompt: What I know about square numbers	Literature. Link: Things That Come in Groups Class Project	<i>What Comes in 2's, 3's, 4's?</i> , Suzanne Aker, Simon & Schuster, 1990 <i>Math by All Means Mult.</i> 3, M. Burns, Cuisenaire, 1991
2. Develop proficiency with basic multiplication and division number facts using a variety of fact strategies (such as "skip counting" and "repeated subtraction") and then commit them to memory.	Teacher observation	I Have... Who Has Cards Multiplication Tic Tac Toe How Long How Many Circles and Stars Literature. Link: Each Orange Had 8 Slices Amanda Bean's Amazing Dream Teaching Multiplication lesson with 5th grade	<i>Math Literature (4-b)</i> , Rusty Bresser, <i>Math Solutions</i> , 1995 www.mathsolutions.com Past Issues: Fall/Winter 98-99
<ul style="list-style-type: none"> Multiplication of 2-digit numbers 	Group solutions Recorded by teacher Individual paper & pencil Multiplication Quiz Sheet # 3 Jack Had 14 Scoops # 5 Beans & Scoops # 15	Pathways JP 125 & 8 & 9, 131 SL 5.7 Lesson 3.1-3.4	www.mathsolutions.com Past Issues: Spring/Summer 99 <i>Lessons for Extending Multiplication Grades 4-5</i> , Wickett & Burns, Math Solutions, 2001
<ul style="list-style-type: none"> Division of 3-digit numbers by 1-digit numbers 	<i>Everyday Mathematics 3.12</i> Assessment Unit 3 Warm-up Quiz	MB lesson from VIDEO using Base 10 Blocks JP 147 SL 6.1 JP 153 & 4 & 6 & 7	<i>Mathematics: Teaching for Understanding</i> Video in Robert Hunter Library

Flemington-Raritan School District Mathematics Curriculum

Performance task: Write riddle.
Exchange with partner and solve

Everyday Mathematics 6.11
Unit 6 Warm-up Quiz
Journal paragraph

Leftovers sheet # 17
Roll 15
Literature. Link: Remainder
Riddles
What I Know About Division

*A Remainder of One, E.J.
Pin czes
(From Math & Literature. 4-6),*

*Writing in Math Class, M. Burns,
Math Solutions, 1995*

Bresser M.S., 1995

3. Construct, use, and explain procedures for performing whole number calculations and with:

- Pencil-and-paper
- Mental math
- Calculator

SL 2.9 Quiz

Teacher observation

Everyday Math 2.7 & 2.9

Game: Name That Number

SRB p. 188

4. Use efficient and accurate pencil-and-paper procedures for computation with whole numbers.

- Addition of 3-digit numbers
- Subtraction of 3-digit numbers

Teacher observation of students
Math Message Do Now
Manual p. 121

Game: Subtraction Target

5. Construct and use procedures for performing decimal addition, subtraction, multiplication, and division.

Quiz: Sam does not believe... # 16
Do Now: A Third Grader was
Trying # 24
Quiz on Metrics # 13
Everyday Mathematics Assessment
4.11
Unit 4 Warm-up Quiz

Decimal Factory Lessons
The Point in Question # 14
Everyday Mathematics unit 4 (all)
Everyday Mathematics lessons
9.8 & 9.9 JP 333

*The Decimal Factory, Holden-
Charles & Randolph, Brummett
Creative Publications, 1990*

6. Count and perform simple computations with money.

- Standard dollars and cents notation

Which Would You Rather Have...
Sheet # 12

Everyday Mathematics 4.5
Literature Link: The Lunch Line

www.mathsolutions.com
Past Issues Fall/Winter 2000/01
Making Change for 20¢

Flemington-Raritan School District Mathematics Curriculum

7. Select pencil-and-paper, mental math, or a calculator as the appropriate computational method in a given situation depending on the context and numbers.

Portfolio
Prompts
Individual interview

Write number stories, exchange and solve

Write and solve place value puzzles

Describe a problem solving strategy

Everyday Mathematics 9.10
Unit 9 Warm-up Quiz
Slates

Everyday Mathematics Unit 9
Percents

Fractions, Decimals, Ratios, and Percents, Barnett, Goldenstein, & Jackson, Heinemann, 1994.

Percents, Proportions, and Grids

Van De Walle p. 288-289

Big Idea:

Another name for Hundredth
Models that connect fractions, decimals, percents

Individual writing assignment

What I Know About Percents
(so far)

Writing in Math Class, M. Burns, 1995

8. Check the reasonableness of results of computations.

9. Use concrete models to explore addition and subtraction with fractions.

Fraction Problems Att # 25

JP 123 SL 5.4
Fraction Kit

The Marilyn Burns Fraction Kit
Gr 4-6, Math Solutions
Publications, 2003
Fraction Factory Puzzles,
Creative Publications, 1987,
OUT OF PRINT, copies
attached, sheet # 35

Fraction Factory
Pattern Blocks
Cuisenaire Rods Sheet # 21
Fractions with Cookies # 22
Sharing Brownies # 22
Which Would You Rather Have #
12

10. Understand and use the inverse relationships between addition and subtraction and between multiplication and division.

Observe and play with students

Everyday Mathematics 6.3

Chip Trading Sheet # 37

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C. Estimation

1. Judge without counting whether a set of objects has less than, more than, or the same number of objects as a reference set.	Slates	Quick flashes on overhead	
2. Construct and use a variety of estimation strategies (e.g., rounding and mental math) for estimating both quantities and the results of computations.	Journal Entry	Beans and Scoops Investigation Foot Figuring: Introducing the Metric System sheet # 26	<i>Lessons for Extending Multiplication</i> , Wickett & Burns, Math Solutions, 2001 <i>About Teaching Mathematics</i> , Marilyn Burns, Math Solutions, 2000
3. Recognize when an estimate is appropriate, and understand the usefulness of an estimate as distinct from an exact answer.	Journal Prompt: If I were 1 cm tall....	Literature Link: How Big is a Foot?	Author: Rolf Myller, Dell Yerling, 1990
4. Use estimation to determine whether the result of a computation (either by calculator or by hand) is reasonable.	<i>Everyday Mathematics</i> 5.12 Unit 5 Warm-up Quiz	<i>Everyday Mathematics</i> Unit 5	

Flemington-Raritan School District Mathematics Curriculum

Grade: 3rd - Gifted and Talented Topic 4.2 Geometry and Measurement

Essential Questions: How can knowledge of geometric properties help in problem solving situations?

How can coordinate grid systems help in understanding locations?

How does the mathematics of geometry enable us to wonder and understand our natural and physical world?

Knowledge/Skills/Understandings	Assessments	Learning Experiences	Resources
A. Geometric Properties			
1. Identify and describe spatial relationships of two or more objects in space.	Hand out packet	<i>Everyday Mathematics</i> Project 6: Building & Viewing Structures Cuisenaire Rods: Front, top, side views	<i>Spatial Problem Solving with Cuisenaire Rods</i> , Davidson & Willett, ETA/Cuisenaire, 2002
<ul style="list-style-type: none"> Direction, orientation, and perspectives (e.g., which object is on your left when you are standing here?) Relative shapes and sizes Shadows (projections) of everyday objects 	Observation of vocabulary	Polygon Tiles Geoboard shape sorting: Polygons are....	<i>Super Source</i> CD Rom video clip # 20
2. Use properties of standard three-dimensional and two-dimensional shapes to identify, classify, and describe them.	Students create poster comparing faces of 2 different solids	Geometric solids and their parts	<i>TERC: Containers and Cubes</i> , Dale Seymour Publishing, 1998
<ul style="list-style-type: none"> Vertex, edge, face, side, angle 	<i>Everyday Mathematics</i> Assessment 11 .8 Unit 22 Warm-up Quiz Time to Reflect	12 Wooden shapes -- Nets -- Pentominoes Literature Link: <i>The Greedy Triangle</i> Polydron Tiles -- students construct 3D solids Polygon Tiles -- students identify 2D shapes Roping in Quadrilaterals with Applet: Mystery Rings	<i>The Greedy Triangle</i> , Marilyn Burns, Math Solutions 1994
<ul style="list-style-type: none"> 3D figures -- cube, rectangular prism, sphere, cone, cylinder, and pyramid 2D figures -- square, rectangle, circle, triangle, quadrilateral, pentagon, hexagon, octagon Inclusive relationships -- squares are rectangles, cubes are rectangular prisms 		Everyday Mathematics Polygon Riddles Geometry riddles sheet # 11	<i>NCTM Navigations Geometry 3-5</i>

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		<p>Everyday Mathematics 6.6 - 6.10</p> <p>Applets: Mirror Tool: reflections, slides, flips, turns</p> <p>Applets: Cutting Corners Tool</p> <p>Applets: Two Geoboards</p> <p><i>Everyday Mathematics</i> Unit 11</p>	
<p>3. Identify and describe relationships among 2D shapes.</p> <ul style="list-style-type: none"> • Congruence • Lines of symmetry 	<p><i>Everyday Mathematics</i> Assessment 10.7</p> <p>Unit 10 Warm-up Quiz</p> <p>Time to Reflect</p>	<p><i>Everyday Mathematics</i> unit 10</p> <p>Geoboard Shapes Sheet # 20</p>	
<p>4. Understand and apply concepts involving lines, angles, and circles.</p> <ul style="list-style-type: none"> • Point, line, line segment, endpoint • Parallel, perpendicular • Angles -- acute, right, obtuse • Circles -- diameter, radius, center 	<p><i>Everyday Mathematics</i> Assessment 1.9</p> <p>Unit 1 Warm-up Quiz</p> <p>Time to Reflect</p> <p>Tangrams sheet # 9</p>	<p><i>Everyday Mathematics</i> Unit 1</p> <p>Notes from class:</p> <p>Vocabulary presented by teacher using overhead and picture poster</p> <p>Students copy, discuss, ask questions.</p> <p>Construct angles with Geostrips</p> <p>Literature Link: <i>Grandfather Tang's Story</i></p> <p>Tangram Challenges</p>	<p><i>NCTM Addenda Series Grades 5-8</i>, 1992</p> <p><i>Grandfather Tang's Story</i>, Ann Tompert, Crown Publishing 1990</p> <p>Navigations: Geometry 3-5, Applet</p>
<p>5. Recognize, describe, extend, and create space-filling patterns.</p>	<p>Observation with checklist</p>	<p>Students build patterns with Pattern Blocks</p>	<p><i>Share and Compare</i>, Larry Bushman, NCTM, 2003, p. 52</p>
<p>B. Transforming Shapes</p>			
<p>1. Use simple shapes to cover an area (tessellations).</p>		<p>Students informally create tessellations with Pattern Blocks</p>	

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2. Describe and use geometric transformations (slide, flip, turn).

SL 10.5

Everyday Mathematics 10.1 - 10.6

Time to Reflect: My Week in Review

Math Arena: Flipster

Everyday Mathematics manual, p. 754

Teacher observation

Dot Patterns

Thinking Goes to School, Furth & Wachs, Oxford University Press, 1974, p. 162-4

SRB p. 92-93

Pattern Blocks on overhead: students create reflections, rotations, translations

3. Investigate the occurrence of geometry in nature and art.

Posters - Notes from Class
SRB

C. Coordinate Geometry

1. Locate and name points in the first quadrant on a coordinate grid.

Battle Ship
Everyday Mathematics 6.5
Animal Grid masters:
Give a Hoot, R-R-Ribbet

Own made sheets # 32-33

Super Source Tan grams 5-6, Cuisenaire, 1996

Hit or Miss

Coordinate Graphing

www.mathsolutions.com Past issues Winter 2002-03

2. Use coordinates to give or follow directions from one point to another on a map or grid.

D. Units of Measurement

1. Understand that everyday objects have a variety of attributes, each of which can be measured in many ways.

2. Select and use appropriate standard units of measure and measurement tools to solve real-life problems.

My Metric Benchmarks
Sheet #1

NFC Units of Measure:
Standard & Metric

Flemington-Raritan School District Mathematics Curriculum

- Length -- fractions of an inch (1/8, 1/4, 1/2), mile, decimeter, kilometer

Project: Poster:
Measure Me

Perimeter with Cuisenaire
Rods

About Teaching Mathematics, M. Burns

Handout from Workshop sheets # 34 packet

The Master Rulers
Students make and use:
20 cm Rulers
Folding Meter Stick
Milliliter Measure
Liter Measure

NCTM Addenda 5-8 Measurement p. 19

About Teaching Mathematics, M. Burns

- Area -- square inch, square centimeter

The Perimeter Stays the
Same

Literature Link: *Inchworm
and a Half*

Inchworm and a Half, E. Pinczes, Houghton
Mifflin, 2001

- Volume -- cubic inch, cubic centimeter

- Capacity -- fluid ounce, cup, gallon, milliliter
- Solve problems involving elapsed time

11
Party Planning

Best of Math Exemplars II CD Rom

3. Develop and use personal referents to approximate standard units of measure (e.g., a common paper clip is about an inch long).

4. Incorporate estimation in measurement activities (e.g., estimate before measuring).

Journal: what I learned
at the Measurement Fair

How good is your estimate?

NCTM Addenda p. 15

Prompt: I used the
_____ benchmark to
measure _____.

Measurement day:
Estimation Fair

NCTM Addenda p. 18

Estimating Lengths with
Benchmarks

TERC Measurement Benchmarks 5-6, Dale -
Seymour, 1996

E. Measuring Geometric Objects

1. Determine the area of simple two-dimensional shapes on a square grid.

Everyday Mathematics
8.9 Assessment

Everyday Mathematics 8.1-
8.8

Unit 8 Warm-up Quiz

2. Distinguish between perimeter and area and use each appropriately in problem-solving situations.

Fixed Areas
Fixed Perimeters

*Van De Walle: Elementary and Middle
School Math*, 2004

Flemington-Raritan School District Mathematics Curriculum

Authentic Performance
Students use color tiles
and record solutions on
graph paper

Literature Link: *Spaghetti
and Meatballs for All*

*Math by All Means: Perimeter and Area
Grades 5-6, mathsolutions.com*

3. Measure and compare the volume of three-dimensional objects using materials such as rice or cubes.

Ticket out the Door

Everyday Mathematics 11.4,
11.5, 11.7

Folding Geometric set (3D --
2D)

View Thru geometric solids
set

Completion of worksheet How Many Cubes?

NCTM 2003 Yearbook, p. 136

Flemington-Raritan School District Mathematics Curriculum

Grade: 3 - Gifted and Talented Topic 4.3 Patterns and Algebra

Essential Questions: How can patterns help in problem solving?

How can symbols be used to help us in problem solving?

How does the study of algebra help us understand mathematical patterns as the patterns found in nature & the real world?

Knowledge/Skills/Understandings	Assessments	Learning Experiences	Resources
A. Patterns			
1. Recognize, describe, extend, and create patterns.	Math Master p. 163	Frieze Patterns <i>Everyday Mathematics 10.5</i> SRB p.94	
<ul style="list-style-type: none"> • Descriptions using words, number sentences/expressions, graphs, tables, variables (e.g., shape, blank, or letter) • Sequences that stop or that continue infinitely 	Students complete worksheets and present a solution at overhead. Math Congress: pairs of students present poster to classmates	Hands On Algebra book I I Spy Patterns Algebra Scales The Variable Machine Hundred Board Wonders	www.borenson.com Navigations through Algebra 3-5 <i>Navigations through Algebra 3-5</i>
<ul style="list-style-type: none"> • Whole number patterns that grow or shrink as a result of repeatedly adding, subtracting, multiplying by, or dividing by a fixed number (e.g., 5, 8, 11,...or 800, 400, 200,...) 		Function Machine & Pan Balance Applets Patterns that grow: Patterns on charts with online calculator	NCTM.org .Illuminations - lesson
<ul style="list-style-type: none"> • ,Sequences can often be extended in more than one way (e.g., the next term after 1, 2, 4, ... could be 8, or 7, or...) 	Students share ideas at overhead	Number Patterns It All Adds Up!	Van de Walle p. 425 www.mathsolutions.com Past issues Fall/winter 2000/01

B. Functions and Relationships

1. Use concrete and pictorial models to explore the basic concept of a function.

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- Input/output table, T-charts

Everyday Mathematics What's my rule? JP 59 & 64 (Mbox)

- Combining two function machines
- Reversing a function machine

Completion of Blackline Masters

Rate Tables 12.2

Tiling a Patio

Navigations through Algebra 3-5

Growing Patterns

Equilateral Triangles

Triangle-Rule Machine

C. Modeling

1. Recognize and describe change in quantities.

NFC

Everyday Mathematics 2.8 9.6

Class graph

- Graphs representing change over time (e.g., temperature, height)

Grow and measure Amaryllis Bulb.
Help students focus on the shape of the data: range, maximum, minimum, outlier

- How change in one physical quantity can produce a corresponding change in another (e.g., pitch of a sound depends on the rate of vibration)

2. Construct and solve simple open sentences involving any one operation (e.g., $3 \times 6 = \underline{\hspace{1cm}}$, $n = 15 \div 3$, $3 \times \underline{\hspace{1cm}} = 0$, $16 - c = 7$).

Whole class discussion
manual p. 191

Number Balance

Van De Walle, p. 428

Everyday Mathematics 3.10

Different uses of variables

Variables as unknowns

Class discussion: Solve
 $b + b + b - 20 = 16$

Number sentences involving relational thinking, p.31

Thinking Mathematically: Integrating Arithmetic & Algebra in Elementary Schools, Carpenter, Franke, Levi Heinemann, 2003

Flemington-Raritan School District

D. Procedures

1. Understand and use the concepts of equals, less than, and greater than in simple number sentences.	Students share posters in Math Congress SL 3.8	Equality, relational thinking <i>Everyday Mathematics</i> 3.8	<i>Thinking Mathematically: Integrating Arithmetic & Algebra in Elementary Schools</i> , Carpenter, Franke, Levi Heinemann, 2003
<ul style="list-style-type: none"> • Symbols (=, <, >) 	Journal paragraph: What I know now about =, <, and >	True, false, and open number sentences	www.mathsolutions.com Past Issues Fall 2002
2. Understand, name, and apply the properties of operations and numbers.	NFC: Big Ideas	Meanings for Operations	Van De Walle p. 135
<ul style="list-style-type: none"> • Commutative (e.g., $3 \times 7 = 7 \times 3$) 		Multiplication and Division Properties The Broken Multiplication Key	Van De Walle p. 149 & 150
<ul style="list-style-type: none"> • Identity element for multiplication is 1 (e.g., $1 \times 8 = 8$) 	Class Discussion: $a + b - b = a$ $k + k + 13 = k + 20$ $56 + 75 + 25 = \underline{\hspace{2cm}}$	The Broken Division Key	<i>Thinking Mathematically: Integrating Arithmetic & Algebra in Elementary Schools</i> , Carpenter, Franke, Levi Heinemann, 2003
		Representing Conjectures Symbolically	Van De Walle p. 106
		Ordering multiple operations	
<ul style="list-style-type: none"> • Division by zero is undefined • Any number multiplied by zero is zero 			

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Grade: 3 Gifted and Talented Topic 4.4 Data Analysis, Probability, and Discrete Mathematics

Essential Questions: How can classifying help me in organizing data to solve problems?

How can statistics help us to understand real world situations?

How can the study of real world data help us understand and make accurate predictions?

Knowledge/Skills/Understandings	Assessments	Learning Experiences	Resources
A. Data Analysis			
1 .Collect,generate,organize,and display data in response to questions, claims, or curiosity.	SL 2.6 Journal prompt: calculate maximum, minimum, range, mode, and median for Adults and kids. Explain: what do you find interesting when comparing the two sets of data?	<i>Everyday Mathematics</i> 2.5, 2.6, & 2.8 Enrichment: Bulletin Board Display Above number line - Adults head circumference Below number line - 3rd grade head circumference	
• Data generated from the school environment		Questions Please? Long Jump How many stars can you draw in 1 minute? Do you get enough sleep? Chores - How many hours a week are typical? SRB p. 63 Roll 15 game sheet # 15	<i>NCTM Navigations through Data Analysis and Probability</i> , 3-5, 2002
2. Read ,interpret,select,construct,analyze, generate questions about, and draw inferences from displays of data.	Notes from Class	BIG Ideas	Van De Walle p. 386
• Pictograph, bar graph, line plot, line graph, table		What's in a name? Lesson: First NCTM.org . Illuminations - lesson Names First	
• Average (mean), most frequent (mode), middle term (median)	<i>Everyday Mathematics</i> 2.10 Unit 2 Warm-up	Finding the Balance Point	Van De Walle p. 401

Flemington-Raritan School District Mathematics Curriculum

B. Probability

1. Use everyday events and chance devices, such as dice, coins, and unevenly divided spinners, to explore concepts of probability

Observe students/play with students

How many rolls to get a 1?

The Two-Dice Sum Game

Fair Game 2

About Teaching Mathematics, p. 70, 73, 74

- Likely, unlikely, certain, impossible, improbable, fair, unfair

- More likely, less likely, equally likely
- Probability of tossing "heads" does not depend on outcomes of previous tosses

NFC BIG Ideas # 4 & 5

Exploring concepts of probability

Van De Walle p. 386

2. Determine probabilities of simple events based on equally likely outcomes and express them as fractions.

SL 7.11

Everyday Mathematics 7.11 & 7.12

3. Predict probabilities in a variety of situations (e.g., given the number of items of each color in a bag, what is the probability that an item picked will have a particular color).

Journal prompts

Color Tile Sampling

Probability 3-4, M. Burns, 1995

Ticket out the door

Roll 2 dice

Tiles in Three Bags

Pigs, testing pig strategies

- What students think will happen (intuitive)
- Collect data and use that data to predict the probability (experimental)

Matching line plots with spinners

Is there such a thing as a lucky coin?

NCTM Navigating through Data Analysis and Probability 3-5

Spin City

Is it fair?

- Analyze all possible outcomes to find the probability (theoretical)

Observation of students

Applets:
Preset Spinner
Dice Sums
Coin Toss

NCTM Navigating through Data Analysis and Probability 3-5

Flemington-Raritan School District

C. Discrete Mathematics-Systematic Listing and Counting

- | | | | |
|---|--|---|--|
| 1. Represent and classify data according to attributes, such as shape or color, and relationships. | Observe students playing the games | Attribute blocks
Venn Diagrams
Difference Chains
Difference Grids
Difference Problems | <i>Attribute Acrobatics</i> , Sternberg Activity Resources, 1974 |
| <ul style="list-style-type: none"> • Venn diagrams • Numerical and alphabetical order | Exit slip: I played ____ today. I liked ____. | Venn Diagram on Math Arena | Math Arena |
| 2. Represent all possibilities for a simple counting situation in an organized way and draw conclusions from this representation. | Class discussion to create class chart | Combinations:
Shorts and Skirts
Ice Cream cones | NCTM.org . Illuminations
-Lessons |
| <ul style="list-style-type: none"> • Organized lists, charts, tree diagrams • Dividing into categories (e.g., to find the total number of rectangles in a grid, find the number of rectangles of each size and add the results) | Ticket out the door
Completion of worksheet | Cooperative Logic
Squares in a square with color tiles | <i>Group Solutions, Too!</i> , GEMS, University of California, Berkeley
<i>Super Source</i> CD Rom, Grades 3-4, p. 74 |

D. Discrete Mathematics - Vertex - Edge - Graphs and Algorithms

1. Follow, devise, and describe practical sets of directions (e.g., to add two 2-digit numbers).

Flemington-Raritan School District Mathematics Curriculum

2. Play two-person games and devise strategies for winning the games (e.g., "make 5" where players alternately add 1 or 2 and the person who reaches 5, or another designated number, is the winner.)

Teacher observation/play
with individual students

Try to write down a
strategy for winning

Game of Nim

Game of Pig

Odd Number Wins

Begin with 15 cubes. Take 1, 2,
or 3 cubes. Whoever has an odd
number of counters when all
blocks have been picked is the
winner.

www.csm.astate.edu/Nim.html-2k

Probability 3-4, M. Burns, 1995

3. Explore vertex-edge graphs and tree diagrams.

- Vertex, edge, neighboring/adjacent, number of neighbors
- Path, circuit(i.e., path that ends at its starting point)

4. Find the smallest number colors needed to color a map or a graph.

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Grade: 3 Gifted and Talented Topic 4.5 Mathematical Processes

Big Idea: Mathematical understandings are an essential part of our lives in and out of school and as such all children need to have an instinctive sense of mathematical resources that they can rely on to help them progress through life.

**Essential Questions: How will learning to "think" mathematically enable us to make a life, make a living, and make a difference?
How does the use of technology enable us to have a deeper understanding of mathematics?**

Knowledge/Skills/Understandings	Assessments	Learning Experiences	Resources
A. Problem Solving			
1. Learn mathematics through problem solving inquiry and discovery	Observe pairs playing/play with a student	Picture This	NCTM.org .Illustrations - lessons
	Extension: Newspaper article	The Product Game Lesson: The Factor Game	NCTM.org .Illustrations - lessons
2. Solve problems that arise in mathematics and in other contexts	Journal: work with partner, report your answer, and how you figured it out	Triangles Lesson: What's Important about Triangles? A Long Division Activity	<i>Problem Solving Lessons</i> , Marilyn Burns, Math Solutions, 1996
• Open ended problems	Teacher observation	Match or No Match	
• Non-routine problems	Students share and teacher records on a class chart	24 Game	<i>Young Children Reinvent Arithmetic</i> , Kamii& Housman, Teachers College Press, 2000
	Teacher collects papers and responds with post-it "nudge notes"	Julia's Dartboard sheet # 29	NJ Curriculum Framework grade 3-4 Standard 1: Problem Solving
• Problems with multiple solutions		Poyla activity: Cows & Chickens sheet # 30	
• Problems that can be solved in several ways	Check your understanding	SRB p. 149	
3. Select and apply a variety of appropriate problem-solving strategies to solve problems.			

Flemington-Raritan School District Mathematics Curriculum

4. Pose problems of various types and levels of difficulty

5. Monitor their progress and reflect on the process of their problem solving activity

B. Communication

1. Use communication to organize and clarify their mathematical thinking

Completion of tally sheet Count on Mathematics for Number Sense

[NCTM.org](https://www.nctm.org/illuminations). Illuminations lesson

Lesson: Every Breath You Take

• Reading and writing

Completion of worksheet Literature Link: *A Tale of Two Stories: Pigging Out*

Mathematics and Children's Literature: Getting the Facts: Counting on Frank

• Discussion, listening and questioning

Collect and respond with post-it "nudge note"

Explain to a student in 2nd grade what you learned about decimals today

Van De Walle p. 70

2. Communicate their mathematical thinking coherently and clearly to peers, teachers, and others, both orally and in writing.

Class discussion

Even/Odd Class Discussion

Classroom Discussions: Using Math Talk to Help Students Learn, Chapin O'Connor, Canavan/Anderson Math Solutions, 2003

Class discussion

Everyday Mathematics lesson 3.7-3.10

3. Analyze and evaluate the mathematical thinking and strategies of others.

Writing Prompt: What about the work we did today was easy? What was hard? What do you still have questions about?

Math Congress: Teacher uses scoring rubric for feedback to students

Parent Volunteers

Best of Math Exemplars II CD Rom

Flemington-Raritan School District Mathematics Curriculum

4. Use the language of mathematics to express mathematical ideas precisely.

C. Connections

1. Recognize recurring themes across mathematical domains (e.g., two linear equations have a unique solution because the lines they represent intersect at a single point).

Exit slip

Exploration of a Balance

[NCTM.org.Illuminations lesson](https://www.nctm.org/illuminations/lesson)

Lesson:
Maintaining the Balance
Shifting the Balance

[NCTM.org.Illuminations lesson](https://www.nctm.org/illuminations/lesson)

Completion of worksheet Games, Measurement, and Statistics Lesson:

Pitching Cards
Literature Link: *Only One*
Literature Link: *The Important Book*

Only One, Harshman, Coblehill Books, 1993
The Important Book, Wise Brown, Harper Collins, 1949

2. Use connections among mathematical ideas to explain concepts (e.g., two linear equations have a unique solution because the lines they represent intersect at a single point).

Students create a class book of their own

Everyday Mathematics
Assessment 12.7
Unit 12 Warm-up Quiz

Everyday Mathematics
Rates 12.1 - 12.5
Everyday Mathematics
Project 7: Numbers Maya Style

3. Recognize that mathematics is used in a variety of contexts outside of mathematics.

4. Apply mathematics in practical situations and in other disciplines.

5. Trace the development of mathematical concepts over time and across cultures (cf. world languages and social studies standards).

6. Understand how mathematical ideas interconnect and build on one another to produce a coherent whole.

D. Reasoning

1. Recognize that mathematical facts, procedures, and claims must be justified.

Class posters to be used Mathematics and for math congress
Environmental Concerns
Lesson: How to Bag It

[NCTM.org.Illuminations -lesson](https://www.nctm.org/illuminations/lesson)

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2. Use reasoning to support their mathematical conclusions and problem solutions.	Completion of worksheet followed by class discussion	Numbers and Language Lesson: Post Office Numbers	NCTM.org.Illuminations -lesson
	Class Brainstorm: can we find all possible combinations?	Possible Solution Sets Lesson: Create an Address Number <i>Roads to Reasoning</i> Packets Grade 4	<i>Roads to Reasoning</i> , Krulik & Rudwick, Creative Publications, 2001 <i>Super Source</i> CD Rom Video Clip # 2, Cuisenaire Co., 1996
3. Select and use various types of reasoning and methods of proof.	Math Congress	Build the Yellow Hexagon	<i>Super Source</i> CD Rom lesson, Cuisenaire Co., 1996, p. 62
	Partners create organized list of all possible combinations	The Last Block with Pattern Blocks Be a Logician with Color Tiles	<i>Super Source</i> CD Rom lesson, Cuisenaire Co., 1996, p. 18 NCTM 2001 Yearbook: Promoting the Use of Diagrams as Tools for Thinking, pp. 77-89
4. Rely on reasoning, rather than answer keys, teachers, or peers, to check the correctness of their problem solutions.	Journal prompt: I used the strategy of ____ to guess the sequence of colors.	Writing Prompt sheet # 31 Writing Prompt sheet # 36	NCTM 1999 Yearbook: Reasoning About Operations, pp. 62-81
5. Make and investigate mathematical conjectures.	• Counterexamples as a means of displaying conjectures		
	• Verifying conjectures using informal reasoning or proofs.		
6. Evaluate examples of mathematical reasoning and determine whether they are valid.			

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E. Representations

1. Create and use representations to organize, record, and communicate mathematical ideas.	Students share at overhead	Problem: What happens to the area of a rectangle if the lengths of its sides are doubled?	<i>Principles and Standards for School Mathematics</i> , NCTM, 2000, p. 205
<ul style="list-style-type: none"> Concrete representations (e.g., base-ten blocks or algebra tiles) 	Students create graphs using spreadsheet	Collecting, Representing, and Interpreting Data	<i>Principles and Standards for School Mathematics</i> , NCTM, 2000, E - example 5.5 (members only)
<ul style="list-style-type: none"> Pictorial representations (e.g., diagrams, charts, or tables) 	whole class discussion	Are there more even or odd products in the multiplication table?	<i>Principles and Standards for School Mathematics</i> , NCTM, 2000, pp. 208-9
<ul style="list-style-type: none"> Symbolic representations (e.g., a formula) 	math congress	Problem Prompts adaptations	NCTM 2001 Yearbook, pp. 77-89
<ul style="list-style-type: none"> Graphical representations (e.g., a line graph) 	Writing Prompt: Reflection on playing the game	Chip Trading	
2. Select, apply, and translate among mathematical representations to solve problems			
3. Use representations to model and interpret physical, social, and mathematical phenomena.			

F. Technology

1. Use technology to gather, analyze, and communicate mathematical information.	Teacher reflection after observing students (see last page of article)	Virtual Tile Turning	NCTM On-Math Journal, Spring 2003, (members only), Printed copy of article attached.
	Math Congress/class discussion	Applets: Patterns Shape Tool (Illuminations) Problem of the week Math Arena	http://mathforum.org

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Mathematics Curriculum

Class Discussions

2. Use computer spreadsheets, software, and graphing utilities to organize and display quantitative information (cf. workplace readiness standard 8.4-D).

3. Use graphing calculators and computer software to investigate properties of functions and their graphs.

4. Use calculators as problem-solving tools (e.g., to explore patterns, to validate solutions).

5. Use computer software to make and verify conjectures about geometric objects.

6. Use computer-based laboratory technology for mathematical applications in the sciences (cf. science standards).A39

Electronic Abacus Applet

NCTM.org. Illuminations

Equivalent Fractions Applet

Fraction Pie Overview Applet

Patch Tool: Fitting Shapes Together to Form Designs

Product Game

Flemington-Raritan School District

Mathematics Curriculum

**4th Grade Gifted and Talented
Pacing Guide**

Unit	Number of Days (Approximate)	Unit	Number of Days (Approximate)
1 . Number Theory	13	7 . Exponents and Negative Numbers	14
2 . Estimation and Computation	13	8 . Fractions and Ratio	16
3 . Geometry Explorations and the American Tour	13	9 . Coordinates, Area, Volume and Capacity	13
4 . Division	10	Hands On Equations	10
5 . Fractions, Decimals, and Percent	15	10 . Using Data; Algebra Concepts and Skills	12
6 . Using Data; Addition and Subtraction of Fractions	13	11 - Volume, & Capacity	10
		12 . Probability, Ratio, and Rates	11
Mid-Year Benchmark Assessment	1	End-of-the-Year Benchmark Assessment	1

Flemington-Raritan School District

Mathematics Curriculum

Grade: 4 - Gifted and Talented Topic 4.1 Number and Numerical Operations

Essential Question: How can problems in the real world be solved with mathematics?

How can estimation be useful to us?

How do numbers help us reason out solutions to problems?

How do basic operations help us understand numbers?

Knowledge/Skills/Understandings

Assessments

Learning Experiences

Resources

A. Number Sense

1. Use real-life experiences, physical materials, and technology to construct meanings for numbers **(unless otherwise noted, all indicators for grade 5 pertain to these sets of numbers as well).**

Teacher observation
Teacher made exit slips
(attachment 3)

Practice Master pm 5-41, 5-82
Pizzazz, E-61

"Pattern Blocks"
Variety of Games

Open Court, 1991
Everyday Mathematics Units
5, 6, and 8

Name That Portion, TERC,
1996

Middle School with Pizzazz,
Booke

- Whole numbers through millions

Student journals

Whole Class Discussion

"Fraction Track"

"Geoboard Puzzles"

*Teaching Children
Mathematics*, Janet Caldwell,
November 1995
TERC, *Name That Portion*

Geoboard Puzzles
(attachment 4 & 5)

- All fractions as part of a whole, as subset of a set, as a location on a number line, and as divisions of whole numbers
- All decimals

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2. Demonstrate an understanding of place value concepts.	State assessment	"Capture Decimals" Mental Math & Reflexes, <i>Everyday Mathematics</i> 2.5	TERC, <i>Name That Portion</i> <i>Everyday Mathematics</i> - 5 Units 2,4,5
3. Recognize the decimal nature of United States currency and compute with money.			
4. Demonstrate a sense of the relative magnitudes of numbers.	Observation of students playing game	Do Now: Mental Math & Reflexes (<i>Everyday Mathematics</i> 2.10) First to 100 "Number Names"	<i>Everyday Mathematics</i> - 5 Units 2,4,7 Problem Parade
5. Use whole numbers, fractions, and decimals to represent equivalent forms of the same number.	<i>Everyday Mathematics</i> Unit 5 Assessment	PM 5-59 Pizzazz C-25, C-74	<i>Everyday Mathematics</i> - 5 Unit 5 Open Court (1991) <i>Middle School with Pizzazz</i>
6. Develop and apply number theory concepts in problem solving situations.	<i>Everyday Mathematics</i> Unit 1 Assessment Authentic Performance Task Project	Factor Capture Game Candy Box Research Ryan's Primes PM 6-52 Variety of Problems "The Sieve of Eratosthenes" "Deficient, Abundant, & Perfect Numbers"	<i>Everyday Mathematics</i> - 5 Unit 1 <i>Multiplication</i> - Grade 3, M. Burns, 1991 <i>Teaching Children</i> <i>Mathematics</i> , May 1997 <i>Practice Masters</i> , Open Court, 1991 Logic Number Problems <i>Everyday Mathematics</i> - 5, Project 1,2
• Primes, factors, multiples			

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6. Compare and order numbers.

Whole Class Division Review

Everyday Mathematics - 5,
Unit 4

B. Numerical Operations

1. Recognize the appropriate use of each arithmetic operation in problem situations.

Everyday Mathematics Unit 2
Assessment

Everyday Mathematics Journal
pages

Everyday Mathematics - 5
Units 2, 4, 5, 6, 8

Everyday Mathematics Unit 4
Assessment

"Ancient Multiplication Algorithm"

Everyday Mathematics - 5
Project 3

Everyday Mathematics Unit 5
Assessment

2.

Everyday Mathematics - 5
performing addition and subtraction with fractions
and decimals with:

Construct, use, and explain procedures for Pizzazz D-28, D-21

Units 5, 6

Pencil-and-paper
Mental math
Calculator

Middle School with Pizzazz

3. Use an efficient and accurate pencil-and-paper procedure for division of a 3-digit number by a 2-digit number.

Everyday Mathematics - 5 Unit 4
Assessment

Notes from class

About Teaching Mathematics,
Marilyn Burns (2000)

Math Congress

Small group work

Everyday Mathematics - 5
Unit 4

Student presentations

4. Select pencil-and-paper, mental math, or a calculator as the appropriate computational method in a given situation depending on the context and numbers.

Completion of enrichment activities

Supplemental enrichment
activities

Everyday Mathematics - 5
Units 1, 2, 3, 8, 10

Roads to Reasoning, Stephen
Krulik & Jesse A. Rudnick,
2001

Crossmatics, Dudley, 1990

Logic Number Problems,
Wade H. Sherard III, 1987

Flemington-Raritan School District Mathematics Curriculum

5. Check the reasonableness of results of computations.

Everyday Mathematics Journal
pages and Study Links

Everyday Mathematics - 5,
Units 1, 2, 4, 7, 8, 9, 10, 11,
12

6. Understand and use the various relationships among operations and properties of operations.

Everyday Mathematics Unit 7
Assessment

"First Four"
The Four 4's Problem Project

Everyday Mathematics - 5
Unit 7

Problem Parade

Everyday Mathematics - 5
Journal 2

C. Estimation

1. Use a variety of estimation strategies for both number and computation.

Authentic performance piece
State assessment

"Lima Bean Estimation Strategy"
Mental Math & Reflexes
Everyday Mathematics - 5 (2.4)

KSK Attachment 1

Everyday Mathematics - 5
Units 2, 4

2. Recognize when an estimate is appropriate, and understand the usefulness of an estimate as distinct from an exact answer.

Everyday Mathematics Journal
page 29

Everyday Mathematics - 5
Unit 2

Everyday Mathematics Study 2.1

Counting on Frank Group Project

Math & Literature, Rusty
Bresser, 1995

3. Determine the reasonableness of an answer by estimating the result of operations.

4. Determine whether a given estimate is an overestimate or an underestimate.

Everyday Mathematics - 5 Unit 2
Assessment

Everyday Mathematics - 5
Unit 2

Flemington-Raritan School District Mathematics Curriculum

Grade: 4 - Gifted and Talented Topic 4.2 Geometry and Measurement

Essential Questions: How can knowledge of geometric properties help in problem solving situations?

How can coordinate grid systems help in understanding locations?

How does the mathematics of geometry enable us to wonder and understand our natural and physical world?

Knowledge/Skills/Understandings	Assessments	Learning Experiences	Resources
A. Geometric Properties			
1. Understand and apply concepts involving lines and angles. <ul style="list-style-type: none"> • Notation for line, ray, angle, line segment • Properties of parallel, perpendicular, and intersecting lines • Sum of the measures of the interior angles of a triangle is 180° 	Everyday Mathematics Unit 3 Assessment		Everyday Mathematics - 5 Unit 3 Assessment
2. Identify, describe, compare, & classify polygons. <ul style="list-style-type: none"> • Triangles by angles & sides • Quadrilaterals, including squares, rectangles, parallelograms, trapezoids, rhombi • Polygons by number of sides • Equilateral, equiangular, regular • All points equidistant from a given point form a circle 	Everyday Mathematics Unit 3 Assessment	"Polygon Capture" "Geodeo's Sorting Scheme"	Everyday Mathematics - 5 Unit 3 <i>Navigation through Geometry</i> in Grades 6-8, 2001 The Greedy Triangle, Marilyn burns, 1994 Geometry in the Middle Grades (6-8), Illuminations Geoshapes (games), Talicor, 1996
3. Identify similar figures.	Everyday Mathematics Unit 3 Assessment	"Geoshapes"	Everyday Mathematics - 5 Unit 3 Assessment
4. Understand and apply the concepts of congruence and symmetry (line and rotational).	Student Journals	Exploring Geometry (2-day activities)	"Exploring Geometry" <i>Arithmetic Teacher</i> , September 1992

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B. Transforming Shapes

1. Use a translation, a reflection, or a rotation to map one figure onto another congruent figure.

Authentic Performance Task

"Shape Cutter" by Illuminations

"Tessellemania"

Everyday Mathematics - 5
Unit 9 Lesson 3

Everyday Mathematics - 5
Unit 3 Lesson 6

Tools, Illuminations

Tessellemania CD Rom

2. Recognize, identify, and describe geometric relationships and properties as they exist in nature, art, and other real-world settings.

"Geometry in the World of Art" -
Grades 3-5

Everyday Mathematics - 5
Unit 3

Lesson, Illuminations

C. Coordinate Geometry

1. Create geometric shapes with specified properties in the first quadrant on a coordinate grid.

Everyday Mathematics Unit 9
Assessment

Teacher observation

"Battleship" game

"Hurkle" game

"Lost in the Crowd" Math Arena
Activity

Everyday Mathematics - 5
Unit 9

"Hurkle" *Family Math*, 1986

Math Arena, 1994

D. Units of Measurement

1. Select and use appropriate units to measure angles and area.

Everyday Mathematics Unit 3
Assessment

"Geoboard Triangle Search"

Everyday Mathematics -
Unit 3

Everyday Mathematics -
Unit 9 Lessons 4-7

*Math by All Means:
Geometry* Grades 3-4,
Marilyn Burns, 1994

Flemington-Raritan School District Mathematics Curriculum

2. Convert measurement units within a system (e.g., 3 feet = ____ inches).

"Measuring Up" (9 lessons)

Lessons, Illuminations

Pizzaz D-69

Middle School with Pizzazz

3. Know approximate equivalents between the standard and metric systems (e.g., one kilometer is approximately 6/10 of a mile).

Everyday Mathematics Unit 6 Lesson 2

4. Use measurements and estimates to describe and compare phenomena.

Observation of students' performance

Project 8

Everyday Mathematics - 5 Units 9 & 11

Everyday Mathematics Lesson 2.5

Everyday Mathematics - 5 Unit 2 Lesson 5

Everyday Mathematics Lesson 10.5

Everyday Mathematics - 5 Unit 10 Lesson 5

E. Measuring Geometric Objects

1. Use a protractor to measure angles.

Early Math UB
Assessment

PM 5-67

Everyday Mathematics Unit 3

"Mrs. Claus" D-26

Open Court, 1991

Middle School with Pizzazz

1. Develop and apply strategies and formulas for finding perimeter and area.

- Square
- Rectangle

Project 7 - *Everyday Mathematics* Everyday Mathematics - 5 Units 9 & 11

3. Recognize that rectangles with the same perimeter do not necessarily have the same area and vice versa.

"The Perimeter Stays the Same"

Everyday Mathematics Unit 9

"Perimeter with Cuisenaire Rods"

About Teaching Mathematics, Marilyn Burns

Flemington-Raritan School District

4. Develop informal ways of approximating the measures of familiar objects (e.g., use a grid to approximate the area of the bottom of one's foot).

Authentic Performance Task

"Foot Area Perimeter"

About Teaching
Mathematics, Marilyn Burns

Everyday Mathematics
Units 6 & 9

Flemington-Raritan School District Mathematics Curriculum

Grade: 4 - Gifted and Talented Topic 4.3 Patterns and Algebra

Essential Questions: How can patterns help in problem solving?

How can symbols be used to help us in problem solving?

How does the study of algebra help us understand mathematical patterns as the patterns found in nature & the real world?

Knowledge/Skills/Understandings	Assessments	Learning Experiences	Resources
A. Patterns			
1. Recognize, describe, extend, and create patterns involving whole numbers.			<i>Everyday Mathematics</i> - 5 Units 1, 2, 7, 10
	Unit 10 Assessment	" Patterns that Grow" (5 lessons)	Illuminations - "Lessons"
• Descriptions using tables, verbal rules, simple equations, and graphs			
B. Functions & Relationships			
1. Describe arithmetic operations as functions, including combining operations and reversing them.	Unit 7 Assessment	<i>Everyday Mathematics</i> - The Four 4's Project	<i>Everyday Mathematics</i> - 5 Unit 7
			<i>Everyday Mathematics</i> - 5 Unit 9
	Unit 10 Assessment		<i>Everyday Mathematics</i> - 5 Unit 10 (Lessons 4 & 6)
2. Graph points satisfying a function from T-charts, from verbal rules, and from simple equations.	Student completion of booklet.	First to 100 - <i>Everyday Mathematics</i>	<i>Everyday Mathematics</i> - Units 3, 4, 10
	Student demonstration	Hands on Algebra	<i>Hands on Algebra</i> , Borenson & Assoc., 1994
C. Modeling			
1. Use number sentences to model situations.			
• Using variables to represent unknown quantities			
• Using concrete materials, tables, graphs, verbal rules, algebraic expressions/equations	Circulate, complete, and share Journal p. 360	<i>Everyday Mathematics</i> 10.5 - Predicting Old Faithful's Next Eruption	<i>Everyday Mathematics</i> - Unit 10 Lesson 5

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2. Draw freehand sketches of graphs that model real phenomena and use such graphs to predict and interpret events.

- Changes over time

- Rates of change (e.g., when is plant growing slowly/rapidly, when is temperature dropping most rapidly/slowly)

D. Procedures

1. Solve simple linear equations with manipulatives and informally

- Whole-number coefficients only, answers also whole numbers
- Variables on one side of equation

Unit 9 Assessment

Unit 10 Assessment

Hands on Algebra

Everyday Mathematics -
Units 9 & 10

Hands on Algebra,
Groundworks - Creative
Publications, 1994

Flemington-Raritan School District

Grade: 4 Gifted and Talented Topic 4.4 Data Analysis, Probability, and Discrete Mathematics

Essential Questions: How can classifying help me in organizing data to solve problems?

How can statistics help us to understand real world situations?

How can the study of real world data help us understand and make accurate predictions?

Knowledge/Skills/Understandings	Assessments	Learning Experiences	Resources
A. Data Analysis			
1. Collect, generate, organize, and display data.	Unit 6 Assessment	"The Search for \$1.00 Words"	www.mathsolutions.com
<ul style="list-style-type: none"> Data generated from surveys 		"Food Court" grade 3-5 (6 lessons)	Attachment 2a & b Everyday Mathematics Unit 6 Lessons - Illuminations
2. Read, interpret, select, construct, analyze, generate questions about, and draw inferences from displays of data.	Unit 6 Assessment	"Information Represented Graphically"	Lessons - Illuminations Everyday Mathematics - 5 Unit 5 Lesson 10, 11 Everyday Mathematics - 5 Unit 6 Everyday Mathematics - 5 Unit 10 Lesson 7
<ul style="list-style-type: none"> Bar graph, line graph, circle graph, table 		Range, median, and mean "Problem Solving: Dealing with	Lessons - Illuminations
3. Respond to questions about data and generate their own questions and hypotheses.	Unit 6 Assessment		Everyday Mathematics - Unit 6

B. Probability

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1. Determine probabilities of events.

Unit 12 Assessment

First to 21 - Journal p. 176

Everyday Mathematics - 5 Unit 12

Math Congress

"Is It Fair?"

Everyday Mathematics - 5 Unit 6 Lesson 2

- Event, probability of an event
- Probability of certain event is 1 and of impossible event is 0

2. Determine probability using intuitive, experimental, and theoretical methods (e.g., using model of picking items of different colors from a bag).

Unit 12 Assessment

Everyday Mathematics - Unit 12

Authentic performance task "Tiles in a Bag" (version 2)

Teaching Children Mathematics

- Given numbers of various types of items in a bag, what is the probability that an item of one type will be picked

- Given data obtained experimentally, what is the likely distribution of items in the bag

1. Model situations involving probability using simulations (with spinners, dice) and theoretical models.

"Spinner Sums"
"Game of Pig"

Everyday Mathematics - Units 2 & 12

Math by All Means - Probability, Marilyn Burns, 1995

C. Discrete Mathematics-Systematic Listing and Counting

1. Solve counting problems and justify that all possibilities have been enumerated without duplication.

Circulate, complete, and share

Discrete Mathematics Workshop, Lisa Ryden, September 2000

"map coloring"
"The Handshake Problem"

About Teaching Mathematics, Marilyn Burns, 2000

- Organized lists, charts, tree diagrams, tables

2. Explore the multiplication principle of counting in simple situations by representing all possibilities in an organized way (e.g., you can make $3 \times 4 = 12$ outfits using 3 shirts and 4 skirts).

Think, pair, share

Fourth Grade Extension Activity:
"Four-by-Four Block"

*Discrete Mathematics Across the
Curriculum K-12*, Yearbook NCTM, 1991

Flemington-Raritan School District

D. Discrete Mathematics-Vertex-Edge Graphs and Algorithms

1. Devise strategies for winning simple games (e.g., start with two piles of objects, each of two players in turn removes any number of objects from a single pile, and the person to take the last group of objects wins) and express those strategies as sets of directions.

Circulate, complete, and share

"Vertex coding"

Discrete Mathematics Workshop - Lisa Ryden, September 2000

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Grade: 4 Gifted and Talented Topic 4.5 Mathematical Processes

Big Idea: Mathematical understandings are an essential part of our lives in and out of school and as such all children need to have an instinctive sense of mathematical resources that they can rely on to help them progress through life.

Essential Questions: How will learning to "think" mathematically enable us to make a life, make a living, and make a difference?
How does the use of technology enable us to have a deeper understanding of mathematics?

Knowledge/Skills/Understandings	Assessments	Learning Experiences	Resources
A. Problem Solving	Note - Since Everyday Mathematics is a spiraling program, NJ standard 4.5 occurs throughout daily lessons. Additional resources that are used in conjunction with the program are listed below.		
1. Learn mathematics through problem solving, inquiry, and discovery.			
2. Solve problems that arise in mathematics and in other contexts (cf. workplace readiness standard 8.3).			Continental Mathematics League: Euclidean Grade 4
• problems			Open-ended
•			Thinker Math Grades 5-6, 1989
•			Non-routine problems Mindbenders - Deductive Thinking Skills, Anita Harnadek
•			Problems with multiple solutions Problem Parade, Dale Seymour
•			Problems that can be solved in several ways Favorite Problem, Dale Seymour
			Problem of the Month, Math Olympiads, www.moens.org
3. Select and apply a variety of appropriate problem-solving strategies (e.g., "try a simpler problem" or "make a diagram") to solve problems.			Elementary and Middle School Mathematics, John A. Van de Walle, Fifth Edition, 2004
4. Pose problems of various types and levels of difficulty.			Get It Together, Tim Erickson, 1989
			Tiguous, Constance Kamii
5. Monitor their progress and reflect on the process of their problem solving activity.			SET - www.setgame.com
			Frameworks - First 4 Standards - Grades 5-6
B. Communication			
1. Use communication to organize and clarify their			Continental Mathematics League: Euclidean

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mathematical thinking.

- Reading and writing
- Discussion, listening, and questioning

Grade 4

Thinker Math Grades 5-6, 1989

Problem of the Month, Math Olympiads,

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2. Communicate their mathematical thinking coherently and clearly to peers, teachers, and others, both orally and in writing.

3. Analyze and evaluate the mathematical thinking and strategies of others.

4. Use the language of mathematics to express mathematical ideas precisely.

C. Connections

1. Recognize recurring themes across mathematical domains (e.g., patterns in number, algebra, and geometry).

2. Use connections among mathematical ideas to explain concepts (e.g., two linear equations have a unique solution because the lines they represent intersect at a single point).

3. Recognize that mathematics is used in a variety of contexts outside of mathematics.

4. Apply mathematics in practical situations and in other disciplines.

5. Trace the development of mathematical concepts over time and across cultures (cf. world languages and social studies standards).

6. Understand how mathematical ideas interconnect and build on one another to produce a coherent whole.

www.moens.org

Get It Together, Tim Erickson, 1989

Writing in Math Class Grades 2-8, Marilyn Burns

Classroom Discussions Grades 1-6, Suzanne H.

Chapin, et al., 2003

Frameworks - First 4 Standards - Grades 5-6

Math Connections Linking Manipulatives and Critical Thinking, Joyce Glatzer, 1997

Everyday Mathematics Project 3 - An Ancient Multiplication Algorithm

Everyday Mathematics Master p. 43

Frameworks - First 4 Standards - Grades 5-6

Mindbenders - Deductive Thinking Skills, Anita Harnadek

Problem Parade, Dale Seymour

Favorite Problem, Dale Seymour

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D. Reasoning

1. Recognize that mathematical facts, procedures, and claims must be justified.

2. Use reasoning to support their mathematical conclusions and problem solutions.

3. Select and use various types of reasoning and methods of proof.

4. Rely on reasoning, rather than answer keys, teachers, or peers, to check the correctness of their problem solutions.

5. Make and investigate mathematical conjectures.

- Counterexamples as a means of disproving conjectures
- Verifying conjectures using informal reasoning or proofs.

6. Evaluate examples of mathematical reasoning and determine whether they are valid.

E. Representations

1. Create and use representations to organize, record, and communicate mathematical ideas.

- Concrete representations (e.g., base-ten blocks or algebra tiles)
- Pictorial representations (e.g., diagrams, charts, or tables)
- Symbolic representations (e.g., a formula)
- Graphical representations (e.g., a line graph)

SET - www.setgame.com

Continental Mathematics League: Euclidean
Grade 4
Thinker Math Grades 5-6, 1989

Problem of the Month, Math Olympiads,
www.moens.org
Frameworks - First 4 Standards - Grades 5-6

Mindbenders - Deductive Thinking Skills, Anita Haradek
Problem Parade, Dale Seymour
Frameworks - First Four Standards Grade 5-6

Fraction Factory (out of print)

2. Select, apply, and translate among mathematical representations to solve problems.

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3. Use representations to model and interpret physical, social, and mathematical phenomena.

F. Technology

1. Use technology to gather, analyze, and communicate mathematical information.

2. Use computer spreadsheets, software, and graphing utilities to organize and display quantitative information (cf. workplace readiness standard 8.4-D).

3. Use graphing calculators and computer software to investigate properties of functions and their graphs.

4. Use calculators as problem-solving tools (e.g., to explore patterns, to validate solutions).

5. Use computer software to make and verify conjectures about geometric objects.

6. Use computer-based laboratory technology for mathematical applications in the sciences (cf. science standards).

Illuminations

Math Arena

SET - www.setgame.com

Navigation Series

Tessellmania

mathsolutions.com

Elementary and Middle School Mathematics,
John A. Van de Walle

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**5th Grade Gifted and Talented
Pacing Guide**

Unit	Number of Days (approximate)	Unit	Number of Days (approximate)
1 - Data & Landmarks (include histograms)	15	6 - Number Systems & Algebra Concepts	14
2 - Operations with Whole Numbers & Decimals (division included)	20	5 - Geometry	15
Metric/Customary Measurement	8	3-D Geometry	7
3 - Variables, Formulas, & Graphs (Algebra, Number Properties, Order of Operations, adding integers)	20	8 - Rates & Ratios	13
4 - Rational Number Uses & Operations (Fractions)	20	7 - Probability	5
Mid-Term	1	9 - Variables, Formulas, & Graphs (more)	10
Hands on Equations	15	Final	1

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Grade: 5th Gifted and Talented Topic 4.1 Number and Numerical Operations

Essential Question: How can problems in the real world be solved with mathematics?

How can estimation be useful to us?

How do numbers help us reason out solutions to problems?

How do basic operations help us understand numbers?

Knowledge/Skills/Understandings	Assessments	Learning Experiences	Resources
A. Number Sense			
1. Use real-life experiences, physical materials, and technology to construct meanings for numbers (unless otherwise noted, all indicators for grade 6 pertain to these sets of numbers as well).	<i>Everyday Mathematics</i> Assessments 2 4 6 and 9 Teacher made tests/quizzes White Boards Student sharing Exit Slips	Direct Instruction * collaborative learning * Written explanations Land Fractions Open Ended Tinkerplots SketchPad Everyday Math Game CMLs Menu of Problems Cuisenaire Rods	<i>A Collection of Math Lessons</i> , Marilyn Burns <i>Problem Parade</i> Doug Monteath & Don Volle Continental Math League monthly problems <i>Mathematics Teaching in Middle School</i> <i>Middle School with Pizzazz</i> ; "Mathematics Teaching in Middle School" (May 1997)
<ul style="list-style-type: none"> • All integers 			Van de Walle books <i>Everyday Math</i> Books 1 and 2 Hand on Equations <i>About Teaching Mathematics</i> , Marilyn Burns <i>Developing Number Sense Series</i> ,
<ul style="list-style-type: none"> • All fractions as part of a whole, as subset of a set, as a location on a number line, and as divisions of whole numbers 			
<ul style="list-style-type: none"> • All decimals 			
<ul style="list-style-type: none"> • Percents 			
<ul style="list-style-type: none"> • Whole numbers with exponents 			

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2. Recognize the decimal nature of United States currency and compute with money.
3. Demonstrate a sense of the relative magnitudes of numbers.
4. Explore the use of ratios and proportions in a variety of situations.
5. Understand and use whole-number percents between 1 and 100 in a variety of situations.
6. Use whole numbers, fractions, and decimals to represent equivalent forms of the same number.
7. Develop and apply number theory concepts in problem solving situations.
8. Demonstrate a sense of relative magnitudes of numbers
9. Compare and order numbers of all types.
10. Understand that all fractions can be represented as repeating or terminating decimals.
11. Understand and use ratios, proportions, and percents in a variety of situations.
 - Primes, factors, multiples
 - Common multiples, common factors
- 12.** Compare and order numbers.

B. Numerical Operations

1. Recognize the appropriate use of each arithmetic operation in problem situations.

2. Construct, use, and explain procedures for performing calculations with fractions and decimals with:

- Pencil-and-paper
- Mental math
- Calculator

3. Use an efficient and accurate pencil-and-paper procedure for division of a 3-digit number by a 2-digit number.

4. Select pencil-and-paper, mental math, or a calculator as the appropriate computational method in a given situation depending on the context and numbers.

5. Find squares and cubes of numbers.

6. Check the reasonableness of results of computations.

7. Understand and use the various relationships among operations and properties of operations.

8. Understand and apply the standard algebraic order of operations for the four basic operations, including appropriate use of

parentheses.

9. Use and explain procedures for performing calculations involving addition, subtraction, multiplication, division, and exponentiation with integers and all number types named above with:

- Pencil-and-paper
- Mental math
- Calculator

10. Understand and apply the standard algebraic order of operations, including appropriate use of parentheses.

C. Estimation

1. Use a variety of strategies for estimating both quantities and the results of computations.

2. Recognize when an estimate is appropriate, and understand the usefulness of an estimate as distinct from an exact answer.

3. Determine the reasonableness of an answer by estimating the result of operations.

4. Determine whether a given estimate is an overestimate or an underestimate.

5. Use equivalent representations of numbers such as fractions, decimals, and percents to facilitate estimation.

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Grade: 5th Gifted and Talented Topic 4.2 Geometry and Measurement

Essential Questions: How can knowledge of geometric properties help in problem solving situations?

How can coordinate grid systems help in understanding locations?

How does the mathematics of geometry enable us to wonder and understand our natural and physical world?

Knowledge/Skills/Understandings	Assessments	Learning Experiences	Resources
A. Geometric Properties			
1. Understand and apply concepts involving lines, angles.	Everyday Mathematics Assessments 5 & 10 Teacher made tests/quizzes White Boards Student sharing Exit Slips EM Star questions	Direct Instruction * collaborative learning * Written explanations GeoBoards Open Ended Tinkerplots SketchPad Everyday Math Game CM Ls Menu of Problems Tangrams Graphing Investigations Pi Day Land Fractions Pi Packet Slides, Flips & Turns Isometry Transformations Pattern Blocks Journaling	<i>Everyday Mathematics</i> Book 6, Unit 5 & 10 <i>Navigation through Geometry</i> Van de Walle, pages 345-385; <i>Illuminations</i> <i>NCTM Addendum Grades 5-8 Geometry</i> ; <i>Geometer's Sketchpad</i> , <i>Seeing Solids and Silhouettes</i> , Terc pages 83-95 <i>Principles and Standards for School Mathematics</i> pgs. 240-247 Van De Walle pgs. 331-336; Adapted from <i>About Teaching Mathematics</i> , Marilyn Burns
<ul style="list-style-type: none"> • Notation for line, ray, angle, line segment. • Properties of parallel, perpendicular, and intersecting lines. • Sum of the measures of the interior angles of a triangle is 180° 			

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2. Identify, describe, compare, and classify polygons and circles

- Triangles, by angles and sides.
- Quadrilaterals, including squares, rectangles, parallelograms, trapezoids, rhombi
- Polygons by number of sides
- Equilateral, equiangular, regular
- All points equidistant from a given point form a circle.

3. Identify similar figures

4. Understand and apply the concepts of congruence and symmetry (line and rotational)

5. Compare properties of cylinders, prisms, cones, pyramids, and spheres.

6. Identify, describe, and draw the faces or shadow (projections) of three-dimensional geometric objects from different perspectives.

7. Identify a three dimensional shape with given projections (top, front and side views).

8. Identify a three dimensional shape with a given net (i.e., a flat pattern that folds into a 3-d shape)

9. Understand and apply properties of polygons.

10. Understand and apply the concept of similarity.

- Using proportions to find missing measures
- Scale drawings
- Models of 3D objects

11. Use logic and reasoning to make and support conjectures about geometric objects.

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B. Transforming Shapes

1. Understand a translation, a reflection, or a rotation to map one figure onto another congruent figure.
2. Recognize , identify, and describe geometric relationships and properties as they exist in nature, art, and other real world settings

C. Coordinate Geometry

1. Create geometric shapes with specified properties in the first quadrant on a coordinate grid.
2. Use coordinates in four quadrants to represent geometric concepts.
3. Use a coordinate grid to model and quantify transformations.

D. Units of Measurement

1. Select and use appropriate units to measure angles, area, surface area, and volume.
2. Use a scale to find a distance on a map or a length on a scale drawing.
3. Convert measurement units within a system, e.g. 3 feet = ____ inches.
4. Know approximate equivalents between standard and metric
5. Use measurements and estimates to describe and compare phenomena.

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6. Solve problems requiring calculations that involve different units of measurement within a measurement system.

E. Measuring Geometric Objects

1. Use a protractor to measure angles.

2 Develop and apply strategies and formulas for finding perimeter and area.

- Triangle, square, rectangle, parallelogram, and trapezoid.
- Circumference and area of a circle

3. Develop and apply strategies and formulas for finding the surface area and volume of rectangular prisms and cylinders

4. Recognize that shapes with the same perimeter do not necessarily have the same area and vice versa.

5. Develop informal ways of approximating the measures of familiar objects (e.g., use a grid to approximate the area of the bottom of one's foot).

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Grade: 5th Gifted and Talented Topic 4.3 Patterns and Algebra

Essential Questions: How can patterns help in problem solving?

How can symbols be used to help us in problem solving?

How does the study of algebra help us understand mathematical patterns as the patterns found in nature & the real world?

Knowledge/Skills/Understandings	Assessments	Learning Experiences	Resources
A. Patterns			
1. Recognize, describe, extend, and create patterns involving whole numbers, and rational numbers and integers	Everyday Mathematics Assessments 4,6 8 &9 Teacher made tests/quizzes White Boards Student sharing Exit Slips Mental Math	Modeling/Collaborative Activity Direct Instruction * collaborative learning * Written explanations Various puzzles Open Ended Tinkerplots SketchPad Everyday Math Game CMLs Menu of Problems Cuisenaire Rods Group Investigation	<i>Everyday Mathematics unit 3, 6, 8, 9; NCTM Addendum Grades 5-8, Patterns & Functions Van de Walle pg 417-435 Chap. 18-21 22-25;</i>
<ul style="list-style-type: none"> • Descriptions using tables, verbal and symbolic rules, expressions, simple equations or graphs. 		<ul style="list-style-type: none"> Journaling Groundworks Hands on Algebra Do Nows 	<ul style="list-style-type: none"> <i>In the Balance, Creative Publications (Grades 4-6)</i> <i>Problem Parade</i> <i>About Teaching Mathematics, M. Burns, pages 112-124;</i> <i>Hands On Algebra Book III</i>
<ul style="list-style-type: none"> • Finite and infinite sequences • Formal iterative formulas 	<ul style="list-style-type: none"> • Recursive patterns, including Pascal's Triangle and the Fibonacci Sequence: 1, 1, 2, 3, 5, 8 		
<ul style="list-style-type: none"> • Generating sequences by using calculators to repeatedly apply a formula 			

B. Functions and Relationships

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1. Describe the general behavior of functions given by formulas or verbal rules

- Graph Functions

C. Modeling

1. Use patterns, relations, and linear functions to model situations.

- Using variables to represent unknown quantities
- Using concrete materials (manipulatives), tables, graphs, verbal rules, algebraic expressions/equations/inequalities

2. Draw freehand sketches of graphs that model real phenomena and use such graphs to predict and interpret graphs

- Using concrete materials (manipulatives), tables, graphs, verbal rules, algebraic expressions/equations/inequalities
- Changes over time
- Relations between quantities
- Rates of change

D. Procedures

1. Solve simple equations with manipulatives and informally.

- Whole number coefficients only, answers also whole numbers.
- Variables on one or both sides of equation

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2. Understand and apply the properties of operations and numbers

- Distributive property
- The product of a number and its reciprocal is 1

3. Evaluate numerical expressions

4. Extend understanding and the use of inequality.

- Symbols (3 , 1 , \neq)

5. Create evaluate and simplify algebraic expressions involving variables

- Order of operations
- Substitution of a number for a variable.

6. Understand and apply the properties of operations, number equations and inequalities

- Additive inverse
- Multiplicative inverse

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Grade: 5th Gifted and Talented Topic 4.4 Data Analysis, Probability, and Discrete Mathematic6

Essential Questions: How can classifying help me in organizing data to solve problems?

How can statistics help us to understand real world situations?

How can the study of real world data help us understand and make accurate predictions?

Knowledge/Skills/Understandings	Assessments	Learning Experiences	Resources
A. Data Analysis			
1 .Collect, generate, organize, and display data. • Data generated from surveys	Graph display Everyday Mathematics Assessments 1 & 7 Teacher made tests/quizzes White Boards Student sharing Exit Slips Mental Math Class Sharing Teacher Observation	Modeling/Collaborative Activity Direct Instruction * collaborative learning * Written explanations Various puzzles Open Ended Tinkerplots SketchPad Everyday Math Game CM Ls Menu of Problems Snap Cubes Group Investigation	<i>Everyday Mathematics</i> units 1 & 7 <i>Van de Walle</i> <i>Used Numbers, Dale Seymour Publications (1992); Navigations through Probability</i> <i>Math by All Means, Marilyn Burns</i> <i>NCTM Illuminations;</i> <i>Problem Parade</i>
2. Read, interpret, select, construct, analyze, generate questions about, and draw inferences from displays of data.		Journaling Groundworks Partner work/ Disease Z Do Nows Partner work/ "Tiles in the Bag" Spinner Puzzles; Shake-n-Spill Pascals Triangle	Discrete Math packet
• Bar graph, line graph, circle graph, table, histogram • Range, median, and mean		Shop-Rite Problem Game of Pig	

- Calculators and computers used to record and process information

3. Respond to questions about data, generate their own questions and hypotheses, and formulate strategies for answering their questions and testing their hypotheses.

B. Probability

1. Determine probabilities of events.

- Event, complementary event, probability of an event

- Multiplication rule for probabilities

- Probability of certain event is 1 and of impossible event is 0

- Probabilities of event and complementary event add up to 1.

2. Determine probability using intuitive, experimental, and theoretical methods (e.g., using model of picking items of different colors from a bag.

- Given numbers of various types of items in a bag, what is the probability that an item of one type will be picked

- Given data obtained experimentally, what is the likely distribution of items in the bag.

3. Explore compound events.

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4. Model situations involving probability using simulations (with spinners, dice) and theoretical models.

5. Recognize and understand the connections among the concepts of independent outcomes, picking at random, and fairness.

6. Interpret probabilities as ratios, percents, and decimals

7. Play and analyze probability-based games, and discuss the concepts of fairness and expected value.

C. Discrete Mathematics-Systematic Listing and Counting

1. Solve counting problems and justify that all possibilities have been enumerated without duplication.

- Organized lists, charts, tree diagrams, tables
- Venn Diagrams

2. Apply the multiplication principle of counting.

- Simple situations (e.g., you can make $3 \times 4 = 12$ outfits using 3 shirts and 4 skirts).
- Number of ways a specified number of items can be arranged in order (concept of permutation)
- Number of ways of selecting a slate of officers from a class

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3. List the possible combinations of two elements chosen from a given set (e.g., forming a committee of two from a group of 12 students, finding how many handshakes there will be among ten people if everyone shakes each other person's hand once).

4. Explore counting problems involving Venn diagrams with two attributes

5. Apply techniques of systematic listing, counting, and reasoning in a variety of different contexts.

D. Discrete Mathematics - Vertex - Edge - Graphs and Algorithms

1. Devise strategies for winning simple games and express those strategies as sets of diagrams.

2. Analyze vertex-edge graphs and tree diagrams.

- Can a picture or a vertex-edge graph be drawn with a single line? (degree of vertex)
- Can you get from any vertex to any other vertex? (connectedness)

3. Use vertex-edge graphs to find solutions to practical problems.

- Delivery route that stops at specified sites but involves less travel
- Shortest route from one site on a map to another.

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Grade: 5 Gifted and Talented Topic 4.5 Mathematical Processes

Big Idea: Mathematical understandings are an essential part of our lives in and out of school and as such all children need to have an instinctive sense of mathematical resources that they can rely on to help them progress through life.

**Essential Questions: How will learning to "think" mathematically enable us to make a life, make a living, and make a difference?
How does the use of technology enable us to have a deeper understanding of mathematics?**

Knowledge/Skills/Understandings	Assessments	Learning Experiences	Resources
A. Problem Solving			
1. Learn mathematics through problem solving	Exit slips Teacher observation with feedback Mental Math Reflexes Estimation Making Conjectures Showing use of efficient math strategies Effective use of technology	Various open-ended questions Monthly CM L's Monthly menu problems Portfolio evaluation Various activities Sharing problem-solving strategies Journaling; reflexive writing; class discussions Division with Fractions attachment #18 "Fat Content in Foods" "Golden Ratio"	i n q u i r y a n d d i s c o v CMLs Exemplars Teaching Children Mathematics, NCTM -Menu of Problems KSK attachments # 17a & 17b Van de Walle
2. Solve problems that arise in mathematics and in other contexts			
ery			

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Math Course
Sir Circumference

Everyday Mathematics, Unit 8 Lesson 5
Everyday Mathematics, Unit 8
Lesson 1 2
Everyday Mathematics, embedded
throughout
Hands-On Algebra, Book III
Everyday Mathematics, Unit 4 Lesson
10
About Teaching Mathematics,
M. Burns, pages 102 and 105

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- Open ended problems

Group discussion;
Examining & use student
Reference Book Strategy
Share
Student Discourse

NCTM illuminations grades 6-8
NCTM illuminations;
Navigations through Geometry
Geometer's Sketch Pad
Tinkerplots
Game of Set

- Non-routine problems

Partner work;
Journal pages;
"Graphing Garbage"
King Arthur Problem;
Prison Problem

Get-it-Together
Family Math Book
Kagan Cooperative Learning Activities
Super Source

- Problems with multiple solutions
- Problems that can be solved in several ways

3. Select and apply a variety of appropriate problem-solving strategies to solve problems.

4. Pose problems of various types and levels of difficulty

5. Monitor their progress and reflect on the process of their problem solving activity

B. Communication

1. Use communication to organize and clarify their mathematical thinking

- Reading and writing
- Discussion, listening and questioning

2. Communicate their mathematical thinking coherently and clearly to peers, teachers, and others, both orally and in writing.

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3. Analyze and evaluate the mathematical thinking and strategies of others.

4. Use the language of mathematics to express mathematical ideas precisely.

C. Connections

1. Recognize recurring themes across mathematical domains (e.g., two linear equations have a unique solution because the lines they represent intersect at a single point).

2. Use connections among mathematical ideas to explain concepts (e.g., two linear equations have a unique solution because the lines they represent intersect at a single point).

3. Recognize that mathematics is used in a variety of contexts outside of mathematics.

4. Apply mathematics in practical situations and in other disciplines.

5. Trace the development of mathematical concepts over time and across cultures (cf. world languages and social studies standards).

6. Understand how mathematical ideas interconnect and build on one another to produce a coherent whole.

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D. Reasoning

1. Recognize that mathematical facts, procedures, and claims must be justified.
2. Use reasoning to support their mathematical conclusions and problem solutions.
3. Select and use various types of reasoning and methods of proof.
4. Rely on reasoning, rather than answer keys, teachers, or peers, to check the correctness of their problem solutions.
5. Make and investigate mathematical conjectures.
 - Counterexamples as a means of displaying conjectures
 - Verifying conjectures using informal reasoning or proofs.
6. Evaluate examples of mathematical reasoning and determine whether they are valid.

E. Representations

1. Create and use representations to organize, record, and communicate mathematical ideas.
 - Concrete representations (e.g., base-ten blocks or algebra tiles)

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- Pictorial representations (e.g., diagrams, charts, or tables)
- Symbolic representations (e.g., a formula)
- Graphical representations (e.g., a line graph)

2. Select, apply, and translate among mathematical representations to solve problems

3. Use representations to model and interpret physical, social, and mathematical phenomena.

F. Technology

1. Use technology to gather, analyze, and communicate mathematical information.

2. Use computer spreadsheets, software, and graphing utilities to organize and display quantitative information (cf. workplace readiness standard 8.4-D).

3. Use graphing calculators and computer software to investigate properties of functions and their graphs.

4. Use calculators as problem-solving tools (e.g., to explore patterns, to validate solutions).

5. Use computer software to make and verify conjectures about geometric objects.

6. Use computer-based laboratory technology for mathematical applications in the sciences (cf. science standards).

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CORE MATERIALS
Kindergarten

*Everyday Kindergarten Math – 3rd edition

* Developing Number Concepts: Counting, Comparing and Patterns
by Kathy Richardson

- MANIPULATIVES
- Pattern Blocks and templates
- Geoboards and rubberbands
- Unifix cubes
- Attribute Blocks
- Blank Dice; Dot Dice; Number Dice
- Large Foam Dice: Numerals and Dots
- Dominoes (double-six)
- Centimeter Cubes
- Interlocking Cubes
- Number Lines – Growing Number Line - Walk on Number Line (0-20)
- 100 Number Grid
- Number Card Decks
- Pan Balance
- Collection of Real or Play Coins
- Coin Cubes
- Standard measuring devices – ruler, yardstick, tape measure, etc.
- Thermometer for classroom
- Counters
- Craft Sticks
- Items for sorting... buttons, beads, toy animals, etc.
- Judy Clock
- Student Calculators
- Water, sand or dry bean “table”

SUPPLEMENTAL MATERIALS- Kindergarten

1. NUMBER AND NUMERICAL OPERATIONS

First Big Book of Numbers

Second Big Book of Numbers

Publisher: Rigby Education ISBN 0731200187

BOOM – game to review number names

Write numbers from 1-20 on index cards. Write 3 cards with the word BOOM. Shuffle cards. Have students line up in a line. Go down the line and show the cards. If the student identifies the number correctly they stay up. If the student identifies the number incorrectly or gets a BOOM card they sit out. The last student standing wins the game.

TEN FRAME – activity to review number sense (1-10)

Students are given a card with ten boxes on it. Five on one side, and five on the other side. Students are given a stack of 10 Unifix cubes. On the overhead the teacher shows a number set. The students look at it for 2-4 seconds. The teacher turns off the light and students reproduce the set they saw. Discuss how they knew how many were in the set. Start out with small sets of numbers and build up to 10.

NUMBER BINGO – game to review number names – School Specialty

Emily's First 100 Days of School – Rosemary Wells

Read a page (number) a day until you reach the 100th day of school

"The Counting Song"; "The Counting Cadence"

Feldman, Jean, *Kiss Your Brain*. New York: Scholastic

"Money Song"

Feldman, Jean. *Best of Dr. Jean: Science and Math*. New York: Scholastic

2. GEOMETRY AND MEASUREMENT

Go Away Big Green Monster – Ed Emberley

Review shapes. Have students create their own green monster using Construction paper shapes and glue.

DIFFERENTIATION/SPECIAL EDUCATION

*NUMBER WORLD (Project Achieve)

*SINGAPORE MATH

*PINPOINT (Intervention)

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6th Grade Supplemental Resources

Title of Resource	Author(s)	Publisher	Copyright
<i>Everyday Mathematics Book 6 – Third Edition</i>	Bell, Bretzlauf, Dillard, Hartfield, Isaacs, McBride, McCarty, Pitvorec, Saecker, Balfanz, Carroll	Wright Group	2007
<i>Algebra With Pizzazz</i>	Steve Marcy, Janis Marcy	McGraw Hill	2002
<i>Teaching Student Centered Math Grades 5-8, Vol 3</i>	John Van DeWalle, LoAnn Lovin	Pearson Education	2006
<i>Connected Mathematics - Prime Time</i>	Lappan, Fey, Fitzgerald, Friel, Phillips	Prentice Hall	2002
<i>Pre-Algebra With Pizzazz</i>	Steve Marcy, Janis Marcy	McGraw Hill	2002
<i>Middle School Math with Pizzazz- Books A-E</i>	Steve Marcy, Janis Marcy	McGraw Hill	2002
<i>New Jersey ASK Coach</i>	Jerome Kaplan Ed.D	Triumph Learning	2005
<i>Question Quest Level B</i>	Paul Lawrence	LL Teach, Inc.	2002
<i>Groundworks Series: Data and Probability, Geometry, Numbers, Algebraic Thinking</i>	Findell, Greenes, Irvin, Tsankova	Wright Group	2006
<i>TinkerPlots</i>	Clifford Konold, Craig D. Miller	Key Curriculum Press	2005
<i>8 Step Model Drawing</i>	Bob Hogan, Char Forsten	Crystal Spring Books	2007
<i>Primary Mathematics- Challenging Word Problems Grade 5 and Grade 6</i>	Joseph D. Lee	EPB Pan Pacific	2006
<i>Elementary and Middle School Mathematics 5th Edition</i>	John A. Van DeWalle	Pearson Education	2004
<i>Geometer's Sketchpad 4.07</i>	Nicholas Jackiw	Key Curriculum Press	2006
<i>Explain It!</i>	Lepore, Fleetwood, Hall	Creative Publications	2001
<i>Get It Together- Math Problems for Groups Grades 4-12</i>	Tim Erickson	Lawrence Hall of Science	1989

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6th Grade Supplemental Resources (continued)

United We Solve- Math Problems for Groups Grades 5-10	Tim Erickson	Eeps	1996
Brain Pop Subscription	www.brainpop.com		

6th Grade Algebra 1A Supplemental Resources

Title of Resource	Author(s)	Publisher	Copyright
<i>Discovering Algebra An Investigative Approach</i>	Jerald Murdock, Ellen Kamischke, Eric Kamischke	Key Curriculum Press	2002
<i>Algebra With Pizzazz</i>	Steve Marcy, Janis Marcy	McGraw Hill	2002
<i>What Do You Expect?</i>	Lappan, Fey, Fitzgerald, Friel, Phillips	Dale Seymour Publications	1998
<i>Pre-Algebra With Pizzazz</i>	Steve Marcy, Janis Marcy	McGraw Hill	2002
<i>Middle School Math with Pizzazz- Books A-E</i>	Steve Marcy, Janis Marcy	McGraw Hill	2002
<i>New Jersey ASK Coach</i>	Jerome Kaplan Ed.D	Triumph Learning	2005
<i>Question Quest Level B</i>	Paul Lawrence	LL Teach, Inc.	2002
<i>Groundworks Series: Data and Probability, Geometry, Numbers, Algebraic Thinking</i>	Findell, Greenes, Irvin, Tsankova	Wright Group	2006
TinkerPlots	Clifford Konold , Craig D. Miller	Key Curriculum Press	2005
<i>8 Step Model Drawing</i>	Bob Hogan, Char Forsten	Crystal Spring Books	2007
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Addendum to K-2 Math Curriculum

Alignment to Common Core Standards in Mathematics

The following grade level addendums describe the areas in need of greater focus as defined by the Common Core Standards for Mathematics for each grade level. A description of what students will do to demonstrate understanding is given.

Kindergarten Addendum to Curriculum

Counting & Cardinality

Children will:

- (old 4.1#1) count forward beginning from a given number within the known sequence (instead of having to begin at 1)
- (old 4.1#2) write numbers from 0 to 20. Represent a number of objects with a written numeral 0-20 (with 0 representing a count of no objects).
- (old 4.1#1) understand that the number of objects is the same regardless of their arrangement or the order in which they were counted.
- understand that each successive number name refers to a quantity that is one larger.

Comparing Numbers

Children will:

- (old 4.1#5) have opportunities to determine which group contains the most or least objects.
- Display written numerals from 1 to 10.

Operations & Algebraic Thinking

Children will:

- (old 4.1 B #1) represent addition and subtraction with mental images, drawings, verbal explanations, expressions, or equations.
- solve addition and subtraction word problems, add and subtract within 10, e.g., by using objects or drawings to represent the problem.
- (old 4.1 B #3) decompose numbers less than or equal to 10 into pairs in more than one way, e.g., by using objects or drawings, and record each decomposition by a drawing or equation (e.g., $5 = 2 + 3$ and $5 = 1 + 4$)
- for any number from 1 to 9, find the number that makes 10 when added to the given number, e.g., by using objects or drawings, and record the answer with a drawing or equation.
- fluently add and subtract within 5.

Classify Objects and Count the Number of Objects in Each Category

Children will:

- (old 4.4#2) classify objects into given categories; count the numbers of objects in each category and sort the categories by count (limiting the category counts to be less than or equal to 10)

Geometry

Children will:

- (old 4.2#2) compose simple shapes to form larger shapes. For example, “Can you join these two triangles with full sides touching to make a rectangle?”

Grade 1 Addendum to Curriculum

Operations and Algebraic Thinking 1.OA

A. Represent and solve addition and subtraction problems:

- **1.OA.1.** Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.
- **1.OA.2.** Solve word problems that call for addition of three whole numbers whose sum is less than or equal to 20, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.

B. Work with addition and subtraction equations.

- **1.OA.7.** Understand the meaning of the equal sign, and determine if equations involving addition and subtraction are true or false. *For example, which of the following equations are true and which are false? $6 = 6$, $7 = 8 - 1$, $5 + 2 = 2 + 5$, $4 + 1 = 5 + 2$.*
- **1.OA.8.** Determine the unknown whole number in an addition or subtraction equation relating three whole numbers. *For example, determine the unknown number that makes the equation true in each of the equations $8 + ? = 11$, $5 = \quad - 3$, $6 + 6 = \quad$*

C. Extend the counting sequence.

- **1.NBT.1.** Count to 120, starting at any number less than 120. In this range, read and write numerals and represent a number of objects with a written numeral.

D. Use place value understanding and properties of operations to add and subtract.

- **1.NBT.4.** Add within 100, including adding a two-digit number and a one-digit number, and adding a two-digit number and a multiple of 10, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used. Understand that in adding two-digit numbers, one adds tens and tens, ones and ones; and sometimes it is necessary to compose a ten.
- **1.NBT.5.** Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count; explain the reasoning used.
- **1.NBT.6.** Subtract multiples of 10 in the range 10-90 from multiples of 10 in the range 10-90 (positive or zero differences), **using concrete models** or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.

Measurement and Data 1.MD

A. Measure lengths indirectly and by iterating length units.

- **1.MD.1.** Order three objects by length; compare the lengths of two objects indirectly by using a third object.

B. Tell and write time.

- **1.MD.3.** Tell and write time in **hours and half-hours** using analog and digital clocks.

Geometry 1.G

A. Reason with shapes and their attributes.

- **1.G.1.** Distinguish between defining attributes (e.g., triangles are closed and three-sided) versus non-defining attributes (e.g., color, orientation, overall size); build and draw shapes to possess defining attributes.
- **1.G.2.** Compose two-dimensional shapes (rectangles, squares, trapezoids, triangles, half-circles, and quarter-circles) or three-dimensional shapes (cubes, right rectangular prisms, right circular cones, and right circular cylinders) to create a composite shape, and compose new shapes from the composite shape. [*Students do not need to learn formal names such as “right rectangular prism.” (Footnote to Common Core State Standards)*]
- **1.G.3.** Partition circles and rectangles into two and four equal shares, describe the shares using the words **halves, fourths, and quarters**, and use the phrases **half of, fourth of, and quarter of**. Describe the whole as two of, or four of the shares. Understand for these examples that decomposing into more equal shares creates smaller shares.

Grade 2 Addendum to Curriculum

Operations and Algebraic Thinking 2.OA

A. Represent and solve problems involving addition and subtraction.

- **2.OA.1.** Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with **unknowns in all positions**, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.

B. Work with equal groups of objects to gain foundations for multiplication

- **2.OA.3.** Determine whether a group of objects (up to 20) has an odd or even number of members, e.g., by pairing objects or counting them by 2s; write an equation to express an even number as a sum of two equal addends.
- **2.OA.4.** Use addition to find the total number of objects arranged in rectangular arrays with up to 5 rows and up to 5 columns; write an equation to express the total as a sum of equal addends.

Number and Operations in Base Ten 2.NBT

- A. **2.NBT.1.** Understand that the three digits of a three-digit number represent amounts of hundreds, tens, and ones; e.g., 706 equals 7 hundreds, 0 tens, and 6 ones.
- B. **2.NBT.3.** Read and write numbers to 1000 using base-ten numerals, number names, and expanded form.
- C. **2.NBT.4.** Compare two three-digit numbers based on meanings of the hundreds, tens, and ones digits, using $>$, $=$, and $<$ symbols to record the results of comparisons.
- D. **2.NBT.6.** Add up to four two-digit numbers using strategies based on place value and properties of operations.
- E. **2.NBT.7.** Add and subtract within 1000, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method. Understand that in adding or subtracting three-digit numbers, one adds or subtracts hundreds and hundreds, tens and tens, ones and ones; and sometimes it is necessary to compose or decompose tens or hundreds.
- F. **2.NBT.9.** Explain why addition and subtraction strategies work, using place value and the properties of operations. [*Explanations may be supported by drawings or objects.*]

Measurement and Data 2.MD

- A. **2.MD.1.** Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes. (Less emphasis on capacity)
- B. **2.MD.5.** Use addition and subtraction within 100 to solve word problems involving lengths that are given in the same units, e.g., by using drawings (such as drawings of rulers) and equations with a symbol for the unknown number to represent the problem.
- C. **2.MD.6.** Represent whole numbers as lengths from 0 on a number line diagram with equally spaced points corresponding to the numbers 0, 1, 2, ..., and represent whole-number sums and differences within 100 on a number line diagram.
- D. **2.MD.7.** Tell and write time from analog and digital clocks to the nearest five minutes, using a.m. and p.m. (Omit Project #8)
- E. **2.MD.8.** Solve word problems involving dollar bills, quarters, dimes, nickels, and pennies, using \$ and ¢ symbols appropriately. *Example: If you have 2 dimes and 3 pennies, how many cents do you have?*
- F. **2.MD.9.** Generate measurement data by measuring lengths of several objects to the nearest whole unit, or by making repeated measurements of the same object. Show the measurements by making a line plot, where the horizontal scale is marked off in whole-number units.

** Remove all probability, discrete math and venn diagrams – moved to upper grades

Geometry 2.G

- A. **2.G.1.** Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces. [*Sizes are compared directly or visually, not compared by measuring.*] Identify triangles, quadrilaterals, pentagons, hexagons, and cubes. (Cubes are the only 3-D shape discussed)
- B. Perimeter is postponed to grade 3 but KEEP area and multiplication model
- C. **2.G.3.** Partition circles and rectangles into two, three, or four equal shares, describe the shares using the words *halves*, *thirds*, *half of*, *a third of*, etc., and describe the whole as two halves, three thirds, four fourths. Recognize that equal shares of identical wholes need not have the same shape.

Geometry is used to show multiplication and fractions; ie. The number of rows and columns (area), and fraction of whole.